

## MASTER

### A truly modern winery project for an untraditional winery in a traditional territory

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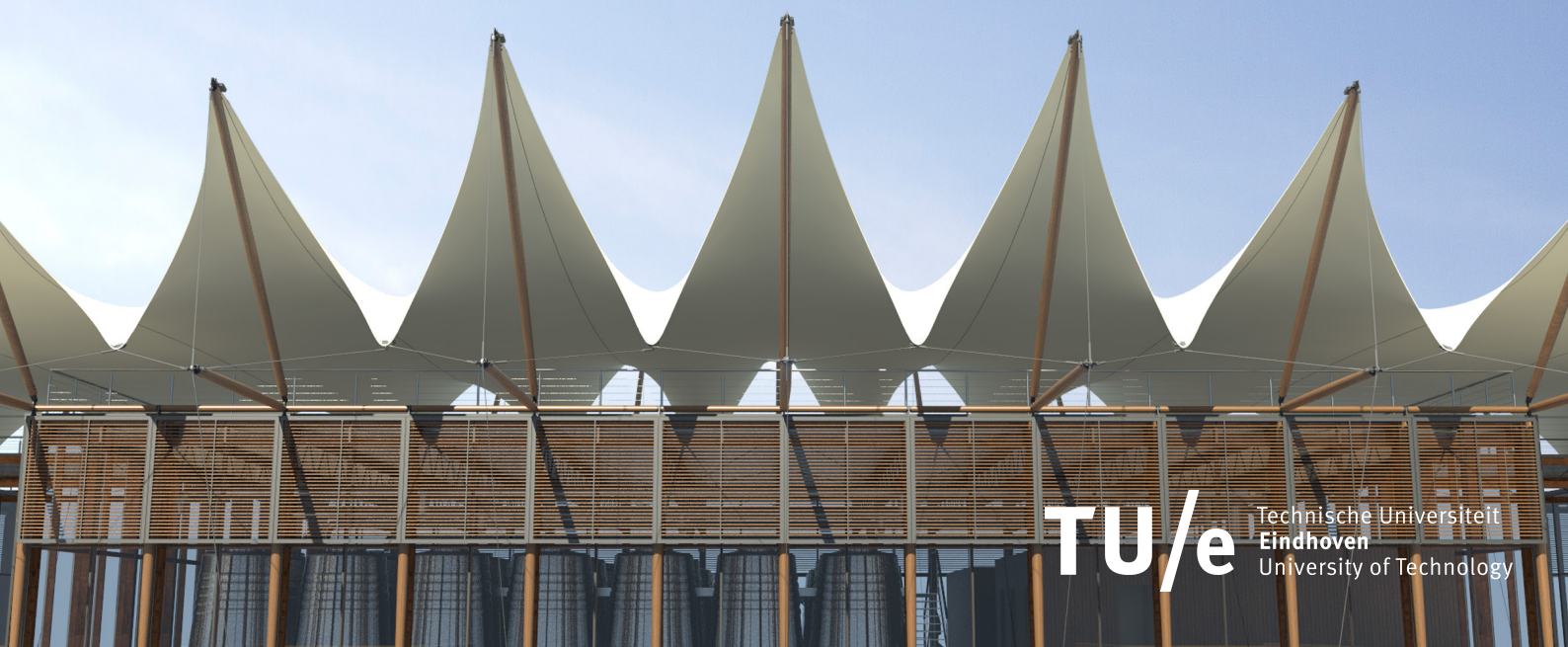
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Master's thesis

# A TRULY MODERN WINERY

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University of Technology





Master's thesis

# **A TRULY MODERN WINERY**

*Project for an untraditional winery in a traditional territory*

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The growing attention to the sustainability of the built environment has led in the last two decades to the development efficient buildings, in which the energy consumption is reduced to the minimum and the environmental impact is kept under a strict control. Nevertheless, when it comes to industrial buildings, aesthetic qualities and integration in the context are hierarchically considered as of secondary importance, subordinated to the more impelling topics of energy and pollution. This resulted in the past decades in a reduction of the quality of the rural landscapes due to the appearance of hybrid agricultural/industrial buildings that constitute the optimal in terms of flexibility and functionality, but disrupt the continuity of the traditional agricultural environment.

This work aims to propose an approach for the development of rural industrial facilities in dialogue and respectful of the qualities of the territory without renouncing to their functionality.

Through the analysis of the specificities of Langhe-Roero vineryard region, in-site collection of relevant data related with the topic and dissection of relevant literature focused on the qualities of the rural environment and their preservation, the study identified the reasons of degrade in the lack of attractiveness of the modern rural buildings, due their architectural qualities and built form and the lack of attention for their surroundings during the design phase.

After a first phase of exploration of different possibilities of intervention, a definitive proposal for an hybrid building have been developed. Through the development of a study project for a winery facility in the location of Torriglione, has been presented a scheme of approach to the design of modern rural buildings that focus on standardized elements and industrialization of the building parts to reach the maximum functionality but at the same time uses the attractiveness of the wine industry to raise up the qualities of the degraded area. The research driven design pointed out the importance of the transparency of the program from the exteriors of the building and its connection with the landscape, not only in a formal manner, but through the integration of the productive processes in the rural context. The cross-programming of the functions and the seamless integration of productive and visiting spaces, has been recognized as a key point of the success of the intervention.



*A “whole building design” approach is particularly useful in dealing with complex functions such as the ones related with specific industrial productions*

*The neutrality is reached when all the systems are integrated together in order to make sure they work in harmony rather than against each other*

*A building is an interdependent system, not the addition of site, structure, systems and function*



## **Introduction and motivations**

Industrial revolutions in the last and in the current centuries resulted in profound changes also in architectural typologies and aesthetics. Suddenly, appeared the necessity to develop spaces that could satisfy the specific requirements of the production and the machines used to carry them out. The pressure of modernization and the need of bigger and bigger factories that could remain flexible to future expansions and adaptable to new techniques, led to the diffusion of industrial sheds often designed disregarding aesthetics in favour of an extreme functionalism. A "smooth" Insertion in the landscape of this typology of buildings should be nowadays an imperative, especially in those areas where should be devoted particular care to maintain the continuity and the integrity of the characteristics of the territory, but this cannot keep the industry to go further or stop the progress.

The topic of this research and design task arises from the interest in investigating the relations in between the man, his work, the territory and the complex dialogue in between environment, landscape and industrial architecture. The choice of the wine-making production further permits to analyse the contrast in between modernization and architectural traditions and to try to respond to the issue of buildings that from one side need to remain traditional for the nature of their production and the context in which

they are located, but at the same time have the necessity to evolve and keep the pace of modernization. The recently named "UNESCO world heritage" vineyard territory of north-west Italy is took as an example of context where these two needs have to merge in a harmonious way to maintain the quality of the place and at the same time produce innovation in the field of wine-making.

The reason of the choice to treat this argument are multiple. In first instance, the connection with the preliminary research led together with the rest of the graduation studio brought me to develop a certain curiosity in the field of buildings designed with an holistic approach. The quest for a typology that allows to admix very different functions and requires specificities in terms of space requirements, building performance, appearance and spacial organization encouraged the further research in the field of the productive buildings, often related with nothing but themselves and to try to find a particular typology in which the relation with the surroundings, not only aesthetic but also functional, would have been a crucial point of the design. The modern winery is a typology still not completely explored and developed, it is difficult to identify a model, a scheme of approach to its design and this leaves open doors to new possibilities of approaching the theme and develop new solutions.

## **Methodology and scopes**

The research is developed through review of relevant literature regarding landscape and quality of rural environment, through the in-depth analysis of the site and its specificities with the aim of deduct some general thoughts about European vineyard landscapes. This preliminary research is completed by a more technical analysis of literature concerning the winery facilities and utilities design to gather the necessary know-how to lead the design part.

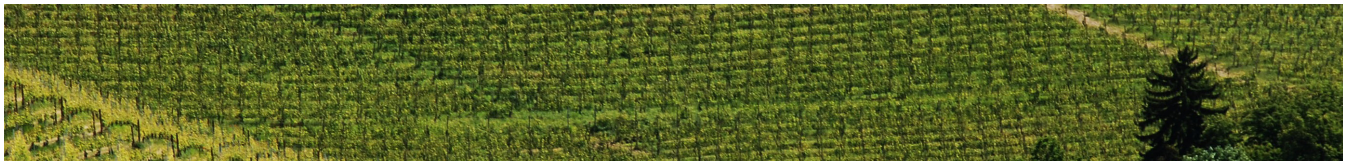
The main body of the work is related with the description of the design process in all its relevant aspects trying to formulate a model of intervention for the design of contemporary wineries by the principles of integrated design and the means of truly modern technologies. The finalities of this thesis work are in first instance the realization of a research driven design project, completed till the level of detailing and the production of a valid piece of literature containing some useful guidelines for the realization of rural industrial facilities that maintaining their production performance are visitor oriented and well inserted into the context.



*Implementation of smart building technologies and integral design approach as improvement of efficiency and performance of wineries in dialogue with a traditional territory*



*Merging modernized industrial buildings and traditional craftsmanship to support advancement and progress in winemaking*



*Producing efficient and technologically advanced buildings that are not creating aesthetic discontinuity in the traditional natural environment*



### Brief history of wine production in Piedmont

Wine production of Piedmont is deeply rooted in the past. First proofs of the domestication of the vines are dated back to 9th century BC when the region was inhabited by little barbarian communities mostly dedicated to hunt and agriculture. Major evidences of wine-making activities are to be connected with the successive presence of the Romans that together with the improvements of the techniques imported from the already advanced wine production of the central Italy, were making the cultivation of the grapevines more widespread in the whole Piedmont. New grape varietal were introduced.

