

CRITERIA FOR THE SUSTAINABLE RE-USE OF DISUSED INDUSTRIAL BUILDINGS IN THE NORTH-EAST OF ITALY

Mauro CAINI

*Department of Civil, Environmental and Architectural engineering, Via Marzolo,9 , Padua,Italy,
mauro.caini@unipd.it*

Rossana PAPARELLA

*Department of Civil, Environmental and Architectural engineering, Via Marzolo,9 , Padua, Italy,
rossana.paparella@unipd.it*

Summary

Recently, a sensibility directed to the re-use of the vast and diffused building patrimony for the industrial production developed in Europe. Originally built in the second half of the 19th and last century, such patrimony is now disused due to processes of economic transformation and urbanism. Even though considered minor buildings nevertheless, such buildings carry historic-cultural values which are recognized and appreciated. The idea of re-using these buildings is linked to the historical memories, which tend to enhance the cultural identity of a determined territory. However, a further challenge is added; the realization of redevelopments based on sustainable criteria. Through the analysis of case studies in the North-East of Italy, this work proposes to identify sustainable criteria of intervention for this building patrimony. Industrial buildings such as spinning and cotton mills have been analyzed; this paper focuses exclusively on spinning mills.

In these cases, sustainability is intended in its wide meaning, it therefore regards: the application of the criterion of “least land consumption”; the identification of the building’s characteristics; the application of the criterion of the reuse compatible with the materials and the construction techniques of the building; the introduction of compatible and innovative technologies that can be integrated without altering of the historical characteristics of the building itself. From this detailed analysis, it is possible to extrapolate guidelines for a sustainable planning in this particular and specific context.

Keywords: factory, reuse, technology, typology, sustainability

1 The spinning mills in the Veneto region

In the territory of the Veneto region, in the north-east of Italy, a large and diffused presence of buildings for the manufacturing of silk exists: the spinning mills. This is due to three orders of factors. The first one is that the manufacturing of silk in its pre-industrial forms was already known in the region. The second is that historically this type of manufacturing derives from the first phase of industrialization that in the Veneto region happened from the second half of the 19th century. The third is that this type of industry, that in our case study we could define "rural", was able to develop in the area object of the study due to the availability of hydraulic energy, to the presence of low cost manpower and

to the facility of retrieval of the mulberry, plant from which silkworms drew nourishment; it must be remembered that silk thread is obtained from silkworms.

1.1 Methodology of field research

At the moment, a census and a filing of the spinning mills present on the territory do not exist, therefore there is the necessity to carry out a punctual investigation and a research on the territory of the Veneto region. In a first phase, the study has identified 66 spinning mills and for 19 of them, it has developed a detailed filing (figure 1).

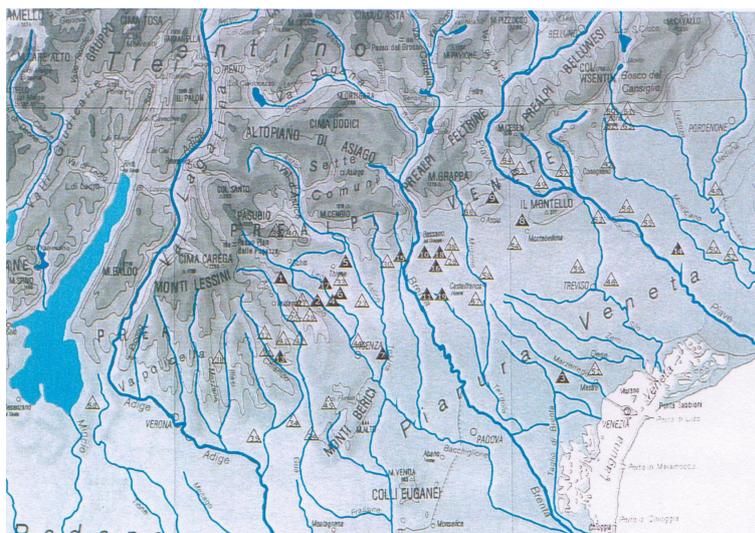


Fig. 1 Localization of the spinning mills present on the territory of the Veneto region

