Politecnico di Torino

Department of Structural, Geotechnical and Building Engineering (DISEG)

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Seismic Vulnerability of Existing Buildings

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Acknowledgment

I wish to express my profound appreciation to my sophisticated supervisors, without their informative guidance, this thesis would not be accomplished.

And I would like to dedicate this thesis to my Mother, who has always supported and encouraged me to achieve academic excellence.

Abstract

This thesis addresses the earthquake phenomenon and its predicaments that can cause a catastrophic incident, and our means for these predicaments reach the buildings.

The thesis first goes for the originality of this phenomenon and classifies its roots based on its nature and human induced actions that may help to its occurrence. After a comprehensive recognition of this matter, it is time for finding an illuminated knowledge about our vulnerability to the earthquake.

There are several types of vulnerabilities in the base of various types of structures about this phenomenon and the thesis specified its concentration on the current hazards which reach the buildings, and all warned cases that can be result into the damage are complied.

After reaching a clear view of our buildings' weaken points, the thesis goes for demonstrating all strong and practical strategies for strengthening and retrofitting the buildings against those existing weaknesses.

At the end, by investigation a real case study as an abandoned residential house which should be renovated for its new functionality, our study based on its previous collected theorical research could testify the applicable strategies for reaching the optimum seismic resistance for our case in comparison with its past built condition.

CONTEXT

Chapter 1

The Occurrence of the Earthquake

How does an earthquake occur?

Earthquakes are nothing but a sudden and intense trembling of the ground or its surface which happens due to an energetic blow of the earth crust. It is a natural phenomenon, which is due to various reasons in the inside of the earth or is also triggered as a result of different activities done by human beings. These causes can generally be classified as natural and human-made causes of earthquakes.

Earthquakes that happen because of things that naturally occur on our planet have their roots in the activities doing that are going within the Earth's surface and the way the plates that constitute the Earth's crust are moved. Whenever the tectonic movements that bring about tectonic plate or faulting form – where huge sections of this surface experience the phenomenon of shifting against one another and creating the most powerful earthquakes. The friction between these plates usually can become so great at or near faults; thus, it happens that eventually one of them gives in to pressure and this leads to an earthquake being felt by all. Similarly, there is volcanic activity where magma moves within the crust creating an upward pressure thus rupturing the lands – on which the crust resides causing tremors as Volcanoes erupt causing surface movement such that there may be vibrations in nearby areas such that people within a certain distance would feel it while furniture shakes about. In addition, many other factors could trigger shaking such as when there is ice on top of it melts away creating a change of weight on top of it or when something drops down onto another with force creating momentum for both parts involved.[1]

The causes that involve human action play a crucial role in the alteration of the outer and inner layers of the planet. Extracting minerals from the underground, specifically tactics involving breaking rocks and excavating dirt, are capable of inducing small earthquakes in neighboring regions when they change the structure of existing rocks. On one hand, the addition of large water bodies behind dams leads to a rise in water pressure in neighboring rocks that might cause minor disturbances in them, this is referred to as reservoir-induced seismicity. The different processes used in the process of extracting oil and natural gas, drilling holes to exploit hot rocks for geothermal energy purposes and carrying out very deep detonations of nuclear weapons underground can cause changes in the pressure conditions of rocks in the earth's crust, this can record the beginning of small earthquakes or even very extensive geological activities along the plate boundaries. Another factor is the construction sector; big construction works such as the construction of tunnels and bridges have the possibility of inducing seismic activities through changing pressure zones within the earth due to heavy construction, heavy-duty vehicles, or other large structures or modifications; those changes could lead to adjustment and hence, mild earthquakes that either depend on the extent of the operations or accumulated changes in the crust.

When examining various damaging movements of plates of the earth's crust, one must acknowledge the major factors that have contributed, either directly or indirectly, to these movements. Although activities caused by these may be small and localized in their occurrence, the causes, such as volcanic eruptions or movement of tectonic plates, result in devastating incidents. These earthquake-producing factors can produce shock waves with enough vigor to sap a city's foundation.[2]

Thus, the study of causes and mechanisms of earthquakes remains the study of the changing effects under the supervision of such an unsteady and changing planet we rely on to support life as it was once represented. A greater understanding of these processes and the effects of earthquakes can be expected to develop better systems.

Natural Causes

Tectonic Plate Movements

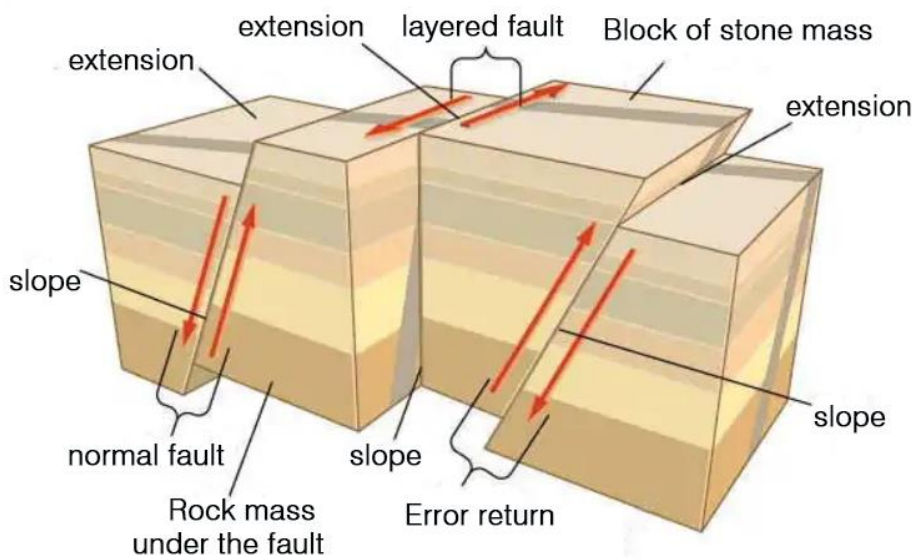


Figure 1 – tectonic plate movement

The Earth's surface is made up of tectonic plates that are floating on the semi-fluid mantle beneath them. These plates are always in motion and are usually driven by several means such as mantle convection, slab pull, and ridge push. When the plates are moving, they interact with one another at their boundaries, and the stress and pressure created there become more and larger over time. When the strength of the rocks on these boundaries is overcome, the accumulated stress is rapidly released thus generating seismic waves or unpredictable earthquakes can occur. Of all types of boundaries, the type of boundary, and the plates interacting at the boundary decide the morbidness, and efficiency of an earthquake. In the way of gaining the knowledge of earthquakes, seismic hazards will be reduced, and hence the environment will be safe. Tectonic plate interactions primarily take place at three types of boundaries: convergent, divergent, and transform. There is a unique seismic activity at each type of boundary. At convergent boundaries also called collision zones, two tectonic plates are directed towards each other that frequently result in either subduction or continental crash. In the zones of subduction, for example, those in the Ring of Fire, an oceanic plate converges with a continental plate and the denser oceanic plate is borne below the lighter continental plate into the mantle. This is the reason for the huge stress which leads to energy release in the form of earthquakes sometimes followed by tsunamis due to water displacement. Earthquakes in subduction zones can be shallow but there are times with some even reaching up to 700 km deep. In collision zones, two continental plates intersect, but none of them is globed due to the same density. The circumstances then become such that the crust is being disturbed and that is the reason why earthquakes occur. Earthquakes are, however, shallow but still powerful as the plates are rubbing against one another.

Contrarily, a divergent boundary (or also a constructive margin) is a situation where a pair of tectonic plates are going farther from each other. Those kinds of boundaries usually happen in the middle of the oceans or in the case of continents where the magma is filling the remaining gap between them, therefore the new rock layer is formed. Because the release of stress causes the separation of the crust, the magnitudes of earthquakes are mostly small at the divergent ridges. They are still causing earthquakes, though they are generally not dense and powerful, because of the cracking and the stretching of the crust. The crack causes earthquakes to mostly move at a depth of fewer than 30 km. Despite this, they can be quite damaging to the areas hit directly. A principle that proves this form of the boundary is the so-called Mid-Atlantic Ridge the place where the Eurasian and the North American plates are moving apart. There is no exception in the case of the volcanic character of those cracks where the uprising of parts of the mantle material becomes quite normal. The magma, during the upward movement through the joints of the fractured crust, generates new layers of the oceanic crust.[3]

Transform boundaries, where two plates are moving beside each other in a sidewise manner, can be recognized through friction that arises due to the relative motion of the rocks along the fault lines. The continuous build-up of energy is the prelude of the earthquake. One of the most famous transform boundaries is the San Andreas Fault in California formed as the Pacific Plate moves alongside the North American Plate. Normally, the earthquakes that arise from transform plate boundaries are shallow and occur at a depth of less than 20 km. In spite of their small magnitude, those earthquakes can be quite dangerous because they are situated so close to the Earth's surface. The earthquakes at these transform boundaries are usually in groups of several motions in the form of small releases of energy after the accumulation of stress is reached.[4]

The shifting of the tectonic plates is motivated by some major powers. Mantle convections happen when heat from the Earth's inner core forms convection currents in the mantle. The upward moving hot material drags the covering tectonic plates, while the colder material descends, it also moves the plate. In subduction zones, slab pull is formed after a heavy oceanic plate falls into the mantle, thus, the whole plate moves due to the former. At divergent boundaries, ridge push arises when the young crust that is being developed at the mid-ocean ridges becomes higher because of the temperature difference. The gravity-induced elevation of the crust causes it to slip down the ridge, and therefore pushing the plates away from each other. Moreover, frictional resistance on the plate boundaries standpoint is another factor as the friction between the plates gives stress to increase over time. As stress reaches the extent of the frictional resistance, the plates slide, and, as a result, cause an earthquake.

Figure 2 - Tōhoku Earthquake (2011 ,Japan): Magnitude 9.0, caused by the subduction of the Pacific Plate under the North American Plate

The tension at the plate boundaries is the main factor that sets off an earthquake. It is the energy stored that causes faults to deform elastically by rocks. The energy gets stored first when the stress overcomes the rocks strength. That is when the rocks move back, and the seismic waves are then released. These processes are the root causes of most tectonic earthquakes. Following a major earthquake, the crust is still adjusting to the new stress conditions, which sometimes results in aftershocks, which are smaller secondary earthquakes that can last for days or even months. Multiple factors because of which earthquakes can vary significantly. The fault coinage is one of the most important factors as longer faults have more energy capability, which results in larger earthquakes. Furthermore, earthquake depth also plays a role in the damage the earthquake caused. Shallow earthquakes are more damaging as they are closer to the surface which leads to more intense shaking and damage, while the deeper ones are less dangerous. Related to it, the boundary type is another determinant since convergent boundaries usually generate larger and deeper earthquakes as compared to transform and divergent boundaries. To sum it up, earthquakes are caused by the tectonic plates moving hard against and under each other. The activities like the movements of the mantle such as the mantle convection, solid environment pull, and ridge push are what cause the strength of the stress to get built up along the fault. Additionally, stress is finally relieved in the form of seismic waves that imply earthquakes whose impact may vary based on the type of boundary. So, people must master the mechanism in order to evaluate earthquake risks and make preparedness and mitigation strategies better.[5]

Fault lines

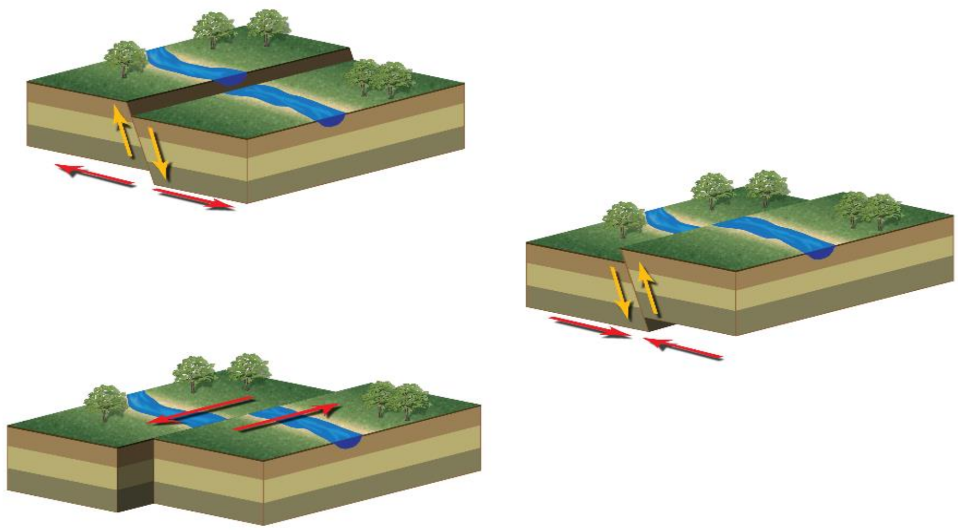


Figure 3 – fault lines

Fault lines are fracturing of the earth's crust where rocks on one side move compared to those on the other because of tectonic force like compression, tension, and shear stress. Movements like these can lead to earthquakes when the fault line builds up stress and eventually the friction that holds rocks together is exceeded, and that results in an energy release. The understanding of the formation, behavior, and the mechanics of fault lines is considered to be the most important factor in predicting earthquakes and preventing their impact.

Faults are caused by the stress which is caused by tectonic plate motions as the Earth's lithosphere is subdivided into plates which come into contact at the boundaries of one another. When the crust can no longer hold the transfer of the stress, then it becomes a fault. Faults happen in the breakable vault where movement occurs, instead of bending, and are usually but not exclusively along the plate boundaries but they can also result in the interior of plates because of the local stress. The three main categories of faults—normal, reverse, and strike-slip—take their names from the direction in which the fault plane moves. Normal faults develop as a result of the crust being pulled apart by tensional forces and the hanging wall moving downward relative to the footwall. These types of faults may usually be found in divergent plate boundaries such as the mid-ocean ridges and continental rift zones. On the contrary, in the case of reverse faults, or thrust faults, they occur due to compression, which makes the hanging wall move upward relative to the footwall and are prevalent subduction zones and continental collision zones. Strike-slip faults are a result of shear stress, which is the process where two blocks slide past each other horizontally and it in many cases results in heavy earthquakes, e.g., the San Andreas Fault.[6]

Faults are hardly ever present as a single entity; rather, they are commonly occurring features of large zones of fractures where the latter are interlinked. The size, length, and complexity of these faults are the major factors that stem earthquakes. Longer fault lines are responsible for stronger earthquakes, since the greater the stress release from them. How deep a fault goes also determines how widespread the earthquake is, where deep faults produce earthquakes that are able to affect larger regions, but cause less surface damage than shallow ones. A few faults remain locked for long periods, till stress builds up to such an extent that a major earthquake happens, whereas some faults do not move much over time and therefore the risk of large seismic events is lower. At times, more than one fault segment may rupture and in one go, a situation evidenced from the 2016 Kaikōura earthquake in New Zealand.

Figure 4 - Kaikōura earthquake (2016 ,New Zealand)

The elastic rebound theory is the method through which engineers explain the mechanics of fault movement and earthquakes. It explains how stress develops due to the tectonic forces along a fault. The rocks located on both sides of the fault move along with the other ones and store the collected energy due to the fault to the point where it snaps and seismic waves are released that result in the formation of an earthquake. They then, however, still get back to their natural position but backlash appears besides the new permanent displacement. The key dissimilarity in fault behavior is friction since too much friction will not allow a fault to move and will accumulate stress until it ramps up into a stronger earthquake, while low friction faults will cause a soft, but significant seismic event. [7]

Improvements in technology have resulted in better fault line monitoring and earthquake prediction. Seismographs pick up ground shaking and fault motion while GPS and radar from satellites calculate deformation and find areas of stress accumulation. Paleoseismology empowers scientists to investigate the history of the fault by concerning the instance of long term earthquake movements. As a result of this, the researchers are able to study the fault lines closely and hence they get the ability to predict earthquake risks, develop early warning systems and also improve the resilience of the infrastructure.

Fault lines are common weak points in the Earth's crust, but through consistent scientific research and technological improvements, the effects of fault lines can be mitigated which underline the changing nature of our planet.[8]

Volcanic Activity

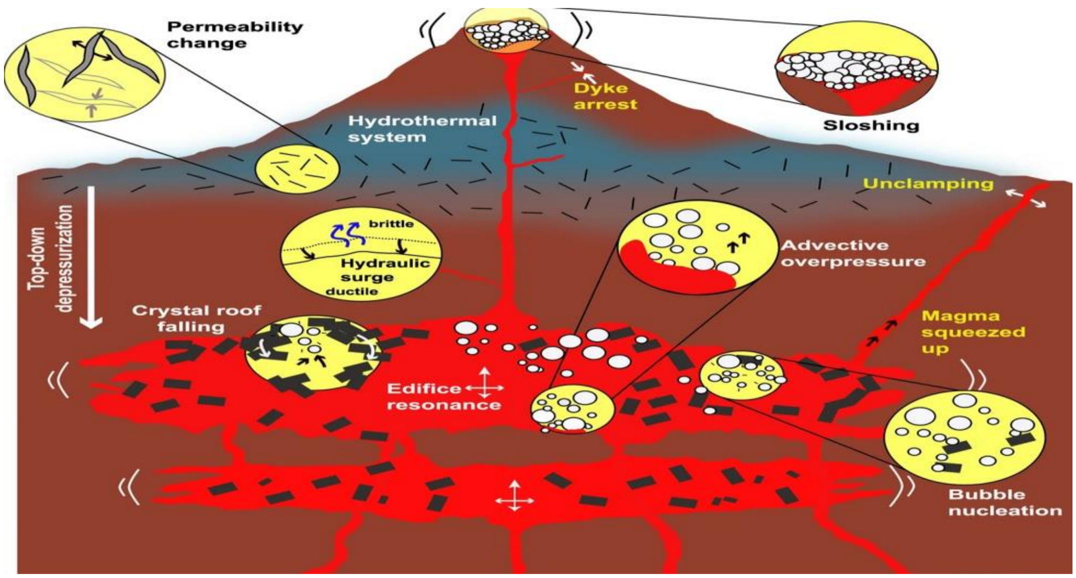


Figure 5 – volcanic activity

Volcanic eruptions are one of the natural forces causing earthquakes. They are directly linked to the flow of magma, volcanic eruptions and the structural reformation of the Earth's crust around the volcanic regions. The volcanic quakes are infrequent when compared to the tectonic earthquakes but in spite of that, they still can cause quite a big damage mainly when they occur at a time when the eruptive events are coinciding with them.

Volcanic activity and earthquakes have a complex geological relationship because of the interplay between fault movements, pressure variations, and magma dynamics. Determining the understanding of these systems is crucial for monitoring volcanic regions and predicting potential of existing hazards.
Numerous seismic events of various types, varying in form and intensity, are known to be triggered by volcanic activity. There are several types of volcanic seismic events, each with its own distinct and specific causes and relationships to other volcanic processes.

One type of volcanic earthquake is a volcano-tectonic earthquake which comes due to the fracturing of rocks as magma moves through the crust of the Earth. The magma rises and falls which brings pressure against the surrounding rocks, and thus the rock walls of the volcano crack. This area of broken rock is a release of stress along faults, producing seismic waves, which in turn make the whole thing shake. In general, volcano-tectonic earthquakes are small to medium in small to moderate-sized earthquakes which can occur before, during, or have magma leaking into the crust. A striking case of this type of earthquake happened before the 1980 eruption of Mount St. Helens. A swarm of volcano-tectonic earthquakes occurred due to magma intrusion.[9]

Other kinds are those of the long-period (LP) earthquake that is due to the movement of magma and gases inside volcanic conduits. When magma is on the move, it brings with it the oscillation of pressure inside cracks and voids that results in the production of low-frequency seismic waves. These quakes used to be less severe and less frequent than most volcano-tectonic earthquakes; they are often also considered as advanced warnings before an eruption, as they indicate an increased volcanic activity. An example of this is the fact that LP earthquakes can be found a month before the 1991 Mount Pinatubo eruption in the Philippines.Another kind of volcanic earthquake is the harmonic tremors characterized by rhythmic, continuous seismic signals that are caused by the extrusion of magma. This kind of seismic activity occurs when the lava, as it moves through the tiny veins, releases shock-waves that can be seen as seismic signals. They are indeed low-frequency, long-lasting signatures which usually indicate immediate volcanic eruption. The harmonic tremors were one of the primary signals that the 2010 eruption of Eyjafjallajökull was going to happen as they were the starting point.

Moreover, they are the earthquakes that happen during the explosive volcanic eruptions. They happen because of the rapid atop of the pressure during the eruption and the shockwaves from below travel through the earth the same as the seismic waves. This type is generally short-lived; however, it can be very strong, usually bringing along the ash clouds, pyroclastic flows, and other volcanic hazards. The earthquake is quite fatal and damaging, as mostly can be detected through many explosive eruption’s occurrences.

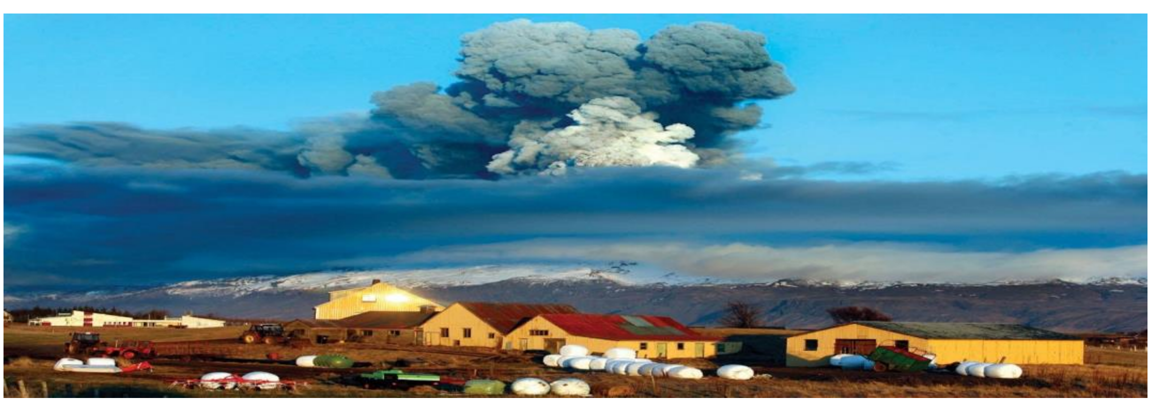


Figure 6 - Eyjafjallajökull (2010, Iceland)

Mechanisms that are responsible for volcanic earthquakes are connected with several processes within the volcano. One of the important factors is the intrusion of magma, which involves the movement of magma through the Earth's crust, thus, it causes the pressure of the surrounding rocks. This stress can cause the development of fractures, like dikes and sills, which are the producers of seismic waves as they penetrate the rock layers.

The volcanic eruptions themselves also cause seismic activity, due to the instant release of gases and magma during the eruption which makes the shockwaves and are then leading to explosive earthquakes. The process of eruption can also bring about the structural collapse of the volcano, that can cause landslides, or caldera collapses which are the ones that trigger extra seismic events.[10]

Another aspect of volcanoes is not only the intrusion of magma and eruptions that gives a significant role to the development of earthquakes to the volcanos is the deformation of the crust. The existence of magma at depth under the ground may lead uplift, and the depression of a magma chamber after an eruption can cause subsidence, which often leads to earthquakes. Yet, a further element is hydrothermal activity, in which, the combination of the magma with the subsurface water systems causes the talking of steam and the development of pressure, that is then, the hydrothermal explosions and the following of seismic activity release.

Volcanic earthquakes forecasts for their occurrence as well as the quantification of potential hazards may be carried out by the application of several techniques. The seismometers are the devices that are sensitive enough to detect and register even the small ground movements that are not caused by the earthquakes, enabling the iii of the tectonic from that of the volcanic earthquakes. Meanwhile, the addition of ground deformation monitoring using GPS and satellite-based methods will alarm the geologists about the burglaries. Gas emission monitoring, especially the measurement of sulfur dioxide, also an increased activity at a volcano and adding the possibility of earthquakes. Infrared cameras are used to observe the changes in surface temperature, which often are associated with volcanic earthquakes.

The earthquake resulting from volcanic activity can be extremely serious. The former one might include the loss of the infrastructure such as buildings, roads and utilities, when the earthquake activity occurs far from populated areas. The seismic process may also disperse the landslides thus making it possible the compounds will become the victims of the catastrophe. The earthquakes occurring near the coasts are the sources of gigantic waves that are responsible for the tsunamis. An example of that is in 1883, when the earthquake, associated with the eruption of Krakatoa caused the waves. Earthquakes that are linked to volcanoes are earthquakes that are most of the time followed by volcanic eruptions making a direct threat to the communities nearby. Therefore, in the study and research of volcanic hazards, it is fundamentally important to become familiar with the stability characteristics of these types of earthquakes and their interconnected risks.[11]

Isostatic Rebound

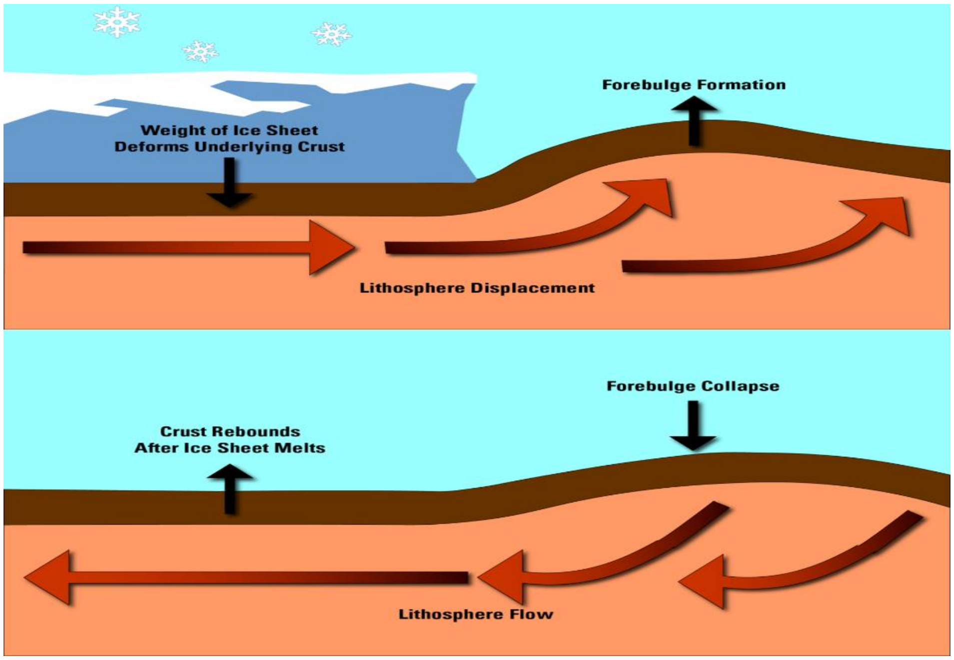


Figure 7 – isostatic rebound

Post-glacial rebound, also known as isostatic, rebound or crustal uplift, is an earth science process that makes the earth’s crust to go up or lower in response to changes in the loading of the surface material. This phenomenon is very common when growing masses, such as glaciers, ice sheets, or big water bodies, are added to or removed from the earth's surface. In the meantime, those heavy loads that fell off sent the crust, which was previously compressed, upwards or “rebounded”. This is because of the decrease in pressure caused by the overloading. In this case, there is a relatively high probability of the crust’s activities, such as their shift resulting from tectonic readjustments, containing stress and fractures making them earthquakes. Isostatic rebound becomes most noticeable in areas which are the post-glacial. These areas used to be covered by glaciers during the last Ice Age and are the territory of such countries as Scandinavia, Canada, and parts of the United States.

Various stages are typical of the mechanics of isostatic rebound. It all starts with the period of glaciation when the huge weight of glaciers and ice sheets causes the Earth's crust to be pressed and getting lower... Somewhere among or even below the mantle. Therefore, the mantle material has to fly away, and therefore, the bulge is created in the surrounding regions nearer to the margin of the ice sheet. Consequently, the ice melting leads to the disappearance of the weight, and thus the crust is uplifted once more, with a subsequent rise to the surface. The upper part of the mantle material farther away is the one which returns all the material back and the one that got away from there. All this process of stress redistribution inside the crust happens and if the stress exceeds the strength of rocks, it does not cause little else but the faulting and seismic activity. In general, this uplift is a very slow process which could last up to even a few thousand years. Moreover, the rate of rebound can be different according to some essential variables like the viscosity of the mantle and the thickness of the crust.[12]

Isostatic rebound-caused earthquakes are those that occur as stress redistribution within the crust of the Earth progresses. This activation of stress is a process composed of different familiar faces. As the crust lifts, the faults that already exist in the lithosphere may be reactivated due to the changing stress fields. The reduction of overburden pressure will let the faults slip, thus immediately causing earthquakes. Some areas experiencing great uplift may find that the crust splinters apart in order that the increase in elevation could be accommodated, which leads to localized seismic events. Simultaneously, the reflow of the mantle material into the previously compressed areas might generate additional stress in the lithosphere, and hence the deep-seated earthquakes can be triggered. Moreover, melting ice sheets can lead to changes in groundwater distribution that influence pore pressure in the crust, and this may as well encourage fault slippage and further seismic activity.

The main part of the Earth, Isostatic Rebound, is where the most places on the Earth are located that experience isostatic rebound. Scandinavia, especially Sweden and Finland, is one of the most studied regions of post-glacial rebound where elevation changes at a rate of up to 9 millimeters per year are still taking place, leading to some earthquakes. In North America, the areas around Hudson Bay and the Great Lakes are also undergoing crustal move upward due to the melting of the melted Laurentide Ice Sheet, and in this process, earthquakes in these regions are often linked to the ongoing crustal adjustments. Regions such as Antarctica and Greenland will experience the melting of the ice sheet which, because of climate change, will in turn lead to an expected increased rate of isostatic rebound, including more seismic events as more ice continues to melt away.[13]

Figure 8 - Sudbury Earthquake (2019, Ontario, Canada) A magnitude 4.1 earthquake in Ontario was attributed to post-glacial rebound in the region

In order to achieve the implementation of isostatic rebound it needs to be cautious together with the technologies to come. Geo, geo and climate data need to be combined to monitor and have a prediction of earthquakes caused by isostatic rebound. Geodesy involves the uses of such instruments as GPS devices and satellite systems InSAR which contribute to the spying the ground uplift or crustal deformation in those regions isostatic rebound being experienced. Seismic monitoring provisions make use of seismometers to track and identify the earthquakes occurring in the areas besides analyzing the patterns of seismicity that may be linked with the rebound process. The climate change projections are crucial to the assessment of the future ice melt rates which is also involved in the isostatic rebound and the associated seismic risks mainly in rapidly melting regions such as Greenland and Antarctica.

The effects of earthquakes due to isostatic rebound can be far-reaching both for the environment and human activities. Earthquakes even of moderate magnitude can cause infrastructure damage, especially where preparation for seismic activities is taken lightly. Routes to be affected by the uplift-induced earthquake may thus become suboptimal over time because the slopes get destabilized by the uplift and landslides and other geohazards may arise. On another aspect, the crustal adjustments are often associated with the isostatic rebound will course the hydrological systems to be changed by say the migration of water from one area to the other or through the ecosystem disturbance. Put simply, isostatic rebound is a slow and continuous process that accounts for the occurrence of seismic activities especially in regions previously dominated by glaciers. The knowledge and monitoring of this phenomenon are a must for the prevention of its human and environmental impact.[14]

Landslide

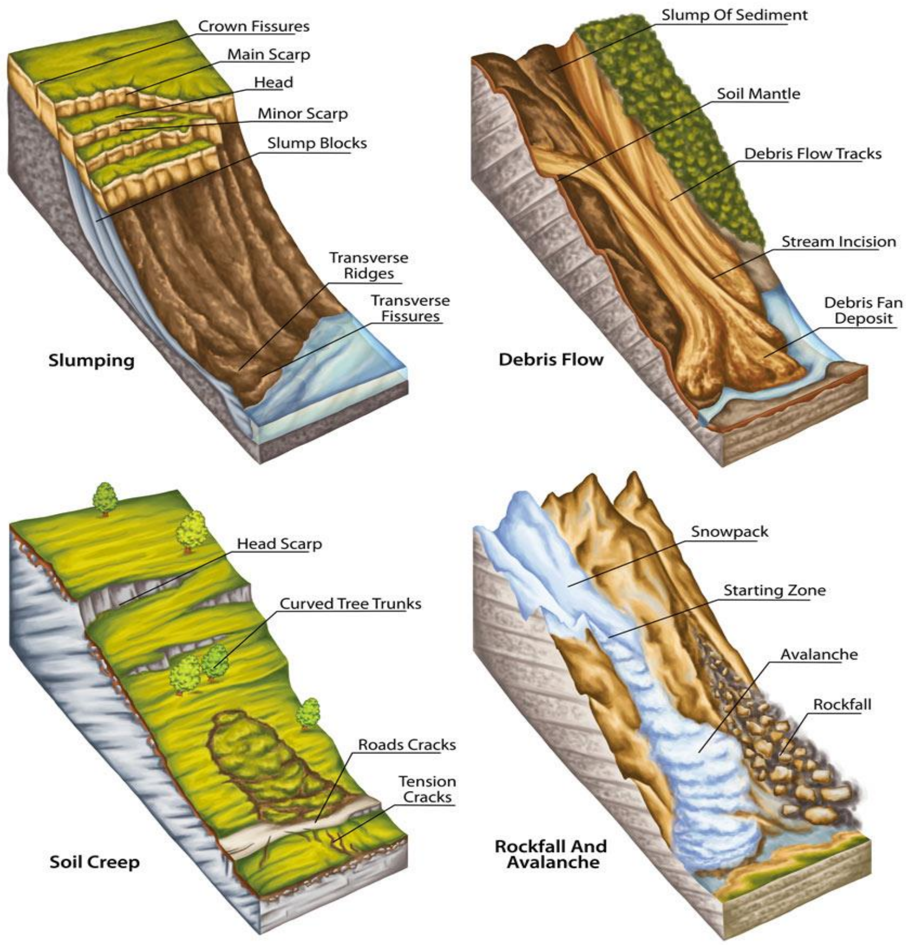


Figure 9 - landslide

Landslides involve moving down of rock, soil and debris along a slope under the gravity operation. Nevertheless, land-sliding is usually caused by heavy rainfall, erosion, volcanic activity, or human-introduced changes; it can also be a trigger of earthquakes. The sudden displacement of a large volume of the material releasing significant energy can be accompanied by the seismic waves that are the characteristics of tectonic earthquakes. Despite their lower frequency, earthquake-triggering landslides can have catastrophic effects, mainly in the mountainous or geologically unstable regions. In connection with the understanding of the relation between landslides and earthquakes is the analysis of the leading conditions of these phenomena and the way landslides create seismic activity by using mechanisms.

Landslides are responsible for the generation of earthquakes through a series of interrelated processes. Having said that, big landslides release the suddenly displaced material, which is energy that turns into seismic waves and goes into the ground. The intensity of the shaking depends on the mass and speed of the landfall. Whenever massive rocks or soil fragments are moving rapidly in a downward direction, their resounding effect on the ground gives rise to vibrations that move through the Earth, which cause point seismic events. Areas (caves or mines) where there are underground cavities, such as caves or abandoned mines, that may collapse due to landslides, are the ones that are subjected to waves. This can happen in karst regions where the dissolution of limestone created by wetlands results in large voids. Water saturation from heavy rain may change the stress in subsurface materials, which could cause small seismic incidents. Sudden addition of water in permeable materials could alter the pressure balance between the fluids and solids which would reduce the strength and lead to further instability.

In addition, the movement of rocks, soil, and debris are responsible for the landslide hazard areas aggravation and enlargement, thereby the overall surface load and localized responses to the landslide event are influenced. That movement involves a minimum of three major components, namely dislocation, distortion, and rotation, all of which are characteristics of a landslide along with their separated characteristic parts, i.e., the head and toe. However, the resulting surface deformation in the soil is proportional to the displacement of rocks during landslides. [15]

The slope's stability is also greatly influenced by the weather affecting the soil's strength: and it specifically decreases when the soil is wet but increases when the soil is dry. Lack of fertilizer use can also result in unreliable soils that do not bind very well and can easily be carried away by water or wind. Consequently, the emphasis of animals, via their activity, must continuously be considered as being one of the major impacts on soil deformation along with other environmental factors. For this reason, the strength of the interface between the soil mass and the bedrock depends Continuous monitoring and analysis of the landslide activity process, such as likelihood and intensity of the earthquake resulting from landslide, are the determining factors behind these catastrophic agents. The force and speed of the landslide lead to the release of additional energy and thus stronger seismic waves. Steeper slopes, especially the mountainous areas consisting of loose and/or fractured rock, are more susceptible to mass movement and vibration. The formation of fault lines, the presence of weak rock layers, or the existence of heavily weathered materials all lead to increased chances of landslides causing earthquakes. The geographical location of the tectonic activity as well as mining, deforestation, construction activities, and reservoir-induced landslides are related to ground instability and thus the earthquake risk. Such actions as changes in the inclination and clearing of the vegetation lead to the deformation of the slope, so that enormous collapses become a matter of the day.[15]

Feature advancements through technology pave the way when the subject is poised to get one step closer to being monitored where landslide-triggered earthquakes are concerned. This allows for the detection of seismic waves by measuring the ground vibrations and identifying those due to landslides from the tectonic ones on the basis of a unique frequency pattern analysis. In this way, satellite radar systems show addition to the once-affect ground deformation that enables such as the development of landslides to be detected in the far-off places. The usage of tech equipment like GPS and inclinometers is done in measuring the movement of the sloping space and deformation as well as in forecasting the landslide activity and its seismic potential. Modern data processing techniques, such as advanced algorithms, which are used in the analysis of statistical variance in the data, mining, synthesizing seismic data as part of forecasting an earthquake. Of great significance can the outcomes of landslide-induced earthquakes be. With the worst-hit being construction work and infrastructure, the ground shaking may lead to the destruction of buildings, roads, bridges, and even outsourcing of the areas with the poorest seismic designs. Some of the landslides, which occur in close proximity to water bodies or sometimes right in a water body, can generate a wave called tsunami.

Such a peculiar occurrence was witnessed in the Hingsbyen village in Greenland in 2017, when a gigantic rock slid into the sea abruptly and a landslide-induced tsunami swallowed the entire coastal village. Induced at amplitudes in which it becomes fatal, and unpreparedness is at a high position on the grave list, the passage of the landslides accompanied by earthquakes could be deadly almost everywhere. What is also accomplished by them is the reverse of the surface of the landscape, the deviating of the course of rivers, and the uprising of ecosystems. Landslides with their associated earthquakes can contribute to additional events like flooding or more slope failures.[16]

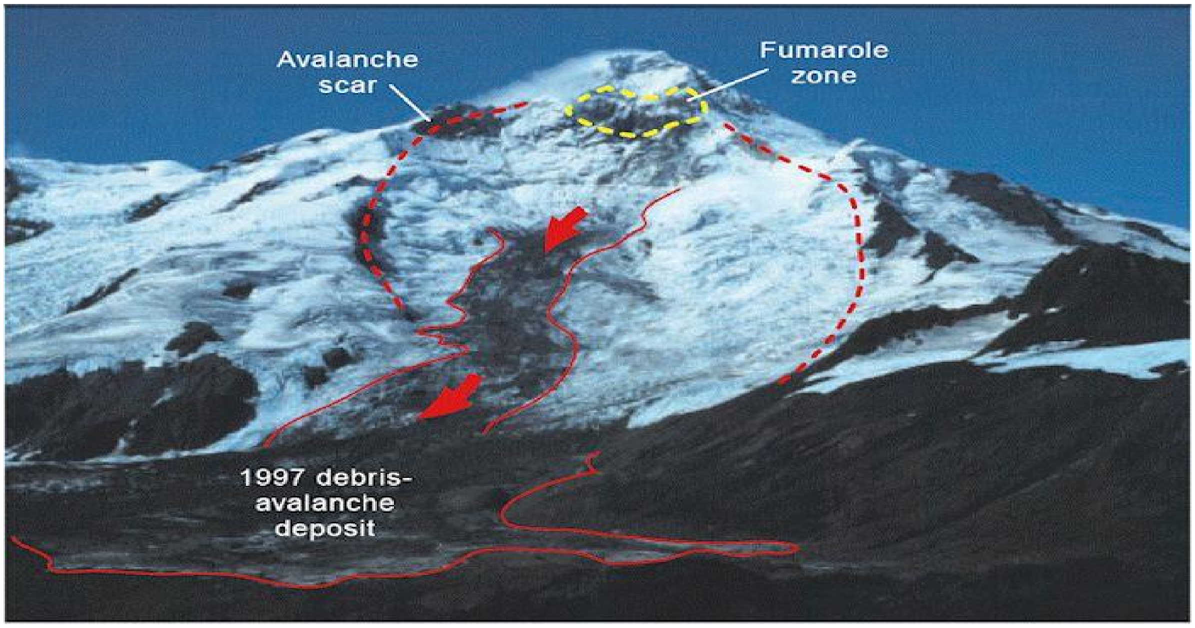


Figure 10 - Mount Iliamna Rockfall (2015, Alaskaa)

To avoid the risk caused by landslides which create earthquakes, a proactive approach should be taken. Building alternatives like retaining walls, drainage systems, and slope reinforcement enhance the staying power of the place, while restoring vegetation helps reduce the erosion of the land. The best prevention of construction in landslide-prone areas is the first step towards minimizing risks, which should be supplemented by the zoning regulations accommodating the geological hazards. As regards the real-time monitoring systems, they are incorporated with seismometers, weather stations, and remote sensing in order to provide early alerts for landslide activity and potential seismic events. Public awareness campaigns are the choice for citizens' education about risks related to landslides and earthquakes, while training programs are the tools to prepare them for responding to emergencies.[16]

Landslides are a grave natural hazard that can come about through the rapid energy release and ground vibration and cause earthquakes. While the tectonic earthquakes contribute the most to the geological forces that result in landslide-induced seismic activity, this type of earthquakes can also be very destructive, more so in areas with steep slopes, unstable terrain, or human interference. Devices with multiform operations such as monitoring, detection, and reduction interventions are major breakthroughs in the effective management of these dangers. Through the combination of scientific research with community resilience, we will be able to minimize the impact of landslide-induced earthquakes on people and improve resistance to these multi-faceted natural disasters.

Meteor Impacts and Earthquakes

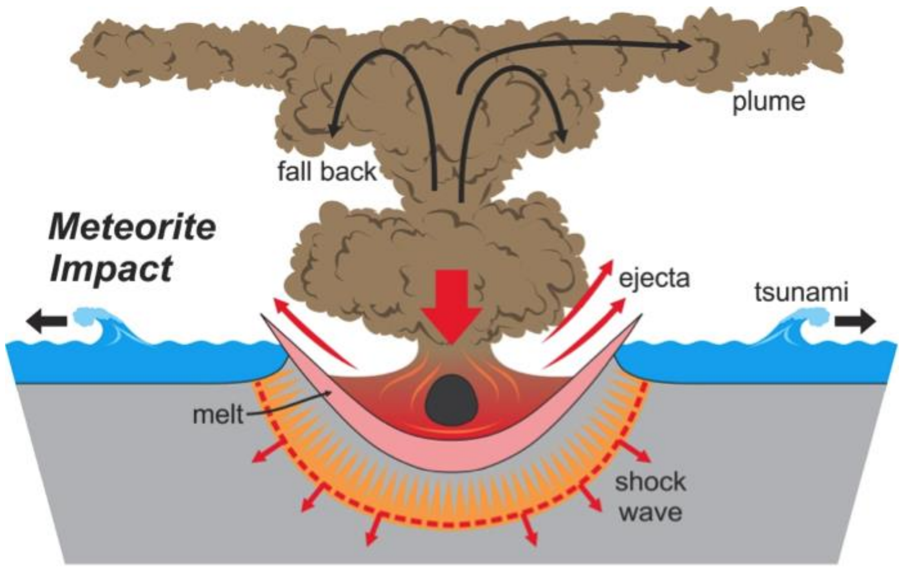


Figure 11 - Meteor Impacts

Meteor impacts are the most dramatic and extreme events on Earth. They cause the energy release that is so huge at the time of hitting the ground. A meteorite gets into the atmosphere and falls on the ground, the former generates seismic waves the same as one of the latter, yet the two have very different compositions. Among the rare cases of impact-induced earthquakes, those that can cause great damage can be determined by the meteor's size, velocity, and energy. The transfer of kinetic energy from the impact occurs due to the pressure of the ground, which sends out shockwaves in a certain direction and, thus, the ground breaks up, creating holes while other changes, such as seismic activity, may also appear. The amount of energy released is directly proportional to the speed and mass of the meteor, wherein, the gravitational pull of the celestial body and the inertia are the reasons for shock upon impact. The shock wave of the cleavers occurs as compressional and sheer waves, and meanwhile, the surface waves radiate thus, leading to the collapse of the structures at the impact site. Moreover, the high force the meteorite has creates cracks, the next step is the exploitation of these cracks to create other faults and fissures to ... earthquake effects to reach a higher point, leading to landslides, volcanic eruptions, or the... of the fault lines.[17]

Tectonic earthquakes take their origin from the movement of the fault and then move asymmetrically in different directions while impact-induced earthquakes exhibit radial symmetry with respect to the center of the impact. The first strike is usually more powerful, although it is quicker, and the distribution of seismic energy is different from the process of earthquakes due to plate movements. The meteor is likely to create signs on the surface such as creating craters and ejecta deposits which is not possible for tectonic activity. Not only they cause buildings to collapse and infra structural damages, but also are the major causes of death. Apart from it, the effects of the latter in the sea are more dangerous in that they may bring out huge tidal waves that could destroy coastal areas. Environmental changes can be of various kinds due to the fact that the impacts can disturb the ecosystems, revise the landscapes, and launch the dust and the aerosols into the atmosphere thus, ultimately affecting the global climate patterns.[17][18]

Figure 12 - Chelyabinsk Meteor (Russia, 2013) - The Chelyabinsk meteor created an airburst explosion equivalent to 500 kilotons of TNT, generating seismic waves recorded around the world

Understanding and reducing such threats depend on the detection and tracking of seismicity caused by meteor impacts. The seismic waves that the meteors released were recorded by a group of seismometers. Because of their unique characteristics, scientists are able to differentiate them from tectonic events. The satellites are watching the world over with the help of trackers primed with optical and infrared sensors. Infrasound monitoring systems also lend a hand in airburst events by detecting low-frequency sound waves. The monitoring organizations across the globe evaluate seismic data so they can assess the risks of the impact and also can improve the response strategies. Raising measures that focus on space protection of the Earth from colliding objects is one of the ways to mitigate the problem. With organizations such as NASA and ESA already scouting along with manned missions to space to identify potential threats, space activity is getting more and more popular in recent years. Research into asteroidal deflection strategies, such as the use of gravitational tugs and kinetic impactors, is one way to try to resolve this goal and avoid future collisions. Public education and scientific modeling are also provided in the emergency response planning domains to aid in readiness.[18]

The algorithm researchers' working group was created at the time of the decision about the world’s fastly centre meteor impact-induced earthquakes and it showed that it is an essential issue because it has a huge negative effect on the world. Scientists, through probing the past devastating events and updating the environmental observation systems will add to the forecasting of the future and in making preventive measures that minimize the destructive power of the disasters. Indeed, the scarcity of such events should not make us underestimate their importance because the implications of a catastrophic impact can be global in scale. Preparedness that includes research, early warning and response measures should be the top priority for planetary system defense which ensures human beings to be in a better position to be able to respond to the strongest powers of nature.[19]

Human Induced

Mining Activities

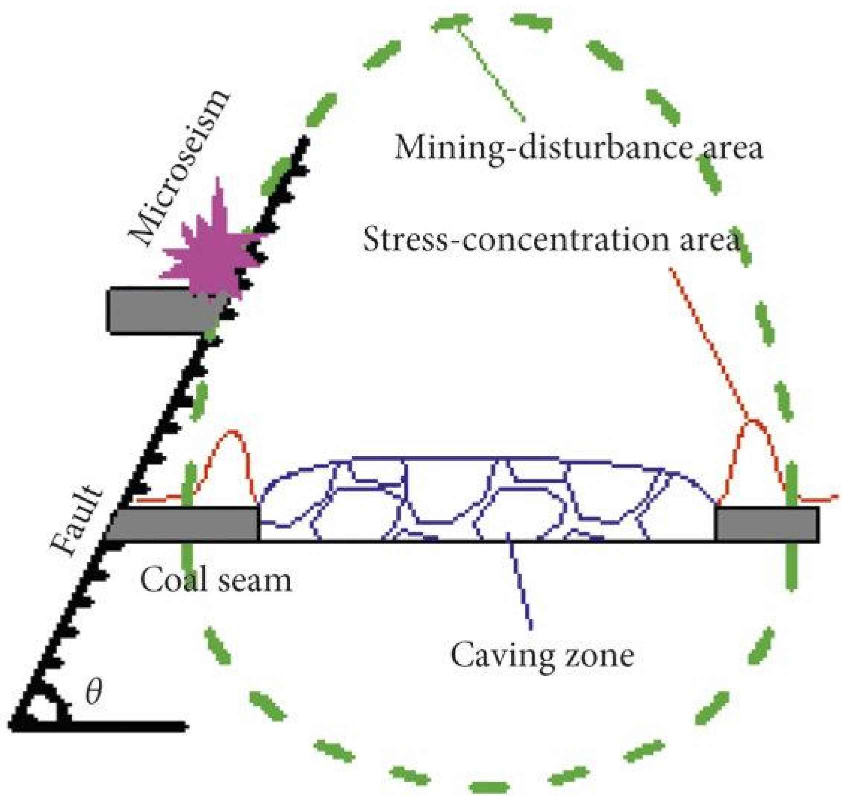


Figure 13 - Mining Activities

Mining activities, particularly the extraction of oils, gas, and minerals on a large scale, is one of the factors that can cause a shift in the lithosphere, thus, the consequent earthquakes. Hence, they happen as a result of jobs done by humans in mining, such as such activities as drilling and blasting that cause the earth's crust to shift. This writing is one of the best-rated rewriters from hand-writers.com who are known for recreating original thoughts.

Mining operations cause earthquakes through the release of stress by affecting the stress balance in the crust of the Earth. The explanation of the fractures from the rock as voids are created from the excavated portion is valuable to the understanding of seismic event capacity. The process of stress release is profoundly avoidable in underground mining, where space work done through digging increases the cracks in rock and this causes the overburdening to crash down. These fractures and collapses can lead to damage to the rock's structure. Through the years the combination of all of these can set off mine roof or walls to collapse thus creating regional tremors. Worst-case scenarios can result in the collapse of entire tunnel or shaft systems that lead to very strong earthquakes. Underground mining's main problem is the support of the upper layers of rock with the use of pillars, but when these pillars are broken down due to too intense seismic activities or wrong excavation design, they will very suddenly release energy that will cause earthquakes at very alarming rates in any mine especially the older ones that have weakened pillars. Furthermore, loading water, chemicals, or other substances to the ground during mining such as hydraulic fracturing results in pore pressure nearing rock formations, i.e. a decrease in the fault's grounding frictional force and subsequently, earthquakes can occur. Consequently, the subtraction of fluids or gases from the bedrock induces subsidence and stress changes, which then alter seismicity. These continuous cuts and injections is the cause of subsidence, the phenomenon that further leads to sustain involuntary seismic activities.[20]

The relationship of whether the mines are deeper with the method of mining also has an impact on the triggering of seismicity, as self-stress in the Earth's crust increases with the increasing depth of the mines. Large quantities of removal in the operational process often will disrupt natural stress balance that could lead to earthquakes or the like. Geology is another aspect that has an influence on seismicity rate. Quoting mining in the sites with already-presented faults and fractures is almost a guaranteed earthquake occupied, a mineral type of sort of human task that may cause earth ijuns earthquakes. Even in such cases, hard rocks become more often subject to seismicity, because these have more elastic energy to the stars. The mining approaches like room-and-pillar, longwall mining, and open-pit mining also correlate with the rock structure, which in turn, has a lot to do with the stability of the spaces around it. The blasting or fluid injection methods in these techniques tend to have a seismic activity advantage over less invasive methods. Also, mining near the fault zones is far more threatening than others, since even tiny movements can set the affected fault in motion, leading to tectonic slip.

One of the main consequences of mining-induced earthquakes will be life and property loss of different magnitude, location, and infrastructure. The results of the earthquake on the ground can be seen by the damage to mine tunnels, shafts, and support structures that are used to endanger the workers, and they can stop working. However, other types of destruction can be applied, such as the damage of the nearby buildings, roads, and bridges, especially in the regions with older or useless constructions. The earthquake dead caused by seismic events might be the mining victims who were either trapped or killed as in the case of the Poland earthquake in 2016 which resulted in several deaths. The environment bears the brunt of the penalties may involve the subsidence that interrupts ecosystems, changes watercourses, and damage of farmed land due to which other issues some of the radioactivity from the uranium tailings and the brain may cause environmental issues Rehabilitation may be expensive and mining-induced earthquakes may cause social disruption during the recovery of the economy loss. Also, companies suffer from marketing hardships. Such disasters may also affect the activities of the companies in the area and hence affect the revenue of the households which depend on mining jobs. The inhabitants of this locality usually live in anxiety and unhappy situations, since seismic activity is associated with heavy losses, the value of properties in the area decreases.[21]

Figure 14 - Poland's Copper Mine (2016, Poland)a magnitude 4.4 earthquake in Poland's copper mining region caused fatalities and significant structural damage

To mitigate the risks of mining-induced earthquakes that are provoked by ground control problems, monitoring and mitigation measures should be implemented. Local seismic networks are strategically placed in mining areas to allow for the detection and analysis of seismic activity in real time with the help of seismometers, which can reveal the patterns of induced seismicity and give early warnings for potential hazardous events. The use of advanced modeling and simulation tools would allow the evaluation of the stability of rock formations and prediction of the stress redistribution that occurs during mining operations. Meanwhile, regular inspections and testing will take care of the safety and support of the mine structures. Minimizing the size and the frequency of blasting operations helps the reduction of the likelihood of inducing large seismic events, the precision techniques such as microseismic blasting minimize ground vibrations and associated risks. Controlling pore pressure through fluid injection/extraction regulation is crucial in minimizing the risk of injection to earthquake triggering during the mining process, and it can be suspended, in some cases, as the fluid is taken back in response to a high increase in the number of earthquakes. The application of the mining techniques which diminishes stress concentrations, for example, optimized pillar spacing and support systems will improve the overall stability. Along the same line, planning the operation to stay away from fault zones and other geologically unstable areas will result in a decrease in the risk of induced seismicity.

Mining-induced earthquakes are the real problem in the mining industry and for the people residing in or near the mining sites. Even though these events are of a smaller magnitude than tectonic earthquakes and are short in duration, they can still cause considerable damage, especially in areas with a large underground mining activity. The correlation between the mining-induced seismicity processes and the monitoring and mitigation approach, if effectively pursued, can bring about virtue in risk reduction, and worker and community safety will as a result be secured. The process of mining is intrinsically tied with the massive increase in demand for raw materials and societal evolution, which make it a key part of the technological revolution is and has been for centuries.[22]

Reservoir-Induced Seismicity

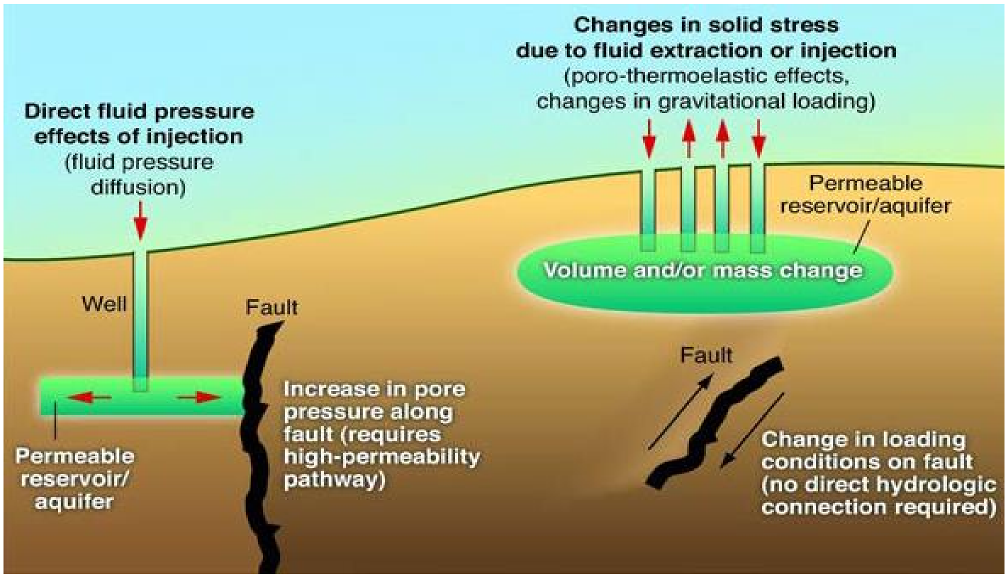


Figure 15 – reservoir activity

significant earthquakes, which in turn have raised concerns about the safety of surrounding communities and infrastructure. This is the synthesis of the topic in the areas of geophysics and engineering because it talks about the enhancement of natural seismic processes through man-made activities. One of the key aspects to being addressed in this area is understanding its mechanisms and risks in order to create safe reservoirs and reduce potential hazards.

The construction of a reservoir results in several changes in the crust of the Earth. Large amounts of water that are stored exert pressure and thus add reserves which may lead to the failure of the fault and slippage. The pressure of the water depends on the depth and the volume of the reservoir; a greater depth reservoir increases the risk. Water can also flow through the bedrock, thereby increasing pore pressure, which resides within fractures and causes the faults to reduce their stress, that in turn makes them slip easily-- a process known as fault lubrication. The transfer of stress is one of the effects of water levels going up and down, and it affects seismic activity especially in areas with potential faults present. The temperature fluctuations caused by the water-borne water might provide the energy to compensatory or inversely metamorphose rock, which leads to stress redistribution. It is also estimated that continuous saturation of rock and soil underneath a reservoir may bring about a weakening of structural integrity through subsidence, ground failure, or reactivation of dormant faults.[23]

One of the critical variances between the seismicity induced by reservoirs and squares (or can be natural tectonic earthquakes) is the location of the epicenter and the nature of the seismic waves. In other words, traditionally, it is not the case that earthquakes occur on a regular basis. Normally, earthquakes are expected to take place very soon after the reservoir is filled or during the changes in the water level of the reservoir. These are sought after and are usually found in the 10-20 km range around the reservoir location. Moreover, such earthquakes can take place at relatively shallow depths within the upper 10–15 km of the crust. However, the majority of RIS events do not generate high magnitudes; however, some reservoirs have indeed caused notable earthquakes of over 6.0. The damage can vary, and it depends on factors such as the size of the water body, geological conditions, and the position of the pre-existing faults.[24]

Figure 16 - Zipingpu Dam, (2008, China), located near the epicenter of the 2008 Wenchuan Earthquake (magnitude 7.9), has been linked to increased seismic activity in the region

Multiple factors that affect the possibility and scale of RIS. Bigger and deeper reservoirs cause higher pressure on the crust and thus increase the stress and also pore pressure fluctuations. The condition of the ground that is underneath the reservoirs is the most important factor, whereby the reservoirs that are near the pre-existing faults or are in the fractured and porous rock formations are more prone to RIS. Besides, the speed of the filling the reservoir is also crucial for the safety—fast filling is usually accompanied by changes in stress and pore pressure, which in turn means the risk can be increased, whereas gradual filling helps in reducing the seismic activity. Moreover, regular or large fluctuations in the water levels repeatedly transfer stress, which could lead to earthquakes; therefore, it is important to maintain the water level stably so that RIS can be lessened.

The results of RIS can be noticeable, with the impacts on infrastructure, communities, and the environment. Damages that can be caused by the ground shaking are the cracking and disruption of the dams, spillways and other key infrastructure elements that lie in the downstream insurgency. Nearby buildings, roads, and bridges may also be thought to be non-resistant. In some instances, the major earthquakes owing to RIS have caused the deaths of many people, for example in the 1967 Koyna earthquake, which led to the death of various people. Environmental damage can involve landslides, erosion, sedimentation, and also the changes in the flow of groundwater, all of which have the capability of affecting the stability of the reservoir and the ecosystems nearby. The economic loss in connection with RIS is not at all small and includes the mending of the broken infrastructure as well as the disturbances in the operations of the reservoir, which again would destroy the water supply, irrigation, and hydropower generation.[25]

Managing RIS entails comprehensive designing, analyzing, developing and engineering for the solution. It is of utmost importance that the proper location of the site is chosen, since it may influence the likelihood of RIS if it is located in an area with minimal seismic activity and will also show the fault lines, which are under the places we must choose our sites. Seismic networks developed from seismometer data will monitor the changes in pressure and fractures, also possibly leading to seismic events. Similarly, reservoir management staff could be alerted to the problem before the event of large Earthquakes by deploying a related economic policy through a Sophisticated Smart Grid (SSG). Such strategies as gradual water level increases and better management of a dam reservoir will enhance the seismic resistance and lead to the overall decrease of the stress accumulated. Engineers could also come up with ideas like planning further expansion of the dams only if they are planned to withstand a potential earthquake, which could be induced by reservoirs, as well as the technique of understandable qualitative analysis. Besides designing and planning earthquake-resilient dam structures, reinforcement of weak structures presents an additional opportunity for improving safety. One of the most important aspects of safety when confronted with the possibility of earthquakes that may be induced by a reservoir is the public's awareness and preparedness. To educate communities about RIS and to execute emergency response plans will increase the ability to stay resilient against possible seismic events.

Reservoir-induced seismicity is an example of how we humans unfortunately may cause geological disasters by ignoring nature's warnings. Despite its rarity, there are still some earthquakes that it has potential to induce- quakes which can vary in size and intensity and therefore they have to be critically looked after in the critical stages of both reservoir design and management. The keys to the successful and sustainable operation and development of the reservoir system must be found by studying the major stresses causing the phenomenon and implementing the corrective measures and their monitoring systems with the assistance of the concerned business institutions. The main technical solutions to the problem of the non-natural but human-induced earthquake that, if it occurs, will ruin the reservoir are the following. The innovative methods to investigate the processes of hazardous earthquakes during hydropower plant functioning and developing supportive standards and recommendation for renewable energy projects like hydropower are the possible resolvers of this issue. If we find out the base reasons for the occurrences.[26]

Oil and Gas Extraction

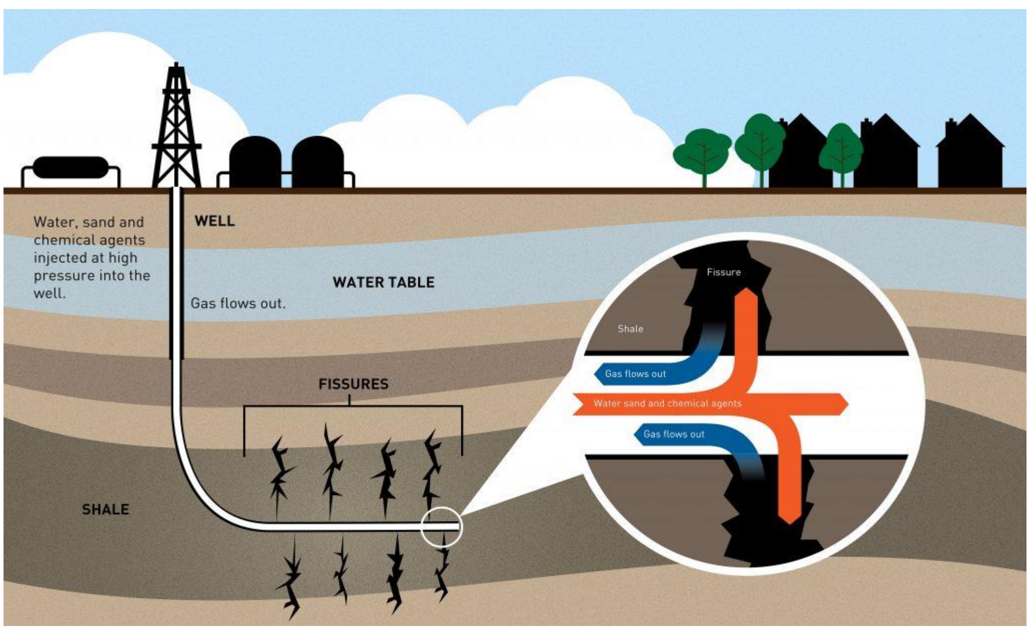


Figure 17 – oil extraction

The disturbance in the Earth's crust caused by various extraction activities like disturbances involve fluid injection and wastewater disposal, hydraulic fracturing, reservoir depletion and enhanced oil recovery techniques. The growing frequency of such events has raised concerns about their environmental, infrastructure, and social impacts, making it crucial to understand their underlying mechanisms to manage risks and ensure sustainable oil and gas operations.

Maybe the most significant aspect is that the wastewater injection is one of the leading causes in the induced seismicity by injecting it into safely engineered earth formations at depth. This wastewater, a byproduct of oil and gas extraction, increases pore pressure within rock formations, reducing friction along fault planes. Earthquakes occur when the frictional force between rock formations is overcome, and they slip along the fault. In Oklahoma, for instance, a surge in seismic activity over the past two decades has been linked to wastewater disposal from oil and gas operations which further confirms this truth. One more example is hydraulic fracturing, often called fracking, which can also generate induced seismicity. Fracking, the technique of injecting high-pressure fluid into the subsurface to create fractures in rock formations, can lessen the amount of incidental seismicity. Nevertheless, the main reason for the increase in seismicity is the enhancement of hydrocarbon recovery by fracking operations. The latter can cause faults to move because they are unstable. Particularly, this kind of activity provokes earthquakes in places like Alberta, Canada, where shale gas extraction has caused seismic activity. Reservoir depletion and compaction also contribute to seismicity, as the removal of oil and gas reduces pressure within underground reservoirs, causing the surrounding rock layers to compact and redistribute stress. This stress redistribution can activate faults, as seen in the famous Groningen gas field in the Netherlands, where the gas extraction has been causing a series of significant seismic events. One of the additional ways that of the stress balance could be disrupted is involving the treatments of water flooding and gas injection. These methods of enhanced oil recovery might also trigger seismic events in geologically active areas.[27]

Seismicity is the natural phenomenon that occurs. The predictable proper movement of the tectonic plates results in the displacement of the earth, and thus the creation of earthquakes at the surface (University of Maryland , n.d.). Such a predictable event of the movement of the plates usually causes transformational features at different levels, the intentional effects and depth of the event, which further can affect the whole surrounding area. Seismicity is divided into three categories: tectonic, volcanic, and non-tectonic seismicity. However good the ground conditions may be, the intensity of the seismic event largely depends on the artificial vibration injected into the ground by human activities such as hydraulic fracturing, which is controlled through injection volume, time, and rate. Furthermore, how close operations are to existent faults, as well as the depth of operations, are among the factors that affect the likelihood and the magnitudes of anthropogenic earthquakes. Actually, it may cause serious damage because of the agreement of current planets are created by the closeness of the planets. Too much fluid injectance, especially when done quickly, will increase the pore pressure as well as the likelihood of seismicity. Misconceptions about this issue can be repaired by detailed insights that come from geological surveys. The depth of the area where the activities are taking place in fact has some influence on the possibility of seismic event occurrence because of the higher stress that deeper rock formations experience that could lead to them giving way. Another cause of seismicity is the extraction, or the injection done over a long period being responsible for the cumulative impact of the subsurface, thereby culminating in the increased probability of seismic events over time. These activities are usually located in and around the fault zones.[28]

Figure 18 – (2016, Panwee, USA) Seismic activity in Oklahoma has surged dramatically since the early 2000s, coinciding with an increase in wastewater injection from oil and gas operations. The largest recorded earthquake, a magnitude 5.8 event in Pawnee in 2016, was linked to wastewater disposal wells

The potential impact of man-made seismicity on infrastructure, nature, and local communities is not small. Ground shaking is such a destruction to real estate in terms of buildings, roads, pipelines, and other core infrastructure. With oil and gas facilities themselves as the main risk factor, seismic activity can also result in environmental hazards such as leaks or spills of hydrocarbons and chemicals, groundwater contamination, and long-term ecological damage. The social and economic repercussions include regulatory scrutiny, popular opposition to oil and gas developments, and monetary losses as a result of earthquake damage and mitigating measures. Additionally, operators may be subject to legal obligations and inconvenience due to the high insurance premiums for personal injury and property damage claims.

To help with induced seismicity problems and their risks, there are actually several approaches that can be utilized. A good example of that would be seismic monitoring networks located near the oil and gas operations. These networks make it possible to detect the occurrence of earth tremors and consequently operate in real-time as they will be able to immediately modify the activity or stop it completely to avert big earthquakes. Regulations on injection of fixed amounts of liquid supplied at a specific time and at constant pressure levels have proved effective in lowering seismic risk levels, as is evident in the regulatory norms of Oklahoma and Alberta. Detailed geological assessments before drilling or injecting fluids can draw attention to the fault zones and thereby reduce the possible and the size of seismic events. Technical measures such as suitable well, as well as pressure dispersion, also help to handle thus reducing the occurrence of seismic events. The community is the one that decides and so it is essential that there is a role performed by it as well as the company. Education to the communities and transparent and true communication about the potential seismic risks are the crucial indicators of developing trust and cooperation while emergency preparedness plans are an efficient reaction to the seismic phenomena from both industrial and local governments.[29]

Induced seismicity from oil and gas extraction is a perfect example of the intricate relationship between human activities and geological processes. The benefits of oil and gas development bring in a lot of income and produce a lot of energy, but the risks of earthquakes associated with them require very careful handling and mitigation. With ongoing regular monitoring and precautionary actions can make a good balance between the extraction the oil and similar products and safety against of the earthquake threats.

Geothermal Extraction

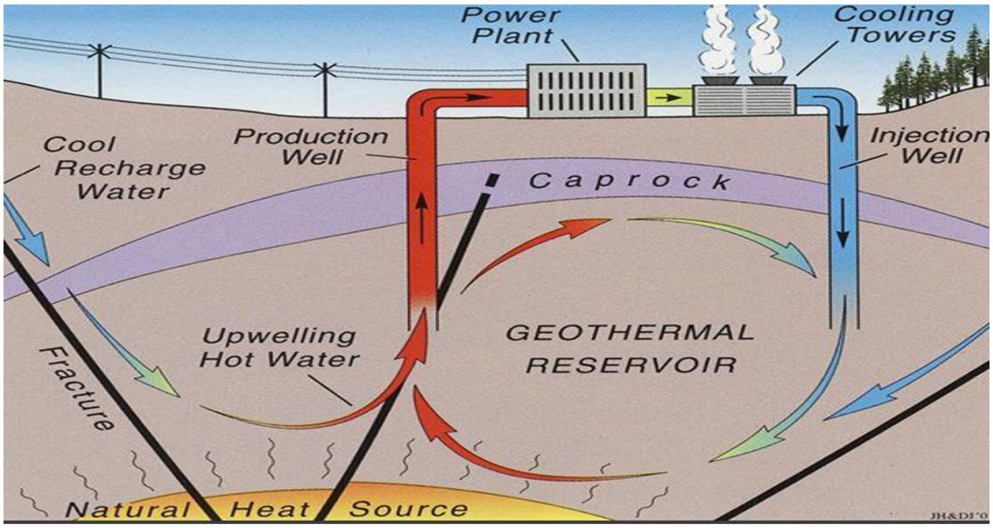


Figure 19 – geothermal extraction

Geothermal energy is sustainable and can be used to heal the planet; it is derived from the natural heat that the Earth produces and comes from the earth's core, it is being used more and more to create electricity and heat as energy demand in the world rises. It is considered an environmentally friendly option to the burning of fossil fuels, but its extraction process, especially geothermal extraction, might lead to induced seismicity, which is earth movements provoked by human activities. These earthquakes initiate because of the stress changes that the Earth's subsurface goes through, which are affected by the fluid, the pressure, the reservoir, and the rock and sand behaviors. Most often, the occurrence of earthquakes with low magnitudes is taken as the result of geothermal activities which are typically not harmful but, in a few examples, they have overly escalated to big earthquakes which now pose threats to infrastructure and public safety. Knowledge of the processes and impacts of induced seismicity and the adoption of efficient management and hazard assessment tools are important aspects of the enhanced usage and safety of geothermal energy.

One way in which geothermal energy extraction can induce earthquakes is through various mechanisms such as fluid injection. Fluid injection, a technique used in EGS (enhanced geothermal systems) involves pumping water or other heated fluids into rock formations to improve the heat exchange process. This approach leads to an increase in pore pressure within the rock horizons and as a result, deviating from the standard deforming limits the above formations can be thus got. The stress redistribution of rocks to the newly formed fissures can be expected to lead to a fault slippage within the terrane, hence the onset of an earthquake. This practice has also been noticeable elsewhere such as in the Cerro Prieto Geothermal Field in Mexico where fluid injection caused some seismic activities that may have been measurable. In addition to the periodic withdrawal of the geothermal fluids, the extraction of the hot water or steam from underground reservoirs may result in the pressure decreases that are responsible for the rock layers collapse or fracture. This is called reservoir depletion which may be the cause of subsidence and seismicity as in the case of the Krafla Geothermal Field in Iceland.[30]

The modern and artificial geothermal reservoir is another reason for the potential threat to induced seismicity. Geothermal enhanced geothermal systems are very useful to improve the productivity of the geothermal systems, but the high-pressure injection of water into the rock formations can result into the formation of micro seismic events. Such actions have been associated with small earthquakes such as the water injection into granite at the renewable energy plant in France and then the slight tremors that followed. Seismic events are not only caused by the injection of water but also by thermal expansion and contraction. The extent of the activities related to geothermal drilling means that the rock is exposed to changing temperatures as the fluids are extracted, which cause movement by the expansion and contraction of rock layers and finally might result in natural tremors. Such a scenario, for instance, was the case at the Wairakei Geothermal Field in New Zealand. Because of these variations in temperature, small earthquakes appeared there due to the stress changes provoked by the temperature differential. Besides, the geological factors of the location are substantial in the impact on the likelihood of earthquakes triggered. If geothermal reservoirs are located closer to active or even pre-existing faults, the stress patterns can change due to the fluid injection, extraction, or thermal fluctuations, which can be done to the extent of causing the trigger. The Basel Geothermal Project in Switzerland is such a representative case, where liquid injection into a deep reservoir in a faulted region gave place to a series of earthquakes.

Induced seismicity from geothermal extraction differs from natural tectonic earthquakes in several ways. Most geothermal-related earthquakes are shallow, with the depth usually < 15 km. The size of these shallow events is typically small, but they may still raise dangers, especially in-residence places. Most of the time, the strength of the earthquake recorded is at or below 3.0 magnitude, but there are some cases of the seismic event reaching even 4.0 according to the measuring scale that is the worst case with demarcated damage. One of the symptoms related to geothermal extraction is the localizing of the drills to the geothermal field or wellbores where the fluid is injected or extracted, and thus the repositioning may not be outside the region of interest. These earthquakes are typically drill or injection-induced, appearing or soon after, though the seismic activity can keep going on for months or even years while subsurface stresses settle.[31]

Seismic induced by geothermal extraction results in numerous effects which can be mentioned to the size, area, and frequency of the earthquakes. the biggest issue is damage to infrastructure, and even a minor earthquake can cause a lot of problems with the buildings, roads. Projects such as the Basel Geothermal Project had to deal with legal and regulatory issues as people were concerned about manmade earthquakes. Apart from these, environmental risks come with seismic activity as well, for instance, the possibility that a fault activation could allow geothermal fluids to leak out; these fluids usually contain solutions of minerals, gases, etc., and other pollutants. Subsidence and deformation of the surface, induced by seismic activities, can have an adverse effect on the ecosystem and groundwater systems. The public's attitude towards the projects and their opposition are among the most significant problems for the geothermal projects as the communities that have been in the middle of the earthquakes (ground shaking) may be against further development. Geothermal extraction and the subsequent seismic activity also trigger some regulatory and legal considerations. Places like Switzerland and the United States are now imposing strict rules concerning the use of fluids and seismic monitoring in geothermal projects to deal with the risks related to the creation of earthquakes. [30][31]

Figure 20 - The Wairakei Geothermal Field (New Zealand) Over the years, seismic activity has been observed in the region, largely associated with the extraction of geothermal fluids. These events, while relatively small, have been linked to pressure changes in the geothermal reservoir and the surrounding rock layers

In order to the possibility of human-induced earthquakes, several measures are taken. Visualizing is a novel technology that guarantees the mining industry proper seismicity control, which in turn ensures the safety of drilling activities. This can be achieved by exploiting cloud computing resources, which enable the cloud-powered monitoring system to perform complex mined subsoil data processing. With the help of embedded devices and location-based services, the system can track natural and induced seismic events and alert emergency managers to disaster situations. In fact, the induced seismicity can be studied and forecasted through the use of the resulting big data. The technology of cloud scale mining use has created a more balanced and interconnected world where mining has become less impactful and has no carbon footprint. The breaking of rocks, ground leveling, and rock blasting are among the construction activities that produce high levels of vibration.

While vibrations can be connected with lively communication and mutual understanding, they can also cause significant damage to nearby buildings as a result of dynamic wave's energy. Technological increase paralleled numerous changes in the lives of people, bringing along more useful and effective inventions and processes, which introduce new functions and/or changes that spread in a structured manner and are continuous. The harvesting of rain and the use of bodily excreta and water can provide enough nutrients in the compost mixture to promote the growth of the mushroom mycelia. An investment in a wireless irrigation system involved using a weather station that provides rainfall or wind speed information. Moreover, data is transmitted directly to the server and the user can access this data from anywhere on earth through the internet. Besides, the automations provided by greenhouses and the sophisticated algorithms implemented by farmers through data-driven decisions can assist in predicting the market demand in a more intelligent way.[32]

Underground Nuclear Testing

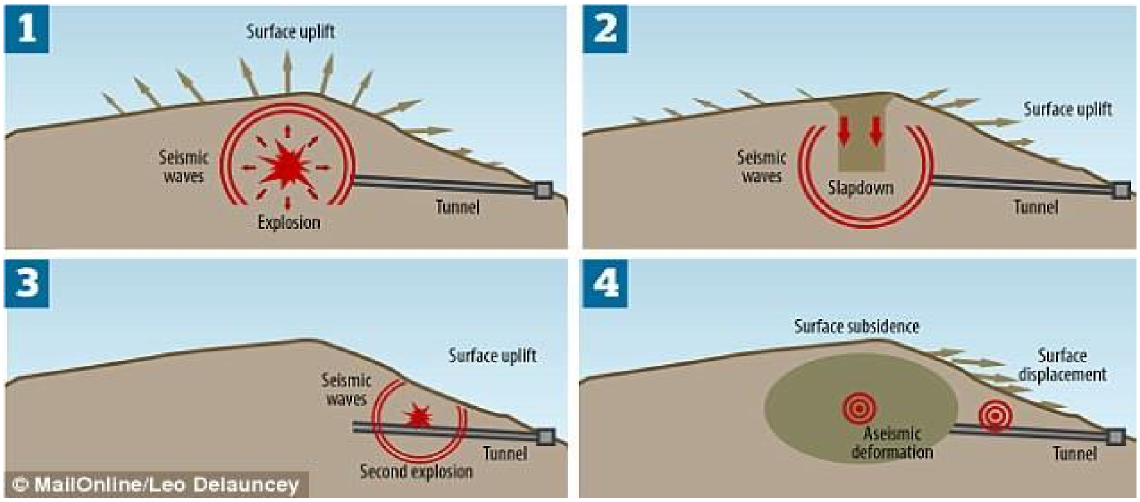


Figure 21 – nuclear testing

Setting off nukes underground, once a common practice of the Cold War and beyond, was a procedure in which nuclear explosives were blown up beneath the Earth's surface. Countries such as the United States, the Soviet Union, and China conducted these tests to evaluate the effectiveness and yield of nuclear weapons. First and foremost, these were believed to be somewhat contained within their original spots, but scientists have discovered that they have been related to man-made seismic activities, like earthquakes. Seismic events associated with underground nuclear testing are not natural earthquakes but are the result of the sudden release of energy in the form of shockwaves from nuclear detonations. Although their causes and mechanisms are different, induced seismicity events appear similar to tectonic earthquakes on seismographs and can be detected worldwide. It is crucial to know how underground nuclear tests are associated with induced seismicity both for assessing environmental consequences and for monitoring the nuclear activities. Understanding of the relationship between underground nuclear tests and induced seismicity is a pre-requisite to environmental consequences assessment and monitoring the nuclear activities.

