POLITECNICO DI TORINO
FIRST SCHOOL OF ARCHITECTURE
Master of Science in Architecture (Construction)
Honors theses

Designing the territory through its own resources: a proposal for redevelopment of quarry's asbestos of Balangero

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If you want to compare the case of the quarry's asbestos of Balangero and Corio to the cycle of an organic approach it could be a primary producer as a tree.
Through the very existence of the plant a system that depends on it it's feeded and at the same time during the course of his life, the plant dies and its organic matters are deposited on land, through the action of decomposers (bacteria eaters and mineralizing), we obtain the transformation of the dead cells in new elements from the tree itself.
Similarly the quarry after its closure is definitely not disappeared but has set the conditions for the regeneration of a new life process. The project of building a new park from a cave begins actually from this potential of regeneration.
The same difficulties due to the nature of the contaminated soil and of the dismissed structures can become an opportunity for the development of new ideas and methods, arousing the interest of external actors and also of a market ready to invest in innovation.
In this sense I worked on the installation of structures such as mayflies and sustainable "baskets", items consisting of a frame of steel recovered from the rests of some of the sheds in critical structural conditions of the old factories.
This idea was born as an alternative to the current inability to exploit the land for agricultural purposes due to the presence of the rock serpenitica (from which we extract the asbestos), as well as for the creation of paths along the terraces of the quarry was designed a system of water sprinklers. This system, giving protection from asbestos fibers, by the formation of a vapor cloud, makes the dust of asbestos heavier and manage to pull it down toward the ground, allowing the accessibility to the areas without any health risks.
The cloud creates a high theatrical amplification of the charm of the quarry, providing not only the possibility of environment due to the new art and crafts-cave museum, but also to an economic
development through tourism and new local activities. The recovery of the sheds becomes an opportunity to create a museum of asbestos together with the technological component of building a building energy-efficient, for the presence of bio-climatic and solar greenhouses, unique for the size of the structure. These points make it possible to define the territory of the quarry as a sustainable production environment, where there is created a surplus run by a few, but have generated a series of relationships between the 'human being and his natural and social environment, a process through which claim form and identity.

Premise

The choice to develop a thesis project related to environmental topics arose from the participation to a design competition, addressed to architects and engineers, which required the determination of strategies and scenarios for the very complex context and places of intervention.
After visiting the cave, the curiosity to understand the relationships with the surrounding area led to visit the neighboring villages. In the town of Corio the chance meeting with a former miner has simplified through his memories and his stories, the work of understanding the links between the mine and the people and helped me to develop the work that since than I started to realize.
For this reason, for the conversion and rebirth of the former quarry of Corio e Balangero contained in this proposal, the idea was to find the value of the place in its history and function that has served the community for the territorial development. Mining has for long time had an economic role in the area's development, around which was took place community life. If the cave on one side has represented a wound for the citizens of Balangero and Corio, on the other one is not possible to separate the cultural and economic development of the area from this activity.
In the territories of mining in general there is often a tendency to "remove" a difficult past: on the other hand, we must remember that these have contributed significantly to characterize the history and identity. The strong interactions with the social context and the environment have resulted in a decisive way the culture, lifestyles, land and landscape.
The Mineral Park of Balangero and Corio, taking origin from these reflections, wants to be a place that shaping its origin, can develop and offer itself as a place of experimentation, technology and culture.
Scraped and worked that same land, become again a matter to be molded to produce a wealth that is not only economic, but cultural, scientific and technological research.
A key of interpretation which makes up the research:

the design of spaces linked to the culture of the site (eco-museum, the area of major events, the visitor route outside)

- The landscape design and horticultural
- The architectural restoration industry
- DSSC photovoltaic systems reclamation of the site

The extraction site of the Balangero's mine

The context guidelines and feasibility study

Since 1990 the company RSA and the Piedmont Region have resulted in numerous initiatives and projects for the reclamation and restoration of the quarry of Corio and Balangero.
Finally the design competition launched in October 2010 in which they were given guidelines and programmatic design was sketched, on which participants in the competition have made their proposals.
The basic idea, often repeated by members of the RSA during the workshop and on site inspections during the project, has always been to preserve, without changing the architectural structure, the nature of places:

- Restructuring the industrial buildings, for setting up offices and exhibition areas covered and preserve the historic buildings.
- Construction of a quarry on the observation of strategic points, integrated alcontesto and minimally invasive for the nature the quarry.
- The naturalization of the surrounding context for the provision of tourist paths and nature of land-art installations.
- Energy supply through renewable energy production systems.

The theme of the competition for the development of the mining site in Corio and Balangero has as its goal the creation of a site with characteristics of energy efficiency, environmental sustainability and economic development. The tendency to hold competitions for ideas on places like the project is now a widespread, especially in Italy, where in past decades mining activities has been widely practiced, places that are an open wound on the territory for which authorities, government, businesses and citizens strongly believe in their potential and their development. In particular, the project area is characterized by environmental conditions rather than criticism, with problems related to drainage and accessibility of the area.
In this regard, the project site visits and scrupulous analysis performed during the preparation of the proposal have suggested a design strategy that makes use of the system architecture and the
environment by focusing on the resources of the site: water, vegetation and climate.
The competition notice being very free, provided several key interpretive energy and economic development, art installations and experimental approach.
After a careful analysis of the site, which started from the study of climatic factors and subsequently from the analysis of former industrial buildings of the quarry, it has been defined a strategy that makes these aspects of the system and makes a proposal to resolve issues of the critical areas, primarily the problems related to air quality conditions and the presence of asbestos
fibers. The initial assumption was to create a regenerative cycle energy "matrix", through the use of only the resources of the site contributing to achieve the goals.
In practical terms, these intentions have been developped:

- The creation of an architecture "cubic zero", a mist along the path of the cave that steps through an extraction and filtration system, draws the water from the lake and quarry generating high pressure along the way, helping to reduce asbestos fibers.
- In the reclamation and restoration of former industrial buildings of the cave, converted to facilities to serve the new park (ecomuseum industrial, scientific laboratories, accommodation) and the creation of aeroponic greenhouses located on the roof of the buildings themselves.