The filing has been carried out for each building with the acquisition and elaboration of the following documentation:

- 1) The collection of brief historical facts and of pictures,
- 2) The localization of the building in the regional technical paper in a scale of 1:500 which underlines the possible presence of water streams,
- 3) The evaluation of the original situation through maps, prospectuses and sections.
- 4) The realization of an abacus of constitutive elements, underlining the structural and linguistic components recurrent in the artifacts such as the structural system, the rough holes of the wrap and the chimneys; as a matter of fact, these last elements result to constitute a typology and a technology that characterize the building artifacts objects of this study.

1.2 Individualization of the Venetian spinning mills' characteristics

In a second phase, it has been possible to carry out typological analysis through a comparison of the buildings taken into examination. From the reading and the comparison of the files and from the study of the production lay-out, it has been possible to understand the origin and the evolution of the building type. The silk production lay-out follows a simple and linear scheme in which the silk thread is directly manufactured from the raw material (the silkworm) through a process called "trattura". In the proto-industrial phase, such process was carried out in a place from within the yard, together with other preexisting places turned to stores, to refuges for animals and to residences for farmers, who became

part of the work force for the new activity [1] Corelli spinning mill sited in Malo (VI). This represented a closed yard, in which the working place did not have a typologically defined allocation on the map and, it did not have a sufficient characterization with respect to the rest of the building compound on the prospectus. Therefore, in a second phase represented by the development of the industrial activity the process shifted from a closed yard to an open yard. The production place can be individualized with greater clarity both on the map and on the prospectus [2] Romanin Jacur spinning mill sited in Salzano (VE). A third phase was reached with the development of the building type, constituted by one rectangular block, isolated by the other bodies of the factory and with the characteristic of having rough holes along the longitudinal closings. Inside it the only activity carried out was the process of the "trattura" [3] Bacego spinning mill (VI).

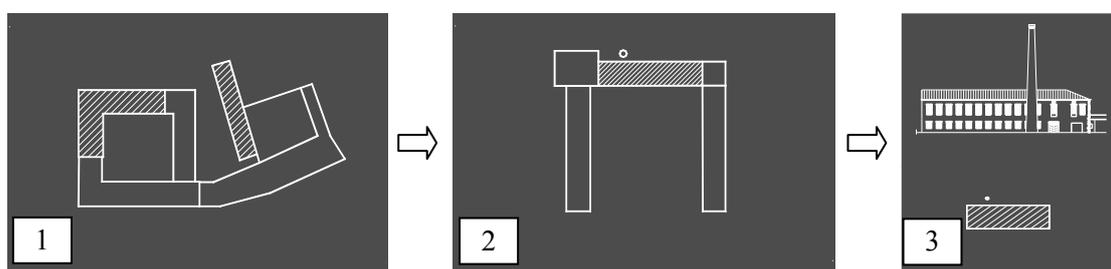


Fig. 2 Evolution on the building type with, in white, the production area.

From the dimensional study it emerges that the width of the spinning mill is typically between 9 and 10 meters. This is the dimension of optimal width. Determined by the encumbrance of the machineries, it has remained constant over time because both the production progress and the utilized machineries have not been subjected to substantial changes with respect to process and dimensions. After the development of the building type, there have not been aggregations of side cells even on the map, since this would have decreased the functionality of the base cell and it would have reduced the air circulation and the illuminating engineering contribution (about $1/10 \text{ m}^2$), necessary for the elimination of the vapor produced by the water used in the production process. Contrarily, the longitudinal dimension varies according to the importance on the factory. There is a two pitched roof, a perimetral bearing masonry and wooden trusses. This original typological and technological choice allows to widen the factory in the longitudinal direction guaranteeing its flexibility.