Nuclear explosions underground cause seismic events as a result of a large amount of energy, i.e. shockwaves and heat, that is suddenly released. These shockwaves interact with the surrounding rock, and as a result, seismic waves are the result that propagate through the Earth's crust. The immediate effect is that very strong shockwaves occur originating from the center of the explosions and thus beaming out into the atmosphere. These shockwaves being the culprit are the ones that cause the rock to crack and give seismic signals to the seismometers all over the world. Over that, the Tsar Bomba, a 1961 Soviet Union detonation that is the most potent nuclear bomb ever tested, generated shockwaves that were global and a lot of people [the eastern part of the world at least] felt This The shockwaves’ energy dissipates as they move away from the detonation site, but they still might cause a little jolt of a seismic shake.[33]

The essential mechanism that we look at is the formation and the collapse of cavities. When a nuclear device explodes underground, it makes a huge hollow space in the stone around it. Gradually, the structure of the rock hangs in the cavity, the seismically active process is amplified. In places like the Nevada Test Site, seismic events were generated by the collapse of cavities due to underground nuclear tests and, even though these events did not spread out much almost all the time, they were detectable using seismic monitoring stations. The energy released from a nuclear explosion can also cause the existing rocks to undergo fracturing, thus activating pre-existing faults or even opening new ones. The piercing pressure and high temperature resulting from the detonation will pull the fault apart creating more seismic waves. Nuclear tests in areas sensitive to geological events such as the Semipalatinsk Test Site in Kazakhstan have been associated with the activation of the surrounding faults. Although these earthquakes induced by the faults were usually smaller, some were stronger enough to be experienced in areas around.

At times, the seismic impacts of underground nuclear tests continue to disturb the ground long after the first detonation is over. Modifications in the subsurface pressure and deformation of structures take some time to get stable, therefore secondary seismic events or aftershocks happen. On the other hand, these aftershocks, which are weaker than the main explosion, might take place during the following weeks or months as the stone formations enter into new equilibrium states. The Pneumocystis test series that the United States conducted in the 1950s produced aftershocks that were recorded for months after the detonations.[33][34]

Underground nuclear test-induced earthquakes and natural earthquakes have some common features, yet they also bear differences. The size of earthquakes caused by a nuclear explosion is usually larger than that of most natural earthquakes owing to the extraordinary amount of energy liberated. Nevertheless, these events are shorter-lived; the initial wave is, in fact, over only after a very short time, and this is thereafter followed by weak aftershocks that still occur over time. These tests are generally carried out at places that are several hundreds of meters below the surface and a few kilometers apart, thus only the area near the test site will be affected by the resulting seismic activity. As contrasted with natural earthquakes, which happen at the junctions of tectonic plates, the explosions of atomic weapons occur in predetermined places, and, therefore, seismic activity is, on the one hand, transferred to these specific regions.

Among the set of instruments utilized to collect data about nuclear tests are the instruments recording seismic waves. The vibrations shown in seismographs due to the underground nuclear tests are typical, and they are different from the ones that happen when the tectonic connections are shaking. Seismic leakages in the form of abrupt and occurred nuclear explosions, are presented as a progressive decrease in amplitude. These distinct telltale signs allow scientists to recognize and categorize nuclear tests. The peculiarity of geographically detecting underground nuclear tests is one of their features. In fact, even smaller-sized nuclear explosions have been such strong as decreasing seismic detection that these readings could be recorded by the seismographs outside the test area. Such abilities have been essential in the control of nuclear interaction globally. The industry has relied on the monitoring system using global seismic networks to keep nuclear tests at bay. Companies such as the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) rely on this global seismic network to identify and verify international declaration of compliance with nuclear test ban.[35]

Figure 22 - The Tsar Bomba Test (1961, Soviet Union) was the largest nuclear bomb ever tested, with a yield of 50 megatons of TNT. The test took place at the Novaya Zemlya Test Site in the Arctic Ocean

Beyond all the seismic activity, humans have also experienced the underground nuclear testing which left, and is still leaving, significant environmental and social impacts. The primary one is the change of soil structure, which in its turn may include both a subsidence and surface damage. The voids below the surface that happen to collapse are the leading causes of cracks, sinkholes, and other surface deformation, which possibly affect the infrastructure and the environment. Moreover, Tunnels, where nuclear tests take place, work to confine the radioactivity. Nevertheless, it has been seen that the radiation has been leaked many times.

This pollution leads to a number of public health risks such as long-term diseases. Living among radiation is responsible for the development of unhealthy issues during the year such as cancer and diseases related to genes. Besides the seismic activities that unfolded as a result of the explosions, people suffered like having stress and worries, as they were the affected ones. Moreover, the tradition of underground nuclear testing has given a boost to global seismological monitoring and non-proliferation initiatives. The global distribution of vast seismic monitoring systems apart from detecting nuclear explosions and scientific research have the main goal of security and deterrence.

The relationship between human activities and rock structures is exhibited by both underground nuclear testing and the earthquakes that follow it. Although these were the experiments that let the world know about the nuclear weapons capabilities, they also caused equally important wealth, health, and geopolitical consequences. The shock waves, cavities that collapse, and fault segments that undergo catastrophic failure during the nuclear explosion are responsible for the seismicity that can be measured and be the cause of the events, some of which last long after the primary one. The installation of international seismic monitoring networks is what shoulders the world in the fight against nuclear tests leading to a safer world and this reinforces the role of science and diplomacy in the world.[35]

Chapter 2

Vulnerability of Buildings as a Matter of Earthquake

Architectural Vulnerability

Irregularity in shape, horizontal & vertical irregularity

Buildings with irregular shapes, besides having their problems described in plan as well as in the vertical arrangement, are rather more sensitive to earthquakes damage than the regular ones, since the torque of seismic forces is dissipated unevenly due to the irregular shape. The earthquakes produce ground motions of multi-components while the absence of a similar layout or height in a building causes stress concentrations to occur in some part which blanket, thus the chances for collapse or the structural compromise grow. In addition, the influence of architectural irregularities upon the structural response of a building in an earthquake is a very important aspect of designing safer buildings. The irregularities in a glass area, such as the areas that are different from a simple, compact, and symmetrical form, seem to destroy the homogeneous distribution of earthquake forces, resulting in twisting forces or torsional effects where different parts of the building vibrate at different rates, producing extra stress. Also, L-types of buildings are likely to display underperformance in seismic hazards and may stress the intersection where the legs come together. In the same manner, other types of architecture named T, K or U contain the ultimate weak points which include the joint and re-entrant corners where the seismic forces are beginning to come a long time which a crack and even the failure are the end results. For instance, the big openings, such as atriums or courtyards, that are also included in the buildings would also create dissymmetrical forces that essentially would generate weak areas around the openings, where force distribution would not be even.[36]

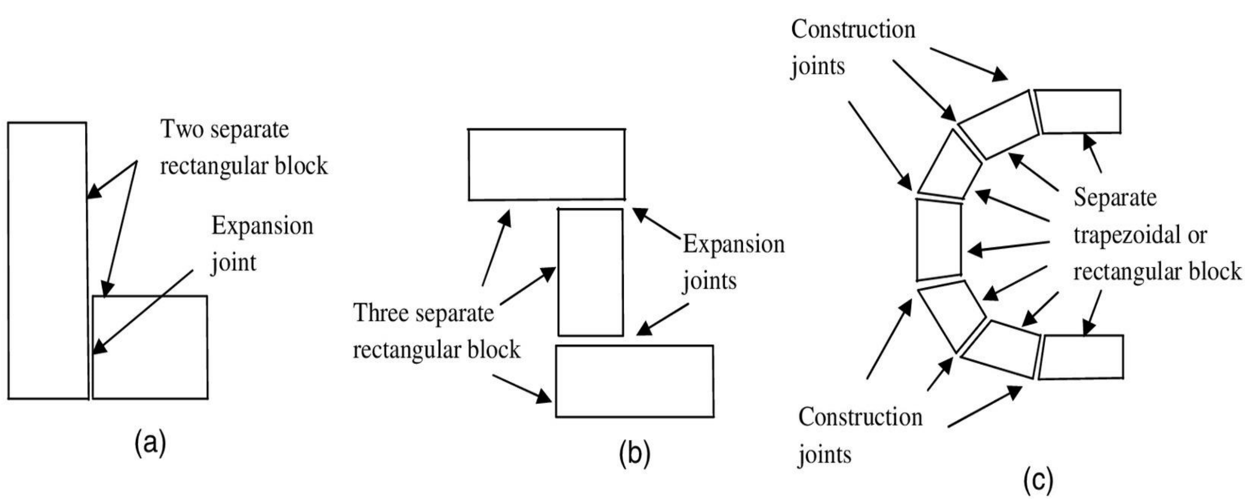
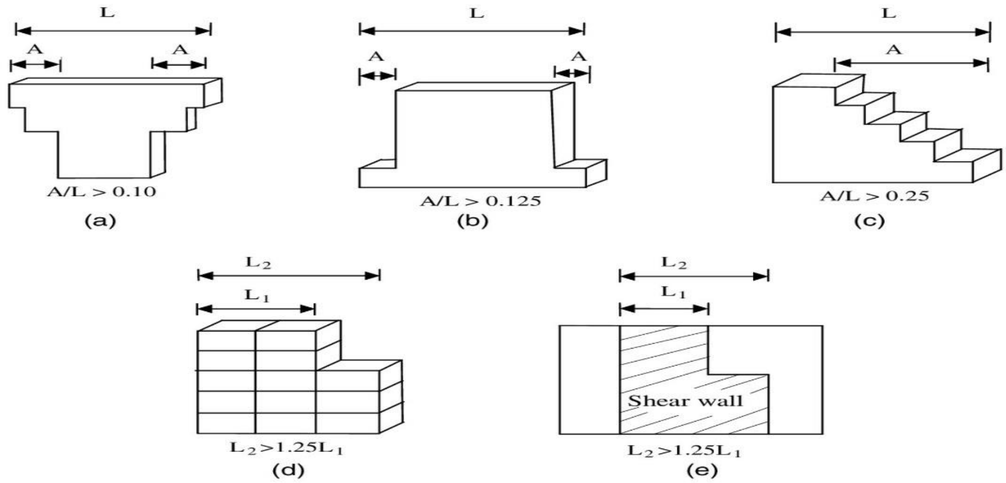
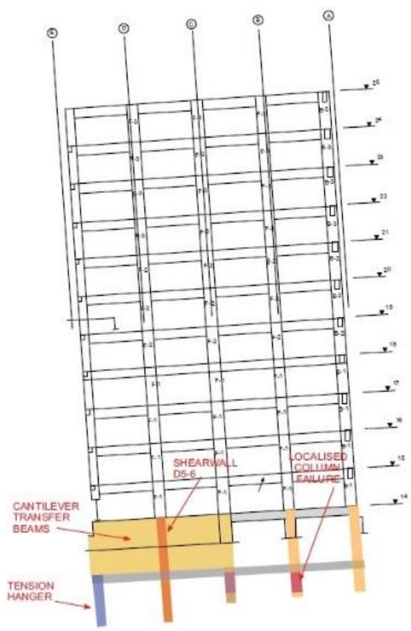


Figure 23 – plan irregularity

Figure 24 - Olive View Hospital (California, USA – 1971) Severely damaged in the 1971 San Fernando earthquake (M6.6) due to horizontal irregularity

The term “vertical irregularities” means “sudden changes in height, mass, or stiffness at different levels of the building.” This disrupts the building's seismic response. Setback buildings are those with a wider base than their midsection. They produce “transition points” with extreme stress that led to concentration. A soft or weak floor, which is commonly the case when the lower part of a building is used for parking or commercial spaces, is not only less stiff but also makes the building more sensitive to a seismic failure, which can be caused by earthquakes. Furthermore, seismic forces are not transmitted efficiently in the case of shear walls or columns discontinuities, thus the structure's design is not fault-tolerant, and the abrupt changes in stiffness or mass, road-top equipment or material shifts, deteriorate the building's reinforcement even more.[36]





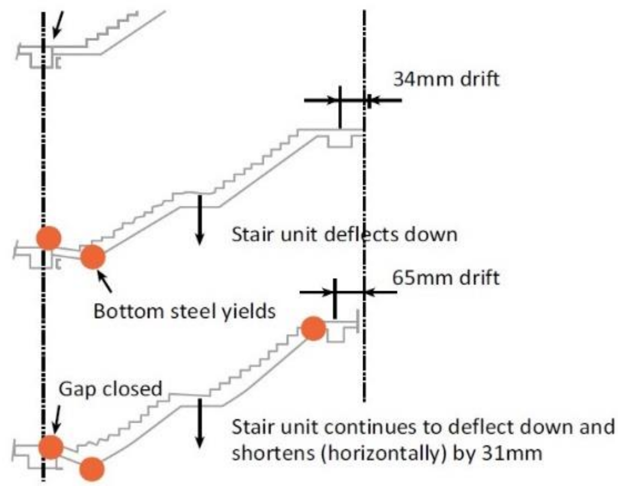


Figure 25 – vertical irregularity

Figure 26 - (2011 Christchurch Earthquake ,New Zealan) The CTV Building in Christchurch collapsed due to vertical irregularities. The building had significant stiffness changes between floors and inadequate lateral load resistance, which led to a catastrophic failure when subjected to earthquake forces

To minimize these threats, designers and constructors are being able to apply a variety of strategies in order to achieve greater seismic performance in the case of irregular buildings. A way to diminish torsion is to create a smaller and symmetrical structure, this will have a positive impact on the reduction of the torsional effects that originate from seismic activity, thus the building will have a more stable life span, plus the seismic joints that are added will allow each section of the building to move independently and thus prevent the accumulation of excessive stresses. Completing the reinforcement of the reentrant corners with additional bracing or shear walls results in strengthening the weak zones. Moreover, providing uniform mass and stiffness distribution throughout the structure will reduce the force imbalances that are occurring. The soft stories can be reinforced with bracing systems, shear walls or stronger columns to enhance their lateral stiffness and prevent the falling over. Irregular buildings can withstand earthquakes very well after the layers of security in both the plan and vertical designs have been dealt with.[37]

Soft Story Effect

A soft-story building is a structure whose floors differ greatly in stiffness and strength with the ground floor more vulnerable to the destruction caused by an earthquake than the upper floors. Such structural weakness is commonly attributed to the architectural design decisions that are made to give priority to open spaces (parking, commercial areas, or lobbies) at the expense of the incorporation of solid walls in the upper floors. Floors with different stiffness coefficients force the seismic loads to be unbalanced thus, the chance of a pancake failure is increasing, which may result in the destruction of the weakened lower story by the upper floors.

This susceptibility is more evident in buildings with open ground floors having little to no bracing or walls to resist the lateral forces. Upper stories that are heavy enhance the instability by exerting large load on the weak lower level, whereas big glass windows cause the construction to become less durable. Short columns without adequate lateral reinforcement are also found to be a contingent, due to their inability to resist the lateral forces induced during the earthquake. When the quake happens, the upper floors are still strong enough while the weak others start swaying extremely making them highly stressed at the interface between floors. This leads to the tilting columns, and the breaking walls, and, eventually, the entire structure falls down.[38]

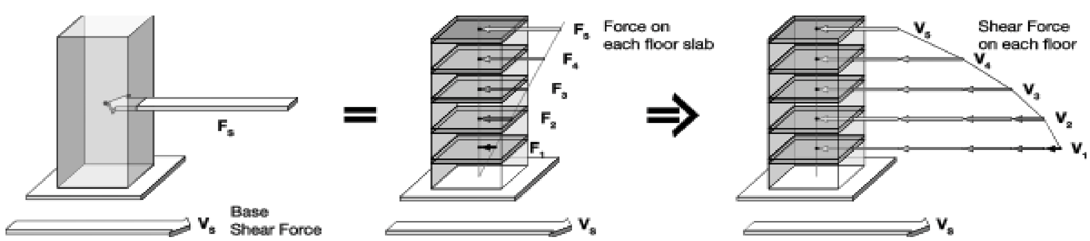


Figure 2.1. Lateral forces and shear forces generated in buildings due to ground motion

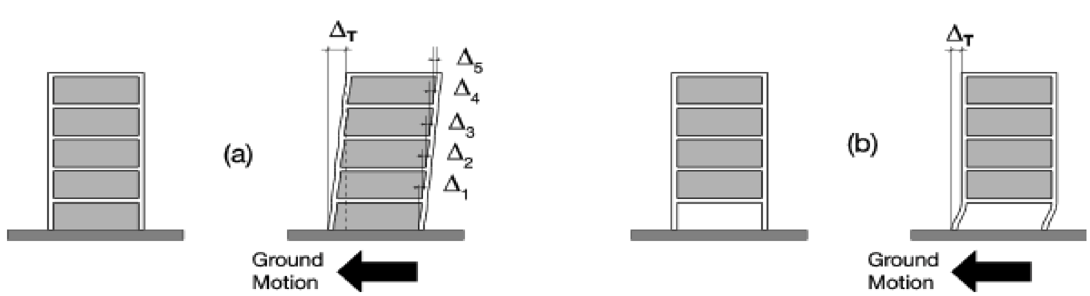


Figure 2.2. Distribution of total displacement generated by an earthquake in: (a) a regular building; and (b) an building with soft story irregularity.

Figure 27 – soft story

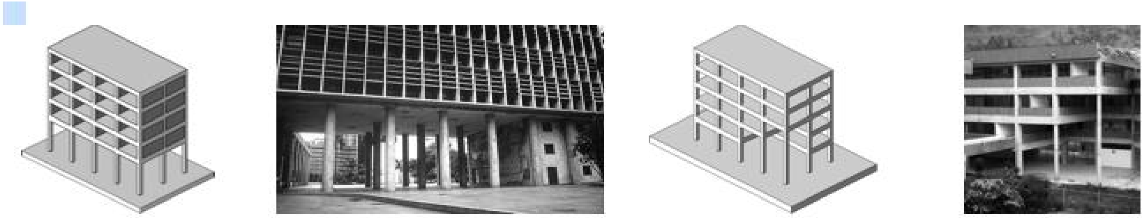


Figure 2.4. Modern building configuration with double height soft story, the main entrance of the Ministry of Education, Rio de Janeiro (Photo: Jose Luis Colmenares); and partial soft story with columns of different height in the corner of the building (Foto: Klaudia Laffaille).

Figure 2.5. Two recent examples of severe damage attributed to the soft first story irregularity in L'Aquila earthquake, Italy in 2009, (Photos, left: Holly Razzano, Degenkolb) and in Lorca, Spain in 2011.

Figure 28 – soft story

Figure 29 – (1994 Northridge Earthquake ,Los Angeles, USA) The Northridge earthquake exposed the vulnerability of soft-story apartments, especially in multi-story residential complexes. Many buildings with open parking spaces on the ground floor collapsed, including the Northridge Meadows apartment complex, where the soft-story failure led to multiple fatalities. The destruction prompted stricter building codes and retrofitting initiatives in seismic-prone regions

To offset these risks, engineers and architects can develop a range of retrofitting strategies that can in turn improve the resistance of a building to seismic forces. Earthquake resistant steel or concrete reinforced shear walls are added to provide sidewise support as well as to make load distribution more effective for earthquake. Strengthening columns with steel or concrete jacketing is a new method for increasing the robustness of a structure, while the installation of moment-resisting frames is beneficial in providing additional flexibility, and strength. Solutions such as base isolation and energy dissipation systems are also advanced ones that are helpful in that they absorb seismic energy and reduce the impact of ground motion to the building before it reaches it.

The soft-story effect is still the most significant issue as one of the architectural vulnerabilities in the areas that are prone to earthquakes, which can lead to the collapse of the buildings and loss of lives. Noticing also that the present challenge that the engineering community and safety agencies are struggling with in this aspect is the earthquake damage issue, it must necessarily be a means of reducing it. The severe effects of past seismic events on soft-story constructions, coupled with the emergence of new designs of contemporary structures with strong support systems, can altogether be a game-changer that significantly improves both the resilience and the survival of people.[39]

Pounding Effect

The pounding effect, which is the primary cause of the building-to-building collisions during earthquakes, occurs when nearby buildings', which are constructed too closely, different swaying motions are colliding, and the earthquake is the day to day life of the big city effected with that, therefore that is why it is required to choose the IT equipment which is helpful for earthquakes. This phenomenon is especially dangerous in highly populated urban areas where space limitations allow for little or no space between buildings. In other words, buildings may sway due to seismic forces, and their movements may not always align with each other. This misalignment causes continuous contact that weakens the structural integrity and causes very severe damage, mainly to the top floors which are mostly out of place.[40]

Many reasons contribute to the pounding effect, and insufficiency distance separation is a major factor. When buildings are constructed too close to each other, the required space is not there, and they cannot move freely, thus the chance of collision increases. Changes in periods of construction, which are due to variations in height, materials, and design, are the other main causes as they result in buildings reacting with seismic waves and moving out of sync from each other. Internal vertical discontinuity, like a few weak lower floors or sudden variations in mass and stiffness, besides the uneven displacement through the building heights, could also fuel the problem. Also, changes in the foundations of buildings can occur, e.g., if in areas with different kinds of soil, they will resettle at different depths, which are submarginal.

The pounding effect caused by the repetitive collision forces has a problem of severe shear failure in columns and walls. Seismic displacement is particularly relevant to failure of heavily damaged upper floors in the building, which are the weak links to overall structure integrity. Panels and claddings, as well as glass windows, masonry, and decorative elements, are especially fragile. These parts are constantly cracked or detached by the load of the collision. Under the most extreme circumstances, repetitive collisions can lead to progressive structural failure which is manifested in the partial or complete collapse of one or both buildings.[40][41]

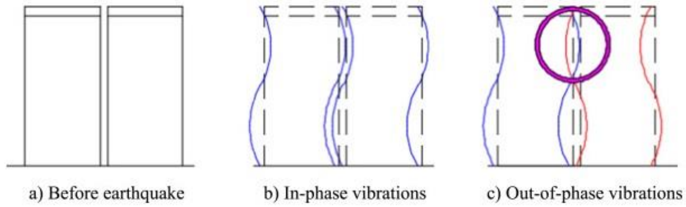


Figure 30 – pounding effect

Architectural and engineering are the first and foremost solutions to be implemented so as to reduce the risks. Thus, the concrete structures must be designed to a large extent, and if they encounter a collision or breakdown, they should behave unexpectedly. The gap between the buildings designed in conjunction with seismic building codes allows them not to be joined and hence collide while they move independently. The installation of seismic joints also helps in this way by absorbing the forces and preventing the buildings from coming into direct contact. The designing of similar dynamic characteristics for the construction of adjacent buildings also minimizes the differential movement and impact as well. The retrofitted structures to column reinforcement, the added dampers, or the implemented base isolation systems become more capable of resisting seismic forces. Zoning regulations are enforced in urban planning which need sufficient clearance between new buildings and the existing ones, thereby further reducing the risk of pounding.[41]

In earthquake-prone zones, the towns are crowded which consequently creates the pounding effect phenomenon. Hence, addressing the pounding effect being better via urban planning, structural retrofitting, and better engineering efforts is essentially building the city more resilient and safer for the public. One of the first steps to do that is to see the cities as a soft spot, the weakness and then to reinforce them. The problem is not only that buildings can collapse, thereby endangering lives and damaging infrastructure but also the process of a car being hit by a building falling can be of importance to both the driver and pedestrians.[42]

Figure 31 – (1999 İzmit Earthquake , Turkey)In the 1999 İzmit Earthquake, multiple buildings constructed in close proximity were severely damaged due to the pounding effect. The destruction was mostevident in older, poorly designed structures, where unreinforced concrete walls and columns sufferedsignificant cracks and failures due to repeated collisions with neighboring buildings

Asymmetry in Mass & Stiffness Distribution

Earthquake resistance of a building is greatly dependent on the distribution of the mass and the stiffness around the center of the building. When a structure has an uneven distribution of weight or rigidity, it becomes highly susceptible to seismic forces, thereby resulting in rotational effects, stress concentrations, and structural weaknesses that are very likely to cause severe damage or even a collapse. Symmetrical buildings achieve more uniform behavior when subjected to earthquakes as both mass distribution and stiffness are symmetrical. Still, imbalanced ones cause irregular responses that amplify structural stress.

These differences in mass distribution often result from the architect's choice to use heavy roofs, such as the use of upper stories for mechanical equipment, rooftop pools, or storage areas, which would trigger inertia forces during an earthquake. The invention of irregular floor plans not only makes it possible to build new walls but also comes as an addition to existing walls, thereby increasing the pressure on the wall. They result in a non-uniform response, which increases vulnerability of such structures. In the same way, the differences in stiffness distribution are a result of weak or soft-story designs, where an open ground floor does not have the rigidity provided by the upper floors with solid walls. Buildings with shear walls or bracing concentrated on only one side experience non-uniform lateral resistance, causing the structure to twist during seismic activity. Sudden transitions in stiffness, like a reinforced concrete base supporting a lightweight steel superstructure, create weak zones that are prone to be damaged.

When an earthquake occurs, architectural defects such as these cause several adverse effects. Torsional motion is an example, in which the building, which has been constructed in a specific way, rotates around its central point trying to achieve stress on a certain number of columns and walls. Where weak areas refuse excessive forces the forces lead to the formation of cracks, deformations, or even structural failure. Moreover, due to some parts of the building, a loss of balance can occur, which can cause a collision and lead to further damage. Also, foundation failure may occur if the heavy section of the building ends up exerting greater pressure on the ground, and that may lead to settlement or tilting.[43]

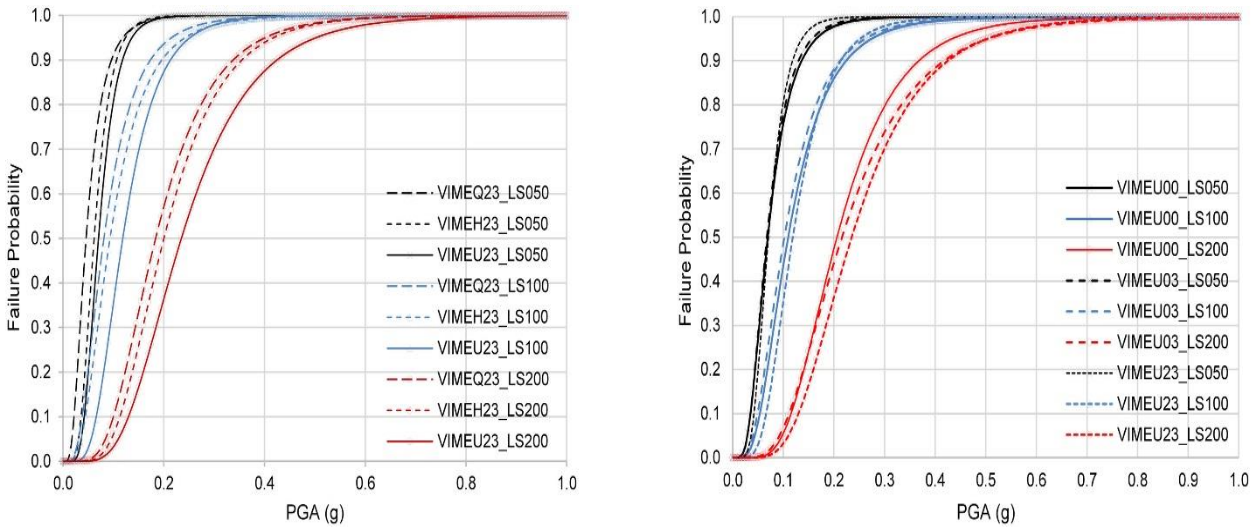


Figure 32 - failure probability to PGA

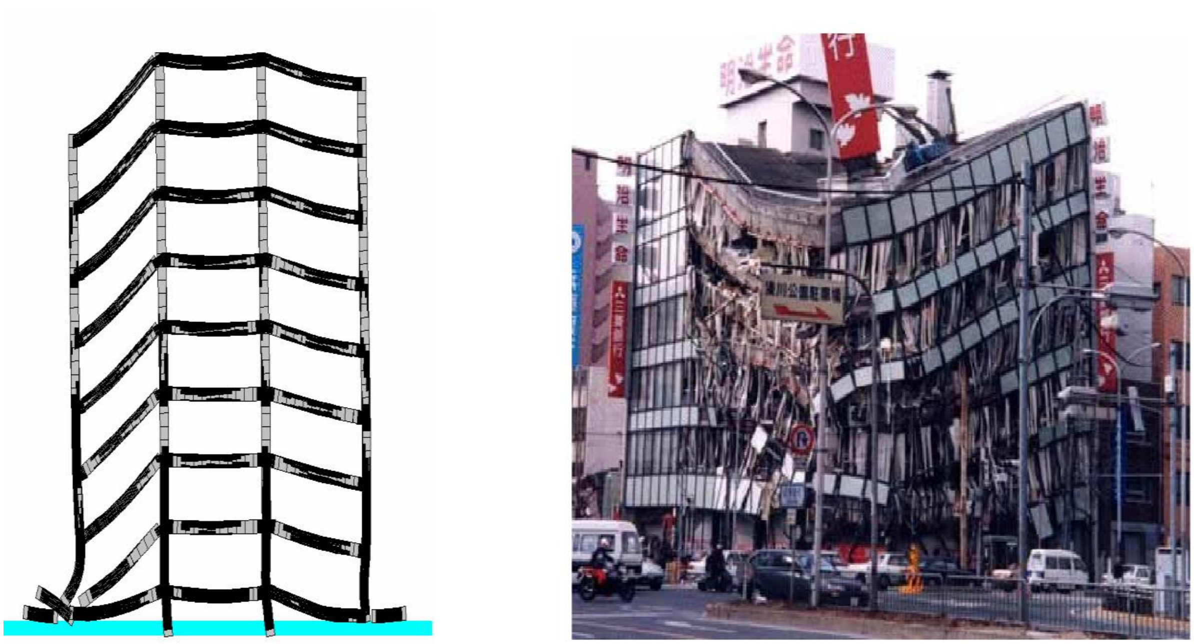


Figure 33 – (1995 Kobe Earthquake, Japan) The 1995 Kobe Earthquake demonstrated the destructive effects of mass and stiffness asymmetry. Many mid-rise buildings in Kobe had heavy rooftop equipment and unsymmetrical bracing, which led to severe torsional damage. Structures with soft ground floors or sudden changes in stiffness suffered disproportionate deformation and collapse

In order to reduce these dangers, architects, as well as engineers, are working on bettering the construction of the most balanced weight and/or stiff distributions of buildings. To ensure that the mass is distributed evenly throughout the floors to stop the excessive twisting movement while at the same time making the mechanical and the storage loads symmetrical to one another so that the structural integrity can be maintained. By smart placement of the shear walls and the bracing elements, the stability of the structure is kept, hence avoiding the possibility of one part being more resistant horizontal than the other. To the weak stories with additional support elements like moment-re, to Enhance overall strength. The use of construction materials in a harmonious way disallows the occurrence of inconsistencies, the flouting of the sudden stiffness transitions thereby reducing stress concentrations. More technical solutions exist, like base isolation systems that let buildings move with no consequences to the ground and dampers to absorb the excessive force that would cause damage to buildings and, in effect, enhance resilience against earthquakes.

The lack of precise mass and stiffness distribution in the buildings still is the major architectural flaw that multiplies the seismic damage. Wrong weight or stiffness layouts cause force distribution to be uneven, torsional effects and excessive stress to occur which in turn lead to a catastrophic failure. By advocating critical thinking and identifying the critical areas and adapting to the contemporary seismic codes, constructions can be designed that withstand the tremors, thus, protecting the assets and lives better.[44]

Buildings with overhanging structural components

Overhangs as parts of buildings such as cantilevered balconies, extended roof areas, large cornices, and slightly protruded façades are rubble waiting to occur during the earthquake. These pieces that often times are incorporated in the building to fit the look the client wants, they, however, generate an extra load and leverage forces, which result in the amplification of the structure's stress. During seismic moments, vibrations from the ground are transferred to these attachments and thereby the extensions experience overloading due to inertia. They become unhooked and walking above them becomes dangerous to pedestrians and everyone concerned.

The vulnerability of overhanging elements is mostly attributed to the imbalance they assert by them. It is an additional load to the cantilever end and therefore, bending and torsional stresses are also generated. Overhanging balconies and projections that jut out externally from a structure undergo the full intensity of the earthquake's effect which can sever the anchorage. Plenty of historic buildings still showcase ornamental cornices or balconies that are made without the application of modern reinforcement methods, which make them the likely casualties due to earthquake-induced shaking. Furthermore, the parts which are given too much overhang are often quite different from the rest of the construction and this is a major stress raiser at the connection points. The danger is further intensified by the use of heavy materials such as concrete, masonry, or stone, since the increased weight can make these elements more prone to downward collapses as a result of the seismic impact.

During the earthquake-induced movements, these big overhanging building parts represent a big danger. The detachment of these parts can end up causing falling risks, in which case balconies, cornices, and façade parts break away either killing or hurting people or blocking emergency routes. Providing that the link to the main structure is not strong enough, a single overhanging part can create a crack that will end up firing a domino effect leading to the catastrophic and the rest of the building collapse. Additionally, the uneven weight distribution due to these outcrops can introduce torsional effects that will make the whole structure more vulnerable to seismic forces. Apart from the collapsing balconies and the cornices, the falling debris can also be a cause of damage to the nearby buildings, which then may impose further risks on the surrounding areas.[45]

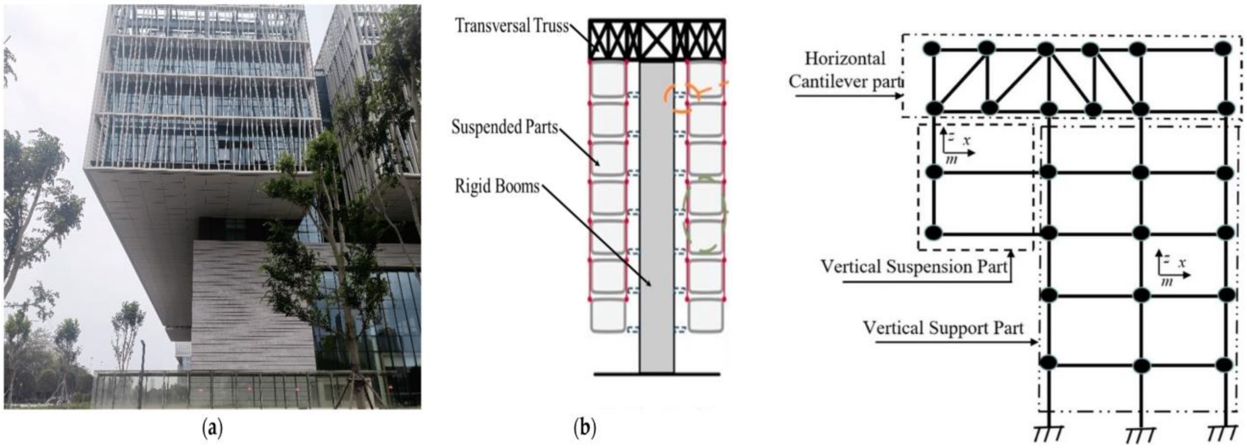


Figure 34 – overhang elements

Figure 35 - (2017 , Mexico) magnitude-7.1

To address these hazards, engineers and architects make use of various techniques to improve the seismic resistance of overhanging materials.

The reinforcement of cantilevered structures by means of steel support and secure anchorage systems is the way to make sure that cantilevers and the projections affiliated to them will be firmly connected. The use of lightweight materials such as engineered wood, reinforced polymers, and fiber-reinforced composites reduce the excessive loading and minimize the structural stress that is borne upon the structure during its lifetime. Older buildings can be retrofitted with modern reinforcement techniques, thus, fatigue overhanging spans can be strengthened to improve earth resistance. Besides following their natural paths, bracing, dampers, or flexible joints can be incorporated between overhanging components and the main structure to absorb seismic energy and reduce the differential movement. In earthquake-prone areas, the updated building codes now limit the size and weight of cantilevered elements and thus, the precision in their calculations is required to make sure that they are strong enough to resist seismic forces.[46]

Heavy overhanging parts of buildings are a crucial weakness of the building design that contribute significantly to the problem of earthquakes. Without proper reinforcement, the overhanging's, which is the most dangerous, can lead to the crashing, which causes injuries, property damage, and even structural instability. In contrast, through efficient engineering solutions, the use of light materials, and by precisely directing the retrofitting operations, the potential hazards of overhanging features can be reduced considerably. By giving consideration to the above-mentioned safety measures, municipalities can increase the resilience of their buildings, thus, they will be able to save the lives and property damage in earthquake-prone zones.

Structural Vulnerability

Weakness of material

Material usage in the construction of a building is the primary factor that affects its ability to withstand earthquakes. Weak or brittle materials such as unreinforced masonry, low-quality concrete, or the ones that is poured badly are especially susceptible to earthquake damage. These materials cannot provide the required tensile strength and the required flexibility to bear the energy of an earthquake. They are hence the ones that are likely to crack, and split shear and when the earthquake comes encourages strong ground motion fall mostly. Some of the greatest damages undergone because of earthquakes have been in houses that were not well built, and therefore using better materials is the main emphasis in seismic regions.

Unreinforced masonry (URM) is one of the most common weaker materials, which is composed of bricks, stones, or concrete blocks held together with mortar and are usually without any embedded steel reinforcement. These buildings have very little, if any, tensile strength, resulting in shear and flexural failures. Among the earthquake hazards, the separation of weak mortar joints is frequent to such an extent that the walls break and fall. Without any help, walls may also turn outward, thus, the whole floor may collapse. This deficiency was observed during past earthquakes, where URM-built historical buildings and older medium-density dwellings damaged most.

At the same time, the utilization of low-quality concretes as one more potential problem can lead to very significant damage. The substandard concrete mixture that is getting vulnerable to earthquakes is among the barrier factors. The concrete resistance to the impacts of earthquakes can be diminished by the application of poor-quality concrete. It is well known that the strength of concrete depends to a great extent on the amount of water used in the ratio of water to cement, curing time, and also on whether it has steel reinforcement in it. The increased presence of water in the mix lowers the compressive strength of concrete, which makes it brittle and if reinforcement is not adequate or is positioned in a wrong way, then shearing off lateral forces will make it be faulty. Incorrect curing practices can also lead to the weakening of the structure and, consequently, the failures that can appear to be brittle fractures during seismic events. Moreover, buildings made of insufficient materials are some of those, for instance, in major earthquakes it is obvious that concrete is the most affected one and in majority of cases the cause lies in the lack of quality standards in its production and application.[46]

The improper use of fragile and crisp objects when earthquakes occur is a matter of life and death. The absence of a proper reinforcement system will lead to a rapid collapse of the buildings and, consequently, to pancake failures, where more than one floor falls atop each other. The sharp debris that falls from unreinforced masonry and weak concrete structures is an extreme threat to occupants and passersby, and therefore it is one of the prominent factors that raises the number of casualties. In the case of flexible materials, such as those that swell and still remain as fluids, they are able to absorb and dissipate seismic energy.

Numerous engineering techniques can be applied reciprocally to strengthen weak or brittle structures and retrofit weak or brittle structures without a frame in order to reduce these possible risks. The building's seismic resistance will be increased by adding steel bars, both vertical and horizontal, to the unreinforced masonry. Fiber-reinforced polymers (FRP) can be put on the exterior masonry walls to increase tensile strength and impact resistance. Sometimes, with concrete jackets—reinforced concrete applied to debilitated walls—they can be added to provide more support. For buildings made of concrete, the correct water-to-cement ratio, embedding high-strength steel reinforcement and curing the concrete properly are the primary measures for increasing earthquake resistance.[46]

The seismic retrofitting of old structures in a general sense is also inevitable; among the regions of high earthquake risk where the older buildings were not designed against earthquakes the seismic retrofitting should be exclusive. Technology, like, for example, shotcrete is one method of rehabilitating a structure by applying a thin layer of reinforced concrete over the old masonry or concrete surfaces to enhance resistance to additional Art. Base isolation systems, which are elastic bearings located at the foundation, create sectional links that interrupt the effect of the ground movement and thus avoid the brittleness of the concrete. In addition, the adhesion of braced frame reinforcement and shear walls minimize lateral force resistance, thus ensuring the overall stability of the structure.

One of the biggest risks in the event of an earthquake is the potential for structures to collapse; however, the experience of previous catastrophes, including some in Haiti, Nepal, and Iran, attests to the tremendous hurry with which reinforced, high-quality materials are applied. Through seismic retrofitting, increased material standards, and adherence to current engineering principles, buildings can become far less destructible and high-quality materials can become standard characteristics. Building structure can be improved not only through seismic retrofitting but also through the use of premium materials and adherence to contemporary engineering techniques, which will reduce the likelihood that structures will sustain damage in the event of an earthquake.[47]

Strength-to-Ductility Ratio (SDR)

The Strength-to-Ductility Ratio (SDR) is a key factor, in influence by which a material's capacity of reaction during an earthquake. Those materials that are brittle and stiff have low ductility; thus, they cannot deform, and eventually, they fall with the stress. This ratio illustrates why the ductile materials (e.g. flexible) should be employed in earthquake zones.[46][47]

$$SDR = \frac{F_{\max}}{\delta_{\max}}$$

- $F_{\max}$ = Maximum strength the material can resist
- $\delta_{\max}$ = Maximum deformation the material can undergo before failure

Peak Ground Acceleration (PGA) vs. Material Strength

Seismic events are typically measured in terms of Peak Ground Acceleration (PGA), which means they demonstrate the force of the earthquake. The chart shows the material strength of the components of the building (concrete, steel, masonry, etc.) in a PGA comparison graph making obvious how brittle materials yield at lower PGA values as opposed to flexible materials. [46][47]

$$F = \sigma \cdot A$$

- F = Force experienced by the material
- σ = Stress (force per unit area)
- A = Cross-sectional area of the material

The R-Value (Seismic Resistance)

The R-value quantifies the earthquake strength resistant coefficient of buildings. The R-value gives information about how strong a building could be against earthquakes, this has to do with building's characteristics, design and construction quality. R-value is also lowered because of certain materials which means the structure gets more exposed to damage. [46][47]

$$R = \frac{\text{Seismic Demand}}{\text{Seismic Capacity}}$$

- **Seismic Demand** is the level of force exerted by an earthquake (PGA).
- **Seismic Capacity** is the strength and resilience of the building, which is influenced by the materials used.

Failure Modes of Brittle Materials

An illustration that presents the various damage paths, which take place under loads generated by earthquakes, may be used as an example to differentiate brittle materials from more ductile ones. Mostly, brittle materials achieve failure at the point of compression and shear, but the ductile ones deform first before they show susceptibility to failing. [46][47]

Brittle Failure Modes: Fracturing, cracking, shear failure, and buckling.

Ductile Failure Modes: Plastic strain, energy dissipation, and gradual failure.

Material Ductility and Earthquake-Induced Displacement

The displacement a building can endure, and fail is often made, in terms of, by the ductility of the materials are used. A building that is made up with brittle materials will undergo high stress concentrations and will collapse earlier during seismic shaking, whereas materials that are ductile will allow more displacement with no immediate failure to occur. [46][47]

$$\Delta = \frac{P}{K}$$

- Δ = Displacement
- P = Applied force (from seismic shaking)
- K = Stiffness of the material (stiffness decreases with brittleness)

Material	Strength (MPa)	Ductility (strain at yield)	Seismic Performance	Failure Mode
Steel	High (400 – 500 MPa)	High (10% - 15 %)	High Resistance to earthquake forces	Plastic deformation, Energy absorption
Reinforced Concrete	Moderate (25 – 40 MPa)	Moderate (1% - 2 %)	Moderate but can fail under extreme stresses	Shear failure. Flexural craking
Unreinforced Concrete	Low (10 – 25 MPa)	Low (0.1% - 0.3 %)	Low , catastrophic failure at moderate PGA	Brittle fracture, shear failure
Brick Masonry	Low (5 – 20 MPa)	Very Low (< 0.1%)	Very Low, prone to collapse under moderate shaking	Cracking, collapse

Seismic Performance of Ductile vs. Brittle Materials

Insufficient lateral load resistance

Various kinds of forces always apply to all buildings continually, such as gravitational, wind, and seismic loads. In the case of earthquakes, the direct threat among them is the unpredictable and subsequently abrupt nature of the ground shaking, which logically results in ground shifting. One of the most critical contributions to the collapse of the building which occurs during the seismic events is insufficient load resistance in the sideways direction. If buildings are designed incorrectly and do not fulfill the function of the horizontal forces effectively due to a lack of structural design, they might be subject to considerable swaying, deflection, and the collapse in extreme cases. This is mainly due to the nonexistence of computational technology in civil engineering and construction for the past few decades, which has resulted in a growing demand for such software in these fields.

Shear or diaphragm walls act as basic elements for absorbing and channeling seismic "stroking" (energy), which is very important for the building frame to remain tall and safe. Shear walls can be made of concrete or braced steel, reinforced with steel, and serve as solid elements that provide strong resistance to lateral movement, prevent drifts, and thus improve the overall construction stiffness and, ultimately, the serviceability of the building. There is no way to avoid the shear walls' job when it comes to horizontal forces. The load of horizontal forces goes only to columns and beams, which are not designed for this. That is why the construction of the buildings is such that they become more elastic and can easily deform and, consequently, collapse. This is a particularly difficult situation in the construction of multi-story buildings, as during an earthquake, the forces that act on the upper floors are added to the ones provided by the earthquake, which causes a serious structural instability.[48]

Another important factor through which structure fails lateral load resistance is a weaker structural joint, which is a critical member that connects the beams, columns, and the floors. These connections are fundamental as they transfer the loads through the structure, and they become points of failure during earth tremors if they are not reinforced correctly. The weak joints can produce many harmful results, like joint failure, in which the badly designed connections are detached from the seismic forces; floor separation, where the slabs are separated from the structural frame, which can cause a partial or a total collapse; and progressive failure, in which the breakdown of one section starts a domino effect, which leads to the collapse of the whole building.[49]

The engineers implemented a number of design techniques to improve lateral load resistance in order to address these issues. In addition to aiding in stabilization, the installation of shear walls in strategic locations, like elevator shafts and stairwells, also increases the overall strength of the buildings. Strengthening the joints of the structure with reinforced connections of high quality ensures that the forces are very efficiently transferred and absorbed. Even moment-resisting frames or steel braces are bracing systems which can assist in distributing lateral loads and acting as a stress reliever for other elements of the structures. In the case of buildings that exist and don't have enough lateral resistance (they need to be...), retrofitting is a way to solve this problem by modern engineering solution things like adding shear walls, steel reinforcements, or base isolators, which substantially boosts earthquake resistance.[49][50]

The absence of adequate lateral load resistance caused by human fickleness is still one of the most common reasons for constructing a fall during quakes. The lack of shear walls and the shear point of structural frame joints are ones that endanger the ability of the building to absorb earthquake jolts and that posed peril on the occupants inside. The role that the right engineer and builder and the right structural design, materials, and retrofitting efforts play in earthquake-prone regions is discussed. This means that buildings that possess seismic safety features are built in a way that protects people staying in them and the buildings are actually the ones that become the safe houses in the areas with the highest seismic activity. New construction and older structures need to correct these vulnerabilities in order to decrease the damage that is caused by earthquakes to both communities and infrastructure.[50]

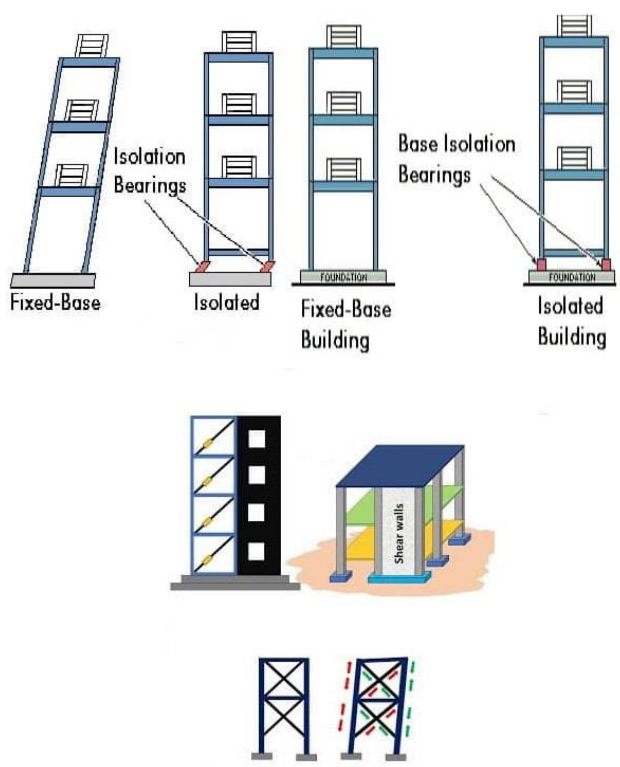


Figure 36 - insufficient lateral load resistance

Foundation Failure

Underpinning a building's reliability is mostly controlled by the solidness of its foundation; thus, any weak link in this indispensable component results in the collapse of the structure during an earthquake. If the soil under the building stays in the unstable mode, its load struggling ability might be hampered; thus, it might start to tilt, sink, or even completely fall apart. Two of the most general reasons for which the foundation is crashed in seismic events are flow of soil such as liquefaction and suitability and inadequacy of the soil, each of which causes the building to be highly deprived of its resistance to the earthquake.

Liquefaction projects once the soil is watered and the water is thoroughly penetrated and then it undergoes an earthquake event which loosens and breaks the soil particles apart, leaving the soil in a condition of behaving like a liquid rather than a solid. This can also bring about a drastic issue of the building's unevenly sinking or turning over. The sudden subsistence in the solid ground under the construction leads to translational effects, those include posing a dilemma to the structural stability and triggering chillness in the proximity of the installations that are buried due to the move of the subsoil.[50]

Also, the other cause of a weak foundation that may come due to bad soil quality is the one causing differential settlement, a condition where various sections of the building descend at different paces. It happens mainly due to the off-set impact, which, if the structure is overburdened by stress, could lead to the creation of cracks in the walls and the foundations and eventually, in the end, a reduction in the infrastructure's durability. Sometimes the buildings could even have a visible pitch, which is not only dangerous for the current occupiers but also the main cause of the buildings falling down. Equal sharing the load on unfavorable soil is very hard and thus whenever a building happens to encounter an earthquake, it will get highly vulnerable.

Engineers, to decrease these dangers, may make better soil by compacting less dense soil, employing deep foundation systems like piles, and the perfection of soil to stop the possibility of liquefaction. Proper foundation design will also be one of the key elements, such as reinforced concrete and elastic foundation systems, which can bear seismic shocks, and will be responsible for maintaining the stability of the structure. Through these steps, building engineers and architects can increase the sprinkling of the building, which further guarantees safety when earthquakes hit regions that are highly prone.[51]

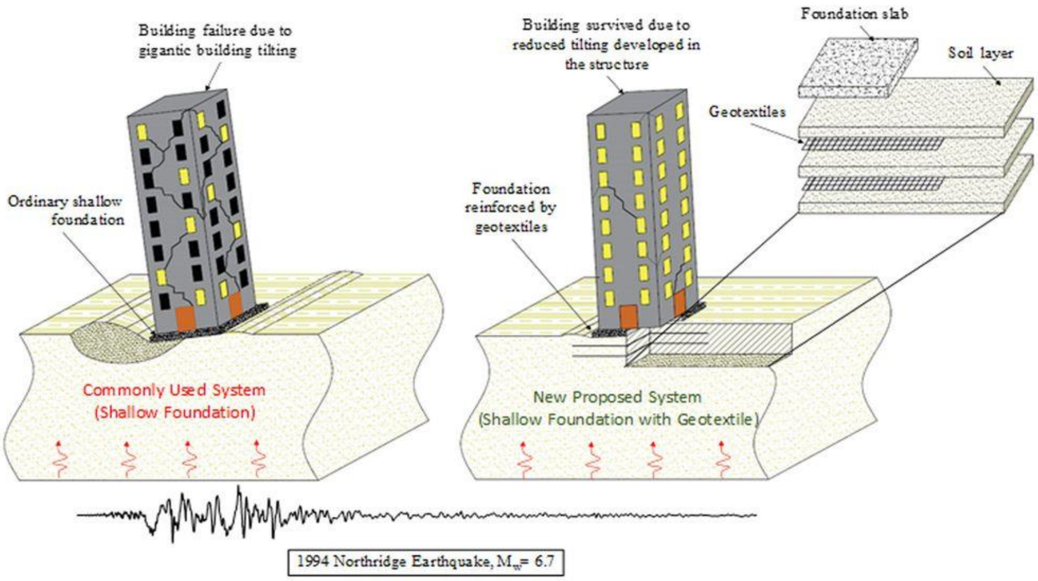


Figure 37 – foundation failure

Structural load transfer failure

A building's stability during an earthquake mostly depends on the quality and the reinforcement of its columns and beams. In the event that these are not designed properly, they become very vulnerable to collapses due to the tensile forces from an earthquake leading to total destruction. Defective columns, especially, experience excessive forces during an earthquake, these act as point loads and may result in a progressive collapse by shaking the whole structure of the building. The fall of any one column may set off a chain reaction, wherein the top floors crumple onto the lower ones, thereby trapping the occupants and causing massive destruction.

Among the most important elements in this area is the column collapse, which is the bending of columns due to a lack of compression reinforcement while the columns are also being compressed and bent in the direction of seismic shaking. Thus, establishing instability and, finally, a total crash. Additively, Columns are susceptible to the failure of shear, the diagonal crack which causes sudden breakdown of the structure. This failure would lead to the collapse of the building like a pancake, with the floors falling one after the other, thus making the situation even more dangerous for those inside.[52]

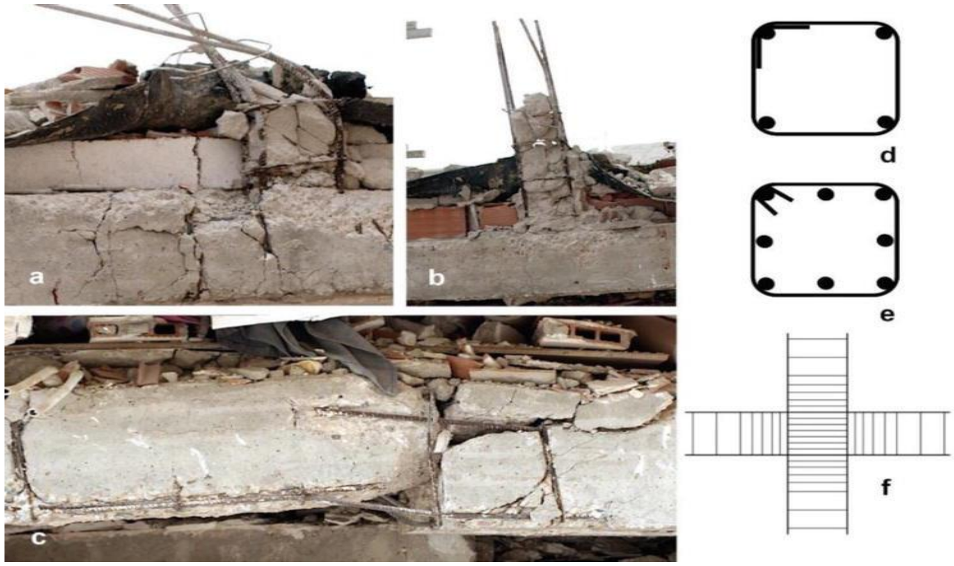


Figure 38 – column load transfer failure

To avoid such failures, it is mandatory to use stirrups which are small steel cages wrapped around the main rebar in columns and beams. Stirrups are the mainstay of these reinforcement members as they prevent buckling and resist shear forces which in turn hold the structural integrity of columns and beams. They also help to spread the seismic forces over the entire building, which in turn can minimize the risk of diagonal and instant failures and increase the ductility of the structure. Iran coronet stirrups allow both beams and columns to restrain from lateral movements and enhance the ductility in the structure. If the stirrups are placed properly, the concrete core of the beams can prevent them from crumble, which will carry a significant load instantly and, in some cases, the formation of plastic hinges—localized failure points that destabilize the entire structure.

The column and beam deficiency of reinforcement is almost always the main culprit, which can be due to fiscal reasons, errors in design or construction, the existing older infrastructure, or having inefficient supervision during construction. By cutting expenditure, some contractors can decrease the number of reinforcements, but what happens when the structures are not correctly built causing significant troubles. Some of the old buildings are either not designed with modern seismic standards or are constructed in a way to introduce misplaced or missing reinforcement. The step to be taken to avoid these risks is for the engineers to stick to seismic design guides which emphasize the strong column-weak beam design, meaning that the columns need to be stronger than beams. The use of high-strength concrete and steel reinforcement not only increases the durability of columns but also ensures that the beams are designed with enough flexural strength to absorb seismic energy without transferring the stress to the columns. Also, correct stirrup spacing, anchorage, and reinforcement at the points of high stress are important. Additionally, upgrade of existing buildings is also an option, with the help of external reinforcements, steel jackets, fiber-reinforced polymer wraps and base isolators. Such technologies can further improve the structural performance of a building. Regular inspection of the structure is very essential to the identification of the weak links present in the old buildings.[53]

A non-destructive testing method like ground-penetrating radar will be useful for evaluating the integrity of the hidden reinforcement, and then the older buildings can be modernized by adding the strengthening zones in order to meet the new seismic standards. By following the principles of seismic design and reinforcing the already existing buildings via retrofitting, engineers can reduction the risk of failure that is a result of the lack of adequate reinforcement by a significant margin. It is crucial to deal with the vulnerabilities because it is only in this way that one can guarantee the construction of safer structures that will be able to resist earthquake vibrations and at the same time reduce casualties and damage.

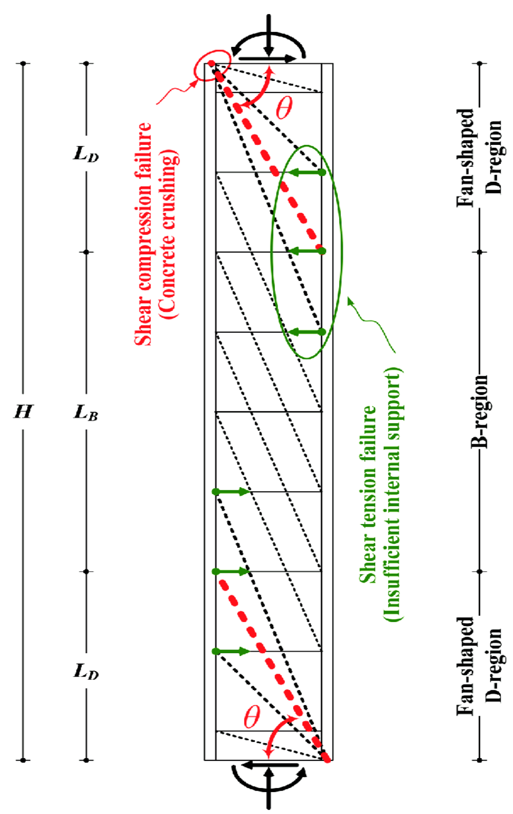


Figure 39 – load transfer scheme

Insufficient construction practice & code

Figure 40 – construction code

The safety and durability of a building in the face of an earthquake are deeply linked to structural quality. However, sometimes well-designed buildings may not behave as specified if their workmanship is of poor quality. The use of substandard workmanship, absence of quality control, and the absence of proper detailing are some of the reasons why these buildings are at risk, thereby making buildings more prone to structural collapse. Specifically, some of the defects during earthquakes are a result of the use of specious materials, improper construction technologies, and the failure of engineers to follow the set standards. In this way, it is an unquestionable fact that the subjects are aware that the buildings are established on the highest standards because this will largely contribute to the reduction of the related risks.[54]

The role of quality control in construction is essential for the provision of structures that can resist earthquake forces. If they do not meet the (specified) standards, which include the materials as well as the construction techniques, the stability of the building is grossly affected. A serious technical problem is one of the materials which are of substandard quality. For example, concrete that is of low quality, incorrect concrete mixture or the poor quality of steel reinforcement are all regarded as major issues. Deficient or the wrong ratio of the raw materials prevent the concrete from being strong enough to withstand the earthquake. This under-resourced steel or rusty one makes a structure lose its suppleness to the seismic energy and therefore, the structure is prone to collapsing.

The other problem is the inefficient curing of concrete. Correct curing of concrete is mandatory to allow it to fully develop strength. Inexpertness in curing leads to concrete with low tensile strength that is hence liable to crack. Thereby the strengthening of the beams, columns, and shear walls becomes the first preference. Besides poor workmanship, mistakes like improper placement of concrete and reinforcement bars can further weaken some building parts like beams, columns, and shear walls. The building has weak planes within it as a result of cold joints that form when pouring the concrete is interrupted, hence this unwanted feature decreases its stability.[54][55]

Structural integrity of buildings is also adversely affected by incorrect detailing. Stability during seismic events is only guaranteed if the elements are correctly detailed. Unfortunately, lack of reinforcement, lap lengths of reinforcement bars that do not comply with the standard, and, on the other hand, wrong grades and improper spacing of stirrups are some of the factors that could affect the building properties to withstand the force of an earthquake. Moreover, cohesion deficiency of beam-column joints can also lead to joint shearing failure and in turn, progressive collapse. Such collapse in multi-storey buildings due to one single joint can provoke the complete fall of all floors, resulting in an earthquake becoming perilous. Another dilemma is the lack of the design of shear walls and bracing systems which are critical factors for the resistance of the lateral loads caused by the earthquakes.

The consequences are severe when poor construction practices are happening during an earthquake. Buildings that are built on weak concrete are not properly installed with reinforcement, and have error details might develop cracks, chips, and pose themselves to structural instability. The performance of key units like columns, beams, and joints are likely to lead to progressive collapse, whatever the cases, risk occupants and property the most. Additionally, such buildings may, in the event of an earthquake have too much deformation that could lead to them being habitable only after the shaking stops getting fixed.

To tackle such risks, the implementation of strict quality control techniques, and proper detailing skills by builders, engineers, and authorities becomes crucial. The primary components of the construction project's quality assurance are, first and foremost, the use of certified concrete material, as well as the timely and appropriate mixing and curing of concrete and the routine inspection of steel reinforcement. The quality of construction can also be greatly increased by using proper construction procedures on the job site, such as educating employees about the ins and outs of concrete mixing and steel reinforcing. An on-site presence and inspection are necessary to guarantee that the workers are adhering to the construction laws and that there are no mistakes made in the completion of tasks.

Another effective way of improving seismic strength is to work on the structural composition. Joint-beams and columns are designed to be the last link in the structure, rebar, and construction splices. are all necessary to bar the cracking around the time of the earthquake. The construction of seismic systems and shear walls can greatly help in guaranteeing the structure's non-collapse during earthquakes. On the other hand, the installation of supportive toroid members or the strengthening of the Tibia to protect from the lateral impact loads will further improve the structure's capacity to withstand the forces of nature. Seismically existing building upgrade can be the case where retrofitting plays a role in the improvement of their performance. One of the methods that are being employed to register a low building performance on a seal of earthquake-prone areas is the use of insufficient practices such as absence of quality control and bad detailing. Not using the right materials, incomplete reinforcement, and poorly made items may all cause buildings to weaken causing potential damage to them by seismic forces. Through the quality measures that are being assured of across the construction stages and then by applying new technologies and retrofitting the remainder of the buildings to higher standards, communities can help reduce the earthquake-induced loss. The proper implementation of the constituent parts of the construction practice is one of the ways of increasing the building toughness and thus the protection of both the physical structures and the loss of lives from the earthquakes.[55]

Chapter 3

Main Strategies for Retrofitting the Buildings

Shear Walls

Shear walls are a very good way to strengthen buildings against earthquakes. These tall vertical structures are made from reinforced concrete, masonry or steel and are used to stabilize structures by transmitting lateral forces caused by seismic activity to the ground. Buildings are pushed back and forth by seismic pressures during an earthquake, which can cause swaying and occasionally even structural collapse. Shear walls, which also absorb wind and other external pressures acting outward and are the primary source of the building's attempt to move, help to resist the lateral load when the structure is subjected to a seismic force. Additionally, aluminum framing is employed in these devices to reduce the impacts of heat migration on the structure and give a greater amount of seismic restraint. The building does not sway and no horizontal motions are anticipated as a result of this strategy. Their placements are made in a way that earthquake loadings are distributed uniformly throughout the structure through weak areas in the structure being concentrated stress on the remaining portions.

The effectiveness of shear walls largely depends on their design and placement within a building. So does the decision of the particular material to be used (either concrete, masonry, or steel) which is going to be dependent on the specific structural and seismic features of the project. Clearly, its position is as crucial as the material in that the wall must be placed at the core of the building ensuring that the forces are balanced and that via symmetric placement along both axes they are efficiently transferred. Required spots are the emergency staircase, the elevator shafts, and the exterior walls. It is an important aspect of the wall design, as it gives an idea of whether the walls may need additional support when stability is threatened due to the height-to-width ratio, which is the ratio of the wall height to the wall width.[56]

Shear walls, the most commonly utilized types of walls among many structural and seismic applications, come in different forms. Reinforced concrete shear walls, which are the preferred type, offer better durability, fire resistance, and strength because of their steel reinforcement. Reinforced masonry shear walls, which are constructed from concrete blocks or bricks with reinforcement embedded, offer a cost-effective option, particularly for low- to mid-rise buildings. When it comes to high-rise structures, steel plate shear walls are ideal for retrofitting applications, they offer the advantages of high ductility and energy dissipation and they are relatively lightweight as compared to concrete walls. These are utilized only for repair or upgrade and are pre-cast, thus making the process faster and the quality more predictable as the elements are laid and bolted together.

Shear walls which are installed during the process of a retrofitting project led to the inclusion of several advantages. The chief objective for which shear walls are used in seismic areas is to enhance structural stability. That means the efficiency of the building’s foundation is magnified. Their presence significantly reduces the risk of damage and collapse, limiting cracking and deformation during earthquakes. Consequently, the occupant's safety level is also boosted as it ensures that only the designated amount of movement happens and that no structural failures take place. In the same manner, the versatility is enhanced by the fact that they can be incorporated into existing buildings or newly built ones, which makes the design-friendly to a wide spectrum of architectural features and structure.[56][57]

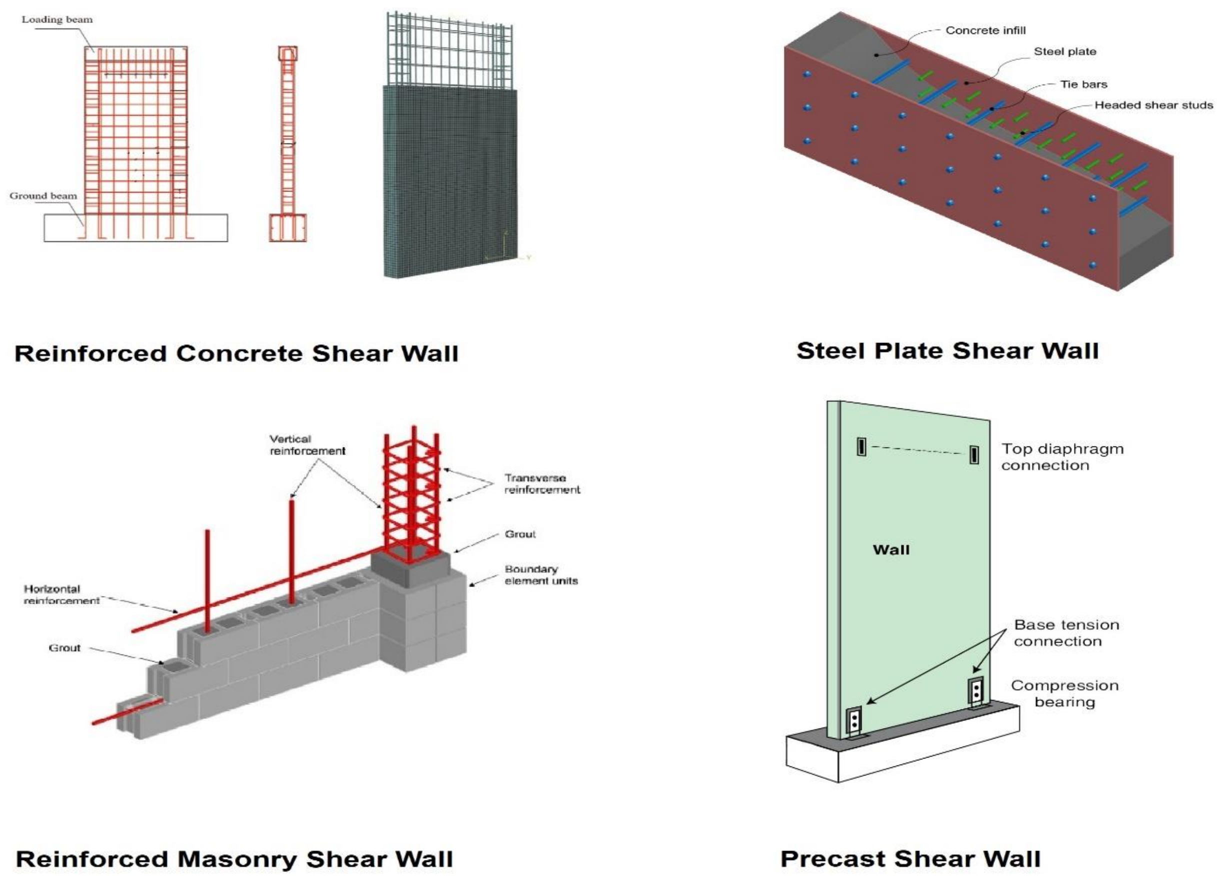


Figure 41 – shear walls

Even if they come with a lot of advantages, integrating shear walls into retrofitting projects can represent some difficulties. In this regard, structural installation may involve respect for the pre-existing structure by changing, for instance, the foundations strengthening or revising the interior layouts. The weight produced by concrete shear walls in steel frames increases demand for additional welding of interior structures, while their placement can also affect the building's aesthetics and the function of other spaces, which in this case design issues have to be resolved in a very careful manner. In addition, the costs and the period of time needed for the construction which are accounted for by the retrofitting of shear walls—both for the materials, labor, and the potential disruption of occupants—should be carefully considered when planning a retrofit project.[58]

In the end, shear walls become one of the most crucial parts of seismic retrofitting, whereby they offer an extremely practical method for reducing lateral loads and, consequently, limiting subsidence and mending the entire building's stability. If they are correctly manufactured, placed properly, and selected from the right material, then they will be well-used in the earthquakes risk reduction and allow for saving the maximum number of lives. Besides the difficulties in terms of the connection of different building parts, weight issues, and various costs, the advantage of the use of shear walls, which are the most reliable and frequently used among the most commonly practiced methods of seismic strengthening methods, are somehow far. At the end of the day, their implementation makes sure not only the safety of the occupants but also the high sustainability of the structures in the earthquake-prone areas.

Bracing and Windbreaker

The increasing trend of building near earthquake-prone regions makes the structures of the buildings in these areas constantly at risk of damage due to the lateral forces generated by earthquakes. Those without the necessary reinforcement will most probably undergo excessive swaying, deformation, or collapse. Use of bracing systems or windbreakers is but one of the most tech-savvy ways of enhancing a structure's earthquake resistance by increasing its lateral stiffness and enabling the distribution of seismic loads in a more efficient manner. These systems will enhance a structure's ability to absorb horizontal forces resulting from the earthquake movement by stiffening movement, as stated above. As a consequence, these systems are designed to achieve lateral stiffness along the building thus the seismic loads will pass more efficiently. The most commonly used retrofitting solution that is cost-effective and applicable to both the existing and the new buildings is the use of bracing systems and the windbreakers which in turn results in structural improvement thus making them earthquake resilient.

As parts of the structural framework, braces and windbreakers are the lifeblood to enhance the building's performance against seismic forces and so to avoid the dangerous levels of deformation. Braces, when installed, are usually placed within the wall or, in some cases, within a frame to provide the necessary support for most parts of the building. As a matter of fact, the strut connections of each section to the earthquake-induced vibrations are made using the wall as the load-bearing element as a means of the earthquake-induced vibration-resistance technique. Intermittent diagonal or vertical reinforcement, such as braces of steel, reinforced concrete or composite materials, e.g., still is vibra-spring. Such are the most-used elements in general and particularly in multi-story buildings, industrial facilities and bridges when statics analysis requires extra lateral support devices to be added to the structures. While windbreakers are the main elements used for control of wind, they also contribute to reducing the lateral displacement during earthquake events thus supporting in general the structural integrity.[59]

In earthquake retrofitting, various types of bracing systems are put to use that are shaped exactly to the requirements of the building and seismic conditions. Diagonal bracing is one of the best-known ways of doing things, that is, X-bracing, which makes use of steel members that are placed in an "X" shape through the structural frame. This pattern helps with both stress on structural members (columns and beams) and the transfer of the seismic load to the foundation, thereby supplying strength to the whole structure. Another way is to utilize K-bracing, a widely known method, where diagonal members (diagonals) connect to a central vertical column in a "K" shape and this lets the structure be able to resist both compression and tension forces during seismic shaking. A set of diagonal braces that meet at a central point, as a system of Chevron or V-bracing and its inverted-V counterpart, is the description of a set of the former, as the latter consists of the same elements but connected in an inverted manner so that there will be two ends for a diagonal brace to sink in. The seismic load is distributed more evenly in that way and the localized stress concentrations are reduced. A more sophisticated approach, the eccentric bracing, is one in which cross-braces are set apart from the beam-column joints, so energy dissipation zones are formed which enable controlled deformation and less the possibility of a sudden structural failure. This system can be successfully used in retrofitting high-rise buildings and bridges.[60]

The various advantages of bracing systems used in earthquake retrofitting are quite considerable. The lateral stiffness is augmented via braces, which reduces the excessive movement and deformation to a minimum, and thus, the building is kept stable during the actual ground motion. Further, these help in better load distribution, transferring seismic forces over to the foundation and assisting in preventing localized weaknesses that might lead to the complete collapse of a building. Forward-thinking bracing systems not only great structural ductility is further developed and allowed the buildings to absorb and dissipate seismic energy but also prevent severe damages. Moreover, bracing is an efficient and cost-effective earthquake protective measure which significantly enhances the buildings' resistance without the need for major reconstruction. At times, braces can be mated with other structural assemblies with minimal disruption of function or aesthetics, and this makes it a practical solution for retrofitting a building as opposed to other structural modifications.[60][61]

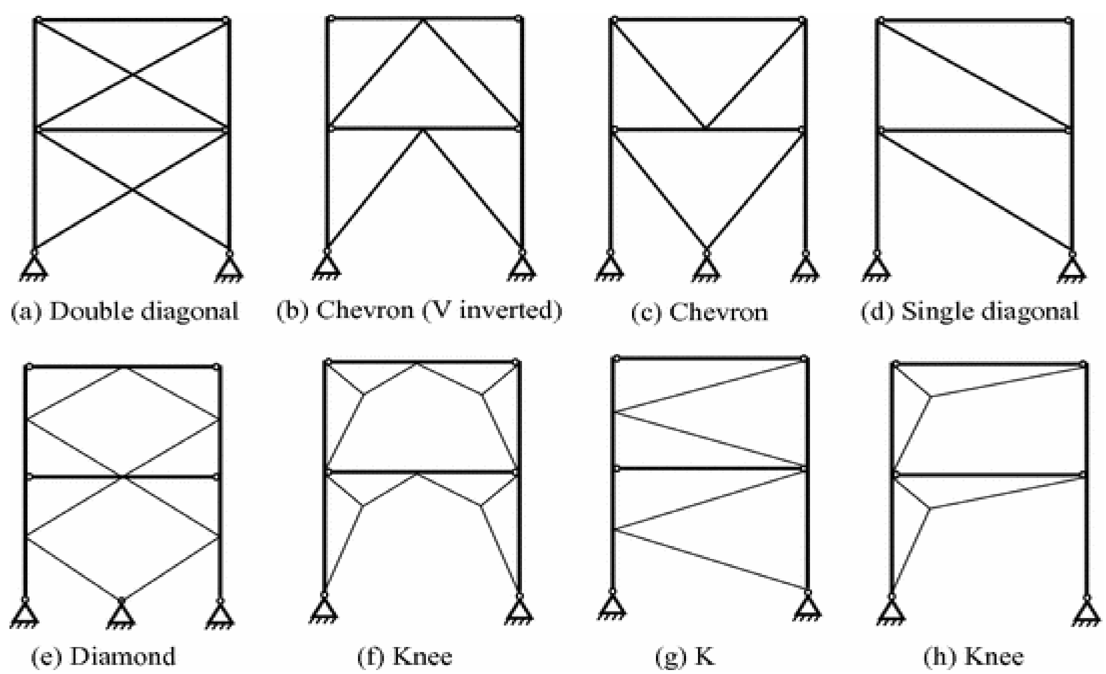


Figure 42 - bracing

The installation of bracing systems presents several challenges that have to be confronted carefully at the time of the project. Structural compatibility is a very important issue here since the NZEB definition that is the load bearing of the building shall not be compromised by the introduction of braces. The choice of materials, whether steel, reinforced concrete, or composites, is the one that defines the efficiency of the bracing system and the amount of time it can be in operation without getting destroyed. Furthermore, the reinforcement that is needed to the foundation is to prevent structural imbalances caused by the new load coming from the brace's installation. Additionally, the capacity effects of foundation are to be considered with regard to load bearing capacities as the tests carried out there may be in iso-level mode, i.e., the load is at a point under the level of the achieved capacity, but the building is stable. Thus, collapse does not occur. Architectural restraints might as well come to pass, and the addition of braces could impede the functionality of windows, doors, and indoor spaces, thus design adjustments might be necessary both in functionality and seismic protection.[61]

Despite these difficulties, bracing and windbreakers are still among the most effective solutions for enhancing a building's structural stability against earthquakes. By upgrading structural frames and guaranteeing effective load distribution and the roof system, these means are the key to a smooth process of failure prevention, and the improvement of earthquakes in vulnerable areas. With the continuous evolution of the technological patterns and the materials, bracing is still the most effective and spread option for both retrofitting the existing-structures and constraining buildings to be built with earthquake-resistant. Earthquake retrofit measures including the use of bracing systems are imperative not only for saving lives in a natural disaster but also for ensuring the constant strength and safety of the building in the seismically active regions. The process of earthquake retrofitting, i.e. bracing systems, is tantamount to the preservation of human lives through ensuring the long-term strength and safety of structures in seismically active regions.

Dampers

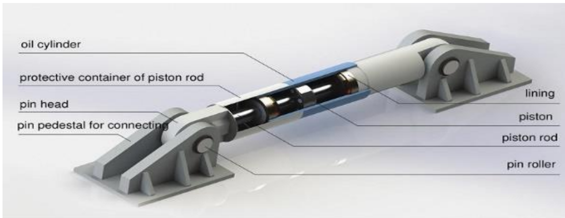
In earthquake-prone regions, seismic activity makes the buildings very sensitive and fragile cause they can move too much, they can become deformed and even collapse. One of the most effective solutions is of course to minimize these risks by using dampers which perform the function of a shock absorber and that in turn dissolves the kinetic energy dissipated by earthquake inelastic response. These devices, installed in a building's internal structure at the right place—such as at connection joints or as part of bracing systems—dampers during an earthquake operate by deforming absorbing and distributing a great deal of seismic energy which otherwise might be transmitted to the structure's major load-bearing elements. Through the regulation of energy reduction, the dampers diminish the degrees of inertia and motion, thus they make the building more stable and the risk of fatal accidents incomplete.