The emergence of the characteristic landscape of Langhe-Roero is to find back to the Middle Ages, however we cannot say that the current situation is reflecting it completely. In this period the legal and political regulations and the strong relationship in between church transformed the wine production in a central activity. We can have the right size of the impulse given by the Church to the wine-making practice if we add to the normal personal consumption of the small clergy the need to ensure a regular supply of wine for holy functions and the awareness that wine also became a good for exchange between small local growers and the clergy in exchange for resources and tools to work the land. This growth in importance made appear the patchworked subdivision of the plots, subdivided in

medium-large and small ones but never exceeding the measurements of 3800 square meters ("giornata"). Direct consequence of the diffusion of the cultivation of grapevines was also the progressive abandon of the big urban centres of the valleys and the appearance of the hilltop settlements, more comfortable to go to work in the vineyards.

From these years are also the numerous castles, built by the rich landlords that were investing their money in the new and profitable wine-making activity. The presence of this architectural products in the landscape is having an high symbolic and identity value both for the medieval community and persists nowadays, being privileged points of observation to control the territory and elements to define the power and the predominance of a family over it. At the same time, in between churches and castles, the countryside of Piedmont was seeing the appearance of the *villenove*, clear urban settlements designed from scratch and symbol of the civic power. In late Middle Ages it was outlined the "landscape of power" that still today dots the countryside of Langhe-Roero and Monferrato, represented by the churches as a symbol of religious power, the castles dominating the uphill villages as a symbol of feudal power and the *villenove* as a symbol of civic power.

The modern age is characterized then by the general improvement of living conditions

in the villages on the hills, requalifying their mansions through scenographic solutions of great refinement. Wine cellars were becoming big and bigger because the possession of large quantities of wine meant a high social status. It is in this period that appears the concept of the building of production and aging as important mean of advertising the product. The wine producers were competing to build the nicest and appreciable production facility in the territory.

Other important fact to mention is the progressive change of the typology of properties of the land. The new management of the vineyards was splitting large plots into smaller lots usually distributed around one or more farms in order to subscribe an adequate number of rental contracts. This practice contributed in creating the mosaic landscape of the Langhe-Roero, unique in the world. We date to this age also the appearance of the typical small sheds in between the vineyards ("ciabot") used to store the harvesting tools. The architecture at the service of the wine-making growth in importance together with the edition of the first treaties of wine-culture, where were described techniques to improve the quality of the product and how the environment of production was influencing it. Lots of nobles where adapting their residence cellars to host the production of the wine till becoming more important then the farms themselves where it was only possible to find



the personal production of the farmers rather than the big one to sell. The upper-class became the thruster of the start of modern production of wine.

From the second half of 1800 the production of wine in Piedmont abandons definitely its medieval legacy characterized by the empirical approach to shift for a more scientific and organized one.

The landscape changes again, consequence of the new Napoleonic regulation that are releasing 66.000 hectares of land that permits to even small producers to acquire small plots to have a profit from the cultivation. The mosaic becomes more intense. Clergy and large estates disappear, killed by the tax burden.

New varietal of grape are planted in Piedmont, using as starting point the existing traditional cultures and because of this, the region can count on the most variegated presence of vines of specific denomination in the country. In this period are also appearing more structured framework aimed to rationalize the system of knowledge in the wine making field and the experimental vineyards like the Cavour castle.

The last fifty years of the century are extremely important to the development of most of techniques that are used still nowadays in the region. The radical shift in the production of wine has been consequence of a series of economical, social, agronomic, technical

and scientific revolutions that brought from the medieval one to the more modern wine science. But maybe the fundamental step in this change was the diffusion of the new diseases of the plants (phylloxera, peronospora, and powdery mildew) coming from the other side of the ocean. This three grapevines parasites forced the viticulturists to adopt new measures such as the use of chemicals, the grafting of weaker species on stronger ones and the replacement of traditional tree-lined supports (live supports) with vines supported by poles (dead supports) together with the use of iron wire instead of the traditional horizontal poles and rods that represent the current cultivation system and one of the main factors in the increase of the quality of wine.

According to a conventional periodization, we start to talk about modern viticulture from this period; in those years many experiments launched in the early 19th century were successfully completed or further perfected to face the onset of new parasitic diseases

Along the 1900 the wine production of Piedmont increased again, thanks to the constant raising demand, and the new possibilities given by the technologies. Great transformations in terms of production and productivity have been made and it is in this period that, as direct consequence of the second industrial revolution, that are appearing the first wine factories. The

century is characterized by a progressive specialization in the realization of the wine production facilities, to respond to the constant need for modernization. What we are witnessing nowadays is the legacy of the process that starting from the beginning of the 80s, gradually transformed wine and wine-making in a mass product, for which suitable facilities were needed in order to second the production.

The uncontrolled development of buildings suiting those needs brought to the appearance of those buildings not anymore in dialogue nor with the territory, nor with the production they are hosting.

### **Terroir and traditional production**

The terroir is the set of special characteristics that the geography, geology and climate of a certain place, interacting with plant genetics, express in agricultural products such as wine, coffee, tobacco and chocolate for example.

Terroir is the combination, consolidated among the centuries, of different factors that are characterizing the quality of a wine and making it directly recognizable geographical position, denomination, soil, climate, varietal, type of cultivation, type of vinification and ageing. The concept of terroir comes from the past, Greeks were already stamping on the amphorae of wine seals indicating the origin of the product, being aware of the deep differences in between the wine produced in one region or in another. The only Piedmont region counts at least 46 DOCG-DOC wine zones, including the well-known Barbera, Barolo, Barbaresco, Dolcetto and Asti Spumante. Piedmont is leading in Italy as the richest region in origin denomination wines. The character of a wine reflects not only what we can see and feel right now, but also the history of the place, mixed with the forces and the events that form its geologic and geographic heritage.

Wines from different regions have different tastes and qualities not only because of the different type of varietal employed for their production as one can believe. Factors such as the exposition of the vineyard and the quality of the air of the area are also very

influencing parameters on the ensemble of characteristics of the final product.

The physical side of the terroir, the one that can be actually objectively measured, is considering elements such as sun, rain, soil, wind and the way in which they are interfering with the plants. Sun ripens grapes, assuring the development of enough sugar to produce sufficient alcohol. Too much sun can lead to intense, often exaggerated characteristics such as excessive fruit flavours and high alcohol. Soil brings forward earthy, mineral qualities, and can produce excessive tannins. Soil that is too nutrient rich can produce too many stalks and leaves, leading to less than ideal ripening of the fruit. Fertile soil also leads to grapes with prominent vegetative, or herbal characteristics. Water in high concentrations can literally “water log” the grapes, lowering sugar content to inadequate levels to produce enough alcohol, and can lead to vigorous plants that produce fruit with herbaceous and vegetative notes. Moist air cushions the vines from excessive heat in the day and insulates against cold night temperatures, buffering the temperature differential and balancing sugar levels. Hot winds dehydrate grapes, leading to highly concentrated sweetness and tannins, lacking the acidity to balance it out.

It is traditionally in the hands of the winemaker the hard and complex task of choosing the right varietal and the right production

organization to develop a good product. Without the knowledge and the intuitions of a trained winemaker there is factually no wine.

This fundamental idea is the one that leads to understand the necessity of developing productive facilities extremely bounded to the territory and the specificities of the production

Some winemakers consider the grape as a mean to extract flavours from the earth. The connection in between the facility of production and its integration in the traditional context is arising directly from the fact that the production itself could not take place anywhere else then there.

### **The rural built environment**

Rural buildings play an important role in the connotation of the overall landscape context, combining agricultural production needs and functional requirements with various constraints thus pursuing crucial issues represented by aesthetic features and architectural quality. Agricultural buildings are the emerging product of the socioeconomic and technological issues and the conscious interpretation of cultural and landscape contexts.

Rural Buildings have undergone deep changes with the historical transition from traditional agriculture to industrial society. From an agricultural landscape based on rural settlements consisting in a whole built

complex in which the farm was reflected and embodied, intensive and specialized farming has led to banal and monotonous landscape structures where the link between crops and geographic context has become weaker and weaker.

The evolution of the technical approach, besides economic, production and geographic influences, has played a central role in determining the qualitative characteristics of rural buildings. Technical approach is more than just an expression of a specialist point of view, since it also reflects a broader social and cultural context. It is possible to actually consider rural building as an accumulation of empirical knowledge in which the aesthetic values are consequence of the union of simplicity and refinement, simple things that do not need any additional or decorative element. Rural architecture is the combination of art of architecture and science of agronomy. The juxtaposition of the functional parts of the agricultural building, the harmonious arrangement of the open and closed spaces are constituting the aesthetic value of it.

It is then clear that rural architecture strongly contributes to the production of the image of the agricultural landscape and it is a fundamental part of it. The quality of the landscape itself can be improved or impoverished by careful or not aware design. However "Preserving the various building

characteristics typical of the different regions is a good thing; but this does not mean that we should perpetuate exactly the same old types [...]. We must try to improve the farmer's house aesthetically" [D. Zucchini, *Nuove costruzioni rurali*, INEA, Roma, 1929].