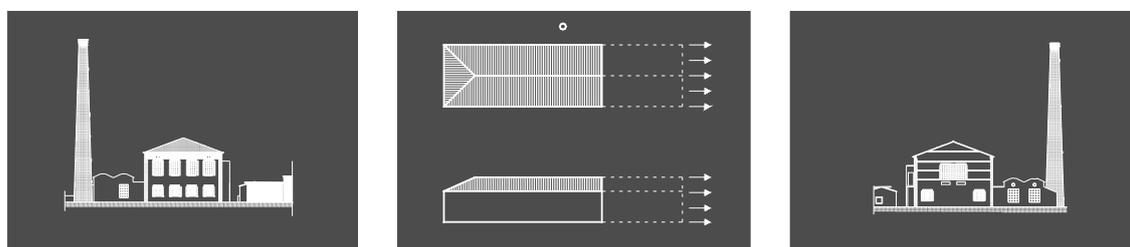


Fig. 3 The flexible planning conception of a spinning mill

1.3 Individualization of compatibility in the re-use

In the third phase of the work, the spinning mill Bacego (VI) was chosen as a representative case study (figure 4), on which planning simulations have been carried out in order to verify the compatibility between the new functions and the typological and technological

characteristics of the building. Based on the comparative study previously developed, the following planning obligations have been assumed: maintenance or restoration of the original perimetral masonries; maintenance or restoration of their rough holes; maintenance or restoration of visible structures; usage of integrated sustainable technologies for energy production, such as photovoltaic and thermal-solar with, for instance, the use of low-emitting and/or photovoltaic glass, photovoltaic roof tiles, etc. The demolishing of the parts of the building that have been realized later in time and that do not conciliate with the identified characteristics has been considered. Moreover, in case of an eventual amplification it has been established that this would happen in a longitudinal direction as already previously anticipated. From the planning verification, the following re-uses resulted compatible: The residence; The library; The expositive room; the offices. In these last hypotheses of usage, it was privileged a planning of large open spaces such as the expositive room, the reading room for the library, or the open space for the offices. The new parts expected to be inside the already existing building such as staircases and elevators are considered independent from the original structure.

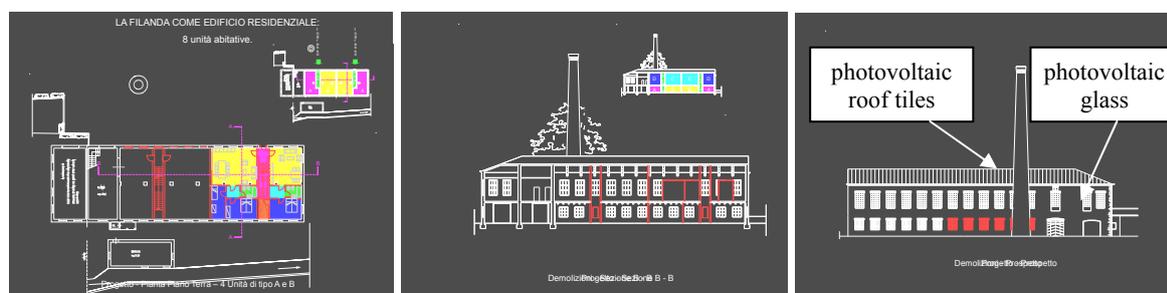


Fig. 4 The reuse of the Venetian spinning mill as Residence

2 Conclusions

Through the safeguard of the technological and typological characteristics of the disused buildings from the first industrialization in the region of Veneto, this work shows how compatible the reuse of the spinning mills is, with many new functions. Contributing to define the approach of intervention and the criteria of sustainability within which to operate in such context, it wants to be a contribution and a starting point for the development and the definition of guide lines for the reuse of spinning mills at a regional and local Administration level.

References

- [1] CANIGGIA G. G. L. MAFFEI, *Lettura dell'edilizia di base vol. I*. Masilio Ve 1984.
- [2] CANIGGIA G. G. L. MAFFEI, *Lettura nell'edilizia di base vol. II*. Masilio Ve 1984.
- [3] PEDRINA G. *La Filanda Franceschetto a Cittadella, da "Padova e il suo territorio"* n°33 ottobre 1991.