Similar to the shock absorbers of a car that nullify the effects of the road surface irregularities, seismic dampers' operation comes down to changing the mechanical energy into heat or a similar lossy form across the structure; hence the forces are reduced. This cycle has the potential to save most building structures from swaying causing harm, especially in sky high construction. A variety of damper types are applied for the retrofitting of structures to earthquakes, each serving its purpose and each being necessary for the implementation of the appropriate level of vibration.[62]

The dampers of the kind utilizing a fluid named silicon oil are the most widely applied ones (VFDs), and their compositions also consist of a cylinder that encloses the fluid. When motion of seismic nature occurs, the piston moves inside the cylinder, thus forcing the fluid from one place to another thus converting the energy into heat. They are capable of high capacity of energy dissipation and are the most effective material to be implemented in the structure of a building besides other added advantages such as good results in the piercing of bridges. Another kind of damper, friction dampers, are governed by the mechanism of sliding that acts as a block in the way of a moving building, and thus they absorb the energy through the friction. Their simplicity, cost-effectiveness, and longevity have been proven and thus they are considered the smartest solutions for retrofitting steel-framed buildings as well as infrastructure with the least possible maintenance requirements.[63]

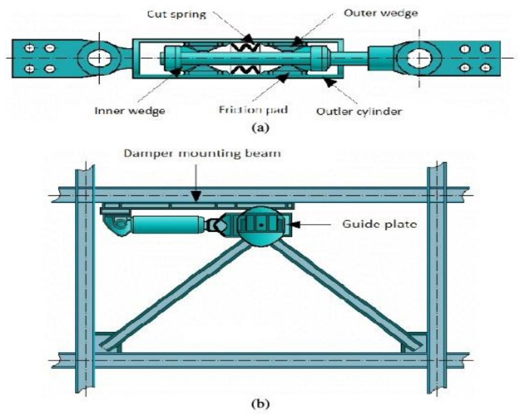
The special solution offered by tuned mass dampers (TMDs) is that a large mass is involved that typically moves in the opposite to the seismic motion, the tendency of buildings to sway; such has been the case of the unique design for skyscrapers and tall structures in general. A case in point, the Taipei 101 tower is among the examples making use of a 660-ton tuned mass damper to ward off lateral displacement due to earthquakes and wind speeds. Deformable element devices, such as yielding dampers, are currently the best retrofitting options that work like metallic elements which may deform plastically under the action of seismic stress, hence, energy is simply absorbed into it, and thus, damage to the main structural members is avoided. The dampers are suggested to be the most suitable one for the buildings that are mandatory to have high seismic resistance.[62][63]

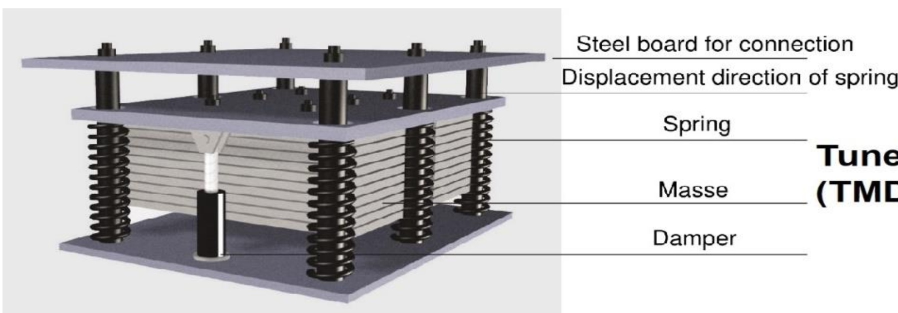
As the top-tier engineering technology grew magnetorheological (MR) dampers were developed. Thermal properties of MR fluids are sensitive to the presence of a field. As a result, the magnetorheological fluid being used is sensitized by the magnetic field, and that is why its engagement is directed to modify viscosity promptly. Real-time variations in the casting force are permitted when using the magnetic field to control the viscosity of the fluid, hence, enabling smart systems that can automatically increase the energy absorbed during an earthquake. In buildings with adaptive environmental control systems, these devices are useful where a sensor controlled on-the-fly response is needed.[62][63]



Viscous Fluid Dampers (VFDs)

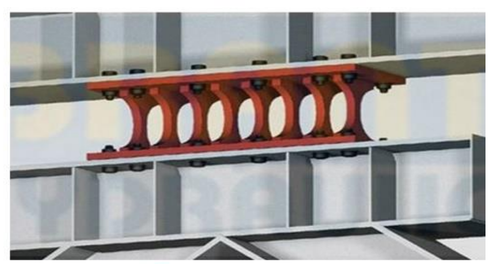
Friction Dampers





Tuned Mass Dampers (TMDs)

Yielding Dampers



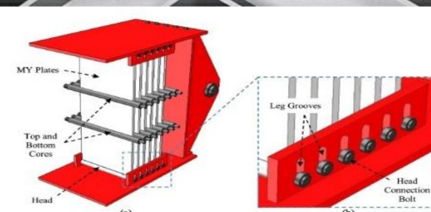


Figure 43 - dampers

By integrating dampers into seismic retrofit strategies, you can expect a wide variety of benefits. The result gives us the opportunity to get rid of all tectonic forces by the expulsion of seismic energy. Supporting structures such as beams, columns, and foundations especially gain from the dampers that they shield, and so these elements contribute amazing improvements to the overall robustness of the entire structure by feeling smaller vibrations through reduced vibrations and lessening structural fatigue. Thereby not only the building resilience is increased but also the life of the retrofitted structure is lengthened, which leads to the slow wearing of materials and thus maintaining low maintenance costs in the long run. Moreover, dampers need only very slight construction adjustments, therefore they can be equipped within the limits of the present buildings with no extra reconstruction this being the reason for their reliability. Also, dampers have an immense impact on the safety of the residents, as they not only lessen the risk of building collapse but at the same time, they create a steadier condition for the tenants, workers, and the public.[64]

However, the dispersal of dampers into practice of structural improvement comes with many obstacles and constraints. Financial restriction, particularly for higher performance systems with an extensive field of application like magnetorheological dampers, is a substantial factor that can impede their popularity due to their high installation and maintenance cost. There are also additional concerns when it comes to damping technologies, for example, tuned mass dampers, they occupy large areas within the building, which might not be possible in all the buildings and as a result, there is limited space. It is true that the requirements for regular maintenance are as important as the basic ones as the hydraulic ones need periodic revision in order to maintain the optimal state of their function. Furthermore, it can create complex situations when the structural systems of old buildings, which can be so different from those traditional ones, are not only with damper installation without their elements being projected with consideration and thereby requiring proper fixing.

Nonetheless, dampers are one of the best solutions preventing earthquake-resistant design, thus, they are classified as a crucial component in a building's safety against seismic threats. The wide range of damping technologies, including conventional friction dampers and smart MR (Magneto-Rheological) dampers, has enabled engineers to customize the retrofitting solutions according to the structural requirements and the budget constraints. Although issues such as cost and maintenance have to be sorted out, the installation of dampers brings a more lasting benefit than it does with the seismic vulnerability. Due to the growth in engineering, especially in the field of seismic protection technology, the dampers will continue to be a feature of earthquake renovations, leading to the construction of globally safer and also more robust buildings in highly seismic areas.[65]

Wall Posts

In the event of an earthquake, buildings that exist in earthquake-prone areas are under severe risk of structural collapse due to movements of the earth, for exactly this the design of retrofit is a must for not predefined stability and safety. Retrofitting is one of the buildings against earthquakes by bonding the wall posts among the walls, which act as vertical reinforcements for the remaining harnesses, thus enabling their internal connectivity, giving them the chance to endure the acceleration and heavy loads from the earthquakes without tilting detachments, fractures, or increased loading of other parts of the building. Braces convert the Earthquake resistance of the buildings which are old as well as the buildings which are not made with today's requirements to meet earthquake resistance.

Often, during an earthquake, buildings face lateral and vertical forces that cause deformation and in the alarming situation even structural collapse. It is crucial to remember that inadequate walls may simply snap or bow causing the slabs on the levels to sway, hence become unbalanced. Wall posts are obviating potential wall buckling and cracking problems instead, they drive away the load through the wall, which means that material becomes more flexible, the building shifts even further out-of-plane causes fewer failures, and the stresses are more uniformly spread. Relationships can be used by buildings to transfer the load into the whole structure so earthquakes will bring mobility to the structure's most fragile point which will lower the overall building stress. Correspondingly, they enable controlled movement, which allows buildings to absorb seismic energy in such a way, so that no catastrophic outcomes occur, and the structural integrity is kept at a satisfactory level.

The selection of wall post materials and construction techniques rely on the existing structure of the building and the amount of reinforcement of seismic required. Reinforced concrete (RC) wall posts, which are composed of high-strength concrete and steel reinforcement bars, have the highest power and ductility, so they are suitable for masonry and concrete buildings. Steel wall posts can be made by using either steel columns or reinforced frames that offer super flexibility and resistance to lateral forces, so they are of high quality that commercial and industrial buildings require. Fiber-reinforced polymer (FRP) wall posts, which are light and resistant to corrosion, can be externally applied to the existing walls with no requirement of the major hacker node, which is a preferred solution for historic buildings, if the goal is to preserve architectural aesthetics. Wooden structures using a combination of Timber wall posts, and cross-laminated timber (CLT) panels were the main ways to make the structures more severe and flexible and, therefore, reduce the seismic damage. [66]

The setup of wall posts is quite different in every case - the building type and the extent of retrofitting required. The traditional way of inserting the vertical steel columns into the existing walls through either cutting or drilling and then bolting the posts to the foundation is one of the common methods. This method is particularly effective if the old buildings are made of bricks, and their walls are not reinforced enough. By engaging the use of external steel frames the attachment of steel posts to the outer surfaces of the walls can be done fast and with very low interior disruption, which still boosts stabilization. Those which could be more invasive solutions notices are the fiber-reinforced epoxy (FRP) wraps that can be glued to the surface of the weak masonry or concrete walls, creating a durable, and ductile composite, however, the structural modifications are not so extensive. For instances where the maximum level of seismic resistance is needed, the name of wall posts can be coupled with shear walls to a minimum of intra-story drift; thus, seismic maneuvers are better deflected and redirected.[66]

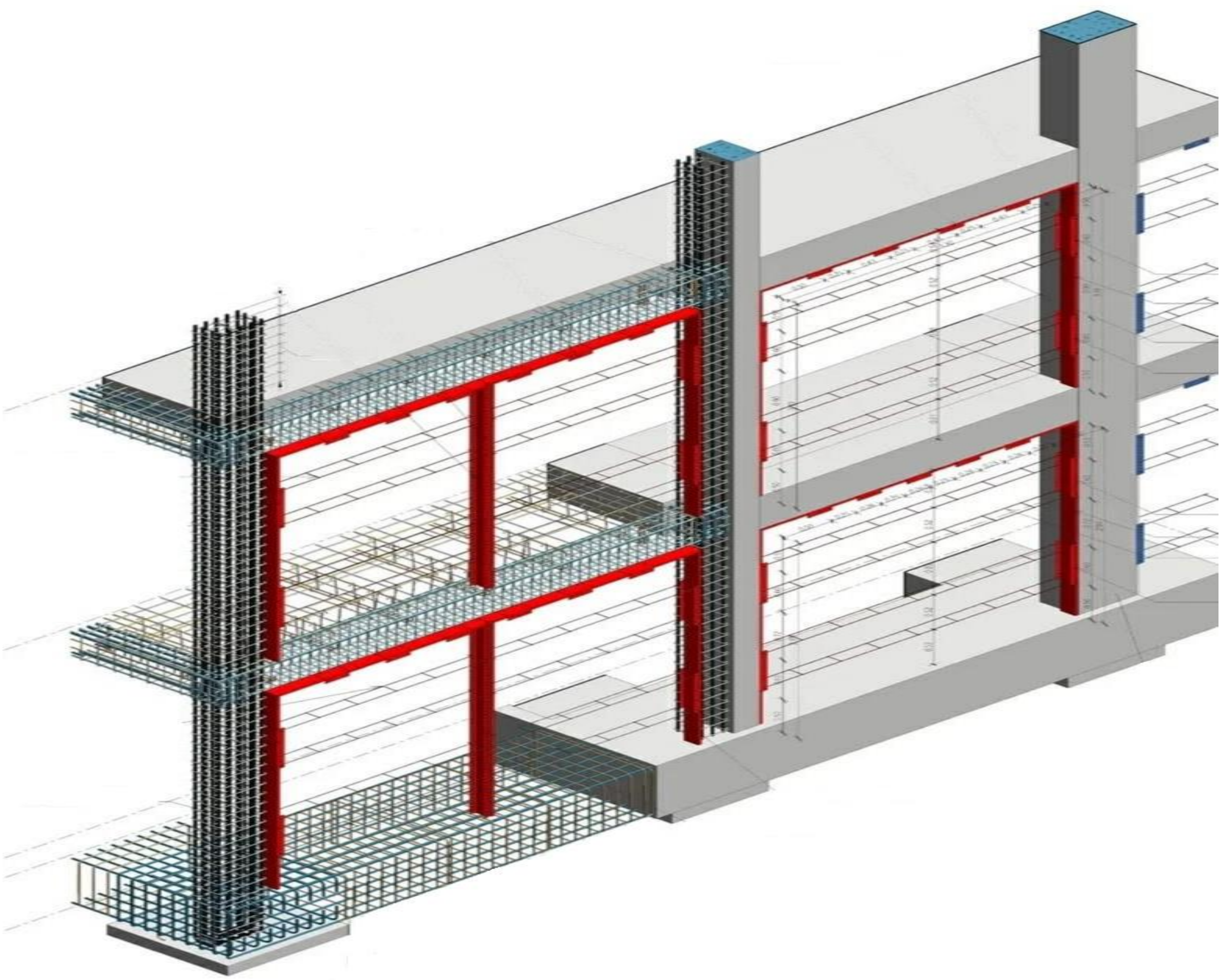


Figure 44 – wall post

Through the utilization of wall posts, significant benefits are brought about by the process of earthquake retrofitting. Essentially, they don't allow exaggerated movement of the system and thus resulting in a lessened possibility of a wall collapse. Load sharing is enabled at the global level with the help of these reinforcements, which bring about a reduction in stress points and an increase in the overall resilience of buildings. These components are adaptable to the different types of building materials such as concrete, masonry, steel, and timber therefore, they can be a multifaceted solution for different architectural styles.Besides, adapting processes like FRP wraps, installing steel frames to the outside allows for retrofitting without bringing about any big changes to the original design of the building such as the historical ones. The operations of such methods are also made simpler.[67]

There are specific issues that must be addressed in the practical use of wall posts even if they are very efficient. Cost issues are often significant and occur in cases when columns of reinforced concrete or steel posts have to be installed in a big project. It is necessary to make the building structure compatible with the new wall posts and sometimes minor changes have to be made to the old buildings before the work on the installation of wall posts can be finished. More so, the installation of reinforced concrete posts can take days or weeks, thus the occupants may experience major interruptions. The choice of materials, whether it is steel, concrete, FRP, or timber, especially depends on the existing composition of a building's structure and the level of seismic risk in the region.

Wall posts are actually a vital component of the earthquake retrofitting process for they could eventually lead to buildings that is better resistant against seismic forces as a result of a better infrastructure. And bolstering the load-bearing capacity of the vertical and strengthening the lateral stability are the prevailing functions of the wall posts that prevent catastrophic failures and ensure both safety and durability. Whether it is the urban high-rise complex or the historical buildings, these building elements are indispensable layers of protection against earthquakes. The integration of wall posts, a method that has been used from the past to the present without many changes, is a fundamental way to save lives and property by giving earthquake-prone areas the full protection they need as the seismic retrofitting techniques are changing and bettering.[67]

Shotcrete

Still posing destructive towns, earthquakes do continue to be a significant threat to the built environment. The market demand for advanced comprehensive seismic retrofitting solutions for the built environment is continuously growing. One of the most trustworthy ways to repair one's home is already being built is to utilize a waterproofing shotcrete system—a high-strength ceramic material, which can be sprayed with a machine, thus improving the structure's durability without having to re-do the work. Especially friendly towards earthquake retrofitting, the technology was widely applied in rating the poor performance of the older buildings if foreseen, e.g. those built of insufficiently strong materials or of adequate and planned reinforcement. It is also a common positive feature for a building to be retrofitted with the aforementioned labile polycarboxylate materials for the buildings to gain a greater force control that makes the structure resistant thus necessitating the injection of these substances in the concrete/shotcrete.

Flywheel of the generator style faster than the other cars as it is attached to the gearbox of the vehicle that is capable of running with two cylinders on hydrogen and also electric power and if it is necessary automatic transmission engine feeding method is available. It is a supplementary technique for the building industry to save significant time and reduce labor intensity via variously implemented methods from block construction to undertaking seismic assessments and many more. A parking elevator is a vertical motion tool that helps to increase space and to reduce the time that the car leaves inside the car population to the elevator as well as the downtown parking spaces load, making transportation better and contributing to certifications of sustainable infrastructure. In the experimental model that we constructed, the elevator's length was set to within 3 meters by measuring the height of the column, and the compactness was kept at a small size, as this was the only way to make it suitable where space was limited. The two primary techniques for applying shotcrete are the wet-mix method, which involves first placing in-situ concrete in a hopper and then pumping it to high pressure to reduce dust and increase consistency, and the dry-mix method, which involves pushing the dry mixture through a hose and adding water at the end nozzle to precisely control the moisture. The best and most popular method for strengthening and repairing a material with a high risk of seismic effects is shotcrete, a type of concrete paving, because the strength formation is maximal in both cases.[68]

Zbigniew Wolski of the Faculty of Chemistry of the University of Wroclaw is verifying the possibility complexity of synthesizing the materials based on effective laser method to create bimetallic nanoparticles used as a structural component in adhesives and paints. The entire process occurs in a very short time and usually, it is a high cycle of volumetric light energy that acts in a single mono-direction, dispersing the refractive scanned light energy for the excitation process to be completed. It is no surprise to find that a multisensory approach aims at the optimization of the experience and that the combined feedback from different sense modalities can foster experiences at a high level for didactical reasons and maybe even lead to certain epiphanies. The main strength of shotcrete to resist earthquakes can be traced down to its great property to enhance the strength and integrity of the walls that exist. The doubling in the bearing capacity of the slab created a completely new strong member increasing the cohesion of the entire structure leading to a monolithic system and, consequently, the element could support all earthquake actions. Furthermore, the more brittle nature of traditional masonry or unreinforced concrete walls, which need to be strengthened, is the reason why when cracked, they do not take the strain well because usually they do not release and retract. In jointing many types of materials and forming solid substances, the addition of bentonite or polymer modified liquid grouts contributes to achieving more infill that has even better results than in the case of saturated loose sand infill. Since shotcrete is a highly flexible material, it can be used on a wide range of structures. In unreinforced masonry (URM) buildings, in which the walls were built originally without proper reinforcement, the usage of shotcrete which has a hidden steel mesh increases the strengthening of these walls against seismic forces. Concrete walls with structural deficiencies, such as cracks or voids, are improved by the application of shotcrete that will restore and enhance their load carrying capacity. Historic and heritage buildings, which usually require non-invasive strengthening methods, may be strengthened with shotcrete while keeping the architectural integrity of the building. Moreover, industrial and commercial facilities, for instance, warehouses and factories, can take advantage of the shotcrete with seismic activity mitigation as it is a good strengthening element for the affected areas of the buildings.[68][69]

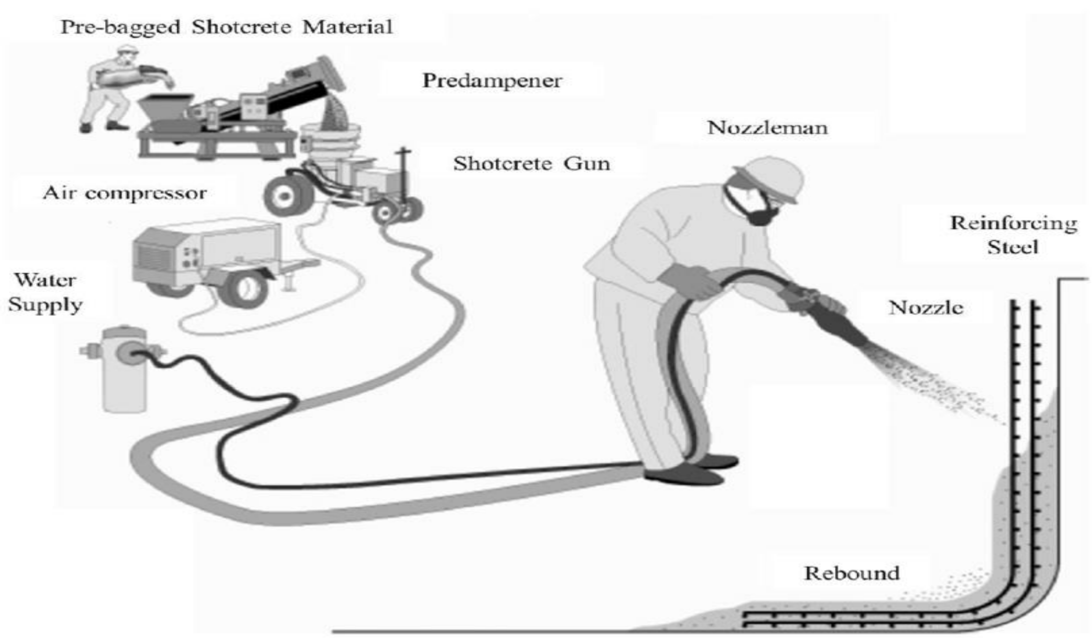


Figure 45 - shotcrete

Shotcrete can leverage its effectiveness by the use of additional reinforcement techniques. Steel mesh and rebar integration within the shotcrete layer helps to improve tensile strength as well as mitigate the brittleness by absorbing the crack development during an earthquake. The use of fiber-reinforced shotcrete (FRS), which is represented by the predominance of synthetic or steel fibers in the mixture as a way to make enhance the compressive strength, as well as the overall durability due to the density of efficiency, correspondingly, eliminates the possible impact damage. With proper surface preparation and bonding agents, one can be assured that shotcrete will stick to existing walls, thus eliding exfoliation which ensures a smooth structural upgrade. The use of shotcrete is now more successful and efficient than it was for the purpose of reinforcing buildings. The increasing of the load-bearing capacity, the boosting of the ductility, and the bonding with a wide range of materials provide optimal fixing for the seismic reinforcement of foundations and buildings in regions where earthquakes are likely to occur. No matter if shotcrete is used on residential, commercial, or historic buildings it is crucial element in the whole process of making the infrastructure safe and getting the environment free of damage. As the earthquake retrofitting inventions are developing still shotcrete is the tool, which has to be with us on this earth to avert the death of humans and the destruction of properties by the earthquakes.[70]

Fiber-Reinforced Polymer (FRP)

Resilience of the large number of buildings that exist is a precautionary measure to prevent earthquakes. Fiber-reinforced polymers with FRP are the most commonly used and most effective technologies in retrofitting. FRP is a composite material of high-strength carbon, glass, or aramid fibers set in a polymer matrix that is used in the strengthening of columns and beams while keeping the weight down. It is also very economic and easy to handle compared to. In addition to being an alternative for replacing old or damaged equipment, it contributes to saving energy, reducing energy costs, and lowering power generation and consumption. The widespread deployment of FRP in bridges reflects its lightweight, long life, and budget-friendly characteristics.

FRP sets itself apart from other materials by the efficiency of its strength-to-weight ratio, being thus lighter and stronger at the same time, and endowing its final products with the best possible quality. As opposed to steel which rusts, FRP is able to withstand corrosion effectively which makes it more a long-lasting product even in a harsh setting. Its bendability and malleability make it possible to attach it to almost any awkward structure of a building, thereby revolutionizing a non-functional structure into an earthquake-resistant one. In the same respect, PRF's ease of installation makes it a cheap and a most realistic retrofitting choice among possible others, and at the same time, causes the least disturbance to operational areas. The fact that FRP can enhance a building’s energy absorption capacity has made it the best available solution for desiltation of waste furnaces and buildings. This is a key aid to making reinforced concrete as efficient as possible in disposing of seismic forces which in turn decreases drastically the chance of building collapsing.

The strengthening through the FRP in structural retrofitting is an essential factor, especially for the columns, i.e., structural elements that mostly bear loads in the building. FRP is commonly put as confinement wrapping. In this method, FRP is applied in sheets or wraps around the column to increase its capacity to break the force to the axial and ductility. For flexural strengthening, FRP strips are placed longitudinally and glued to the column along with the surface to represent an upward strength to the bending forces. The addition of diagonal or vertical FRP sheets that are placed in plan with the slab has been found to be more effective in these shear modes, and it also improves the capacity of the connection to respond to seismic events by avoiding the failure shear mode.[71]

Equally, beams, which are used to transfer loads, thus contributing to a structure’s overall stability, have been found to be much affected by FRP retrofitting. Built-ins, reinforcing of beams/column connections, are achieved by applying FRP laminates or strips to the tension zones of the beam where stresses are being discharged from bending, which effectively help in preventing the premature failure. Joint wrapping of shear strength means that the presence of FRP materials on the beam-webs is a U-shaped reinforcement of resistance to diagonal cracks and brittle fractures. Besides, FRP is a well-proven and well-used material that can be used to create the reinforcement of the brown-field connections when beam-column joints are heavily damaged by earthquakes, leading to the loss of the integrity of the connections under the seismic loads. The process began when FRP retrofitting was successfully implemented after a proper structural assessment, in which the necessary and precise condition of the building was determined to carry out the removal of weak points. [72][73]

Surface preparation is the next step to be done where the main aim is to clean and roughen the concrete substrate to achieve the maximum bond strength. Selection of epoxy adhesives being an FRP is decided, either by the application of wet lay-up techniques, pre-cured laminates, or regardless of specific structural requirements. Curing and quality control post-retrofit monitoring and steps are executed. All the measures are conducted to ensure curing is correct and that quality control is in place, hence the retrofit is verified to be intact and genuine. Additionally, post-retrofit monitoring is done to check the effectiveness of the retrofit for the long-term.

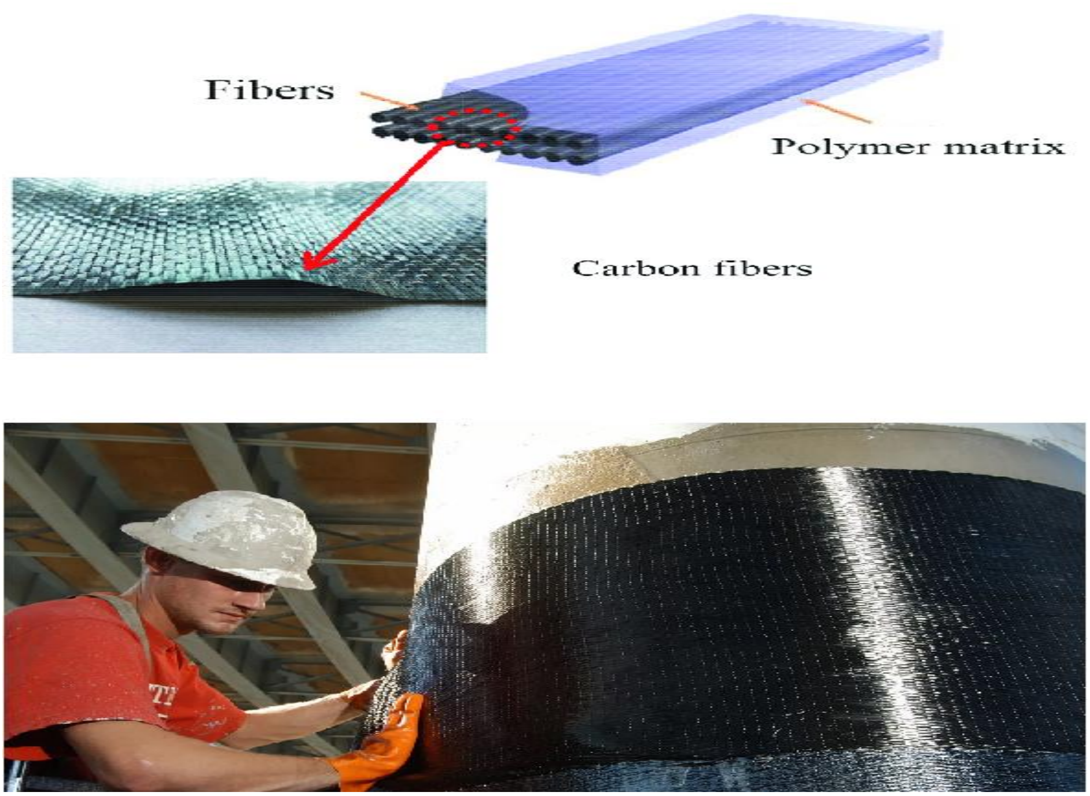


Figure 46 - Fiber-Reinforced Polymer

Retrofitting columns and beams by FRP is among the efficient and reliable methods to improve seismic resilience which have been widely identified. The strength, the duration of the resistance to corrosion, the simplicity of the application and the durability are among the advantages of this material compared to the conventional strengthening techniques. By conducting the necessary repair of the building using FRP cables, the structure will become more resistant to fracture when it is subjected to abrupt motion, which in turn will be beneficial toward saving lives and maintaining infrastructure, and on the other hand easing up economic risks caused by other seismic events.[73]

Steel Jacketing

To enhance the seismic resistance of structures is very important for the proper safety of the construction and the people who live in them during the earthquakes. One of the steel jacketing technologies, a method that includes placing steel plates around old or weak columns to increase their strength, ductility, and load-bearing capacity, is one of the most effective retrofitting methods for increasing the strength of old buildings. When steel is added to a retrofit, plenty of stiffening is experienced, so to speak, and this is how steel jacketing contributes in a great way to earthquake risk mitigation.

The ability of steel jacketing demonstrates through its capability to be able to improve the performance of reinforced concrete (RC) columns during earthquake stress. The process of the steel plates is to increase load-bearing capacity, which helps the structure to withstand higher forces from the axial and lateral. In addition, the confined environment by the steel plates increases ductility, thereby, the columns can withstand more deformation without any sudden breaking. Another important benefit is the reinforcement of shear strength since the steel casement bars are capable of preventing shear failures, which are prevalent in older buildings. Steel jacketing, on the other hand, in addition to its structural contribution, also provides corrosion protection by acting as an environmental deterrent of the corrosion of the concrete core. What\'s more, it is mainly done by this retrofitting approach, which causes minimal disruption as the installation process is quite fast and the building owners need not undertake heavy demolition work, so it is a great challenge for an occupied building.[74]

Steel jacketing application is the set of its own ways by which the RC columns are maximally reinforced, and these latter are the structural elements most responsible for the load-carrying capacity of the entire building. When full encapsulation is a method then steel plates, which are used as wraps, are placed around all sides of the column and finally welded together into a long strip to be the main jacket that will make a stable side of the material distribution the rest of it the uniform strengthening is obtained for the whole of the perimeter besides. Again, partial jacketing is one of the concepts that come to mind, and it is skirting only the chosen faces of the column, and as to this the selection is based on the specific conditions of construction. In addition, stiffeners or angles are used to increase the overall retrofit stability and reduce confinement that comes from the steel plate crunch, because the former additions give support to the latter. Also, anchors are detoxified, and steel jacket is perfectly stabilized by the foundation and slab, thus, this is the load transfer and integration of the materials within the existing structure.

It becomes clear the effective execution of steel jacketing when a detailed structural assessment is the first step, engineers look at the deficiencies of the column and the appropriate retrofit design is supposed to be crafted. Optimization of surface preparation comprises the cleaning and concrete decongestion of any loose or deteriorated material for obtaining the best bond. The installation of steel jackets consists of cutting and welding steel plates around the column, and then the connections are made secure through welding or bolting. For example, high-strength grout or epoxy would be suitable to guarantee that both materials are connected a hundred percent perfectly.[74][75]

Through the gaps, a non-homogeneous adhesive, which further increases the bonding, and the structural cohesion is filled by replacement material. Quality control and inspection are carried out by the company through the non-destructive testing methods to ensure that a reinforcement was done according to the design. Post-retrofit monitoring is performed by scheduled checks to search for corrosion, deformation, or any other structural concerns to the retrofit work thus ensuring the retrofit work is efficient in the long term.

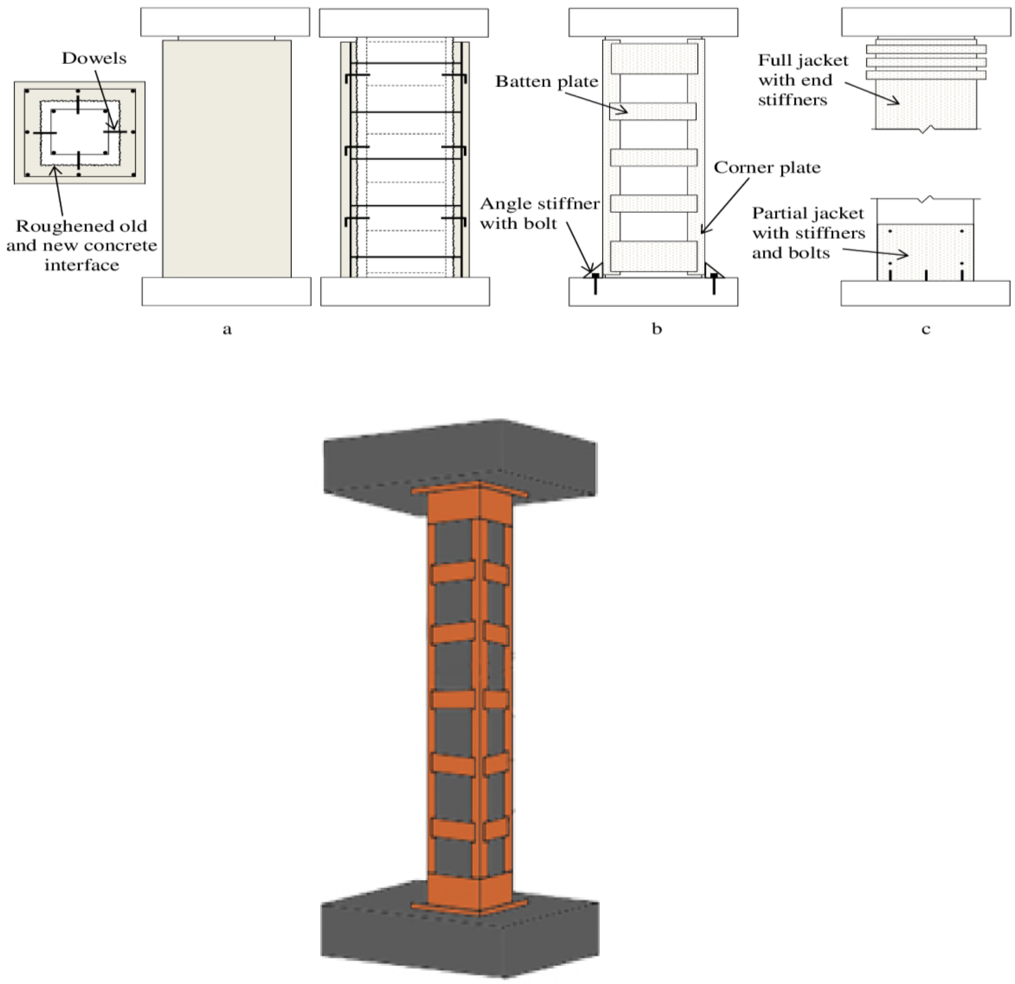


Figure 47 – steel jacketing

The concept of building safety is taken very seriously. When a building is constructed, it includes safety features such as sprinklers, smoke alarms, and fire alarm systems that need to be checked regularly. Along the line, materials and systems used in construction might wear or become susceptible to the occurrence of a natural disaster like an earthquake, making the building lose its proper condition and therefore its safety. Among various earthquake retrofitting strategies, steel jacketing, the reinforcement of a concrete or metal structure by adding steel members or sheaths, has proved to be the most reliable and economical approach.[75]

Chapter 4

Case Study

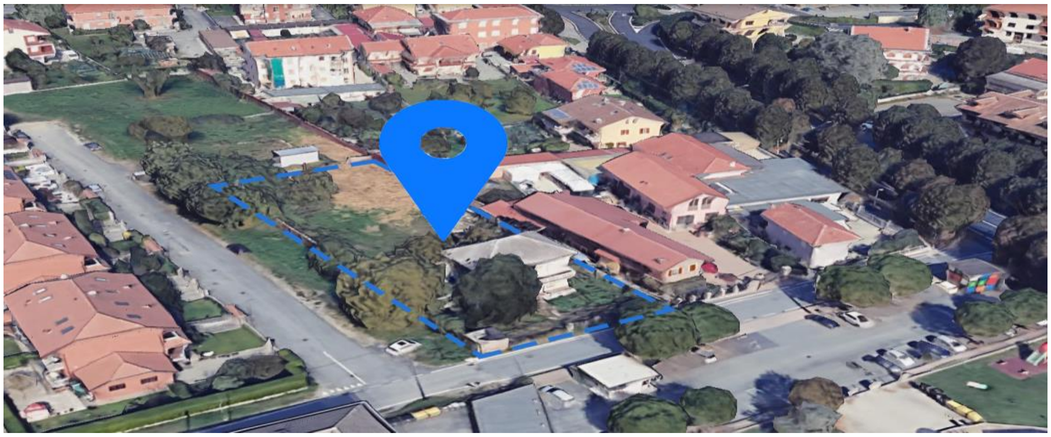
Our case study is located in Leini (a city 15 kilometers from Turin) , an abandoned house that is going to be renovated for its new functionality as a scientific institution.

Our mission based on the new planning is that first design new structural elements, secondly retrofit the existing structure for reaching optimum safety and comfort.

Let’s begin with introducing the case:

Leini

Address: Via Dott.sa G. Caviglietto, 8, 10040 Leini TO



Adjacent views:

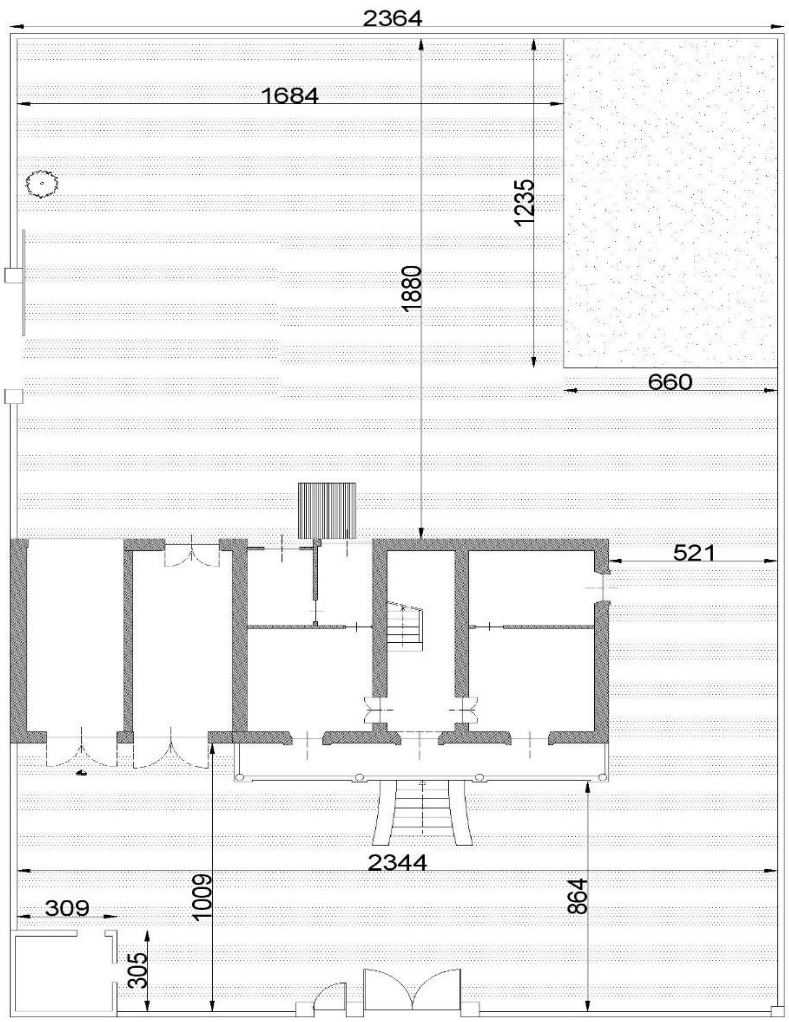
Pre-renovation status:

Our building is a 2-storey concrete structure which was constructed 50 years ago and based on its new functionality and new design, we should deconstruct some parts of that and retain and retrofit the rest of the parts. For reaching a clear view from our work we compare the plans, elevations and sections from the current status and after renovation status.

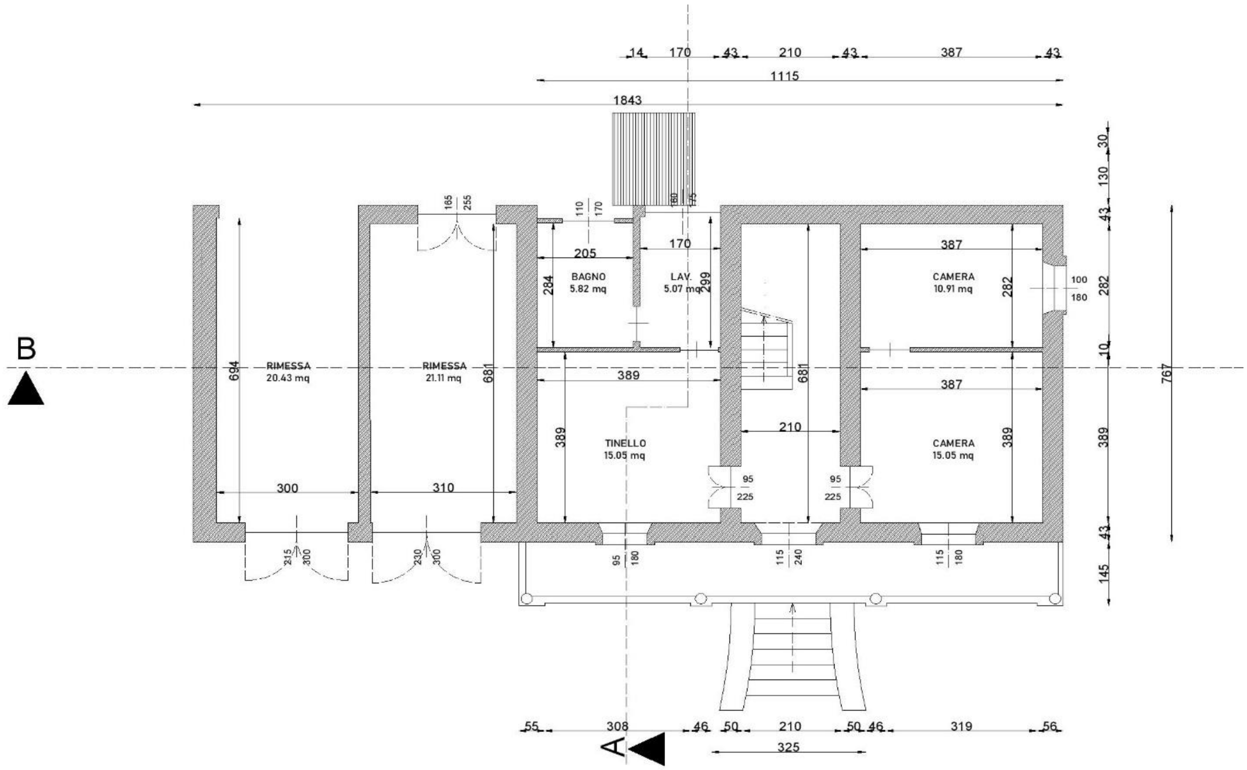
Our strategy for this project for those parts that are going to demolish is to use new structural elements and for untouched structural elements we go through the retrofitting strategy for parts that need be strengthened.

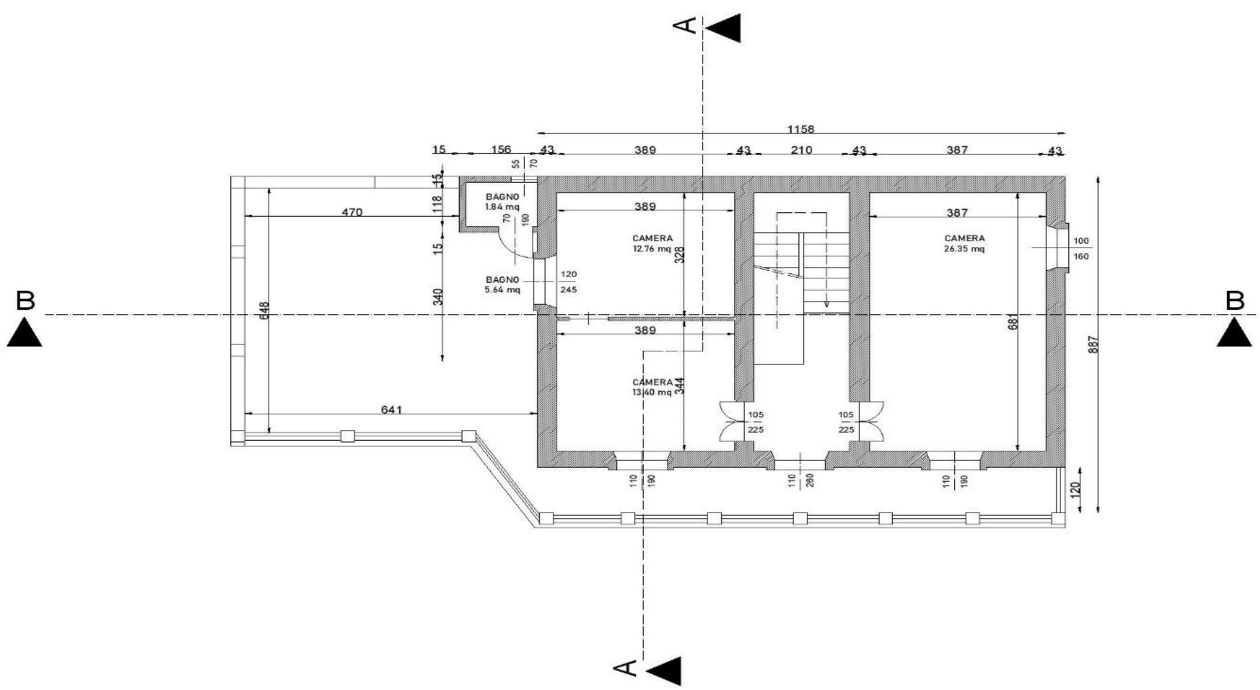
For better understanding, first we review the pre-renovation documents of the building (the scales of them may vary):

Site plan:

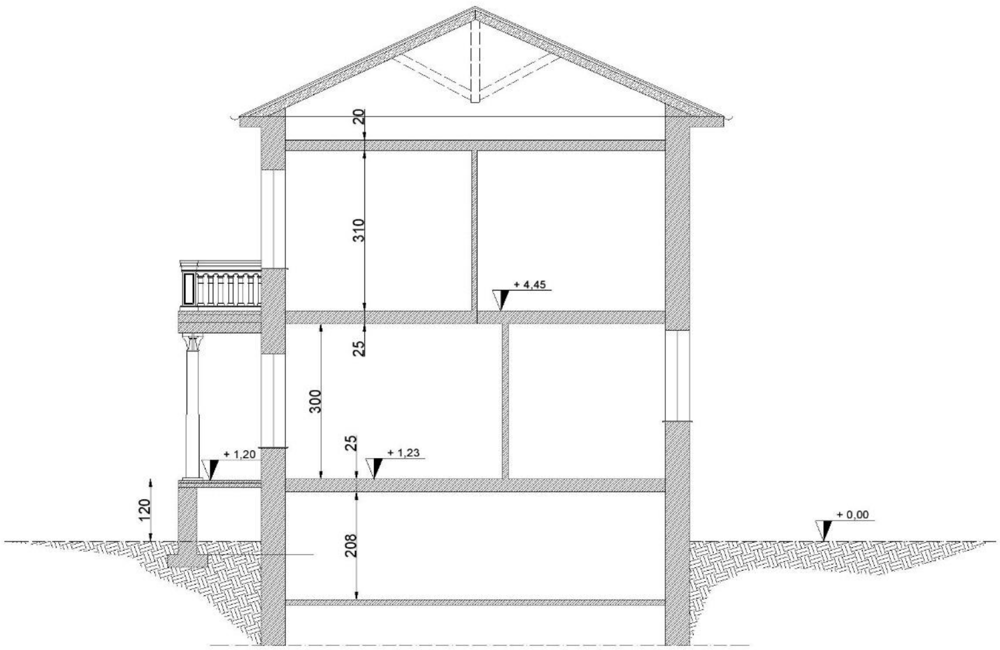


The plan of the first and second floors:

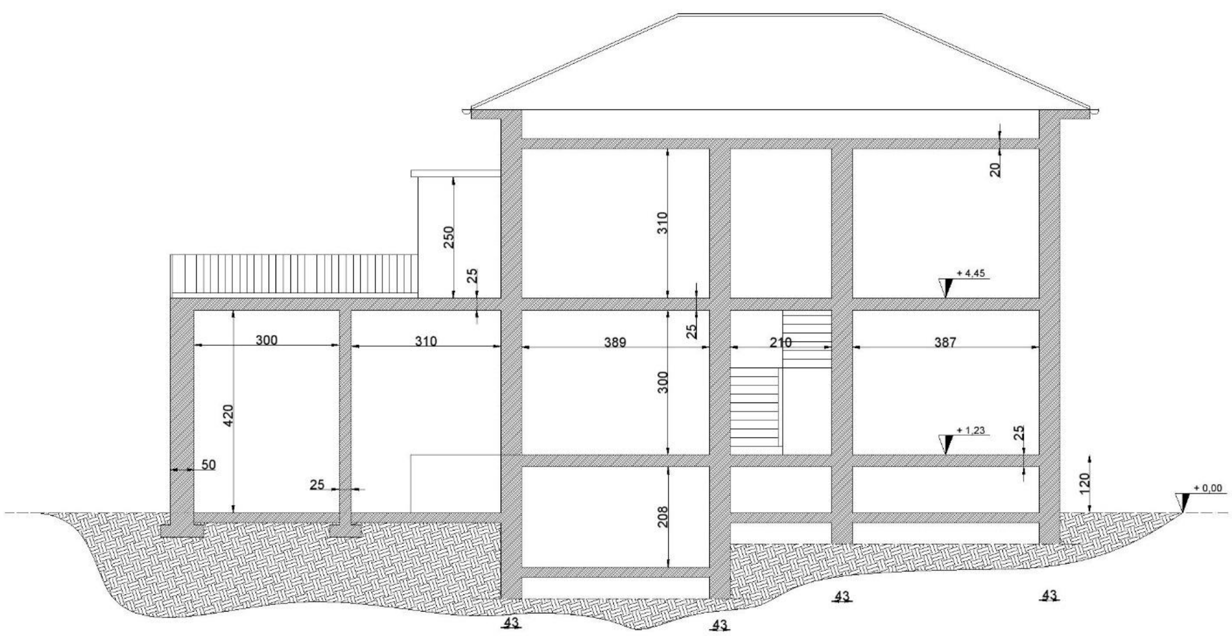




Section A-A:



Section B-B:

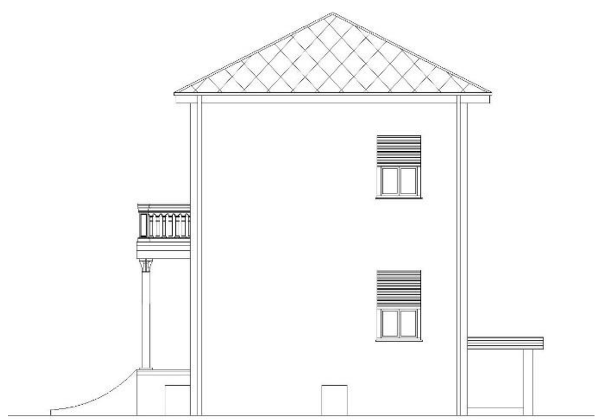


4-side elevations:

South elevation

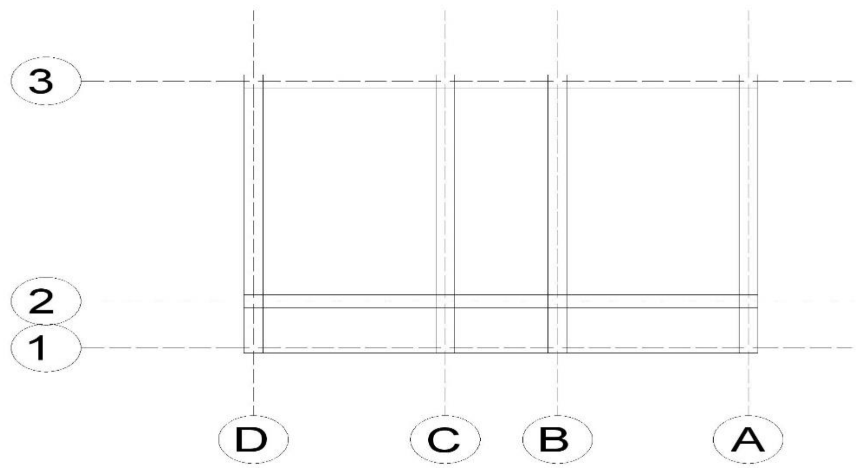
West elevation

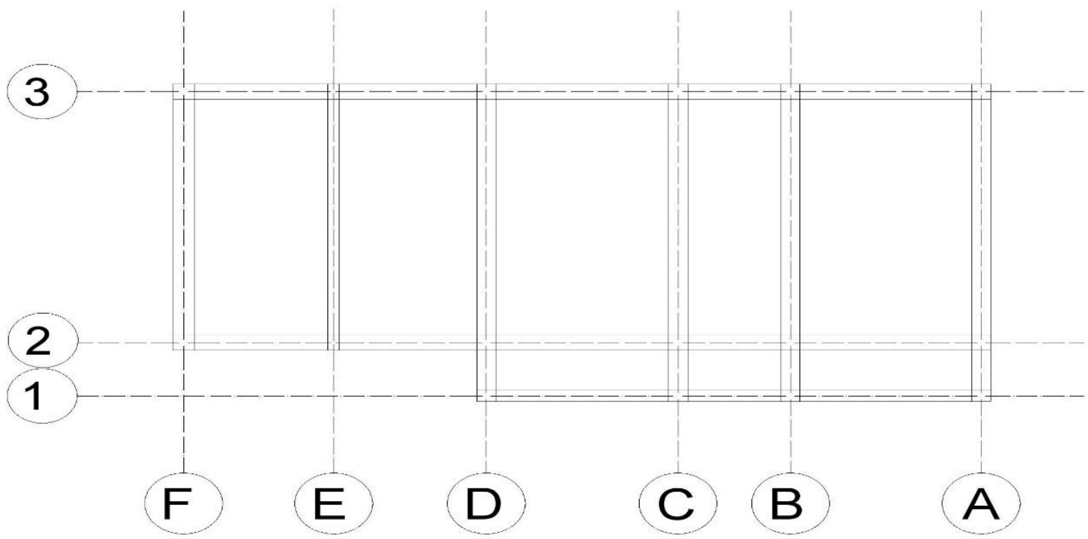
North elevation

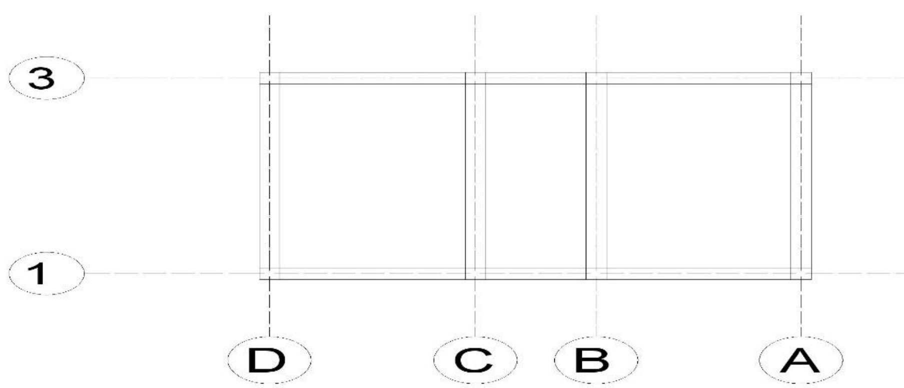


East elevation

The column array from basement to second floor:

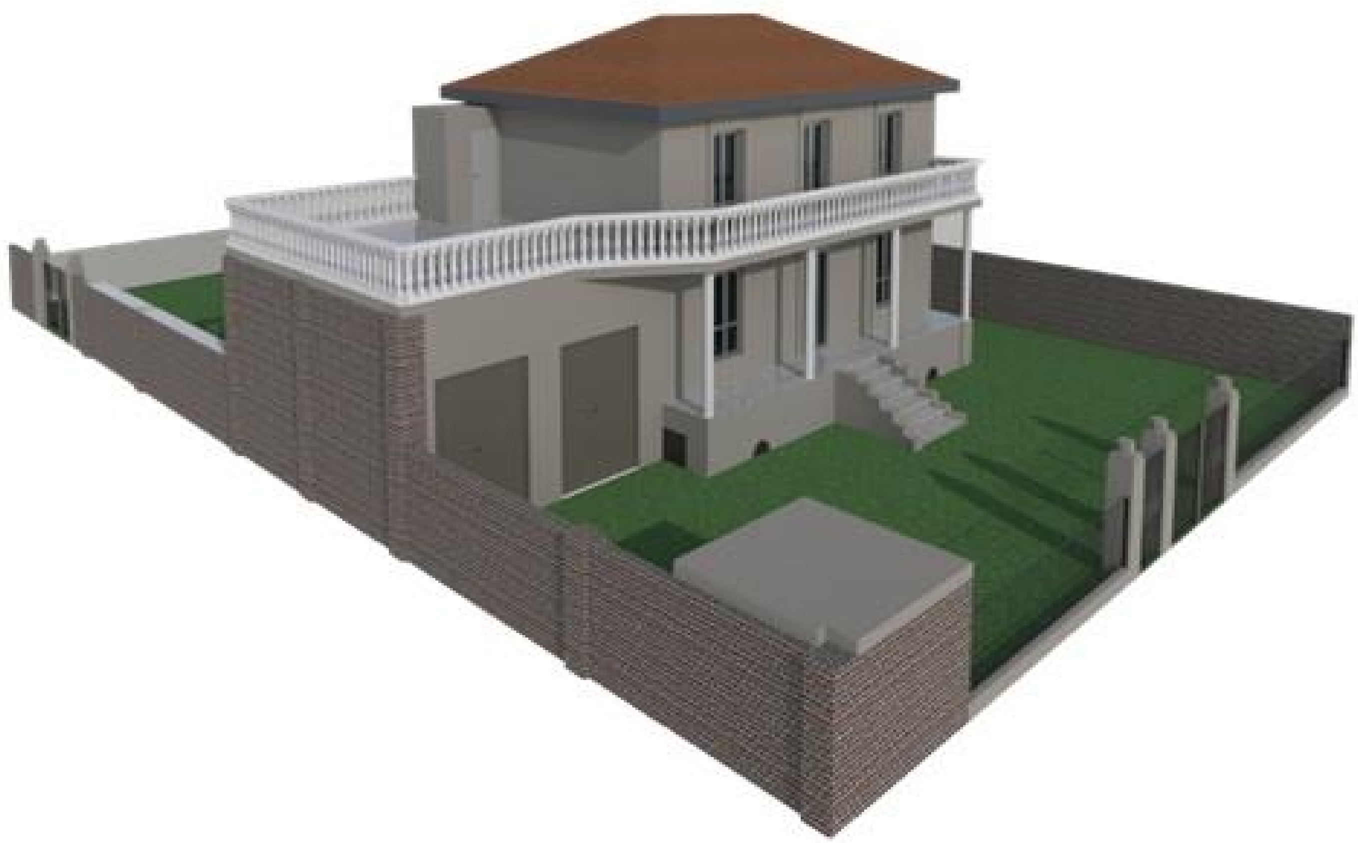






Structural model of the building:

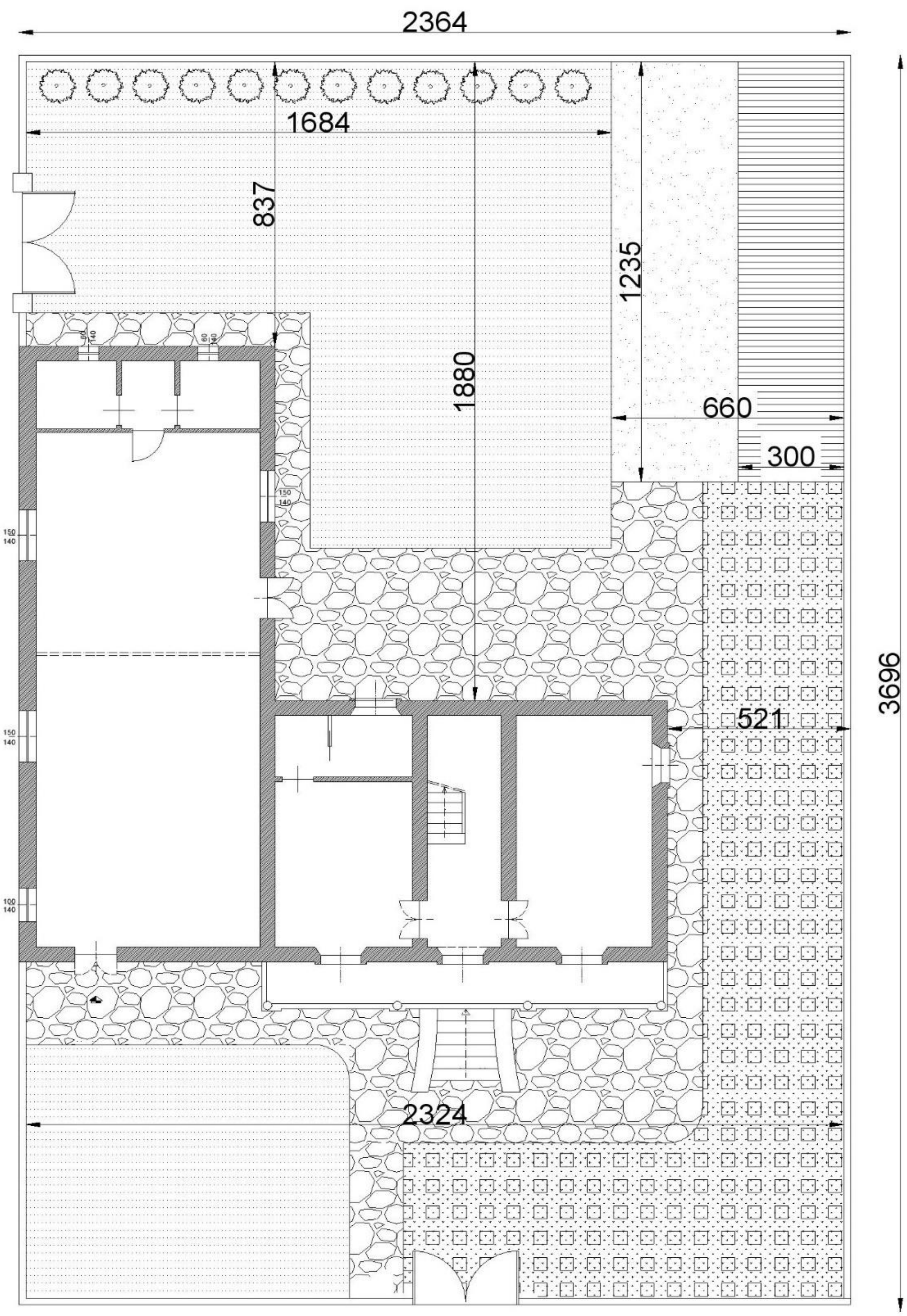
Architectural model of the building:



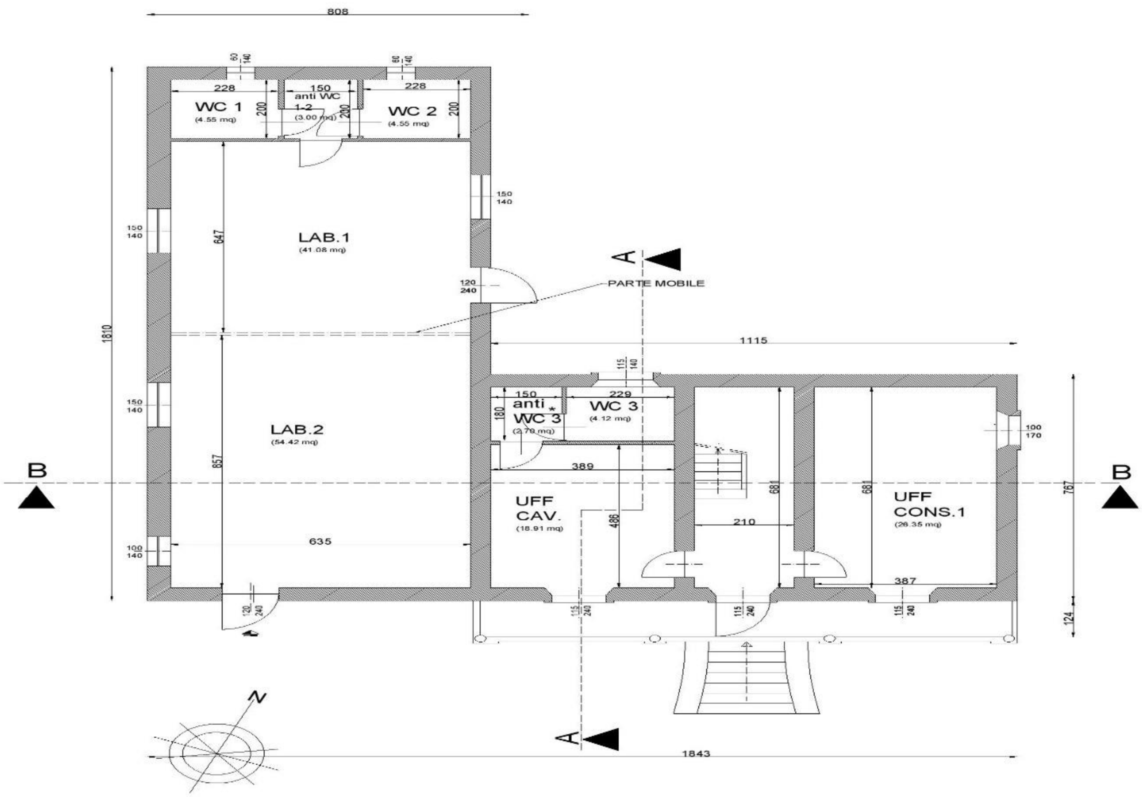
Now based on the new renovation plan , the left part of the building and some of internal walls must be deconstructed , and a new canteen must be construct in the left part of the building with lower height, our mission is that testify our old structure till reach the clear view that based on the new design which part of our building need to be retrofitted.

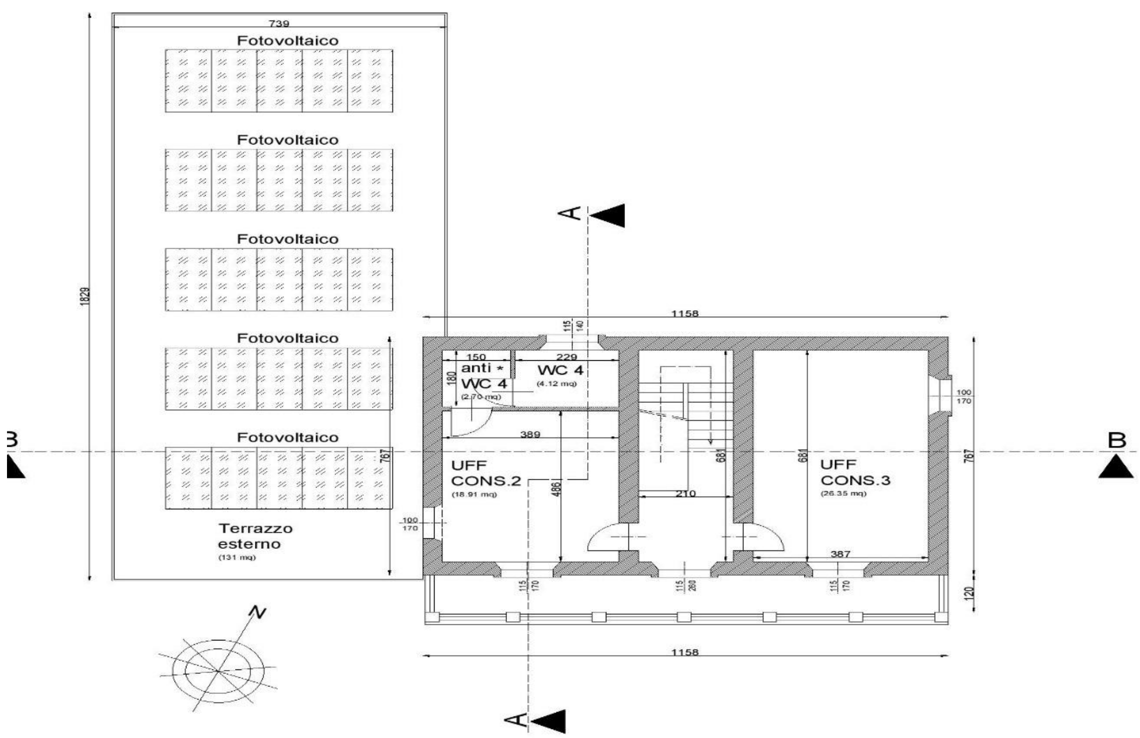
First, like previous pages we go through our new intervention plans.

Site plan:

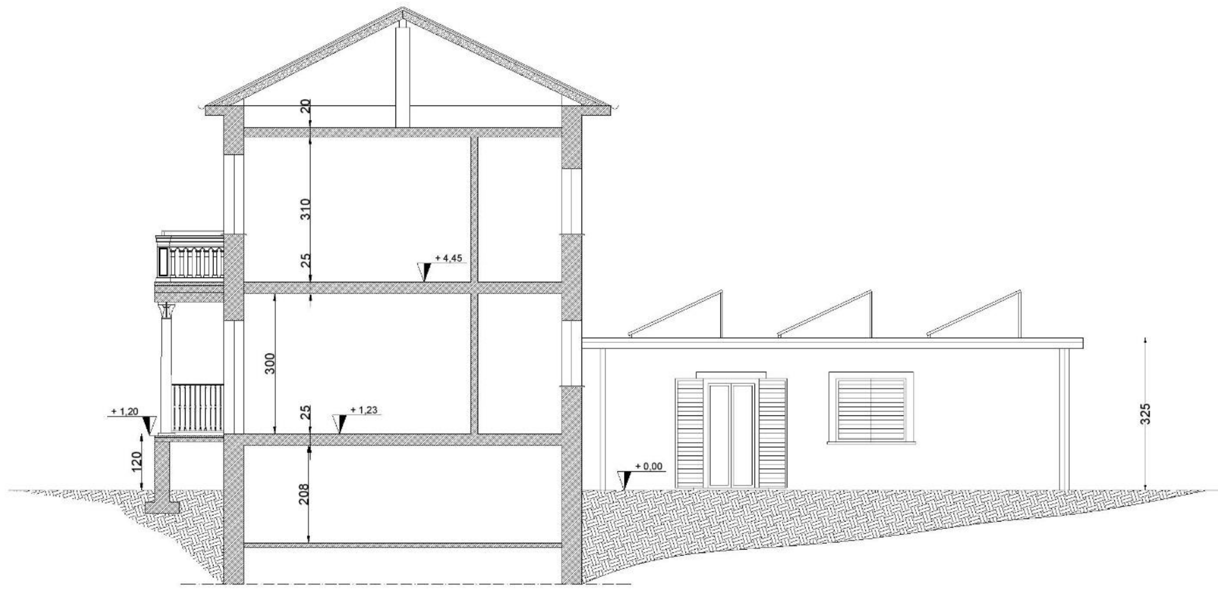


The plan of the first and second floors:

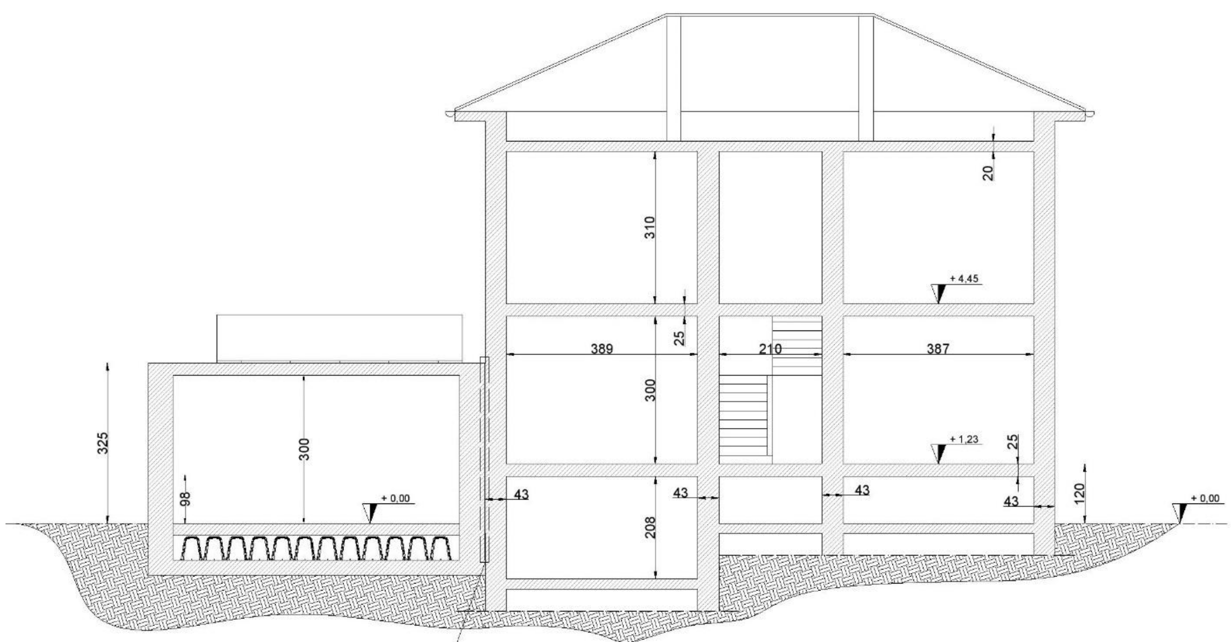




Section A-A:



Section B-B:



2-side elevations:

South elevation

Nord elevation

2-side elevations:

West elevation

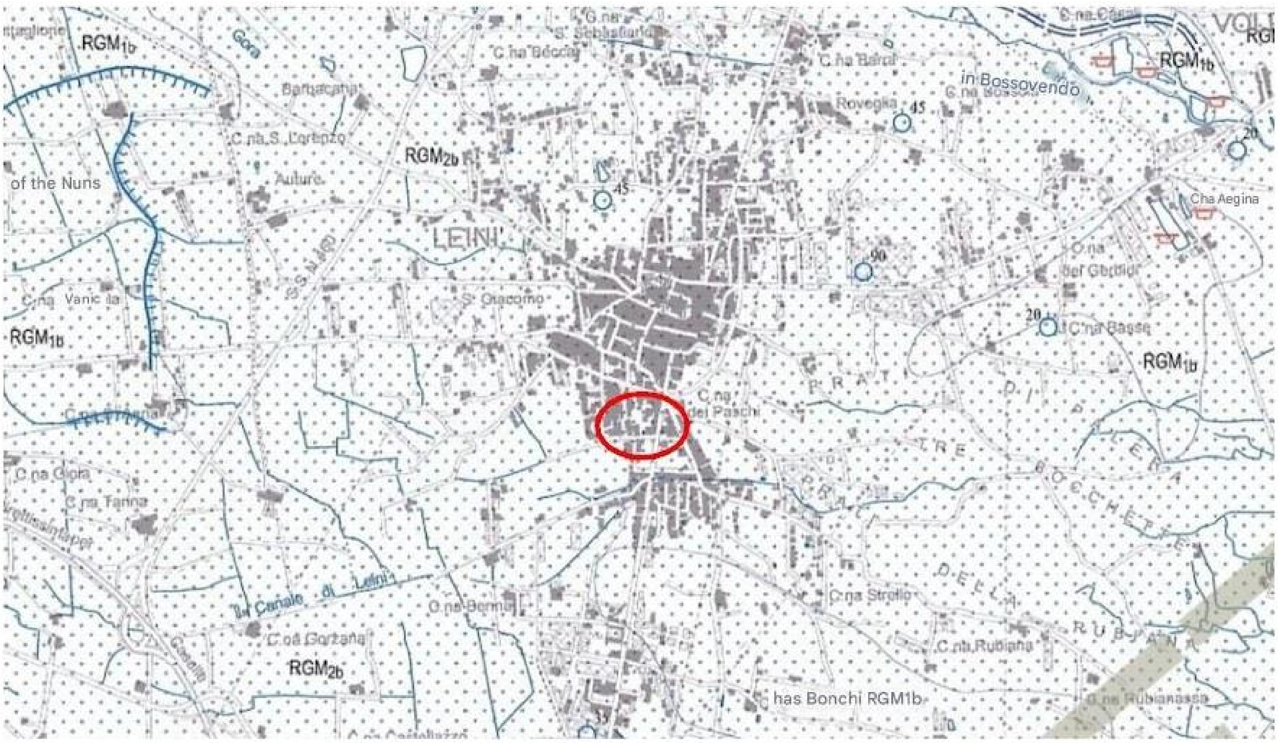
East elevation

Structural model:

Architectural model:

After preparing our renovation documents, it is time to testify our structure based on our renovation plan, for structure examination we used dolmen software, and the continuous pages we go through our building seismic specifications and also our structural model.

First we determined the geological features of our site:



Stura di Lanzo River Basin

SYNTHESIS OF ROYAL HERD

Leini's subsynthem

Coarse sandy gravels with heterometric clasts mainly composed of serpentinites, gneisses and quartzites, covered by a 0.5 to 1.5 m thick layer of weakly altered sandy silt (10YR). They form large suspended terraced surfaces of about 10 m above the bed of the Stura di Lanzo River (fluvial deposits) (RGM26). UPPER PLEISTOCENE.

RGM_2

Subsynthem of Venaria Reale

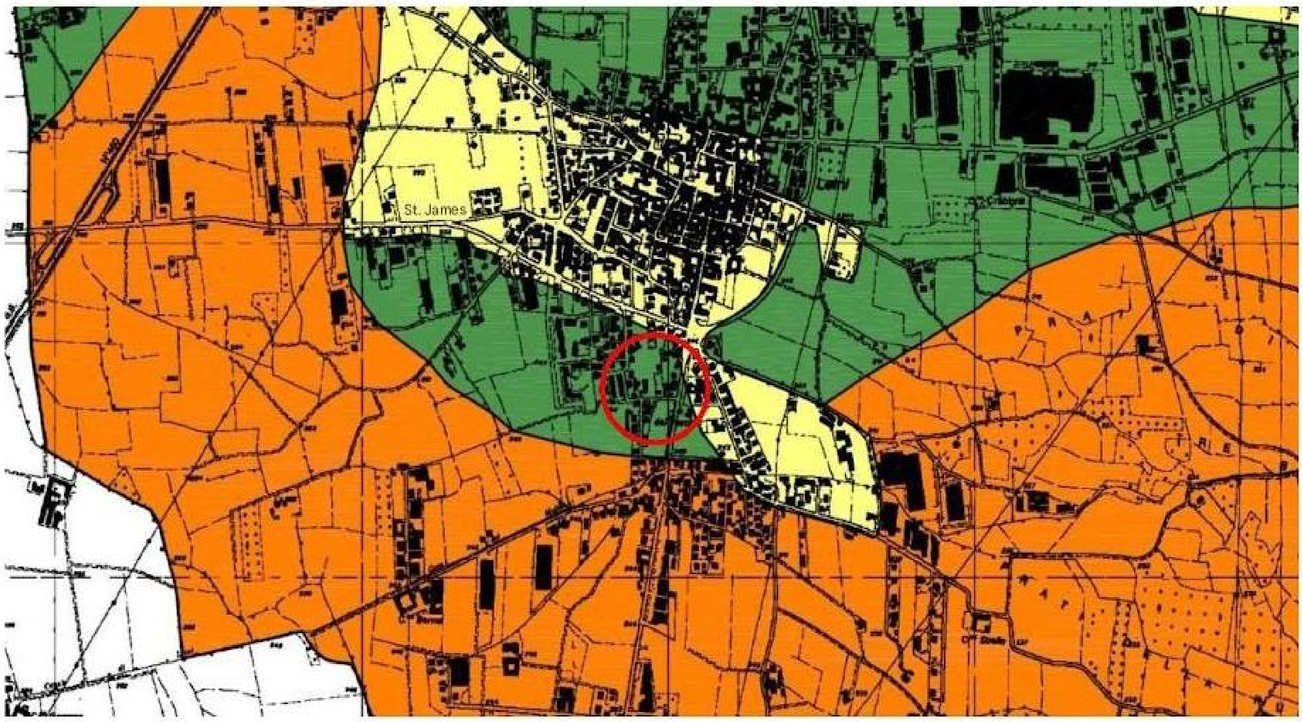
Altered gravels (7.5YR) of relatively homogeneous size with little coarse sandy matrix and with clasts mainly composed of serpentinites, ultrabasites and gneisses, covered by a metre-thick layer of sandy silt. They constitute suspended terraced surfaces of 10-15 m above the current bed of the Stura di Lanzo River (fluvial deposits) (RGM16). Lower part of the UPPER PLEISTOCENE.

RGM_1

Supersymbols of surface formations

- eluvio-colluvial blanket (b2)
- sandy-silty fluvial deposit (b)
- landslide accumulation (a1)
- silty fluvial deposit (b)
- gravelly river deposit (b)
- wind storage (d)
- sandy river deposit (b)

And also, the seismic hazard classification of our site:



		GEOLOGICAL HAZARD	REGULATIONS FOR URBAN-BUILDING USE
	CLASS I	SECTORS WHERE THERE ARE NO GEOLOGICALLY DANGEROUS CONDITIONS	SECTORS WITHOUT URBAN RESTRICTIONS Both public and private interventions are permitted in compliance with the provisions of the Ministerial Decree 11/03/1988
a b	CLASS II	SECTORS CHARACTERIZED BY CONDITIONS OF MODERATE GEOLOGICAL HAZARD a Areas characterized by shallow water table depth b Areas potentially flooded by low-energy waters of a few decimetres in height	SECTORS WITH MODERATE URBAN PLANNING RESTRICTIONS a_ The construction of underground floors is not appropriate b_For new buildings, the construction of floors is prohibited underground and the first floor above ground must be built at a height of no less than 0.50 m from the level of the main access road. In the built-up areas, interventions must be carried out to adapt the crossings of the surface water network and to maintain the same.
to b	CLASS III	SECTORS WHERE CONDITIONS OF GEOLOGICAL HAZARD EXIST Areas affected by the dynamics of watercourses and/or by slope processes	SECTORS THAT PRESENT ELEMENTS THAT ARE PENALIZING FOR URBAN PLANNING PURPOSES a_ Mainly undeveloped portions not suitable for hosting new buildings b Built-up areas where land redevelopment interventions must be carried out to protect existing heritage. For existing buildings, ordinary and extraordinary maintenance, conservative recovery and renovations are planned that do not involve an increase in the housing load. New works and new constructions will be permitted only at following the implementation of territorial redevelopment interventions

After putting our structure model under scrutiny of testing, it is shown that we have deflection/drift error based on our roof and drift between the second story and roof and also because of long height adjacent left part of structure we face the error too(before of testing process this part was partially collapsed , and in the architectural renovation process is considered to be fully deconstructed)

Structural Element	Location	Error Type	Expected Deflection (mm)	Actual Deflection (mm)	Expected Drift Ratio	Actual Drift Ratio	Notes
Left Section (Highlighted Red)	Entire Left Extension	Seismic Stability Issue	≤ 10	18	≤ 0.005	**0.012**	Needs reinforcement or redesign
Wooden Roof Truss	Roof Structure	Weak Structural Integrity	≤ 15	28	≤ 0.004	0.009	Strengthening required
Second Story vs. Roof	Between 2nd & Roof	Drift Exceeds Limit	≤ 12	22	≤ 0.006	**0.014**	Possible excessive deformation
First Floor vs. Second Floor	Between 1st & 2nd Floor	No Issues	≤ 10	9	≤ 0.005	**0.004**	**Within safe limits**
First Story	Ground to 1st Floor	No Issues	≤ 10	9	≤ 0.005	0.004	**Within safe limits**
Basement vs. First Floor	Below Ground Level	No Issues	≤ 10	8	≤ 0.005	0.003	**Within safe limits**

The seismic code for this region (Leinì, near Turin) follows NTC 2018 (Norme Tecniche per le Costruzioni), which limits drift to 0.005 - 0.007 for regular structures. Since the actual drift exceeds these values, reinforcement or structural redesign is required.