In other words the reference to the traditional architecture of the place has not to be considered as dogmatic and the goal is not the reproduction of the past, rather the heritage of the context should be intended as a "huge dictionary of the construction intelligence of man, creator of abstract shapes and plastic inventions whose conception clearly related to land, climate economy and technology".

Nevertheless advancement of agriculture is necessarily based on building improvements, but there should always be a sense of proportion about economy and utility, not separated from the cult of beauty to avoid disaffection from land which would have led farmers to move into city under the false illusion of achieving better life standards. The boom of agricultural industrialization however brought to maximization of production thus causing the deep and rapid changes in the rural built system, while standardization and unification of building typologies allowed by technological innovations were somehow necessary and useful to improve quality and economy of the rural built system. The degradation of this built system due to the poor and irrational

use of industrial construction technologies brought consequentially to a loss of its traditional landscape integration.

The architecture of the place

With place is intended a very different meaning than the one of locality. Place is consisting of concrete things defined by materials, shape, texture, colours that united are forming the characteristics of the environment, the atmosphere. Atmosphere allows certain spaces, to embody very different properties in accord with the unique cultural and environmental conditions of the places which they exist, even if their functions are extremely similar. The object has then an unique conversation with its place, is not just an object itself but becomes part of an objectified environment.

The distinction of natural and man-made offers us the first step in the phenomenological approach but in the landscape of Piedmont the border in between man-made and natural appears blurry, it is not easy to distinguish anymore where the hand of human being stops and starts the untouched nature. Is it possible to dissimulate and dissolve the border in between outside and inside, the relationship in between earth and sky? It is therefore needed a strong character, an unique identity, a distinctive relationship with the landscape, the architecture has to add something, become part of the sum rather than maintain its character of mere addition.

## Winery design

Wine-making factories are playing a very important role in the determination of the quality of wine and its production costs. They can offer a central contribution in the realization of suitable micro-climatic conditions for the correct development of the processes of transformation, aging and conservation of the product, in the improvement of the safety and efficiency of the work, in the reduction of the energetic consumptions and in the creation of the hygienic conditions necessary to respect the norms and provide a competitive product.

Winery design is requiring in respect of other agricultural factory buildings, more attention and higher aesthetic qualities. The wine production process from one side has to offer to the consumer warranties (hygiene, production discipline) getting rid of some of the past trends derived from empiric procedures and not suitable with the modernization of the industry and adopting new technologies to improve the production efficiency and performance. On the other side it is needed to maintain the characteristic of typicality that are making the products unique and are distinguishing the high quality wines and that are often deriving from hand-crafted cures and artisan experience.

The production unit should at the same time second this two exigencies that most of the times are resulting to be opposite and provide flexibility and adaptability favouring the

future update of the spaces and endorse the eventuality of expansions of the production.

It is also important to consider that in the high quality productions architectural aesthetics and qualities of the buildings hosting the production in relationship with the context in which are inserted are contributing to the image of the wine itself and to the image that the brand is having on the market. The wine production factory is not anymore only an envelope in which the product is processed but a symbol that the product and the brand are carrying with themselves. To proceed with a conscious design it is necessary to consider the program of the production cycle that is strongly influencing the environmental needs (dimension, climate, hygiene, perception). It is also important to provide the correct disposition of the machineries and the systems hosted in the edifice, to optimize the process and minimize the costs reducing the possible wastes.

Is furthermore necessary to consider since the very phases of the design the presence in the area of conditions of advantage or disadvantage for the energy provisioning and the maintenance of the correct environmental aspects. The spaces of the wine-making factory can be subdivided in specific functional units: reception of the grapes, fermentation processes, elaboration and refining of the finished product, aging and conservation, packing and shipping.

### *Spaces for Reception of the grapes*

This spaces can be generally located in the exterior part of the building and are comprehending an area for the movement of the means of transportation, an area for the parking of the means of visitors and workers an area for the control of the quality and the quantity of the grapes, an area for the drop of the grapes and an area for the first processing of the grapes (crunching and de-grasping)

This spaces are usually presenting a very intense usage during the harvesting period but they become unused during the rest of the year. Forecasting the flexibility of these spaces for providing new functions along the rest of the year is therefore important.

In this area can also be performed the de-grasping procedure, avoiding to bring the waste inside the building. The first phase should also integrate some sort of small laboratory for the analysis of the grapes.

It is also important to keep in consideration the visibility of this area from the surroundings, the treatment of the ground and the facilities related with this zone should be accurately planned to harmoniously integrate themselves with the landscape.

### *Spaces for the fermentation processes*

This spaces are located in the interior of the building since the phases of the cycle of transformation of the wine are necessitating environmental conditions rigorously controlled. This specific part of

the production is determinative for the good results of the process. The area should have a constant temperature (never above 26 degrees). Other issue is the transferring of the grapes from the previous area to this one. From the crushing unit is possible to move the must via pump with the risk of damaging the grape skin and compromising the good results of the product, so it is preferred to locate the fermentation area in a level lower than the previous. Specific attention has to be given to the ease of the surfaces of this area to be cleaned and to the quality of the work environment, being the area prone to the human presence. From this area are coming out essentially two products, the wine and the marks that can be sold to distilleries for other production.

#### *Spaces for the elaboration and refining of the finished product*

The wine coming from the fast fermentation process (that in total is 60% of the weight of the total amount of processed grapes) is then sent to the spaces where the second fermentation (so called "slow") take place. This spaces have to be designed with attention to the presence of workers that are taking care of the various moments of transfer of the wine from one vase to the other (racking). This area can be equipped with different typologies of wine tanks that are produced in different materials and shapes. Adopting the most recent stainless

steel ones gives the possibility to regulate the temperature of each single container instead of provide a precise system of temperature conditioning to the whole space.

#### *Spaces for aging and conservation*

The space for the ageing is requiring the most accurate design of the system that controls its environmental conditions. The good results in the wine production are strongly depending from the quality of the environment and the container that is conserving it. For specific productions that are considering ageing systems in barrique, in barrel or in bottle it is extremely important to have a precise system (active or passive) to regulate the micro-climate of the storing space. The storing space should have a constant temperature comprehended in between 12 and 14 degrees (for red wines), a relative humidity of 80-85%, air speed constant and not superior to 1m/sec. It is also important that the illumination of the room not reaches values higher than 250-300 lux.

Being the most energy expensive spaces, it is needed to adopt technical solutions addressed to the reduction of the costs of maintaining constant micro-climatic conditions. Hypogeal spaces with high thermal inertia and employment of renewable energy sources are particularly indicated for this part of the process.

#### *Spaces for packing*

After the aging process the wine is ready to be bottled and commercialized. It is necessary stabilize the product via thermal treatment. The bottling unit is preferably located in the surroundings of the aging areas and has to grant the maximal hygienic conditions. The area is characterized by elevated levels of noise caused by the glass for which is necessary to take the adequate precautions (as sound-absorbing panels and buffers). Representative spaces and presence of visitors.

### **The vineyard landscape of Langhe-Roero**

The vineyard landscape of Langhe-Roero and Monferrato represents a unique example of a cultural environment emerging from interaction in between man and nature since more than 2000 years. This interaction has since always been connected with wine-making, where the natural profile of the hills and the artificial disposition of the vineyards, the top hill rural settlements and the ancient farmhouses create an harmonious contrast in between pristine and humanized environment that characterizes deeply the area.

The property has preserved the close physical, visual and functional relationship between human and natural environments, thanks to wine production practices, developed with an eye on continuity and innovation, which have warranted the conservation of numerous material artefacts on the site: vineyard areas, settlements, infrastructural network and buildings which still define a unspoilt system in all its components. [UNESCO] Nevertheless the preservation of the characters of the area is tied also to the presence of historic artefacts such as dispersed rural settlements and farms, the reuse and conservation of which should be encouraged but in the same way, the tendency to imitate and produce historical false to not create discontinuity to the architecture typical of the area results

to be a complete mistake. The concept of authenticity of the area should be interpreted as a dogmatic rule to not produce architecture strictly inspired in its aesthetic qualities, to the one of the past. Rather the way of intervene on the place should aim to not interrupt the innovation and the development of the wine sector and stand as an avant-garde over the other wine territories.

### **Choice of the location**

The first step of the design process focused on the quest for an adequate plot in the landscape of Piedmont region.

The characteristics needed to carry out the project are the ones of a plot that being fully inserted inside the UNESCO territory, presents elements of discontinuity, degradation, disruption of the landscape and in overall are responsible of lowering down the qualities of area.

