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Honors theses

Galfione's Spinning-Mill at Pianezze di Camandona (in the outskirts of Biella): a hypothesis of consolidation

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PROJECT: A study of the structures, consolidation and renovation for specific use such as the

Archaeological Industrial Museum.

The origins.

The Spinning-Mill located in the outskirts area of Biella (in Piedmont, north-western Italy) was built in 1884 by Bernardo Bellia and subsequently sold to the Galfione brothers in the thirties. In 1996 it was bought by Mr. Costenaro who has kept it in its original form.

The Spinning-Mill in the oldest photograph found, showing the original aspect of the building in 1896.

The Building.

It is shaped like a lofty long spanned industrial structure of 4 storeys above ground floor, plus a loft on the upper level. With the exception of the third floor, which was the probable residence of the Bellia family, the rest of the building was used entirely for the business activity. In the first two decades of the 20th century it was extended: on the western side as an office block, and implemented on the opposite side with an annexed industrial hoist. It is rendered with lime plaster both inside and outside and it still bears the original shape with a daylight access opening.

Study of the Project.

At the very beginning it was quite clear that there were no plans or drawings available, not even old or new surveying plans of the industrial complex. The task seemed extremely difficult at first but later proved to be a real challenge, which made our work very praiseworthy.

Each of the first three floors of the original structure was meant to be a large single workshop where the spinning belt-driving machinery and other textile equipment was placed.

From the ground to the fifth floor, the external wall is built with a corner quoin, a brick depressed arch and random rubble stone on a perimeter bearing wall, with a single centre-line of regular square cursed ashlar columns.

The first and second vault are made in a pendentive dome structure, while the third one is made with iron ribbing and hollow brick decking.

At the first floor, the primary structure changes only on the shape of the columns. From this level upwards to the 3rd floor, these become regular round cursed ashlar columns.

From the 4th floor, the columns are made of round bricks supporting the 5th floor and the roof, both made of solid wild chestnut hardwood.

The hardwood structure with the central brick columns of the loft support the gable roof and the open view marseilles-tiles roof cover.

The western wing is made of reinforced concrete with a load-bearing wall, purposely built in rooms of different sizes for the office block and residential area.

There are two built-in connecting staircases each with a different status: one for residential purposes and the other for the industrial complex with the annexed hoist support link.

Clear is the difference between the residential area and the industrial block which is sturdily built for productive purposes.

A view of the Spinning-Mill from the road facing south

The Idea.

The motivation for selecting this subject came from the personal desire to conceive a real project of structure consolidation and specific renovation for re-starting a pioneer structure. The Spinning-Mill is bound to become an industrial museum with real working historical textile machinery, and aims at reconstructing in the textile area of Biella the original aspect of a mill with its peculiar wool manufacture in the pioneering golden age of the Industrial Revolution.

For these purposes we have conducted several tests and calculations to make sure that the load bearing structure can support new weight and strain.

The test carried out on the pendentive dome of the first and second floor shows that there is a situation of global stability, nevertheless there are signs of admissible load stress.

Other test was performed on the third decking which is made of iron ribbing and hollow brick; the fourth decking is made of solid hardwood and the gable roof made in the same solid hardwood. The results were that there is a high level of admissible load but the stress is above fixed limits. The internal columns and the peripheral load bearing wall, after the test gave the verified results of a situation of overall stability.

After an analysis of tests and calculations the conclusion is that the Spinning-Mill needs some specific work in order to consolidate the structure especially at the upper level. The strength of the structure must be upgraded to meet the safety requirements for a building which is supposed to be destined to public use. The working load strain does not undermine the steadiness of the structure itself, but the severity of safety rules is too restrictive for an industrial building over one hundred years old.

For all types of consolidation required, we can see many alternative ways of approaching the matter and different proposals are all ready evaluated case by case bearing in mind both benefits and costs.

The overall picture of our work is that we confirm the feasibility of this project which is actually a very good idea.

However, the conformity to safety rules requires huge amounts of capital which cannot be affordable without risk from private individuals.

The Spinning-Mill, ground-floor workshop with pendentive dome.

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