The left portion of the structure has a seismic error
Reason: Overly High Columns Causing Unstability
The particularly tall columns on the left-side construction greatly increase lateral displacement and decrease rigidity. The structure becomes more flexible as a result of the height-to-width ratio, which increases drift and decreases resistance to seismic pressures.

Inadequate Wooden Roof Trusses
Low Structural Stiffness and Excessive Deformation
Excessive deflection results from the wooden truss's insufficient lateral and vertical rigidity.Because of their greater flexibility, wooden structures are more likely to bend and deform excessively when subjected to lateral seismic loads. The truss's resistance to

seismic stresses may be further diminished by inadequate connections between its wooden components.

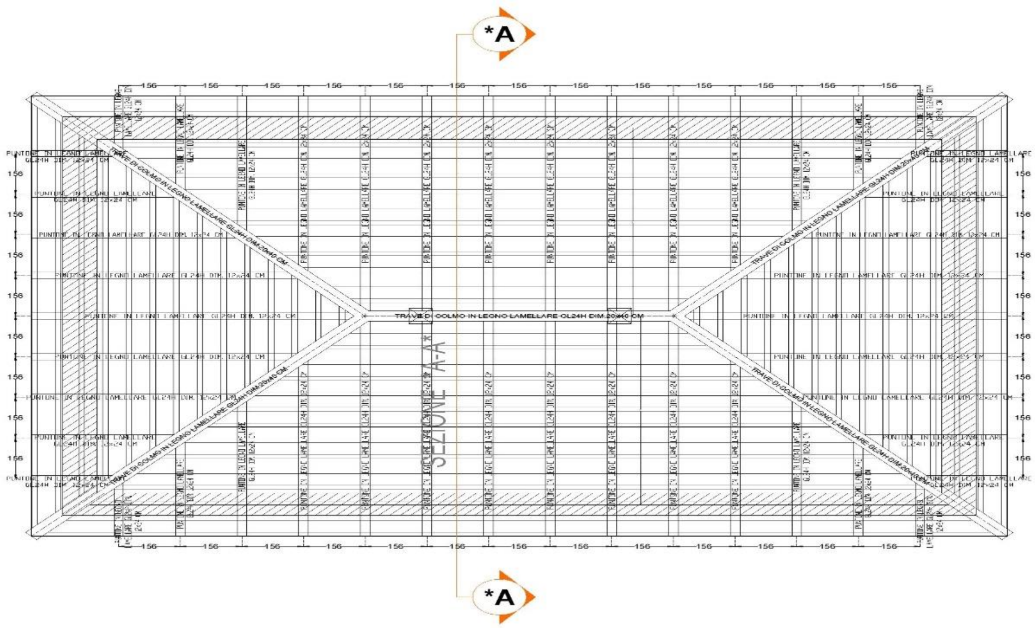
Too Much Movement Between the Roof and the Second Story
Transfer of Weak Lateral Load from Second Story to Roof
There is too much drift between the second floor and the roof as a result of the roof structure's improper distribution of seismic forces to the supporting columns. The roof moves more than the floors below due to an uneven seismic response caused by the discontinuous stiffness between the second floor and roof level. There is insufficient rigidity in the second-story columns and roof truss to prevent drift.

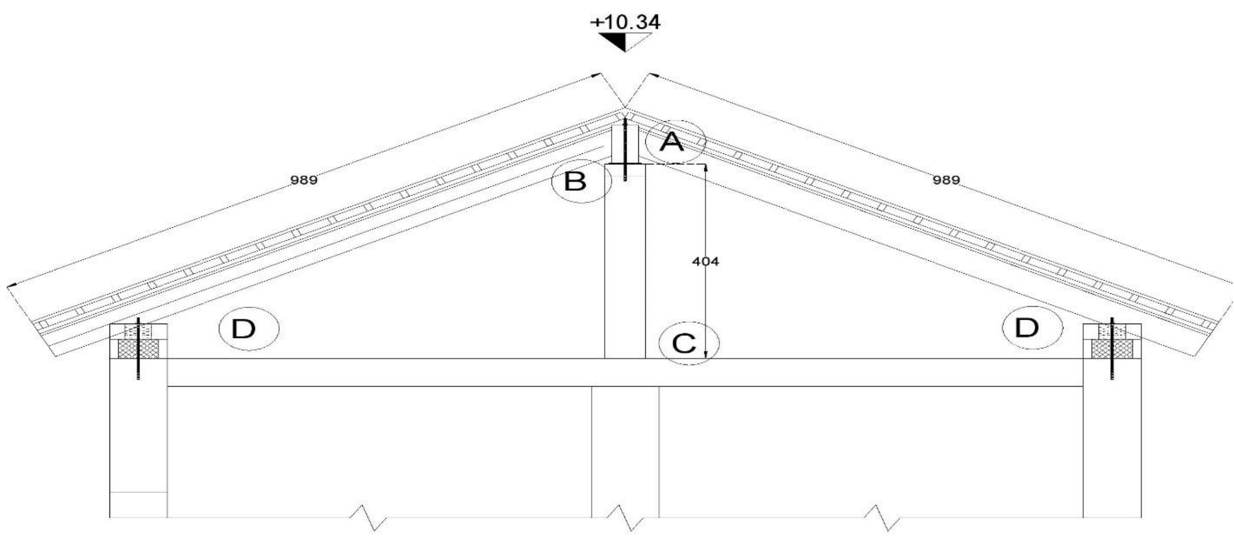
Our preventive strategy for the weaken parts of the structure is to redesign the roof and consolidate the slabs between second story and roof by using FRP method, and also for reaching the optimum integrity of structure against the earthquake we consider using wall-post between walls after rechange process of demolish parts.

Roof Modifications Implemented:

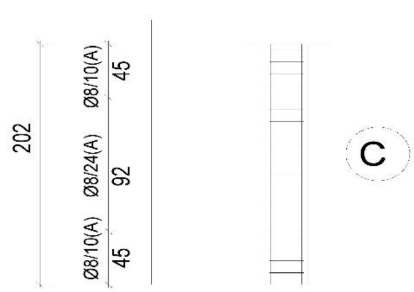
The old wooden truss roof was replaced with a new roof structure. For further support, two little concrete columns were added. The concrete structure had new timber beams securely fastened to it. There is less significant interstory drift due to the new concrete column roof structure's more uniform mass distribution. Short columns provide extra support, which reduces excessive deformation and increases lateral rigidity. Reduced Torsional Effects: Under seismic stresses, the enhanced structural balance removes notable torsional anomalies. Better Bonds: Because the concrete components are firmly fastened to the new timber beams, they won't separate when subjected to lateral loads.

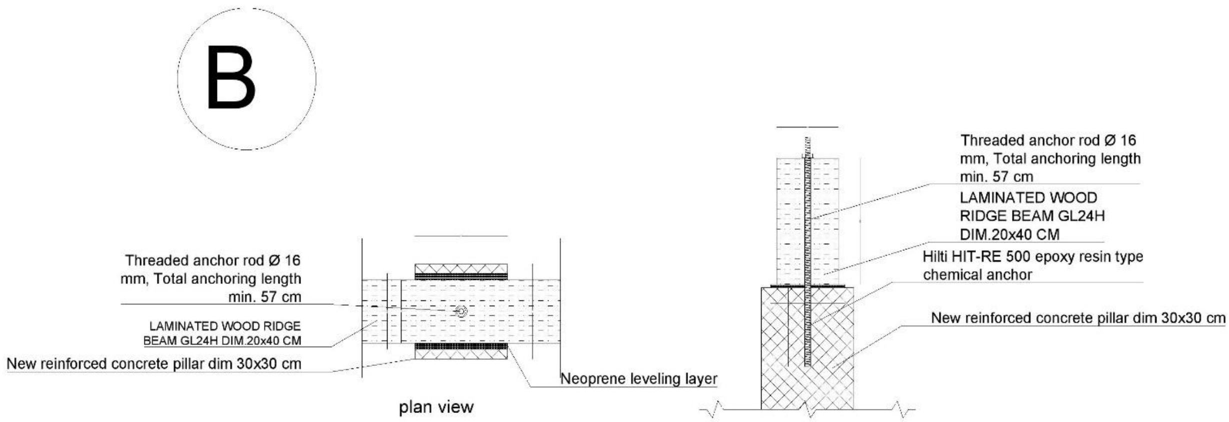
Condition	Deflection (mm)	Drift Ratio	Deflection Improvement (%)	Drift Improvement (%)
Pre renovation	**28 mm**	**0.009**	-	-
Post renovation	**10 mm**	**0.003**	**64.3%**	**66.7%**



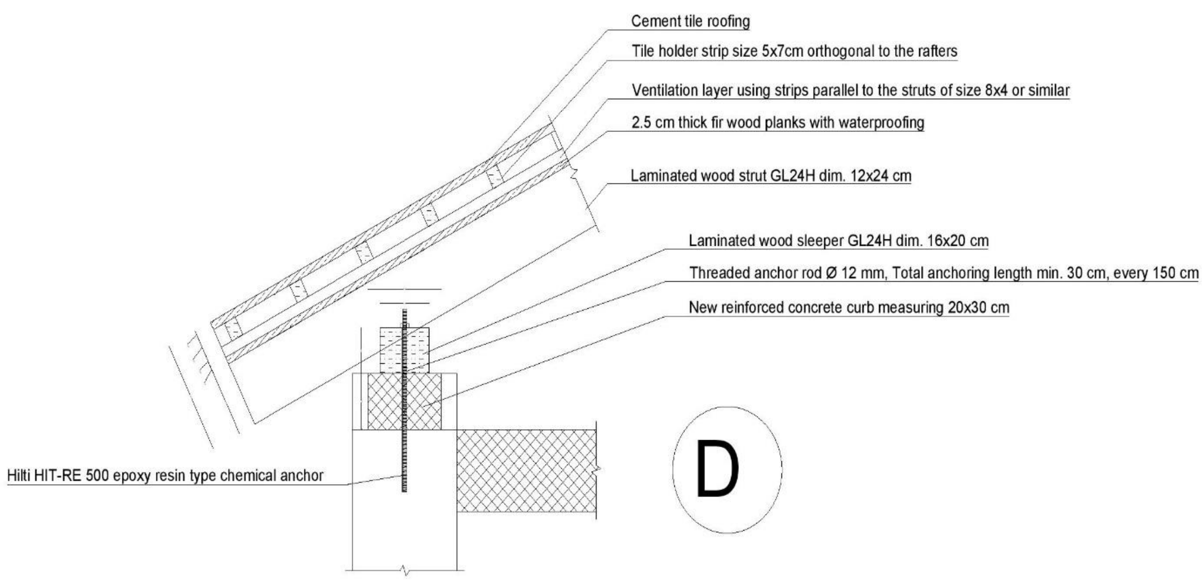


C- new reinforced concrete pillars measuring 30x30 and approximately 202 cm high, anchored to the existing floor using Ø 20 mm resumption tie rods, embedded for at least 30 cm with Hilti HIT-RE 500 type resin, hole diameter Ø 21





B - Connection Ridge beam - new reinforced concrete pillar using a Ø16 mm threaded bar, with characteristic tensile strength equal to tr ≥ 800 N/mmq (class 8.8), embedded for at least 47 cm between the ridge beam section (h=40 cm) and the new reinforced concrete pillar measuring 25x30 cm with Hilti HIT-RE 500 type resin, hole diameter Ø 17 and tightening with nut and washer.



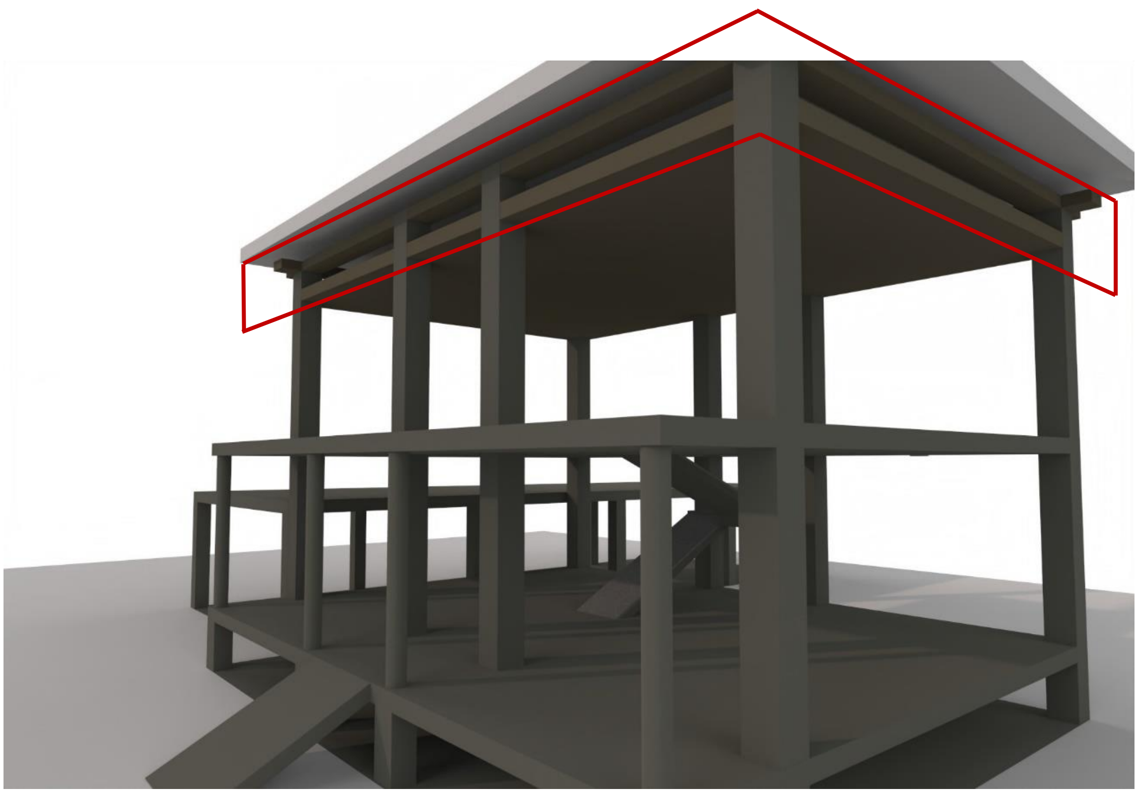
D -Dormant-underlying wall connection using a threaded bar Ø12 mm/150 cm, with characteristic tensile strength equal to tr ≥ 800 N/mmq (class 8.8), embedded for at least 30 cm between the 16x20 cm section dormant and the new 20x30 cm reinforced concrete curb with Hilti HIT-RE 500 type resin, hole diameter Ø 14 and tightening with nut and washer.

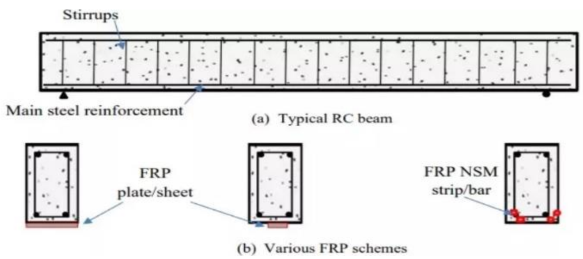
By applying FRP wraps around the beam joints at the second story and roof level, the lateral stiffness of the structure was significantly increased, reducing excessive drift.

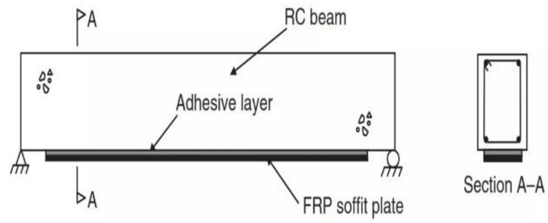
FRP strips and sheets were applied to the floor slabs and beam improving the continuity of load transfer, preventing weak connections that caused excessive movement.

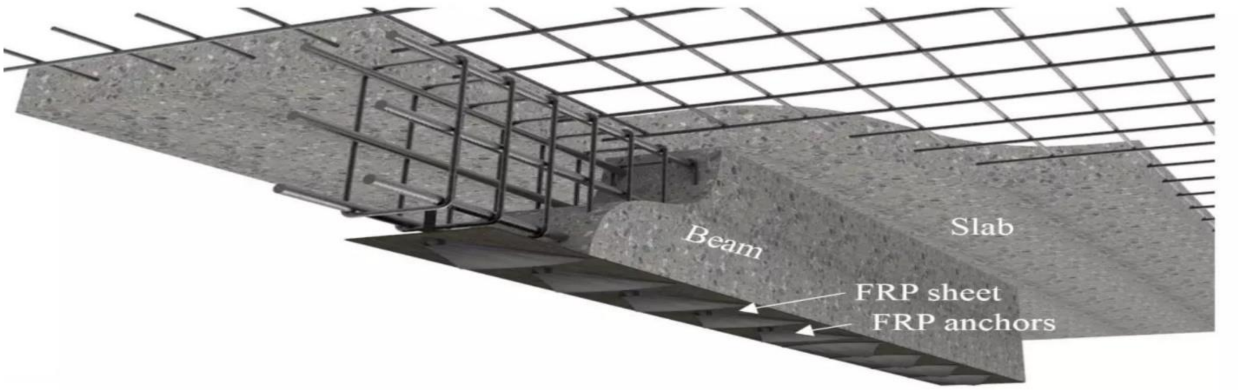
The high tensile strength of FRP reduced beam deformations, minimizing seismic deflection and drift between the second story and roof.The flexibility of FRP materials allows the structure to absorb more seismic energy, preventing brittle failure at critical connections.

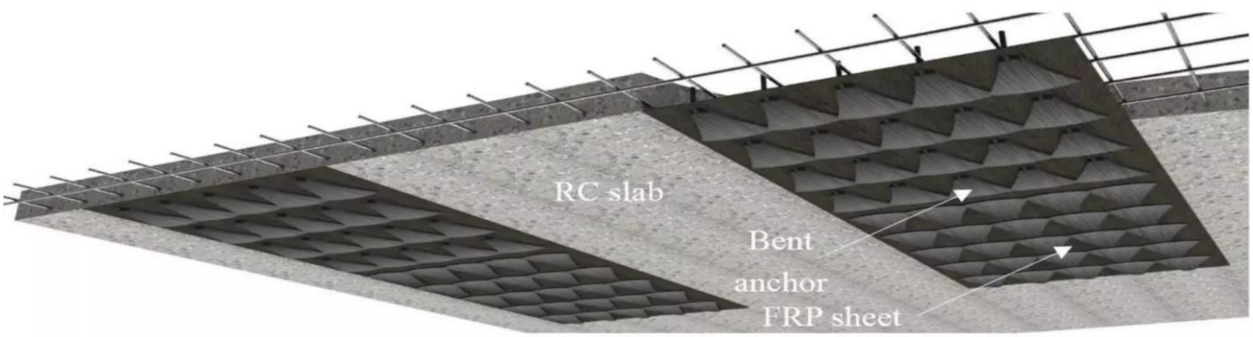
Condition	Deflection (mm)	Drift Ratio	Deflection Improvement (%)	Drift Improvement (%)
Pre renovation	**11 mm**	**0.005**	-	-
Post renovation	**6 mm**	**0.002**	**45.5%**	**60%**

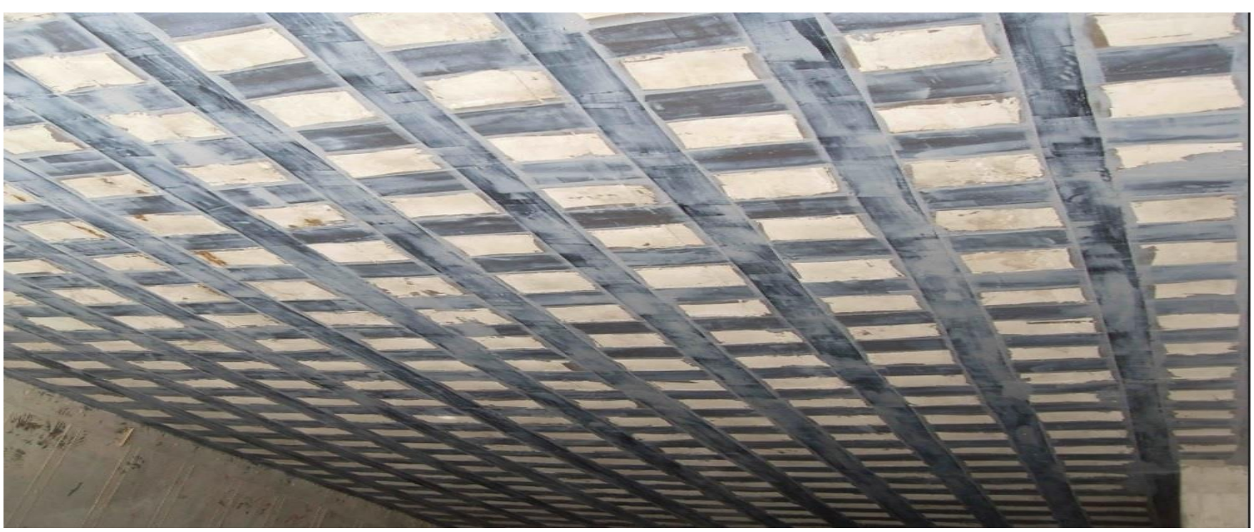



Stirrups
Main steel reinforcement
(a) Typical RC beam
FRP
plate/sheet
FRP NSM
strip/bar
(b) Various FRP schemes


A
RC beam
Adhesive layer
A
FRP soffit plate
Section A–A


Beam
Slab
FRP sheet
FRP anchors


RC slab
Bent
anchor
FRP sheet

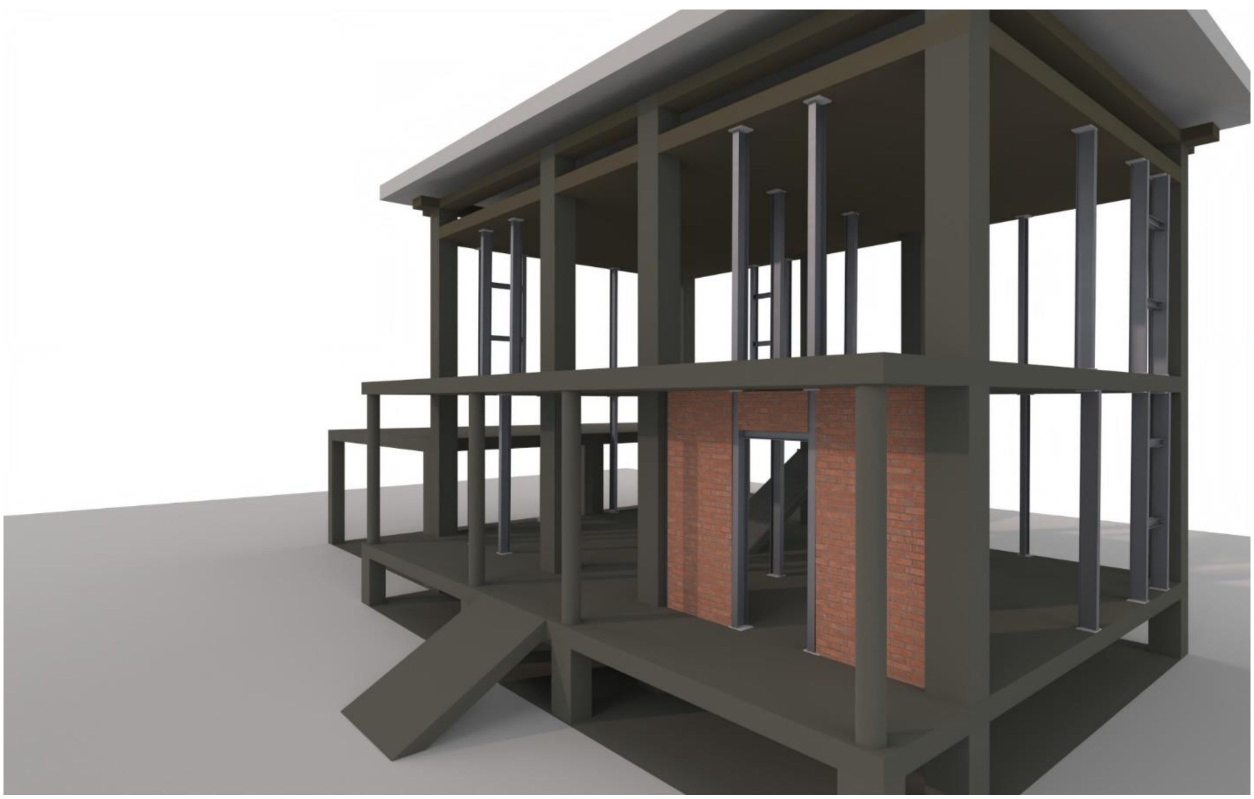


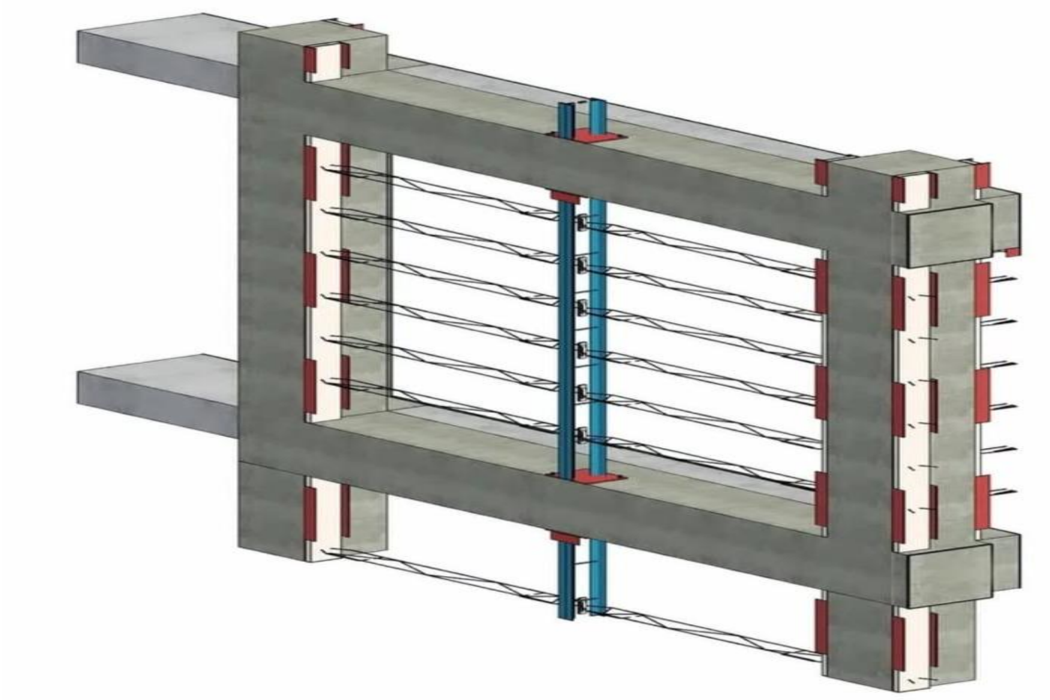
Wall-posts act as shear walls, absorbing seismic forces and preventing excessive sway or drift. They improve stiffness by distributing lateral loads more evenly across the structure.

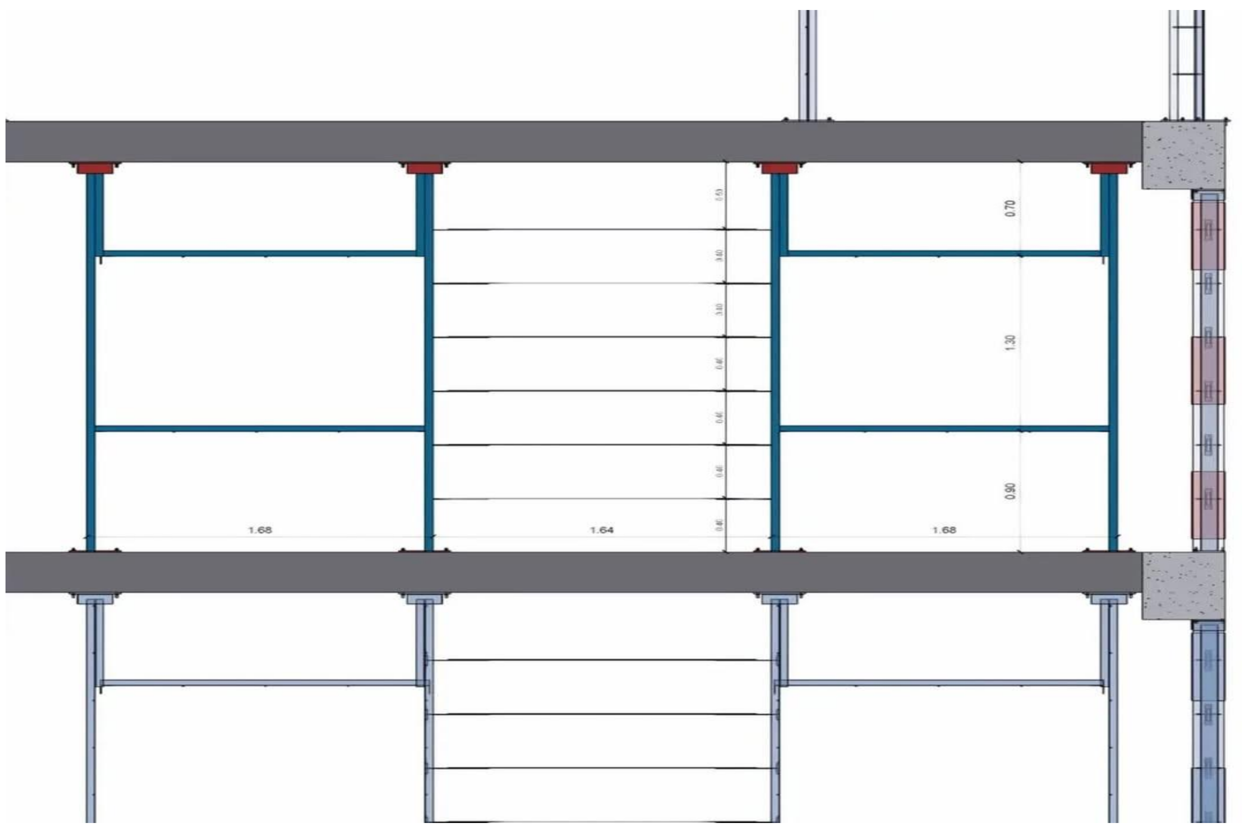
The added wall-posts connect the walls with the frame, preventing weak points or detachment under seismic stress. This ensures that walls do not separate from beams/columns, reducing structural damage. Without reinforcement, walls may collapse outward during an earthquake. Wall-posts anchor the walls, preventing out-of-plane movement and buckling.

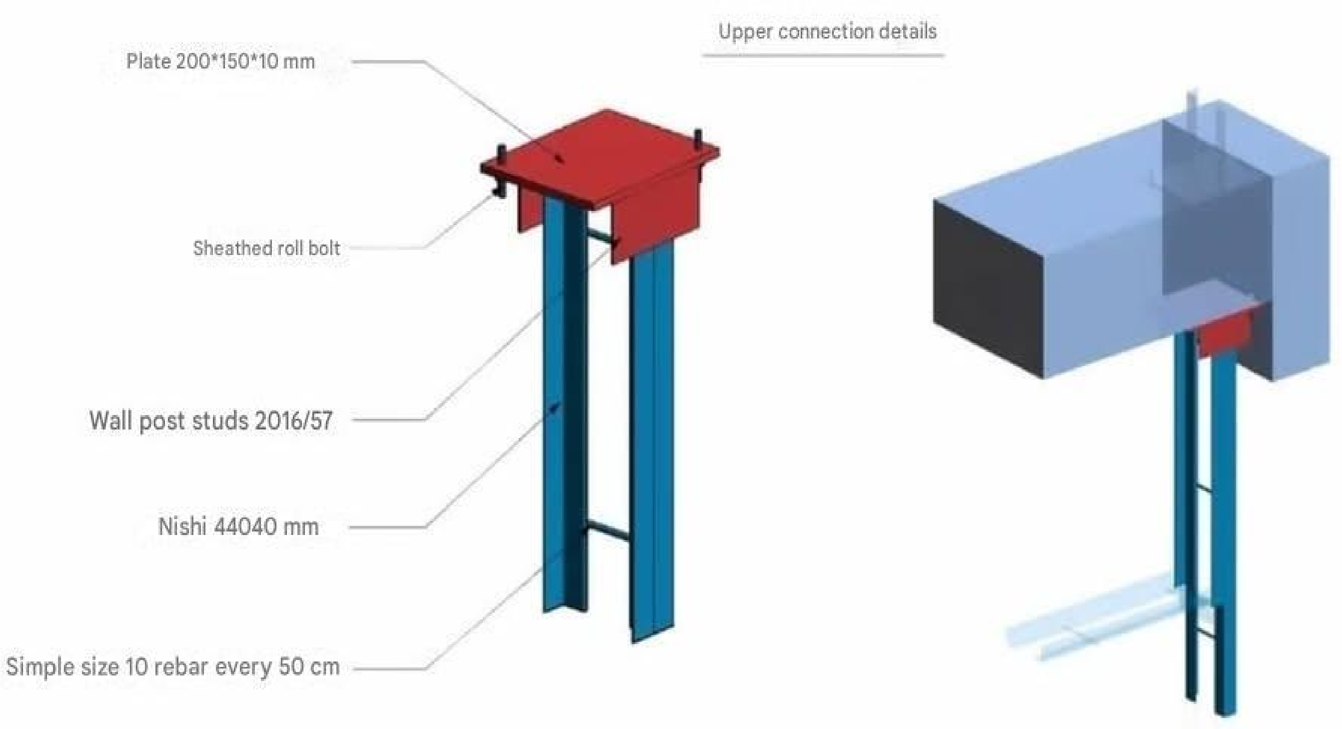
The stiffening effect of the wall-posts helps in reducing inter-story drift, ensuring better structural integrity.

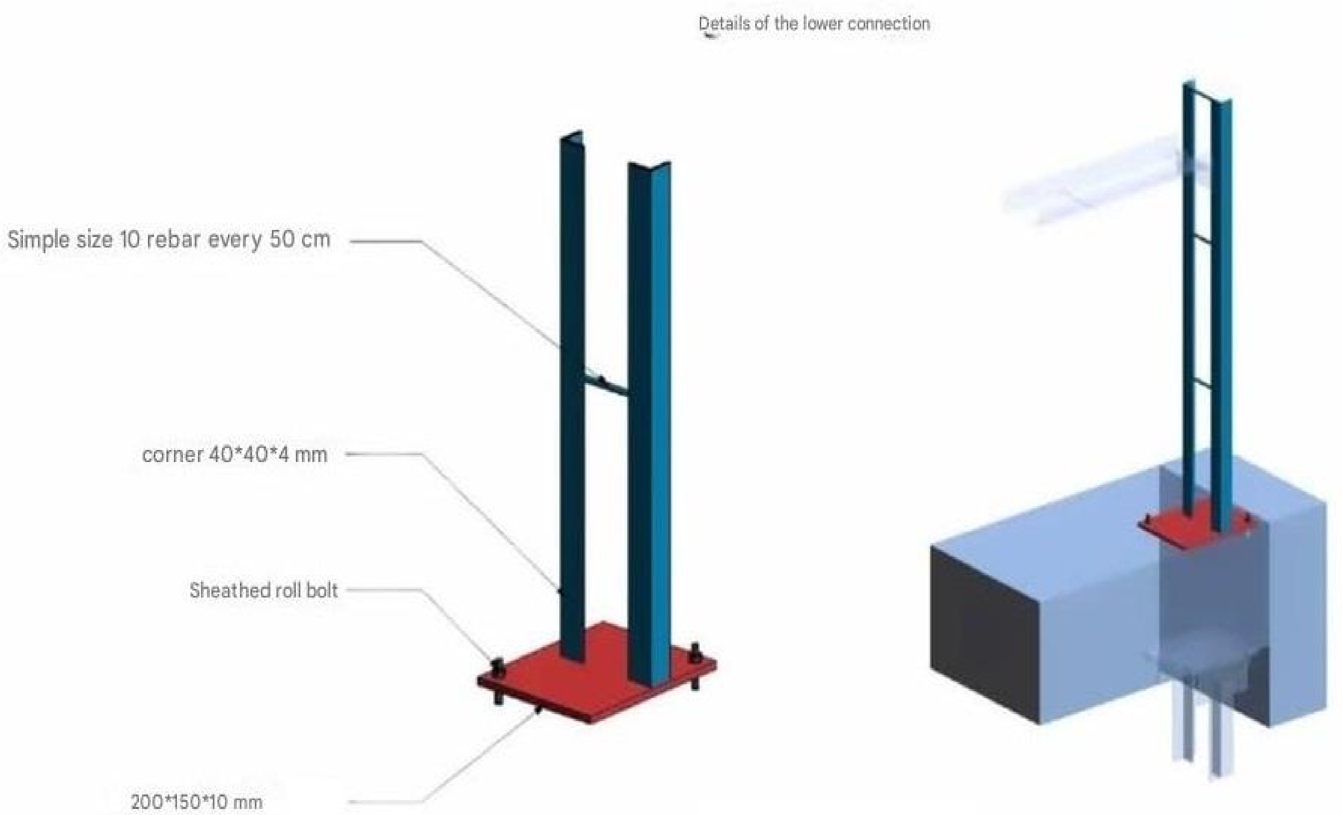
Condition	Wall Displacement (mm) (mm)	Drift Ratio	Seismic Energy Absorption (%)	Overall Structural Integrity Improvement (%)
Pre renovation	**18 mm**	**0.012**	**65%**	-
Post renovation	**9 mm**	**0.005**	**85%**	**60%**






0.70
1.30
0.90
1.68
1.64
1.68


Upper connection details
Plate 200*150*10 mm
Sheathed roll bolt
Wall post studs 2016/57
Nishi 44040 mm
Simple size 10 rebar every 50 cm


Details of the lower connection
Simple size 10 rebar every 50 cm
corner 40*40*4 mm
Sheathed roll bolt
200*150*10 mm

At the end of the renovation journey we achieved this improvement as a matter of our retrofitting:

Retrofitting Strategy	Deflection Improvement (%)	Drift Improvement (%)	Structural Integrity Improvement (%)	Seismic Energy Absorption Increase (%)
Concrete Roof Slab & Short Columns	64.3% ✅	66.7% ✅	-	-
FRP Reinforcement for 2nd Story & Roof	45.5% ✅	60% ✅	-	-
Wall-Post Installation	50% ✅	58% ✅	60% ✅	30% ✅

Finally, the pre and post retrofitting comparison:

Condition	Overall Deflection Reduction (%)	Overall Drift Reduction (%)	Total Structural Integrity Improvement (%)	Total Seismic Energy Absorption Increase (%)
Pre renovation	(Baseline)	Baseline)	(Baseline)	Baseline (Original Capacity)
Post renovation	86.6% Improvement ✅	80% Improvement ✅	60% Improvement ✅	30% More Energy Absorption ✅

Conclusion

"By accepting the fact that the threat of earthquakes is always a constant danger for all structures that have been or will be built, we must achieve a complete and comprehensive understanding of the vulnerability of our structures to this issue. This awareness helps us classify this vulnerability in relation to the existing type of risk, based on various factors such as (the location where the structure is or will be built, its intended use, the design and form it will take, the materials used, and finally, the quality of execution, construction factors, etc.).

Based on this classification, we are faced with two approaches: the new structures that we will build, and the structures that have already been built. For the first case, our task is very easy because by referring to the vulnerability classification, we can take precautionary measures in the design process to prevent any potential incidents.

However, for the second case, the task is a bit more complicated, especially for older structures, because we do not have a complete understanding of how they were built. Initially, we must start researching them to determine the vulnerability of the structure based on its precise specifications. In the next stage, we use methods that can address structural weaknesses.

These methods appear in the form of retrofitting, and they can be applied both in the process of constructing a new structure and for those structures that are older and vulnerable. However, the key point, just as classification for vulnerability was important, is that we must have an executable classification for the retrofitting process so that we can correctly address the vulnerability of our structure using the methods introduced during this study."

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Appendix

(structural report)

1 Descrizione Delle Opere

La presente relazione strutturale riguarda l'esame e la valutazione della copertura in legno, della platea di fondazione e del solaio di copertura in c.a. dell'edificio situato in Via Caviglietto 8, Leini. La forma della copertura sarà rettangolare con quattro falde. Il suo diametro sarà di 12,4 metri per 8,5 metri e avrà una pendenza uniforme di circa il 50%. L'edificio è stato concepito per: Nominale della vita: :50 anni

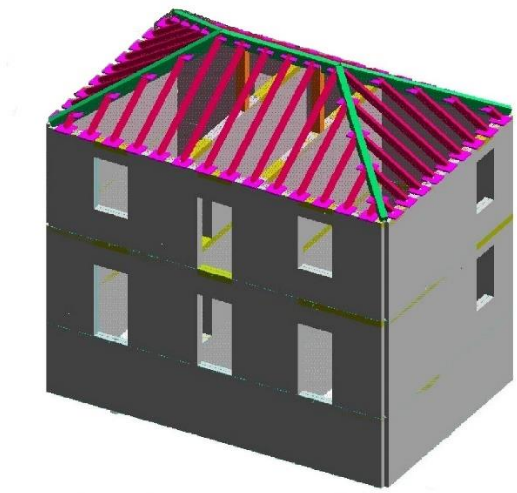

Figura 1-Vista Assonometrica Della Struttura

1.1 Ubicazione

L'edificio oggetto del presente progetto strutturale sarà ubicato nel comune di Leini. Le sue coordinate geografiche sono 45.17809028018309° N, 7.71379193724582° E

Figura 2-Vista Area Via Caviglietto 8(Leini)

2 Normativa Di Riferimento

La progettazione, il dimensionamento e la verifica dei requisiti sono eseguiti in conformità con le seguenti direttive.

2.1 Leggi, Decreti E Circolari

Legge 5 novembre 1971 n. 1086 (G.U. 21 dicembre 1971 n. 321) Norme per l'esecuzione di lavori con conglomerato cementizio armato, normale o precompresso, e strutture metalliche.

Circ. M. n. 11951 del 14/02/1974

Istruzioni per le applicazione della legge n. 1086.

Legge 2 febbraio 194 n. 64 (G.U. 21 marzo 1974 n. 76)

Provvedimenti di costruzione specifici per aree sismiche. Indicazioni progettive per le nuove costruzioni in zone sismiche a cura del Ministero per la Ricerca scientifica - Roma 1981. D.M. Infrastrutture Trasporti 17 gennaio 2018 (G.U. 20 febbraio 2018 n. 42 - Suppl. Ord.) Norme Tecniche per le Costruzioni.

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Un testo completo delle norme legislative e regolamentari relative all'edilizia.

2.2 Norme Nazionali

Inoltre, in mancanza di specifiche indicazioni, ad integrazione della norma precedente e per quanto con esse non in contrasto, sono state utilizzate le indicazioni contenute nella UNI EN 206-1/2001 - Calcestruzzo, prestazione produzione e conformità.

2.3 Norme Europee

Conformemente a quanto previsto dal paragrafo 12 del D.M. 17 gennaio 2018 si sono considerati anche I seguenti riferimenti tecnici che si intendono coerenti con i principi del D.M. stesso:

EUROCODICI da 1 a 8, scritti in EN.

3 Criteri Di Progettazione E Modellazione

Il metodo semiprobabilistico agli Stati Limite viene utilizzato per la progettazione e la verifica degli elementi strutturali. La struttura è modellata utilizzando il metodo degli elementi finiti per sistemi tridimensionali. Gli oggetti utilizzati sono sia bidimensionali (piastre e membrane triangolari e quadrangolari) che monodimensionali (trave con eventuali sconnessioni interne). I vincoli vengono inseriti tramite sei costanti di rigidezza elastica (o elementi asta che poggiano su suolo elastico) e sono considerati puntuali.Le parti che devono essere verificate nelle travi sono stampate a passo costante; Le sollecitazioni nel baricentro dei gusci sono note. Ai fini delle singole verifiche, le condizioni elementari di carico vengono combinate in modo che siano le più sfavorevoli. Questo decide le azioni di calcolo del progetto.

· Stati Limite Ultimi SLV di salvaguardia della vita;

· Stati Limite di Esercizio SLD.

Quelli definiti al paragrafo 2.5.3, Stati Limite di Esercizio SLE sono definiti dalle combinazioni: rara, frequente e quasi permanente.

Dal programma di calcolo in modo automatico, i carichi agenti sui solai vengono ripartiti sulle membrature (travi, pilastri, pareti, solette, platee, ecc.) utilizzando l'analisi dei carichi. I carichi lineari agenti sulle aste sono utilizzati per descrivere i carichi dovuti ai tamponamenti sia sulle travi di fondazione che su quelle di piano. È inoltre possibile applicare direttamente azioni concentrate e/o distribuite su tutti gli elementi strutturali. Queste azioni possono essere applicate su agenti e variabili con legge lineare lungo l'asta o su parti specifiche di essa. Le seguenti combinazioni di carico combinano le azioni introdotte direttamente con le altre (carichi permanenti, accidentali e sismi) ; Ciò consente di ottenere i valori probabilistici da utilizzare nelle verifiche successive.

3.1 Stato Limite Di Salvaguardia Della Vita

Le azioni sulla costruzione sono state eseguite in modo che le condizioni di carico fossero più sfavorevoli ai fini delle singole verifiche, tenendo conto della probabilità ridotta che tutte le azioni avessero i valori più sfavorevoli contemporaneamente, come consentito dalle norme. Gli Stati Limite Ultimi hanno utilizzato le combinazioni di questo tipo:

$$\gamma_{G1} \cdot G_1 + \gamma_{G2} \cdot G_2 + \gamma_P \cdot P + \gamma_{Q1} \cdot Q_{k1} + \gamma_{Q2} \cdot \psi_{02} \cdot Q_{k2} + \gamma_{Q3} \cdot \psi_{03} \cdot Q_{k3} + \ldots\ldots$$

dove:

G1 Peso specifico di tutte le parti strutturali; peso specifico del terreno, quando necessario;

Forze indotte dal terreno (esclusi gli effetti di carichi variabili applicati al terreno);

Forze risultanti dalla pressione dell'acqua (quando si configurino costanti nel tempo);

G2 Peso specifico di tutte le parti non strutturali;

P Azioni di pretensione e precompressione;

Q Azioni sulla struttura o sull'elemento strutturale con valori istantanei che possono risultare

sensibilmente

diversi fra loro nel tempo;

di lungo periodo: agiscono con una notevole intensità, anche non costante, per un lungo periodo di tempo rispetto alla vita nominale della struttura;
breve: azioni che sono più brevi della vita nominale della struttura;

Qki Valore caratteristico dell'azione variabile i-esima.

γ Coefficienti parziali come definiti nella tabella 2.6.I del D.M. 17 gennaio 2018;

ϕ 0i Coefficienti di combinazione per tenere conto della ridotta probabilità di concomitanza delle azioni

variabili con i rispettivi valori caratteristici.

Le combinazioni che sono state ottenute utilizzando le sollecitazioni caratteristiche per ogni condizione di carico elementare sono state costruite: La sollecitazione di base è stata considerata per ogni condizione di carico accidentale a rotazione (Qk1 nella formula precedente). Gli allegati tabulati di calcolo contengono i coefficienti per tali combinazioni di carico. La zona sismica deve tenere conto delle sollecitazioni causate dal sisma oltre alle sollecitazioni derivanti dalle normali condizioni di carico statiche. Secondo la seguente relazione, l'azione sismica è stata combinata con altre azioni:

$$G_1 + G_2 + P + E + \sum_i \Psi_{2i} \cdot Q_{ki}$$

dove:

E Azione sismica per lo Stato Limite e per la classe di importanza in esame;

G1 Peso proprio di tutti gli elementi strutturali;

G2 Peso proprio di tutti gli elementi non strutturali;

P Azione di pretensione e precompressione;

ϕ 2i Coefficienti di combinazione per tenere conto della ridotta probabilità di concomitanza delle azioni

variabili

Qki Valore caratteristico dell'azione variabile i-esima.

Gli effetti dell'azione sismica vengono valutati tenendo conto delle masse correlate ai carichi gravitazionali seguenti:

$$G_K + \sum_i (\Psi_{2i} \cdot Q_{ki})$$

I valori dei coefficienti ϕ 2i sono contenuti nella seguente tabella:

Tabella 1-Valori Dei Coefficienti Ψ

Azione	ψ_{0i}	ψ_{1i}	ψ_{2i}
Categoria A – Ambienti ad uso residenziale	0,7	0,5	0,3
Categoria B – Uffici	0,7	0,5	0,3
Categoria C – Ambienti suscettibili di affollamento	0,7	0,7	0,6
Categoria D – Ambienti ad uso commerciale	0,7	0,7	0,6
Categoria E – Biblioteche, archivi, magazzini e ambienti ad uso industriale	1,0	0,9	0,8
Categoria F – Rimesse e parcheggi (per autoveicoli di peso ≤ 30 kN)	0,7	0,7	0,6
Categoria G – Rimesse e parcheggi (per autoveicoli di peso > 30 kN)	0,7	0,5	0,3
Categoria H – Coperture	0,0	0,0	0,0
Vento	0,6	0,2	0,0
Neve (a quota ≤ 1000 m s.l.m.)	0,5	0,2	0,0
Neve (a quota > 1000 m s.l.m.)	0,7	0,5	0,2
Variazioni termiche	0,6	0,5	0,0

1.1 Stato Limite Di Danno

Una relazione del tutto identica a quella precedente ha collegato l'azione sismica alle altre azioni:

$$G_1 + G_2 + P + E + \sum_i \psi_{2i} \cdot Q_{ki}$$

dove:

E Azione sismica per lo Stato Limite e per la classe di importanza in esame;

G1 Peso proprio di tutti gli elementi strutturali;

G2 Peso proprio di tutti gli elementi non strutturali;

P Azione di pretensione e precompressione;

ϕ 2i Coefficienti di combinazione per tenere conto della ridotta probabilità di concomitanza delle azioni variabili

Qki Valore caratteristico dell'azione variabile i-esima.

Gli effetti dell'azione sismica sono valutati tenendo conto delle masse associate ai seguenti carichi gravitazionali:

$$G_K + \sum_i (\psi_{2i} \cdot Q_{ki})$$

I valori dei coefficienti ϕ 2i sono contenuti nella tabella già riportata per lo SLV.

3.2 Stati Limite Di Esercizio

A seconda dei casi, le combinazioni di carico seguenti possono essere utilizzate per verificare lo stato limite di esercizio:

combinazione rara

$$F_d = \sum_{j=1}^{m}\left(G_{Kj}\right) + Q_{k1} + \sum_{i=2}^{n}\left(\psi_{0i} \cdot Q_{ki}\right) + \sum_{h=1}^{l}\left(P_{kh}\right)$$

combinazione frequente

$$F_d = \sum_{j=1}^{m}\left(G_{Kj}\right) + \psi_{11} \cdot Q_{k1} + \sum_{i=2}^{n}\left(\psi_{2i} \cdot Q_{ki}\right) + \sum_{h=1}^{l}\left(P_{kh}\right)$$

combinazione quasi permanente

$$F_d = \sum_{j=1}^{m}\left(G_{Kj}\right) + \psi_{21} \cdot Q_{k1} + \sum_{i=2}^{n}\left(\psi_{2i} \cdot Q_{ki}\right) + \sum_{h=1}^{l}\left(P_{kh}\right)$$

dove:

Gkj Valore caratteristico della j-esima azione permanente;

Pkh Valore caratteristico della h-esima azione di pretensione o precompressione;

Qk1 Valore caratteristico dell'azione variabile di base di ogni combinazione;

Qki Valore caratteristico dell'azione variabile i-esima.

ϕ 0i Coefficiente atto a definire i valori delle azioni ammissibili di durata breve ma ancora significativi

nei

riguardi della possibile concomitanza con altre azioni variabili;

ϕ 1i Coefficiente atto a definire i valori delle azioni ammissibili ai frattili di ordine 0.95 delle distribuzioni

dei

valori istantanei;

ϕ 2i Coefficiente atto a definire i valori quasi permanenti delle azioni ammissibili ai valori medi delle

distribuzioni dei valori istantanei.

I valori dei coefficienti ϕ 0i ϕ 1i ϕ 2i sono contenuti nella tabella già riportata per lo SLV.

Le combinazioni ottenute sono state costruite utilizzando le sollecitazioni caratteristiche per ogni condizione di carico, come visto nel caso dello SLU. Ogni condizione di carico casuale è stata successivamente considerata sollecitazione di base, il che ha portato a una moltitudine di valori combinati. Ognuna delle combinazioni ottenute, in base all'elemento (trave, pilastro, ecc.), ha sperimentato SLE (tensione, deformazione e fessurazione).

4 Azioni Sulle Strutture

1.2 Condizioni Elementari Di Carico

Il peso proprio, i carichi permanenti, i carichi accidentali, le coazioni e il sisma sono le condizioni elementari di carico. Il sisma previsto dal DM del 17 gennaio 2018 è corretto. Come sopra indicato, i dati ufficiali della microzonizzazione vengono utilizzati per determinare l'ampiezza dello spettro di risposta.

In accordo con le sopracitate normative, sono state considerate nei calcoli le seguenti azioni:

· pesi propri strutturali;

· carichi permanenti portati dalla struttura;

· carichi variabili;

· forze simulanti il sisma, ricavate tramite analisi statica semplificata o dinamica.

Le condizioni ed i casi di carico prese in conto nel calcolo sono specificate nei seguenti paragrafi.

4.1 Analisi Dei Carichi Pesi Propri Dei Materiali Strutturale

Gli opportuni carichi concentrati e distribuiti su nodi ed aste sono stati utilizzati per modellare le azioni. Il programma determina automaticamente i pesi degli elementi strutturali inseriti nei modelli di calcolo in base alle dimensioni e al peso del materiale:

· γ cls, armato = 25.0 kN/m3

· γ acciaio = 78.5 kN/m3

I valori dei carichi applicati sono riportati di seguito.

Solaio latero-cemento 20+4 cm -2.3KN/m2

4.2 Analisi Dei Carichi Carichi Permanenti Non Strutturale

Carichi di Sottofondo e pavimentazione -1.5KN/m2

Carichi di tramezatura -1.5KN/m2

4.3 Analisi Dei Carichi Variabili

Prescritti alla tabella 3.1.II.

Ambienti suscettibili di affollamento (Cat. A, Abitazione) -2.0 kN/m2

Scale comuni,balconi,ballatoi(Cat. A, Abitazione) -4.0 kN/m2

Coperture e sottotetti accessibili per la sola manutenzione (Cat. H1 -0.5 KN/m2

4.4 Analisi Dei Carichi Neve

Definizione Carico Neve

La valutazione del carico verticale dovuto alla neve secondo quanto riportato al paragrafo 3.4 del DM del 17 gennaio 2018 è riportata di seguito. I seguenti fattori influenzano i dati sul carico della neve:

· sito di installazione

· altitudine = as (m s.l.m.)

· valore caratteristico del carico di neve al suolo riferito ad un periodo di ritorno di 50 anni = qsk

· coefficiente termico in funzione della configurazione di installazione della struttura e dell'interazione

della perdita di calore della costruzione = Ct

· coefficiente di esposizione in funzione della caratteristiche specifiche dell'area in cui sorge la

costruzione (battuta dai venti, normale, riparata) = CE

· fattore di forma della copertura in funzione della sua inclinazione = μ i

Il carico provocato dalla presenza della neve è valutato con la seguente espressione:

$$qs = \mu i \cdot qsk \cdot CE \cdot Ct$$

Calcolo Di Carico Neve

Unità di misura : cm ; Kgf/cmq ; Kgf/cm

Zona 0

Altitudine [m]: 245

Periodo di Ritorno [anni]: 50

qsk (carico neve al suolo) = .015779

COPERTURA A DUE FALDE

alfa1 (inclinazione della falda1 [$^\circ$]) = 27

alfa2 (inclinazione della falda2 [$^\circ$]) = 27

Tabella 2-Carico Di Neve

	mu	qs	qe
mu1(alfa1)	0.8	0.012624	0.645
0.5mu1(alfa1)	0.4	0.006312	0.081
mu1(alfa2)	0.8	0.012624	0.645
0.5mu1(alfa2)	0.4	0.006312	0.081

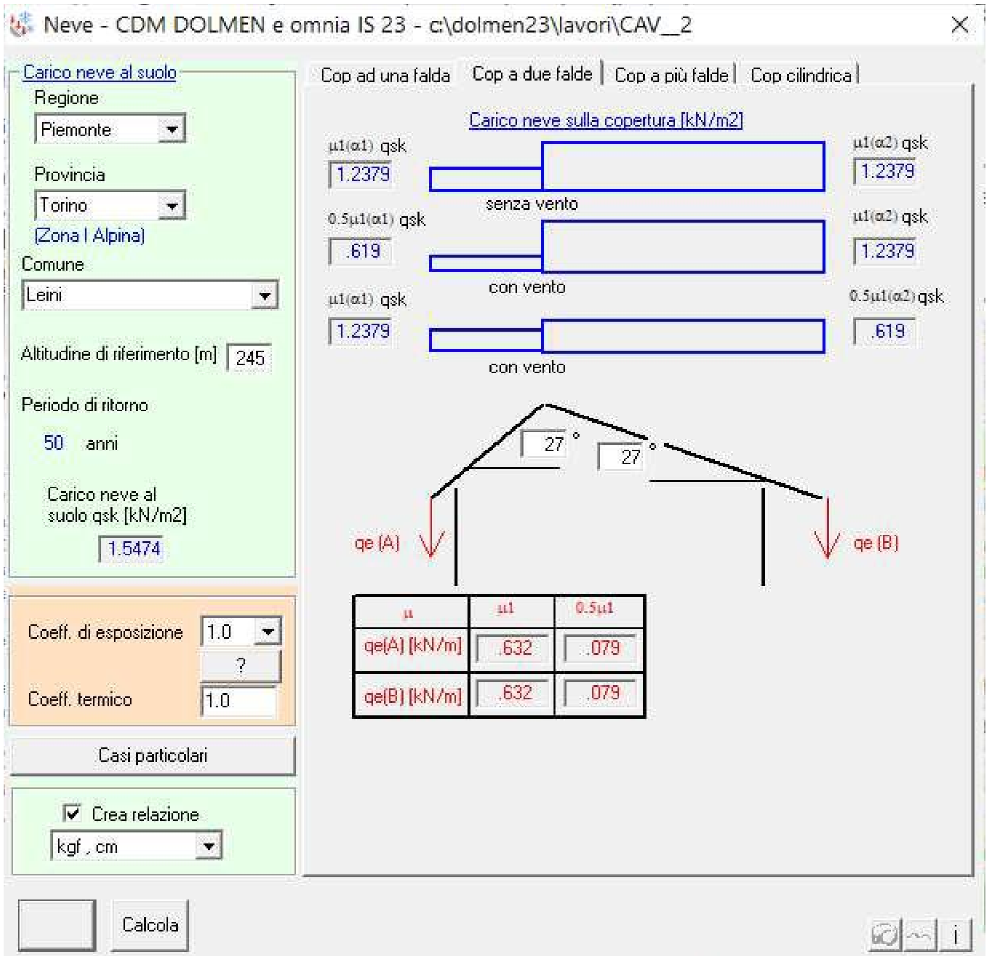

Figura 3-Carico Neve A 2 Falde

4.5 Analisi Dei Carichi Di Vento

Definizione Carico Vento

Il vento, la cui direzione è generalmente considerata orizzontale, esercita azioni sulle costruzioni che cambiano nel tempo e nello spazio, causando generalmente effetti dinamici. Per le costruzioni convenzionali, tali azioni sono generalmente collegate ad azioni statiche equivalenti, schematizzate ortogonalmente alle superfici investite tramite pressioni e depressioni agenti. Secondo la procedura del paragrafo 3.3 del DM del 17 gennaio 2018, la pressione cinetica di calcolo p viene trovata prendendo in considerazione la zona climatica del sito di costruzione, che definisce la pressione cinetica di riferimento qref, opportunamente modificata per tenere conto delle specifiche del sito. I coefficienti di esposizione, di forma e dinamico svolgono questo processo. In particolare, viene applicata la seguente equazione:

$$p = q_{ref} \cdot c_e \cdot c_p \cdot c_d$$

Il coefficiente di esposizione ce dipende da una serie di fattori, tra cui l'altezza sul suolo del punto in questione, la topografia del terreno e la categoria di esposizione del sito ove sorge la costruzione. Il coefficiente di forma cp dipende dalla tipologia, geometria e orientamento della costruzione rispetto alla direzione del vento. Il coefficiente dinamico cd consente di tenere conto degli effetti riduttivi dovuti alla non contemporaneità delle massime pressioni locali e degli effetti amplificativi dovuti alle vibrazioni strutturali. È possibile assumere cautelativamente un valore pari a 1 per edifici di forma regolare di non più di 80 metri di altezza.

Calcolo Carico Vento

Unità di misura : cm ; Kgf/cmq ; cm/s

Convenzione di segno:

(+) compressione

(-) decompressione

Zona 1

Altitudine: 245

Periodo di Ritorno [anni]: 50

Classe di rugosità del terreno:A

Distanza dalla costa [km]: 100

Categoria di esposizione del sito: 5

Tipologia di costruzione:Edifici a pianta rettangolare con coperture piane a falde inclinate o curve

vref (velocità di riferimento) = 2500.

qref (pressione cinetica di riferimento) = .003983

cd (coefficiente dinamico) = 1.

cf (coefficiente d' attrito) = .01

Tabella 3-Carico Di Vento Per Parete 1 Esterno

					par.1 esterno	
	P.to	**z**	**ct(z)**	**ce(z)**	**cp**	**p(z)**
1	**A**	**0**	**1**	**1.4794**	**0.8**	**0.004714**
2		**86**	**1**	**1.4794**	**0.8**	**0.004714**
3		**172**	**1**	**1.4794**	**0.8**	**0.004714**
4		**258**	**1**	**1.4794**	**0.8**	**0.004714**
5		**344**	**1**	**1.4794**	**0.8**	**0.004714**
6		**431**	**1**	**1.4794**	**0.8**	**0.004714**
7		**517**	**1**	**1.4794**	**0.8**	**0.004714**
8		**603**	**1**	**1.4794**	**0.8**	**0.004714**
9		**689**	**1**	**1.4794**	**0.8**	**0.004714**
10	**B**	**775**	**1**	**1.4794**	**0.8**	**0.004714**

Tabella 4-Carico Di Vento Per Parete 2 Esterno

	P.to	z	ct(z)	ce(z)	par.2 esterno	
					cp	p(z)
1	E	0	1	1.4794	-0.4	-0.00236
2		86	1	1.4794	-0.4	-0.00236
3		172	1	1.4794	-0.4	-0.00236
4		258	1	1.4794	-0.4	-0.00236
5		344	1	1.4794	-0.4	-0.00236
6		431	1	1.4794	-0.4	-0.00236
7		517	1	1.4794	-0.4	-0.00236
8		603	1	1.4794	-0.4	-0.00236
9		689	1	1.4794	-0.4	-0.00236
10	D	775	1	1.4794	-0.4	-0.00236

Tabella 5-Carico Di Vento Per Falda 1 Esterno

	P.to	z	ct(z)	ce(z)	fal.1 esterno	
					cp	p(z)
10	B	775	0	1.4794	-0.2	-0.00112
11		804	0	1.4794	-0.2	-0.00112
12		834	0	1.4794	-0.2	-0.00112
13		863	0	1.4794	-0.2	-0.00112
14		893	0	1.4794	-0.2	-0.00112
15		922	0	1.4794	-0.2	-0.00112
16		952	0	1.4794	-0.2	-0.00112
17		981	0	1.4794	-0.2	-0.00112
18		1011	0	1.4794	-0.2	-0.00112
19	C	1040	0	1.4794	-0.2	-0.00112

Tabella 6-Carico Di Vento Per Falda 2 Esterno

	P.to	z	ct(z)	ce(z)	fal.2 esterno	
					cp	p(z)
10	D	775	0	1.4794	-0.4	-0.00236
11		804	0	1.4794	-0.4	-0.00236
12		834	0	1.4794	-0.4	-0.00236
13		863	0	1.4794	-0.4	-0.00236
14		893	0	1.4794	-0.4	-0.00236
15		922	0	1.4794	-0.4	-0.00236
16		952	0	1.4794	-0.4	-0.00236
17		981	0	1.4794	-0.4	-0.00236
18		1011	0	1.4794	-0.4	-0.00236
19	C	1040	0	1.4794	-0.4	-0.00236

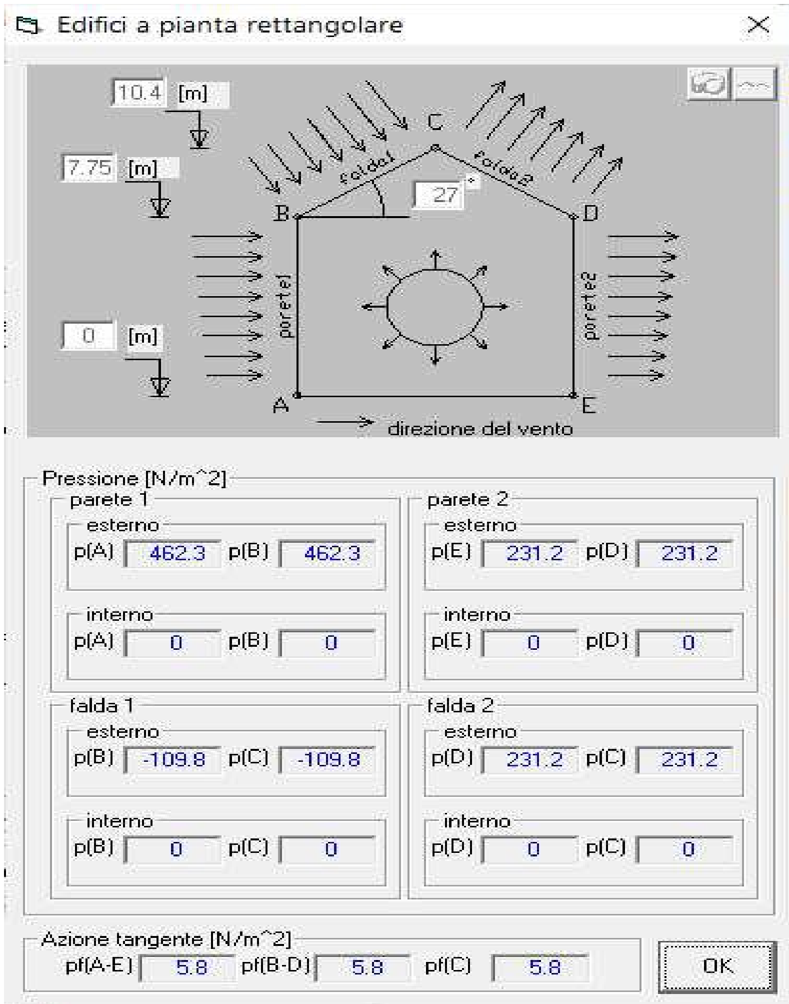

Figura 4-Carico di vento

4.6 Modellazione E Analisi Di Azioni Sismici

4.6.1 Classe Di Duttilità

La capacità di una struttura in cemento armato di dissipare energia in un campo anelastico durante azioni cicliche ripetute è indicata dalla classe di duttilità. Per proteggere i pilastri e gli elementi più fragili, le deformazioni anelastiche devono essere distribuite nel maggior numero di elementi duttili, in particolare le travi.

· comportamento strutturale non dissipativo;

· comportamento strutturale dissipativo.

Due classi di capacità dissipativa o duttilità (CD) sono disponibili per strutture che mostrano un comportamento strutturale dissipativo:

· CD 'A' - Alta;

· CD 'B' - Bassa.

La differenza tra le due classi è la quantità di plasticizzazione cui ci si riconduce durante il processo di progettazione; Per ambedue le classi vengono utilizzati i metodi convenzionali della gerarchia delle resistenze per garantire che la struttura sia duttile e dissipativa, in modo da evitare danni fragili e la creazione di meccanismi instabili imprevisti.

Le strutture esaminate sono state progettate per essere della classe di duttilità (CD) B.

L'azione sismica è stata valutata in conformità alle indicazioni riportate al capitolo 3.2 del DM del 17 gennaio 2018 - Nuove Norme Tecniche per le Costruzioni. I seguenti sono stati i passaggi utilizzati per definire gli spettri di progetto per ogni stato limite per cui sono state effettuate le verifiche:

• Definizione del Periodo di riferimento dell'azione sismica attraverso l'uso combinato della Vita Nominale e della Classe d'Uso della struttura;
• identificazione dei parametri sismici di base ag, F0 e T*c per tutti e quattro gli Stati Limite previsti (SLO, SLD, SLV e SLC) utilizzando latitudine e longitudine; interpolando tra i quattro punti più vicini al punto di riferimento dell'edificio;
• determinare i coefficienti di amplificazione sia topografici che stratigrafici;

calcolare il periodo che corrisponde all'inizio del tratto a velocità costante dello Spettro.
Gli Spettri di Progetto nelle verifiche agli Stati Limite considerati sono stati determinati utilizzando i dati calcolati in questo modo.

L'area in cui si svolgerà l'opera rientra nella zona sismica 3.

4.6.3 Metodo Di Analisi

L'analisi dinamica modale è stata utilizzata per calcolare le azioni sismiche prendendo in considerazione il comportamento della struttura in regime elastico lineare. Come spiegato nel DM del 17 gennaio 2018, punto 7.3.3.1, l'analisi dinamica lineare è composta da:
• nell'individuazione dei modi in cui la costruzione vibra (analisi modale);
• Nel calcolo degli effetti dell'azione sismica, rappresentati dallo spettro di risposta di progetto, per

tutti i modi di vibrare identificati;
• quando si combinano questi effetti.

Tutti i modi con una massa partecipante significativa devono essere presi in considerazione. Per questo motivo, dovrebbero essere presi in considerazione tutti i modi che hanno una massa partecipante superiore al 5% e anche un numero di modi che hanno una massa partecipante totale superiore all'85%. Una Combinazione Quadratica Completa (CQC) deve essere utilizzata per combinare gli effetti relativi ai singoli modi. Secondo le varie combinazioni probabilistiche di carico, le sollecitazioni derivanti da carichi verticali e orizzontali non sismici sono state successivamente combinate con quelle derivanti da tali azioni. Nelle varie condizioni, il numero di modi di vibrazione considerati ha permesso la mobilità di percentuali della massa della struttura superiori all'85% della massa totale.

I valori dei parametri fondamentali per l'analisi dinamica sono riportati di seguito.

PARAMETRI DI CALCOLO:

Modello generale

Assi di vibrazione: X Y

Combinazione quadratica completa (CQC)

4.6.4 Dati Progetto

Edificio sito in località LEINI (long. 7.716000 lat. 45.183100)

Categoria del suolo di fondazione = B

Coeff. di amplificazione stratigrafica Ss = 1.200

Coeff. di amplificazione topografica ST = 1.000

S = 1.200

Vita nominale dell'opera VN = 50 anni

Coefficiente d'uso CU = 1.0

Periodo di riferimento VR = 50.0

PVR : probabilita' di superamento in VR = 10 %

Tempo di ritorno = 474

Coeff. di smorzamento viscoso = 5.0

Valori risultanti per :

ag 0.501 [g/10]

Fo 2.738

TC* 0.270

Fattore di comportamento q = 1.500

Rapporto spettro di esercizio / spettro di progetto = 0.746

Tabella 7-Condizioni Carichi Sismici

CONDIZIONI DI RIFERIMENTO	COEFFICIENTE	PESO RISULTANTE [daN]
1	1	422732.3
2	1	148880.9
3	0.3	39503.7

Tabella 8-Autovettori

n	PERIODO	MASSA ATTIVATA			COEFFICIENTI DI CORRELAZIONE						
	[sec]	%X	%Y	%Z	n+1	n+2	n+3	n+4	n+5	n+6	n+7
1	0.220581	77.492	0.846	0.000	0.175	0.027	0.008	0.006			
2	0.177797	1.020	54.043	0.000	0.068	0.014	0.009				
3	0.123272	0.213	24.416	0.000	0.053	0.026					
4	0.081284	10.484	2.216	0.000	0.257						
5	0.068631	0.339	7.822	0.000							
MASSA TOTALE		89.548	89.343	0.000							

4.6.5 Combinazione Delle Componenti Dell'azione Sismica

Il terremoto è tradizionalmente considerato un agente separato in due direzioni tra le sue ortogonali predefinite; per tenere conto che il movimento del terreno durante l'evento sismico ha in realtà una direzione casuale e, in conformità con le norme, è stato necessario sommare i massimi ottenuti in una direzione con il 30% dei massimi ottenuti per l'azione applicata nell'altra direzione per ottenere l'effetto complessivo del sisma. La presenza di elementi principali precompressi, elementi a mensola o elementi pressoché orizzontali con luce superiore a 20 m è considerata azione sismica verticale.

4.6.6 Eccentricità Accidentali

Per valutare sia le eccentricità effettive che le eccentricità accidentali, sono state utilizzate le condizioni di carico aggiuntive ottenute applicando l'azione sismica nelle posizioni del centro di massa di ogni piano. Queste posizioni sono state ottenute traslando i piani in ogni direzione considerata a una distanza pari a +/- 5% della dimensione massima del piano in direzione perpendicolare all'azione sismica.

1.2.1 Livelli Rigidi

Nel processo di definizione del modello strutturale, alcuni livelli sono stati ritenuti invariabilmente rigidi nel piano. I seguenti sono i piani rigidi creati dal modello tridimensionale:

Tabella 9-Livelli Rigidi

Livello	Quota [cm]	Rigido
Fondazione	-113	SÌ
Livello 1	120	SÌ
Livello 2	445	SÌ
Livello 3	775	SÌ

Il rispetto del paragrafo 7.2.6 D.M. del 17 gennaio 2018 consente di considerare un solaio come invariabilmente rigido se è costruito in cemento armato, latero-cemento con soletta in carbonio di almeno 40 mm di spessore o in strutture miste con soletta in cemento armato di almeno 50 mm di spessore, a condizione che le aperture presenti non ne risentano.

4.6.7 Spettri Di Progetto Per Slu E Sld

Il fattore di struttura q, oltre ai parametri precedentemente richiamati (dipendenti dalla classificazione sismica del Comune), è necessario per determinare gli spettri di risposta. Un fattore riduttivo delle forze elastiche noto come fattore di struttura q viene utilizzato per tenere conto delle capacità dissipative della struttura, che dipendono dal sistema costruttivo scelto, dalla classe di duttilità e dalla regolarità della pianta e dell'altezza.

Per la struttura in esame sono stati determinati i seguenti valori:

Fattore di struttura per sisma orizzontale (q)= 1.5

TB =0.129 [s]

TC =0.386 [s]

TD =1.801 [s]

Per la struttura in esame sono stati utilizzati i seguenti spettri orizzontali:

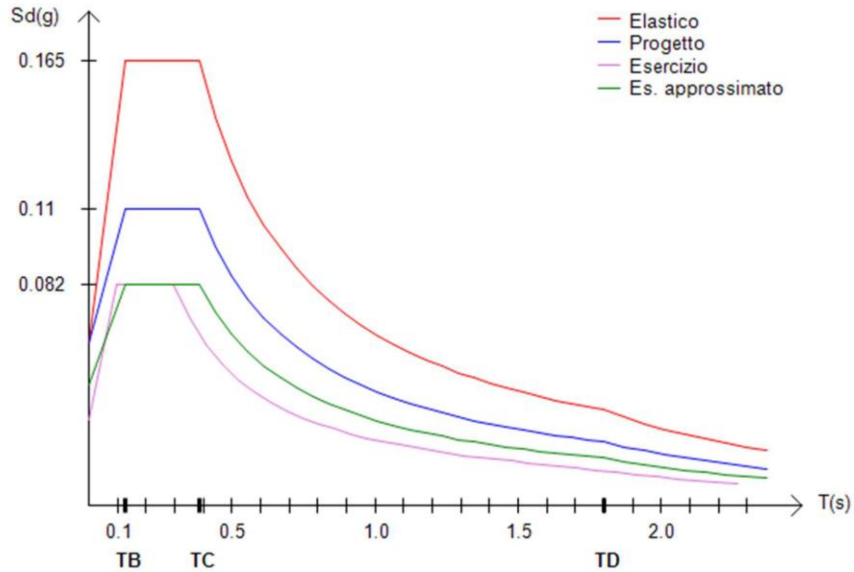

Figura 5-spettri orizontali per l'opera in ogetto

Fattore di struttura per sisma verticale (q)= 1.5

TB =0.05 [s]

TC =0.15 [s]

TD =1 [s]

Per la struttura in esame sono stati utilizzati i seguenti spettri verticali:

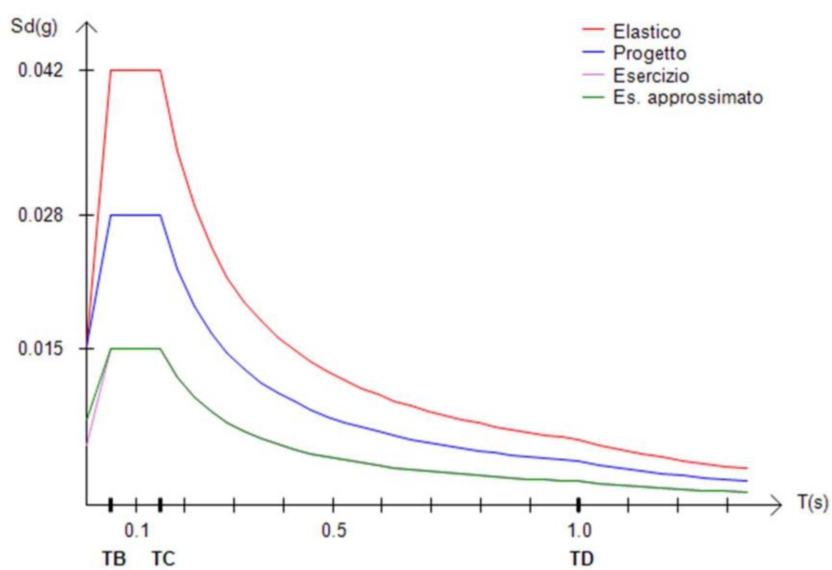

Figura 6-Spettri Verticali Per L'opera In Ogetto

4.7 Condizioni E Casi Di Carico

Di seguito è un riassunto delle condizioni di carico riportate nei tabulati relativi alla verifica di ciascun elemento.

Tabella 10-Condizioni Di Carico

NUM	DESCRIZIONE
1	Peso proprio
2	Permanente
3	A:Var abitazione
4	Neve (<1000m slm)
5	copertura variabile
6	VENTO X
7	VENTO Y
8	Autovett 001 (X)
9	Autovett 001 (Y)
10	Autovett 002 (X)
11	Autovett 002 (Y)
12	Autovett 003 (X)
13	Autovett 003 (Y)
14	Autovett 004 (X)
15	Autovett 004 (Y)
16	Autovett 005 (X)
17	Autovett 005 (Y)
18	Sisma X
19	Sisma Y
20	Torcente add. X
21	Torcente add. Y

Di seguito sono riportati i carichi di ciascuna condizione.