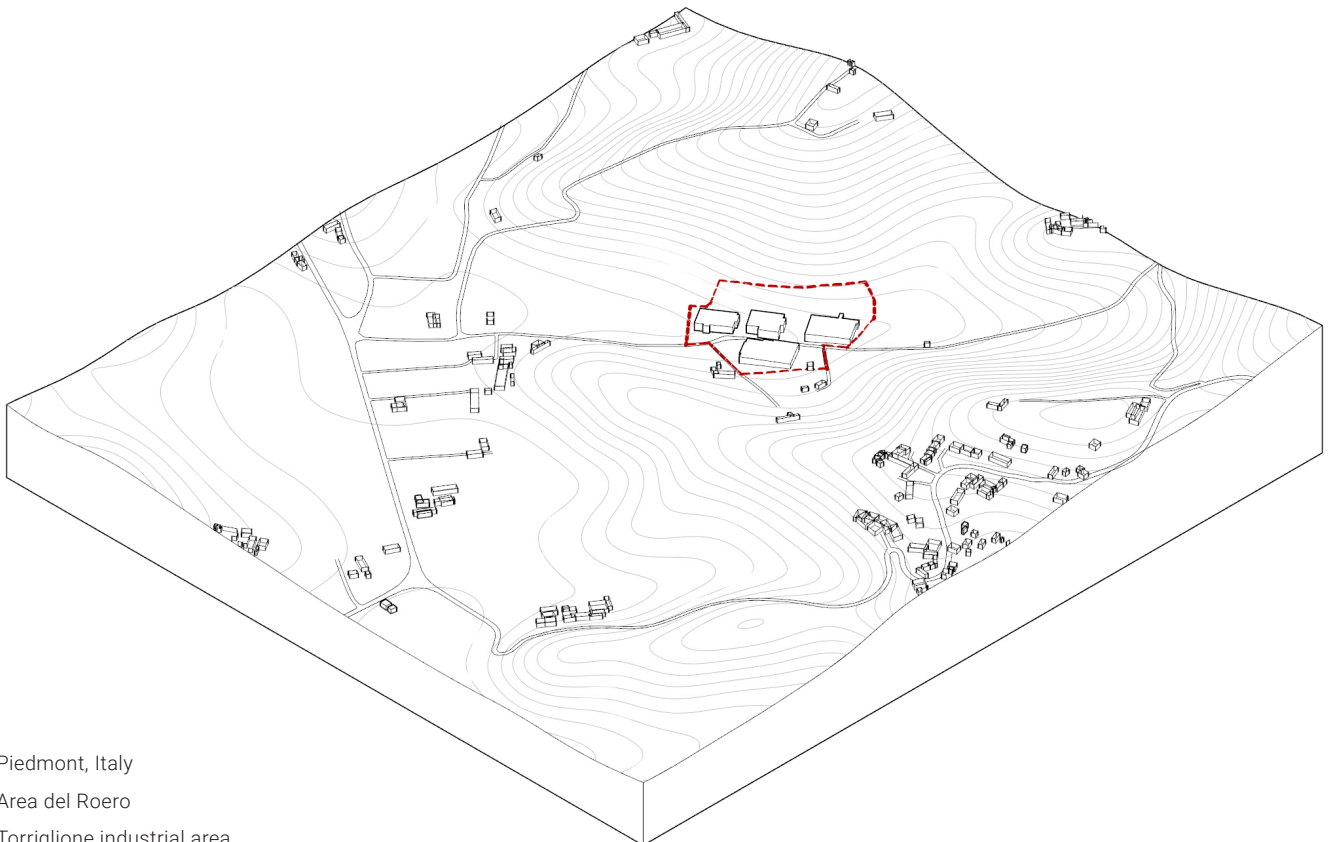
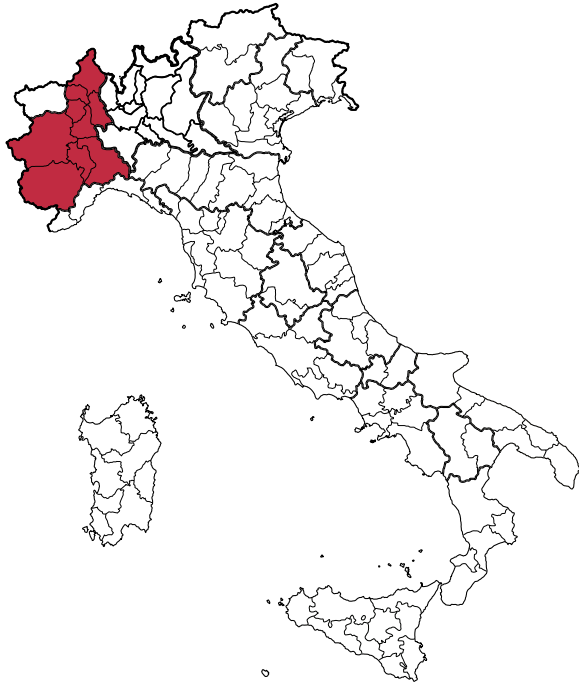
The first crucial decision has been to limit the search to the area of Roero, being this one the most tourist-oriented and frequented by travellers.

The search has been conducted primarily through the Google Earth platform, starting from the analysis of the satellite views of the UNESCO heritage areas and trying to identify the patterns of continuity in the parcelling of the fields. The search has been then reduced to the area of the village of Barolo, identifiable

as the epicentre of the tourism in the region and characterized by an high concentration of new interventions related to wine production and wine history. A qualitative research on the area aimed to spot the elements of interruption of the continuity of the mosaic-like parcelling brought to individuate the big area of Torriglione,, a visible and distinguishable gap in the patchwork of the fields.

After this first phase, has been carried out the research of information related to the buildings already present in the area and their function, through the GIS data available from the administration offices of Piemonte and the collection of street views to perform a qualitative analysis of the perceptive impact of the built environment of the plot.





Piedmont, Italy  
Area del Roero  
Torrione industrial area

## Characteristics of the site

The industrial area of Torriglione is a plot of about 30.000 square meters located in between the rural urbanizations of Annunziata, La Morra and Castiglione Falletto. The actual situation is the result of a conversion of the agricultural terrains to mixed use zones hosting factory buildings.

The existing buildings are presenting themselves as generic industrial sheds, averagely opaque and extended from the northern side to the southern one of the area along a 12 meters wide road that gives access to the plot from the southern side.

Objectively the buildings are looking anonymous, the continuity of the façades and the lack of apertures make impossible to understand which kind of production is led in their inside. The first thought relates with the quality of the façades, the materialization of which is very important to provide a visual connection with the context. The covered surface for each of the existing buildings is around 2000 square meters, the treatment of the 5th façades is not taking in consideration their visibility from the above hills and the surrounding situation. The composition of the exterior spaces is almost completely missing green areas and the most of them is destined to parking areas. It is visible how the lack of greenery contributes to disrupt the continuity of the landscape, since the perception of the environment from outside the area to inside

the area changes abruptly. The vineyards disappear to leave place to two rows of fences and 10 meters of height sheds.

After the nomination of the site to UNESCO World Heritage, the area has been subject of little work of cosmetic redevelopment such as the repaint of the façades with palettes of colours considered more suitable for the environment and plantation of rows of trees in front of the built façades. The biggest problem is the scale of the built fabric, the size of the buildings is not in line and not harmoniously merging with the surrounding context and requires to be redesigned. In second instance the typology of buildings does not permit enough connection in between the natural environment and the buildings themselves and moreover does not consist of an interesting point of attraction able to populate the area with visitors but rather constitutes a dead end for the surroundings, a cul-de-sac that leads to nowhere.



## A TRULY MODERN WINERY | **CHARACTERISTICS OF THE SITE**



Up: entrance to the plot (1)

Middle: typological industrial building (2)

Down: existing winery (3)

## Strategy and approach

The change of typology of rural buildings started in the eighties and continuing till now, arises from serious needs of modernization due the growth of the production. It is therefore necessary to develop models of intervention that are respecting the qualities of the place and its essence

The last trends are seeing big wine producers moving their factories faraway from the places of the tradition to leave there the only showrooms, shops and sometimes the ageing cellars. This phenomena brings to a first radical and dangerous change in the nature of the place itself, that from a working site becomes just a fake open-air museum.

On the other hand, the poor attention in realizing factories that are too function oriented generates a diffused degradation of the aesthetic quality of the rural landscape. The main idea is creating nor a factory nor a representative building but rather an hybrid, a truly functional and rationalized factory that integrates seamlessly visiting spaces. Only in this way it is possible to produce an industrial architecture that from one side responds to the needs of a modern factory and from the other creates a point of interest for the tourist and does not disrupt the protected landscape. As first step of the design process, a total redevelopment of the site has been proposed in order to achieve a clear and neat area of intervention.

Showing the process, creating a continuity in

between the interior spaces and the exterior ones has been recognized as key point to connect the production to its surroundings.

As second element of the design attitude has been placed the search for maximum clarity open and transparent building becomes then the connective ring in between the elements of the landscape, the visitor and the product itself.

Third element of the adopted strategy is to involve as much as possible the visitor, the potential client. Consequentially it is needed a full range of tourist oriented functions. The relationship between the product and the food in this case facilitate the integration inside the factory of a restaurant in which is possible to taste traditional products from the region. Thanks to that the factory becomes more desirable place to visit. In addition, the possibility to visit entirely the factory and to enjoy the wine tasting directly from the aging cellar constitute certainly added values.

In parallel to the cross-programming of the functions, has been paid particular attention to the standardization and the flexibility of the building.

The forth idea lying behind the project is the search for a light construction that allows very different possibilities of configuration of the inside spaces, as required by modern industries. The materialization of the project has been carried out taking in consideration maximum standardization and

possibilities of prefabrication aimed to faster constructive time and reduction of costs. The attention to possibilities of different standardized building system makes of the project an example of alternative solutions to common problems.





image courtesy of: [nature.desktopnexus.com](https://www.nature.desktopnexus.com)

## Building underground

In a region of keeping the language of the traditional vernacular architecture a clumsy imitation of the past and the insertion of new contemporary architecture could only risk to interrupt the continuity of a protected landscape. Is it possible, through a correct distribution of the underground spaces, to limit the impact of the building on the above level on the territory respecting its aesthetic and natural qualities?