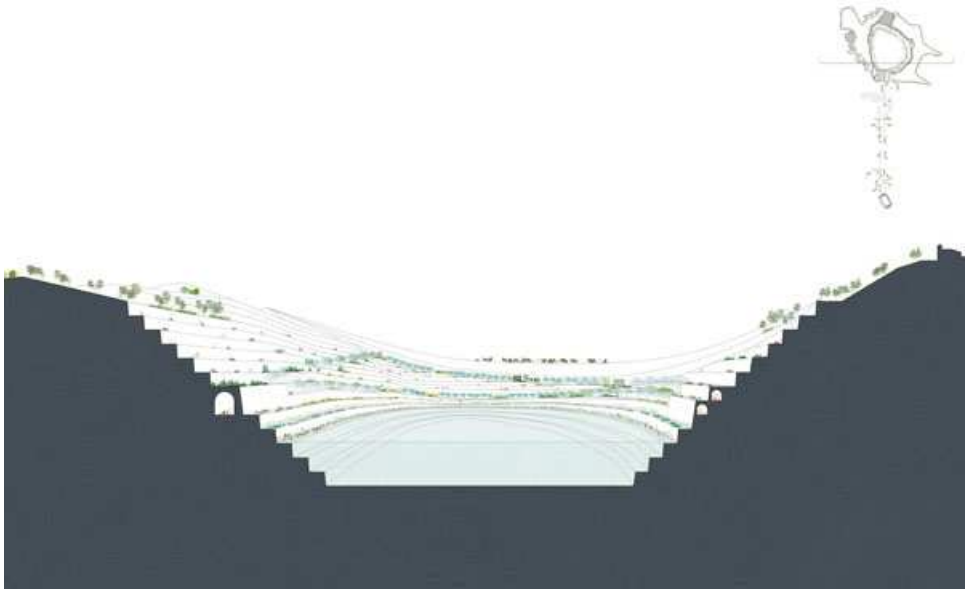
The decision to use the water of Lake quarry and the study of the repopulation of the flora on the slopes, are among the most important aspects of the project. It was therefore decided to use part of the water resources of the lake creating a "fog-path", to reduce the airborne asbestos dust: a solution designed not only to break down the fibers in the environment, but also to create a vegetation in the cave's area.
This "fog-system" project finds its foundations in the concept of environmental sustainability, as will be shown, can be associated with experimental and innovative systems that affect the chemistry,
environmental engineering and architecture. After establishing a program of 'interventions, the following step has been calculation, dimensioning and choosing the filtration system of the water.

Orthophoto of the project proposal

Project Objectives

The environmental characteristics, together with the complexity of the issue variously and widely exposed in the work of research and guidelines adopted in the stage of the competition, has brought this work to be seen as an interdisciplinary research, characterized by a discussion of the project based on a detailed, scientific and cognitive system approach. It was essential during the design process, create a working method characterized by the democratization of the various disciplinary knowledges in the game and a critical review after the stage of the competition.
The overall analysis of the site, divided by the scale and detailed landscape / regional scale architecture, it is consequently detailed in a master director.
In the first part of the study were treated as subject many aspects of the quarries. Entering in the most scientific research, datas were identified about the amount of water in the basin, with a distinction between contributions arising from the flow from groundwater and climate datas related to annual precipitations.
Secondly, they have been identified and analyzed researches, surveys and studies conducted by
universities and agencies that deal with issues related to asbestos, in particular on the amount of airborne fibers and dissolved in water.
After treating the general case, the research has focused on the specific case of the quarry of Balangero, collecting all the necessary datas, such as the volume and the water balance of the lake, in order to determine the amount of water used in the sprinkler system, datas about the presence of asbestos fibers into the air and the lake have also allowed the identification of plant species and vegetation needed to eliminate the concentration of asbestos fibers and restore natural habitat type throughout. In addition, the comparison drawn between the cultivated
land and traditional crops aeroponic allowed to determine the water savings that would result in favor of issues related to water supply of the site, allowing the production of particular varieties of crops even in difficult environmental project like that.

Subsequently, the focus fell on the energy problem by providing the architectural integration of photovoltaic-type organic DSSC on the roof of the museum-buildings (a technology that allows a strong reduction of economic and environmental costs than traditional panels) and a hydroelectric plant that uses the jump altitude between the water of the lake and the buildings of former quarry production, in order to make the "fog-path" of the quarry, a self-energy.
As for the actual design phase, this has involved three categories of intervention: the fog system, the greenhouse aeroponic and restoration of former industrial buildings into museum and structures for the public.



Perspective section of the quarry and the path

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