CARICHI NELLE CONDIZIONI

001) Peso proprio [Peso proprio]

438 pesi propri aste

88 pesi propri gusci

13 carichi di solaio

13 p.proprioh=16+4 : globale -0.023 daN/cm2

002) Permanente [Permanente]

28 carichi di solaio

12 tramezzature : globale -0.015 daN/cm2

12 SottofondoPav_+_Pav : globale -0.015 daN/cm2

4 copertura : globale -0.010 daN/cm2

003) A:Var abitazione [A:Var abitazione]

13 carichi di solaio

8 var.abitazione : globale -0.020 daN/cm2

5 var.scaleebalconi : globale -0.040 daN/cm2

004) Neve (<1000m slm) [Neve (<1000m slm)]

4 carichi di solaio

4 Neve : proiez. -0.012 daN/cm2

005) copertura variabile [H1:Cop,Sottot sola manut]

4 carichi di solaio

4 var_copertura : globale -0.005 daN/cm2

006) VENTO X [Vento X]

2 carichi di solaio

1 VENTO_P : locale -0.001 daN/cm2

1 VENTO_DEP : locale 0.002 daN/cm2

007) VENTO Y [Vento Y]

2 carichi di solaio

1 VENTO_P : locale -0.001 daN/cm2

1 VENTO_DEP : locale 0.002 daN/cm2

Di seguito sono riassunti i casi di carico riportati nei tabulati relativi alla verifica di ciascun elemento.

Tabella 11-Casi Di Carico

NOM	DESCRIZIONE	VERIF.	TIPO	CONDIZIONI INSERITE				CASI INS.	
				Nro	Descrizione	Coef.	Somma	Nom	Coef.
1	SLU Max Var	SLU	somma	1	Peso_proprio________	1.3	+		
				2	Permanente__________	1.5	+		
				3	A:Var_abitazione____	1.5	+		
				4	Neve_(<1000m_slm)___	0.75	+		
				5	copertura_variabile_	1.5	+		
2	SLU Max Neve	SLU	somma	1	Peso_proprio________	1.3	+		
				2	Permanente__________	1.5	+		
				3	A:Var_abitazione____	1.05	+		
				4	Neve_(<1000m_slm)	1.5	+		
3	SLU VENTOX 1	SLU	somma	1	Peso_proprio________	1.3	+		
				2	Permanente__________	1.5	+		
				3	A:Var_abitazione____	1.5	+		
				4	Neve_(<1000m_slm)___	0.75	+		
				5	copertura_variabile_	1.5	+		
				6	VENTO_X	0.9	+/-		
4	SLU VENTOY 1	SLU	somma	1	Peso_proprio________	1.3	+		
				2	Permanente__________	1.5	+		
				3	A:Var_abitazione____	1.5	+		
				4	Neve_(<1000m_slm)___	0.75	+		
				5	copertura_variabile_	1.5	+		
				7	VENTO_Y	0.9	+/-		
5	SLU VENTOX 2	SLU	somma	1	Peso_proprio________	1.3	+		
				2	Permanente__________	1.5	+		

				3	A:Var_abitazione____	1.05	+		
				4	Neve_(<1000m_slm)	1.5	+		
				6	VENTO_X	0.9	+/-		
6	SLU VENTOY 2	SLU	somma	1	Peso_proprio________	1.3	+		
				2	Permanente_________	1.5	+		
				3	A:Var_abitazione____	1.05	+		
				4	Neve_(<1000m_slm)___	1.5	+		
				7	VENTO_Y	0.9	+/-		
7	SLU VENTOX 3	SLU	somma	1	Peso_proprio________	1.3	+		
				2	Permanente_________	1.5	+		
				3	A:Var_abitazione____	1.05	+		
				4	Neve_(<1000m_slm)___	0.75	+		
				6	VENTO_X	1.5	+/-		
8	SLU VENTOY 3	SLU	somma	1	Peso_proprio________	1.3	+		
				2	Permanente_________	1.5	+		
				3	A:Var_abitazione____	1.05	+		
				4	Neve_(<1000m_slm)___	0.75	+		
				7	VENTO_Y	1.5	+/-		
9	SISMAX SLU	NONUT	somma	8	Autovett_001_(X)	1	quad		
				10	Autovett_002_(X)	1	quad		
				12	Autovett_003_(X)	1	quad		
				14	Autovett_004_(X)	1	quad		
				16	Autovett_005_(X)	1	quad		
				20	Torcente_add._X	1	+/-		
10	SISMAY SLU	NONUT	somma	9	Autovett_001_(Y)	1	quad		
				11	Autovett_002_(Y)	1	quad		
				13	Autovett_003_(Y)	1	quad		
				15	Autovett_004_(Y)	1	quad		
				17	Autovett_005_(Y)	1	quad		
				21	Torcente_add._Y	1	+/-		
11	SLU con SISMAX PRINC	SLU	somma	1	Peso_proprio________	1	+	9	1
				2	Permanente_________	1	+	10	0.3
				3	A:Var_abitazione____	0.3	+		

12	SLU con SISMAY PRINC	SLU	somma	1	Peso_proprio________	1	+	10	1
				2	Permanente_________	1	+	9	0.3
				3	A:Var_abitazione__	0.3	+		
13	SLD con SISMAX PRINC	SLD	somma	1	Peso_proprio________	1	+	9	0.746
				2	Permanente_________	1	+	10	0.224
				3	A:Var_abitazione__	0.3	+		
14	SLD con SISMAY PRINC	SLD	somma	1	Peso_proprio________	1	+	10	0.746
				2	Permanente_________	1	+	9	0.224
				3	A:Var_abitazione__	0.3	+		
15	Rara	RARA	somma	1	Peso_proprio________	1	+		
				2	Permanente_________	1	+		
				3	A:Var_abitazione__	1	+		
				4	Neve_(<1000m_slm)	0.5	+		
				5	copertura_variabile_	1	+		
16	Rara VentoX 1	RARA	somma	1	Peso_proprio________	1	+		
				2	Permanente_________	1	+		
				3	A:Var_abitazione__	1	+		
				4	Neve_(<1000m_slm)	0.5	+		
				5	copertura_variabile_	1	+		
				6	VENTO_X	0.6	+/-		
17	Rara VentoY 1	RARA	somma	1	Peso_proprio________	1	+		
				2	Permanente_________	1	+		
				3	A:Var_abitazione__	1	+		
				4	Neve_(<1000m_slm)___	0.5	+		
				5	copertura_variabile_	1	+		
				7	VENTO_Y	0.6	+/-		
18	Rara VentoX 2	RARA	somma	1	Peso_proprio________	1	+		
				2	Permanente_________	1	+		

				3	A:Var_abitazione_	0.7	+		
				4	Neve_(<1000m_sl m)	1	+		
				6	VENTO_X	0.6	+/-		
19	Rara VentoY 2	RARA	somma	1	Peso_proprio_____	1	+		
				2	Permanente______	1	+		
				3	A:Var_abitazione_	0.7	+		
				4	Neve_(<1000m_sl m)___	1	+		
				7	VENTO_Y	0.6	+/-		
20	Rara VentoX 3	RARA	somma	1	Peso_proprio_____	1	+		
				2	Permanente______	1	+		
				3	A:Var_abitazione_	0.7	+		
				4	Neve_(<1000m_sl m)___	0.5	+		
				6	VENTO_X	1	+/-		
21	Rara VentoY 3	RARA	somma	1	Peso_proprio_____	1	+		
				2	Permanente______	1	+		
				3	A:Var_abitazione_	0.7	+		
				4	Neve_(<1000m_sl m)	0.5	+		
				7	VENTO_Y	1	+/-		
22	Frequente 1	FREQ	somma	1	Peso_proprio_____	1	+		
				2	Permanente______	1	+		
				3	A:Var_abitazione_	0.5	+		
23	Frequente 2	FREQ	somma	1	Peso_proprio_____	1	+		
				2	Permanente______	1	+		
				3	A:Var_abitazione_	0.3	+		
				4	Neve_(<1000m_sl m)	0.2	+		
24	Frequente VentoX 3	FREQ	somma	1	Peso_proprio_____	1	+		
				2	Permanente______	1	+		
				3	A:Var_abitazione_	0.3	+		
				6	VENTO_X	0.2	+/-		

25	Frequente VentoY 3	FREQ	somma	1	Peso_proprio_______	1	+		
				2	Permanente_______	1	+		
				3	A:Var_abitazione_	0.3	+		
				7	VENTO_Y	0.2	+/-		
26	Quasi Perm	QPERM	somma	1	Peso_proprio_______	1	+		
				2	Permanente_______	1	+		
				3	A:Var_abitazione__	0.3	+		

5 Analisi Del Comportamento Delle Strutture

5.1 Sistemi Di Riferimento

Il sistema di riferimento locale della singola asta e la convenzione di segno positivo per le caratteristiche di sollecitazione sono visualizzati nell'immagine seguente. Le seguenti figure mostrano le sollecitazioni locali e non il sistema di riferimento globale del modello 3D. Invece, il sistema di riferimento globale mostra gli spostamenti.

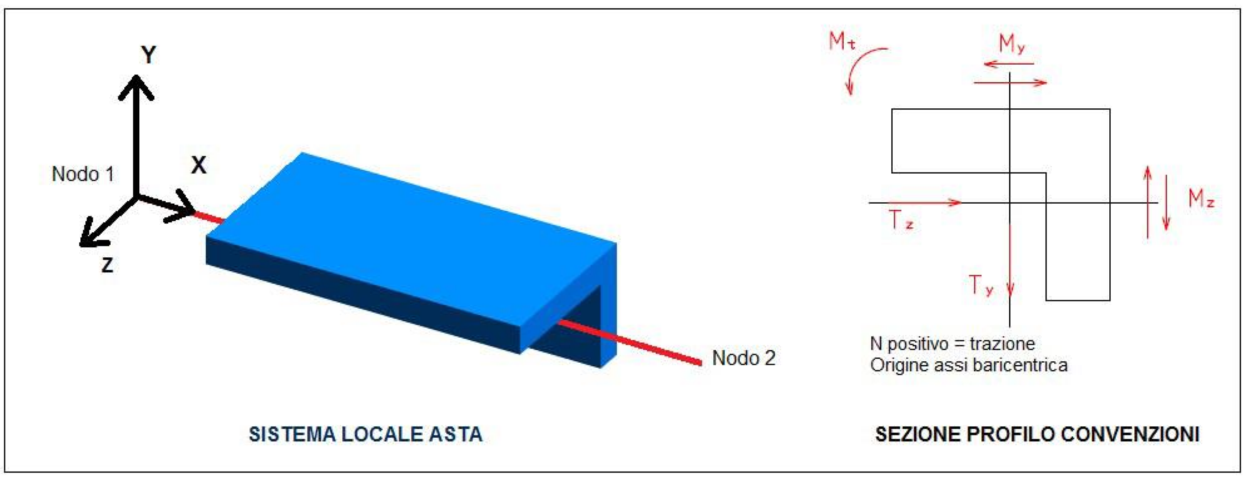

Figura 7-Sistemi Di Riferimento Local Di Asta

6 Risultati

6.1 Utilizzo Percentuale Delle Aste In Legno

La percentuale di utilizzo di un'asta in legno è definita come il peggior rapporto tra quelli definiti ai

paragrafi 4.4.8.1.6 e successivi del D.M. 17 gennaio 2018.

VERIFICA ASTE IN LEGNO - RELAZIONE SINTETICA

Unita' di misura: cm; daN; daN/cm; daNcm; daN/cm2; daN/cm3.

Data : 4/03/2024 - 23:59

Numero aste : 73

RESISTENZE LIMITE RAGGIUNTE (%) :

Tabella 12- Resistenze Limite Raggiunte %

asta	sez	b	h	fsPfd	fsIfl	fsIto	fsTau	Caso %	VE
1	2	20	40	0.287	0	0.152	0.013	2- 1 29	si
2	2	20	40	0.27	0	0.145	0.084	2- 1 27	si
10	3	12	24	0.403	0.416	0.204	0.241	2- 1 42	si
11	3	12	24	0.403	0.416	0.204	0.241	2- 1 42	si
12	3	12	24	0.403	0.416	0.204	0.239	2- 1 42	si
13	3	12	24	0.403	0.416	0.204	0.239	2- 1 42	si
14	3	12	24	0.403	0.416	0.204	0.239	2- 1 42	si
15	3	12	24	0.403	0.416	0.204	0.239	2- 1 42	si
16	3	12	24	0.006	0	0.002	0.03	2- 1 3	si
17	3	12	24	0.05	0.053	0.008	0.089	2- 1 9	si
18	3	12	24	0.13	0.136	0.026	0.139	2- 1 14	si
19	3	12	24	0.248	0.256	0.082	0.19	2- 1 26	si
20	3	12	24	0.248	0.256	0.082	0.19	2- 1 26	si
21	3	12	24	0.13	0.136	0.026	0.139	2- 1 14	si
22	3	12	24	0.05	0.053	0.008	0.089	2- 1 9	si
23	3	12	24	0.006	0	0.002	0.03	2- 1 3	si
24	3	12	24	0.403	0.416	0.204	0.241	2- 1 42	si
25	3	12	24	0.403	0.416	0.204	0.241	2- 1 42	si
26	3	12	24	0.403	0.416	0.204	0.239	2- 1 42	si
27	3	12	24	0.403	0.416	0.204	0.239	2- 1 42	si
28	3	12	24	0.403	0.416	0.204	0.239	2- 1 42	si
29	3	12	24	0.403	0.416	0.204	0.239	2- 1 42	si
30	3	12	24	0.006	0	0.002	0.03	2- 1 3	si
31	3	12	24	0.05	0.053	0.008	0.089	2- 1 9	si
32	3	12	24	0.13	0.136	0.026	0.139	2- 1 14	si
33	3	12	24	0.248	0.256	0.082	0.19	2- 1 26	si
34	3	12	24	0.248	0.256	0.082	0.19	2- 1 26	si
35	3	12	24	0.13	0.136	0.026	0.139	2- 1 14	si
36	3	12	24	0.05	0.053	0.008	0.089	2- 1 9	si
37	3	12	24	0.006	0	0.002	0.03	2- 1 3	si
38	3	12	24	0.403	0.415	0.203	0.243	2- 1 42	si
39	3	12	24	0.006	0	0.002	0.03	2- 1 3	si

40	3	12	24	0.05	0.053	0.008	0.089	2-1	9	si
41	3	12	24	0.13	0.136	0.026	0.139	2-1	14	si
42	3	12	24	0.248	0.256	0.082	0.19	2-1	26	si
43	3	12	24	0.248	0.256	0.082	0.19	2-1	26	si
44	3	12	24	0.13	0.136	0.026	0.139	2-1	14	si
45	3	12	24	0.05	0.053	0.008	0.089	2-1	9	si
46	3	12	24	0.006	0	0.002	0.03	2-1	3	si
47	3	12	24	0.403	0.415	0.203	0.243	2-1	42	si
48	3	12	24	0.006	0	0.002	0.03	2-1	3	si
49	3	12	24	0.05	0.053	0.008	0.089	2-1	9	si
50	3	12	24	0.13	0.136	0.026	0.139	2-1	14	si
51	3	12	24	0.248	0.256	0.082	0.19	2-1	26	si
52	3	12	24	0.248	0.256	0.082	0.19	2-1	26	si
53	3	12	24	0.13	0.136	0.026	0.139	2-1	14	si
54	3	12	24	0.006	0	0.002	0.03	2-1	3	si
55	3	12	24	0.05	0.053	0.008	0.089	2-1	9	si
6391	2	20	40	0.174	0.222	0.074	0.238	2-1	24	si
6392	2	20	40	0.247	0.295	0.106	0.095	2-1	30	si
6393	2	20	40	0.245	0.293	0.105	0.026	2-1	29	si
6394	2	20	40	0.216	0.265	0.095	0.099	2-1	26	si
6395	2	20	40	0.1	0	0.062	0.129	2-1	13	si
6396	2	20	40	0.099	0	0.061	0.128	2-1	13	si
6397	2	20	40	0.214	0.263	0.094	0.098	2-1	26	si
6398	2	20	40	0.241	0.29	0.104	0.025	2-1	29	si
6399	2	20	40	0.243	0.291	0.105	0.095	2-1	29	si
6400	2	20	40	0.175	0.222	0.074	0.239	2-1	24	si
6401	2	20	40	0.1	0	0.06	0.128	2-1	13	si
6402	2	20	40	0.215	0.263	0.094	0.098	2-1	26	si
6403	2	20	40	0.243	0.291	0.103	0.025	2-1	29	si
6404	2	20	40	0.245	0.292	0.104	0.095	2-1	29	si
6405	2	20	40	0.176	0.223	0.073	0.239	2-1	24	si
6406	2	20	40	0.173	0.221	0.075	0.239	2-1	24	si
6407	2	20	40	0.245	0.294	0.107	0.095	2-1	29	si
6408	2	20	40	0.243	0.293	0.106	0.026	2-1	29	si
6409	2	20	40	0.215	0.265	0.096	0.099	2-1	26	si
6410	2	20	40	0.1	0	0.062	0.129	2-1	13	si
6411	2	20	40	0.283	0	0.151	0.332	2-1	33	si
6412	2	20	40	0.255	0	0.138	0.177	2-1	26	si
6413	2	20	40	0.121	0	0.089	0.016	2-1	12	si
6414	2	20	40	0.235	0	0.128	0.158	2-1	24	si
6415	2	20	40	0.267	0	0.142	0.314	2-1	31	si

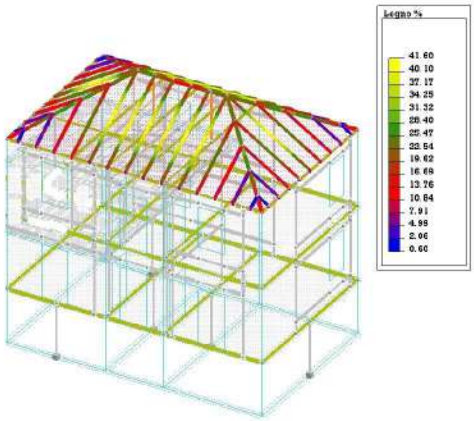

Figura 8-Vista assonometrica con percentuale di utilizzo deele aste

```
VERIFICA FRECCE

Lavoro            : CAV__W
Descrizione       : Verifica frecce
Kdef              : 0.6
Unità di misura : cm; daN; daN/cm; daNcm; daN/cm2; daN/cm3.
Data              : 24/05/2024 - 00:14
Numero aste       : 46
```

```
                                CASI DI CARICO

    N | Descrizione                           |   Soll.| Utilizzo   |
     4|Rara 1                                 |       1| Wnet;Wfin |
     5|Rara 2                                 |       1| Wnet;Wfin |
     6|Rara 3                                 |       1| Wnet;Wfin |
    10|Quasi Perm                             |       1| Wcreep    |
```

```
                                    LIMITI

          |Winst (instantanea)|Wnet (netta finale)|Wfin (finale)      |
appoggi   | L/300             | L/250             | L/150             |
mensole   | L/150             | L/125             | L/75              |
```

```
                                     ASTE

nome |sez|tipo|L asta| L0    | Wc |          nome |sez|tipo|L asta| L0    | Wc |
   10|  3|app | 424.7| 424.7|0.   |             11|  3|app | 424.7| 424.7|0.   |
   12|  3|app | 424.7| 424.7|0.   |             13|  3|app | 424.7| 424.7|0.   |
   14|  3|app | 424.7| 424.7|0.   |             15|  3|app | 424.7| 424.7|0.   |
   16|  3|app |  57.7|  57.7|0.   |             17|  3|app | 149.4| 149.4|0.   |
   18|  3|app | 241.2| 241.2|0.   |             19|  3|app | 332.9| 332.9|0.   |
   20|  3|app | 332.9| 332.9|0.   |             21|  3|app | 241.2| 241.2|0.   |
   22|  3|app | 149.4| 149.4|0.   |             23|  3|app |  57.7|  57.7|0.   |
   24|  3|app | 424.7| 424.7|0.   |             25|  3|app | 424.7| 424.7|0.   |
```

26	3	app	424.7	424.7	0.		27	3	app	424.7	424.7	0.
28	3	app	424.7	424.7	0.		29	3	app	424.7	424.7	0.
30	3	app	57.7	57.7	0.		31	3	app	149.4	149.4	0.
32	3	app	241.2	241.2	0.		33	3	app	332.9	332.9	0.
34	3	app	332.9	332.9	0.		35	3	app	241.2	241.2	0.
36	3	app	149.4	149.4	0.		37	3	app	57.7	57.7	0.
38	3	app	424.7	424.7	0.		39	3	app	57.7	57.7	0.
40	3	app	149.4	149.4	0.		41	3	app	241.2	241.2	0.
42	3	app	332.9	332.9	0.		43	3	app	332.9	332.9	0.
44	3	app	241.2	241.2	0.		45	3	app	149.4	149.4	0.
46	3	app	57.7	57.7	0.		47	3	app	424.7	424.7	0.
48	3	app	57.7	57.7	0.		49	3	app	149.4	149.4	0.
50	3	app	241.2	241.2	0.		51	3	app	332.9	332.9	0.
52	3	app	332.9	332.9	0.		53	3	app	241.2	241.2	0.
54	3	app	57.7	57.7	0.		55	3	app	149.4	149.4	0.

RISULTATI

----------------- (Rara 1) CASO 4- 1

asta	progr.	Wrid	Wcre	Wins	lim	Wnet	lim	Wfin	lim	%	VE
10	0.	0.	.02	.05	1.42	.06	1.7	.06	2.83	3.7	si
	53.1	0.	.07	.2	1.42	.27	1.7	.27	2.83	15.7	si
	106.2	0.	.11	.33	1.42	.44	1.7	.44	2.83	25.6	si
	159.2	0.	.13	.41	1.42	.54	1.7	.54	2.83	32.	si
	212.3	0.	.14	.43	1.42	.58	1.7	.58	2.83	33.9	si
	265.4	0.	.13	.4	1.42	.53	1.7	.53	2.83	31.1	si
	318.5	0.	.1	.3	1.42	.4	1.7	.4	2.83	23.8	si
	371.6	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
11	0.	0.	.02	.04	1.42	.06	1.7	.06	2.83	3.5	si
	53.1	0.	.07	.2	1.42	.26	1.7	.26	2.83	15.6	si
	106.2	0.	.11	.33	1.42	.43	1.7	.43	2.83	25.5	si
	159.2	0.	.13	.41	1.42	.54	1.7	.54	2.83	31.9	si
	212.3	0.	.14	.43	1.42	.57	1.7	.57	2.83	33.8	si
	265.4	0.	.13	.4	1.42	.53	1.7	.53	2.83	31.	si
	318.5	0.	.1	.3	1.42	.4	1.7	.4	2.83	23.8	si
	371.6	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
12	0.	0.	0.	0.	1.42	0.	1.7	0.	2.83	.2	si
	53.1	0.	.05	.16	1.42	.22	1.7	.22	2.83	12.7	si
	106.2	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.	si
	159.2	0.	.12	.38	1.42	.51	1.7	.51	2.83	29.8	si
	212.3	0.	.13	.41	1.42	.55	1.7	.55	2.83	32.2	si
	265.4	0.	.12	.38	1.42	.51	1.7	.51	2.83	29.8	si
	318.5	0.	.1	.29	1.42	.39	1.7	.39	2.83	22.9	si
	371.6	0.	.05	.16	1.42	.21	1.7	.21	2.83	12.5	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
13	0.	0.	0.	.01	1.42	.01	1.7	.01	2.83	.6	si
	53.1	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.1	si
	106.2	0.	.1	.3	1.42	.4	1.7	.4	2.83	23.4	si
	159.2	0.	.13	.39	1.42	.51	1.7	.51	2.83	30.1	si
	212.3	0.	.14	.41	1.42	.55	1.7	.55	2.83	32.4	si
	265.4	0.	.13	.38	1.42	.51	1.7	.51	2.83	29.9	si
	318.5	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.1	si
	371.6	0.	.05	.16	1.42	.21	1.7	.21	2.83	12.6	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
14	0.	0.	0.	.01	1.42	.01	1.7	.01	2.83	.7	si

	53.1	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.1	si
	106.2	0.	.1	.3	1.42	.4	1.7	.4	2.83	23.4	si
	159.2	0.	.13	.39	1.42	.51	1.7	.51	2.83	30.1	si
	212.3	0.	.14	.41	1.42	.55	1.7	.55	2.83	32.4	si
	265.4	0.	.13	.38	1.42	.51	1.7	.51	2.83	29.9	si
	318.5	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.1	si
	371.6	0.	.05	.16	1.42	.21	1.7	.21	2.83	12.6	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
15	0.	0.	0.	0.	1.42	0.	1.7	0.	2.83	.2	si
	53.1	0.	.05	.16	1.42	.22	1.7	.22	2.83	12.7	si
	106.2	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.1	si
	159.2	0.	.12	.38	1.42	.51	1.7	.51	2.83	29.8	si
	212.3	0.	.13	.41	1.42	.55	1.7	.55	2.83	32.2	si
	265.4	0.	.12	.38	1.42	.51	1.7	.51	2.83	29.8	si
	318.5	0.	.1	.29	1.42	.39	1.7	.39	2.83	22.9	si
	371.6	0.	.05	.16	1.42	.21	1.7	.21	2.83	12.5	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
16	0.	0.	.06	.14	.19	.2	.23	.2	.38	87.2	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.4	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	65.6	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	54.7	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	43.8	si
	36.1	0.	.02	.05	.19	.08	.23	.08	.38	32.9	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	22.	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
17	0.	0.	.12	.32	.5	.44	.6	.44	1.	74.3	si
	18.7	0.	.11	.28	.5	.39	.6	.39	1.	65.8	si
	37.4	0.	.1	.25	.5	.34	.6	.34	1.	57.1	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.2	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	39.	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.6	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	20.	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.1	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
18	0.	0.	.14	.37	.8	.51	.96	.51	1.61	53.1	si
	30.1	0.	.13	.34	.8	.47	.96	.47	1.61	49.	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.5	si
	90.4	0.	.1	.27	.8	.38	.96	.38	1.61	39.2	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	33.	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	25.9	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	17.9	si
	211.	0.	.02	.06	.8	.09	.96	.09	1.61	9.2	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
19	0.	0.	.1	.27	1.11	.37	1.33	.37	2.22	27.7	si
	41.6	0.	.11	.3	1.11	.41	1.33	.41	2.22	30.5	si
	83.2	0.	.11	.31	1.11	.43	1.33	.43	2.22	32.2	si
	124.8	0.	.11	.31	1.11	.43	1.33	.43	2.22	32.1	si
	166.5	0.	.1	.29	1.11	.4	1.33	.4	2.22	29.8	si
	208.1	0.	.09	.25	1.11	.34	1.33	.34	2.22	25.2	si
	249.7	0.	.06	.18	1.11	.24	1.33	.24	2.22	18.3	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.7	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
20	0.	0.	.1	.26	1.11	.37	1.33	.37	2.22	27.5	si
	41.6	0.	.11	.29	1.11	.4	1.33	.4	2.22	30.3	si
	83.2	0.	.11	.31	1.11	.43	1.33	.43	2.22	32.	si
	124.8	0.	.11	.31	1.11	.43	1.33	.43	2.22	31.9	si

	166.5	0.	.1	.29	1.11	.4	1.33	.4	2.22	29.7	si
	208.1	0.	.09	.25	1.11	.33	1.33	.33	2.22	25.1	si
	249.7	0.	.06	.18	1.11	.24	1.33	.24	2.22	18.3	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.7	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
21	0.	0.	.14	.37	.8	.51	.96	.51	1.61	52.9	si
	30.1	0.	.13	.34	.8	.47	.96	.47	1.61	48.9	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.3	si
	90.4	0.	.1	.27	.8	.38	.96	.38	1.61	39.1	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	32.9	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	25.9	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	17.9	si
	211.	0.	.02	.06	.8	.09	.96	.09	1.61	9.2	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
22	0.	0.	.12	.32	.5	.44	.6	.44	1.	74.1	si
	18.7	0.	.11	.28	.5	.39	.6	.39	1.	65.6	si
	37.4	0.	.1	.24	.5	.34	.6	.34	1.	56.9	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.1	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	38.9	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.6	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	19.9	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
23	0.	0.	.06	.14	.19	.2	.23	.2	.38	87.	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.2	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	65.4	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	54.6	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	43.7	si
	36.1	0.	.02	.05	.19	.08	.23	.08	.38	32.9	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	21.9	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
24	0.	0.	.02	.05	1.42	.06	1.7	.06	2.83	3.7	si
	53.1	0.	.07	.2	1.42	.27	1.7	.27	2.83	15.7	si
	106.2	0.	.11	.33	1.42	.44	1.7	.44	2.83	25.6	si
	159.2	0.	.13	.41	1.42	.54	1.7	.54	2.83	32.	si
	212.3	0.	.14	.43	1.42	.58	1.7	.58	2.83	33.9	si
	265.4	0.	.13	.4	1.42	.53	1.7	.53	2.83	31.1	si
	318.5	0.	.1	.3	1.42	.4	1.7	.4	2.83	23.8	si
	371.6	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
25	0.	0.	.02	.04	1.42	.06	1.7	.06	2.83	3.5	si
	53.1	0.	.07	.2	1.42	.26	1.7	.26	2.83	15.6	si
	106.2	0.	.11	.33	1.42	.43	1.7	.43	2.83	25.5	si
	159.2	0.	.13	.41	1.42	.54	1.7	.54	2.83	31.9	si
	212.3	0.	.14	.43	1.42	.57	1.7	.57	2.83	33.8	si
	265.4	0.	.13	.4	1.42	.53	1.7	.53	2.83	31.	si
	318.5	0.	.1	.3	1.42	.4	1.7	.4	2.83	23.8	si
	371.6	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
26	0.	0.	0.	0.	1.42	0.	1.7	0.	2.83	.2	si
	53.1	0.	.05	.16	1.42	.22	1.7	.22	2.83	12.7	si
	106.2	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.	si
	159.2	0.	.12	.38	1.42	.51	1.7	.51	2.83	29.8	si
	212.3	0.	.13	.41	1.42	.55	1.7	.55	2.83	32.2	si
	265.4	0.	.12	.38	1.42	.51	1.7	.51	2.83	29.8	si
	318.5	0.	.1	.29	1.42	.39	1.7	.39	2.83	22.9	si

	371.6	0.	.05	.16	1.42	.21	1.7	.21	2.83	12.5	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
27	0.	0.	0.	.01	1.42	.01	1.7	.01	2.83	.6	si
	53.1	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.1	si
	106.2	0.	.1	.3	1.42	.4	1.7	.4	2.83	23.4	si
	159.2	0.	.13	.39	1.42	.51	1.7	.51	2.83	30.1	si
	212.3	0.	.14	.41	1.42	.55	1.7	.55	2.83	32.4	si
	265.4	0.	.13	.38	1.42	.51	1.7	.51	2.83	29.9	si
	318.5	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.1	si
	371.6	0.	.05	.16	1.42	.21	1.7	.21	2.83	12.6	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
28	0.	0.	0.	.01	1.42	.01	1.7	.01	2.83	.7	si
	53.1	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.1	si
	106.2	0.	.1	.3	1.42	.4	1.7	.4	2.83	23.4	si
	159.2	0.	.13	.39	1.42	.51	1.7	.51	2.83	30.1	si
	212.3	0.	.14	.41	1.42	.55	1.7	.55	2.83	32.4	si
	265.4	0.	.13	.38	1.42	.51	1.7	.51	2.83	29.9	si
	318.5	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.1	si
	371.6	0.	.05	.16	1.42	.21	1.7	.21	2.83	12.6	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
29	0.	0.	0.	0.	1.42	0.	1.7	0.	2.83	.2	si
	53.1	0.	.05	.16	1.42	.22	1.7	.22	2.83	12.7	si
	106.2	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.1	si
	159.2	0.	.12	.38	1.42	.51	1.7	.51	2.83	29.8	si
	212.3	0.	.13	.41	1.42	.55	1.7	.55	2.83	32.2	si
	265.4	0.	.12	.38	1.42	.51	1.7	.51	2.83	29.8	si
	318.5	0.	.1	.29	1.42	.39	1.7	.39	2.83	22.9	si
	371.6	0.	.05	.16	1.42	.21	1.7	.21	2.83	12.5	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
30	0.	0.	.06	.14	.19	.2	.23	.2	.38	87.2	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.4	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	65.6	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	54.7	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	43.8	si
	36.1	0.	.02	.05	.19	.08	.23	.08	.38	32.9	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	22.	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
31	0.	0.	.12	.32	.5	.44	.6	.44	1.	74.3	si
	18.7	0.	.11	.28	.5	.39	.6	.39	1.	65.8	si
	37.4	0.	.1	.25	.5	.34	.6	.34	1.	57.1	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.2	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	39.	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.6	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	20.	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.1	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
32	0.	0.	.14	.37	.8	.51	.96	.51	1.61	53.1	si
	30.1	0.	.13	.34	.8	.47	.96	.47	1.61	49.	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.5	si
	90.4	0.	.1	.27	.8	.38	.96	.38	1.61	39.2	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	33.	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	25.9	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	17.9	si
	211.	0.	.02	.06	.8	.09	.96	.09	1.61	9.2	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
33	0.	0.	.1	.27	1.11	.37	1.33	.37	2.22	27.7	si

	41.6	0.	.11	.3	1.11	.41	1.33	.41	2.22	30.5	si
	83.2	0.	.11	.31	1.11	.43	1.33	.43	2.22	32.2	si
	124.8	0.	.11	.31	1.11	.43	1.33	.43	2.22	32.1	si
	166.5	0.	.1	.29	1.11	.4	1.33	.4	2.22	29.8	si
	208.1	0.	.09	.25	1.11	.34	1.33	.34	2.22	25.2	si
	249.7	0.	.06	.18	1.11	.24	1.33	.24	2.22	18.3	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.7	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
34	0.	0.	.1	.26	1.11	.37	1.33	.37	2.22	27.5	si
	41.6	0.	.11	.29	1.11	.4	1.33	.4	2.22	30.3	si
	83.2	0.	.11	.31	1.11	.43	1.33	.43	2.22	32.	si
	124.8	0.	.11	.31	1.11	.43	1.33	.43	2.22	31.9	si
	166.5	0.	.1	.29	1.11	.4	1.33	.4	2.22	29.7	si
	208.1	0.	.09	.25	1.11	.33	1.33	.33	2.22	25.1	si
	249.7	0.	.06	.18	1.11	.24	1.33	.24	2.22	18.3	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.7	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
35	0.	0.	.14	.37	.8	.51	.96	.51	1.61	52.9	si
	30.1	0.	.13	.34	.8	.47	.96	.47	1.61	48.9	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.3	si
	90.4	0.	.1	.27	.8	.38	.96	.38	1.61	39.1	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	32.9	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	25.9	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	17.9	si
	211.	0.	.02	.06	.8	.09	.96	.09	1.61	9.2	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
36	0.	0.	.12	.32	.5	.44	.6	.44	1.	74.1	si
	18.7	0.	.11	.28	.5	.39	.6	.39	1.	65.6	si
	37.4	0.	.1	.24	.5	.34	.6	.34	1.	56.9	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.1	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	38.9	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.6	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	19.9	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
37	0.	0.	.06	.14	.19	.2	.23	.2	.38	87.	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.2	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	65.4	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	54.6	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	43.7	si
	36.1	0.	.02	.05	.19	.08	.23	.08	.38	32.9	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	21.9	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
38	0.	0.	.02	.04	1.42	.06	1.7	.06	2.83	3.5	si
	53.1	0.	.07	.2	1.42	.26	1.7	.26	2.83	15.5	si
	106.2	0.	.11	.32	1.42	.43	1.7	.43	2.83	25.5	si
	159.2	0.	.13	.41	1.42	.54	1.7	.54	2.83	31.8	si
	212.3	0.	.14	.43	1.42	.57	1.7	.57	2.83	33.8	si
	265.4	0.	.13	.4	1.42	.53	1.7	.53	2.83	31.	si
	318.5	0.	.1	.3	1.42	.4	1.7	.4	2.83	23.8	si
	371.6	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
39	0.	0.	.06	.14	.19	.2	.23	.2	.38	87.	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.2	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	65.4	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	54.6	si

	28.9	0.	.03	.07	.19	.1	.23	.1	.38	43.7	si
	36.1	0.	.02	.05	.19	.08	.23	.08	.38	32.9	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	21.9	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
40	0.	0.	.12	.32	.5	.44	.6	.44	1.	74.1	si
	18.7	0.	.11	.28	.5	.39	.6	.39	1.	65.6	si
	37.4	0.	.1	.24	.5	.34	.6	.34	1.	56.9	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.1	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	38.9	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.6	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	19.9	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
41	0.	0.	.14	.37	.8	.51	.96	.51	1.61	52.9	si
	30.1	0.	.13	.34	.8	.47	.96	.47	1.61	48.9	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.3	si
	90.4	0.	.1	.27	.8	.38	.96	.38	1.61	39.1	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	32.9	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	25.9	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	17.9	si
	211.	0.	.02	.06	.8	.09	.96	.09	1.61	9.2	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
42	0.	0.	.1	.26	1.11	.37	1.33	.37	2.22	27.5	si
	41.6	0.	.11	.29	1.11	.4	1.33	.4	2.22	30.3	si
	83.2	0.	.11	.31	1.11	.43	1.33	.43	2.22	32.	si
	124.8	0.	.11	.31	1.11	.43	1.33	.43	2.22	31.9	si
	166.5	0.	.1	.29	1.11	.4	1.33	.4	2.22	29.7	si
	208.1	0.	.09	.25	1.11	.33	1.33	.33	2.22	25.1	si
	249.7	0.	.06	.18	1.11	.24	1.33	.24	2.22	18.3	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.7	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
43	0.	0.	.1	.26	1.11	.37	1.33	.37	2.22	27.5	si
	41.6	0.	.11	.29	1.11	.4	1.33	.4	2.22	30.3	si
	83.2	0.	.11	.31	1.11	.43	1.33	.43	2.22	32.	si
	124.8	0.	.11	.31	1.11	.43	1.33	.43	2.22	31.9	si
	166.5	0.	.1	.29	1.11	.4	1.33	.4	2.22	29.7	si
	208.1	0.	.09	.25	1.11	.33	1.33	.33	2.22	25.1	si
	249.7	0.	.06	.18	1.11	.24	1.33	.24	2.22	18.3	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.7	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
44	0.	0.	.14	.37	.8	.51	.96	.51	1.61	52.9	si
	30.1	0.	.13	.34	.8	.47	.96	.47	1.61	48.9	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.3	si
	90.4	0.	.1	.27	.8	.38	.96	.38	1.61	39.1	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	32.9	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	25.9	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	17.9	si
	211.	0.	.02	.06	.8	.09	.96	.09	1.61	9.2	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
45	0.	0.	.12	.32	.5	.44	.6	.44	1.	74.1	si
	18.7	0.	.11	.28	.5	.39	.6	.39	1.	65.6	si
	37.4	0.	.1	.24	.5	.34	.6	.34	1.	56.9	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.1	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	38.9	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.6	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	19.9	si

	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
46	0.	0.	.06	.14	.19	.2	.23	.2	.38	87.	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.2	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	65.4	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	54.6	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	43.7	si
	36.1	0.	.02	.05	.19	.08	.23	.08	.38	32.9	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	21.9	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
47	0.	0.	.02	.05	1.42	.06	1.7	.06	2.83	3.7	si
	53.1	0.	.07	.2	1.42	.27	1.7	.27	2.83	15.7	si
	106.2	0.	.11	.33	1.42	.44	1.7	.44	2.83	25.6	si
	159.2	0.	.13	.41	1.42	.54	1.7	.54	2.83	32.	si
	212.3	0.	.14	.43	1.42	.58	1.7	.58	2.83	33.9	si
	265.4	0.	.13	.4	1.42	.53	1.7	.53	2.83	31.1	si
	318.5	0.	.1	.31	1.42	.41	1.7	.41	2.83	23.9	si
	371.6	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
48	0.	0.	.06	.14	.19	.2	.23	.2	.38	87.2	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.4	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	65.6	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	54.7	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	43.8	si
	36.1	0.	.02	.05	.19	.08	.23	.08	.38	32.9	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	22.	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
49	0.	0.	.12	.32	.5	.44	.6	.44	1.	74.3	si
	18.7	0.	.11	.28	.5	.39	.6	.39	1.	65.8	si
	37.4	0.	.1	.25	.5	.34	.6	.34	1.	57.1	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.2	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	39.	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.6	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	20.	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.1	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
50	0.	0.	.14	.37	.8	.51	.96	.51	1.61	53.1	si
	30.1	0.	.13	.34	.8	.47	.96	.47	1.61	49.	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.5	si
	90.4	0.	.1	.27	.8	.38	.96	.38	1.61	39.2	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	33.	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	25.9	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	17.9	si
	211.	0.	.02	.06	.8	.09	.96	.09	1.61	9.2	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
51	0.	0.	.1	.27	1.11	.37	1.33	.37	2.22	27.7	si
	41.6	0.	.11	.3	1.11	.41	1.33	.41	2.22	30.5	si
	83.2	0.	.11	.31	1.11	.43	1.33	.43	2.22	32.2	si
	124.8	0.	.11	.31	1.11	.43	1.33	.43	2.22	32.1	si
	166.5	0.	.1	.29	1.11	.4	1.33	.4	2.22	29.8	si
	208.1	0.	.09	.25	1.11	.34	1.33	.34	2.22	25.2	si
	249.7	0.	.06	.18	1.11	.24	1.33	.24	2.22	18.3	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.7	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
52	0.	0.	.1	.27	1.11	.37	1.33	.37	2.22	27.7	si

	41.6	0.	.11	.3	1.11	.41	1.33	.41	2.22	30.5	si
	83.2	0.	.11	.31	1.11	.43	1.33	.43	2.22	32.2	si
	124.8	0.	.11	.31	1.11	.43	1.33	.43	2.22	32.1	si
	166.5	0.	.1	.29	1.11	.4	1.33	.4	2.22	29.8	si
	208.1	0.	.09	.25	1.11	.34	1.33	.34	2.22	25.2	si
	249.7	0.	.06	.18	1.11	.24	1.33	.24	2.22	18.3	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.7	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
53	0.	0.	.14	.37	.8	.51	.96	.51	1.61	53.1	si
	30.1	0.	.13	.34	.8	.47	.96	.47	1.61	49.	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.5	si
	90.4	0.	.1	.27	.8	.38	.96	.38	1.61	39.2	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	33.	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	25.9	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	17.9	si
	211.	0.	.02	.06	.8	.09	.96	.09	1.61	9.2	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
54	0.	0.	.06	.14	.19	.2	.23	.2	.38	87.2	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.4	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	65.6	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	54.7	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	43.8	si
	36.1	0.	.02	.05	.19	.08	.23	.08	.38	32.9	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	22.	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
55	0.	0.	.12	.32	.5	.44	.6	.44	1.	74.3	si
	18.7	0.	.11	.28	.5	.39	.6	.39	1.	65.8	si
	37.4	0.	.1	.25	.5	.34	.6	.34	1.	57.1	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.2	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	39.	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.6	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	20.	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.1	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si

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asta	progr.	Wrid	Wcre	Wins	lim	Wnet	lim	Wfin	lim	%	VE
10	0.	0.	.02	.05	1.42	.06	1.7	.06	2.83	3.7	si
	53.1	0.	.07	.2	1.42	.27	1.7	.27	2.83	15.9	si
	106.2	0.	.11	.33	1.42	.44	1.7	.44	2.83	25.8	si
	159.2	0.	.13	.41	1.42	.55	1.7	.55	2.83	32.2	si
	212.3	0.	.14	.44	1.42	.58	1.7	.58	2.83	34.2	si
	265.4	0.	.13	.4	1.42	.53	1.7	.53	2.83	31.3	si
	318.5	0.	.1	.31	1.42	.41	1.7	.41	2.83	24.	si
	371.6	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.1	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
11	0.	0.	.02	.04	1.42	.06	1.7	.06	2.83	3.5	si
	53.1	0.	.07	.2	1.42	.27	1.7	.27	2.83	15.7	si
	106.2	0.	.11	.33	1.42	.44	1.7	.44	2.83	25.7	si
	159.2	0.	.13	.41	1.42	.55	1.7	.55	2.83	32.1	si
	212.3	0.	.14	.44	1.42	.58	1.7	.58	2.83	34.1	si
	265.4	0.	.13	.4	1.42	.53	1.7	.53	2.83	31.3	si
	318.5	0.	.1	.31	1.42	.41	1.7	.41	2.83	24.	si
	371.6	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.1	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si

12	0.	0.	0.	0.	1.42	0.	1.7	0.	2.83	.2	si
	53.1	0.	.05	.16	1.42	.22	1.7	.22	2.83	12.8	si
	106.2	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.2	si
	159.2	0.	.12	.39	1.42	.51	1.7	.51	2.83	30.1	si
	212.3	0.	.13	.42	1.42	.55	1.7	.55	2.83	32.4	si
	265.4	0.	.12	.39	1.42	.51	1.7	.51	2.83	30.	si
	318.5	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.1	si
	371.6	0.	.05	.16	1.42	.21	1.7	.21	2.83	12.6	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
13	0.	0.	0.	.01	1.42	.01	1.7	.01	2.83	.6	si
	53.1	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.2	si
	106.2	0.	.1	.3	1.42	.4	1.7	.4	2.83	23.6	si
	159.2	0.	.13	.39	1.42	.52	1.7	.52	2.83	30.3	si
	212.3	0.	.14	.42	1.42	.55	1.7	.55	2.83	32.6	si
	265.4	0.	.13	.39	1.42	.51	1.7	.51	2.83	30.2	si
	318.5	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.2	si
	371.6	0.	.05	.16	1.42	.22	1.7	.22	2.83	12.7	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
14	0.	0.	0.	.01	1.42	.01	1.7	.01	2.83	.7	si
	53.1	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.2	si
	106.2	0.	.1	.3	1.42	.4	1.7	.4	2.83	23.6	si
	159.2	0.	.13	.39	1.42	.52	1.7	.52	2.83	30.3	si
	212.3	0.	.14	.42	1.42	.55	1.7	.55	2.83	32.6	si
	265.4	0.	.13	.39	1.42	.51	1.7	.51	2.83	30.2	si
	318.5	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.2	si
	371.6	0.	.05	.16	1.42	.22	1.7	.22	2.83	12.7	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
15	0.	0.	0.	0.	1.42	0.	1.7	0.	2.83	.2	si
	53.1	0.	.05	.16	1.42	.22	1.7	.22	2.83	12.8	si
	106.2	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.2	si
	159.2	0.	.12	.39	1.42	.51	1.7	.51	2.83	30.1	si
	212.3	0.	.13	.42	1.42	.55	1.7	.55	2.83	32.4	si
	265.4	0.	.12	.39	1.42	.51	1.7	.51	2.83	30.	si
	318.5	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.1	si
	371.6	0.	.05	.16	1.42	.21	1.7	.21	2.83	12.6	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
16	0.	0.	.06	.15	.19	.2	.23	.2	.38	87.7	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.9	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	66.	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	55.	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	44.1	si
	36.1	0.	.02	.06	.19	.08	.23	.08	.38	33.1	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	22.1	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.1	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
17	0.	0.	.12	.32	.5	.45	.6	.45	1.	74.8	si
	18.7	0.	.11	.29	.5	.4	.6	.4	1.	66.2	si
	37.4	0.	.1	.25	.5	.34	.6	.34	1.	57.4	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.5	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	39.3	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.8	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	20.1	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.1	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
18	0.	0.	.14	.37	.8	.52	.96	.52	1.61	53.4	si
	30.1	0.	.13	.34	.8	.48	.96	.48	1.61	49.3	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.7	si

	90.4	0.	.1	.28	.8	.38	.96	.38	1.61	39.4	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	33.2	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	26.1	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	18.1	si
	211.	0.	.02	.07	.8	.09	.96	.09	1.61	9.3	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
19	0.	0.	.1	.27	1.11	.37	1.33	.37	2.22	27.9	si
	41.6	0.	.11	.3	1.11	.41	1.33	.41	2.22	30.7	si
	83.2	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.4	si
	124.8	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.3	si
	166.5	0.	.1	.3	1.11	.4	1.33	.4	2.22	30.	si
	208.1	0.	.09	.25	1.11	.34	1.33	.34	2.22	25.3	si
	249.7	0.	.06	.18	1.11	.25	1.33	.25	2.22	18.5	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.8	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
20	0.	0.	.1	.27	1.11	.37	1.33	.37	2.22	27.7	si
	41.6	0.	.11	.3	1.11	.41	1.33	.41	2.22	30.5	si
	83.2	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.2	si
	124.8	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.2	si
	166.5	0.	.1	.29	1.11	.4	1.33	.4	2.22	29.9	si
	208.1	0.	.09	.25	1.11	.34	1.33	.34	2.22	25.3	si
	249.7	0.	.06	.18	1.11	.25	1.33	.25	2.22	18.4	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.8	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
21	0.	0.	.14	.37	.8	.51	.96	.51	1.61	53.2	si
	30.1	0.	.13	.34	.8	.47	.96	.47	1.61	49.2	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.6	si
	90.4	0.	.1	.28	.8	.38	.96	.38	1.61	39.3	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	33.1	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	26.	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	18.	si
	211.	0.	.02	.07	.8	.09	.96	.09	1.61	9.2	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
22	0.	0.	.12	.32	.5	.45	.6	.45	1.	74.6	si
	18.7	0.	.11	.28	.5	.39	.6	.39	1.	66.	si
	37.4	0.	.1	.25	.5	.34	.6	.34	1.	57.3	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.4	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	39.2	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.7	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	20.	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.1	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
23	0.	0.	.06	.15	.19	.2	.23	.2	.38	87.5	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.7	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	65.8	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	54.9	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	44.	si
	36.1	0.	.02	.05	.19	.08	.23	.08	.38	33.1	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	22.1	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.1	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
24	0.	0.	.02	.05	1.42	.06	1.7	.06	2.83	3.7	si
	53.1	0.	.07	.2	1.42	.27	1.7	.27	2.83	15.9	si
	106.2	0.	.11	.33	1.42	.44	1.7	.44	2.83	25.8	si
	159.2	0.	.13	.41	1.42	.55	1.7	.55	2.83	32.2	si
	212.3	0.	.14	.44	1.42	.58	1.7	.58	2.83	34.2	si
	265.4	0.	.13	.4	1.42	.53	1.7	.53	2.83	31.3	si

	318.5	0.	.1	.31	1.42	.41	1.7	.41	2.83	24.	si
	371.6	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.1	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
25	0.	0.	.02	.04	1.42	.06	1.7	.06	2.83	3.5	si
	53.1	0.	.07	.2	1.42	.27	1.7	.27	2.83	15.7	si
	106.2	0.	.11	.33	1.42	.44	1.7	.44	2.83	25.7	si
	159.2	0.	.13	.41	1.42	.55	1.7	.55	2.83	32.1	si
	212.3	0.	.14	.44	1.42	.58	1.7	.58	2.83	34.1	si
	265.4	0.	.13	.4	1.42	.53	1.7	.53	2.83	31.3	si
	318.5	0.	.1	.31	1.42	.41	1.7	.41	2.83	24.	si
	371.6	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.1	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
26	0.	0.	0.	0.	1.42	0.	1.7	0.	2.83	.2	si
	53.1	0.	.05	.16	1.42	.22	1.7	.22	2.83	12.8	si
	106.2	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.2	si
	159.2	0.	.12	.39	1.42	.51	1.7	.51	2.83	30.1	si
	212.3	0.	.13	.42	1.42	.55	1.7	.55	2.83	32.4	si
	265.4	0.	.12	.39	1.42	.51	1.7	.51	2.83	30.	si
	318.5	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.1	si
	371.6	0.	.05	.16	1.42	.21	1.7	.21	2.83	12.6	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
27	0.	0.	0.	.01	1.42	.01	1.7	.01	2.83	.6	si
	53.1	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.2	si
	106.2	0.	.1	.3	1.42	.4	1.7	.4	2.83	23.6	si
	159.2	0.	.13	.39	1.42	.52	1.7	.52	2.83	30.3	si
	212.3	0.	.14	.42	1.42	.55	1.7	.55	2.83	32.6	si
	265.4	0.	.13	.39	1.42	.51	1.7	.51	2.83	30.2	si
	318.5	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.2	si
	371.6	0.	.05	.16	1.42	.22	1.7	.22	2.83	12.7	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
28	0.	0.	0.	.01	1.42	.01	1.7	.01	2.83	.7	si
	53.1	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.2	si
	106.2	0.	.1	.3	1.42	.4	1.7	.4	2.83	23.6	si
	159.2	0.	.13	.39	1.42	.52	1.7	.52	2.83	30.3	si
	212.3	0.	.14	.42	1.42	.55	1.7	.55	2.83	32.6	si
	265.4	0.	.13	.39	1.42	.51	1.7	.51	2.83	30.2	si
	318.5	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.2	si
	371.6	0.	.05	.16	1.42	.22	1.7	.22	2.83	12.7	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
29	0.	0.	0.	0.	1.42	0.	1.7	0.	2.83	.2	si
	53.1	0.	.05	.16	1.42	.22	1.7	.22	2.83	12.8	si
	106.2	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.2	si
	159.2	0.	.12	.39	1.42	.51	1.7	.51	2.83	30.1	si
	212.3	0.	.13	.42	1.42	.55	1.7	.55	2.83	32.4	si
	265.4	0.	.12	.39	1.42	.51	1.7	.51	2.83	30.	si
	318.5	0.	.1	.3	1.42	.39	1.7	.39	2.83	23.1	si
	371.6	0.	.05	.16	1.42	.21	1.7	.21	2.83	12.6	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
30	0.	0.	.06	.15	.19	.2	.23	.2	.38	87.7	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.9	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	66.	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	55.	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	44.1	si
	36.1	0.	.02	.06	.19	.08	.23	.08	.38	33.1	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	22.1	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.1	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si

31	0.	0.	.12	.32	.5	.45	.6	.45	1.	74.8	si
	18.7	0.	.11	.29	.5	.4	.6	.4	1.	66.2	si
	37.4	0.	.1	.25	.5	.34	.6	.34	1.	57.4	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.5	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	39.3	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.8	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	20.1	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.1	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
32	0.	0.	.14	.37	.8	.52	.96	.52	1.61	53.4	si
	30.1	0.	.13	.34	.8	.48	.96	.48	1.61	49.3	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.7	si
	90.4	0.	.1	.28	.8	.38	.96	.38	1.61	39.4	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	33.2	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	26.1	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	18.1	si
	211.	0.	.02	.07	.8	.09	.96	.09	1.61	9.3	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
33	0.	0.	.1	.27	1.11	.37	1.33	.37	2.22	27.9	si
	41.6	0.	.11	.3	1.11	.41	1.33	.41	2.22	30.7	si
	83.2	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.4	si
	124.8	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.3	si
	166.5	0.	.1	.3	1.11	.4	1.33	.4	2.22	30.	si
	208.1	0.	.09	.25	1.11	.34	1.33	.34	2.22	25.3	si
	249.7	0.	.06	.18	1.11	.25	1.33	.25	2.22	18.5	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.8	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
34	0.	0.	.1	.27	1.11	.37	1.33	.37	2.22	27.7	si
	41.6	0.	.11	.3	1.11	.41	1.33	.41	2.22	30.5	si
	83.2	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.2	si
	124.8	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.2	si
	166.5	0.	.1	.29	1.11	.4	1.33	.4	2.22	29.9	si
	208.1	0.	.09	.25	1.11	.34	1.33	.34	2.22	25.3	si
	249.7	0.	.06	.18	1.11	.25	1.33	.25	2.22	18.4	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.8	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
35	0.	0.	.14	.37	.8	.51	.96	.51	1.61	53.2	si
	30.1	0.	.13	.34	.8	.47	.96	.47	1.61	49.2	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.6	si
	90.4	0.	.1	.28	.8	.38	.96	.38	1.61	39.3	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	33.1	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	26.	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	18.	si
	211.	0.	.02	.07	.8	.09	.96	.09	1.61	9.2	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
36	0.	0.	.12	.32	.5	.45	.6	.45	1.	74.6	si
	18.7	0.	.11	.28	.5	.39	.6	.39	1.	66.	si
	37.4	0.	.1	.25	.5	.34	.6	.34	1.	57.3	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.4	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	39.2	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.7	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	20.	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.1	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
37	0.	0.	.06	.15	.19	.2	.23	.2	.38	87.5	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.7	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	65.8	si

	21.6	0.	.04	.09	.19	.13	.23	.13	.38	54.9	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	44.	si
	36.1	0.	.02	.05	.19	.08	.23	.08	.38	33.1	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	22.1	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.1	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
38	0.	0.	.02	.04	1.42	.06	1.7	.06	2.83	3.5	si
	53.1	0.	.07	.2	1.42	.27	1.7	.27	2.83	15.7	si
	106.2	0.	.11	.33	1.42	.44	1.7	.44	2.83	25.7	si
	159.2	0.	.13	.41	1.42	.55	1.7	.55	2.83	32.1	si
	212.3	0.	.14	.44	1.42	.58	1.7	.58	2.83	34.1	si
	265.4	0.	.13	.4	1.42	.53	1.7	.53	2.83	31.3	si
	318.5	0.	.1	.31	1.42	.41	1.7	.41	2.83	24.	si
	371.6	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.1	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
39	0.	0.	.06	.15	.19	.2	.23	.2	.38	87.5	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.7	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	65.8	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	54.9	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	44.	si
	36.1	0.	.02	.05	.19	.08	.23	.08	.38	33.1	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	22.1	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.1	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
40	0.	0.	.12	.32	.5	.45	.6	.45	1.	74.6	si
	18.7	0.	.11	.28	.5	.39	.6	.39	1.	66.	si
	37.4	0.	.1	.25	.5	.34	.6	.34	1.	57.3	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.4	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	39.2	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.7	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	20.	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.1	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
41	0.	0.	.14	.37	.8	.51	.96	.51	1.61	53.2	si
	30.1	0.	.13	.34	.8	.47	.96	.47	1.61	49.2	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.6	si
	90.4	0.	.1	.28	.8	.38	.96	.38	1.61	39.3	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	33.1	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	26.	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	18.	si
	211.	0.	.02	.07	.8	.09	.96	.09	1.61	9.2	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
42	0.	0.	.1	.27	1.11	.37	1.33	.37	2.22	27.7	si
	41.6	0.	.11	.3	1.11	.41	1.33	.41	2.22	30.5	si
	83.2	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.2	si
	124.8	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.2	si
	166.5	0.	.1	.29	1.11	.4	1.33	.4	2.22	29.9	si
	208.1	0.	.09	.25	1.11	.34	1.33	.34	2.22	25.3	si
	249.7	0.	.06	.18	1.11	.25	1.33	.25	2.22	18.4	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.8	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
43	0.	0.	.1	.27	1.11	.37	1.33	.37	2.22	27.7	si
	41.6	0.	.11	.3	1.11	.41	1.33	.41	2.22	30.5	si
	83.2	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.2	si
	124.8	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.2	si
	166.5	0.	.1	.29	1.11	.4	1.33	.4	2.22	29.9	si
	208.1	0.	.09	.25	1.11	.34	1.33	.34	2.22	25.3	si

	249.7	0.	.06	.18	1.11	.25	1.33	.25	2.22	18.4	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.8	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
44	0.	0.	.14	.37	.8	.51	.96	.51	1.61	53.2	si
	30.1	0.	.13	.34	.8	.47	.96	.47	1.61	49.2	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.6	si
	90.4	0.	.1	.28	.8	.38	.96	.38	1.61	39.3	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	33.1	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	26.	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	18.	si
	211.	0.	.02	.07	.8	.09	.96	.09	1.61	9.2	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
45	0.	0.	.12	.32	.5	.45	.6	.45	1.	74.6	si
	18.7	0.	.11	.28	.5	.39	.6	.39	1.	66.	si
	37.4	0.	.1	.25	.5	.34	.6	.34	1.	57.3	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.4	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	39.2	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.7	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	20.	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.1	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
46	0.	0.	.06	.15	.19	.2	.23	.2	.38	87.5	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.7	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	65.8	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	54.9	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	44.	si
	36.1	0.	.02	.05	.19	.08	.23	.08	.38	33.1	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	22.1	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.1	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
47	0.	0.	.02	.05	1.42	.06	1.7	.06	2.83	3.7	si
	53.1	0.	.07	.2	1.42	.27	1.7	.27	2.83	15.8	si
	106.2	0.	.11	.33	1.42	.44	1.7	.44	2.83	25.8	si
	159.2	0.	.13	.41	1.42	.55	1.7	.55	2.83	32.2	si
	212.3	0.	.14	.44	1.42	.58	1.7	.58	2.83	34.2	si
	265.4	0.	.13	.4	1.42	.53	1.7	.53	2.83	31.4	si
	318.5	0.	.1	.31	1.42	.41	1.7	.41	2.83	24.1	si
	371.6	0.	.05	.17	1.42	.22	1.7	.22	2.83	13.1	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
48	0.	0.	.06	.15	.19	.2	.23	.2	.38	87.7	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.9	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	66.	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	55.	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	44.1	si
	36.1	0.	.02	.06	.19	.08	.23	.08	.38	33.1	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	22.1	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.1	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
49	0.	0.	.12	.32	.5	.45	.6	.45	1.	74.8	si
	18.7	0.	.11	.29	.5	.4	.6	.4	1.	66.2	si
	37.4	0.	.1	.25	.5	.34	.6	.34	1.	57.4	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.5	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	39.3	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.8	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	20.1	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.1	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si

50	0.	0.	.14	.37	.8	.52	.96	.52	1.61	53.4	si
	30.1	0.	.13	.34	.8	.48	.96	.48	1.61	49.3	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.7	si
	90.4	0.	.1	.28	.8	.38	.96	.38	1.61	39.4	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	33.2	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	26.1	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	18.1	si
	211.	0.	.02	.07	.8	.09	.96	.09	1.61	9.3	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
51	0.	0.	.1	.27	1.11	.37	1.33	.37	2.22	27.9	si
	41.6	0.	.11	.3	1.11	.41	1.33	.41	2.22	30.7	si
	83.2	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.4	si
	124.8	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.3	si
	166.5	0.	.1	.3	1.11	.4	1.33	.4	2.22	30.	si
	208.1	0.	.09	.25	1.11	.34	1.33	.34	2.22	25.3	si
	249.7	0.	.06	.18	1.11	.25	1.33	.25	2.22	18.5	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.8	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
52	0.	0.	.1	.27	1.11	.37	1.33	.37	2.22	27.9	si
	41.6	0.	.11	.3	1.11	.41	1.33	.41	2.22	30.7	si
	83.2	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.4	si
	124.8	0.	.11	.32	1.11	.43	1.33	.43	2.22	32.3	si
	166.5	0.	.1	.3	1.11	.4	1.33	.4	2.22	30.	si
	208.1	0.	.09	.25	1.11	.34	1.33	.34	2.22	25.3	si
	249.7	0.	.06	.18	1.11	.25	1.33	.25	2.22	18.5	si
	291.3	0.	.03	.1	1.11	.13	1.33	.13	2.22	9.8	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
53	0.	0.	.14	.37	.8	.52	.96	.52	1.61	53.4	si
	30.1	0.	.13	.34	.8	.48	.96	.48	1.61	49.3	si
	60.3	0.	.12	.31	.8	.43	.96	.43	1.61	44.7	si
	90.4	0.	.1	.28	.8	.38	.96	.38	1.61	39.4	si
	120.6	0.	.09	.23	.8	.32	.96	.32	1.61	33.2	si
	150.7	0.	.07	.18	.8	.25	.96	.25	1.61	26.1	si
	180.9	0.	.05	.13	.8	.17	.96	.17	1.61	18.1	si
	211.	0.	.02	.07	.8	.09	.96	.09	1.61	9.3	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
54	0.	0.	.06	.15	.19	.2	.23	.2	.38	87.7	si
	7.2	0.	.05	.13	.19	.18	.23	.18	.38	76.9	si
	14.4	0.	.04	.11	.19	.15	.23	.15	.38	66.	si
	21.6	0.	.04	.09	.19	.13	.23	.13	.38	55.	si
	28.9	0.	.03	.07	.19	.1	.23	.1	.38	44.1	si
	36.1	0.	.02	.06	.19	.08	.23	.08	.38	33.1	si
	43.3	0.	.01	.04	.19	.05	.23	.05	.38	22.1	si
	50.5	0.	.01	.02	.19	.03	.23	.03	.38	11.1	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
55	0.	0.	.12	.32	.5	.45	.6	.45	1.	74.8	si
	18.7	0.	.11	.29	.5	.4	.6	.4	1.	66.2	si
	37.4	0.	.1	.25	.5	.34	.6	.34	1.	57.4	si
	56.	0.	.08	.21	.5	.29	.6	.29	1.	48.5	si
	74.7	0.	.07	.17	.5	.23	.6	.23	1.	39.3	si
	93.4	0.	.05	.13	.5	.18	.6	.18	1.	29.8	si
	112.1	0.	.03	.09	.5	.12	.6	.12	1.	20.1	si
	130.8	0.	.02	.04	.5	.06	.6	.06	1.	10.1	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si

asta	progr.	Wrid	Wcre	Wins	lim	Wnet	lim	Wfin	lim	%	VE
10	0.	0.	.02	.04	1.42	.05	1.7	.05	2.83	3.2	si
	53.1	0.	.07	.16	1.42	.22	1.7	.22	2.83	13.2	si
	106.2	0.	.11	.26	1.42	.36	1.7	.36	2.83	21.4	si
	159.2	0.	.13	.32	1.42	.45	1.7	.45	2.83	26.7	si
	212.3	0.	.14	.34	1.42	.48	1.7	.48	2.83	28.3	si
	265.4	0.	.13	.31	1.42	.44	1.7	.44	2.83	25.9	si
	318.5	0.	.1	.24	1.42	.34	1.7	.34	2.83	19.9	si
	371.6	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.8	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
11	0.	0.	.02	.04	1.42	.05	1.7	.05	2.83	3.	si
	53.1	0.	.07	.16	1.42	.22	1.7	.22	2.83	13.1	si
	106.2	0.	.11	.25	1.42	.36	1.7	.36	2.83	21.3	si
	159.2	0.	.13	.32	1.42	.45	1.7	.45	2.83	26.6	si
	212.3	0.	.14	.34	1.42	.48	1.7	.48	2.83	28.2	si
	265.4	0.	.13	.31	1.42	.44	1.7	.44	2.83	25.9	si
	318.5	0.	.1	.24	1.42	.34	1.7	.34	2.83	19.8	si
	371.6	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.8	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
12	0.	0.	0.	0.	1.42	0.	1.7	0.	2.83	.2	si
	53.1	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.6	si
	106.2	0.	.1	.23	1.42	.33	1.7	.33	2.83	19.2	si
	159.2	0.	.12	.3	1.42	.42	1.7	.42	2.83	24.8	si
	212.3	0.	.13	.32	1.42	.45	1.7	.45	2.83	26.8	si
	265.4	0.	.12	.3	1.42	.42	1.7	.42	2.83	24.8	si
	318.5	0.	.1	.23	1.42	.32	1.7	.32	2.83	19.1	si
	371.6	0.	.05	.12	1.42	.18	1.7	.18	2.83	10.4	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
13	0.	0.	0.	.01	1.42	.01	1.7	.01	2.83	.5	si
	53.1	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.9	si
	106.2	0.	.1	.23	1.42	.33	1.7	.33	2.83	19.4	si
	159.2	0.	.13	.3	1.42	.43	1.7	.43	2.83	25.	si
	212.3	0.	.14	.32	1.42	.46	1.7	.46	2.83	26.9	si
	265.4	0.	.13	.3	1.42	.42	1.7	.42	2.83	24.9	si
	318.5	0.	.1	.23	1.42	.33	1.7	.33	2.83	19.2	si
	371.6	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.5	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
14	0.	0.	0.	.01	1.42	.01	1.7	.01	2.83	.5	si
	53.1	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.9	si
	106.2	0.	.1	.23	1.42	.33	1.7	.33	2.83	19.5	si
	159.2	0.	.13	.3	1.42	.43	1.7	.43	2.83	25.	si
	212.3	0.	.14	.32	1.42	.46	1.7	.46	2.83	26.9	si
	265.4	0.	.13	.3	1.42	.42	1.7	.42	2.83	24.9	si
	318.5	0.	.1	.23	1.42	.33	1.7	.33	2.83	19.2	si
	371.6	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.5	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
15	0.	0.	0.	0.	1.42	0.	1.7	0.	2.83	.2	si
	53.1	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.6	si
	106.2	0.	.1	.23	1.42	.33	1.7	.33	2.83	19.2	si
	159.2	0.	.12	.3	1.42	.42	1.7	.42	2.83	24.8	si
	212.3	0.	.13	.32	1.42	.45	1.7	.45	2.83	26.8	si
	265.4	0.	.12	.3	1.42	.42	1.7	.42	2.83	24.8	si
	318.5	0.	.1	.23	1.42	.32	1.7	.32	2.83	19.1	si
	371.6	0.	.05	.12	1.42	.18	1.7	.18	2.83	10.4	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
16	0.	0.	.06	.12	.19	.18	.23	.18	.38	76.7	si
	7.2	0.	.05	.11	.19	.16	.23	.16	.38	67.2	si

	14.4	0.	.04	.09	.19	.13	.23	.13	.38	57.7	si
	21.6	0.	.04	.08	.19	.11	.23	.11	.38	48.1	si
	28.9	0.	.03	.06	.19	.09	.23	.09	.38	38.6	si
	36.1	0.	.02	.05	.19	.07	.23	.07	.38	29.	si
	43.3	0.	.01	.03	.19	.04	.23	.04	.38	19.3	si
	50.5	0.	.01	.02	.19	.02	.23	.02	.38	9.7	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
17	0.	0.	.12	.27	.5	.39	.6	.39	1.	65.2	si
	18.7	0.	.11	.23	.5	.34	.6	.34	1.	57.7	si
	37.4	0.	.1	.2	.5	.3	.6	.3	1.	50.	si
	56.	0.	.08	.17	.5	.25	.6	.25	1.	42.2	si
	74.7	0.	.07	.14	.5	.2	.6	.2	1.	34.2	si
	93.4	0.	.05	.11	.5	.15	.6	.15	1.	25.9	si
	112.1	0.	.03	.07	.5	.1	.6	.1	1.	17.5	si
	130.8	0.	.02	.04	.5	.05	.6	.05	1.	8.8	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
18	0.	0.	.14	.31	.8	.45	.96	.45	1.61	46.5	si
	30.1	0.	.13	.28	.8	.41	.96	.41	1.61	42.8	si
	60.3	0.	.12	.26	.8	.37	.96	.37	1.61	38.8	si
	90.4	0.	.1	.22	.8	.33	.96	.33	1.61	34.1	si
	120.6	0.	.09	.19	.8	.28	.96	.28	1.61	28.7	si
	150.7	0.	.07	.15	.8	.22	.96	.22	1.61	22.5	si
	180.9	0.	.05	.1	.8	.15	.96	.15	1.61	15.5	si
	211.	0.	.02	.05	.8	.08	.96	.08	1.61	8.	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
19	0.	0.	.1	.22	1.11	.32	1.33	.32	2.22	24.2	si
	41.6	0.	.11	.24	1.11	.35	1.33	.35	2.22	26.4	si
	83.2	0.	.11	.25	1.11	.37	1.33	.37	2.22	27.6	si
	124.8	0.	.11	.25	1.11	.37	1.33	.37	2.22	27.4	si
	166.5	0.	.1	.23	1.11	.34	1.33	.34	2.22	25.4	si
	208.1	0.	.09	.2	1.11	.28	1.33	.28	2.22	21.4	si
	249.7	0.	.06	.14	1.11	.21	1.33	.21	2.22	15.5	si
	291.3	0.	.03	.08	1.11	.11	1.33	.11	2.22	8.2	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
20	0.	0.	.1	.22	1.11	.32	1.33	.32	2.22	24.1	si
	41.6	0.	.11	.24	1.11	.35	1.33	.35	2.22	26.2	si
	83.2	0.	.11	.25	1.11	.37	1.33	.37	2.22	27.5	si
	124.8	0.	.11	.25	1.11	.36	1.33	.36	2.22	27.3	si
	166.5	0.	.1	.23	1.11	.34	1.33	.34	2.22	25.3	si
	208.1	0.	.09	.2	1.11	.28	1.33	.28	2.22	21.3	si
	249.7	0.	.06	.14	1.11	.21	1.33	.21	2.22	15.5	si
	291.3	0.	.03	.08	1.11	.11	1.33	.11	2.22	8.2	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
21	0.	0.	.14	.3	.8	.45	.96	.45	1.61	46.4	si
	30.1	0.	.13	.28	.8	.41	.96	.41	1.61	42.7	si
	60.3	0.	.12	.25	.8	.37	.96	.37	1.61	38.6	si
	90.4	0.	.1	.22	.8	.33	.96	.33	1.61	34.	si
	120.6	0.	.09	.19	.8	.28	.96	.28	1.61	28.6	si
	150.7	0.	.07	.15	.8	.22	.96	.22	1.61	22.4	si
	180.9	0.	.05	.1	.8	.15	.96	.15	1.61	15.5	si
	211.	0.	.02	.05	.8	.08	.96	.08	1.61	7.9	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
22	0.	0.	.12	.26	.5	.39	.6	.39	1.	65.1	si
	18.7	0.	.11	.23	.5	.34	.6	.34	1.	57.6	si
	37.4	0.	.1	.2	.5	.3	.6	.3	1.	49.9	si
	56.	0.	.08	.17	.5	.25	.6	.25	1.	42.1	si
	74.7	0.	.07	.14	.5	.2	.6	.2	1.	34.1	si

	93.4	0.	.05	.11	.5	.15	.6	.15	1.	25.9	si
	112.1	0.	.03	.07	.5	.1	.6	.1	1.	17.4	si
	130.8	0.	.02	.04	.5	.05	.6	.05	1.	8.8	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
23	0.	0.	.06	.12	.19	.18	.23	.18	.38	76.5	si
	7.2	0.	.05	.11	.19	.15	.23	.15	.38	67.	si
	14.4	0.	.04	.09	.19	.13	.23	.13	.38	57.5	si
	21.6	0.	.04	.08	.19	.11	.23	.11	.38	48.	si
	28.9	0.	.03	.06	.19	.09	.23	.09	.38	38.5	si
	36.1	0.	.02	.05	.19	.07	.23	.07	.38	28.9	si
	43.3	0.	.01	.03	.19	.04	.23	.04	.38	19.3	si
	50.5	0.	.01	.02	.19	.02	.23	.02	.38	9.7	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
24	0.	0.	.02	.04	1.42	.05	1.7	.05	2.83	3.2	si
	53.1	0.	.07	.16	1.42	.22	1.7	.22	2.83	13.2	si
	106.2	0.	.11	.26	1.42	.36	1.7	.36	2.83	21.4	si
	159.2	0.	.13	.32	1.42	.45	1.7	.45	2.83	26.7	si
	212.3	0.	.14	.34	1.42	.48	1.7	.48	2.83	28.3	si
	265.4	0.	.13	.31	1.42	.44	1.7	.44	2.83	25.9	si
	318.5	0.	.1	.24	1.42	.34	1.7	.34	2.83	19.9	si
	371.6	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.8	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
25	0.	0.	.02	.04	1.42	.05	1.7	.05	2.83	3.	si
	53.1	0.	.07	.16	1.42	.22	1.7	.22	2.83	13.1	si
	106.2	0.	.11	.25	1.42	.36	1.7	.36	2.83	21.3	si
	159.2	0.	.13	.32	1.42	.45	1.7	.45	2.83	26.6	si
	212.3	0.	.14	.34	1.42	.48	1.7	.48	2.83	28.2	si
	265.4	0.	.13	.31	1.42	.44	1.7	.44	2.83	25.9	si
	318.5	0.	.1	.24	1.42	.34	1.7	.34	2.83	19.8	si
	371.6	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.8	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
26	0.	0.	0.	0.	1.42	0.	1.7	0.	2.83	.2	si
	53.1	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.6	si
	106.2	0.	.1	.23	1.42	.33	1.7	.33	2.83	19.2	si
	159.2	0.	.12	.3	1.42	.42	1.7	.42	2.83	24.8	si
	212.3	0.	.13	.32	1.42	.45	1.7	.45	2.83	26.8	si
	265.4	0.	.12	.3	1.42	.42	1.7	.42	2.83	24.8	si
	318.5	0.	.1	.23	1.42	.32	1.7	.32	2.83	19.1	si
	371.6	0.	.05	.12	1.42	.18	1.7	.18	2.83	10.4	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
27	0.	0.	0.	.01	1.42	.01	1.7	.01	2.83	.5	si
	53.1	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.9	si
	106.2	0.	.1	.23	1.42	.33	1.7	.33	2.83	19.4	si
	159.2	0.	.13	.3	1.42	.43	1.7	.43	2.83	25.	si
	212.3	0.	.14	.32	1.42	.46	1.7	.46	2.83	26.9	si
	265.4	0.	.13	.3	1.42	.42	1.7	.42	2.83	24.9	si
	318.5	0.	.1	.23	1.42	.33	1.7	.33	2.83	19.2	si
	371.6	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.5	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
28	0.	0.	0.	.01	1.42	.01	1.7	.01	2.83	.5	si
	53.1	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.9	si
	106.2	0.	.1	.23	1.42	.33	1.7	.33	2.83	19.5	si
	159.2	0.	.13	.3	1.42	.43	1.7	.43	2.83	25.	si
	212.3	0.	.14	.32	1.42	.46	1.7	.46	2.83	26.9	si
	265.4	0.	.13	.3	1.42	.42	1.7	.42	2.83	24.9	si
	318.5	0.	.1	.23	1.42	.33	1.7	.33	2.83	19.2	si
	371.6	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.5	si

	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
29	0.	0.	0.	0.	1.42	0.	1.7	0.	2.83	.2	si
	53.1	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.6	si
	106.2	0.	.1	.23	1.42	.33	1.7	.33	2.83	19.2	si
	159.2	0.	.12	.3	1.42	.42	1.7	.42	2.83	24.8	si
	212.3	0.	.13	.32	1.42	.45	1.7	.45	2.83	26.8	si
	265.4	0.	.12	.3	1.42	.42	1.7	.42	2.83	24.8	si
	318.5	0.	.1	.23	1.42	.32	1.7	.32	2.83	19.1	si
	371.6	0.	.05	.12	1.42	.18	1.7	.18	2.83	10.4	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
30	0.	0.	.06	.12	.19	.18	.23	.18	.38	76.7	si
	7.2	0.	.05	.11	.19	.16	.23	.16	.38	67.2	si
	14.4	0.	.04	.09	.19	.13	.23	.13	.38	57.7	si
	21.6	0.	.04	.08	.19	.11	.23	.11	.38	48.1	si
	28.9	0.	.03	.06	.19	.09	.23	.09	.38	38.6	si
	36.1	0.	.02	.05	.19	.07	.23	.07	.38	29.	si
	43.3	0.	.01	.03	.19	.04	.23	.04	.38	19.3	si
	50.5	0.	.01	.02	.19	.02	.23	.02	.38	9.7	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
31	0.	0.	.12	.27	.5	.39	.6	.39	1.	65.2	si
	18.7	0.	.11	.23	.5	.34	.6	.34	1.	57.7	si
	37.4	0.	.1	.2	.5	.3	.6	.3	1.	50.	si
	56.	0.	.08	.17	.5	.25	.6	.25	1.	42.2	si
	74.7	0.	.07	.14	.5	.2	.6	.2	1.	34.2	si
	93.4	0.	.05	.11	.5	.15	.6	.15	1.	25.9	si
	112.1	0.	.03	.07	.5	.1	.6	.1	1.	17.5	si
	130.8	0.	.02	.04	.5	.05	.6	.05	1.	8.8	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
32	0.	0.	.14	.31	.8	.45	.96	.45	1.61	46.5	si
	30.1	0.	.13	.28	.8	.41	.96	.41	1.61	42.8	si
	60.3	0.	.12	.26	.8	.37	.96	.37	1.61	38.8	si
	90.4	0.	.1	.22	.8	.33	.96	.33	1.61	34.1	si
	120.6	0.	.09	.19	.8	.28	.96	.28	1.61	28.7	si
	150.7	0.	.07	.15	.8	.22	.96	.22	1.61	22.5	si
	180.9	0.	.05	.1	.8	.15	.96	.15	1.61	15.5	si
	211.	0.	.02	.05	.8	.08	.96	.08	1.61	8.	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
33	0.	0.	.1	.22	1.11	.32	1.33	.32	2.22	24.2	si
	41.6	0.	.11	.24	1.11	.35	1.33	.35	2.22	26.4	si
	83.2	0.	.11	.25	1.11	.37	1.33	.37	2.22	27.6	si
	124.8	0.	.11	.25	1.11	.37	1.33	.37	2.22	27.4	si
	166.5	0.	.1	.23	1.11	.34	1.33	.34	2.22	25.4	si
	208.1	0.	.09	.2	1.11	.28	1.33	.28	2.22	21.4	si
	249.7	0.	.06	.14	1.11	.21	1.33	.21	2.22	15.5	si
	291.3	0.	.03	.08	1.11	.11	1.33	.11	2.22	8.2	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
34	0.	0.	.1	.22	1.11	.32	1.33	.32	2.22	24.1	si
	41.6	0.	.11	.24	1.11	.35	1.33	.35	2.22	26.2	si
	83.2	0.	.11	.25	1.11	.37	1.33	.37	2.22	27.5	si
	124.8	0.	.11	.25	1.11	.36	1.33	.36	2.22	27.3	si
	166.5	0.	.1	.23	1.11	.34	1.33	.34	2.22	25.3	si
	208.1	0.	.09	.2	1.11	.28	1.33	.28	2.22	21.3	si
	249.7	0.	.06	.14	1.11	.21	1.33	.21	2.22	15.5	si
	291.3	0.	.03	.08	1.11	.11	1.33	.11	2.22	8.2	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
35	0.	0.	.14	.3	.8	.45	.96	.45	1.61	46.4	si
	30.1	0.	.13	.28	.8	.41	.96	.41	1.61	42.7	si