Furthermore, the depth of the earth has been along the centuries considered as the best environment for wine conservation, thanks to its insulating properties able to maintain temperature and humidity constant along the whole year. Wooden barrels are getting particular advantage out of this condition. Hypogeal architecture answers at the same time to a functional need constituted by the conservation and ageing necessities of the wine production and to an ecological one, giving the possibility to literally merge with the landscape and reinterpreting the relationship between man and nature, from dominance to a dialogue. Building underground firstly limits the amount of surfaces that architecture subtract to nature, reducing the percentage of impermeable soil and merge itself as least as possible in the terroir. In wine production the advantages of keeping part of the production underground are related with quality of the product, reduction of the economical impact of climate control systems and sustainability

of the construction.

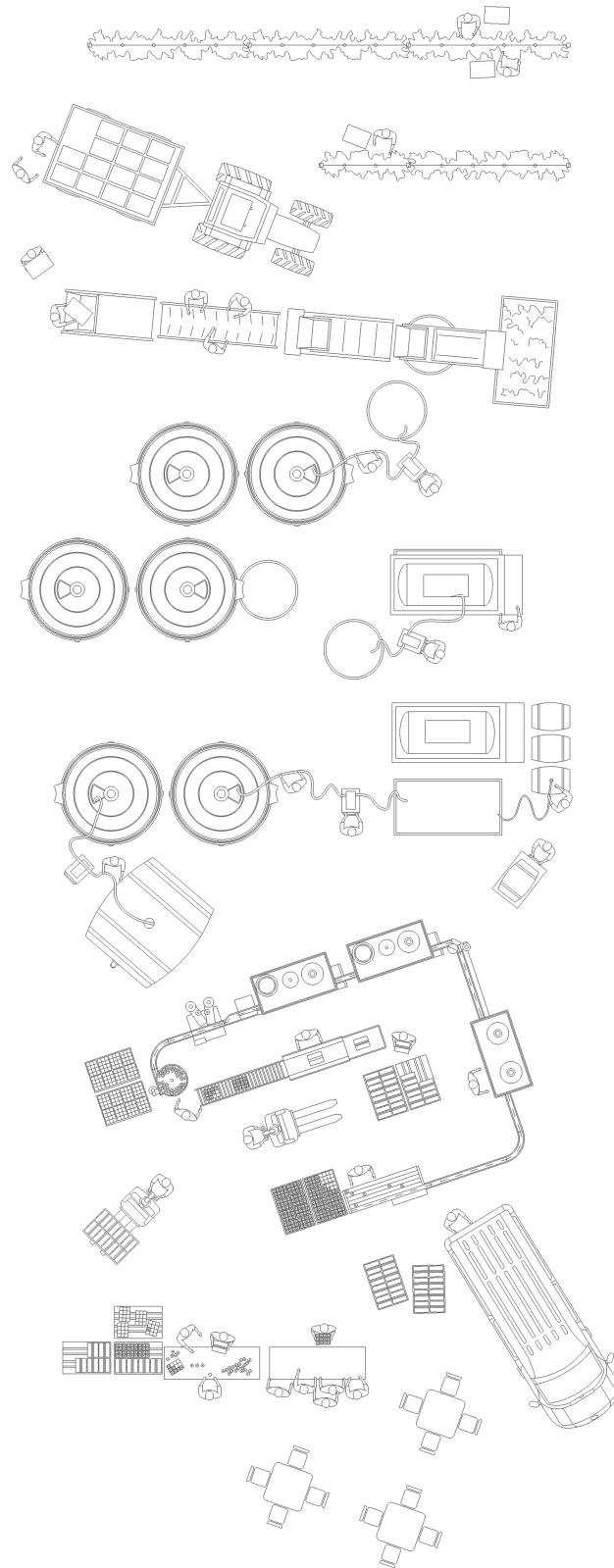
The 80s and 90s brought, on the wave of the economic growth, to the uncontrolled built of valueless industrial sheds that are responding perfectly to the needs of the production not considering the importance of the preservation and the respect of the surroundings' aesthetic qualities. Due to functionalism and costs of construction, during the 80s the idea of giving to the modern wine factories an underground space to conserve and age the product has been almost completely abandoned preferring one-level organization of the utilities and to locate the barrels in the same spaces of the fermentation, requiring both more surface above the ground and more effort to keep the storing conditions ideal for the product.

It is possible through the help of elevation systems and piping opportunely located, to provide the facilities of wine production of the right functionalism and to maintain the production flow uninterrupted even having an underground cellar of big dimensions. Furthermore the presence of a cellar area, an underground hiding space, creates a sense of mystery around the building that attracts the visitor pushing him to discover what lays below. Locating part of the visiting program underground results in a new way of living the production space projecting the visitor in the centre of it and not anymore only as a visitor, but as a user.

## The process

Wine production, from grape to bottle, is defined by two very important steps, the life in the vineyard, where the grapes are gaining their characteristics and the process of vinification. This is where the grapes are manipulated by the winemaker in order to maximise the quality of the end product. Traditionally in Piedmont the harvest is manual, due to the configuration of the territory that is not allowing the employment of big machineries and because of the special tradition that characterizes the region and that ties it to not abandon the good habits. To the harvest, that usually happens in between October and November, follows the fermentation. For red wines, the must of the grapes undergoes fermentation together with the skins. Fermentation yeast is added which converts the sugars into alcohol. The "free run" wine is pumped off and the skins are pressed to extract more flavour. Then a second fermentation takes place, converting malic acid into lactic acid, which gives the wine a softer taste. If a wine is destined for oak ageing, it is transferred to the barrels through pumps. After two years of aging in cellar at controlled and constant temperature, the wine is ready to be bottled and again, if required by the variety, to spend another year (or more) in the cellar for the bottle aging. Finally the product can be packed if not already and shipped to the final user through the distribution channels.





The sequence of the wine making process

## Roads and parkings

On a macroscale level, the area has been completely redeveloped. The decision to demolish the four existing buildings comes from the evident maladjustment of their typology to the characteristics of the environment. A simple refurbishment, or cosmetic treatment as the repainting of the perimeter walls demonstrated to be not enough to change the perception of the place, it is consequentially needed, in order to requalifying the area, to refunctionalize the entire plot.

The wide road leading to the area has been left untouched by the intervention and used to distribute the circulation around the building. The shape of the building itself creates two main paths that are bringing back the natural parcelling of the plot and re-harmonizing the scale of the land areas. All the terrain set free from the previously existing buildings is given to new vineyards that are surrounding the new facility. As part of the program requires and as answer to the problem of the big amount of ground removed from the area to dig the future cellar, an intervention of earthscaping with the is used in order to create an artificial hill and give repair to the employees parking lot located on the northern side of the area. An underground parking lot for the clients of the facility is gonna be located in between the two access roads, underground and covered with vineyards. A third parking area is gonna be placed in the southern area and used by

the staff of the restaurant and to store the waste containers, being close to a service road that can accommodate the passage of the garbage trucks. The organization of the roads around the building permits to separate clearly the access for the visitors, the first road coming from south, and the one for the workers, the second one. Furthermore the working access permits to arrive directly to the work pad where to discharge grapes or load the trucks with the finished product and to go away using the same road and without the need of changing direction.

## Building

After resubdividing the plot in 6 smaller areas, the building finds place in between them, aligned with the main road and with a with a set back of 100 meters from it. The entire block sinks in between the new vineyards, divided by them by a strip of 6 meters of white gravel. The access roads, one pedestrian and the other practicable by cars are passing through the plants creating a buffer from the rest of the environment and the facility and offering a unique experience to the visitor. The orientation of the building, exposed on the longest sides east-west is particularly well suited for the underground aging cellar, that suffers big changes in temperature if exposed to north.







|                          |                        |
|--------------------------|------------------------|
| PLOT AREA                | 5.03 ha                |
| BUILDING AREA            | 2447.65m <sup>2</sup>  |
| TOTAL VOLUME             | 21483.08m <sup>3</sup> |
| TOTAL USAGE AREA         | 5949.96m <sup>2</sup>  |
| -1.00 UNDERGROUND LEVEL  | 2270.56m <sup>2</sup>  |
| +0.00 GROUND FLOOR LEVEL | 1755.81m <sup>2</sup>  |
| +1.00 ROOF DECK LEVEL    | 1923.59m <sup>2</sup>  |
| A VISITING               | 2797.18m <sup>2</sup>  |
| B PRODUCTION             | 3152.78m <sup>2</sup>  |
| WINEYARDS AREA           |                        |
| EXISTING                 | 0 ha                   |
| PLANNED                  | 3.32 ha                |

# A TRULY MODERN WINERY | MORPHOLOGY

## Morphology

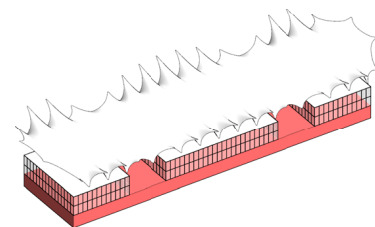
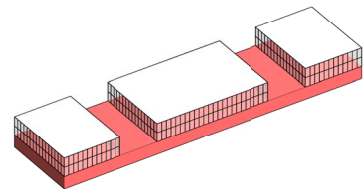
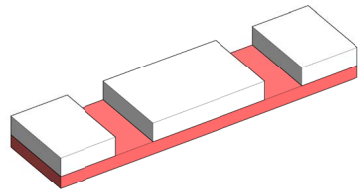
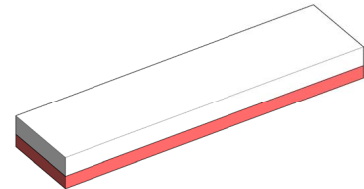
The building's logic is consequence of a simple iteration. The initial pure geometry is composed by an outstanding straight volume hosting the production and an underground cellar giving space to the storing and aging of the product. The shape is cut in three parts to leave place in one of them to the visiting area on one side and to the administration offices on the other. This iteration permits to create two passages in between the sections, functional areas for visiting access and covered working space open air. The volumes are then covered with glass to reach the maximum clarity and transparency.