	60.3	0.	.12	.25	.8	.37	.96	.37	1.61	38.6	si
	90.4	0.	.1	.22	.8	.33	.96	.33	1.61	34.	si
	120.6	0.	.09	.19	.8	.28	.96	.28	1.61	28.6	si
	150.7	0.	.07	.15	.8	.22	.96	.22	1.61	22.4	si
	180.9	0.	.05	.1	.8	.15	.96	.15	1.61	15.5	si
	211.	0.	.02	.05	.8	.08	.96	.08	1.61	7.9	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
36	0.	0.	.12	.26	.5	.39	.6	.39	1.	65.1	si
	18.7	0.	.11	.23	.5	.34	.6	.34	1.	57.6	si
	37.4	0.	.1	.2	.5	.3	.6	.3	1.	49.9	si
	56.	0.	.08	.17	.5	.25	.6	.25	1.	42.1	si
	74.7	0.	.07	.14	.5	.2	.6	.2	1.	34.1	si
	93.4	0.	.05	.11	.5	.15	.6	.15	1.	25.9	si
	112.1	0.	.03	.07	.5	.1	.6	.1	1.	17.4	si
	130.8	0.	.02	.04	.5	.05	.6	.05	1.	8.8	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
37	0.	0.	.06	.12	.19	.18	.23	.18	.38	76.5	si
	7.2	0.	.05	.11	.19	.15	.23	.15	.38	67.	si
	14.4	0.	.04	.09	.19	.13	.23	.13	.38	57.5	si
	21.6	0.	.04	.08	.19	.11	.23	.11	.38	48.	si
	28.9	0.	.03	.06	.19	.09	.23	.09	.38	38.5	si
	36.1	0.	.02	.05	.19	.07	.23	.07	.38	28.9	si
	43.3	0.	.01	.03	.19	.04	.23	.04	.38	19.3	si
	50.5	0.	.01	.02	.19	.02	.23	.02	.38	9.7	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
38	0.	0.	.02	.04	1.42	.05	1.7	.05	2.83	3.	si
	53.1	0.	.07	.16	1.42	.22	1.7	.22	2.83	13.	si
	106.2	0.	.11	.25	1.42	.36	1.7	.36	2.83	21.3	si
	159.2	0.	.13	.32	1.42	.45	1.7	.45	2.83	26.6	si
	212.3	0.	.14	.34	1.42	.48	1.7	.48	2.83	28.2	si
	265.4	0.	.13	.31	1.42	.44	1.7	.44	2.83	25.9	si
	318.5	0.	.1	.24	1.42	.34	1.7	.34	2.83	19.8	si
	371.6	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.8	si
	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
39	0.	0.	.06	.12	.19	.18	.23	.18	.38	76.5	si
	7.2	0.	.05	.11	.19	.15	.23	.15	.38	67.	si
	14.4	0.	.04	.09	.19	.13	.23	.13	.38	57.5	si
	21.6	0.	.04	.08	.19	.11	.23	.11	.38	48.	si
	28.9	0.	.03	.06	.19	.09	.23	.09	.38	38.5	si
	36.1	0.	.02	.05	.19	.07	.23	.07	.38	28.9	si
	43.3	0.	.01	.03	.19	.04	.23	.04	.38	19.3	si
	50.5	0.	.01	.02	.19	.02	.23	.02	.38	9.7	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
40	0.	0.	.12	.26	.5	.39	.6	.39	1.	65.1	si
	18.7	0.	.11	.23	.5	.34	.6	.34	1.	57.6	si
	37.4	0.	.1	.2	.5	.3	.6	.3	1.	49.9	si
	56.	0.	.08	.17	.5	.25	.6	.25	1.	42.1	si
	74.7	0.	.07	.14	.5	.2	.6	.2	1.	34.1	si
	93.4	0.	.05	.11	.5	.15	.6	.15	1.	25.9	si
	112.1	0.	.03	.07	.5	.1	.6	.1	1.	17.4	si
	130.8	0.	.02	.04	.5	.05	.6	.05	1.	8.8	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
41	0.	0.	.14	.3	.8	.45	.96	.45	1.61	46.4	si
	30.1	0.	.13	.28	.8	.41	.96	.41	1.61	42.7	si
	60.3	0.	.12	.25	.8	.37	.96	.37	1.61	38.6	si
	90.4	0.	.1	.22	.8	.33	.96	.33	1.61	34.	si
	120.6	0.	.09	.19	.8	.28	.96	.28	1.61	28.6	si

	150.7	0.	.07	.15	.8	.22	.96	.22	1.61	22.4	si
	180.9	0.	.05	.1	.8	.15	.96	.15	1.61	15.5	si
	211.	0.	.02	.05	.8	.08	.96	.08	1.61	7.9	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
42	0.	0.	.1	.22	1.11	.32	1.33	.32	2.22	24.1	si
	41.6	0.	.11	.24	1.11	.35	1.33	.35	2.22	26.2	si
	83.2	0.	.11	.25	1.11	.37	1.33	.37	2.22	27.5	si
	124.8	0.	.11	.25	1.11	.36	1.33	.36	2.22	27.3	si
	166.5	0.	.1	.23	1.11	.34	1.33	.34	2.22	25.3	si
	208.1	0.	.09	.2	1.11	.28	1.33	.28	2.22	21.3	si
	249.7	0.	.06	.14	1.11	.21	1.33	.21	2.22	15.5	si
	291.3	0.	.03	.08	1.11	.11	1.33	.11	2.22	8.2	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
43	0.	0.	.1	.22	1.11	.32	1.33	.32	2.22	24.1	si
	41.6	0.	.11	.24	1.11	.35	1.33	.35	2.22	26.2	si
	83.2	0.	.11	.25	1.11	.37	1.33	.37	2.22	27.5	si
	124.8	0.	.11	.25	1.11	.36	1.33	.36	2.22	27.3	si
	166.5	0.	.1	.23	1.11	.34	1.33	.34	2.22	25.3	si
	208.1	0.	.09	.2	1.11	.28	1.33	.28	2.22	21.3	si
	249.7	0.	.06	.14	1.11	.21	1.33	.21	2.22	15.5	si
	291.3	0.	.03	.08	1.11	.11	1.33	.11	2.22	8.2	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
44	0.	0.	.14	.3	.8	.45	.96	.45	1.61	46.4	si
	30.1	0.	.13	.28	.8	.41	.96	.41	1.61	42.7	si
	60.3	0.	.12	.25	.8	.37	.96	.37	1.61	38.6	si
	90.4	0.	.1	.22	.8	.33	.96	.33	1.61	34.	si
	120.6	0.	.09	.19	.8	.28	.96	.28	1.61	28.6	si
	150.7	0.	.07	.15	.8	.22	.96	.22	1.61	22.4	si
	180.9	0.	.05	.1	.8	.15	.96	.15	1.61	15.5	si
	211.	0.	.02	.05	.8	.08	.96	.08	1.61	7.9	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
45	0.	0.	.12	.26	.5	.39	.6	.39	1.	65.1	si
	18.7	0.	.11	.23	.5	.34	.6	.34	1.	57.6	si
	37.4	0.	.1	.2	.5	.3	.6	.3	1.	49.9	si
	56.	0.	.08	.17	.5	.25	.6	.25	1.	42.1	si
	74.7	0.	.07	.14	.5	.2	.6	.2	1.	34.1	si
	93.4	0.	.05	.11	.5	.15	.6	.15	1.	25.9	si
	112.1	0.	.03	.07	.5	.1	.6	.1	1.	17.4	si
	130.8	0.	.02	.04	.5	.05	.6	.05	1.	8.8	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
46	0.	0.	.06	.12	.19	.18	.23	.18	.38	76.5	si
	7.2	0.	.05	.11	.19	.15	.23	.15	.38	67.	si
	14.4	0.	.04	.09	.19	.13	.23	.13	.38	57.5	si
	21.6	0.	.04	.08	.19	.11	.23	.11	.38	48.	si
	28.9	0.	.03	.06	.19	.09	.23	.09	.38	38.5	si
	36.1	0.	.02	.05	.19	.07	.23	.07	.38	28.9	si
	43.3	0.	.01	.03	.19	.04	.23	.04	.38	19.3	si
	50.5	0.	.01	.02	.19	.02	.23	.02	.38	9.7	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
47	0.	0.	.02	.04	1.42	.05	1.7	.05	2.83	3.2	si
	53.1	0.	.07	.16	1.42	.22	1.7	.22	2.83	13.2	si
	106.2	0.	.11	.26	1.42	.36	1.7	.36	2.83	21.4	si
	159.2	0.	.13	.32	1.42	.45	1.7	.45	2.83	26.7	si
	212.3	0.	.14	.34	1.42	.48	1.7	.48	2.83	28.3	si
	265.4	0.	.13	.31	1.42	.44	1.7	.44	2.83	25.9	si
	318.5	0.	.1	.24	1.42	.34	1.7	.34	2.83	19.9	si
	371.6	0.	.05	.13	1.42	.18	1.7	.18	2.83	10.8	si

	424.7	0.	0.	0.	1.42	0.	1.7	0.	2.83	0.	si
48	0.	0.	.06	.12	.19	.18	.23	.18	.38	76.7	si
	7.2	0.	.05	.11	.19	.16	.23	.16	.38	67.2	si
	14.4	0.	.04	.09	.19	.13	.23	.13	.38	57.7	si
	21.6	0.	.04	.08	.19	.11	.23	.11	.38	48.1	si
	28.9	0.	.03	.06	.19	.09	.23	.09	.38	38.6	si
	36.1	0.	.02	.05	.19	.07	.23	.07	.38	29.	si
	43.3	0.	.01	.03	.19	.04	.23	.04	.38	19.3	si
	50.5	0.	.01	.02	.19	.02	.23	.02	.38	9.7	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
49	0.	0.	.12	.27	.5	.39	.6	.39	1.	65.2	si
	18.7	0.	.11	.23	.5	.34	.6	.34	1.	57.7	si
	37.4	0.	.1	.2	.5	.3	.6	.3	1.	50.	si
	56.	0.	.08	.17	.5	.25	.6	.25	1.	42.2	si
	74.7	0.	.07	.14	.5	.2	.6	.2	1.	34.2	si
	93.4	0.	.05	.11	.5	.15	.6	.15	1.	25.9	si
	112.1	0.	.03	.07	.5	.1	.6	.1	1.	17.5	si
	130.8	0.	.02	.04	.5	.05	.6	.05	1.	8.8	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si
50	0.	0.	.14	.31	.8	.45	.96	.45	1.61	46.5	si
	30.1	0.	.13	.28	.8	.41	.96	.41	1.61	42.8	si
	60.3	0.	.12	.26	.8	.37	.96	.37	1.61	38.8	si
	90.4	0.	.1	.22	.8	.33	.96	.33	1.61	34.1	si
	120.6	0.	.09	.19	.8	.28	.96	.28	1.61	28.7	si
	150.7	0.	.07	.15	.8	.22	.96	.22	1.61	22.5	si
	180.9	0.	.05	.1	.8	.15	.96	.15	1.61	15.5	si
	211.	0.	.02	.05	.8	.08	.96	.08	1.61	8.	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
51	0.	0.	.1	.22	1.11	.32	1.33	.32	2.22	24.2	si
	41.6	0.	.11	.24	1.11	.35	1.33	.35	2.22	26.4	si
	83.2	0.	.11	.25	1.11	.37	1.33	.37	2.22	27.6	si
	124.8	0.	.11	.25	1.11	.37	1.33	.37	2.22	27.4	si
	166.5	0.	.1	.23	1.11	.34	1.33	.34	2.22	25.4	si
	208.1	0.	.09	.2	1.11	.28	1.33	.28	2.22	21.4	si
	249.7	0.	.06	.14	1.11	.21	1.33	.21	2.22	15.5	si
	291.3	0.	.03	.08	1.11	.11	1.33	.11	2.22	8.2	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
52	0.	0.	.1	.22	1.11	.32	1.33	.32	2.22	24.2	si
	41.6	0.	.11	.24	1.11	.35	1.33	.35	2.22	26.4	si
	83.2	0.	.11	.25	1.11	.37	1.33	.37	2.22	27.6	si
	124.8	0.	.11	.25	1.11	.37	1.33	.37	2.22	27.4	si
	166.5	0.	.1	.23	1.11	.34	1.33	.34	2.22	25.4	si
	208.1	0.	.09	.2	1.11	.28	1.33	.28	2.22	21.4	si
	249.7	0.	.06	.14	1.11	.21	1.33	.21	2.22	15.5	si
	291.3	0.	.03	.08	1.11	.11	1.33	.11	2.22	8.2	si
	332.9	0.	0.	0.	1.11	0.	1.33	0.	2.22	0.	si
53	0.	0.	.14	.31	.8	.45	.96	.45	1.61	46.5	si
	30.1	0.	.13	.28	.8	.41	.96	.41	1.61	42.8	si
	60.3	0.	.12	.26	.8	.37	.96	.37	1.61	38.8	si
	90.4	0.	.1	.22	.8	.33	.96	.33	1.61	34.1	si
	120.6	0.	.09	.19	.8	.28	.96	.28	1.61	28.7	si
	150.7	0.	.07	.15	.8	.22	.96	.22	1.61	22.5	si
	180.9	0.	.05	.1	.8	.15	.96	.15	1.61	15.5	si
	211.	0.	.02	.05	.8	.08	.96	.08	1.61	8.	si
	241.2	0.	0.	0.	.8	0.	.96	0.	1.61	0.	si
54	0.	0.	.06	.12	.19	.18	.23	.18	.38	76.7	si
	7.2	0.	.05	.11	.19	.16	.23	.16	.38	67.2	si

	14.4	0.	.04	.09	.19	.13	.23	.13	.38	57.7	si
	21.6	0.	.04	.08	.19	.11	.23	.11	.38	48.1	si
	28.9	0.	.03	.06	.19	.09	.23	.09	.38	38.6	si
	36.1	0.	.02	.05	.19	.07	.23	.07	.38	29.	si
	43.3	0.	.01	.03	.19	.04	.23	.04	.38	19.3	si
	50.5	0.	.01	.02	.19	.02	.23	.02	.38	9.7	si
	57.7	0.	0.	0.	.19	0.	.23	0.	.38	0.	si
55	0.	0.	.12	.27	.5	.39	.6	.39	1.	65.2	si
	18.7	0.	.11	.23	.5	.34	.6	.34	1.	57.7	si
	37.4	0.	.1	.2	.5	.3	.6	.3	1.	50.	si
	56.	0.	.08	.17	.5	.25	.6	.25	1.	42.2	si
	74.7	0.	.07	.14	.5	.2	.6	.2	1.	34.2	si
	93.4	0.	.05	.11	.5	.15	.6	.15	1.	25.9	si
	112.1	0.	.03	.07	.5	.1	.6	.1	1.	17.5	si
	130.8	0.	.02	.04	.5	.05	.6	.05	1.	8.8	si
	149.4	0.	0.	0.	.5	0.	.6	0.	1.	0.	si

7 Verifiche Muratura Portante

VALUTAZIONE DELLA RISPOSTA GLOBALE DELL'EDIFICIO

La struttura è stata modellata secondo lo schema cosidetto a 'telaio equivalente'.
Il metodo utilizzato mira alla valutazione della risposta globale degli edifici in cui il meccanismo resistente è governato dalla risposta nel piano delle pareti.
Le pareti murarie sono state idealizzate mediante un telaio equivalente costituito da elementi maschio (ad asse verticale), elementi fascia (ad asse orizzontale), elementi nodo. Gli elementi maschio e gli elementi fascia vengono modellati come elementi di telaio ('beam-column') deformabili assialmente e a taglio. Se si suppone che gli elementi nodo siano infinitamente rigidi e resistenti, è possibile modellarli numericamente introducendo opportuni bracci rigidi (offsets) alle estremità degli elementi maschio e fascia.
Si suppone che un elemento maschio sia costituito da una parte deformabile con resistenza finita, e di due parti infinitamente rigide e resistenti alle estremità dell'elemento. L'altezza della parte deformabile o <altezza efficace> del maschio viene definita secondo quanto proposto da Dolce in 'Schematizzazione e modellazione per azioni nel piano delle pareti', nel corso sul consolidamento degli edifici in muratura in zona sismica, Ordine degli Ingegneri, Potenza, 1989, per tenere conto in modo approssimato della deformabilita' della muratura nelle zone di nodo.

CARATTERISTICHE MECCANICHE DEI MATERIALI NELLA MODELLAZIONE F.E.M.

Scheda mat. 01) -- CALCESTRUZZO
Modulo di Young E 300000.0 daN/cm2
Modulo di Poisson 0.15
Modulo elast. tangenziale G 130000.0 daN/cm2
Coeff. di dilatazione termica 1e-05/°C
Peso specifico 0.003 daN/cm3

Scheda mat. 02) -- ACCIAIO
Modulo di Young E 2100000.0 daN/cm2
Modulo di Poisson 0.30
Modulo elast. tangenziale G 850000.0 daN/cm2
Coeff. di dilatazione termica 1e-05/°C
Peso specifico 0.008 daN/cm3

Scheda mat. 03) -- LEGNO Legno massiccio
Modulo di Young E 100000.0 daN/cm2
Modulo di Poisson 0.25
Modulo elast. tangenziale G 6000.0 daN/cm2
Coeff. di dilatazione termica 0/°C
Peso specifico 0.001 daN/cm3

Scheda mat. 04) -- muratura muratura
Modulo di Young E 18000.0 daN/cm2
Modulo di Poisson 0.20
Modulo elast. tangenziale G 3000.0 daN/cm2
Coeff. di dilatazione termica 10/°C
Peso specifico 0.001 daN/cm3

RESISTENZE DEI MATERIALI

Mat. muratura 1) -- nuova, MATTONI SEMIPIENI E MALTA M5
Coeff. resistenze materiali : 2.00 (casi non sismici)
Coeff. resistenze materiali : 2.00 (casi sismici)
Res. caratt. a compressione fk : 60.0 daN/cm2
Res. caratt. a taglio in assenza di tensioni normali fnk0 : 2.0 daN/cm2
Res. caratt. a compressione in direzione orizzontale fh0 : 30.0 daN/cm2
Res. a compressione del blocco, normalizzata : 150.0 daN/cm2
E' stato assunto come max drift ammissibile il 4 % dell'altezza interpiano

DISPOSIZIONI DI ARMATURA TIPO

01) 1 diam. 16 a distanza 12.0 cm dall'estremo
1 diam. 16 a interasse max 200.0 cm
2 diam. 6 armatura orizz. con passo 46.0 cm

CASI UTILIZZATI PER LA VERIFICA DELLE MURATURE

1 -- SLU SENZA SISMA
4 -- SLU con SISMAX PRINC
5 -- SLU con SISMAY PRINC

E' stata effettuata un redistribuzione del taglio fra pannelli appartenenti ad uno stesso piano di una parete, in accordo con le condizioni previste al punto 7.8.1.5.2 delle NTC2018

UNITA' DI MISURA UTILIZZATE :

Lunghezze : cm
Forze : daN
Momenti : daNcm

SCHEMA PARETI

PARETE 1 - da (975.54 , 2424.46) a (1640.54 , 2424.46)

VERIFICHE MASCHI MURARI

	Car.mecc/res		Dati geometrici					Ecc. e2		
	mat.	res.	hsez	t	h0	W	e1	caso	e2	Arm.
M0006	04	01	181.8	30.0	382.5	2195	1.9	1	1.0	001
M0007	04	01	185.0	30.0	382.5	2234	1.9	1	1.0	001
M0008	04	01	178.2	30.0	382.5	2152	1.9	1	1.0	001

Pressoflessione nel piano

	caso	Md	% red.	Mred	Nd	Mrd
M0006	4	252688	+0.00	252688	2599	1486527
M0007	4	213943	+0.00	213943	2568	1512154
M0008	4	246311	+0.00	246311	2616	1455568

Taglio nel piano

	caso	Nd	Md	Vmax	Vd	c.red.	Vred	Vrd
M0006	4	2599	243178	0.46	1928	+0.00	1928	7691
M0007	4	1491	138205	0.47	1815	+0.00	1815	7756
M0008	4	1578	134345	0.49	1899	+0.00	1899	7579

Pressoflessione per carichi laterali

	caso	Nd	My	h0/t	e	phi	e l.	phi l.	Nrd	Mrd
M0006	1	4244	8116	12.75						255711
M0007	1	3645	6971	12.75						250043
M0008	1	4397	8410	12.75						256432

Sismica fuori piano

	Sa	Fa	My	caso	Nd	Mrd
M0006	0.10529	77	3684	4	2070	232152
M0007	0.10529	78	3749	4	2030	232305
M0008	0.10529	76	3611	4	2097	231743

Verifica deformazioni

	caso	sest.	drift	Limite
M0006	4	4	0.1	15.3
M0007	4	4	0.1	15.3
M0008	4	4	0.1	15.3

VERIFICHE FASCE DI PIANO

Car.mecc/res			Pressoflessione			Taglio		
	mat.	res.	caso	Md	Mrd	caso	Vd	Vrd
F0007	04	01	1	144041	1501180	4	145	5325 [t]
F0008	04	01	1	9975	233471	4	506	2100 [t]
F0009	04	01	1	142987	1501180	1	163	5325 [t]
F0010	04	01	4	10827	233471	4	504	2100 [t]

PARETE 2 - da (975.54 , 1381.46) a (975.54 , 2424.46)

VERIFICHE MASCHI MURARI

Car.mecc/res			Dati geometrici					Ecc. e2		
	mat.	res.	hsez	t	h0	W	e1	caso	e2	Arm.
M0004	04	01	372.8	30.0	382.5	4502	1.9	1	1.0	001
M0005	04	01	493.7	30.0	382.5	5961	1.9	1	1.0	001

Pressoflessione nel piano

	caso	Md	% red.	Mred	Nd	Mrd
M0004	4	581886	+0.00	581886	13332	5019512
M0005	4	998198	+0.00	998198	13782	6791298

Taglio nel piano

	caso	Nd	Md	Vmax	Vd	c.red.	Vred	Vrd
M0004	4	11162	132889	1.00	3683	+0.00	3683	23904
M0005	4	10909	593413	1.00	4713	+0.00	4713	30950

Pressoflessione per carichi laterali

	caso	Nd	My	h0/t	e	phi	e l.	phi l.	Nrd	Mrd
M0004	1	28770	55022	12.75						638228
M0005	1	29692	56787	12.75						765680

Sismica fuori piano

	Sa	Fa	My	caso	Nd	Mrd
M0004	0.10529	158	7554	5	12247	468700
M0005	0.10529	209	10004	4	12825	584829

Verifica deformazioni

	caso	sest.	drift	Limite
M0004	4	6	0.1	15.3
M0005	4	6	0.1	15.3

VERIFICHE FASCE DI PIANO

Car.mecc/res			Pressoflessione			Taglio		
	mat.	res.	caso	Md	Mrd	caso	Vd	Vrd
F0005	04	01	1	100903	1501180	4	1607	5325 [t]
F0006	04	01	1	15106	233471	4	697	2100 [t]

PARETE 3 - da (1640.54 , 1381.46) a (1640.54 , 2424.46)

VERIFICHE MASCHI MURARI

Car.mecc/res			Dati geometrici					Ecc. e2		
	mat.	res.	hsez	t	h0	W	e1	caso	e2	Arm.
M0001	04	01	257.3	30.0	382.5	3107	1.9	1	1.0	001
M0002	04	01	181.4	30.0	382.5	2190	1.9	1	1.0	001
M0003	04	01	348.4	30.0	382.5	4207	1.9	1	1.0	001

Pressoflessione nel piano

	caso	Md	% red.	Mred	Nd	Mrd
M0001	4	380251	+0.00	380251	9092	2911944
M0002	4	292054	+0.00	292054	8371	1932917
M0003	4	734293	+0.00	734293	9604	4083642

Taglio nel piano

	caso	Nd	Md	Vmax	Vd	c.red.	Vred	Vrd
M0001	4	7290	132958	1.00	2171	+0.00	2171	16328
M0002	4	8371	292054	0.92	2203	+0.00	2203	11579
M0003	4	7576	409226	1.00	3714	+0.00	3714	21731

Pressoflessione per carichi laterali

	caso	Nd	My	h0/t	e	phi	e l. phi l.	Nrd	Mrd
M0001	1	19089	36507	12.75					498503
M0002	1	18630	35630	12.75					385085
M0003	1	20569	39339	12.75					550413

Sismica fuori piano

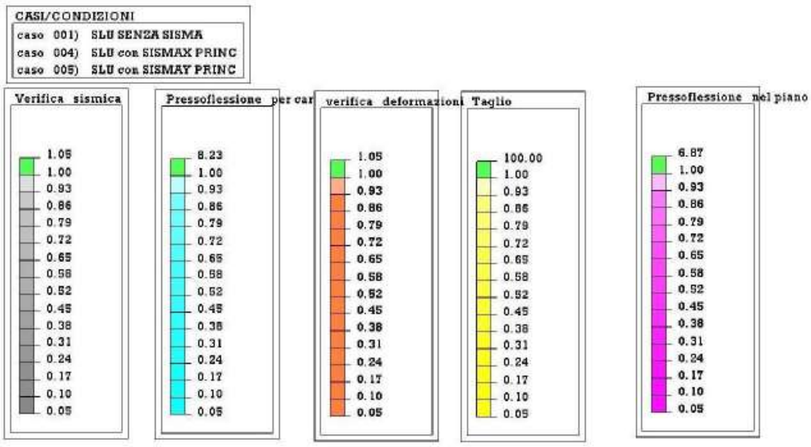
	Sa	Fa	My	caso	Nd	Mrd
M0001	0.10529	109	5214	4	8191	398223
M0002	0.10529	77	3676	4	7789	291765
M0003	0.10529	148	7060	4	8590	423318

Verifica deformazioni

	caso	sest.	drift	Limite
M0001	4	11	0.1	15.3
M0002	4	11	0.1	15.3
M0003	4	11	0.1	15.3

VERIFICHE FASCE DI PIANO

	Car.mecc/res		Pressoflessione			Taglio		
	mat.	res.	caso	Md	Mrd	caso	Vd	Vrd
F0001	04	01	4	3656	286180	4	129	2325 [t]
F0002	04	01	1	6610	201309	4	550	1950 [t]
F0003	04	01	4	80920	1501180	4	1139	5325 [t]
F0004	04	01	1	13983	233471	4	679	2100 [t]



8 Verifica dei Travetti della nuova copertura in c.a.

```
              VERIFICA TRAVATA IN CEMENTO ARMATO

Nome travata       : PIANO_PRIMO (travetto)
Metodo di verifica : stati limite (NTC18). ->
Duttilita'         : calcolo completo.
                   : struttura dissipativa in bassa duttilita'.
                   : dettagli costruttivi del capitolo 7 attivi.
                   : dettagli costruttivi del capitolo 4 attivi.
Unita' di misura   : cm; daN; daN/cm; daNcm; daN/cm2; deform. %.
Unita' particolari : fessure [Wk]:mm - ferri:mm e cm2 - sezioni:cm e derivate.
Copriferri (assi)  : longitudinali= 3 ; staffe= 2

              MATERIALI

CLS      : Rck =300. ; fck=249. ; fctk= 17.9; fctm= 25.6; Ec= 314472. ;
           gc =1.5 ; fcd=141.1; fbd= 26.9; fctd= 11.9; Ecud=.35%
ACCIAIO  : B450C; ftk=5175. ; fyk=4500. ; Es=2100000. ;
           gs =1.15; fyd=3913. ; ftd(k*fyd)=4500. ; fud=4439.8; Eud=6.75%

              TENSIONI E FESSURE MASSIME IN ESERCIZIO

GRUPPO   : ordinario.
CLS      :  σc (rara)=149.4;  σc (quasi permanente)=112. ; fbd(esercizio)= 26.9
ACCIAIO  :  σf (rara)=3600.; Coeff.Omogeneizzazione= 15
FESSURE  : Wdmax(fre.)=.4  ; Wdmax(q.p.)=.3  [4.1.2.2.4.5];
           kt=.4 [EN 1992-1 7.3.4].
<-
              CONDIZIONI DI CARICO
                                                    |Molt.|Coeff. per combinazioni     |
Nro|   Descrizione        |      Tipo               |Caric|SLU   |Rare  |Freq.  |Q.Per.|
 1 |Perman.strutturali    |senza permutazioni       |1.   | 1.3  | 1.   | 1.    | 1.   |
 2 |Perman.non strutt.    |senza permutazioni       |1.   | 1.5  | 1.   | 1.    | 1.   |
 3 |Variabili             |permutaz. campate        |1.   | 1.5  | 1.   |  .5   |  .3  |

              CARICHI APPLICATI

Nro|Con|Camp.| Tipo              | Sistema  |carico 1|carico 2|dist.1|dist.2|
  1|  1|    1|Forza distribuita  |Globale   |  -1.3  |   -    |  -   |  -   |
  2|  2|    1|Forza distribuita  |Globale   |   -.75 |   -    |  -   |  -   |
  3|  3|    1|Forza distribuita  |Globale   |  -2.   |   -    |  -   |  -   |
  4|  3|    1|Forza distribuita  |Globale   |   -.75 |   -    |  -   |  -   |

              SEZIONI UTILIZZATE

 3) Sezione a T : 60/11X31/5; A=586.; Jg=51913.; E=314471.6

              DESCRIZIONE CAMPATE

Cam.| Descriz.  |S.ini|Sez. |S.fin|Incl.|L.assi|L.net.|lambda | K |r.Ar.|lam.max|
   1|C1         |    3|    3|    3|    0| 665.| 635.| 21.452|1. |1.18 | 21.565|

              VERIFICHE ALLO STATO LIMITE ULTIMO

FLESSIONE:

Progressive|SE|Ar|   Msd      Epscl Epsac|    Mrd     Epscl  Epsac Cam x/d |Mr/Ms|VE|
>   0.|   0.|3.|1.|   -95908.|-.039| .117|  -164985.|-.35  |2.668|3.|  .116|1.72 |SI|
    0.|   0.|3.|1.|    76514.|-.011| .035|   453314.!-.35  |3.338|3.|  .095!5.925|SI|
  126.| 126.|3.|1.|   -22526.|-.009| .027|  -164985.|-.35  |2.668|3.|  .116|7.324!SI|
  291.| 291.|3.|1.|   382736.|-.056! .175|   453314.|-.35  |3.338|3.|  .095|1.184|SI|
  332.| 332.|3.|2.|   383630.!-.054| .176!   452815.|-.35  |3.22 |3.|  .098|1.18 !SI|
  665.| 665.|3.|1.|   -95908.!-.039| .117|  -164985.!-.35  |2.668|3.|  .116!1.72 |SI|
  665.| 665.|3.|1.|    76514.|-.011| .035|   453314.|-.35  |3.338|3.|  .095|5.925|SI|

TAGLIO:

Progressive|Se|  Vsd  |  VRd  |  VRcd |  VRsd   Asw    s  ctgT|Ve|
>   0.|   0.|3.|  1718.!  1348.|  8547.|  8426.| 1.01|20. |1.7 |SI|
  168.| 168.|3.|  1145.|  2177.!  8547.|  8426.| 1.01|20. |1.7 |SI|
  665.| 665.|3.| -1718.!  1348.|  8547.!  8426.! 1.01|20. |1.7 |SI|

              VERIFICHE ALLO STATO LIMITE DI ESERCIZIO

TENSIONI DI ESERCIZIO E FESSURAZIONE - RARE:

Progressive|Se|Ar Momento      σc      σf  | As   hc,ef     Eps%  Sr,max    Wd  |Ve|
   15.|  15.|3.|1.|   -56340.| -31.7|1442.4| 1.54| 7.5 |   .0412| 31.28|   .129|SI|
  291.| 291.|3.|1.|   261251.| -50.7!2506.1| 4.02| 7.5 |   .1061| 13.06|   .139|SI|
  332.| 332.|3.|2.|   265335.! -49.7|2547.5! 4.02| 7.5 |   .1081| 13.06|   .141|SI|
  665.| 665.|3.|1.|   -66334.! -37.3|1698.2| 1.54| 7.5 |   .0485| 31.28|   .152!SI|

TENSIONI DI ESERCIZIO E FESSURAZIONE - FREQUENTI:
```

Progressive	Se	Ar	Momento	σc	σf	As	hc,ef	Eps%	Sr,max	Wd	Ve
15.	15.	3.	1.	-37338.	-21.	955.9	1.54	7.5	.0273	31.28	.085	SI
291.	291.	3.	1.	186414.	-36.2	1788.2	4.02	7.5	.0719	13.06	.094	SI
332.	332.	3.	2.	189328.	-35.5	1817.8	4.02	7.5	.0733	13.06	.096	SI
665.	665.	3.	1.	-47332.	-26.6	1211.8	1.54	7.5	.0346	31.28	.108	SI

TENSIONI DI ESERCIZIO E FESSURAZIONE - QUASI PERMANENTI:

Progressive		Se	Ar	Momento	σc	σf	As	hc,ef	Eps%	Sr,max	Wd	Ve
15.	15.	3.	1.	-29738.	-16.7	761.3	1.54	7.5	.0218	31.28	.068	SI
291.	291.	3.	1.	156479.	-30.4	1501.1	4.02	7.5	.0582	13.06	.076	SI
332.	332.	3.	2.	158925.	-29.8	1525.9	4.02	7.5	.0594	13.06	.078	SI
665.	665.	3.	1.	-39731.	-22.3	1017.2	1.54	7.5	.0291	31.28	.091	SI

ARMATURE LONGITUDINALI (%=100*Af/Acls - Acls=area intera sezione)

Nro	Totale	%	Super.	%	Barre	Infer.	%	Barre
1	5.56	.949	1.54	.263	1d14	4.02	.686	2d16
2	7.1	1.212	3.08	.525	1d14 +1d14	4.02	.686	2d16

VERIFICA TRAVATA IN CEMENTO ARMATO

```
Nome travata        : PIANO_PRIMO (travetto)
Metodo di verifica  : tensioni ammissibili (DM92) ->
Duttilita'          : calcolo completo.
                    : struttura dissipativa in bassa duttilita'.
                    : dettagli costruttivi del capitolo 7 attivi.
                    : dettagli costruttivi del capitolo 4 attivi.
Unita' di misura    : cm; daN; daN/cm; daNcm; daN/cm2.
Unita' particolari  : ferri:mm e cm2 - sezioni:cm e derivate.
Copriferri (assi)   : longitudinali= 3 ; staffe= 2
```

MATERIALI

```
CLS     : Rck =300. ;  σc = 97.5;   τc0= 6.  ;   τc1=18.29; TauB =18.
ACCIAIO: B450C;  σf =2550. ; Coeff.Omogeinizzazione=15.
<-
```

CONDIZIONI DI CARICO

Nro	Descrizione	Tipo	Coeff. Moltiplicatori Carichi	Sollec.	Totale
1	Perman.strutturali	senza permutazioni	1.	1.	1.
2	Perman.non strutt.	senza permutazioni	1.	1.	1.
3	Variabili	permutaz. campate	1.	1.	1.

CARICHI APPLICATI

Nro	Con	Camp.	Tipo	Sistema	carico 1	carico 2	dist.1	dist.2
1	1	1	Forza distribuita	Globale	-1.3	-	-	-
2	2	1	Forza distribuita	Globale	-.75	-	-	-
3	3	1	Forza distribuita	Globale	-2.	-	-	-
4	3	1	Forza distribuita	Globale	-.75	-	-	-

SEZIONI UTILIZZATE

1) Rettangolare: 50X24; A=1200.; Jg=57600.; E=314471.6
3) Sezione a T : 60/11X31/5; A=586.; Jg=51913.; E=314471.6

DESCRIZIONE CAMPATE

Cam.	Descriz.	S.ini	Sez.	S.fin	Incl.	L.assi	L.netta
1	C1	1	3	1	0	665.	635.

VERIFICHE FLESSIONALI

PROGRESSIVE		SE	MOMENTO	Af tt	% tot	Af sp	% sup	Af if	% inf	σc	σf	VE
> 0.	0.	1.	-66334.	5.56	.9489	1.54	.2627	4.02	.6862	11.7	1789.	SI
15.	15.	3.	-56340.	5.56	.9489	1.54	.2627	4.02	.6862	31.7	1442.	SI
332.	332.	3.	265335.	7.1	1.212	3.08	.5254	4.02	.6862	49.7	2548.	SI
665.	665.	1.	-66334.	5.56	.9489	1.54	.2627	4.02	.6862	11.7	1789.	SI

VERIFICHE A TAGLIO

PROGRESSIVE		SE	TAGLIO	τ	Af st	Ps st	σ st.	VE
> 0.	0.	1.	1188.	1.3	1.01	12.	0.	SI
15.	15.	3.	1188.	4.3	1.01	12.	0.	SI
665.	665.	1.	-1188.	-1.3	1.01	12.	0.	SI

9 Verifica platea di fondazione

MACROGUSCIO FONDAZIONE

VERIFICA ARMATURE EFFETTIVE (EFFETTO MEMBRANA + PIASTRA)

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CASI DI CARICO: ->
    Nome  Descrizione
    1     SLU SENZA SISMA
    4     SLU con SISMAX PRINC
    5     SLU con SISMAY PRINC
    8     SLU FON con SISMAX P
    9     SLU FON con SISMAY P
    11    SLUEqu

DATI:
   tensione di snervamento acciaio (fyk): 4500    daN/cm2
   coefficiente sicurezza acciaio       : 1.15
   deformazione ultima acciaio          : 1.8633  per mille
   deformazione ultima cls              :  3.5    per mille
   rapporto rottura/snervamento      (k): 1
   resistenza cilindrica cls       (fck): 249     daN/cm2
   coefficiente sicurezza cls           : 1.5
   coefficiente riduttivo         (alfa): 0.85
   copriferro inferiore  (asse armatura):  3      cm
   copriferro superiore  (asse armatura):  3      cm
   moltiplicatore sollecitazioni        :  1

LEGENDA:
   spess = spessore guscio. Verifica effettuata su sezione BxH, con B=1 cm e H="spess" cm
   Af    = area disposta al lembo teso, in cm2 al metro
   Afc   = area disposta al lembo compresso, in cm2 al metro
   Mom   = momento flettente [daNcm/cm]
   Nor   = sforzo normale [daN]
   epsC  = deformazione cls [per mille]
   epsF  = deformazione acciaio [per mille]
<-
```

L'armatura è sufficiente se le deformazioni dei materiali sono ovunque minori delle corrispondenti deformazioni ultime.

Per gli elementi non dissipativi la permanenza in campo elastico è ottenuta limitando la deformazione dell'acciaio alla deformazione di snervamento (1.8633 per mille) e quella del calcestruzzo al 2 per mille.

		INFERIORE ORIZZONTALE						INFERIORE VERTICALE						
GUSCI	spess	Af	Afc	Mom	Nor	epsC	epsF	Af	Afc	Mom	Nor	epsC	epsF	COEF. % MAX
7702	30	3.93	3.93	2110.	0.	0.22	1.01	3.93	3.93	155.	0.	0.02	0.07	52
7703	30	3.93	3.93	760.	0.	0.08	0.36	3.93	3.93	153.	0.	0.02	0.07	19
7704	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	84.	0.	0.01	0.04	2
7705	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7706	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7707	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7708	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7709	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7710	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7711	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7712	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7713	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	3.	0.	0.00	0.00	0
7714	30	3.93	3.93	30.	0.	0.00	0.01	3.93	3.93	118.	0.	0.01	0.06	3
7715	30	3.93	3.93	803.	0.	0.08	0.39	3.93	3.93	187.	0.	0.02	0.09	20
7716	30	3.93	3.93	2170.	0.	0.23	1.04	3.93	3.93	182.	0.	0.02	0.09	53
7717	30	3.93	3.93	2095.	0.	0.22	1.00	3.93	3.93	174.	0.	0.02	0.08	51
7718	30	3.93	3.93	749.	0.	0.08	0.36	3.93	3.93	167.	0.	0.02	0.08	18
7719	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	82.	0.	0.01	0.04	2

7720	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7721	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7722	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7723	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7724	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7725	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7726	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7727	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7728	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7729	30	3.93	3.93	27.	0.	0.00	0.01	3.93	3.93	118.	0.	0.01	0.06	3
7730	30	3.93	3.93	779.	0.	0.08	0.37	3.93	3.93	197.	0.	0.02	0.09	19
7731	30	3.93	3.93	2058.	0.	0.22	0.99	3.93	3.93	203.	0.	0.02	0.10	50
7732	30	3.93	3.93	2046.	0.	0.22	0.98	3.93	3.93	184.	0.	0.02	0.09	50
7733	30	3.93	3.93	693.	0.	0.07	0.33	3.93	3.93	173.	0.	0.02	0.08	17
7734	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	78.	0.	0.01	0.04	2
7735	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7736	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7737	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7738	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7739	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7740	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7741	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7742	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7743	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7744	30	3.93	3.93	22.	0.	0.00	0.01	3.93	3.93	122.	0.	0.01	0.06	3
7745	30	3.93	3.93	752.	0.	0.08	0.36	3.93	3.93	202.	0.	0.02	0.10	18
7747	30	3.93	3.93	1953.	0.	0.21	0.94	3.93	3.93	216.	0.	0.02	0.10	48
7748	30	3.93	3.93	685.	0.	0.07	0.33	3.93	3.93	180.	0.	0.02	0.09	17
7749	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	71.	0.	0.01	0.03	2
7750	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7751	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7752	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7753	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7754	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7755	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7756	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7757	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7758	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7759	30	3.93	3.93	20.	0.	0.00	0.01	3.93	3.93	101.	0.	0.01	0.05	2
7760	30	3.93	3.93	731.	0.	0.08	0.35	3.93	3.93	182.	0.	0.02	0.09	18
7761	30	3.93	3.93	1939.	0.	0.20	0.93	3.93	3.93	190.	0.	0.02	0.09	48
7763	30	3.93	3.93	691.	0.	0.07	0.33	3.93	3.93	215.	0.	0.02	0.10	17
7764	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	146.	0.	0.02	0.07	4

7765	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7766	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7767	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7768	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7769	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7770	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7771	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7772	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7773	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7774	30	3.93	3.93	19.	0.	0.00	0.01	3.93	3.93	75.	0.	0.01	0.04	2
7775	30	3.93	3.93	714.	0.	0.08	0.34	3.93	3.93	156.	0.	0.02	0.08	18
7776	30	3.93	3.93	1992.	0.	0.21	0.96	3.93	3.93	164.	0.	0.02	0.08	49
7777	30	3.93	3.93	1954.	0.	0.21	0.94	3.93	3.93	218.	0.	0.02	0.10	48
7778	30	3.93	3.93	724.	0.	0.08	0.35	3.93	3.93	205.	0.	0.02	0.10	18
7779	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	107.	0.	0.01	0.05	3
7780	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7781	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7782	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7783	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7784	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7785	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7786	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7787	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7788	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7789	30	3.93	3.93	15.	0.	0.00	0.01	3.93	3.93	68.	0.	0.01	0.03	2
7790	30	3.93	3.93	686.	0.	0.07	0.33	3.93	3.93	150.	0.	0.02	0.07	17
7791	30	3.93	3.93	1976.	0.	0.21	0.95	3.93	3.93	159.	0.	0.02	0.08	48
7792	30	3.93	3.93	2024.	0.	0.21	0.97	3.93	3.93	183.	0.	0.02	0.09	50
7793	30	3.93	3.93	709.	0.	0.07	0.34	3.93	3.93	173.	0.	0.02	0.08	17
7794	30	3.93	3.93	3.	0.	0.00	0.00	3.93	3.93	80.	0.	0.01	0.04	2
7795	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7796	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7797	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7798	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7799	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7800	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7801	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7802	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7803	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7804	30	3.93	3.93	13.	0.	0.00	0.01	3.93	3.93	67.	0.	0.01	0.03	2
7805	30	3.93	3.93	671.	0.	0.07	0.32	3.93	3.93	152.	0.	0.02	0.07	16
7806	30	3.93	3.93	1959.	0.	0.21	0.94	3.93	3.93	161.	0.	0.02	0.08	48
7807	30	3.93	3.93	2012.	0.	0.21	0.97	3.93	3.93	170.	0.	0.02	0.08	49

7808	30	3.93	3.93	696.	0.	0.07	0.33	3.93	3.93	160.	0.	0.02	0.08	17
7809	30	3.93	3.93	18.	0.	0.00	0.01	3.93	3.93	69.	0.	0.01	0.03	2
7810	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7811	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7812	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7813	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7814	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7815	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7816	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7817	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7818	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7819	30	3.93	3.93	27.	0.	0.00	0.01	3.93	3.93	71.	0.	0.01	0.03	2
7820	30	3.93	3.93	672.	0.	0.07	0.32	3.93	3.93	159.	0.	0.02	0.08	16
7821	30	3.93	3.93	1957.	0.	0.21	0.94	3.93	3.93	169.	0.	0.02	0.08	48
7822	30	3.93	3.93	1993.	0.	0.21	0.96	3.93	3.93	163.	0.	0.02	0.08	49
7823	30	3.93	3.93	679.	0.	0.07	0.33	3.93	3.93	152.	0.	0.02	0.07	17
7824	30	3.93	3.93	9.	0.	0.00	0.00	3.93	3.93	60.	0.	0.01	0.03	1
7825	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7826	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7827	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7828	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7829	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7830	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7831	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7832	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7833	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7834	30	3.93	3.93	50.	0.	0.01	0.02	3.93	3.93	76.	0.	0.01	0.04	2
7835	30	3.93	3.93	663.	0.	0.07	0.32	3.93	3.93	167.	0.	0.02	0.08	16
7836	30	3.93	3.93	1948.	0.	0.21	0.93	3.93	3.93	180.	0.	0.02	0.09	48
7837	30	3.93	3.93	1991.	0.	0.21	0.96	3.93	3.93	167.	0.	0.02	0.08	49
7838	30	3.93	3.93	681.	0.	0.07	0.33	3.93	3.93	155.	0.	0.02	0.07	17
7839	30	3.93	3.93	30.	0.	0.00	0.01	3.93	3.93	59.	0.	0.01	0.03	1
7840	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7841	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7842	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7843	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7844	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7845	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7846	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7847	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7848	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7849	30	3.93	3.93	91.	0.	0.01	0.04	3.93	3.93	81.	0.	0.01	0.04	2
7850	30	3.93	3.93	670.	0.	0.07	0.32	3.93	3.93	179.	0.	0.02	0.09	16

7851	30	3.93	3.93	1948.	0.	0.21	0.93	3.93	3.93	194.	0.	0.02	0.09	48
7852	30	3.93	3.93	1992.	0.	0.21	0.96	3.93	3.93	172.	0.	0.02	0.08	49
7853	30	3.93	3.93	682.	0.	0.07	0.33	3.93	3.93	159.	0.	0.02	0.08	17
7854	30	3.93	3.93	52.	0.	0.01	0.03	3.93	3.93	59.	0.	0.01	0.03	1
7855	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7856	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7857	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7858	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7859	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7860	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7861	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7862	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7863	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7864	30	3.93	3.93	113.	0.	0.01	0.05	3.93	3.93	90.	0.	0.01	0.04	3
7865	30	3.93	3.93	673.	0.	0.07	0.32	3.93	3.93	181.	0.	0.02	0.09	17
7866	30	3.93	3.93	1941.	0.	0.20	0.93	3.93	3.93	185.	0.	0.02	0.09	48
7867	30	3.93	3.93	2008.	0.	0.21	0.96	3.93	3.93	184.	0.	0.02	0.09	49
7868	30	3.93	3.93	707.	0.	0.07	0.34	3.93	3.93	169.	0.	0.02	0.08	17
7869	30	3.93	3.93	109.	0.	0.01	0.05	3.93	3.93	63.	0.	0.01	0.03	3
7870	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7871	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7872	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7873	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7874	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7875	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7876	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7877	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7878	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7879	30	3.93	3.93	133.	0.	0.01	0.06	3.93	3.93	86.	0.	0.01	0.04	3
7880	30	3.93	3.93	691.	0.	0.07	0.33	3.93	3.93	178.	0.	0.02	0.09	17
7881	30	3.93	3.93	1939.	0.	0.20	0.93	3.93	3.93	182.	0.	0.02	0.09	48
7882	30	3.93	3.93	2003.	0.	0.21	0.96	3.93	3.93	207.	0.	0.02	0.10	49
7883	30	3.93	3.93	732.	0.	0.08	0.35	3.93	3.93	199.	0.	0.02	0.10	18
7884	30	3.93	3.93	135.	0.	0.01	0.06	3.93	3.93	90.	0.	0.01	0.04	3
7885	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7886	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7887	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7888	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7889	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7890	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7891	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7892	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7893	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0

7894	30	3.93	3.93	145.	0.	0.02	0.07	3.93	3.93	87.	0.	0.01	0.04	4
7895	30	3.93	3.93	699.	0.	0.07	0.34	3.93	3.93	181.	0.	0.02	0.09	17
7896	30	3.93	3.93	1920.	0.	0.20	0.92	3.93	3.93	185.	0.	0.02	0.09	47
7897	30	3.93	3.93	1956.	0.	0.21	0.94	3.93	3.93	245.	0.	0.03	0.12	48
7898	30	3.93	3.93	727.	0.	0.08	0.35	3.93	3.93	228.	0.	0.02	0.11	18
7899	30	3.93	3.93	154.	0.	0.02	0.07	3.93	3.93	129.	0.	0.01	0.06	4
7900	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7901	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7902	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7903	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7904	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7905	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7906	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7907	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7908	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7909	30	3.93	3.93	163.	0.	0.02	0.08	3.93	3.93	112.	0.	0.01	0.05	4
7910	30	3.93	3.93	705.	0.	0.07	0.34	3.93	3.93	193.	0.	0.02	0.09	17
7911	30	3.93	3.93	1880.	0.	0.20	0.90	3.93	3.93	197.	0.	0.02	0.09	46
7912	30	3.93	3.93	1839.	0.	0.19	0.88	3.93	3.93	315.	0.	0.03	0.15	45
7913	30	3.93	3.93	746.	0.	0.08	0.36	3.93	3.93	270.	0.	0.03	0.13	18
7914	30	3.93	3.93	180.	0.	0.02	0.09	3.93	3.93	159.	0.	0.02	0.08	4
7915	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7916	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7917	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7918	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7919	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7920	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7921	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7922	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7923	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7924	30	3.93	3.93	185.	0.	0.02	0.09	3.93	3.93	133.	0.	0.01	0.06	5
7925	30	3.93	3.93	708.	0.	0.07	0.34	3.93	3.93	214.	0.	0.02	0.10	17
7926	30	3.93	3.93	1791.	0.	0.19	0.86	3.93	3.93	220.	0.	0.02	0.11	44
7928	30	3.93	3.93	755.	0.	0.08	0.36	3.93	3.93	347.	0.	0.04	0.17	19
7929	30	3.93	3.93	213.	0.	0.02	0.10	3.93	3.93	289.	0.	0.03	0.14	7
7930	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	98.	0.	0.01	0.05	2
7931	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7932	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7933	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7934	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7935	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7936	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7937	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0

7938	30	3.93	3.93	17.	0.	0.00	0.01	3.93	3.93	45.	0.	0.00	0.02	1
7939	30	3.93	3.93	210.	0.	0.02	0.10	3.93	3.93	186.	0.	0.02	0.09	5
7940	30	3.93	3.93	678.	0.	0.07	0.33	3.93	3.93	251.	0.	0.03	0.12	17
7941	30	3.93	3.93	1600.	0.	0.17	0.77	3.93	3.93	266.	0.	0.03	0.13	39
7942	30	3.93	3.93	1507.	0.	0.16	0.72	3.93	3.93	379.	0.	0.04	0.18	37
7943	30	3.93	3.93	748.	0.	0.08	0.36	3.93	3.93	392.	0.	0.04	0.19	18
7944	30	3.93	3.93	262.	0.	0.03	0.13	3.93	3.93	320.	0.	0.03	0.15	8
7945	30	3.93	3.93	90.	0.	0.01	0.04	3.93	3.93	196.	0.	0.02	0.09	5
7946	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	44.	0.	0.00	0.02	1
7947	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7948	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7949	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7950	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7951	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7952	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	26.	0.	0.00	0.01	1
7953	30	3.93	3.93	117.	0.	0.01	0.06	3.93	3.93	155.	0.	0.02	0.07	4
7954	30	3.93	3.93	254.	0.	0.03	0.12	3.93	3.93	266.	0.	0.03	0.13	7
7955	30	3.93	3.93	654.	0.	0.07	0.31	3.93	3.93	307.	0.	0.03	0.15	16
7957	30	3.93	3.93	1185.	0.	0.13	0.57	3.93	3.93	372.	0.	0.04	0.18	29
7958	30	3.93	3.93	650.	0.	0.07	0.31	3.93	3.93	420.	0.	0.04	0.20	16
7959	30	3.93	3.93	317.	0.	0.03	0.15	3.93	3.93	416.	0.	0.04	0.20	10
7960	30	3.93	3.93	183.	0.	0.02	0.09	3.93	3.93	343.	0.	0.04	0.16	8
7961	30	3.93	3.93	88.	0.	0.01	0.04	3.93	3.93	249.	0.	0.03	0.12	6
7962	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	153.	0.	0.02	0.07	4
7963	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7964	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7965	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	81.	0.	0.01	0.04	2
7966	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	182.	0.	0.02	0.09	4
7967	30	3.93	3.93	107.	0.	0.01	0.05	3.93	3.93	253.	0.	0.03	0.12	6
7968	30	3.93	3.93	186.	0.	0.02	0.09	3.93	3.93	328.	0.	0.03	0.16	8
7969	30	3.93	3.93	309.	0.	0.03	0.15	3.93	3.93	412.	0.	0.04	0.20	10
7970	30	3.93	3.93	598.	0.	0.06	0.29	3.93	3.93	416.	0.	0.04	0.20	15
7971	30	3.93	3.93	1072.	0.	0.11	0.51	3.93	3.93	372.	0.	0.04	0.18	26
7972	30	3.93	3.93	758.	0.	0.08	0.36	3.93	3.93	398.	0.	0.04	0.19	19
7973	30	3.93	3.93	461.	0.	0.05	0.22	3.93	3.93	522.	0.	0.06	0.25	13
7974	30	3.93	3.93	298.	0.	0.03	0.14	3.93	3.93	627.	0.	0.07	0.30	15
7975	30	3.93	3.93	215.	0.	0.02	0.10	3.93	3.93	687.	0.	0.07	0.33	17
7976	30	3.93	3.93	156.	0.	0.02	0.08	3.93	3.93	725.	0.	0.08	0.35	18
7977	30	3.93	3.93	101.	0.	0.01	0.05	3.93	3.93	730.	0.	0.08	0.35	18
7978	30	3.93	3.93	29.	0.	0.00	0.01	3.93	3.93	679.	0.	0.07	0.33	17
7979	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	605.	0.	0.06	0.29	15
7980	30	3.93	3.93	57.	0.	0.01	0.03	3.93	3.93	664.	0.	0.07	0.32	16
7981	30	3.93	3.93	113.	0.	0.01	0.05	3.93	3.93	746.	0.	0.08	0.36	18

7982	30	3.93	3.93	158.	0.	0.02	0.08	3.93	3.93	754.	0.	0.08	0.36	19
7983	30	3.93	3.93	217.	0.	0.02	0.10	3.93	3.93	725.	0.	0.08	0.35	18
7984	30	3.93	3.93	297.	0.	0.03	0.14	3.93	3.93	660.	0.	0.07	0.32	16
7985	30	3.93	3.93	461.	0.	0.05	0.22	3.93	3.93	535.	0.	0.06	0.26	13
7986	30	3.93	3.93	686.	0.	0.07	0.33	3.93	3.93	401.	0.	0.04	0.19	17
7987	30	3.93	3.93	380.	0.	0.04	0.18	3.93	3.93	419.	0.	0.04	0.20	10
7988	30	3.93	3.93	319.	0.	0.03	0.15	3.93	3.93	692.	0.	0.07	0.33	17
7989	30	3.93	3.93	243.	0.	0.03	0.12	3.93	3.93	1012.	0.	0.11	0.49	25
7990	30	3.93	3.93	165.	0.	0.02	0.08	3.93	3.93	1310.	0.	0.14	0.63	32
7991	30	3.93	3.93	126.	0.	0.01	0.06	3.93	3.93	1575.	0.	0.17	0.76	39
7992	30	3.93	3.93	96.	0.	0.01	0.05	3.93	3.93	1710.	0.	0.18	0.82	42
7993	30	3.93	3.93	55.	0.	0.01	0.03	3.93	3.93	1727.	0.	0.18	0.83	42
7995	30	3.93	3.93	82.	0.	0.01	0.04	3.93	3.93	1774.	0.	0.19	0.85	44
7996	30	3.93	3.93	111.	0.	0.01	0.05	3.93	3.93	1791.	0.	0.19	0.86	44
7997	30	3.93	3.93	139.	0.	0.01	0.07	3.93	3.93	1698.	0.	0.18	0.81	42
7998	30	3.93	3.93	177.	0.	0.02	0.08	3.93	3.93	1482.	0.	0.16	0.71	36
7999	30	3.93	3.93	232.	0.	0.02	0.11	3.93	3.93	1152.	0.	0.12	0.55	28
8000	30	3.93	3.93	317.	0.	0.03	0.15	3.93	3.93	792.	0.	0.08	0.38	19
8001	30	3.93	3.93	301.	0.	0.03	0.14	3.93	3.93	474.	0.	0.05	0.23	12
8002	30	3.93	3.93	138.	0.	0.01	0.07	3.93	3.93	143.	0.	0.02	0.07	4
8003	30	3.93	3.93	629.	0.	0.07	0.30	3.93	3.93	146.	0.	0.02	0.07	15
8004	30	3.93	3.93	146.	0.	0.02	0.07	3.93	3.93	161.	0.	0.02	0.08	4
8005	30	3.93	3.93	632.	0.	0.07	0.30	3.93	3.93	169.	0.	0.02	0.08	16
8006	30	3.93	3.93	159.	0.	0.02	0.08	3.93	3.93	182.	0.	0.02	0.09	4
8007	30	3.93	3.93	637.	0.	0.07	0.31	3.93	3.93	186.	0.	0.02	0.09	16
8008	30	3.93	3.93	158.	0.	0.02	0.08	3.93	3.93	239.	0.	0.03	0.11	6
8009	30	3.93	3.93	620.	0.	0.07	0.30	3.93	3.93	236.	0.	0.02	0.11	15
8010	30	3.93	3.93	162.	0.	0.02	0.08	3.93	3.93	206.	0.	0.02	0.10	5
8012	30	3.93	3.93	160.	0.	0.02	0.08	3.93	3.93	213.	0.	0.02	0.10	5
8013	30	3.93	3.93	604.	0.	0.06	0.29	3.93	3.93	222.	0.	0.02	0.11	15
8014	30	3.93	3.93	169.	0.	0.02	0.08	3.93	3.93	182.	0.	0.02	0.09	4
8015	30	3.93	3.93	621.	0.	0.07	0.30	3.93	3.93	186.	0.	0.02	0.09	15
8016	30	3.93	3.93	172.	0.	0.02	0.08	3.93	3.93	169.	0.	0.02	0.08	4
8017	30	3.93	3.93	620.	0.	0.07	0.30	3.93	3.93	173.	0.	0.02	0.08	15
8018	30	3.93	3.93	175.	0.	0.02	0.08	3.93	3.93	164.	0.	0.02	0.08	4
8019	30	3.93	3.93	616.	0.	0.07	0.30	3.93	3.93	168.	0.	0.02	0.08	15
8020	30	3.93	3.93	179.	0.	0.02	0.09	3.93	3.93	169.	0.	0.02	0.08	4
8021	30	3.93	3.93	612.	0.	0.06	0.29	3.93	3.93	173.	0.	0.02	0.08	15
8022	30	3.93	3.93	181.	0.	0.02	0.09	3.93	3.93	176.	0.	0.02	0.08	4
8023	30	3.93	3.93	605.	0.	0.06	0.29	3.93	3.93	179.	0.	0.02	0.09	15
8024	30	3.93	3.93	189.	0.	0.02	0.09	3.93	3.93	193.	0.	0.02	0.09	5
8025	30	3.93	3.93	603.	0.	0.06	0.29	3.93	3.93	195.	0.	0.02	0.09	15
8026	30	3.93	3.93	201.	0.	0.02	0.10	3.93	3.93	218.	0.	0.02	0.10	5

8027	30	3.93	3.93	607.	0.	0.06	0.29	3.93	3.93	221.	0.	0.02	0.11	15
8028	30	3.93	3.93	221.	0.	0.02	0.11	3.93	3.93	258.	0.	0.03	0.12	6
8029	30	3.93	3.93	633.	0.	0.07	0.30	3.93	3.93	261.	0.	0.03	0.13	16
8030	30	3.93	3.93	223.	0.	0.02	0.11	3.93	3.93	344.	0.	0.04	0.17	8
8031	30	3.93	3.93	619.	0.	0.07	0.30	3.93	3.93	343.	0.	0.04	0.16	15
8032	30	3.93	3.93	221.	0.	0.02	0.11	3.93	3.93	319.	0.	0.03	0.15	8
8034	30	3.93	3.93	207.	0.	0.02	0.10	3.93	3.93	295.	0.	0.03	0.14	7
8035	30	3.93	3.93	537.	0.	0.06	0.26	3.93	3.93	352.	0.	0.04	0.17	13
8036	30	3.93	3.93	208.	0.	0.02	0.10	3.93	3.93	258.	0.	0.03	0.12	6
8037	30	3.93	3.93	538.	0.	0.06	0.26	3.93	3.93	315.	0.	0.03	0.15	13
8038	30	3.93	3.93	205.	0.	0.02	0.10	3.93	3.93	247.	0.	0.03	0.12	6
8039	30	3.93	3.93	551.	0.	0.06	0.26	3.93	3.93	312.	0.	0.03	0.15	14
8040	30	3.93	3.93	165.	0.	0.02	0.08	3.93	3.93	244.	0.	0.03	0.12	6
8041	30	3.93	3.93	508.	0.	0.05	0.24	3.93	3.93	306.	0.	0.03	0.15	12
8042	30	3.93	3.93	676.	0.	0.07	0.32	3.93	3.93	172.	0.	0.02	0.08	17
8043	30	3.93	3.93	159.	0.	0.02	0.08	3.93	3.93	169.	0.	0.02	0.08	4
8044	30	3.93	3.93	638.	0.	0.07	0.31	3.93	3.93	197.	0.	0.02	0.09	16
8045	30	3.93	3.93	154.	0.	0.02	0.07	3.93	3.93	188.	0.	0.02	0.09	5
8047	30	3.93	3.93	151.	0.	0.02	0.07	3.93	3.93	199.	0.	0.02	0.10	5
8048	30	3.93	3.93	603.	0.	0.06	0.29	3.93	3.93	184.	0.	0.02	0.09	15
8049	30	3.93	3.93	149.	0.	0.02	0.07	3.93	3.93	170.	0.	0.02	0.08	4
8050	30	3.93	3.93	622.	0.	0.07	0.30	3.93	3.93	158.	0.	0.02	0.08	15
8051	30	3.93	3.93	154.	0.	0.02	0.07	3.93	3.93	153.	0.	0.02	0.07	4
8052	30	3.93	3.93	618.	0.	0.07	0.30	3.93	3.93	156.	0.	0.02	0.07	15
8053	30	3.93	3.93	158.	0.	0.02	0.08	3.93	3.93	151.	0.	0.02	0.07	4
8054	30	3.93	3.93	614.	0.	0.06	0.29	3.93	3.93	160.	0.	0.02	0.08	15
8055	30	3.93	3.93	162.	0.	0.02	0.08	3.93	3.93	156.	0.	0.02	0.07	4
8056	30	3.93	3.93	614.	0.	0.06	0.29	3.93	3.93	171.	0.	0.02	0.08	15
8057	30	3.93	3.93	169.	0.	0.02	0.08	3.93	3.93	167.	0.	0.02	0.08	4
8058	30	3.93	3.93	614.	0.	0.06	0.29	3.93	3.93	189.	0.	0.02	0.09	15
8059	30	3.93	3.93	172.	0.	0.02	0.08	3.93	3.93	186.	0.	0.02	0.09	5
8060	30	3.93	3.93	609.	0.	0.06	0.29	3.93	3.93	207.	0.	0.02	0.10	15
8061	30	3.93	3.93	176.	0.	0.02	0.08	3.93	3.93	205.	0.	0.02	0.10	5
8062	30	3.93	3.93	598.	0.	0.06	0.29	3.93	3.93	196.	0.	0.02	0.09	15
8063	30	3.93	3.93	177.	0.	0.02	0.08	3.93	3.93	193.	0.	0.02	0.09	5
8064	30	3.93	3.93	590.	0.	0.06	0.28	3.93	3.93	191.	0.	0.02	0.09	14
8065	30	3.93	3.93	182.	0.	0.02	0.09	3.93	3.93	188.	0.	0.02	0.09	5
8066	30	3.93	3.93	585.	0.	0.06	0.28	3.93	3.93	194.	0.	0.02	0.09	14
8067	30	3.93	3.93	187.	0.	0.02	0.09	3.93	3.93	190.	0.	0.02	0.09	5
8068	30	3.93	3.93	584.	0.	0.06	0.28	3.93	3.93	205.	0.	0.02	0.10	14
8069	30	3.93	3.93	196.	0.	0.02	0.09	3.93	3.93	200.	0.	0.02	0.10	5
8070	30	3.93	3.93	597.	0.	0.06	0.29	3.93	3.93	227.	0.	0.02	0.11	15
8071	30	3.93	3.93	212.	0.	0.02	0.10	3.93	3.93	221.	0.	0.02	0.11	5

8072	30	3.93	3.93	596.	0.	0.06	0.29	3.93	3.93	274.	0.	0.03	0.13	15
8073	30	3.93	3.93	224.	0.	0.02	0.11	3.93	3.93	265.	0.	0.03	0.13	7
8075	30	3.93	3.93	219.	0.	0.02	0.11	3.93	3.93	296.	0.	0.03	0.14	7
8076	30	3.93	3.93	520.	0.	0.05	0.25	3.93	3.93	329.	0.	0.03	0.16	13
8077	30	3.93	3.93	207.	0.	0.02	0.10	3.93	3.93	261.	0.	0.03	0.13	6
8078	30	3.93	3.93	493.	0.	0.05	0.24	3.93	3.93	302.	0.	0.03	0.14	12
8079	30	3.93	3.93	194.	0.	0.02	0.09	3.93	3.93	232.	0.	0.02	0.11	6
8080	30	3.93	3.93	475.	0.	0.05	0.23	3.93	3.93	289.	0.	0.03	0.14	12
8081	30	3.93	3.93	156.	0.	0.02	0.07	3.93	3.93	214.	0.	0.02	0.10	5
8082	30	3.93	3.93	282.	0.	0.03	0.14	3.93	3.93	477.	0.	0.05	0.23	12
8083	30	3.93	3.93	258.	0.	0.03	0.12	3.93	3.93	178.	0.	0.02	0.09	6
8084	30	3.93	3.93	282.	0.	0.03	0.14	3.93	3.93	473.	0.	0.05	0.23	12
8085	30	3.93	3.93	244.	0.	0.03	0.12	3.93	3.93	185.	0.	0.02	0.09	6
8086	30	3.93	3.93	213.	0.	0.02	0.10	3.93	3.93	410.	0.	0.04	0.20	10
8087	30	3.93	3.93	169.	0.	0.02	0.08	3.93	3.93	154.	0.	0.02	0.07	4
8088	30	3.93	3.93	135.	0.	0.01	0.06	3.93	3.93	294.	0.	0.03	0.14	7
8089	30	3.93	3.93	95.	0.	0.01	0.05	3.93	3.93	107.	0.	0.01	0.05	3
8090	30	3.93	3.93	90.	0.	0.01	0.04	3.93	3.93	256.	0.	0.03	0.12	6
8091	30	3.93	3.93	66.	0.	0.01	0.03	3.93	3.93	58.	0.	0.01	0.03	2
8092	30	3.93	3.93	65.	0.	0.01	0.03	3.93	3.93	245.	0.	0.03	0.12	6
8093	30	3.93	3.93	45.	0.	0.00	0.02	3.93	3.93	43.	0.	0.00	0.02	1
8094	30	3.93	3.93	39.	0.	0.00	0.02	3.93	3.93	223.	0.	0.02	0.11	5
8095	30	3.93	3.93	8.	0.	0.00	0.00	3.93	3.93	42.	0.	0.00	0.02	1
8097	30	3.93	3.93	24.	0.	0.00	0.01	3.93	3.93	47.	0.	0.01	0.02	1
8098	30	3.93	3.93	78.	0.	0.01	0.04	3.93	3.93	226.	0.	0.02	0.11	6
8099	30	3.93	3.93	52.	0.	0.01	0.02	3.93	3.93	49.	0.	0.01	0.02	1
8100	30	3.93	3.93	82.	0.	0.01	0.04	3.93	3.93	251.	0.	0.03	0.12	6
8101	30	3.93	3.93	63.	0.	0.01	0.03	3.93	3.93	55.	0.	0.01	0.03	2
8102	30	3.93	3.93	104.	0.	0.01	0.05	3.93	3.93	266.	0.	0.03	0.13	7
8103	30	3.93	3.93	81.	0.	0.01	0.04	3.93	3.93	65.	0.	0.01	0.03	2
8104	30	3.93	3.93	134.	0.	0.01	0.06	3.93	3.93	286.	0.	0.03	0.14	7
8105	30	3.93	3.93	100.	0.	0.01	0.05	3.93	3.93	79.	0.	0.01	0.04	2
8106	30	3.93	3.93	180.	0.	0.02	0.09	3.93	3.93	310.	0.	0.03	0.15	8
8107	30	3.93	3.93	126.	0.	0.01	0.06	3.93	3.93	106.	0.	0.01	0.05	3
8108	30	3.93	3.93	216.	0.	0.02	0.10	3.93	3.93	335.	0.	0.04	0.16	8
8109	30	3.93	3.93	153.	0.	0.02	0.07	3.93	3.93	117.	0.	0.01	0.06	4
8110	30	3.93	3.93	211.	0.	0.02	0.10	3.93	3.93	353.	0.	0.04	0.17	9
8111	30	3.93	3.93	165.	0.	0.02	0.08	3.93	3.93	111.	0.	0.01	0.05	4
8112	30	3.93	3.93	441.	0.	0.05	0.21	3.93	3.93	341.	0.	0.04	0.16	11
8113	30	3.93	3.93	129.	0.	0.01	0.06	3.93	3.93	354.	0.	0.04	0.17	9
8114	30	3.93	3.93	436.	0.	0.05	0.21	3.93	3.93	97.	0.	0.01	0.05	11
8115	30	3.93	3.93	115.	0.	0.01	0.06	3.93	3.93	92.	0.	0.01	0.04	3
8116	30	3.93	3.93	140.	0.	0.01	0.07	3.93	3.93	401.	0.	0.04	0.19	10

8117	30	3.93	3.93	473.	0.	0.05	0.23	3.93	3.93	445.	0.	0.05	0.21	12
8118	30	3.93	3.93	124.	0.	0.01	0.06	3.93	3.93	128.	0.	0.01	0.06	3
8119	30	3.93	3.93	458.	0.	0.05	0.22	3.93	3.93	148.	0.	0.02	0.07	11
8120	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	1692.	0.	0.18	0.81	42
8121	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	1543.	0.	0.16	0.74	38
8122	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	1718.	0.	0.18	0.82	42
8123	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	212.	0.	0.02	0.10	5
8124	30	3.93	3.93	40.	0.	0.00	0.02	3.93	3.93	176.	0.	0.02	0.08	4
8125	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	214.	0.	0.02	0.10	5
8126	30	3.93	3.93	1881.	0.	0.20	0.90	3.93	3.93	69.	0.	0.01	0.03	46
8127	30	3.93	3.93	1675.	0.	0.18	0.80	3.93	3.93	215.	0.	0.02	0.10	41
8128	30	3.93	3.93	1920.	0.	0.20	0.92	3.93	3.93	103.	0.	0.01	0.05	47
8129	30	3.93	3.93	568.	0.	0.06	0.27	3.93	3.93	89.	0.	0.01	0.04	14
8130	30	3.93	3.93	467.	0.	0.05	0.22	3.93	3.93	216.	0.	0.02	0.10	11
8131	30	3.93	3.93	567.	0.	0.06	0.27	3.93	3.93	55.	0.	0.01	0.03	14
8132	30	3.93	3.93	1724.	0.	0.18	0.83	3.93	3.93	334.	0.	0.04	0.16	42
8133	30	3.93	3.93	1547.	0.	0.16	0.74	3.93	3.93	377.	0.	0.04	0.18	38
8134	30	3.93	3.93	1633.	0.	0.17	0.78	3.93	3.93	276.	0.	0.03	0.13	40
8135	30	3.93	3.93	551.	0.	0.06	0.26	3.93	3.93	270.	0.	0.03	0.13	14
8136	30	3.93	3.93	477.	0.	0.05	0.23	3.93	3.93	376.	0.	0.04	0.18	12
8137	30	3.93	3.93	567.	0.	0.06	0.27	3.93	3.93	321.	0.	0.03	0.15	14
8138	30	3.93	3.93	1191.	0.	0.13	0.57	3.93	3.93	258.	0.	0.03	0.12	29
8139	30	3.93	3.93	1163.	0.	0.12	0.56	3.93	3.93	324.	0.	0.03	0.16	29
8140	30	3.93	3.93	1379.	0.	0.15	0.66	3.93	3.93	264.	0.	0.03	0.13	34
8141	30	3.93	3.93	546.	0.	0.06	0.26	3.93	3.93	262.	0.	0.03	0.13	13
8142	30	3.93	3.93	470.	0.	0.05	0.23	3.93	3.93	319.	0.	0.03	0.15	12
8143	30	3.93	3.93	521.	0.	0.05	0.25	3.93	3.93	231.	0.	0.02	0.11	13
8152	30	3.93	3.93	1869.	0.	0.20	0.90	3.93	3.93	159.	0.	0.02	0.08	46
8153	30	3.93	3.93	1671.	0.	0.18	0.80	3.93	3.93	250.	0.	0.03	0.12	41
8154	30	3.93	3.93	1879.	0.	0.20	0.90	3.93	3.93	152.	0.	0.02	0.07	46
8155	30	3.93	3.93	577.	0.	0.06	0.28	3.93	3.93	155.	0.	0.02	0.07	14
8156	30	3.93	3.93	481.	0.	0.05	0.23	3.93	3.93	255.	0.	0.03	0.12	12
8157	30	3.93	3.93	574.	0.	0.06	0.28	3.93	3.93	146.	0.	0.02	0.07	14

		SUPERIORE ORIZZONTALE						SUPERIORE VERTICALE						
GUSCI	spess	Af	Afc	Mom	Nor	epsC	epsF	Af	Afc	Mom	Nor	epsC	epsF	COEF. MAX %
7702	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7703	30	3.93	3.93	250.	0.	0.03	0.12	3.93	3.93	4.	0.	0.00	0.00	6
7704	30	3.93	3.93	599.	0.	0.06	0.29	3.93	3.93	85.	0.	0.01	0.04	15
7705	30	3.93	3.93	946.	0.	0.10	0.45	3.93	3.93	123.	0.	0.01	0.06	23
7706	30	3.93	3.93	1131.	0.	0.12	0.54	3.93	3.93	123.	0.	0.01	0.06	28
7707	30	3.93	3.93	1175.	0.	0.12	0.56	3.93	3.93	115.	0.	0.01	0.06	29
7708	30	3.93	3.93	1163.	0.	0.12	0.56	3.93	3.93	79.	0.	0.01	0.04	29
7709	30	3.93	3.93	1167.	0.	0.12	0.56	3.93	3.93	80.	0.	0.01	0.04	29

7710	30	3.93	3.93	1188.	0.	0.13	0.57	3.93	3.93	118.	0.	0.01	0.06	29
7711	30	3.93	3.93	1204.	0.	0.13	0.58	3.93	3.93	133.	0.	0.01	0.06	30
7712	30	3.93	3.93	1165.	0.	0.12	0.56	3.93	3.93	140.	0.	0.01	0.07	29
7713	30	3.93	3.93	982.	0.	0.10	0.47	3.93	3.93	140.	0.	0.01	0.07	24
7714	30	3.93	3.93	629.	0.	0.07	0.30	3.93	3.93	101.	0.	0.01	0.05	15
7715	30	3.93	3.93	234.	0.	0.02	0.11	3.93	3.93	26.	0.	0.00	0.01	6
7716	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7717	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7718	30	3.93	3.93	249.	0.	0.03	0.12	3.93	3.93	0.	0.	0.00	0.00	6
7719	30	3.93	3.93	589.	0.	0.06	0.28	3.93	3.93	65.	0.	0.01	0.03	14
7720	30	3.93	3.93	933.	0.	0.10	0.45	3.93	3.93	114.	0.	0.01	0.05	23
7721	30	3.93	3.93	1120.	0.	0.12	0.54	3.93	3.93	133.	0.	0.01	0.06	27
7722	30	3.93	3.93	1167.	0.	0.12	0.56	3.93	3.93	131.	0.	0.01	0.06	29
7723	30	3.93	3.93	1156.	0.	0.12	0.55	3.93	3.93	121.	0.	0.01	0.06	28
7724	30	3.93	3.93	1159.	0.	0.12	0.56	3.93	3.93	129.	0.	0.01	0.06	28
7725	30	3.93	3.93	1179.	0.	0.12	0.57	3.93	3.93	145.	0.	0.02	0.07	29
7726	30	3.93	3.93	1194.	0.	0.13	0.57	3.93	3.93	158.	0.	0.02	0.08	29
7727	30	3.93	3.93	1153.	0.	0.12	0.55	3.93	3.93	160.	0.	0.02	0.08	28
7728	30	3.93	3.93	970.	0.	0.10	0.47	3.93	3.93	152.	0.	0.02	0.07	24
7729	30	3.93	3.93	622.	0.	0.07	0.30	3.93	3.93	97.	0.	0.01	0.05	15
7730	30	3.93	3.93	234.	0.	0.02	0.11	3.93	3.93	0.	0.	0.00	0.00	6
7731	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7732	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7733	30	3.93	3.93	245.	0.	0.03	0.12	3.93	3.93	0.	0.	0.00	0.00	6
7734	30	3.93	3.93	577.	0.	0.06	0.28	3.93	3.93	60.	0.	0.01	0.03	14
7735	30	3.93	3.93	917.	0.	0.10	0.44	3.93	3.93	99.	0.	0.01	0.05	22
7736	30	3.93	3.93	1106.	0.	0.12	0.53	3.93	3.93	145.	0.	0.02	0.07	27
7737	30	3.93	3.93	1154.	0.	0.12	0.55	3.93	3.93	146.	0.	0.02	0.07	28
7738	30	3.93	3.93	1145.	0.	0.12	0.55	3.93	3.93	142.	0.	0.02	0.07	28
7739	30	3.93	3.93	1146.	0.	0.12	0.55	3.93	3.93	152.	0.	0.02	0.07	28
7740	30	3.93	3.93	1164.	0.	0.12	0.56	3.93	3.93	166.	0.	0.02	0.08	29
7741	30	3.93	3.93	1176.	0.	0.12	0.56	3.93	3.93	176.	0.	0.02	0.08	29
7742	30	3.93	3.93	1133.	0.	0.12	0.54	3.93	3.93	178.	0.	0.02	0.09	28
7743	30	3.93	3.93	950.	0.	0.10	0.46	3.93	3.93	167.	0.	0.02	0.08	23
7744	30	3.93	3.93	609.	0.	0.06	0.29	3.93	3.93	107.	0.	0.01	0.05	15
7745	30	3.93	3.93	228.	0.	0.02	0.11	3.93	3.93	22.	0.	0.00	0.01	6
7747	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7748	30	3.93	3.93	234.	0.	0.02	0.11	3.93	3.93	0.	0.	0.00	0.00	6
7749	30	3.93	3.93	579.	0.	0.06	0.28	3.93	3.93	75.	0.	0.01	0.04	14
7750	30	3.93	3.93	910.	0.	0.10	0.44	3.93	3.93	103.	0.	0.01	0.05	22
7751	30	3.93	3.93	1096.	0.	0.12	0.53	3.93	3.93	155.	0.	0.02	0.07	27
7752	30	3.93	3.93	1143.	0.	0.12	0.55	3.93	3.93	158.	0.	0.02	0.08	28
7753	30	3.93	3.93	1133.	0.	0.12	0.54	3.93	3.93	157.	0.	0.02	0.08	28

7754	30	3.93	3.93	1131.	0.	0.12	0.54	3.93	3.93	166.	0.	0.02	0.08	28
7755	30	3.93	3.93	1147.	0.	0.12	0.55	3.93	3.93	179.	0.	0.02	0.09	28
7756	30	3.93	3.93	1157.	0.	0.12	0.56	3.93	3.93	187.	0.	0.02	0.09	28
7757	30	3.93	3.93	1113.	0.	0.12	0.53	3.93	3.93	188.	0.	0.02	0.09	27
7758	30	3.93	3.93	933.	0.	0.10	0.45	3.93	3.93	174.	0.	0.02	0.08	23
7759	30	3.93	3.93	598.	0.	0.06	0.29	3.93	3.93	113.	0.	0.01	0.05	15
7760	30	3.93	3.93	211.	0.	0.02	0.10	3.93	3.93	0.	0.	0.00	0.00	5
7761	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7763	30	3.93	3.93	213.	0.	0.02	0.10	3.93	3.93	0.	0.	0.00	0.00	5
7764	30	3.93	3.93	583.	0.	0.06	0.28	3.93	3.93	90.	0.	0.01	0.04	14
7765	30	3.93	3.93	907.	0.	0.10	0.43	3.93	3.93	148.	0.	0.02	0.07	22
7766	30	3.93	3.93	1088.	0.	0.11	0.52	3.93	3.93	166.	0.	0.02	0.08	27
7767	30	3.93	3.93	1133.	0.	0.12	0.54	3.93	3.93	169.	0.	0.02	0.08	28
7768	30	3.93	3.93	1122.	0.	0.12	0.54	3.93	3.93	168.	0.	0.02	0.08	28
7769	30	3.93	3.93	1116.	0.	0.12	0.54	3.93	3.93	171.	0.	0.02	0.08	27
7770	30	3.93	3.93	1130.	0.	0.12	0.54	3.93	3.93	184.	0.	0.02	0.09	28
7771	30	3.93	3.93	1139.	0.	0.12	0.55	3.93	3.93	193.	0.	0.02	0.09	28
7772	30	3.93	3.93	1094.	0.	0.12	0.52	3.93	3.93	193.	0.	0.02	0.09	27
7773	30	3.93	3.93	916.	0.	0.10	0.44	3.93	3.93	181.	0.	0.02	0.09	22
7774	30	3.93	3.93	584.	0.	0.06	0.28	3.93	3.93	119.	0.	0.01	0.06	14
7775	30	3.93	3.93	192.	0.	0.02	0.09	3.93	3.93	0.	0.	0.00	0.00	5
7776	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7777	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7778	30	3.93	3.93	184.	0.	0.02	0.09	3.93	3.93	0.	0.	0.00	0.00	5
7779	30	3.93	3.93	579.	0.	0.06	0.28	3.93	3.93	91.	0.	0.01	0.04	14
7780	30	3.93	3.93	900.	0.	0.09	0.43	3.93	3.93	159.	0.	0.02	0.08	22
7781	30	3.93	3.93	1078.	0.	0.11	0.52	3.93	3.93	176.	0.	0.02	0.08	26
7782	30	3.93	3.93	1122.	0.	0.12	0.54	3.93	3.93	178.	0.	0.02	0.09	28
7783	30	3.93	3.93	1111.	0.	0.12	0.53	3.93	3.93	175.	0.	0.02	0.08	27
7784	30	3.93	3.93	1100.	0.	0.12	0.53	3.93	3.93	173.	0.	0.02	0.08	27
7785	30	3.93	3.93	1113.	0.	0.12	0.53	3.93	3.93	185.	0.	0.02	0.09	27
7786	30	3.93	3.93	1120.	0.	0.12	0.54	3.93	3.93	193.	0.	0.02	0.09	27
7787	30	3.93	3.93	1074.	0.	0.11	0.52	3.93	3.93	194.	0.	0.02	0.09	26
7788	30	3.93	3.93	897.	0.	0.09	0.43	3.93	3.93	181.	0.	0.02	0.09	22
7789	30	3.93	3.93	569.	0.	0.06	0.27	3.93	3.93	122.	0.	0.01	0.06	14
7790	30	3.93	3.93	176.	0.	0.02	0.08	3.93	3.93	0.	0.	0.00	0.00	4
7791	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7792	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7793	30	3.93	3.93	162.	0.	0.02	0.08	3.93	3.93	0.	0.	0.00	0.00	4
7794	30	3.93	3.93	566.	0.	0.06	0.27	3.93	3.93	108.	0.	0.01	0.05	14
7795	30	3.93	3.93	888.	0.	0.09	0.43	3.93	3.93	171.	0.	0.02	0.08	22
7796	30	3.93	3.93	1065.	0.	0.11	0.51	3.93	3.93	185.	0.	0.02	0.09	26
7797	30	3.93	3.93	1109.	0.	0.12	0.53	3.93	3.93	186.	0.	0.02	0.09	27

7798	30	3.93	3.93	1099.	0.	0.12	0.53	3.93	3.93	181.	0.	0.02	0.09	27
7799	30	3.93	3.93	1084.	0.	0.11	0.52	3.93	3.93	173.	0.	0.02	0.08	27
7800	30	3.93	3.93	1096.	0.	0.12	0.53	3.93	3.93	184.	0.	0.02	0.09	27
7801	30	3.93	3.93	1102.	0.	0.12	0.53	3.93	3.93	191.	0.	0.02	0.09	27
7802	30	3.93	3.93	1055.	0.	0.11	0.51	3.93	3.93	191.	0.	0.02	0.09	26
7803	30	3.93	3.93	878.	0.	0.09	0.42	3.93	3.93	177.	0.	0.02	0.08	22
7804	30	3.93	3.93	554.	0.	0.06	0.27	3.93	3.93	118.	0.	0.01	0.06	14
7805	30	3.93	3.93	161.	0.	0.02	0.08	3.93	3.93	0.	0.	0.00	0.00	4
7806	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7807	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7808	30	3.93	3.93	147.	0.	0.02	0.07	3.93	3.93	0.	0.	0.00	0.00	4
7809	30	3.93	3.93	554.	0.	0.06	0.27	3.93	3.93	117.	0.	0.01	0.06	14
7810	30	3.93	3.93	874.	0.	0.09	0.42	3.93	3.93	179.	0.	0.02	0.09	21
7811	30	3.93	3.93	1051.	0.	0.11	0.50	3.93	3.93	193.	0.	0.02	0.09	26
7812	30	3.93	3.93	1096.	0.	0.12	0.53	3.93	3.93	193.	0.	0.02	0.09	27
7813	30	3.93	3.93	1087.	0.	0.11	0.52	3.93	3.93	187.	0.	0.02	0.09	27
7814	30	3.93	3.93	1071.	0.	0.11	0.51	3.93	3.93	176.	0.	0.02	0.08	26
7815	30	3.93	3.93	1082.	0.	0.11	0.52	3.93	3.93	185.	0.	0.02	0.09	27
7816	30	3.93	3.93	1087.	0.	0.11	0.52	3.93	3.93	190.	0.	0.02	0.09	27
7817	30	3.93	3.93	1039.	0.	0.11	0.50	3.93	3.93	189.	0.	0.02	0.09	25
7818	30	3.93	3.93	863.	0.	0.09	0.41	3.93	3.93	160.	0.	0.02	0.08	21
7819	30	3.93	3.93	545.	0.	0.06	0.26	3.93	3.93	94.	0.	0.01	0.05	13
7820	30	3.93	3.93	148.	0.	0.02	0.07	3.93	3.93	0.	0.	0.00	0.00	4
7821	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7822	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7823	30	3.93	3.93	61.	0.	0.01	0.03	3.93	3.93	5.	0.	0.00	0.00	1
7824	30	3.93	3.93	536.	0.	0.06	0.26	3.93	3.93	124.	0.	0.01	0.06	13
7825	30	3.93	3.93	856.	0.	0.09	0.41	3.93	3.93	186.	0.	0.02	0.09	21
7826	30	3.93	3.93	1034.	0.	0.11	0.50	3.93	3.93	202.	0.	0.02	0.10	25
7827	30	3.93	3.93	1080.	0.	0.11	0.52	3.93	3.93	202.	0.	0.02	0.10	27
7828	30	3.93	3.93	1072.	0.	0.11	0.51	3.93	3.93	197.	0.	0.02	0.09	26
7829	30	3.93	3.93	1056.	0.	0.11	0.51	3.93	3.93	186.	0.	0.02	0.09	26
7830	30	3.93	3.93	1068.	0.	0.11	0.51	3.93	3.93	194.	0.	0.02	0.09	26
7831	30	3.93	3.93	1072.	0.	0.11	0.51	3.93	3.93	197.	0.	0.02	0.09	26
7832	30	3.93	3.93	1024.	0.	0.11	0.49	3.93	3.93	194.	0.	0.02	0.09	25
7833	30	3.93	3.93	849.	0.	0.09	0.41	3.93	3.93	162.	0.	0.02	0.08	21
7834	30	3.93	3.93	533.	0.	0.06	0.26	3.93	3.93	93.	0.	0.01	0.04	13
7835	30	3.93	3.93	59.	0.	0.01	0.03	3.93	3.93	0.	0.	0.00	0.00	1
7836	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7837	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7838	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	10.	0.	0.00	0.00	0
7839	30	3.93	3.93	525.	0.	0.06	0.25	3.93	3.93	133.	0.	0.01	0.06	13
7840	30	3.93	3.93	840.	0.	0.09	0.40	3.93	3.93	199.	0.	0.02	0.10	21

7841	30	3.93	3.93	1018.	0.	0.11	0.49	3.93	3.93	218.	0.	0.02	0.10	25
7842	30	3.93	3.93	1066.	0.	0.11	0.51	3.93	3.93	219.	0.	0.02	0.11	26
7843	30	3.93	3.93	1057.	0.	0.11	0.51	3.93	3.93	215.	0.	0.02	0.10	26
7844	30	3.93	3.93	1042.	0.	0.11	0.50	3.93	3.93	205.	0.	0.02	0.10	26
7845	30	3.93	3.93	1055.	0.	0.11	0.51	3.93	3.93	214.	0.	0.02	0.10	26
7846	30	3.93	3.93	1059.	0.	0.11	0.51	3.93	3.93	215.	0.	0.02	0.10	26
7847	30	3.93	3.93	1012.	0.	0.11	0.49	3.93	3.93	213.	0.	0.02	0.10	25
7848	30	3.93	3.93	839.	0.	0.09	0.40	3.93	3.93	190.	0.	0.02	0.09	21
7849	30	3.93	3.93	529.	0.	0.06	0.25	3.93	3.93	121.	0.	0.01	0.06	13
7850	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7851	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7852	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7853	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	14.	0.	0.00	0.01	0
7854	30	3.93	3.93	521.	0.	0.05	0.25	3.93	3.93	145.	0.	0.02	0.07	13
7855	30	3.93	3.93	836.	0.	0.09	0.40	3.93	3.93	218.	0.	0.02	0.10	21
7856	30	3.93	3.93	1010.	0.	0.11	0.48	3.93	3.93	243.	0.	0.03	0.12	25
7857	30	3.93	3.93	1056.	0.	0.11	0.51	3.93	3.93	247.	0.	0.03	0.12	26
7858	30	3.93	3.93	1046.	0.	0.11	0.50	3.93	3.93	245.	0.	0.03	0.12	26
7859	30	3.93	3.93	1028.	0.	0.11	0.49	3.93	3.93	238.	0.	0.03	0.11	25
7860	30	3.93	3.93	1044.	0.	0.11	0.50	3.93	3.93	248.	0.	0.03	0.12	26
7861	30	3.93	3.93	1051.	0.	0.11	0.50	3.93	3.93	249.	0.	0.03	0.12	26
7862	30	3.93	3.93	1006.	0.	0.11	0.48	3.93	3.93	244.	0.	0.03	0.12	25
7863	30	3.93	3.93	838.	0.	0.09	0.40	3.93	3.93	217.	0.	0.02	0.10	21
7864	30	3.93	3.93	529.	0.	0.06	0.25	3.93	3.93	158.	0.	0.02	0.08	13
7865	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	6.	0.	0.00	0.00	0
7866	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7867	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7868	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	32.	0.	0.00	0.02	1
7869	30	3.93	3.93	533.	0.	0.06	0.26	3.93	3.93	189.	0.	0.02	0.09	13
7870	30	3.93	3.93	846.	0.	0.09	0.41	3.93	3.93	258.	0.	0.03	0.12	21
7871	30	3.93	3.93	1015.	0.	0.11	0.49	3.93	3.93	291.	0.	0.03	0.14	25
7872	30	3.93	3.93	1051.	0.	0.11	0.50	3.93	3.93	299.	0.	0.03	0.14	26
7873	30	3.93	3.93	1036.	0.	0.11	0.50	3.93	3.93	298.	0.	0.03	0.14	25
7874	30	3.93	3.93	1013.	0.	0.11	0.49	3.93	3.93	290.	0.	0.03	0.14	25
7875	30	3.93	3.93	1034.	0.	0.11	0.50	3.93	3.93	304.	0.	0.03	0.15	25
7876	30	3.93	3.93	1047.	0.	0.11	0.50	3.93	3.93	305.	0.	0.03	0.15	26
7877	30	3.93	3.93	1011.	0.	0.11	0.48	3.93	3.93	299.	0.	0.03	0.14	25
7878	30	3.93	3.93	851.	0.	0.09	0.41	3.93	3.93	268.	0.	0.03	0.13	21
7879	30	3.93	3.93	545.	0.	0.06	0.26	3.93	3.93	199.	0.	0.02	0.10	13
7880	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	35.	0.	0.00	0.02	1
7881	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7882	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7883	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	61.	0.	0.01	0.03	1

7884	30	3.93	3.93	562.	0.	0.06	0.27	3.93	3.93	238.	0.	0.03	0.11	14
7885	30	3.93	3.93	875.	0.	0.09	0.42	3.93	3.93	322.	0.	0.03	0.15	21
7886	30	3.93	3.93	1029.	0.	0.11	0.49	3.93	3.93	365.	0.	0.04	0.18	25
7887	30	3.93	3.93	1050.	0.	0.11	0.50	3.93	3.93	376.	0.	0.04	0.18	26
7888	30	3.93	3.93	1024.	0.	0.11	0.49	3.93	3.93	375.	0.	0.04	0.18	25
7889	30	3.93	3.93	989.	0.	0.10	0.47	3.93	3.93	361.	0.	0.04	0.17	24
7890	30	3.93	3.93	1020.	0.	0.11	0.49	3.93	3.93	382.	0.	0.04	0.18	25
7891	30	3.93	3.93	1043.	0.	0.11	0.50	3.93	3.93	385.	0.	0.04	0.18	26
7892	30	3.93	3.93	1020.	0.	0.11	0.49	3.93	3.93	379.	0.	0.04	0.18	25
7893	30	3.93	3.93	877.	0.	0.09	0.42	3.93	3.93	342.	0.	0.04	0.16	22
7894	30	3.93	3.93	574.	0.	0.06	0.28	3.93	3.93	262.	0.	0.03	0.13	14
7895	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	79.	0.	0.01	0.04	2
7896	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7897	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7898	30	3.93	3.93	43.	0.	0.00	0.02	3.93	3.93	125.	0.	0.01	0.06	3
7899	30	3.93	3.93	618.	0.	0.07	0.30	3.93	3.93	311.	0.	0.03	0.15	15
7900	30	3.93	3.93	921.	0.	0.10	0.44	3.93	3.93	414.	0.	0.04	0.20	23
7901	30	3.93	3.93	1047.	0.	0.11	0.50	3.93	3.93	466.	0.	0.05	0.22	26
7902	30	3.93	3.93	1048.	0.	0.11	0.50	3.93	3.93	478.	0.	0.05	0.23	26
7903	30	3.93	3.93	1004.	0.	0.11	0.48	3.93	3.93	475.	0.	0.05	0.23	25
7904	30	3.93	3.93	952.	0.	0.10	0.46	3.93	3.93	447.	0.	0.05	0.21	23
7905	30	3.93	3.93	994.	0.	0.10	0.48	3.93	3.93	481.	0.	0.05	0.23	24
7906	30	3.93	3.93	1034.	0.	0.11	0.50	3.93	3.93	491.	0.	0.05	0.24	25
7907	30	3.93	3.93	1028.	0.	0.11	0.49	3.93	3.93	485.	0.	0.05	0.23	25
7908	30	3.93	3.93	913.	0.	0.10	0.44	3.93	3.93	444.	0.	0.05	0.21	22
7909	30	3.93	3.93	625.	0.	0.07	0.30	3.93	3.93	349.	0.	0.04	0.17	15
7910	30	3.93	3.93	57.	0.	0.01	0.03	3.93	3.93	162.	0.	0.02	0.08	4
7911	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7912	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
7913	30	3.93	3.93	170.	0.	0.02	0.08	3.93	3.93	219.	0.	0.02	0.11	5
7914	30	3.93	3.93	703.	0.	0.07	0.34	3.93	3.93	404.	0.	0.04	0.19	17
7915	30	3.93	3.93	975.	0.	0.10	0.47	3.93	3.93	532.	0.	0.06	0.26	24
7916	30	3.93	3.93	1057.	0.	0.11	0.51	3.93	3.93	587.	0.	0.06	0.28	26
7917	30	3.93	3.93	1037.	0.	0.11	0.50	3.93	3.93	595.	0.	0.06	0.29	25
7918	30	3.93	3.93	969.	0.	0.10	0.46	3.93	3.93	584.	0.	0.06	0.28	24
7919	30	3.93	3.93	896.	0.	0.09	0.43	3.93	3.93	540.	0.	0.06	0.26	22
7920	30	3.93	3.93	950.	0.	0.10	0.46	3.93	3.93	584.	0.	0.06	0.28	23
7921	30	3.93	3.93	1012.	0.	0.11	0.49	3.93	3.93	608.	0.	0.06	0.29	25
7922	30	3.93	3.93	1030.	0.	0.11	0.49	3.93	3.93	605.	0.	0.06	0.29	25
7923	30	3.93	3.93	952.	0.	0.10	0.46	3.93	3.93	567.	0.	0.06	0.27	23
7924	30	3.93	3.93	696.	0.	0.07	0.33	3.93	3.93	460.	0.	0.05	0.22	17
7925	30	3.93	3.93	170.	0.	0.02	0.08	3.93	3.93	279.	0.	0.03	0.13	7
7926	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	33.	0.	0.00	0.02	1

7928	30	3.93	3.93	326.	0.	0.03	0.16	3.93	3.93	349.	0.	0.04	0.17	9
7929	30	3.93	3.93	801.	0.	0.08	0.38	3.93	3.93	560.	0.	0.06	0.27	20
7930	30	3.93	3.93	1011.	0.	0.11	0.48	3.93	3.93	664.	0.	0.07	0.32	25
7931	30	3.93	3.93	1055.	0.	0.11	0.51	3.93	3.93	699.	0.	0.07	0.34	26
7932	30	3.93	3.93	1000.	0.	0.11	0.48	3.93	3.93	700.	0.	0.07	0.34	25
7933	30	3.93	3.93	903.	0.	0.10	0.43	3.93	3.93	664.	0.	0.07	0.32	22
7934	30	3.93	3.93	808.	0.	0.09	0.39	3.93	3.93	596.	0.	0.06	0.29	20
7935	30	3.93	3.93	875.	0.	0.09	0.42	3.93	3.93	654.	0.	0.07	0.31	21
7936	30	3.93	3.93	964.	0.	0.10	0.46	3.93	3.93	701.	0.	0.07	0.34	24
7937	30	3.93	3.93	1017.	0.	0.11	0.49	3.93	3.93	705.	0.	0.07	0.34	25
7938	30	3.93	3.93	969.	0.	0.10	0.47	3.93	3.93	686.	0.	0.07	0.33	24
7939	30	3.93	3.93	775.	0.	0.08	0.37	3.93	3.93	589.	0.	0.06	0.28	19
7940	30	3.93	3.93	309.	0.	0.03	0.15	3.93	3.93	394.	0.	0.04	0.19	10
7941	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	122.	0.	0.01	0.06	3
7942	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	240.	0.	0.03	0.12	6
7943	30	3.93	3.93	498.	0.	0.05	0.24	3.93	3.93	470.	0.	0.05	0.23	12
7944	30	3.93	3.93	873.	0.	0.09	0.42	3.93	3.93	666.	0.	0.07	0.32	21
7945	30	3.93	3.93	1012.	0.	0.11	0.49	3.93	3.93	744.	0.	0.08	0.36	25
7946	30	3.93	3.93	1012.	0.	0.11	0.49	3.93	3.93	751.	0.	0.08	0.36	25
7947	30	3.93	3.93	914.	0.	0.10	0.44	3.93	3.93	719.	0.	0.08	0.34	22
7948	30	3.93	3.93	791.	0.	0.08	0.38	3.93	3.93	644.	0.	0.07	0.31	19
7949	30	3.93	3.93	677.	0.	0.07	0.32	3.93	3.93	547.	0.	0.06	0.26	17
7950	30	3.93	3.93	755.	0.	0.08	0.36	3.93	3.93	619.	0.	0.07	0.30	19
7951	30	3.93	3.93	868.	0.	0.09	0.42	3.93	3.93	700.	0.	0.07	0.34	21
7952	30	3.93	3.93	960.	0.	0.10	0.46	3.93	3.93	741.	0.	0.08	0.36	24
7953	30	3.93	3.93	965.	0.	0.10	0.46	3.93	3.93	738.	0.	0.08	0.35	24
7954	30	3.93	3.93	830.	0.	0.09	0.40	3.93	3.93	669.	0.	0.07	0.32	20
7955	30	3.93	3.93	481.	0.	0.05	0.23	3.93	3.93	491.	0.	0.05	0.24	12
7957	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	358.	0.	0.04	0.17	9
7958	30	3.93	3.93	637.	0.	0.07	0.31	3.93	3.93	567.	0.	0.06	0.27	16
7959	30	3.93	3.93	862.	0.	0.09	0.41	3.93	3.93	682.	0.	0.07	0.33	21
7960	30	3.93	3.93	949.	0.	0.10	0.46	3.93	3.93	697.	0.	0.07	0.33	23
7961	30	3.93	3.93	877.	0.	0.09	0.42	3.93	3.93	644.	0.	0.07	0.31	22
7962	30	3.93	3.93	750.	0.	0.08	0.36	3.93	3.93	548.	0.	0.06	0.26	18
7963	30	3.93	3.93	617.	0.	0.07	0.30	3.93	3.93	437.	0.	0.05	0.21	15
7964	30	3.93	3.93	496.	0.	0.05	0.24	3.93	3.93	318.	0.	0.03	0.15	12
7965	30	3.93	3.93	578.	0.	0.06	0.28	3.93	3.93	334.	0.	0.04	0.16	14
7966	30	3.93	3.93	701.	0.	0.07	0.34	3.93	3.93	498.	0.	0.05	0.24	17
7967	30	3.93	3.93	821.	0.	0.09	0.39	3.93	3.93	607.	0.	0.06	0.29	20
7968	30	3.93	3.93	886.	0.	0.09	0.43	3.93	3.93	666.	0.	0.07	0.32	22
7969	30	3.93	3.93	810.	0.	0.09	0.39	3.93	3.93	655.	0.	0.07	0.31	20
7970	30	3.93	3.93	599.	0.	0.06	0.29	3.93	3.93	551.	0.	0.06	0.26	15
7971	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	370.	0.	0.04	0.18	9

7972	30	3.93	3.93	295.	0.	0.03	0.14	3.93	3.93	381.	0.	0.04	0.18	9
7973	30	3.93	3.93	583.	0.	0.06	0.28	3.93	3.93	482.	0.	0.05	0.23	14
7974	30	3.93	3.93	764.	0.	0.08	0.37	3.93	3.93	537.	0.	0.06	0.26	19
7975	30	3.93	3.93	722.	0.	0.08	0.35	3.93	3.93	451.	0.	0.05	0.22	18
7976	30	3.93	3.93	601.	0.	0.06	0.29	3.93	3.93	322.	0.	0.03	0.15	15
7977	30	3.93	3.93	490.	0.	0.05	0.24	3.93	3.93	184.	0.	0.02	0.09	12
7978	30	3.93	3.93	318.	0.	0.03	0.15	3.93	3.93	74.	0.	0.01	0.04	8
7979	30	3.93	3.93	207.	0.	0.02	0.10	3.93	3.93	0.	0.	0.00	0.00	5
7980	30	3.93	3.93	273.	0.	0.03	0.13	3.93	3.93	0.	0.	0.00	0.00	7
7981	30	3.93	3.93	425.	0.	0.04	0.20	3.93	3.93	48.	0.	0.01	0.02	10
7982	30	3.93	3.93	559.	0.	0.06	0.27	3.93	3.93	181.	0.	0.02	0.09	14
7983	30	3.93	3.93	665.	0.	0.07	0.32	3.93	3.93	341.	0.	0.04	0.16	16
7984	30	3.93	3.93	687.	0.	0.07	0.33	3.93	3.93	468.	0.	0.05	0.22	17
7985	30	3.93	3.93	532.	0.	0.06	0.26	3.93	3.93	423.	0.	0.04	0.20	13
7986	30	3.93	3.93	323.	0.	0.03	0.16	3.93	3.93	356.	0.	0.04	0.17	9
7987	30	3.93	3.93	478.	0.	0.05	0.23	3.93	3.93	557.	0.	0.06	0.27	14
7988	30	3.93	3.93	468.	0.	0.05	0.22	3.93	3.93	515.	0.	0.05	0.25	13
7989	30	3.93	3.93	487.	0.	0.05	0.23	3.93	3.93	307.	0.	0.03	0.15	12
7990	30	3.93	3.93	410.	0.	0.04	0.20	3.93	3.93	0.	0.	0.00	0.00	10
7991	30	3.93	3.93	215.	0.	0.02	0.10	3.93	3.93	0.	0.	0.00	0.00	5
7992	30	3.93	3.93	136.	0.	0.01	0.07	3.93	3.93	0.	0.	0.00	0.00	3
7993	30	3.93	3.93	81.	0.	0.01	0.04	3.93	3.93	0.	0.	0.00	0.00	2
7995	30	3.93	3.93	85.	0.	0.01	0.04	3.93	3.93	0.	0.	0.00	0.00	2
7996	30	3.93	3.93	112.	0.	0.01	0.05	3.93	3.93	0.	0.	0.00	0.00	3
7997	30	3.93	3.93	163.	0.	0.02	0.08	3.93	3.93	0.	0.	0.00	0.00	4
7998	30	3.93	3.93	262.	0.	0.03	0.13	3.93	3.93	0.	0.	0.00	0.00	6
7999	30	3.93	3.93	415.	0.	0.04	0.20	3.93	3.93	0.	0.	0.00	0.00	10
8000	30	3.93	3.93	392.	0.	0.04	0.19	3.93	3.93	91.	0.	0.01	0.04	10
8001	30	3.93	3.93	471.	0.	0.05	0.23	3.93	3.93	168.	0.	0.02	0.08	12
8002	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8003	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8004	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8005	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8006	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8007	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8008	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8009	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8010	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8012	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8013	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8014	30	3.93	3.93	10.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8015	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8016	30	3.93	3.93	23.	0.	0.00	0.01	3.93	3.93	0.	0.	0.00	0.00	1

8017	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8018	30	3.93	3.93	28.	0.	0.00	0.01	3.93	3.93	0.	0.	0.00	0.00	1
8019	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8020	30	3.93	3.93	36.	0.	0.00	0.02	3.93	3.93	0.	0.	0.00	0.00	1
8021	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8022	30	3.93	3.93	42.	0.	0.00	0.02	3.93	3.93	0.	0.	0.00	0.00	1
8023	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8024	30	3.93	3.93	53.	0.	0.01	0.03	3.93	3.93	0.	0.	0.00	0.00	1
8025	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8026	30	3.93	3.93	63.	0.	0.01	0.03	3.93	3.93	0.	0.	0.00	0.00	2
8027	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8028	30	3.93	3.93	80.	0.	0.01	0.04	3.93	3.93	0.	0.	0.00	0.00	2
8029	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8030	30	3.93	3.93	91.	0.	0.01	0.04	3.93	3.93	0.	0.	0.00	0.00	2
8031	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8032	30	3.93	3.93	102.	0.	0.01	0.05	3.93	3.93	4.	0.	0.00	0.00	3
8034	30	3.93	3.93	102.	0.	0.01	0.05	3.93	3.93	24.	0.	0.00	0.01	2
8035	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	63.	0.	0.01	0.03	2
8036	30	3.93	3.93	105.	0.	0.01	0.05	3.93	3.93	90.	0.	0.01	0.04	3
8037	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	205.	0.	0.02	0.10	5
8038	30	3.93	3.93	107.	0.	0.01	0.05	3.93	3.93	184.	0.	0.02	0.09	5
8039	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	269.	0.	0.03	0.13	7
8040	30	3.93	3.93	107.	0.	0.01	0.05	3.93	3.93	413.	0.	0.04	0.20	10
8041	30	3.93	3.93	87.	0.	0.01	0.04	3.93	3.93	526.	0.	0.06	0.25	13
8042	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8043	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8044	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8045	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8047	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	53.	0.	0.01	0.03	1
8048	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8049	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8050	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8051	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8052	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8053	30	3.93	3.93	6.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8054	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8055	30	3.93	3.93	13.	0.	0.00	0.01	3.93	3.93	0.	0.	0.00	0.00	0
8056	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8057	30	3.93	3.93	21.	0.	0.00	0.01	3.93	3.93	0.	0.	0.00	0.00	1
8058	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8059	30	3.93	3.93	27.	0.	0.00	0.01	3.93	3.93	0.	0.	0.00	0.00	1
8060	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8061	30	3.93	3.93	35.	0.	0.00	0.02	3.93	3.93	0.	0.	0.00	0.00	1

8062	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8063	30	3.93	3.93	41.	0.	0.00	0.02	3.93	3.93	0.	0.	0.00	0.00	1
8064	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8065	30	3.93	3.93	51.	0.	0.01	0.02	3.93	3.93	0.	0.	0.00	0.00	1
8066	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8067	30	3.93	3.93	60.	0.	0.01	0.03	3.93	3.93	0.	0.	0.00	0.00	1
8068	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8069	30	3.93	3.93	68.	0.	0.01	0.03	3.93	3.93	0.	0.	0.00	0.00	2
8070	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8071	30	3.93	3.93	81.	0.	0.01	0.04	3.93	3.93	0.	0.	0.00	0.00	2
8072	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	9.	0.	0.00	0.00	0
8073	30	3.93	3.93	96.	0.	0.01	0.05	3.93	3.93	0.	0.	0.00	0.00	2
8075	30	3.93	3.93	107.	0.	0.01	0.05	3.93	3.93	132.	0.	0.01	0.06	3
8076	30	3.93	3.93	23.	0.	0.00	0.01	3.93	3.93	250.	0.	0.03	0.12	6
8077	30	3.93	3.93	109.	0.	0.01	0.05	3.93	3.93	148.	0.	0.02	0.07	4
8078	30	3.93	3.93	65.	0.	0.01	0.03	3.93	3.93	269.	0.	0.03	0.13	7
8079	30	3.93	3.93	106.	0.	0.01	0.05	3.93	3.93	192.	0.	0.02	0.09	5
8080	30	3.93	3.93	112.	0.	0.01	0.05	3.93	3.93	217.	0.	0.02	0.10	5
8081	30	3.93	3.93	96.	0.	0.01	0.05	3.93	3.93	257.	0.	0.03	0.12	6
8082	30	3.93	3.93	617.	0.	0.07	0.30	3.93	3.93	193.	0.	0.02	0.09	15
8083	30	3.93	3.93	660.	0.	0.07	0.32	3.93	3.93	163.	0.	0.02	0.08	16
8084	30	3.93	3.93	365.	0.	0.04	0.18	3.93	3.93	54.	0.	0.01	0.03	9
8085	30	3.93	3.93	264.	0.	0.03	0.13	3.93	3.93	121.	0.	0.01	0.06	6
8086	30	3.93	3.93	303.	0.	0.03	0.15	3.93	3.93	0.	0.	0.00	0.00	7
8087	30	3.93	3.93	186.	0.	0.02	0.09	3.93	3.93	74.	0.	0.01	0.04	5
8088	30	3.93	3.93	197.	0.	0.02	0.09	3.93	3.93	0.	0.	0.00	0.00	5
8089	30	3.93	3.93	123.	0.	0.01	0.06	3.93	3.93	39.	0.	0.00	0.02	3
8090	30	3.93	3.93	90.	0.	0.01	0.04	3.93	3.93	0.	0.	0.00	0.00	2
8091	30	3.93	3.93	69.	0.	0.01	0.03	3.93	3.93	17.	0.	0.00	0.01	2
8092	30	3.93	3.93	65.	0.	0.01	0.03	3.93	3.93	0.	0.	0.00	0.00	2
8093	30	3.93	3.93	56.	0.	0.01	0.03	3.93	3.93	2.	0.	0.00	0.00	1
8094	30	3.93	3.93	52.	0.	0.01	0.02	3.93	3.93	0.	0.	0.00	0.00	1
8095	30	3.93	3.93	56.	0.	0.01	0.03	3.93	3.93	0.	0.	0.00	0.00	1
8097	30	3.93	3.93	229.	0.	0.02	0.11	3.93	3.93	15.	0.	0.00	0.01	6
8098	30	3.93	3.93	50.	0.	0.01	0.02	3.93	3.93	0.	0.	0.00	0.00	1
8099	30	3.93	3.93	54.	0.	0.01	0.03	3.93	3.93	29.	0.	0.00	0.01	1
8100	30	3.93	3.93	52.	0.	0.01	0.02	3.93	3.93	0.	0.	0.00	0.00	1
8101	30	3.93	3.93	48.	0.	0.01	0.02	3.93	3.93	37.	0.	0.00	0.02	1
8102	30	3.93	3.93	66.	0.	0.01	0.03	3.93	3.93	0.	0.	0.00	0.00	2
8103	30	3.93	3.93	52.	0.	0.01	0.02	3.93	3.93	40.	0.	0.00	0.02	1
8104	30	3.93	3.93	105.	0.	0.01	0.05	3.93	3.93	0.	0.	0.00	0.00	3
8105	30	3.93	3.93	77.	0.	0.01	0.04	3.93	3.93	43.	0.	0.00	0.02	2
8106	30	3.93	3.93	178.	0.	0.02	0.09	3.93	3.93	0.	0.	0.00	0.00	4

8107	30	3.93	3.93	117.	0.	0.01	0.06	3.93	3.93	49.	0.	0.01	0.02	3
8108	30	3.93	3.93	285.	0.	0.03	0.14	3.93	3.93	0.	0.	0.00	0.00	7
8109	30	3.93	3.93	212.	0.	0.02	0.10	3.93	3.93	56.	0.	0.01	0.03	5
8110	30	3.93	3.93	574.	0.	0.06	0.28	3.93	3.93	52.	0.	0.01	0.02	14
8111	30	3.93	3.93	552.	0.	0.06	0.26	3.93	3.93	67.	0.	0.01	0.03	14
8112	30	3.93	3.93	131.	0.	0.01	0.06	3.93	3.93	82.	0.	0.01	0.04	3
8113	30	3.93	3.93	90.	0.	0.01	0.04	3.93	3.93	146.	0.	0.02	0.07	4
8114	30	3.93	3.93	163.	0.	0.02	0.08	3.93	3.93	72.	0.	0.01	0.03	4
8115	30	3.93	3.93	91.	0.	0.01	0.04	3.93	3.93	79.	0.	0.01	0.04	2
8116	30	3.93	3.93	117.	0.	0.01	0.06	3.93	3.93	478.	0.	0.05	0.23	12
8117	30	3.93	3.93	149.	0.	0.02	0.07	3.93	3.93	315.	0.	0.03	0.15	8
8118	30	3.93	3.93	130.	0.	0.01	0.06	3.93	3.93	212.	0.	0.02	0.10	5
8119	30	3.93	3.93	256.	0.	0.03	0.12	3.93	3.93	189.	0.	0.02	0.09	6
8120	30	3.93	3.93	131.	0.	0.01	0.06	3.93	3.93	0.	0.	0.00	0.00	3
8121	30	3.93	3.93	35.	0.	0.00	0.02	3.93	3.93	0.	0.	0.00	0.00	1
8122	30	3.93	3.93	145.	0.	0.02	0.07	3.93	3.93	0.	0.	0.00	0.00	4
8123	30	3.93	3.93	142.	0.	0.01	0.07	3.93	3.93	0.	0.	0.00	0.00	3
8124	30	3.93	3.93	5.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8125	30	3.93	3.93	157.	0.	0.02	0.08	3.93	3.93	0.	0.	0.00	0.00	4
8126	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8127	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8128	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	1.	0.	0.00	0.00	0
8129	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	2.	0.	0.00	0.00	0
8130	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8131	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8132	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	34.	0.	0.00	0.02	1
8133	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	36.	0.	0.00	0.02	1
8134	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	47.	0.	0.00	0.02	1
8135	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8136	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8137	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	18.	0.	0.00	0.01	0
8138	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	284.	0.	0.03	0.14	7
8139	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	264.	0.	0.03	0.13	6
8140	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	151.	0.	0.02	0.07	4
8141	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	67.	0.	0.01	0.03	2
8142	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	70.	0.	0.01	0.03	2
8143	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	190.	0.	0.02	0.09	5
8152	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8153	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8154	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8155	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8156	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0
8157	30	3.93	3.93	0.	0.	0.00	0.00	3.93	3.93	0.	0.	0.00	0.00	0

L'ARMATURA È OVUNQUE > DELLA QUANTITÀ RICHIESTA: IL PUNTO 2.3 DELLE NTC È VERIFICATO (Rd > Ed)

*** VERIFICHE A TAGLIO SECONDO NTC2018 (cap. 7.4.4.5.1) ***

Vrcd = compressione cls d'anima
Vrsd = trazione armatura trasversale
Vrd,s = scorrimento in zona dissipativa

	Quota	Sezione	Af long.	Af trasv.	Taglio	Vrcd	Vrsd	alfas	Vrd,s
	[cm]	[cm2]	[cm2]	[cm2]	[daN]	[daN]	[daN]		[daN]
C	932.3	32940	86.24	86.24	0.	929567	269955	-	-
C	972.3	32940	86.24	86.24	0.	929567	269955	-	-
C	1012.3	32940	86.24	86.24	0.	929567	269955	-	-
C	1052.3	32940	86.24	86.24	0.	929567	269955	-	-
C	1092.3	32940	86.24	86.24	0.	929567	269955	-	-
C	1132.3	32940	86.24	86.24	0.	929567	269955	-	-
C	1172.3	32940	86.24	86.24	0.	929567	269955	-	-
C	1212.3	32940	86.24	86.24	0.	929567	269955	-	-
C	1252.3	32940	86.24	86.24	0.	929567	269955	-	-
C	1292.3	32940	86.24	86.24	0.	929567	269955	-	-
C	1332.3	32940	86.24	86.24	0.	929567	269955	-	-
C	1372.3	32940	86.24	86.24	0.	929567	269955	-	-
	1412.3	32940	86.24	86.24	0.	929567	269955	-	-
	1452.3	32940	86.24	86.24	0.	929567	269955	-	-
	1492.3	32940	86.24	86.24	0.	929567	269955	-	-
	1532.3	32940	86.24	86.24	0.	929567	269955	-	-
	1572.3	32940	86.24	86.24	0.	929567	269955	-	-
	1612.3	32940	86.24	86.24	0.	929567	269955	-	-
	1652.3	32940	86.24	86.24	0.	929567	269955	-	-
	1692.3	32940	86.24	86.24	0.	929567	269955	-	-

MACROGUSCIO FONDAZIONE

VERIFICHE A FESSURAZIONE (EFFETTO MEMBRANA + PIASTRA)

CASI DI CARICO: ->

Nome	Descrizione
12	Rara (RARA)
13	Frequente (FREQUENTE)
14	Quasi Perm (QUASI PERMANENTE)

DATI:
copriferro inferiore (asse armatura): 3 cm
copriferro superiore (asse armatura): 3 cm

Af = area effettiva tesa (cm2 al metro)
Afc = area effettiva compressa (cm2 al metro)
Mom = momento flettente [daNcm/cm]
Nor = sforzo normale [daN]
σc = tensione calcestruzzo [daN/cm2]
valore max per combinazione rara = 149.4 daN/cm2
'' '' '' '' quasi permanente = 112 daN/cm2
σf = tensione acciaio [daN/cm2]
valore max per combinazione rara = 3600 daN/cm2
wkF = apertura caratteristica per combinazione frequente (mm) - valore max = 0.4 mm
wkP = '' '' '' '' quasi permanente (mm) - '' '' = 0.3 mm

DATI FRC (calcestruzzo fibrorinforzato, verifica secondo Linee Guida maggio 2022):
fFtsk = tensione di progetto in esercizio = 0 daN/cm2
<-

ARMATURA INFERIORE ORIZZONTALE

			COMBINAZIONE RARA				COMB. FREQUENTE			COMB. QUASI PERMANENTE			
GUSCI	Af	Afc	Mom	Nor	σc	σf	Mom	Nor	wkF	Mom	Nor	σc	wkP
7702	3.93	3.93	1284	0.	19.05	1294.	958	0.	0.012	847	0.	12.56	0.010
7703	3.93	3.93	309	0.	4.58	312.	221	0.	0.003	191	0.	2.84	0.002
7704	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7705	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7706	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7707	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7708	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7709	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7710	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7711	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7712	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7713	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7714	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000

7715	3.93	3.93	355	0.	5.26	358.	259	0.	0.003	226	0.	3.35	0.003
7716	3.93	3.93	1351	0.	20.04	1362.	1011	0.	0.012	894	0.	13.26	0.011
7717	3.93	3.93	1277	0.	18.96	1288.	956	0.	0.012	846	0.	12.55	0.010
7718	3.93	3.93	301	0.	4.47	304.	216	0.	0.003	187	0.	2.78	0.002
7719	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7720	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7721	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7722	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7723	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7724	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7725	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7726	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7727	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7728	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7729	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7730	3.93	3.93	339	0.	5.03	342.	248	0.	0.003	216	0.	3.21	0.003
7731	3.93	3.93	1324	0.	19.64	1335.	993	0.	0.012	879	0.	13.04	0.011
7732	3.93	3.93	1292	0.	19.18	1303.	972	0.	0.012	862	0.	12.79	0.011
7733	3.93	3.93	279	0.	4.14	281.	201	0.	0.002	175	0.	2.59	0.002
7734	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7735	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7736	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7737	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7738	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7739	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7740	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7741	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7742	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7743	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7744	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7745	3.93	3.93	323	0.	4.79	325.	236	0.	0.003	207	0.	3.07	0.003
7747	3.93	3.93	1289	0.	19.13	1300.	975	0.	0.012	866	0.	12.86	0.011
7748	3.93	3.93	270	0.	4.01	272.	196	0.	0.002	170	0.	2.52	0.002
7749	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7750	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7751	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7752	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7753	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7754	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7755	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7756	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7757	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7758	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7759	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7760	3.93	3.93	320	0.	4.76	323.	237	0.	0.003	208	0.	3.08	0.003
7761	3.93	3.93	1252	0.	18.58	1263.	947	0.	0.012	842	0.	12.49	0.010
7763	3.93	3.93	282	0.	4.18	284.	206	0.	0.003	180	0.	2.67	0.002
7764	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7765	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7766	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7767	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7768	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7769	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7770	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7771	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7772	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7773	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7774	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7775	3.93	3.93	319	0.	4.74	322.	237	0.	0.003	209	0.	3.10	0.003
7776	3.93	3.93	1237	0.	18.35	1247.	938	0.	0.012	835	0.	12.39	0.010
7777	3.93	3.93	1263	0.	18.74	1274.	963	0.	0.012	860	0.	12.77	0.011
7778	3.93	3.93	307	0.	4.56	310.	227	0.	0.003	200	0.	2.96	0.002
7779	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7780	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7781	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7782	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7783	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7784	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7785	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7786	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7787	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7788	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7789	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7790	3.93	3.93	311	0.	4.62	314.	232	0.	0.003	205	0.	3.05	0.003
7791	3.93	3.93	1215	0.	18.03	1225.	925	0.	0.011	825	0.	12.25	0.010
7792	3.93	3.93	1256	0.	18.64	1267.	963	0.	0.012	862	0.	12.79	0.011
7793	3.93	3.93	319	0.	4.73	321.	239	0.	0.003	211	0.	3.13	0.003
7794	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7795	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7796	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7797	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7798	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7799	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7800	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7801	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7802	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000

7803	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7804	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7805	3.93	3.93	306	0.	4.54	308.	230	0.	0.003	204	0.	3.02	0.003
7806	3.93	3.93	1205	0.	17.89	1216.	922	0.	0.011	824	0.	12.23	0.010
7807	3.93	3.93	1243	0.	18.44	1253.	958	0.	0.012	860	0.	12.76	0.011
7808	3.93	3.93	316	0.	4.68	318.	238	0.	0.003	212	0.	3.14	0.003
7809	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7810	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7811	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7812	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7813	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7814	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7815	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7816	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7817	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7818	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7819	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7820	3.93	3.93	308	0.	4.57	310.	233	0.	0.003	207	0.	3.07	0.003
7821	3.93	3.93	1203	0.	17.86	1214.	925	0.	0.011	829	0.	12.30	0.010
7822	3.93	3.93	1235	0.	18.32	1245.	958	0.	0.012	862	0.	12.80	0.011
7823	3.93	3.93	315	0.	4.68	318.	240	0.	0.003	214	0.	3.18	0.003
7824	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7825	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7826	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7827	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7828	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7829	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7830	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7831	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7832	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7833	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7834	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7835	3.93	3.93	314	0.	4.65	316.	239	0.	0.003	214	0.	3.17	0.003
7836	3.93	3.93	1203	0.	17.85	1213.	930	0.	0.011	836	0.	12.41	0.010
7837	3.93	3.93	1236	0.	18.35	1247.	965	0.	0.012	872	0.	12.93	0.011
7838	3.93	3.93	320	0.	4.76	323.	246	0.	0.003	221	0.	3.28	0.003
7839	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7840	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7841	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7842	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7843	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7844	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7845	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7846	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7847	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7848	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7849	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7850	3.93	3.93	323	0.	4.80	326.	249	0.	0.003	223	0.	3.31	0.003
7851	3.93	3.93	1207	0.	17.92	1217.	939	0.	0.012	847	0.	12.56	0.010
7852	3.93	3.93	1243	0.	18.44	1253.	976	0.	0.012	884	0.	13.12	0.011
7853	3.93	3.93	329	0.	4.89	332.	256	0.	0.003	230	0.	3.42	0.003
7854	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7855	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7856	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7857	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7858	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7859	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7860	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7861	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7862	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7863	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7864	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7865	3.93	3.93	334	0.	4.95	336.	259	0.	0.003	233	0.	3.46	0.003
7866	3.93	3.93	1209	0.	17.94	1219.	946	0.	0.012	856	0.	12.70	0.011
7867	3.93	3.93	1254	0.	18.61	1264.	991	0.	0.012	901	0.	13.37	0.011
7868	3.93	3.93	343	0.	5.10	346.	269	0.	0.003	243	0.	3.61	0.003
7869	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7870	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7871	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7872	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7873	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7874	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7875	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7876	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7877	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7878	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7879	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7880	3.93	3.93	344	0.	5.11	347.	270	0.	0.003	244	0.	3.62	0.003
7881	3.93	3.93	1209	0.	17.95	1220.	953	0.	0.012	865	0.	12.84	0.011
7882	3.93	3.93	1258	0.	18.66	1268.	1001	0.	0.012	912	0.	13.54	0.011
7883	3.93	3.93	361	0.	5.36	364.	285	0.	0.004	259	0.	3.84	0.003
7884	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7885	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7886	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7887	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7888	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000

7889	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7890	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7891	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7892	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7893	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7894	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7895	3.93	3.93	354	0.	5.25	357.	280	0.	0.003	254	0.	3.77	0.003
7896	3.93	3.93	1200	0.	17.81	1210.	953	0.	0.012	868	0.	12.88	0.011
7897	3.93	3.93	1265	0.	18.78	1276.	1014	0.	0.012	927	0.	13.76	0.011
7898	3.93	3.93	371	0.	5.50	374.	295	0.	0.004	269	0.	3.99	0.003
7899	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7900	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7901	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7902	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7903	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7904	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7905	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7906	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7907	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7908	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7909	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7910	3.93	3.93	364	0.	5.39	367.	290	0.	0.004	264	0.	3.92	0.003
7911	3.93	3.93	1178	0.	17.48	1188.	942	0.	0.012	861	0.	12.78	0.011
7912	3.93	3.93	1248	0.	18.51	1258.	1005	0.	0.012	921	0.	13.67	0.011
7913	3.93	3.93	384	0.	5.70	387.	307	0.	0.004	281	0.	4.17	0.003
7914	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7915	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7916	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7917	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7918	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7919	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7920	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7921	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7922	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7923	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7924	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7925	3.93	3.93	373	0.	5.54	376.	300	0.	0.004	275	0.	4.08	0.003
7926	3.93	3.93	1127	0.	16.73	1137.	908	0.	0.011	833	0.	12.36	0.010
7928	3.93	3.93	403	0.	5.97	406.	324	0.	0.004	297	0.	4.41	0.004
7929	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7930	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7931	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7932	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7933	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7934	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7935	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7936	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7937	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7938	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7939	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7940	3.93	3.93	373	0.	5.53	376.	302	0.	0.004	278	0.	4.12	0.003
7941	3.93	3.93	1041	0.	15.44	1049.	844	0.	0.010	777	0.	11.53	0.010
7942	3.93	3.93	1012	0.	15.01	1020.	823	0.	0.010	758	0.	11.25	0.009
7943	3.93	3.93	415	0.	6.15	418.	336	0.	0.004	308	0.	4.58	0.004
7944	3.93	3.93	66	0.	0.98	67.	53	0.	0.001	48	0.	0.72	0.001
7945	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7946	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7947	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7948	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7949	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7950	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7951	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7952	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7953	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7954	3.93	3.93	54	0.	0.80	54.	44	0.	0.001	41	0.	0.61	0.001
7955	3.93	3.93	373	0.	5.53	376.	303	0.	0.004	280	0.	4.15	0.003
7957	3.93	3.93	754	0.	11.19	761.	619	0.	0.008	573	0.	8.50	0.007
7958	3.93	3.93	384	0.	5.70	387.	313	0.	0.004	288	0.	4.28	0.004
7959	3.93	3.93	148	0.	2.19	149.	120	0.	0.001	111	0.	1.64	0.001
7960	3.93	3.93	7	0.	0.11	7.	6	0.	0.000	6	0.	0.09	0.000
7961	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7962	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7963	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7964	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7965	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7966	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7967	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7968	3.93	3.93	0.	0.	0.00	0.	1	0.	0.000	1	0.	0.02	0.000
7969	3.93	3.93	139	0.	2.06	140.	114	0.	0.001	106	0.	1.57	0.001
7970	3.93	3.93	360	0.	5.35	363.	295	0.	0.004	272	0.	4.04	0.003
7971	3.93	3.93	682	0.	10.12	687.	560	0.	0.007	518	0.	7.68	0.006
7972	3.93	3.93	447	0.	6.64	451.	372	0.	0.005	346	0.	5.13	0.004
7973	3.93	3.93	296	0.	4.40	299.	243	0.	0.003	225	0.	3.33	0.003
7974	3.93	3.93	188	0.	2.79	190.	155	0.	0.002	143	0.	2.12	0.002
7975	3.93	3.93	109	0.	1.62	110.	91	0.	0.001	84	0.	1.25	0.001
7976	3.93	3.93	44	0.	0.66	45.	38	0.	0.000	36	0.	0.54	0.000

7977	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7978	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7979	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7980	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7981	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7982	3.93	3.93	43	0.	0.64	44.	38	0.	0.000	37	0.	0.54	0.000
7983	3.93	3.93	109	0.	1.61	110.	91	0.	0.001	85	0.	1.26	0.001
7984	3.93	3.93	194	0.	2.88	196.	160	0.	0.002	148	0.	2.20	0.002
7985	3.93	3.93	309	0.	4.58	311.	253	0.	0.003	234	0.	3.48	0.003
7986	3.93	3.93	379	0.	5.63	382.	316	0.	0.004	294	0.	4.36	0.004
7987	3.93	3.93	183	0.	2.72	185.	158	0.	0.002	149	0.	2.21	0.002
7988	3.93	3.93	200	0.	2.96	201.	165	0.	0.002	153	0.	2.27	0.002
7989	3.93	3.93	141	0.	2.08	142.	117	0.	0.001	109	0.	1.62	0.001
7990	3.93	3.93	99	0.	1.47	100.	84	0.	0.001	78	0.	1.16	0.001
7991	3.93	3.93	62	0.	0.92	62.	54	0.	0.001	51	0.	0.76	0.001
7992	3.93	3.93	28	0.	0.41	28.	26	0.	0.000	26	0.	0.38	0.000
7993	3.93	3.93	9	0.	0.13	9.	12	0.	0.000	13	0.	0.19	0.000
7995	3.93	3.93	16	0.	0.23	16.	18	0.	0.000	19	0.	0.29	0.000
7996	3.93	3.93	33	0.	0.49	33.	31	0.	0.000	31	0.	0.46	0.000
7997	3.93	3.93	68	0.	1.01	69.	59	0.	0.001	56	0.	0.83	0.001
7998	3.93	3.93	104	0.	1.55	105.	88	0.	0.001	83	0.	1.23	0.001
7999	3.93	3.93	145	0.	2.16	147.	121	0.	0.001	113	0.	1.67	0.001
8000	3.93	3.93	189	0.	2.80	191.	156	0.	0.002	145	0.	2.15	0.002
8001	3.93	3.93	96	0.	1.42	97.	86	0.	0.001	83	0.	1.23	0.001
8002	3.93	3.93	58	0.	0.86	59.	43	0.	0.001	38	0.	0.56	0.000
8003	3.93	3.93	370	0.	5.49	373.	280	0.	0.003	249	0.	3.69	0.003
8004	3.93	3.93	64	0.	0.95	64.	47	0.	0.001	42	0.	0.62	0.001
8005	3.93	3.93	372	0.	5.52	375.	282	0.	0.003	251	0.	3.72	0.003
8006	3.93	3.93	73	0.	1.09	74.	54	0.	0.001	48	0.	0.71	0.001
8007	3.93	3.93	386	0.	5.73	389.	293	0.	0.004	261	0.	3.87	0.003
8008	3.93	3.93	77	0.	1.14	78.	57	0.	0.001	51	0.	0.75	0.001
8009	3.93	3.93	389	0.	5.77	392.	296	0.	0.004	263	0.	3.91	0.003
8010	3.93	3.93	79	0.	1.18	80.	59	0.	0.001	52	0.	0.78	0.001
8012	3.93	3.93	79	0.	1.18	80.	59	0.	0.001	52	0.	0.78	0.001
8013	3.93	3.93	369	0.	5.47	372.	282	0.	0.003	252	0.	3.74	0.003
8014	3.93	3.93	82	0.	1.22	83.	62	0.	0.001	55	0.	0.81	0.001
8015	3.93	3.93	367	0.	5.44	370.	281	0.	0.003	251	0.	3.73	0.003
8016	3.93	3.93	84	0.	1.24	84.	63	0.	0.001	56	0.	0.83	0.001
8017	3.93	3.93	368	0.	5.45	371.	282	0.	0.003	253	0.	3.75	0.003
8018	3.93	3.93	88	0.	1.30	88.	66	0.	0.001	59	0.	0.87	0.001
8019	3.93	3.93	368	0.	5.45	371.	283	0.	0.003	254	0.	3.77	0.003
8020	3.93	3.93	91	0.	1.36	92.	69	0.	0.001	62	0.	0.92	0.001
8021	3.93	3.93	367	0.	5.44	370.	283	0.	0.003	255	0.	3.78	0.003
8022	3.93	3.93	95	0.	1.41	96.	73	0.	0.001	65	0.	0.96	0.001
8023	3.93	3.93	365	0.	5.41	368.	283	0.	0.003	255	0.	3.78	0.003
8024	3.93	3.93	100	0.	1.49	101.	77	0.	0.001	69	0.	1.02	0.001
8025	3.93	3.93	365	0.	5.41	368.	284	0.	0.003	256	0.	3.80	0.003
8026	3.93	3.93	110	0.	1.64	111.	85	0.	0.001	77	0.	1.14	0.001
8027	3.93	3.93	370	0.	5.50	374.	290	0.	0.004	262	0.	3.89	0.003
8028	3.93	3.93	124	0.	1.84	125.	96	0.	0.001	87	0.	1.28	0.001
8029	3.93	3.93	398	0.	5.90	401.	312	0.	0.004	283	0.	4.19	0.003
8030	3.93	3.93	130	0.	1.92	131.	101	0.	0.001	91	0.	1.35	0.001
8031	3.93	3.93	399	0.	5.92	402.	314	0.	0.004	285	0.	4.23	0.004
8032	3.93	3.93	128	0.	1.91	129.	100	0.	0.001	90	0.	1.34	0.001
8034	3.93	3.93	122	0.	1.81	123.	96	0.	0.001	86	0.	1.28	0.001
8035	3.93	3.93	336	0.	4.99	339.	269	0.	0.003	246	0.	3.65	0.003
8036	3.93	3.93	121	0.	1.80	122.	95	0.	0.001	87	0.	1.29	0.001
8037	3.93	3.93	332	0.	4.92	334.	267	0.	0.003	244	0.	3.63	0.003
8038	3.93	3.93	117	0.	1.74	118.	93	0.	0.001	85	0.	1.26	0.001
8039	3.93	3.93	348	0.	5.16	350.	282	0.	0.003	259	0.	3.85	0.003
8040	3.93	3.93	92	0.	1.36	92.	73	0.	0.001	67	0.	0.99	0.001
8041	3.93	3.93	296	0.	4.39	299.	242	0.	0.003	224	0.	3.33	0.003
8042	3.93	3.93	400	0.	5.94	404.	302	0.	0.004	269	0.	3.99	0.003
8043	3.93	3.93	69	0.	1.02	70.	51	0.	0.001	45	0.	0.67	0.001
8044	3.93	3.93	390	0.	5.78	393.	295	0.	0.004	262	0.	3.89	0.003
8045	3.93	3.93	68	0.	1.00	68.	50	0.	0.001	44	0.	0.65	0.001
8047	3.93	3.93	68	0.	1.00	68.	50	0.	0.001	44	0.	0.65	0.001
8048	3.93	3.93	369	0.	5.47	372.	280	0.	0.003	249	0.	3.70	0.003
8049	3.93	3.93	68	0.	1.01	69.	50	0.	0.001	44	0.	0.66	0.001
8050	3.93	3.93	366	0.	5.44	369.	278	0.	0.003	248	0.	3.68	0.003
8051	3.93	3.93	71	0.	1.06	72.	53	0.	0.001	47	0.	0.69	0.001
8052	3.93	3.93	365	0.	5.42	368.	278	0.	0.003	248	0.	3.68	0.003
8053	3.93	3.93	74	0.	1.10	75.	55	0.	0.001	49	0.	0.72	0.001
8054	3.93	3.93	363	0.	5.39	366.	277	0.	0.003	247	0.	3.67	0.003
8055	3.93	3.93	78	0.	1.15	78.	58	0.	0.001	51	0.	0.76	0.001
8056	3.93	3.93	364	0.	5.40	367.	278	0.	0.003	249	0.	3.69	0.003
8057	3.93	3.93	82	0.	1.21	82.	61	0.	0.001	54	0.	0.81	0.001
8058	3.93	3.93	366	0.	5.43	369.	281	0.	0.003	251	0.	3.73	0.003
8059	3.93	3.93	86	0.	1.28	87.	65	0.	0.001	58	0.	0.86	0.001
8060	3.93	3.93	365	0.	5.41	368.	281	0.	0.003	252	0.	3.73	0.003
8061	3.93	3.93	90	0.	1.34	91.	68	0.	0.001	61	0.	0.90	0.001
8062	3.93	3.93	360	0.	5.34	363.	278	0.	0.003	250	0.	3.70	0.003
8063	3.93	3.93	93	0.	1.38	94.	71	0.	0.001	63	0.	0.93	0.001
8064	3.93	3.93	355	0.	5.27	358.	275	0.	0.003	248	0.	3.68	0.003
8065	3.93	3.93	96	0.	1.43	97.	73	0.	0.001	66	0.	0.97	0.001
8066	3.93	3.93	353	0.	5.25	356.	275	0.	0.003	248	0.	3.69	0.003

8067	3.93	3.93	101	0.	1.49	101.	77	0.	0.001	69	0.	1.03	0.001
8068	3.93	3.93	355	0.	5.27	358.	278	0.	0.003	251	0.	3.73	0.003
8069	3.93	3.93	108	0.	1.60	109.	83	0.	0.001	75	0.	1.11	0.001
8070	3.93	3.93	370	0.	5.50	374.	291	0.	0.004	264	0.	3.92	0.003
8071	3.93	3.93	119	0.	1.77	120.	92	0.	0.001	83	0.	1.23	0.001
8072	3.93	3.93	385	0.	5.71	388.	304	0.	0.004	276	0.	4.10	0.003
8073	3.93	3.93	126	0.	1.88	128.	98	0.	0.001	89	0.	1.32	0.001
8075	3.93	3.93	125	0.	1.85	126.	97	0.	0.001	88	0.	1.31	0.001
8076	3.93	3.93	339	0.	5.03	342.	272	0.	0.003	248	0.	3.68	0.003
8077	3.93	3.93	118	0.	1.75	119.	93	0.	0.001	84	0.	1.25	0.001
8078	3.93	3.93	327	0.	4.85	330.	264	0.	0.003	243	0.	3.61	0.003
8079	3.93	3.93	111	0.	1.64	112.	88	0.	0.001	80	0.	1.18	0.001
8080	3.93	3.93	287	0.	4.26	290.	234	0.	0.003	216	0.	3.21	0.003
8081	3.93	3.93	85	0.	1.26	85.	67	0.	0.001	61	0.	0.91	0.001
8082	3.93	3.93	81	0.	1.21	82.	74	0.	0.001	72	0.	1.07	0.001
8083	3.93	3.93	29	0.	0.44	30.	32	0.	0.000	32	0.	0.48	0.000
8084	3.93	3.93	155	0.	2.29	156.	128	0.	0.002	119	0.	1.77	0.001
8085	3.93	3.93	123	0.	1.83	124.	103	0.	0.001	95	0.	1.42	0.001
8086	3.93	3.93	109	0.	1.62	110.	92	0.	0.001	86	0.	1.28	0.001
8087	3.93	3.93	71	0.	1.05	71.	61	0.	0.001	57	0.	0.85	0.001
8088	3.93	3.93	83	0.	1.23	84.	71	0.	0.001	67	0.	0.99	0.001
8089	3.93	3.93	50	0.	0.75	51.	45	0.	0.001	43	0.	0.63	0.001
8090	3.93	3.93	60	0.	0.89	60.	53	0.	0.001	50	0.	0.74	0.001
8091	3.93	3.93	36	0.	0.54	37.	34	0.	0.000	33	0.	0.49	0.000
8092	3.93	3.93	36	0.	0.53	36.	33	0.	0.000	33	0.	0.48	0.000