The main utilities of the building are collected into independent boxes following the principle of "building within the building". The process is fully visible and the building becomes readable as specific productive space. As final step an overhanging lightweight roof is added on top of the building, functioning both as heat shield for the production areas, and covering for the rooftop, hosting restaurant terrace and space for events and constituting an interesting standing point on the valley.

The building consists of a basement, a ground floor and a walkable roof deck covered with a membrane tensile structure. The total height of the main volumes is 6 meters, to which are added other 6 meters for the tensile roofing.

The measurement of the east-west side is kept constant to allow the maximum standardization of the structural grid and

measures 24 meters. The side blocks are measuring 18 meters and the middle one 36.



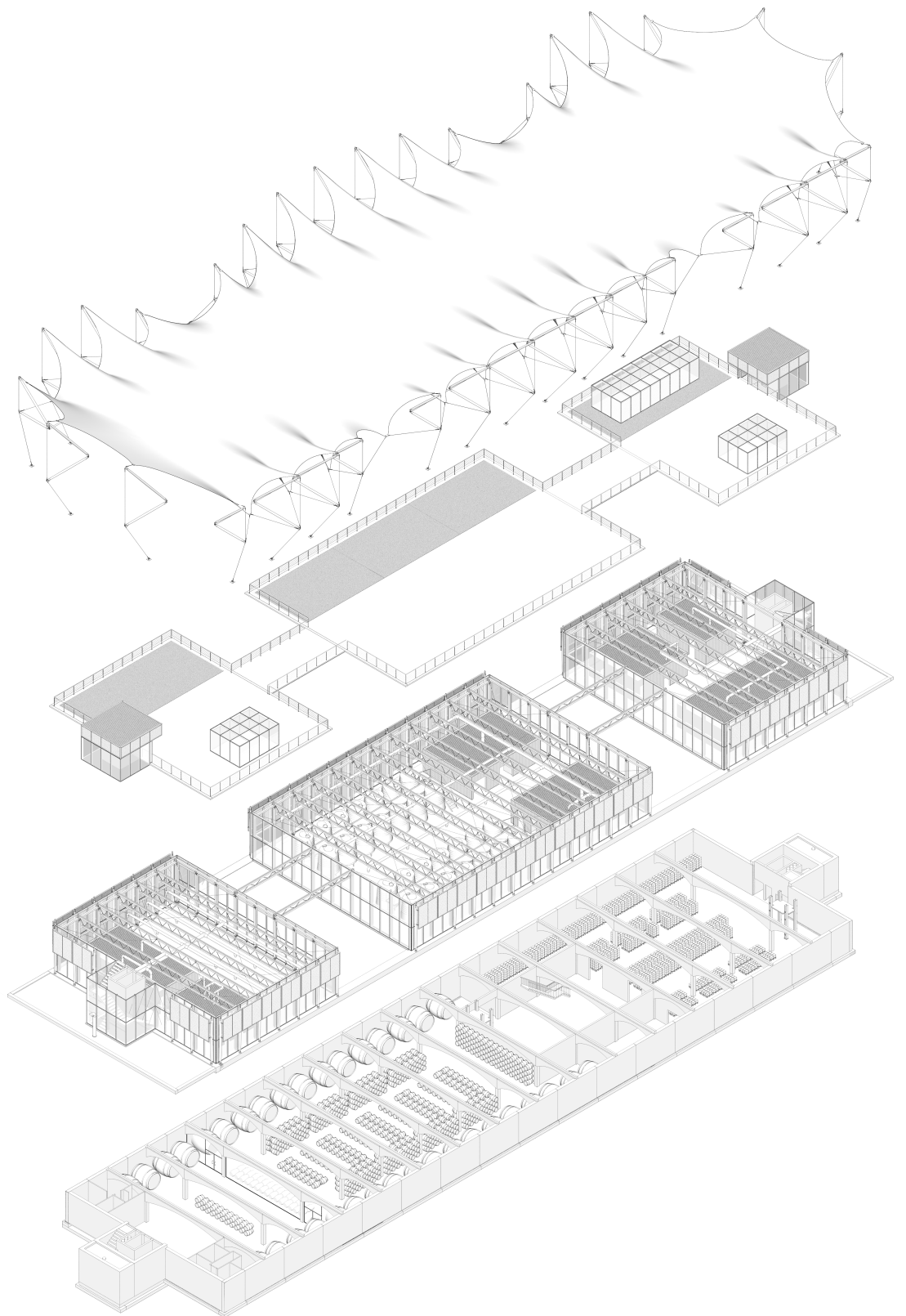
Stage 1: simple volume

Stage 2: double split

Stage 3: transparency

Stage 4: covering





Roof  
Roof deck level  
groundfloor level  
underground level

# A TRULY MODERN WINERY | PROGRAM

## Ground Floor

The main production space is maintained as simple as possible. It occupies the central section of the building, where the first phases of the wine-making process are taking place. A covered service road (12 meters wide) leads to the entrance of the 36 meters wide central unit and offers a repair to receive the grapes, transported by agricultural machines in small quantities a time as required by the traditional hand-harvesting process. Here can be mounted a flexible sequence of machines: a hopper, a selection table, a conveyor belt and lastly a destemmer/crusher. This particular configuration permits to get rid of the first wastes of the production, the stems, without them enter the interior spaces and reducing the necessity of cleaning afterwards. When not needed, the sorting line machineries find place inside the building on a wide depot equipped of reparation table and accessible by the workers. This sort of flexibility permits to enclose the machineries once the harvesting period (usually in between October and December) is over. The inside space is divided in three main parts, two enclosed in separate boxes and one constituted by the big open space. After the selection and the crushing the destemmed grapes are moved to the presses if white wine or to the fermentation vats if red. The press room and barrel filling space occupies entirely one of the boxes and hosts two pneumatic membrane presses to differentiate red and

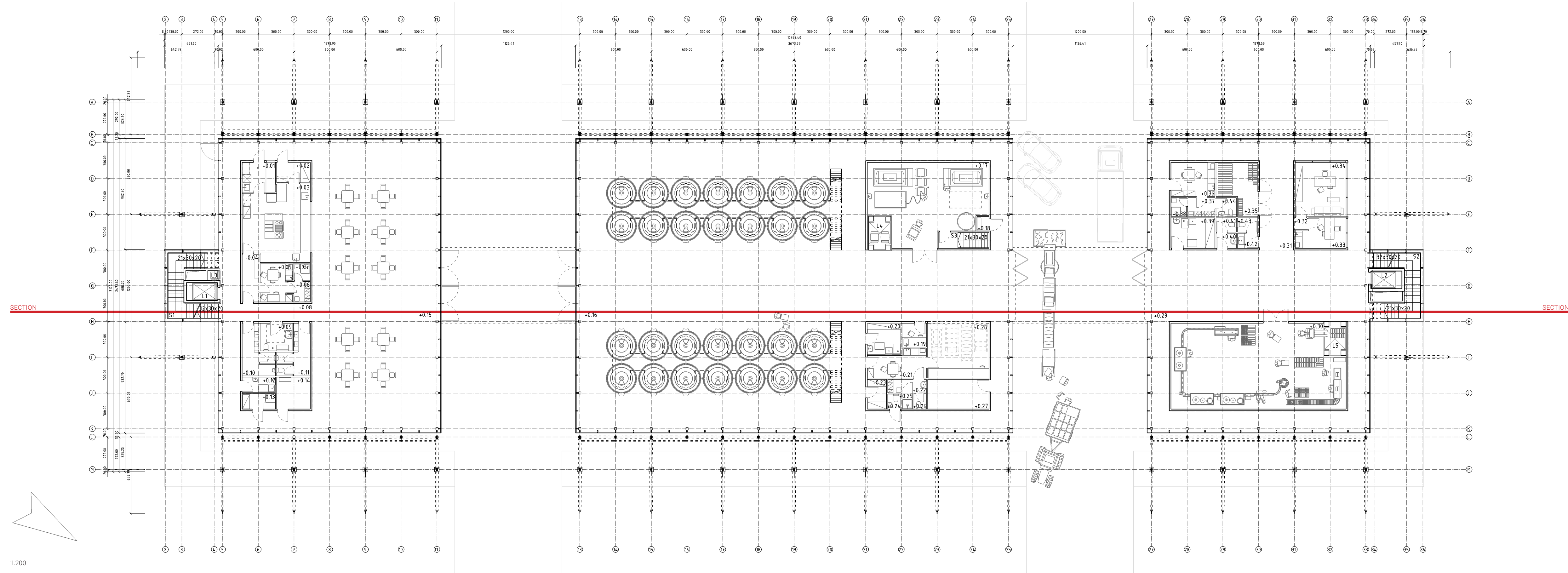
wine line without interferences. Integrated in the same space is possible to find a service elevator used to move the barrels from cellar to ground floor and vice versa. This organization permits to move the wine gently from one floor to the other without making it flow through long pipes.