8093	3.93	3.93	22	0.	0.33	22.	23	0.	0.000	23	0.	0.34	0.000
8094	3.93	3.93	24	0.	0.35	24.	24	0.	0.000	24	0.	0.36	0.000
8095	3.93	3.93	9	0.	0.13	9.	12	0.	0.000	13	0.	0.19	0.000
8097	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	4	0.	0.06	0.000
8098	3.93	3.93	35	0.	0.52	35.	34	0.	0.000	34	0.	0.51	0.000
8099	3.93	3.93	22	0.	0.32	22.	23	0.	0.000	24	0.	0.36	0.000
8100	3.93	3.93	45	0.	0.67	46.	41	0.	0.001	40	0.	0.60	0.000
8101	3.93	3.93	35	0.	0.52	36.	34	0.	0.000	33	0.	0.49	0.000
8102	3.93	3.93	70	0.	1.04	71.	61	0.	0.001	58	0.	0.86	0.001
8103	3.93	3.93	50	0.	0.74	50.	45	0.	0.001	43	0.	0.64	0.001
8104	3.93	3.93	92	0.	1.36	92.	78	0.	0.001	74	0.	1.09	0.001
8105	3.93	3.93	61	0.	0.90	61.	53	0.	0.001	51	0.	0.75	0.001
8106	3.93	3.93	112	0.	1.66	113.	94	0.	0.001	88	0.	1.30	0.001
8107	3.93	3.93	70	0.	1.04	71.	60	0.	0.001	57	0.	0.84	0.001
8108	3.93	3.93	125	0.	1.86	126.	105	0.	0.001	98	0.	1.45	0.001
8109	3.93	3.93	75	0.	1.11	75.	63	0.	0.001	59	0.	0.88	0.001
8110	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	3	0.	0.04	0.000
8111	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8112	3.93	3.93	266	0.	3.94	268.	218	0.	0.003	202	0.	2.99	0.002
8113	3.93	3.93	70	0.	1.03	70.	55	0.	0.001	51	0.	0.75	0.001
8114	3.93	3.93	252	0.	3.75	255.	208	0.	0.003	193	0.	2.86	0.002
8115	3.93	3.93	56	0.	0.84	57.	45	0.	0.001	41	0.	0.61	0.001
8116	3.93	3.93	76	0.	1.13	77.	61	0.	0.001	56	0.	0.83	0.001
8117	3.93	3.93	267	0.	3.96	269.	220	0.	0.003	204	0.	3.03	0.003
8118	3.93	3.93	62	0.	0.92	63.	50	0.	0.001	45	0.	0.67	0.001
8119	3.93	3.93	244	0.	3.62	246.	202	0.	0.002	188	0.	2.79	0.002
8120	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8121	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8122	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8123	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8124	3.93	3.93	17	0.	0.26	18.	24	0.	0.000	26	0.	0.38	0.000
8125	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8126	3.93	3.93	1336	0.	19.83	1348.	1009	0.	0.012	896	0.	13.30	0.011
8127	3.93	3.93	1190	0.	17.66	1200.	896	0.	0.011	795	0.	11.80	0.010
8128	3.93	3.93	1363	0.	20.23	1375.	1027	0.	0.013	911	0.	13.51	0.011
8129	3.93	3.93	405	0.	6.00	408.	307	0.	0.004	273	0.	4.06	0.003
8130	3.93	3.93	332	0.	4.93	335.	252	0.	0.003	224	0.	3.33	0.003
8131	3.93	3.93	404	0.	5.99	407.	307	0.	0.004	273	0.	4.05	0.003
8132	3.93	3.93	1245	0.	18.48	1256.	1006	0.	0.012	924	0.	13.71	0.011
8133	3.93	3.93	1118	0.	16.59	1127.	904	0.	0.011	830	0.	12.32	0.010
8134	3.93	3.93	1181	0.	17.53	1191.	958	0.	0.012	881	0.	13.08	0.011
8135	3.93	3.93	396	0.	5.88	400.	315	0.	0.004	287	0.	4.26	0.004
8136	3.93	3.93	343	0.	5.10	346.	272	0.	0.003	248	0.	3.67	0.003
8137	3.93	3.93	408	0.	6.05	411.	322	0.	0.004	293	0.	4.35	0.004
8138	3.93	3.93	863	0.	12.81	871.	706	0.	0.009	652	0.	9.68	0.008
8139	3.93	3.93	842	0.	12.50	849.	687	0.	0.008	634	0.	9.41	0.008
8140	3.93	3.93	999	0.	14.82	1007.	813	0.	0.010	750	0.	11.13	0.009
8141	3.93	3.93	393	0.	5.83	396.	312	0.	0.004	284	0.	4.22	0.003
8142	3.93	3.93	338	0.	5.02	341.	269	0.	0.003	245	0.	3.63	0.003
8143	3.93	3.93	375	0.	5.57	379.	299	0.	0.004	273	0.	4.05	0.003
8152	3.93	3.93	1330	0.	19.73	1341.	1008	0.	0.012	898	0.	13.32	0.011
8153	3.93	3.93	1189	0.	17.64	1199.	902	0.	0.011	804	0.	11.92	0.010
8154	3.93	3.93	1338	0.	19.85	1349.	1018	0.	0.013	908	0.	13.47	0.011
8155	3.93	3.93	411	0.	6.10	415.	314	0.	0.004	280	0.	4.16	0.003
8156	3.93	3.93	343	0.	5.09	346.	261	0.	0.003	233	0.	3.46	0.003
8157	3.93	3.93	409	0.	6.07	412.	312	0.	0.004	278	0.	4.13	0.003

ARMATURA INFERIORE VERTICALE

			COMBINAZIONE RARA				COMB. FREQUENTE			COMB. QUASI PERMANENTE			
GUSCI	Af	Afc	Mom	Nor	σc	σf	Mom	Nor	WkF	Mom	Nor	σc	WkP

7702	3.93	3.93	94	0.	1.39	95.	66	0.	0.001	57	0.	0.84	0.001
7703	3.93	3.93	87	0.	1.29	88.	59	0.	0.001	49	0.	0.73	0.001
7704	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7705	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7706	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7707	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7708	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7709	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7710	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7711	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7712	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7713	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7714	3.93	3.93	13	0.	0.19	13.	4	0.	0.000	1	0.	0.02	0.000
7715	3.93	3.93	112	0.	1.66	113.	79	0.	0.001	67	0.	1.00	0.001
7716	3.93	3.93	115	0.	1.71	116.	83	0.	0.001	72	0.	1.06	0.001
7717	3.93	3.93	106	0.	1.57	107.	77	0.	0.001	67	0.	0.99	0.001
7718	3.93	3.93	88	0.	1.30	89.	61	0.	0.001	52	0.	0.77	0.001
7719	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7720	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7721	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7722	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7723	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7724	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7725	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7726	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7727	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7728	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7729	3.93	3.93	9	0.	0.14	9.	3	0.	0.000	1	0.	0.02	0.000
7730	3.93	3.93	115	0.	1.70	116.	82	0.	0.001	71	0.	1.06	0.001
7731	3.93	3.93	129	0.	1.91	130.	94	0.	0.001	83	0.	1.23	0.001
7732	3.93	3.93	114	0.	1.70	115.	84	0.	0.001	74	0.	1.09	0.001
7733	3.93	3.93	88	0.	1.31	89.	62	0.	0.001	54	0.	0.79	0.001
7734	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7735	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7736	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7737	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7738	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7739	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7740	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7741	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7742	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7743	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7744	3.93	3.93	3	0.	0.04	3.	0.	0.	0.000	0.	0.	0.00	0.000
7745	3.93	3.93	116	0.	1.72	117.	85	0.	0.001	74	0.	1.09	0.001
7747	3.93	3.93	132	0.	1.95	133.	98	0.	0.001	86	0.	1.28	0.001
7748	3.93	3.93	94	0.	1.39	95.	67	0.	0.001	58	0.	0.87	0.001
7749	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7750	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7751	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7752	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7753	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7754	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7755	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7756	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7757	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7758	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7759	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7760	3.93	3.93	105	0.	1.56	106.	76	0.	0.001	66	0.	0.98	0.001
7761	3.93	3.93	123	0.	1.83	124.	91	0.	0.001	80	0.	1.19	0.001
7763	3.93	3.93	125	0.	1.85	126.	91	0.	0.001	79	0.	1.17	0.001
7764	3.93	3.93	17	0.	0.26	18.	10	0.	0.000	8	0.	0.11	0.000
7765	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7766	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7767	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7768	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7769	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7770	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7771	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7772	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7773	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7774	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7775	3.93	3.93	84	0.	1.24	84.	60	0.	0.001	52	0.	0.77	0.001
7776	3.93	3.93	102	0.	1.52	103.	75	0.	0.001	66	0.	0.98	0.001
7777	3.93	3.93	148	0.	2.19	149.	110	0.	0.001	96	0.	1.43	0.001
7778	3.93	3.93	120	0.	1.78	121.	87	0.	0.001	76	0.	1.12	0.001
7779	3.93	3.93	3	0.	0.04	3.	0.	0.	0.000	0.	0.	0.00	0.000
7780	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7781	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7782	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7783	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7784	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7785	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7786	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7787	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7788	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7789	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000

7790	3.93	3.93	77	0.	1.14	77.	54	0.	0.001	47	0.	0.69	0.001
7791	3.93	3.93	98	0.	1.45	99.	72	0.	0.001	62	0.	0.93	0.001
7792	3.93	3.93	120	0.	1.79	121.	89	0.	0.001	78	0.	1.16	0.001
7793	3.93	3.93	97	0.	1.43	97.	69	0.	0.001	60	0.	0.89	0.001
7794	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7795	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7796	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7797	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7798	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7799	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7800	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7801	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7802	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7803	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7804	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7805	3.93	3.93	76	0.	1.13	77.	53	0.	0.001	46	0.	0.68	0.001
7806	3.93	3.93	99	0.	1.47	100.	72	0.	0.001	63	0.	0.94	0.001
7807	3.93	3.93	110	0.	1.63	111.	81	0.	0.001	71	0.	1.05	0.001
7808	3.93	3.93	85	0.	1.26	86.	60	0.	0.001	52	0.	0.77	0.001
7809	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7810	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7811	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7812	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7813	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7814	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7815	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7816	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7817	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7818	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7819	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7820	3.93	3.93	80	0.	1.19	81.	56	0.	0.001	48	0.	0.71	0.001
7821	3.93	3.93	106	0.	1.57	107.	77	0.	0.001	67	0.	1.00	0.001
7822	3.93	3.93	104	0.	1.55	105.	76	0.	0.001	67	0.	0.99	0.001
7823	3.93	3.93	77	0.	1.15	78.	54	0.	0.001	46	0.	0.68	0.001
7824	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7825	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7826	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7827	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7828	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7829	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7830	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7831	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7832	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7833	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7834	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7835	3.93	3.93	87	0.	1.30	88.	61	0.	0.001	52	0.	0.77	0.001
7836	3.93	3.93	117	0.	1.73	118.	85	0.	0.001	74	0.	1.10	0.001
7837	3.93	3.93	106	0.	1.57	106.	78	0.	0.001	68	0.	1.02	0.001
7838	3.93	3.93	76	0.	1.13	77.	53	0.	0.001	46	0.	0.68	0.001
7839	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7840	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7841	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7842	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7843	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7844	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7845	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7846	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7847	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7848	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7849	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7850	3.93	3.93	97	0.	1.44	98.	69	0.	0.001	59	0.	0.87	0.001
7851	3.93	3.93	128	0.	1.91	130.	94	0.	0.001	83	0.	1.23	0.001
7852	3.93	3.93	110	0.	1.63	111.	81	0.	0.001	71	0.	1.06	0.001
7853	3.93	3.93	79	0.	1.17	79.	55	0.	0.001	46	0.	0.69	0.001
7854	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7855	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7856	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7857	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7858	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7859	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7860	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7861	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7862	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7863	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7864	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7865	3.93	3.93	94	0.	1.39	95.	65	0.	0.001	56	0.	0.83	0.001
7866	3.93	3.93	123	0.	1.82	124.	90	0.	0.001	79	0.	1.17	0.001
7867	3.93	3.93	121	0.	1.79	122.	90	0.	0.001	79	0.	1.17	0.001
7868	3.93	3.93	86	0.	1.28	87.	60	0.	0.001	52	0.	0.77	0.001
7869	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7870	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7871	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7872	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7873	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7874	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7875	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000

7876	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7877	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7878	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7879	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7880	3.93	3.93	90	0.	1.34	91.	63	0.	0.001	54	0.	0.80	0.001
7881	3.93	3.93	120	0.	1.78	121.	88	0.	0.001	77	0.	1.15	0.001
7882	3.93	3.93	138	0.	2.05	139.	104	0.	0.001	92	0.	1.36	0.001
7883	3.93	3.93	101	0.	1.49	101.	72	0.	0.001	62	0.	0.92	0.001
7884	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7885	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7886	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7887	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7888	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7889	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7890	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7891	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7892	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7893	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7894	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7895	3.93	3.93	92	0.	1.36	93.	64	0.	0.001	55	0.	0.81	0.001
7896	3.93	3.93	123	0.	1.82	124.	91	0.	0.001	80	0.	1.18	0.001
7897	3.93	3.93	166	0.	2.46	167.	125	0.	0.002	111	0.	1.65	0.001
7898	3.93	3.93	125	0.	1.85	126.	90	0.	0.001	79	0.	1.17	0.001
7899	3.93	3.93	8	0.	0.12	8.	0.	0.	0.000	0.	0.	0.00	0.000
7900	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7901	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7902	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7903	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7904	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7905	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7906	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7907	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7908	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7909	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7910	3.93	3.93	100	0.	1.49	101.	71	0.	0.001	62	0.	0.91	0.001
7911	3.93	3.93	132	0.	1.96	133.	99	0.	0.001	87	0.	1.30	0.001
7912	3.93	3.93	210	0.	3.12	212.	160	0.	0.002	143	0.	2.12	0.002
7913	3.93	3.93	160	0.	2.37	161.	118	0.	0.001	104	0.	1.54	0.001
7914	3.93	3.93	45	0.	0.67	46.	24	0.	0.000	17	0.	0.25	0.000
7915	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7916	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7917	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7918	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7919	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7920	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7921	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7922	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7923	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7924	3.93	3.93	18	0.	0.26	18.	4	0.	0.000	0.	0.	0.00	0.000
7925	3.93	3.93	119	0.	1.77	120.	87	0.	0.001	76	0.	1.13	0.001
7926	3.93	3.93	151	0.	2.24	152.	114	0.	0.001	102	0.	1.51	0.001
7928	3.93	3.93	226	0.	3.36	228.	170	0.	0.002	151	0.	2.24	0.002
7929	3.93	3.93	126	0.	1.86	127.	88	0.	0.001	75	0.	1.11	0.001
7930	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7931	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7932	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7933	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7934	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7935	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7936	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7937	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7938	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7939	3.93	3.93	54	0.	0.80	54.	33	0.	0.000	25	0.	0.37	0.000
7940	3.93	3.93	153	0.	2.27	154.	115	0.	0.001	102	0.	1.51	0.001
7941	3.93	3.93	186	0.	2.76	188.	143	0.	0.002	128	0.	1.90	0.002
7942	3.93	3.93	257	0.	3.81	259.	199	0.	0.002	180	0.	2.67	0.002
7943	3.93	3.93	264	0.	3.91	266.	203	0.	0.002	182	0.	2.70	0.002
7944	3.93	3.93	180	0.	2.67	181.	132	0.	0.002	116	0.	1.73	0.001
7945	3.93	3.93	28	0.	0.41	28.	9	0.	0.000	2	0.	0.03	0.000
7946	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7947	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7948	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7949	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7950	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7951	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7952	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7953	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7954	3.93	3.93	118	0.	1.75	119.	85	0.	0.001	73	0.	1.08	0.001
7955	3.93	3.93	202	0.	3.00	204.	154	0.	0.002	138	0.	2.04	0.002
7957	3.93	3.93	247	0.	3.67	250.	195	0.	0.002	177	0.	2.63	0.002
7958	3.93	3.93	290	0.	4.31	293.	228	0.	0.003	206	0.	3.06	0.003
7959	3.93	3.93	260	0.	3.85	262.	200	0.	0.002	180	0.	2.67	0.002
7960	3.93	3.93	186	0.	2.75	187.	138	0.	0.002	122	0.	1.81	0.002
7961	3.93	3.93	82	0.	1.22	83.	55	0.	0.001	45	0.	0.67	0.001
7962	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7963	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000

7964	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7965	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7966	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7967	3.93	3.93	50	0.	0.75	51.	31	0.	0.000	25	0.	0.37	0.000
7968	3.93	3.93	164	0.	2.43	165.	122	0.	0.001	107	0.	1.59	0.001
7969	3.93	3.93	252	0.	3.74	254.	194	0.	0.002	175	0.	2.59	0.002
7970	3.93	3.93	287	0.	4.26	289.	224	0.	0.003	203	0.	3.01	0.002
7971	3.93	3.93	248	0.	3.68	250.	195	0.	0.002	176	0.	2.61	0.002
7972	3.93	3.93	257	0.	3.81	259.	205	0.	0.003	188	0.	2.78	0.002
7973	3.93	3.93	350	0.	5.20	353.	280	0.	0.003	256	0.	3.80	0.003
7974	3.93	3.93	409	0.	6.07	412.	326	0.	0.004	298	0.	4.42	0.004
7975	3.93	3.93	427	0.	6.33	430.	339	0.	0.004	309	0.	4.58	0.004
7976	3.93	3.93	427	0.	6.33	430.	338	0.	0.004	307	0.	4.56	0.004
7977	3.93	3.93	407	0.	6.04	411.	321	0.	0.004	291	0.	4.32	0.004
7978	3.93	3.93	336	0.	4.99	339.	264	0.	0.003	240	0.	3.56	0.003
7979	3.93	3.93	297	0.	4.40	299.	230	0.	0.003	207	0.	3.07	0.003
7980	3.93	3.93	329	0.	4.88	332.	259	0.	0.003	235	0.	3.49	0.003
7981	3.93	3.93	411	0.	6.10	414.	325	0.	0.004	295	0.	4.38	0.004
7982	3.93	3.93	439	0.	6.52	443.	348	0.	0.004	317	0.	4.71	0.004
7983	3.93	3.93	442	0.	6.57	446.	352	0.	0.004	321	0.	4.76	0.004
7984	3.93	3.93	425	0.	6.30	428.	339	0.	0.004	309	0.	4.59	0.004
7985	3.93	3.93	357	0.	5.30	360.	285	0.	0.004	260	0.	3.86	0.003
7986	3.93	3.93	256	0.	3.81	259.	205	0.	0.003	187	0.	2.77	0.002
7987	3.93	3.93	215	0.	3.18	216.	174	0.	0.002	160	0.	2.38	0.002
7988	3.93	3.93	387	0.	5.74	390.	314	0.	0.004	289	0.	4.29	0.004
7989	3.93	3.93	614	0.	9.11	619.	500	0.	0.006	460	0.	6.83	0.006
7990	3.93	3.93	834	0.	12.38	841.	679	0.	0.008	626	0.	9.29	0.008
7991	3.93	3.93	990	0.	14.68	998.	806	0.	0.010	743	0.	11.02	0.009
7992	3.93	3.93	1085	0.	16.10	1094.	884	0.	0.011	815	0.	12.09	0.010
7993	3.93	3.93	1149	0.	17.05	1158.	936	0.	0.012	863	0.	12.81	0.011
7995	3.93	3.93	1179	0.	17.49	1188.	960	0.	0.012	885	0.	13.13	0.011
7996	3.93	3.93	1138	0.	16.89	1148.	926	0.	0.011	853	0.	12.66	0.010
7997	3.93	3.93	1066	0.	15.81	1074.	866	0.	0.011	797	0.	11.83	0.010
7998	3.93	3.93	936	0.	13.90	944.	760	0.	0.009	700	0.	10.38	0.009
7999	3.93	3.93	738	0.	10.96	745.	599	0.	0.007	550	0.	8.17	0.007
8000	3.93	3.93	487	0.	7.23	491.	394	0.	0.005	362	0.	5.37	0.004
8001	3.93	3.93	275	0.	4.08	277.	222	0.	0.003	203	0.	3.02	0.003
8002	3.93	3.93	96	0.	1.43	97.	71	0.	0.001	62	0.	0.92	0.001
8003	3.93	3.93	98	0.	1.46	99.	71	0.	0.001	62	0.	0.91	0.001
8004	3.93	3.93	106	0.	1.58	107.	80	0.	0.001	70	0.	1.04	0.001
8005	3.93	3.93	115	0.	1.71	116.	85	0.	0.001	75	0.	1.11	0.001
8006	3.93	3.93	123	0.	1.82	124.	92	0.	0.001	82	0.	1.21	0.001
8007	3.93	3.93	128	0.	1.90	129.	95	0.	0.001	84	0.	1.25	0.001
8008	3.93	3.93	160	0.	2.37	161.	121	0.	0.001	107	0.	1.59	0.001
8009	3.93	3.93	153	0.	2.27	154.	115	0.	0.001	102	0.	1.52	0.001
8010	3.93	3.93	122	0.	1.81	123.	92	0.	0.001	82	0.	1.21	0.001
8012	3.93	3.93	142	0.	2.11	143.	107	0.	0.001	95	0.	1.41	0.001
8013	3.93	3.93	158	0.	2.34	159.	118	0.	0.001	104	0.	1.55	0.001
8014	3.93	3.93	123	0.	1.82	124.	93	0.	0.001	82	0.	1.22	0.001
8015	3.93	3.93	130	0.	1.93	131.	98	0.	0.001	86	0.	1.28	0.001
8016	3.93	3.93	114	0.	1.69	115.	86	0.	0.001	76	0.	1.13	0.001
8017	3.93	3.93	121	0.	1.79	122.	90	0.	0.001	80	0.	1.19	0.001
8018	3.93	3.93	111	0.	1.65	112.	84	0.	0.001	75	0.	1.11	0.001
8019	3.93	3.93	117	0.	1.74	118.	87	0.	0.001	77	0.	1.15	0.001
8020	3.93	3.93	114	0.	1.69	115.	86	0.	0.001	77	0.	1.14	0.001
8021	3.93	3.93	119	0.	1.77	120.	90	0.	0.001	80	0.	1.18	0.001
8022	3.93	3.93	120	0.	1.78	121.	91	0.	0.001	81	0.	1.20	0.001
8023	3.93	3.93	125	0.	1.85	126.	94	0.	0.001	83	0.	1.24	0.001
8024	3.93	3.93	132	0.	1.95	133.	101	0.	0.001	90	0.	1.33	0.001
8025	3.93	3.93	137	0.	2.03	138.	103	0.	0.001	92	0.	1.37	0.001
8026	3.93	3.93	150	0.	2.23	151.	115	0.	0.001	103	0.	1.53	0.001
8027	3.93	3.93	155	0.	2.30	157.	118	0.	0.001	106	0.	1.57	0.001
8028	3.93	3.93	179	0.	2.65	180.	138	0.	0.002	124	0.	1.84	0.002
8029	3.93	3.93	184	0.	2.73	186.	141	0.	0.002	126	0.	1.88	0.002
8030	3.93	3.93	234	0.	3.48	236.	181	0.	0.002	163	0.	2.41	0.002
8031	3.93	3.93	234	0.	3.47	236.	180	0.	0.002	161	0.	2.39	0.002
8032	3.93	3.93	200	0.	2.96	201.	153	0.	0.002	136	0.	2.02	0.002
8034	3.93	3.93	193	0.	2.86	194.	150	0.	0.002	136	0.	2.01	0.002
8035	3.93	3.93	238	0.	3.53	240.	186	0.	0.002	168	0.	2.49	0.002
8036	3.93	3.93	168	0.	2.49	169.	132	0.	0.002	120	0.	1.78	0.001
8037	3.93	3.93	212	0.	3.15	214.	167	0.	0.002	152	0.	2.26	0.002
8038	3.93	3.93	151	0.	2.24	152.	120	0.	0.001	110	0.	1.63	0.001
8039	3.93	3.93	200	0.	2.96	201.	160	0.	0.002	146	0.	2.16	0.002
8040	3.93	3.93	115	0.	1.70	116.	93	0.	0.001	85	0.	1.27	0.001
8041	3.93	3.93	132	0.	1.96	133.	107	0.	0.001	98	0.	1.45	0.001
8042	3.93	3.93	119	0.	1.76	120.	87	0.	0.001	76	0.	1.12	0.001
8043	3.93	3.93	115	0.	1.70	116.	85	0.	0.001	75	0.	1.11	0.001
8044	3.93	3.93	137	0.	2.03	138.	101	0.	0.001	89	0.	1.33	0.001
8045	3.93	3.93	123	0.	1.82	124.	92	0.	0.001	81	0.	1.21	0.001
8047	3.93	3.93	122	0.	1.80	123.	92	0.	0.001	81	0.	1.21	0.001
8048	3.93	3.93	129	0.	1.92	130.	96	0.	0.001	85	0.	1.26	0.001
8049	3.93	3.93	110	0.	1.63	111.	83	0.	0.001	73	0.	1.09	0.001
8050	3.93	3.93	110	0.	1.64	111.	82	0.	0.001	72	0.	1.07	0.001
8051	3.93	3.93	102	0.	1.51	102.	76	0.	0.001	67	0.	1.00	0.001
8052	3.93	3.93	108	0.	1.60	109.	80	0.	0.001	71	0.	1.05	0.001
8053	3.93	3.93	100	0.	1.49	101.	75	0.	0.001	66	0.	0.98	0.001

8054	3.93	3.93	111	0.	1.65	112.	82	0.	0.001	72	0.	1.07	0.001
8055	3.93	3.93	104	0.	1.55	105.	78	0.	0.001	69	0.	1.02	0.001
8056	3.93	3.93	119	0.	1.76	120.	88	0.	0.001	77	0.	1.15	0.001
8057	3.93	3.93	113	0.	1.67	114.	84	0.	0.001	74	0.	1.10	0.001
8058	3.93	3.93	132	0.	1.95	133.	97	0.	0.001	86	0.	1.27	0.001
8059	3.93	3.93	127	0.	1.89	128.	95	0.	0.001	84	0.	1.25	0.001
8060	3.93	3.93	144	0.	2.14	145.	107	0.	0.001	95	0.	1.41	0.001
8061	3.93	3.93	139	0.	2.07	141.	104	0.	0.001	92	0.	1.37	0.001
8062	3.93	3.93	137	0.	2.04	138.	102	0.	0.001	90	0.	1.34	0.001
8063	3.93	3.93	131	0.	1.94	132.	98	0.	0.001	87	0.	1.29	0.001
8064	3.93	3.93	134	0.	1.99	135.	101	0.	0.001	89	0.	1.32	0.001
8065	3.93	3.93	128	0.	1.89	129.	96	0.	0.001	86	0.	1.27	0.001
8066	3.93	3.93	137	0.	2.03	138.	103	0.	0.001	92	0.	1.36	0.001
8067	3.93	3.93	129	0.	1.92	131.	98	0.	0.001	88	0.	1.30	0.001
8068	3.93	3.93	145	0.	2.16	147.	111	0.	0.001	99	0.	1.47	0.001
8069	3.93	3.93	136	0.	2.03	138.	105	0.	0.001	94	0.	1.39	0.001
8070	3.93	3.93	162	0.	2.41	164.	125	0.	0.002	112	0.	1.66	0.001
8071	3.93	3.93	151	0.	2.24	152.	117	0.	0.001	105	0.	1.56	0.001
8072	3.93	3.93	197	0.	2.92	198.	153	0.	0.002	137	0.	2.04	0.002
8073	3.93	3.93	182	0.	2.71	184.	142	0.	0.002	128	0.	1.90	0.002
8075	3.93	3.93	195	0.	2.90	197.	151	0.	0.002	135	0.	2.01	0.002
8076	3.93	3.93	212	0.	3.14	214.	166	0.	0.002	151	0.	2.24	0.002
8077	3.93	3.93	155	0.	2.30	156.	121	0.	0.001	109	0.	1.62	0.001
8078	3.93	3.93	192	0.	2.85	193.	153	0.	0.002	139	0.	2.07	0.002
8079	3.93	3.93	137	0.	2.04	138.	109	0.	0.001	99	0.	1.47	0.001
8080	3.93	3.93	162	0.	2.40	163.	130	0.	0.002	119	0.	1.76	0.001
8081	3.93	3.93	93	0.	1.39	94.	75	0.	0.001	68	0.	1.01	0.001
8082	3.93	3.93	281	0.	4.17	283.	232	0.	0.003	215	0.	3.19	0.003
8083	3.93	3.93	106	0.	1.57	107.	85	0.	0.001	78	0.	1.16	0.001
8084	3.93	3.93	312	0.	4.62	314.	257	0.	0.003	239	0.	3.54	0.003
8085	3.93	3.93	116	0.	1.72	117.	94	0.	0.001	86	0.	1.28	0.001
8086	3.93	3.93	272	0.	4.04	275.	225	0.	0.003	209	0.	3.10	0.003
8087	3.93	3.93	92	0.	1.36	92.	74	0.	0.001	68	0.	1.01	0.001
8088	3.93	3.93	185	0.	2.75	187.	157	0.	0.002	148	0.	2.20	0.002
8089	3.93	3.93	57	0.	0.85	58.	49	0.	0.001	46	0.	0.68	0.001
8090	3.93	3.93	157	0.	2.33	158.	133	0.	0.002	125	0.	1.85	0.002
8091	3.93	3.93	27	0.	0.40	27.	22	0.	0.000	21	0.	0.31	0.000
8092	3.93	3.93	149	0.	2.21	150.	127	0.	0.002	119	0.	1.77	0.001
8093	3.93	3.93	20	0.	0.30	20.	17	0.	0.000	16	0.	0.23	0.000
8094	3.93	3.93	143	0.	2.13	145.	122	0.	0.002	115	0.	1.71	0.001
8095	3.93	3.93	18	0.	0.26	18.	15	0.	0.000	14	0.	0.20	0.000
8097	3.93	3.93	18	0.	0.26	18.	15	0.	0.000	14	0.	0.21	0.000
8098	3.93	3.93	146	0.	2.16	147.	125	0.	0.002	118	0.	1.74	0.001
8099	3.93	3.93	19	0.	0.29	20.	16	0.	0.000	15	0.	0.23	0.000
8100	3.93	3.93	154	0.	2.28	155.	131	0.	0.002	124	0.	1.84	0.002
8101	3.93	3.93	24	0.	0.36	24.	20	0.	0.000	19	0.	0.28	0.000
8102	3.93	3.93	162	0.	2.40	163.	138	0.	0.002	130	0.	1.93	0.002
8103	3.93	3.93	30	0.	0.45	30.	26	0.	0.000	24	0.	0.36	0.000
8104	3.93	3.93	175	0.	2.60	177.	150	0.	0.002	141	0.	2.10	0.002
8105	3.93	3.93	40	0.	0.59	40.	34	0.	0.000	32	0.	0.47	0.000
8106	3.93	3.93	196	0.	2.90	197.	163	0.	0.002	152	0.	2.25	0.002
8107	3.93	3.93	57	0.	0.85	57.	48	0.	0.001	44	0.	0.66	0.001
8108	3.93	3.93	237	0.	3.51	239.	196	0.	0.002	182	0.	2.70	0.002
8109	3.93	3.93	71	0.	1.05	71.	57	0.	0.001	53	0.	0.78	0.001
8110	3.93	3.93	231	0.	3.43	233.	191	0.	0.002	177	0.	2.62	0.002
8111	3.93	3.93	65	0.	0.96	65.	52	0.	0.001	48	0.	0.71	0.001
8112	3.93	3.93	223	0.	3.31	225.	184	0.	0.002	170	0.	2.53	0.002
8113	3.93	3.93	228	0.	3.38	230.	187	0.	0.002	173	0.	2.57	0.002
8114	3.93	3.93	58	0.	0.87	59.	47	0.	0.001	43	0.	0.64	0.001
8115	3.93	3.93	54	0.	0.81	55.	43	0.	0.001	40	0.	0.59	0.000
8116	3.93	3.93	163	0.	2.42	165.	136	0.	0.002	127	0.	1.89	0.002
8117	3.93	3.93	244	0.	3.61	246.	201	0.	0.002	187	0.	2.77	0.002
8118	3.93	3.93	73	0.	1.08	73.	58	0.	0.001	53	0.	0.79	0.001
8119	3.93	3.93	88	0.	1.31	89.	71	0.	0.001	65	0.	0.97	0.001
8120	3.93	3.93	1226	0.	18.19	1236.	1000	0.	0.012	922	0.	13.68	0.011
8121	3.93	3.93	1118	0.	16.58	1127.	910	0.	0.011	839	0.	12.45	0.010
8122	3.93	3.93	1244	0.	18.47	1255.	1016	0.	0.012	937	0.	13.90	0.012
8123	3.93	3.93	156	0.	2.31	157.	133	0.	0.002	126	0.	1.86	0.002
8124	3.93	3.93	130	0.	1.93	131.	111	0.	0.001	105	0.	1.56	0.001
8125	3.93	3.93	157	0.	2.33	158.	134	0.	0.002	127	0.	1.88	0.002
8126	3.93	3.93	38	0.	0.56	38.	27	0.	0.000	24	0.	0.35	0.000
8127	3.93	3.93	139	0.	2.07	141.	103	0.	0.001	91	0.	1.35	0.001
8128	3.93	3.93	65	0.	0.97	66.	48	0.	0.001	42	0.	0.62	0.001
8129	3.93	3.93	59	0.	0.87	59.	43	0.	0.001	38	0.	0.57	0.000
8130	3.93	3.93	152	0.	2.26	154.	114	0.	0.001	101	0.	1.50	0.001
8131	3.93	3.93	31	0.	0.46	31.	23	0.	0.000	20	0.	0.30	0.000
8132	3.93	3.93	233	0.	3.46	235.	176	0.	0.002	157	0.	2.33	0.002
8133	3.93	3.93	269	0.	3.99	271.	206	0.	0.003	184	0.	2.74	0.002
8134	3.93	3.93	196	0.	2.91	198.	149	0.	0.002	133	0.	1.97	0.002
8135	3.93	3.93	192	0.	2.85	194.	146	0.	0.002	131	0.	1.94	0.002
8136	3.93	3.93	268	0.	3.98	270.	207	0.	0.003	186	0.	2.75	0.002
8137	3.93	3.93	223	0.	3.31	225.	168	0.	0.002	150	0.	2.22	0.002
8138	3.93	3.93	169	0.	2.51	171.	128	0.	0.002	114	0.	1.69	0.001
8139	3.93	3.93	232	0.	3.44	233.	179	0.	0.002	161	0.	2.39	0.002
8140	3.93	3.93	188	0.	2.79	190.	144	0.	0.002	129	0.	1.92	0.002
8141	3.93	3.93	187	0.	2.77	188.	144	0.	0.002	129	0.	1.91	0.002

8142	3.93	3.93	228	0.	3.38	230.	177	0.	0.002	160	0.	2.37	0.002
8143	3.93	3.93	148	0.	2.19	149.	111	0.	0.001	98	0.	1.46	0.001
8152	3.93	3.93	106	0.	1.58	107.	77	0.	0.001	67	0.	1.00	0.001
8153	3.93	3.93	170	0.	2.52	171.	126	0.	0.002	111	0.	1.65	0.001
8154	3.93	3.93	103	0.	1.52	103.	76	0.	0.001	67	0.	0.99	0.001
8155	3.93	3.93	108	0.	1.61	109.	81	0.	0.001	72	0.	1.06	0.001
8156	3.93	3.93	181	0.	2.69	183.	136	0.	0.002	121	0.	1.79	0.001
8157	3.93	3.93	97	0.	1.44	98.	71	0.	0.001	62	0.	0.92	0.001

ARMATURA SUPERIORE ORIZZONTALE

			COMBINAZIONE RARA				COMB. FREQUENTE			COMB. QUASI PERMANENTE			
GUSCI	Af	Afc	Mom	Nor	σc	σf	Mom	Nor	WkF	Mom	Nor	σc	WkP
7702	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7703	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7704	3.93	3.93	365	0.	5.42	368.	277	0.	0.003	246	0.	3.65	0.003
7705	3.93	3.93	668	0.	9.92	674.	506	0.	0.006	449	0.	6.67	0.006
7706	3.93	3.93	801	0.	11.88	807.	605	0.	0.007	538	0.	7.98	0.007
7707	3.93	3.93	833	0.	12.36	839.	630	0.	0.008	560	0.	8.30	0.007
7708	3.93	3.93	825	0.	12.24	832.	624	0.	0.008	556	0.	8.25	0.007
7709	3.93	3.93	828	0.	12.28	834.	627	0.	0.008	559	0.	8.29	0.007
7710	3.93	3.93	842	0.	12.50	849.	637	0.	0.008	567	0.	8.42	0.007
7711	3.93	3.93	853	0.	12.66	860.	645	0.	0.008	574	0.	8.51	0.007
7712	3.93	3.93	824	0.	12.23	831.	623	0.	0.008	554	0.	8.22	0.007
7713	3.93	3.93	694	0.	10.31	700.	525	0.	0.006	467	0.	6.92	0.006
7714	3.93	3.93	375	0.	5.57	378.	284	0.	0.003	253	0.	3.75	0.003
7715	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7716	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7717	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7718	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7719	3.93	3.93	357	0.	5.29	360.	270	0.	0.003	241	0.	3.57	0.003
7720	3.93	3.93	661	0.	9.80	666.	500	0.	0.006	445	0.	6.60	0.005
7721	3.93	3.93	794	0.	11.78	800.	601	0.	0.007	534	0.	7.93	0.007
7722	3.93	3.93	827	0.	12.27	834.	626	0.	0.008	557	0.	8.26	0.007
7723	3.93	3.93	820	0.	12.17	827.	621	0.	0.008	554	0.	8.22	0.007
7724	3.93	3.93	822	0.	12.20	829.	624	0.	0.008	556	0.	8.25	0.007
7725	3.93	3.93	836	0.	12.40	843.	633	0.	0.008	564	0.	8.36	0.007
7726	3.93	3.93	845	0.	12.55	852.	640	0.	0.008	569	0.	8.45	0.007
7727	3.93	3.93	816	0.	12.11	823.	617	0.	0.008	549	0.	8.14	0.007
7728	3.93	3.93	686	0.	10.18	692.	519	0.	0.006	461	0.	6.85	0.006
7729	3.93	3.93	371	0.	5.50	374.	281	0.	0.003	250	0.	3.71	0.003
7730	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7731	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7732	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7733	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7734	3.93	3.93	347	0.	5.14	350.	263	0.	0.003	234	0.	3.47	0.003
7735	3.93	3.93	650	0.	9.64	655.	492	0.	0.006	438	0.	6.51	0.005
7736	3.93	3.93	784	0.	11.63	790.	594	0.	0.007	529	0.	7.84	0.006
7737	3.93	3.93	818	0.	12.13	825.	620	0.	0.008	552	0.	8.19	0.007
7738	3.93	3.93	811	0.	12.04	818.	616	0.	0.008	550	0.	8.16	0.007
7739	3.93	3.93	812	0.	12.05	819.	618	0.	0.008	551	0.	8.17	0.007
7740	3.93	3.93	824	0.	12.23	831.	626	0.	0.008	557	0.	8.27	0.007
7741	3.93	3.93	832	0.	12.34	839.	631	0.	0.008	561	0.	8.33	0.007
7742	3.93	3.93	801	0.	11.88	807.	606	0.	0.007	540	0.	8.01	0.007
7743	3.93	3.93	671	0.	9.96	677.	508	0.	0.006	452	0.	6.71	0.006
7744	3.93	3.93	362	0.	5.36	365.	274	0.	0.003	244	0.	3.62	0.003
7745	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7747	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7748	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7749	3.93	3.93	349	0.	5.17	351.	264	0.	0.003	235	0.	3.49	0.003
7750	3.93	3.93	646	0.	9.59	651.	490	0.	0.006	437	0.	6.48	0.005
7751	3.93	3.93	777	0.	11.53	784.	590	0.	0.007	526	0.	7.80	0.006
7752	3.93	3.93	811	0.	12.03	817.	616	0.	0.008	549	0.	8.14	0.007
7753	3.93	3.93	804	0.	11.93	811.	611	0.	0.008	546	0.	8.10	0.007
7754	3.93	3.93	802	0.	11.90	809.	611	0.	0.008	546	0.	8.10	0.007
7755	3.93	3.93	812	0.	12.05	819.	618	0.	0.008	551	0.	8.18	0.007
7756	3.93	3.93	819	0.	12.15	826.	622	0.	0.008	554	0.	8.22	0.007
7757	3.93	3.93	787	0.	11.68	794.	597	0.	0.007	532	0.	7.89	0.007
7758	3.93	3.93	659	0.	9.78	665.	500	0.	0.006	445	0.	6.60	0.005
7759	3.93	3.93	355	0.	5.27	358.	269	0.	0.003	239	0.	3.55	0.003
7760	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7761	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7763	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7764	3.93	3.93	352	0.	5.22	354.	266	0.	0.003	237	0.	3.51	0.003
7765	3.93	3.93	644	0.	9.55	649.	489	0.	0.006	436	0.	6.47	0.005
7766	3.93	3.93	772	0.	11.45	778.	587	0.	0.007	524	0.	7.77	0.006
7767	3.93	3.93	804	0.	11.93	811.	612	0.	0.008	546	0.	8.11	0.007
7768	3.93	3.93	797	0.	11.82	803.	608	0.	0.007	542	0.	8.05	0.007
7769	3.93	3.93	792	0.	11.75	798.	605	0.	0.007	541	0.	8.03	0.007
7770	3.93	3.93	801	0.	11.88	807.	611	0.	0.008	545	0.	8.09	0.007
7771	3.93	3.93	806	0.	11.96	813.	613	0.	0.008	547	0.	8.12	0.007
7772	3.93	3.93	774	0.	11.48	780.	588	0.	0.007	524	0.	7.77	0.006
7773	3.93	3.93	647	0.	9.60	652.	491	0.	0.006	437	0.	6.48	0.005
7774	3.93	3.93	346	0.	5.14	349.	262	0.	0.003	233	0.	3.45	0.003
7775	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7776	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000

7777	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7778	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7779	3.93	3.93	350	0.	5.19	352.	264	0.	0.003	235	0.	3.48	0.003
7780	3.93	3.93	638	0.	9.46	643.	485	0.	0.006	433	0.	6.42	0.005
7781	3.93	3.93	765	0.	11.35	771.	583	0.	0.007	520	0.	7.72	0.006
7782	3.93	3.93	796	0.	11.81	803.	608	0.	0.007	543	0.	8.06	0.007
7783	3.93	3.93	789	0.	11.71	795.	603	0.	0.007	540	0.	8.01	0.007
7784	3.93	3.93	781	0.	11.58	787.	598	0.	0.007	536	0.	7.95	0.007
7785	3.93	3.93	789	0.	11.71	796.	603	0.	0.007	539	0.	8.00	0.007
7786	3.93	3.93	793	0.	11.77	800.	605	0.	0.007	540	0.	8.02	0.007
7787	3.93	3.93	760	0.	11.28	766.	578	0.	0.007	516	0.	7.66	0.006
7788	3.93	3.93	634	0.	9.40	639.	481	0.	0.006	429	0.	6.36	0.005
7789	3.93	3.93	337	0.	5.00	340.	254	0.	0.003	226	0.	3.35	0.003
7790	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7791	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7792	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7793	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7794	3.93	3.93	341	0.	5.06	344.	257	0.	0.003	228	0.	3.38	0.003
7795	3.93	3.93	628	0.	9.32	634.	478	0.	0.006	427	0.	6.34	0.005
7796	3.93	3.93	755	0.	11.20	761.	577	0.	0.007	516	0.	7.65	0.006
7797	3.93	3.93	787	0.	11.68	794.	603	0.	0.007	539	0.	8.00	0.007
7798	3.93	3.93	780	0.	11.58	787.	599	0.	0.007	536	0.	7.96	0.007
7799	3.93	3.93	770	0.	11.43	776.	592	0.	0.007	531	0.	7.88	0.007
7800	3.93	3.93	778	0.	11.54	784.	597	0.	0.007	534	0.	7.93	0.007
7801	3.93	3.93	781	0.	11.59	787.	597	0.	0.007	534	0.	7.93	0.007
7802	3.93	3.93	747	0.	11.08	753.	569	0.	0.007	509	0.	7.55	0.006
7803	3.93	3.93	621	0.	9.21	626.	472	0.	0.006	420	0.	6.24	0.005
7804	3.93	3.93	327	0.	4.85	330.	246	0.	0.003	218	0.	3.24	0.003
7805	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7806	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7807	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7808	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7809	3.93	3.93	332	0.	4.93	335.	250	0.	0.003	221	0.	3.29	0.003
7810	3.93	3.93	618	0.	9.17	623.	471	0.	0.006	421	0.	6.25	0.005
7811	3.93	3.93	745	0.	11.06	752.	571	0.	0.007	511	0.	7.58	0.006
7812	3.93	3.93	779	0.	11.55	785.	598	0.	0.007	536	0.	7.95	0.007
7813	3.93	3.93	773	0.	11.47	779.	595	0.	0.007	534	0.	7.92	0.007
7814	3.93	3.93	762	0.	11.30	768.	588	0.	0.007	529	0.	7.85	0.006
7815	3.93	3.93	769	0.	11.42	776.	592	0.	0.007	531	0.	7.88	0.007
7816	3.93	3.93	772	0.	11.45	778.	592	0.	0.007	530	0.	7.87	0.007
7817	3.93	3.93	737	0.	10.93	743.	563	0.	0.007	503	0.	7.47	0.006
7818	3.93	3.93	611	0.	9.06	616.	465	0.	0.006	414	0.	6.15	0.005
7819	3.93	3.93	319	0.	4.74	322.	239	0.	0.003	212	0.	3.14	0.003
7820	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7821	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7822	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7823	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7824	3.93	3.93	321	0.	4.76	323.	240	0.	0.003	213	0.	3.16	0.003
7825	3.93	3.93	605	0.	8.98	610.	462	0.	0.006	413	0.	6.13	0.005
7826	3.93	3.93	733	0.	10.88	739.	563	0.	0.007	505	0.	7.49	0.006
7827	3.93	3.93	767	0.	11.38	773.	592	0.	0.007	531	0.	7.88	0.007
7828	3.93	3.93	762	0.	11.31	768.	589	0.	0.007	530	0.	7.87	0.007
7829	3.93	3.93	751	0.	11.15	757.	583	0.	0.007	525	0.	7.79	0.006
7830	3.93	3.93	759	0.	11.26	765.	587	0.	0.007	527	0.	7.83	0.006
7831	3.93	3.93	761	0.	11.30	767.	586	0.	0.007	526	0.	7.80	0.006
7832	3.93	3.93	726	0.	10.78	732.	557	0.	0.007	498	0.	7.40	0.006
7833	3.93	3.93	601	0.	8.91	606.	458	0.	0.006	408	0.	6.06	0.005
7834	3.93	3.93	312	0.	4.63	314.	233	0.	0.003	206	0.	3.05	0.003
7835	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7836	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7837	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7838	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7839	3.93	3.93	313	0.	4.65	316.	234	0.	0.003	207	0.	3.07	0.003
7840	3.93	3.93	597	0.	8.85	602.	457	0.	0.006	409	0.	6.07	0.005
7841	3.93	3.93	725	0.	10.76	731.	559	0.	0.007	502	0.	7.45	0.006
7842	3.93	3.93	759	0.	11.27	765.	588	0.	0.007	529	0.	7.85	0.007
7843	3.93	3.93	754	0.	11.18	760.	586	0.	0.007	528	0.	7.83	0.006
7844	3.93	3.93	743	0.	11.02	749.	579	0.	0.007	523	0.	7.75	0.006
7845	3.93	3.93	752	0.	11.16	758.	584	0.	0.007	526	0.	7.80	0.006
7846	3.93	3.93	755	0.	11.20	761.	583	0.	0.007	525	0.	7.78	0.006
7847	3.93	3.93	720	0.	10.69	726.	554	0.	0.007	497	0.	7.37	0.006
7848	3.93	3.93	596	0.	8.84	601.	455	0.	0.006	406	0.	6.03	0.005
7849	3.93	3.93	309	0.	4.58	312.	230	0.	0.003	203	0.	3.01	0.002
7850	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7851	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7852	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7853	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7854	3.93	3.93	311	0.	4.61	313.	232	0.	0.003	205	0.	3.05	0.003
7855	3.93	3.93	593	0.	8.80	598.	456	0.	0.006	409	0.	6.06	0.005
7856	3.93	3.93	720	0.	10.69	726.	558	0.	0.007	502	0.	7.45	0.006
7857	3.93	3.93	753	0.	11.18	759.	586	0.	0.007	529	0.	7.84	0.006
7858	3.93	3.93	746	0.	11.06	752.	582	0.	0.007	526	0.	7.80	0.006
7859	3.93	3.93	733	0.	10.87	739.	574	0.	0.007	519	0.	7.70	0.006
7860	3.93	3.93	744	0.	11.05	750.	580	0.	0.007	524	0.	7.78	0.006
7861	3.93	3.93	750	0.	11.12	756.	582	0.	0.007	524	0.	7.78	0.006
7862	3.93	3.93	718	0.	10.65	723.	554	0.	0.007	498	0.	7.39	0.006

7863	3.93	3.93	595	0.	8.83	600.	456	0.	0.006	408	0.	6.05	0.005
7864	3.93	3.93	311	0.	4.61	313.	231	0.	0.003	204	0.	3.03	0.003
7865	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7866	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7867	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7868	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7869	3.93	3.93	318	0.	4.72	321.	239	0.	0.003	212	0.	3.14	0.003
7870	3.93	3.93	600	0.	8.90	605.	463	0.	0.006	416	0.	6.18	0.005
7871	3.93	3.93	724	0.	10.74	730.	564	0.	0.007	509	0.	7.55	0.006
7872	3.93	3.93	753	0.	11.17	759.	589	0.	0.007	532	0.	7.90	0.007
7873	3.93	3.93	740	0.	10.98	746.	581	0.	0.007	526	0.	7.81	0.006
7874	3.93	3.93	722	0.	10.71	728.	568	0.	0.007	515	0.	7.64	0.006
7875	3.93	3.93	738	0.	10.95	744.	579	0.	0.007	524	0.	7.77	0.006
7876	3.93	3.93	748	0.	11.10	755.	584	0.	0.007	528	0.	7.83	0.006
7877	3.93	3.93	721	0.	10.70	727.	560	0.	0.007	504	0.	7.48	0.006
7878	3.93	3.93	603	0.	8.95	608.	464	0.	0.006	416	0.	6.18	0.005
7879	3.93	3.93	322	0.	4.78	325.	240	0.	0.003	213	0.	3.15	0.003
7880	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7881	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7882	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7883	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7884	3.93	3.93	340	0.	5.05	343.	258	0.	0.003	229	0.	3.40	0.003
7885	3.93	3.93	617	0.	9.16	623.	480	0.	0.006	433	0.	6.42	0.005
7886	3.93	3.93	733	0.	10.88	739.	574	0.	0.007	520	0.	7.71	0.006
7887	3.93	3.93	753	0.	11.17	759.	592	0.	0.007	537	0.	7.97	0.007
7888	3.93	3.93	731	0.	10.84	737.	577	0.	0.007	524	0.	7.77	0.006
7889	3.93	3.93	702	0.	10.41	708.	555	0.	0.007	505	0.	7.49	0.006
7890	3.93	3.93	726	0.	10.77	732.	572	0.	0.007	519	0.	7.71	0.006
7891	3.93	3.93	745	0.	11.06	751.	585	0.	0.007	530	0.	7.86	0.007
7892	3.93	3.93	728	0.	10.80	734.	568	0.	0.007	513	0.	7.62	0.006
7893	3.93	3.93	619	0.	9.19	624.	479	0.	0.006	431	0.	6.40	0.005
7894	3.93	3.93	346	0.	5.13	349.	261	0.	0.003	231	0.	3.43	0.003
7895	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7896	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7897	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7898	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7899	3.93	3.93	384	0.	5.70	387.	294	0.	0.004	264	0.	3.91	0.003
7900	3.93	3.93	648	0.	9.61	653.	507	0.	0.006	459	0.	6.81	0.006
7901	3.93	3.93	747	0.	11.09	753.	589	0.	0.007	535	0.	7.93	0.007
7902	3.93	3.93	751	0.	11.14	757.	594	0.	0.007	540	0.	8.01	0.007
7903	3.93	3.93	714	0.	10.60	720.	567	0.	0.007	516	0.	7.66	0.006
7904	3.93	3.93	672	0.	9.97	678.	534	0.	0.007	487	0.	7.23	0.006
7905	3.93	3.93	705	0.	10.46	711.	559	0.	0.007	509	0.	7.55	0.006
7906	3.93	3.93	738	0.	10.95	744.	583	0.	0.007	529	0.	7.85	0.007
7907	3.93	3.93	736	0.	10.91	742.	578	0.	0.007	524	0.	7.78	0.006
7908	3.93	3.93	644	0.	9.56	650.	503	0.	0.006	454	0.	6.73	0.006
7909	3.93	3.93	388	0.	5.75	391.	296	0.	0.004	264	0.	3.92	0.003
7910	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7911	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7912	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7913	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7914	3.93	3.93	453	0.	6.72	456.	352	0.	0.004	317	0.	4.70	0.004
7915	3.93	3.93	687	0.	10.20	693.	542	0.	0.007	492	0.	7.31	0.006
7916	3.93	3.93	759	0.	11.26	765.	602	0.	0.007	548	0.	8.13	0.007
7917	3.93	3.93	739	0.	10.96	745.	588	0.	0.007	536	0.	7.95	0.007
7918	3.93	3.93	683	0.	10.14	689.	545	0.	0.007	497	0.	7.38	0.006
7919	3.93	3.93	625	0.	9.28	630.	500	0.	0.006	456	0.	6.77	0.006
7920	3.93	3.93	668	0.	9.91	673.	532	0.	0.007	485	0.	7.20	0.006
7921	3.93	3.93	718	0.	10.65	724.	570	0.	0.007	520	0.	7.71	0.006
7922	3.93	3.93	738	0.	10.95	744.	584	0.	0.007	531	0.	7.88	0.007
7923	3.93	3.93	674	0.	10.00	680.	530	0.	0.007	481	0.	7.13	0.006
7924	3.93	3.93	447	0.	6.64	451.	346	0.	0.004	311	0.	4.62	0.004
7925	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7926	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7928	3.93	3.93	64	0.	0.95	65.	40	0.	0.000	31	0.	0.47	0.000
7929	3.93	3.93	534	0.	7.93	539.	420	0.	0.005	381	0.	5.66	0.005
7930	3.93	3.93	721	0.	10.70	727.	573	0.	0.007	523	0.	7.75	0.006
7931	3.93	3.93	753	0.	11.17	759.	601	0.	0.007	549	0.	8.14	0.007
7932	3.93	3.93	703	0.	10.43	709.	562	0.	0.007	514	0.	7.63	0.006
7933	3.93	3.93	627	0.	9.30	632.	502	0.	0.006	459	0.	6.81	0.006
7934	3.93	3.93	553	0.	8.20	557.	443	0.	0.005	406	0.	6.02	0.005
7935	3.93	3.93	604	0.	8.97	609.	484	0.	0.006	443	0.	6.57	0.005
7936	3.93	3.93	674	0.	10.01	680.	539	0.	0.007	492	0.	7.31	0.006
7937	3.93	3.93	722	0.	10.71	728.	575	0.	0.007	525	0.	7.79	0.006
7938	3.93	3.93	695	0.	10.32	701.	552	0.	0.007	502	0.	7.45	0.006
7939	3.93	3.93	518	0.	7.68	522.	406	0.	0.005	368	0.	5.45	0.005
7940	3.93	3.93	80	0.	1.19	81.	52	0.	0.001	42	0.	0.62	0.001
7941	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7942	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7943	3.93	3.93	216	0.	3.21	218.	164	0.	0.002	146	0.	2.17	0.002
7944	3.93	3.93	604	0.	8.96	609.	480	0.	0.006	438	0.	6.50	0.005
7945	3.93	3.93	722	0.	10.71	728.	578	0.	0.007	528	0.	7.84	0.006
7946	3.93	3.93	705	0.	10.46	711.	566	0.	0.007	518	0.	7.68	0.006
7947	3.93	3.93	626	0.	9.29	631.	503	0.	0.006	460	0.	6.83	0.006
7948	3.93	3.93	533	0.	7.91	537.	428	0.	0.005	392	0.	5.82	0.005
7949	3.93	3.93	447	0.	6.64	451.	359	0.	0.004	329	0.	4.88	0.004

7950	3.93	3.93	506	0.	7.50	510.	407	0.	0.005	372	0.	5.53	0.005
7951	3.93	3.93	591	0.	8.77	596.	475	0.	0.006	435	0.	6.45	0.005
7952	3.93	3.93	665	0.	9.87	671.	533	0.	0.007	488	0.	7.24	0.006
7953	3.93	3.93	684	0.	10.14	689.	546	0.	0.007	499	0.	7.41	0.006
7954	3.93	3.93	575	0.	8.54	580.	456	0.	0.006	415	0.	6.16	0.005
7955	3.93	3.93	234	0.	3.47	236.	178	0.	0.002	158	0.	2.35	0.002
7957	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7958	3.93	3.93	359	0.	5.32	362.	282	0.	0.003	256	0.	3.80	0.003
7959	3.93	3.93	611	0.	9.07	616.	490	0.	0.006	448	0.	6.65	0.006
7960	3.93	3.93	644	0.	9.56	650.	519	0.	0.006	475	0.	7.05	0.006
7961	3.93	3.93	583	0.	8.64	587.	469	0.	0.006	430	0.	6.38	0.005
7962	3.93	3.93	487	0.	7.22	491.	392	0.	0.005	359	0.	5.33	0.004
7963	3.93	3.93	392	0.	5.82	396.	315	0.	0.004	289	0.	4.29	0.004
7964	3.93	3.93	301	0.	4.47	304.	241	0.	0.003	220	0.	3.27	0.003
7965	3.93	3.93	367	0.	5.45	370.	296	0.	0.004	271	0.	4.02	0.003
7966	3.93	3.93	452	0.	6.71	456.	364	0.	0.004	334	0.	4.96	0.004
7967	3.93	3.93	540	0.	8.01	545.	435	0.	0.005	399	0.	5.92	0.005
7968	3.93	3.93	597	0.	8.87	602.	480	0.	0.006	440	0.	6.53	0.005
7969	3.93	3.93	567	0.	8.42	572.	454	0.	0.006	415	0.	6.16	0.005
7970	3.93	3.93	357	0.	5.30	360.	280	0.	0.003	254	0.	3.77	0.003
7971	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7972	3.93	3.93	77	0.	1.14	77.	48	0.	0.001	38	0.	0.56	0.000
7973	3.93	3.93	406	0.	6.02	409.	324	0.	0.004	296	0.	4.39	0.004
7974	3.93	3.93	485	0.	7.20	489.	390	0.	0.005	358	0.	5.31	0.004
7975	3.93	3.93	444	0.	6.59	448.	358	0.	0.004	328	0.	4.87	0.004
7976	3.93	3.93	292	0.	4.33	294.	237	0.	0.003	218	0.	3.24	0.003
7977	3.93	3.93	184	0.	2.74	186.	148	0.	0.002	135	0.	2.00	0.002
7978	3.93	3.93	129	0.	1.91	130.	101	0.	0.001	91	0.	1.36	0.001
7979	3.93	3.93	90	0.	1.34	91.	67	0.	0.001	60	0.	0.88	0.001
7980	3.93	3.93	119	0.	1.76	120.	93	0.	0.001	84	0.	1.25	0.001
7981	3.93	3.93	161	0.	2.39	163.	129	0.	0.002	118	0.	1.75	0.001
7982	3.93	3.93	239	0.	3.55	241.	194	0.	0.002	179	0.	2.65	0.002
7983	3.93	3.93	388	0.	5.75	391.	318	0.	0.004	294	0.	4.36	0.004
7984	3.93	3.93	430	0.	6.38	434.	346	0.	0.004	317	0.	4.70	0.004
7985	3.93	3.93	358	0.	5.32	361.	285	0.	0.004	260	0.	3.86	0.003
7986	3.93	3.93	95	0.	1.40	95.	62	0.	0.001	51	0.	0.76	0.001
7987	3.93	3.93	282	0.	4.19	285.	217	0.	0.003	195	0.	2.90	0.002
7988	3.93	3.93	288	0.	4.28	291.	231	0.	0.003	211	0.	3.13	0.003
7989	3.93	3.93	280	0.	4.15	282.	224	0.	0.003	205	0.	3.04	0.003
7990	3.93	3.93	151	0.	2.24	152.	120	0.	0.001	109	0.	1.62	0.001
7991	3.93	3.93	85	0.	1.27	86.	66	0.	0.001	59	0.	0.88	0.001
7992	3.93	3.93	52	0.	0.78	53.	39	0.	0.000	34	0.	0.50	0.000
7993	3.93	3.93	31	0.	0.46	31.	20	0.	0.000	17	0.	0.25	0.000
7995	3.93	3.93	29	0.	0.43	29.	19	0.	0.000	15	0.	0.22	0.000
7996	3.93	3.93	45	0.	0.67	45.	33	0.	0.000	29	0.	0.43	0.000
7997	3.93	3.93	70	0.	1.03	70.	54	0.	0.001	48	0.	0.71	0.001
7998	3.93	3.93	116	0.	1.72	117.	92	0.	0.001	84	0.	1.24	0.001
7999	3.93	3.93	196	0.	2.90	197.	157	0.	0.002	144	0.	2.14	0.002
8000	3.93	3.93	240	0.	3.57	242.	192	0.	0.002	175	0.	2.60	0.002
8001	3.93	3.93	245	0.	3.64	247.	188	0.	0.002	168	0.	2.49	0.002
8002	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8003	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8004	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8005	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8006	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8007	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8008	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8009	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8010	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8012	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8013	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8014	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8015	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8016	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8017	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8018	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8019	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8020	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.01	0.000
8021	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8022	3.93	3.93	4	0.	0.06	4.	4	0.	0.000	4	0.	0.06	0.000
8023	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8024	3.93	3.93	10	0.	0.15	10.	9	0.	0.000	9	0.	0.13	0.000
8025	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8026	3.93	3.93	16	0.	0.24	16.	14	0.	0.000	13	0.	0.19	0.000
8027	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8028	3.93	3.93	27	0.	0.40	27.	22	0.	0.000	21	0.	0.31	0.000
8029	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8030	3.93	3.93	39	0.	0.58	39.	32	0.	0.000	29	0.	0.43	0.000
8031	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8032	3.93	3.93	49	0.	0.73	50.	40	0.	0.000	36	0.	0.54	0.000
8034	3.93	3.93	52	0.	0.77	52.	41	0.	0.001	38	0.	0.56	0.000
8035	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8036	3.93	3.93	53	0.	0.78	53.	42	0.	0.001	38	0.	0.57	0.000
8037	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8038	3.93	3.93	54	0.	0.81	55.	43	0.	0.001	40	0.	0.59	0.000
8039	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000

8040	3.93	3.93	62	0.	0.93	63.	50	0.	0.001	45	0.	0.67	0.001
8041	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8042	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8043	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8044	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8045	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8047	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8048	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8049	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8050	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8051	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8052	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8053	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8054	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8055	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8056	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8057	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8058	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8059	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8060	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8061	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8062	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8063	3.93	3.93	2	0.	0.04	2.	3	0.	0.000	4	0.	0.05	0.000
8064	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8065	3.93	3.93	9	0.	0.13	9.	8	0.	0.000	8	0.	0.12	0.000
8066	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8067	3.93	3.93	15	0.	0.23	15.	13	0.	0.000	13	0.	0.19	0.000
8068	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8069	3.93	3.93	22	0.	0.32	22.	18	0.	0.000	17	0.	0.25	0.000
8070	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8071	3.93	3.93	29	0.	0.43	29.	24	0.	0.000	22	0.	0.33	0.000
8072	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8073	3.93	3.93	40	0.	0.60	41.	33	0.	0.000	30	0.	0.45	0.000
8075	3.93	3.93	51	0.	0.76	52.	41	0.	0.001	38	0.	0.56	0.000
8076	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8077	3.93	3.93	56	0.	0.84	57.	45	0.	0.001	41	0.	0.61	0.001
8078	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8079	3.93	3.93	57	0.	0.84	57.	45	0.	0.001	41	0.	0.61	0.001
8080	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8081	3.93	3.93	54	0.	0.81	55.	43	0.	0.001	39	0.	0.59	0.000
8082	3.93	3.93	357	0.	5.30	360.	280	0.	0.003	253	0.	3.75	0.003
8083	3.93	3.93	372	0.	5.52	375.	293	0.	0.004	266	0.	3.95	0.003
8084	3.93	3.93	208	0.	3.09	210.	166	0.	0.002	152	0.	2.25	0.002
8085	3.93	3.93	103	0.	1.53	104.	80	0.	0.001	72	0.	1.06	0.001
8086	3.93	3.93	110	0.	1.63	111.	86	0.	0.001	78	0.	1.15	0.001
8087	3.93	3.93	37	0.	0.54	37.	26	0.	0.000	23	0.	0.33	0.000
8088	3.93	3.93	50	0.	0.73	50.	37	0.	0.000	32	0.	0.48	0.000
8089	3.93	3.93	15	0.	0.23	15.	9	0.	0.000	6	0.	0.10	0.000
8090	3.93	3.93	20	0.	0.30	20.	12	0.	0.000	10	0.	0.15	0.000
8091	3.93	3.93	4	0.	0.05	4.	0.	0.	0.000	0.	0.	0.00	0.000
8092	3.93	3.93	6	0.	0.08	6.	0.	0.	0.000	0.	0.	0.00	0.000
8093	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8094	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8095	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8097	3.93	3.93	19	0.	0.28	19.	6	0.	0.000	2	0.	0.03	0.000
8098	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8099	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8100	3.93	3.93	2	0.	0.03	2.	0.	0.	0.000	0.	0.	0.00	0.000
8101	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8102	3.93	3.93	12	0.	0.18	13.	7	0.	0.000	4	0.	0.07	0.000
8103	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8104	3.93	3.93	34	0.	0.51	35.	25	0.	0.000	22	0.	0.32	0.000
8105	3.93	3.93	10	0.	0.15	10.	5	0.	0.000	3	0.	0.04	0.000
8106	3.93	3.93	70	0.	1.04	71.	55	0.	0.001	49	0.	0.73	0.001
8107	3.93	3.93	25	0.	0.38	26.	18	0.	0.000	15	0.	0.22	0.000
8108	3.93	3.93	143	0.	2.12	144.	114	0.	0.001	104	0.	1.54	0.001
8109	3.93	3.93	53	0.	0.79	53.	40	0.	0.000	36	0.	0.54	0.000
8110	3.93	3.93	278	0.	4.13	281.	216	0.	0.003	195	0.	2.89	0.002
8111	3.93	3.93	247	0.	3.67	249.	193	0.	0.002	174	0.	2.58	0.002
8112	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8113	3.93	3.93	55	0.	0.82	56.	44	0.	0.001	40	0.	0.59	0.000
8114	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8115	3.93	3.93	56	0.	0.84	57.	45	0.	0.001	41	0.	0.60	0.001
8116	3.93	3.93	68	0.	1.01	69.	54	0.	0.001	49	0.	0.73	0.001
8117	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8118	3.93	3.93	73	0.	1.08	73.	58	0.	0.001	53	0.	0.78	0.001
8119	3.93	3.93	21	0.	0.31	21.	10	0.	0.000	6	0.	0.08	0.000
8120	3.93	3.93	103	0.	1.53	104.	77	0.	0.001	68	0.	1.01	0.001
8121	3.93	3.93	27	0.	0.40	27.	14	0.	0.000	10	0.	0.15	0.000
8122	3.93	3.93	108	0.	1.61	109.	82	0.	0.001	72	0.	1.08	0.001
8123	3.93	3.93	100	0.	1.48	101.	75	0.	0.001	66	0.	0.98	0.001
8124	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8125	3.93	3.93	110	0.	1.63	111.	83	0.	0.001	73	0.	1.09	0.001
8126	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8127	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8128	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000

8129	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8130	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8131	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8132	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8133	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8134	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8135	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8136	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8137	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8138	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8139	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8140	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8141	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8142	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8143	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8152	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8153	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8154	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8155	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8156	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8157	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000

ARMATURA SUPERIORE VERTICALE

			COMBINAZIONE RARA				COMB. FREQUENTE			COMB. QUASI PERMANENTE			
GUSCI	Af	Afc	Mom	Nor	σc	σf	Mom	Nor	WkF	Mom	Nor	σc	WkP
7702	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7703	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7704	3.93	3.93	50	0.	0.74	50.	36	0.	0.000	32	0.	0.47	0.000
7705	3.93	3.93	76	0.	1.13	77.	57	0.	0.001	50	0.	0.74	0.001
7706	3.93	3.93	78	0.	1.16	79.	59	0.	0.001	52	0.	0.78	0.001
7707	3.93	3.93	70	0.	1.05	71.	54	0.	0.001	48	0.	0.71	0.001
7708	3.93	3.93	60	0.	0.89	60.	47	0.	0.001	42	0.	0.62	0.001
7709	3.93	3.93	64	0.	0.96	65.	52	0.	0.001	47	0.	0.70	0.001
7710	3.93	3.93	76	0.	1.13	77.	60	0.	0.001	54	0.	0.80	0.001
7711	3.93	3.93	88	0.	1.31	89.	68	0.	0.001	61	0.	0.91	0.001
7712	3.93	3.93	97	0.	1.44	98.	74	0.	0.001	66	0.	0.98	0.001
7713	3.93	3.93	93	0.	1.39	94.	71	0.	0.001	63	0.	0.93	0.001
7714	3.93	3.93	64	0.	0.95	64.	48	0.	0.001	42	0.	0.63	0.001
7715	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7716	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7717	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7718	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7719	3.93	3.93	35	0.	0.52	36.	25	0.	0.000	21	0.	0.31	0.000
7720	3.93	3.93	77	0.	1.14	77.	56	0.	0.001	49	0.	0.72	0.001
7721	3.93	3.93	91	0.	1.35	92.	67	0.	0.001	59	0.	0.88	0.001
7722	3.93	3.93	90	0.	1.33	91.	67	0.	0.001	59	0.	0.88	0.001
7723	3.93	3.93	82	0.	1.22	83.	63	0.	0.001	57	0.	0.85	0.001
7724	3.93	3.93	89	0.	1.31	89.	69	0.	0.001	62	0.	0.92	0.001
7725	3.93	3.93	99	0.	1.47	100.	76	0.	0.001	68	0.	1.00	0.001
7726	3.93	3.93	109	0.	1.62	110.	83	0.	0.001	73	0.	1.09	0.001
7727	3.93	3.93	112	0.	1.67	113.	84	0.	0.001	75	0.	1.11	0.001
7728	3.93	3.93	97	0.	1.44	98.	72	0.	0.001	64	0.	0.94	0.001
7729	3.93	3.93	43	0.	0.64	44.	31	0.	0.000	27	0.	0.40	0.000
7730	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7731	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7732	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7733	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7734	3.93	3.93	29	0.	0.43	29.	19	0.	0.000	16	0.	0.23	0.000
7735	3.93	3.93	75	0.	1.12	76.	54	0.	0.001	47	0.	0.69	0.001
7736	3.93	3.93	98	0.	1.46	99.	72	0.	0.001	63	0.	0.93	0.001
7737	3.93	3.93	103	0.	1.52	103.	76	0.	0.001	67	0.	0.99	0.001
7738	3.93	3.93	99	0.	1.46	99.	75	0.	0.001	68	0.	1.00	0.001
7739	3.93	3.93	105	0.	1.56	106.	80	0.	0.001	72	0.	1.07	0.001
7740	3.93	3.93	115	0.	1.70	116.	87	0.	0.001	77	0.	1.14	0.001
7741	3.93	3.93	123	0.	1.83	124.	92	0.	0.001	81	0.	1.21	0.001
7742	3.93	3.93	124	0.	1.84	125.	92	0.	0.001	81	0.	1.21	0.001
7743	3.93	3.93	108	0.	1.60	109.	80	0.	0.001	70	0.	1.04	0.001
7744	3.93	3.93	56	0.	0.83	56.	40	0.	0.000	35	0.	0.51	0.000
7745	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7747	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7748	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7749	3.93	3.93	8	0.	0.13	9.	3	0.	0.000	3	0.	0.04	0.000
7750	3.93	3.93	75	0.	1.11	75.	53	0.	0.001	46	0.	0.68	0.001
7751	3.93	3.93	104	0.	1.55	105.	76	0.	0.001	66	0.	0.98	0.001
7752	3.93	3.93	112	0.	1.66	113.	82	0.	0.001	72	0.	1.07	0.001
7753	3.93	3.93	109	0.	1.62	110.	82	0.	0.001	74	0.	1.09	0.001
7754	3.93	3.93	115	0.	1.70	116.	87	0.	0.001	78	0.	1.16	0.001
7755	3.93	3.93	124	0.	1.84	125.	93	0.	0.001	83	0.	1.22	0.001
7756	3.93	3.93	131	0.	1.95	132.	98	0.	0.001	86	0.	1.28	0.001
7757	3.93	3.93	131	0.	1.94	132.	97	0.	0.001	85	0.	1.27	0.001
7758	3.93	3.93	114	0.	1.69	115.	84	0.	0.001	73	0.	1.09	0.001
7759	3.93	3.93	64	0.	0.95	64.	46	0.	0.001	40	0.	0.59	0.000
7760	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7761	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7763	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000

7764	3.93	3.93	42	0.	0.62	42.	28	0.	0.000	23	0.	0.34	0.000
7765	3.93	3.93	91	0.	1.35	92.	65	0.	0.001	56	0.	0.84	0.001
7766	3.93	3.93	113	0.	1.68	114.	83	0.	0.001	72	0.	1.07	0.001
7767	3.93	3.93	120	0.	1.77	120.	88	0.	0.001	77	0.	1.15	0.001
7768	3.93	3.93	117	0.	1.74	118.	87	0.	0.001	77	0.	1.14	0.001
7769	3.93	3.93	119	0.	1.77	120.	90	0.	0.001	81	0.	1.20	0.001
7770	3.93	3.93	128	0.	1.90	129.	96	0.	0.001	85	0.	1.26	0.001
7771	3.93	3.93	135	0.	2.00	136.	101	0.	0.001	89	0.	1.32	0.001
7772	3.93	3.93	135	0.	2.01	136.	100	0.	0.001	88	0.	1.30	0.001
7773	3.93	3.93	119	0.	1.77	120.	88	0.	0.001	77	0.	1.14	0.001
7774	3.93	3.93	73	0.	1.09	74.	53	0.	0.001	46	0.	0.68	0.001
7775	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7776	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7777	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7778	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7779	3.93	3.93	45	0.	0.67	46.	31	0.	0.000	26	0.	0.38	0.000
7780	3.93	3.93	100	0.	1.48	101.	72	0.	0.001	62	0.	0.92	0.001
7781	3.93	3.93	122	0.	1.80	123.	89	0.	0.001	78	0.	1.15	0.001
7782	3.93	3.93	126	0.	1.87	127.	93	0.	0.001	82	0.	1.21	0.001
7783	3.93	3.93	122	0.	1.82	123.	91	0.	0.001	81	0.	1.20	0.001
7784	3.93	3.93	120	0.	1.78	121.	92	0.	0.001	82	0.	1.21	0.001
7785	3.93	3.93	129	0.	1.91	130.	97	0.	0.001	86	0.	1.27	0.001
7786	3.93	3.93	135	0.	2.01	137.	101	0.	0.001	89	0.	1.32	0.001
7787	3.93	3.93	135	0.	2.01	137.	100	0.	0.001	88	0.	1.31	0.001
7788	3.93	3.93	120	0.	1.77	121.	88	0.	0.001	77	0.	1.14	0.001
7789	3.93	3.93	75	0.	1.11	75.	54	0.	0.001	46	0.	0.69	0.001
7790	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7791	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7792	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7793	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7794	3.93	3.93	65	0.	0.97	66.	45	0.	0.001	38	0.	0.57	0.000
7795	3.93	3.93	111	0.	1.64	112.	80	0.	0.001	69	0.	1.03	0.001
7796	3.93	3.93	129	0.	1.91	130.	94	0.	0.001	83	0.	1.23	0.001
7797	3.93	3.93	131	0.	1.94	132.	97	0.	0.001	86	0.	1.27	0.001
7798	3.93	3.93	126	0.	1.87	127.	95	0.	0.001	84	0.	1.25	0.001
7799	3.93	3.93	121	0.	1.79	122.	92	0.	0.001	83	0.	1.23	0.001
7800	3.93	3.93	128	0.	1.91	130.	97	0.	0.001	86	0.	1.28	0.001
7801	3.93	3.93	134	0.	1.99	135.	100	0.	0.001	88	0.	1.31	0.001
7802	3.93	3.93	133	0.	1.98	134.	98	0.	0.001	86	0.	1.28	0.001
7803	3.93	3.93	116	0.	1.73	117.	85	0.	0.001	74	0.	1.10	0.001
7804	3.93	3.93	71	0.	1.06	72.	51	0.	0.001	44	0.	0.65	0.001
7805	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7806	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7807	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7808	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7809	3.93	3.93	74	0.	1.09	74.	51	0.	0.001	44	0.	0.65	0.001
7810	3.93	3.93	117	0.	1.74	118.	85	0.	0.001	74	0.	1.09	0.001
7811	3.93	3.93	134	0.	1.99	136.	99	0.	0.001	87	0.	1.29	0.001
7812	3.93	3.93	136	0.	2.01	137.	101	0.	0.001	89	0.	1.32	0.001
7813	3.93	3.93	130	0.	1.94	132.	98	0.	0.001	87	0.	1.30	0.001
7814	3.93	3.93	123	0.	1.83	124.	95	0.	0.001	85	0.	1.26	0.001
7815	3.93	3.93	130	0.	1.93	131.	98	0.	0.001	88	0.	1.30	0.001
7816	3.93	3.93	134	0.	1.99	135.	100	0.	0.001	89	0.	1.32	0.001
7817	3.93	3.93	132	0.	1.95	133.	97	0.	0.001	86	0.	1.27	0.001
7818	3.93	3.93	113	0.	1.68	114.	83	0.	0.001	72	0.	1.07	0.001
7819	3.93	3.93	67	0.	0.99	67.	47	0.	0.001	40	0.	0.60	0.000
7820	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7821	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7822	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7823	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7824	3.93	3.93	80	0.	1.18	80.	57	0.	0.001	49	0.	0.72	0.001
7825	3.93	3.93	122	0.	1.82	123.	90	0.	0.001	79	0.	1.17	0.001
7826	3.93	3.93	141	0.	2.09	142.	105	0.	0.001	93	0.	1.37	0.001
7827	3.93	3.93	143	0.	2.12	144.	108	0.	0.001	96	0.	1.43	0.001
7828	3.93	3.93	138	0.	2.05	139.	106	0.	0.001	95	0.	1.41	0.001
7829	3.93	3.93	131	0.	1.94	132.	102	0.	0.001	93	0.	1.37	0.001
7830	3.93	3.93	137	0.	2.03	138.	105	0.	0.001	94	0.	1.40	0.001
7831	3.93	3.93	140	0.	2.07	141.	106	0.	0.001	94	0.	1.40	0.001
7832	3.93	3.93	135	0.	2.00	136.	101	0.	0.001	89	0.	1.32	0.001
7833	3.93	3.93	114	0.	1.69	115.	84	0.	0.001	74	0.	1.09	0.001
7834	3.93	3.93	66	0.	0.97	66.	47	0.	0.001	40	0.	0.60	0.000
7835	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7836	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7837	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7838	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7839	3.93	3.93	85	0.	1.26	86.	60	0.	0.001	51	0.	0.76	0.001
7840	3.93	3.93	131	0.	1.94	132.	96	0.	0.001	84	0.	1.24	0.001
7841	3.93	3.93	152	0.	2.25	153.	113	0.	0.001	100	0.	1.48	0.001
7842	3.93	3.93	156	0.	2.31	157.	118	0.	0.001	105	0.	1.56	0.001
7843	3.93	3.93	151	0.	2.24	153.	116	0.	0.001	104	0.	1.55	0.001
7844	3.93	3.93	145	0.	2.15	146.	113	0.	0.001	102	0.	1.52	0.001
7845	3.93	3.93	151	0.	2.24	152.	116	0.	0.001	104	0.	1.55	0.001
7846	3.93	3.93	154	0.	2.28	155.	116	0.	0.001	104	0.	1.54	0.001
7847	3.93	3.93	147	0.	2.19	149.	110	0.	0.001	97	0.	1.44	0.001
7848	3.93	3.93	124	0.	1.84	125.	91	0.	0.001	80	0.	1.18	0.001
7849	3.93	3.93	72	0.	1.08	73.	51	0.	0.001	44	0.	0.65	0.001

7850	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7851	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7852	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7853	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7854	3.93	3.93	92	0.	1.37	93.	66	0.	0.001	58	0.	0.86	0.001
7855	3.93	3.93	143	0.	2.13	145.	107	0.	0.001	95	0.	1.40	0.001
7856	3.93	3.93	169	0.	2.51	171.	129	0.	0.002	115	0.	1.70	0.001
7857	3.93	3.93	177	0.	2.62	178.	136	0.	0.002	123	0.	1.82	0.002
7858	3.93	3.93	174	0.	2.58	175.	136	0.	0.002	123	0.	1.83	0.002
7859	3.93	3.93	168	0.	2.49	170.	134	0.	0.002	122	0.	1.81	0.001
7860	3.93	3.93	176	0.	2.61	177.	138	0.	0.002	125	0.	1.85	0.002
7861	3.93	3.93	178	0.	2.64	179.	137	0.	0.002	123	0.	1.83	0.002
7862	3.93	3.93	169	0.	2.51	171.	129	0.	0.002	115	0.	1.71	0.001
7863	3.93	3.93	143	0.	2.12	144.	107	0.	0.001	95	0.	1.40	0.001
7864	3.93	3.93	89	0.	1.32	90.	64	0.	0.001	56	0.	0.83	0.001
7865	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7866	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7867	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7868	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7869	3.93	3.93	111	0.	1.64	111.	82	0.	0.001	72	0.	1.07	0.001
7870	3.93	3.93	170	0.	2.53	172.	130	0.	0.002	116	0.	1.72	0.001
7871	3.93	3.93	203	0.	3.01	204.	157	0.	0.002	142	0.	2.10	0.002
7872	3.93	3.93	214	0.	3.18	216.	168	0.	0.002	153	0.	2.26	0.002
7873	3.93	3.93	212	0.	3.15	214.	169	0.	0.002	154	0.	2.28	0.002
7874	3.93	3.93	204	0.	3.03	206.	165	0.	0.002	151	0.	2.24	0.002
7875	3.93	3.93	216	0.	3.20	218.	172	0.	0.002	156	0.	2.32	0.002
7876	3.93	3.93	219	0.	3.25	221.	172	0.	0.002	156	0.	2.31	0.002
7877	3.93	3.93	209	0.	3.09	210.	162	0.	0.002	145	0.	2.16	0.002
7878	3.93	3.93	178	0.	2.64	179.	136	0.	0.002	121	0.	1.80	0.001
7879	3.93	3.93	117	0.	1.74	118.	87	0.	0.001	77	0.	1.14	0.001
7880	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7881	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7882	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7883	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7884	3.93	3.93	143	0.	2.12	144.	109	0.	0.001	98	0.	1.45	0.001
7885	3.93	3.93	214	0.	3.18	216.	167	0.	0.002	151	0.	2.24	0.002
7886	3.93	3.93	255	0.	3.78	257.	202	0.	0.002	183	0.	2.72	0.002
7887	3.93	3.93	270	0.	4.01	273.	216	0.	0.003	197	0.	2.93	0.002
7888	3.93	3.93	268	0.	3.97	270.	216	0.	0.003	198	0.	2.94	0.002
7889	3.93	3.93	254	0.	3.77	256.	207	0.	0.003	191	0.	2.83	0.002
7890	3.93	3.93	272	0.	4.03	274.	219	0.	0.003	201	0.	2.98	0.002
7891	3.93	3.93	278	0.	4.12	280.	222	0.	0.003	202	0.	3.00	0.002
7892	3.93	3.93	266	0.	3.95	269.	210	0.	0.003	191	0.	2.83	0.002
7893	3.93	3.93	230	0.	3.41	232.	179	0.	0.002	161	0.	2.39	0.002
7894	3.93	3.93	159	0.	2.36	160.	121	0.	0.001	108	0.	1.61	0.001
7895	3.93	3.93	2	0.	0.04	2.	1	0.	0.000	1	0.	0.01	0.000
7896	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7897	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7898	3.93	3.93	4	0.	0.06	4.	3	0.	0.000	2	0.	0.03	0.000
7899	3.93	3.93	193	0.	2.86	194.	151	0.	0.002	137	0.	2.03	0.002
7900	3.93	3.93	277	0.	4.12	280.	221	0.	0.003	201	0.	2.98	0.002
7901	3.93	3.93	328	0.	4.86	330.	263	0.	0.003	241	0.	3.58	0.003
7902	3.93	3.93	345	0.	5.12	348.	280	0.	0.003	257	0.	3.81	0.003
7903	3.93	3.93	339	0.	5.03	341.	277	0.	0.003	255	0.	3.79	0.003
7904	3.93	3.93	315	0.	4.67	317.	259	0.	0.003	240	0.	3.56	0.003
7905	3.93	3.93	342	0.	5.07	344.	278	0.	0.003	257	0.	3.81	0.003
7906	3.93	3.93	354	0.	5.25	357.	286	0.	0.004	263	0.	3.90	0.003
7907	3.93	3.93	343	0.	5.10	346.	275	0.	0.003	251	0.	3.73	0.003
7908	3.93	3.93	302	0.	4.48	304.	239	0.	0.003	218	0.	3.23	0.003
7909	3.93	3.93	219	0.	3.25	221.	171	0.	0.002	155	0.	2.29	0.002
7910	3.93	3.93	35	0.	0.52	35.	26	0.	0.000	23	0.	0.34	0.000
7911	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7912	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7913	3.93	3.93	33	0.	0.49	33.	25	0.	0.000	23	0.	0.34	0.000
7914	3.93	3.93	252	0.	3.73	254.	202	0.	0.002	185	0.	2.74	0.002
7915	3.93	3.93	361	0.	5.35	364.	291	0.	0.004	268	0.	3.97	0.003
7916	3.93	3.93	417	0.	6.19	420.	339	0.	0.004	312	0.	4.63	0.004
7917	3.93	3.93	431	0.	6.39	434.	352	0.	0.004	326	0.	4.83	0.004
7918	3.93	3.93	415	0.	6.15	418.	342	0.	0.004	317	0.	4.70	0.004
7919	3.93	3.93	378	0.	5.61	381.	314	0.	0.004	292	0.	4.33	0.004
7920	3.93	3.93	413	0.	6.13	417.	340	0.	0.004	315	0.	4.68	0.004
7921	3.93	3.93	436	0.	6.48	440.	357	0.	0.004	329	0.	4.89	0.004
7922	3.93	3.93	433	0.	6.42	436.	351	0.	0.004	323	0.	4.79	0.004
7923	3.93	3.93	391	0.	5.80	394.	314	0.	0.004	288	0.	4.27	0.004
7924	3.93	3.93	298	0.	4.43	301.	237	0.	0.003	216	0.	3.21	0.003
7925	3.93	3.93	92	0.	1.37	93.	69	0.	0.001	62	0.	0.92	0.001
7926	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7928	3.93	3.93	163	0.	2.41	164.	125	0.	0.002	112	0.	1.67	0.001
7929	3.93	3.93	361	0.	5.35	364.	293	0.	0.004	269	0.	4.00	0.003
7930	3.93	3.93	462	0.	6.85	466.	377	0.	0.005	348	0.	5.16	0.004
7931	3.93	3.93	504	0.	7.48	508.	414	0.	0.005	383	0.	5.68	0.005
7932	3.93	3.93	502	0.	7.44	506.	414	0.	0.005	384	0.	5.70	0.005
7933	3.93	3.93	469	0.	6.95	472.	389	0.	0.005	362	0.	5.38	0.004
7934	3.93	3.93	415	0.	6.16	418.	347	0.	0.004	324	0.	4.81	0.004
7935	3.93	3.93	460	0.	6.82	463.	382	0.	0.005	356	0.	5.28	0.004
7936	3.93	3.93	500	0.	7.42	504.	412	0.	0.005	382	0.	5.68	0.005

7937	3.93	3.93	512	0.	7.59	516.	419	0.	0.005	387	0.	5.75	0.005
7938	3.93	3.93	480	0.	7.13	484.	391	0.	0.005	360	0.	5.34	0.004
7939	3.93	3.93	388	0.	5.75	391.	313	0.	0.004	287	0.	4.26	0.004
7940	3.93	3.93	205	0.	3.04	206.	155	0.	0.002	139	0.	2.06	0.002
7941	3.93	3.93	26	0.	0.38	26.	20	0.	0.000	18	0.	0.26	0.000
7942	3.93	3.93	62	0.	0.91	62.	47	0.	0.001	43	0.	0.63	0.001
7943	3.93	3.93	282	0.	4.18	284.	229	0.	0.003	210	0.	3.12	0.003
7944	3.93	3.93	446	0.	6.62	450.	364	0.	0.004	336	0.	4.99	0.004
7945	3.93	3.93	530	0.	7.86	534.	435	0.	0.005	403	0.	5.98	0.005
7946	3.93	3.93	541	0.	8.03	546.	448	0.	0.006	415	0.	6.17	0.005
7947	3.93	3.93	507	0.	7.52	511.	422	0.	0.005	393	0.	5.84	0.005
7948	3.93	3.93	448	0.	6.64	451.	376	0.	0.005	351	0.	5.21	0.004
7949	3.93	3.93	375	0.	5.56	378.	318	0.	0.004	298	0.	4.42	0.004
7950	3.93	3.93	429	0.	6.37	433.	362	0.	0.004	338	0.	5.02	0.004
7951	3.93	3.93	492	0.	7.30	496.	411	0.	0.005	383	0.	5.68	0.005
7952	3.93	3.93	532	0.	7.89	536.	440	0.	0.005	408	0.	6.06	0.005
7953	3.93	3.93	528	0.	7.83	532.	433	0.	0.005	401	0.	5.95	0.005
7954	3.93	3.93	446	0.	6.62	449.	364	0.	0.004	336	0.	4.98	0.004
7955	3.93	3.93	315	0.	4.67	317.	255	0.	0.003	235	0.	3.49	0.003
7957	3.93	3.93	210	0.	3.12	212.	171	0.	0.002	157	0.	2.33	0.002
7958	3.93	3.93	358	0.	5.31	361.	292	0.	0.004	269	0.	3.99	0.003
7959	3.93	3.93	479	0.	7.11	483.	394	0.	0.005	364	0.	5.40	0.004
7960	3.93	3.93	495	0.	7.35	499.	410	0.	0.005	381	0.	5.65	0.005
7961	3.93	3.93	441	0.	6.55	445.	369	0.	0.005	344	0.	5.11	0.004
7962	3.93	3.93	357	0.	5.30	360.	303	0.	0.004	284	0.	4.22	0.003
7963	3.93	3.93	267	0.	3.96	269.	230	0.	0.003	218	0.	3.24	0.003
7964	3.93	3.93	178	0.	2.64	179.	159	0.	0.002	152	0.	2.26	0.002
7965	3.93	3.93	240	0.	3.56	242.	210	0.	0.003	199	0.	2.96	0.002
7966	3.93	3.93	327	0.	4.85	329.	279	0.	0.003	262	0.	3.89	0.003
7967	3.93	3.93	409	0.	6.06	412.	343	0.	0.004	320	0.	4.75	0.004
7968	3.93	3.93	466	0.	6.91	470.	386	0.	0.005	359	0.	5.33	0.004
7969	3.93	3.93	463	0.	6.88	467.	381	0.	0.005	352	0.	5.23	0.004
7970	3.93	3.93	354	0.	5.25	357.	289	0.	0.004	266	0.	3.95	0.003
7971	3.93	3.93	224	0.	3.32	226.	182	0.	0.002	167	0.	2.48	0.002
7972	3.93	3.93	237	0.	3.52	239.	192	0.	0.002	177	0.	2.63	0.002
7973	3.93	3.93	328	0.	4.87	331.	268	0.	0.003	248	0.	3.67	0.003
7974	3.93	3.93	332	0.	4.92	335.	274	0.	0.003	255	0.	3.78	0.003
7975	3.93	3.93	220	0.	3.26	222.	186	0.	0.002	175	0.	2.59	0.002
7976	3.93	3.93	63	0.	0.94	64.	61	0.	0.001	60	0.	0.89	0.001
7977	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7978	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7979	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7980	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7981	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7982	3.93	3.93	2	0.	0.03	2.	12	0.	0.000	15	0.	0.23	0.000
7983	3.93	3.93	148	0.	2.19	149.	129	0.	0.002	122	0.	1.81	0.001
7984	3.93	3.93	271	0.	4.02	273.	226	0.	0.003	210	0.	3.12	0.003
7985	3.93	3.93	291	0.	4.32	293.	238	0.	0.003	220	0.	3.27	0.003
7986	3.93	3.93	228	0.	3.38	230.	185	0.	0.002	170	0.	2.53	0.002
7987	3.93	3.93	184	0.	2.73	186.	149	0.	0.002	136	0.	2.02	0.002
7988	3.93	3.93	81	0.	1.20	82.	66	0.	0.001	60	0.	0.89	0.001
7989	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7990	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7991	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7992	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7993	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7995	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7996	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7997	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7998	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
7999	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8000	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8001	3.93	3.93	58	0.	0.87	59.	48	0.	0.001	44	0.	0.66	0.001
8002	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8003	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8004	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8005	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8006	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8007	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8008	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8009	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8010	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8012	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8013	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8014	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8015	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8016	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8017	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8018	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8019	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8020	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8021	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8022	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8023	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8024	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8025	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000

8026	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8027	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8028	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8029	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8030	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8031	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8032	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8034	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8035	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8036	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8037	3.93	3.93	54	0.	0.80	54.	41	0.	0.001	36	0.	0.54	0.000
8038	3.93	3.93	51	0.	0.76	52.	37	0.	0.000	33	0.	0.48	0.000
8039	3.93	3.93	164	0.	2.43	165.	132	0.	0.002	121	0.	1.79	0.001
8040	3.93	3.93	137	0.	2.04	138.	109	0.	0.001	99	0.	1.47	0.001
8041	3.93	3.93	208	0.	3.09	210.	167	0.	0.002	153	0.	2.27	0.002
8042	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8043	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8044	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8045	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8047	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8048	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8049	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8050	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8051	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8052	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8053	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8054	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8055	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8056	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8057	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8058	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8059	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8060	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8061	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8062	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8063	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8064	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8065	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8066	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8067	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8068	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8069	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8070	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8071	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8072	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8073	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8075	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8076	3.93	3.93	84	0.	1.25	85.	64	0.	0.001	58	0.	0.86	0.001
8077	3.93	3.93	9	0.	0.14	9.	7	0.	0.000	6	0.	0.09	0.000
8078	3.93	3.93	171	0.	2.54	173.	138	0.	0.002	126	0.	1.87	0.002
8079	3.93	3.93	85	0.	1.26	86.	63	0.	0.001	55	0.	0.82	0.001
8080	3.93	3.93	130	0.	1.93	131.	105	0.	0.001	96	0.	1.43	0.001
8081	3.93	3.93	136	0.	2.02	137.	108	0.	0.001	99	0.	1.47	0.001
8082	3.93	3.93	1	0.	0.02	1.	0.	0.	0.000	0.	0.	0.00	0.000
8083	3.93	3.93	82	0.	1.21	82.	65	0.	0.001	60	0.	0.89	0.001
8084	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8085	3.93	3.93	48	0.	0.71	48.	38	0.	0.000	35	0.	0.52	0.000
8086	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8087	3.93	3.93	19	0.	0.28	19.	15	0.	0.000	13	0.	0.20	0.000
8088	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8089	3.93	3.93	3	0.	0.05	3.	2	0.	0.000	2	0.	0.03	0.000
8090	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8091	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8092	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8093	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8094	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8095	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8097	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8098	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8099	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8100	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8101	3.93	3.93	2	0.	0.04	2.	2	0.	0.000	1	0.	0.02	0.000
8102	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8103	3.93	3.93	7	0.	0.10	7.	5	0.	0.000	5	0.	0.07	0.000
8104	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8105	3.93	3.93	11	0.	0.17	11.	9	0.	0.000	8	0.	0.12	0.000
8106	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8107	3.93	3.93	16	0.	0.23	16.	12	0.	0.000	11	0.	0.17	0.000
8108	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8109	3.93	3.93	24	0.	0.36	25.	20	0.	0.000	18	0.	0.27	0.000
8110	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8111	3.93	3.93	35	0.	0.53	36.	28	0.	0.000	26	0.	0.38	0.000
8112	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8113	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8114	3.93	3.93	42	0.	0.63	43.	34	0.	0.000	31	0.	0.46	0.000
8115	3.93	3.93	49	0.	0.73	50.	39	0.	0.000	36	0.	0.53	0.000

8116	3.93	3.93	166	0.	2.46	167.	128	0.	0.002	115	0.	1.70	0.001
8117	3.93	3.93	66	0.	0.98	66.	48	0.	0.001	41	0.	0.61	0.001
8118	3.93	3.93	114	0.	1.69	115.	91	0.	0.001	83	0.	1.24	0.001
8119	3.93	3.93	99	0.	1.47	100.	80	0.	0.001	73	0.	1.08	0.001
8120	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8121	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8122	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8123	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8124	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8125	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8126	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8127	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8128	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8129	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8130	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8131	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8132	3.93	3.93	12	0.	0.17	12.	12	0.	0.000	12	0.	0.18	0.000
8133	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8134	3.93	3.93	11	0.	0.16	11.	11	0.	0.000	10	0.	0.16	0.000
8135	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8136	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8137	3.93	3.93	0.	0.	0.00	0.	1	0.	0.000	3	0.	0.04	0.000
8138	3.93	3.93	174	0.	2.59	176.	137	0.	0.002	125	0.	1.85	0.002
8139	3.93	3.93	145	0.	2.14	146.	112	0.	0.001	101	0.	1.50	0.001
8140	3.93	3.93	91	0.	1.35	92.	72	0.	0.001	66	0.	0.98	0.001
8141	3.93	3.93	37	0.	0.55	37.	31	0.	0.000	28	0.	0.42	0.000
8142	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.01	0.000
8143	3.93	3.93	116	0.	1.72	117.	93	0.	0.001	85	0.	1.27	0.001
8152	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8153	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8154	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8155	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8156	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000
8157	3.93	3.93	0.	0.	0.00	0.	0.	0.	0.000	0.	0.	0.00	0.000