The fermentation space hosts 28 stainless steel vats of 150 HL disposed on two independent steel catwalks and are able to host 320 tons of must and produce 250.000 bottles of wine per year. The vessels are provided with an internal system for controlling the temperature and consequentially can be freely moved in the space in different configurations. The second inner box hosts, together with the deposit for the selection line mentioned before, a big maintenance room where the utilities to clean the vats and the fermentation area are kept, a laboratory used to control the quality of the product during the phases of the production, a staff room where the workers can rest and change clothes and an additional toilet. A big room is given to the machine room that hosts the separate air handling unit that treat the air to filter the exhalation of carbon dioxide produced during the fermentation. On the other side of the access road, the Southern block hosts in one box the facility for the bottling and the packaging, served by an industrial elevator and a central free space for easing the procedures of load / unload of

the trucks.

On the western side of this block, other two boxes are hosting the administration spaces, two offices for owner and personal manager. Both the spaces are equipped with big glass windows that are enjoying an exclusive view on the surroundings. In the second box additional workers facilities are located to serve those working at the bottling line.

The third glass box, on the southern side of the facility, is hosting the restaurant. Here is where the visitor can access the building through the main entrance under the upper deck bridge and start his tour through the other floors, or just stop to taste a bite at the restaurant. The dining room is located directly inside the glass box, allowing to enjoy the wooden structure and the installations that are visible under the roof. The treatment of the surfaces is the same as the rest of the facility to maintain the industrial feeling even in the visiting areas. All the functions of the restaurant are enclosed again in the boxes and a little gap in between those last is letting notice the presence of the staircases and the elevator leading to the other levels. Inside the boxes is integrated a fully equipped kitchen with window view over the dining room, maintenance and storage rooms, toilets, a private area for the employees. The block is having an additional entrance reserved to the staff on the south-western corner.



|  |                            |
|--|----------------------------|
| +0.00 GROUND FLOOR LEVEL               | 1755.81m <sup>2</sup>      |
| <b>A VISITING</b>                      | <b>408.49m<sup>2</sup></b> |
| S1 STAIRCASE                           | 19.33m <sup>2</sup>        |
| L1 LIFT                                | 4.05m <sup>2</sup>         |
| L3 MICRO LIFT                          | 0.72m <sup>2</sup>         |
| +0.01 DISHWASHING                      | 7.00m <sup>2</sup>         |
| +0.02 COOL STORAGE                     | 4.76m <sup>2</sup>         |
| +0.03 KITCHEN                          | 34.10m <sup>2</sup>        |
| +0.04 CORRIDOR                         | 5.60m <sup>2</sup>         |
| +0.05 STAFF ROOM                       | 8.02m <sup>2</sup>         |
| +0.06 LOCKER ROOM                      | 2.93m <sup>2</sup>         |
| +0.07 SHOWER                           | 1.82m <sup>2</sup>         |
| +0.08 PASSAGE                          | 8.82m <sup>2</sup>         |
| +0.09 TOILET                           | 6.28m <sup>2</sup>         |
| +0.10 SANITARY (MALE)                  | 8.95m <sup>2</sup>         |
| +0.11 SANITARY (FEMALE)                | 8.95m <sup>2</sup>         |
| +0.12 MAINTENANCE                      | 3.57m <sup>2</sup>         |
| +0.13 LAUNDRY STORAGE                  | 3.64m <sup>2</sup>         |
| +0.14 DRY STORAGE                      | 7.49m <sup>2</sup>         |
| +0.15 DINING ROOM                      | 296.56m <sup>2</sup>       |
| <b>B PRODUCTION</b>                    | <b>918.24m<sup>2</sup></b> |
| +0.16 FERMENTATION AREA                | 772.57m <sup>2</sup>       |
| L4 GOODS ONLY LIFT                     | 5.39m <sup>2</sup>         |
| S3 STAIRCASE                           | 5.01m <sup>2</sup>         |
| +0.17 PRESS ROOM                       | 60.10m <sup>2</sup>        |
| +0.18 MECHANICAL ROOM                  | 4.10m <sup>2</sup>         |
| +0.19 LABORATORY                       | 4.10m <sup>2</sup>         |
| +0.20 MAINTENANCE                      | 7.28m <sup>2</sup>         |
| +0.21 STAFF ROOM                       | 10.64m <sup>2</sup>        |
| +0.22 LOCKER ROOM                      | 3.74m <sup>2</sup>         |
| +0.23 DRY STORAGE                      | 4.00m <sup>2</sup>         |
| +0.24 TOILET                           | 1.38m <sup>2</sup>         |
| +0.25 SHOWER                           | 1.22m <sup>2</sup>         |
| +0.26 TOILET                           | 1.37m <sup>2</sup>         |
| +0.27 MECHANICAL ROOM                  | 12.88m <sup>2</sup>        |
| +0.28 MACHINERY DEPOSIT                | 24.46m <sup>2</sup>        |
| <b>C PRODUCTION AND ADMINISTRATION</b> | <b>429.08m<sup>2</sup></b> |
| +0.29 WORKING SPACE                    | 196.84m <sup>2</sup>       |
| +0.30 BOTTLING AREA                    | 102.49m <sup>2</sup>       |
| L5 GOODS ONLY LIFT                     | 5.39m <sup>2</sup>         |
| +0.31 PASSAGE                          | 21.19m <sup>2</sup>        |
| +0.32 CORRIDOR                         | 1.15m <sup>2</sup>         |
| +0.33 SECRETARY OFFICE                 | 9.69m <sup>2</sup>         |
| +0.34 OWNER'S OFFICE                   | 19.46m <sup>2</sup>        |
| +0.35 STORAGE                          | 12.87m <sup>2</sup>        |
| +0.36 STAFF ROOM                       | 10.47m <sup>2</sup>        |
| +0.37 LOCKER ROOM                      | 3.64m <sup>2</sup>         |
| +0.38 SHOWER                           | 2.08m <sup>2</sup>         |
| +0.39 MAINTENANCE                      | 9.37m <sup>2</sup>         |
| +0.40 VESTIBULE                        | 2.13m <sup>2</sup>         |
| +0.41 TOILET                           | 2.04m <sup>2</sup>         |
| +0.42 VESTIBULE                        | 2.13m <sup>2</sup>         |
| +0.43 TOILET                           | 2.04m <sup>2</sup>         |
| +0.44 TOILET                           | 2.72m <sup>2</sup>         |
| S2 STAIRCASE                           | 19.33m <sup>2</sup>        |
| L2 LIFT                                | 4.05m <sup>2</sup>         |

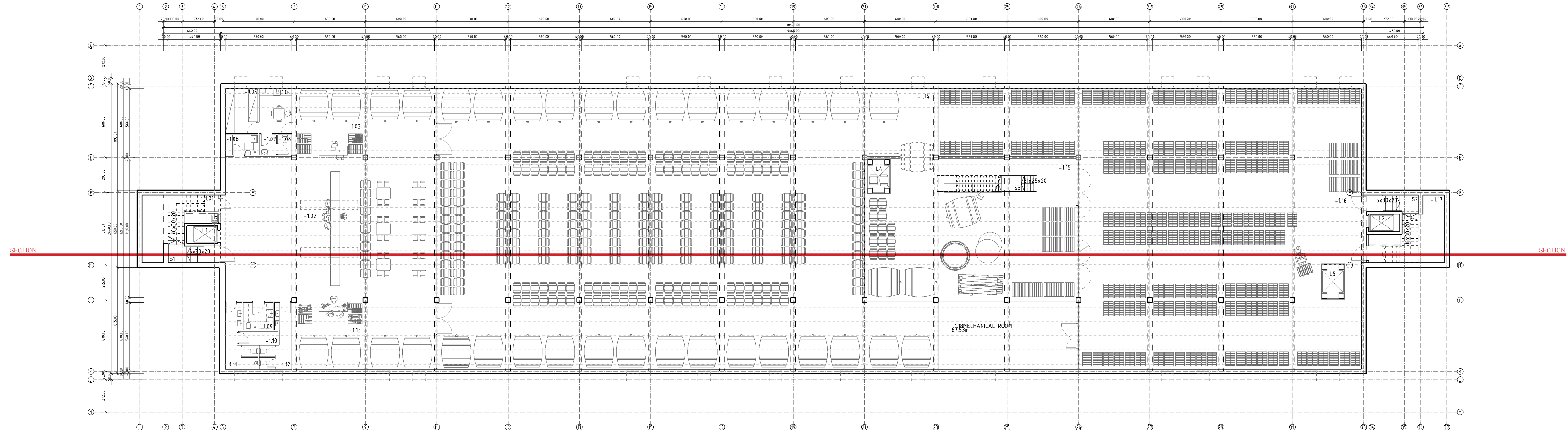
# A TRULY MODERN WINERY | PROGRAM

## Underground floor

From the upper floor, after the fermentation process is over, the wine maker can send to the cellar the product for aging. Here, barrels are stored around the service elevator that is used to move them up empty and bring them down as filled up. In the cellar the wine is stored in the aging room where will stay for the next 2 years. This area has the most strict requirements in terms of climate of the entire facility. From here the choice to locate it under the ground level, where the earth works as natural insulation and protect the wine from changes of temperature, humidity and vibrations. The capacity of the barrel storage is of approximately 600 barriques, even more if stacked multiple times, and can be loaded with 36 big barrels (botti). Immediately next to the barrel cellar it is possible to find the bottle aging section. Here the finished product, already bottled, is sent to age more and get ready to be sold. The organization of the underground storage depends on the lift that brings from the above floor the boxes coming out from the bottling line. The cellar level hosts also a little workshop for mounting and repairing the big barrels, that for transportation needs are arriving in pieces to the facility. The space is connected with the above floor by a concrete staircase arriving into the pressing room. On the side of the workshop there is a mechanical room space, having an independent climate control system and the main plumbing of the

building. On the opposite side, right under the restaurant, another visiting area is organized. Here the visitor can enjoy wine tasting and through a glass from a close point of view observe the entire cellar. A removable selling point is giving the possibility to buy products or to just ask for the menu and receive food from the kitchen upstairs. In this area are also localized the facilities for the workers and public toilets



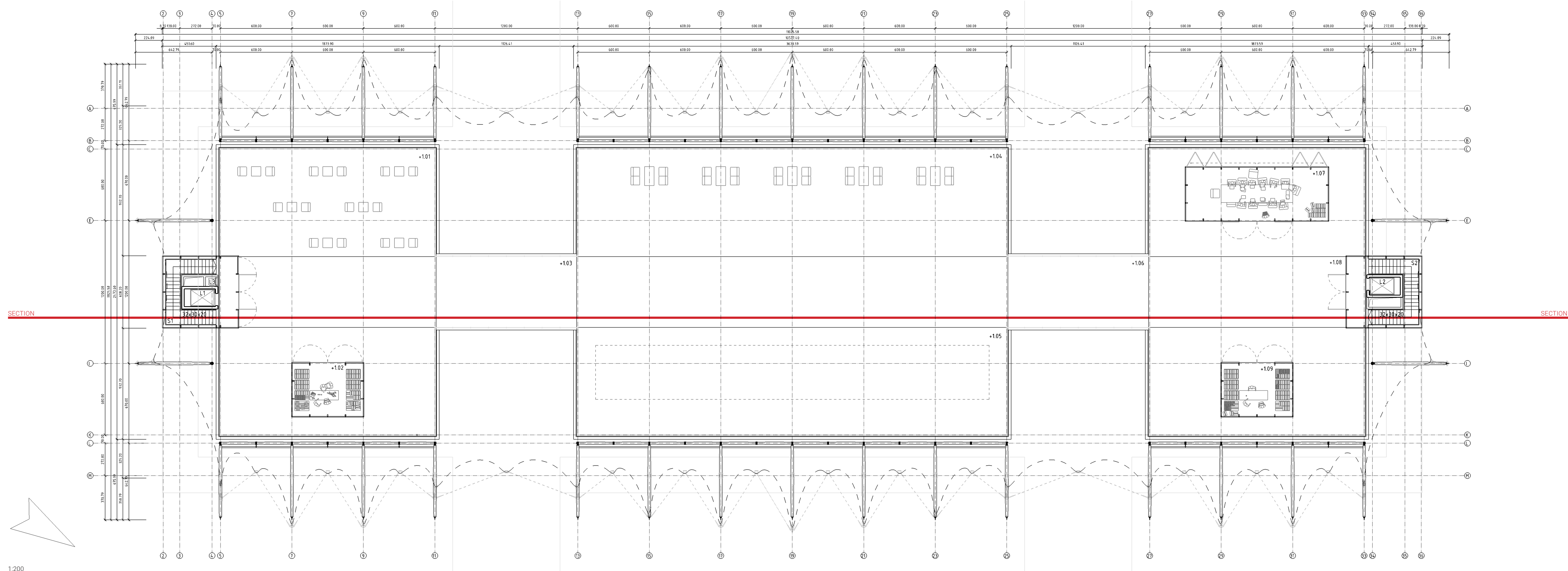


|                           |                             |
|---------------------------|-----------------------------|
| -0.00 UNDERGROUND LEVEL   | 2270.56m <sup>2</sup>       |
| <b>A VISITING</b>         | <b>465.10m<sup>2</sup></b>  |
| S1 STAIRCASE              | 19.33m <sup>2</sup>         |
| L1 LIFT                   | 4.05m <sup>2</sup>          |
| L3 MICRO LIFT             | 0.72m <sup>2</sup>          |
| -101 MECHANICAL ROOM      | 23.40m <sup>2</sup>         |
| -102 TASTING AREA         | 277.84m <sup>2</sup>        |
| -103 WINE SHOP            | 39.36m <sup>2</sup>         |
| -104 STAFF ROOM           | 10.59m <sup>2</sup>         |
| -105 SHOP STORAGE         | 10.78m <sup>2</sup>         |
| -106 MAINTENANCE          | 4.76m <sup>2</sup>          |
| -107 VESTIBULE            | 2.47m <sup>2</sup>          |
| -108 TOILET               | 2.04m <sup>2</sup>          |
| -109 TOILET               | 6.16m <sup>2</sup>          |
| -110 MAINTENANCE          | 3.88m <sup>2</sup>          |
| -111 SANITARY (MALE)      | 10.18m <sup>2</sup>         |
| -112 SANITARY (FEMALE)    | 10.18m <sup>2</sup>         |
| -113 WINE TASTING STATION | 39.36m <sup>2</sup>         |
| <b>B PRODUCTION</b>       | <b>1805.46m<sup>2</sup></b> |
| -114 AGEING CELLAR        | 921.42m <sup>2</sup>        |
| -115 WORKSHOP/STORAGE     | 192.19m <sup>2</sup>        |
| S3 STAIRCASE              | 8.58m <sup>2</sup>          |
| L4 GOODS ONLY LIFT        | 5.39m <sup>2</sup>          |
| -116 BOTTLE AGEING        | 625.08m <sup>2</sup>        |
| L5 GOODS ONLY LIFT        | 5.39m <sup>2</sup>          |
| -117 MECHANICAL ROOM      | 24.03m <sup>2</sup>         |
| S2 STAIRCASE              | 19.33m <sup>2</sup>         |
| L2 LIFT                   | 4.05m <sup>2</sup>          |

# A TRULY MODERN WINERY | PROGRAM

## Roof Deck

The roof deck, accessible from staircase cores located at the extremes north and south of the building is completely covered by a membrane roof structure. Arriving from the Southern staircase to the roof deck first volume to see is a glass box containing what's needed to provide a wine tasting point with view over the vineyard and the landscape. A dumb waiter installed on the side of the elevator shaft can provide catering service from the below level kitchen. The seats are disposed on the western side of the deck, allowing the visitor to enjoy the sunset. The communication between one part of the roof deck to the other is provided by two bridges of 12 meters length and 6 meters wide from which is possible to observe the very first stages of wine making process: crushing and destemming. The middle space of the roof is provided of seats and the necessary site for small events and concerts. Thanks to the lifts is possible to move up and down furniture and temporary utilities for every purpose. The northern side of the roof is connected with the administration and hosts a glass box for conferences and meeting. Though there is no lack of another smaller one, exact copy of the one on the opposite part of the roof. This one is usable for private wine tasting sessions. The particular ridge-valley shape of the roof creates a 6 meters overhead vault that produce repARATION from sun and showers, making the rooftop usable for most of the year.



|       |                                 |                       |
|-------|---------------------------------|-----------------------|
| +1.00 | ROOF DECK LEVEL                 | 1923.59m <sup>2</sup> |
| A     | VISITING                        | 1923.59m <sup>2</sup> |
| S1    | STAIRCASE                       | 24.95m <sup>2</sup>   |
| L1    | LIFT                            | 4.05m <sup>2</sup>    |
| L3    | MICRO LIFT                      | 0.72m <sup>2</sup>    |
| +1.01 | TASTING AREA                    | 392.33m <sup>2</sup>  |
| +1.02 | WINE TASTING BOX1               | 26.43m <sup>2</sup>   |
| +1.03 | BRIDGE OVER THE PEDESTRIAN PATH | 75.52m <sup>2</sup>   |
| +1.04 | LOUNGE AREA                     | 538.89m <sup>2</sup>  |
| +1.05 | SEAZONAL STAGE                  | 330.51m <sup>2</sup>  |
| +1.06 | BRIDGE OVER THE GRAPES ARRIVAL  | 75.52m <sup>2</sup>   |
| +1.07 | CONFERENCE ROOM                 | 53.17m <sup>2</sup>   |
| +1.08 | COMMUNICATION                   | 346.07m <sup>2</sup>  |
| +1.09 | WINE TASTING BOX2               | 26.43m <sup>2</sup>   |
| S2    | STAIRCASE                       | 24.95m <sup>2</sup>   |
| L2    | LIFT                            | 4.05m <sup>2</sup>    |

# A TRULY MODERN WINERY | PROGRAM

## Section

The section reveals how the building works as a whole organism thanks to the underground connection of the cellar. The wine-making process is distributed along the ground and the below floor to take advantage of the thermal resistance of the underground. The product is moved from one floor to the other by the means of elevators and pumps, facilitating the connection in between phases and creating at the ground level a separation in between the volumes that helps to brake the curtain created by the building.





## **Buildings within building**

In order to achieve a constant connection in between the worker, the visitor and the process, has been applied the concept of the "buildings-within-building", inserting inside bigger productive spaces, smaller independent rooms that, limiting the amount of heavy construction elements, maintain the facility very flexible and easy to change and adapt. The typology is the one of the "inplant" offices, usually modular lightweight structure

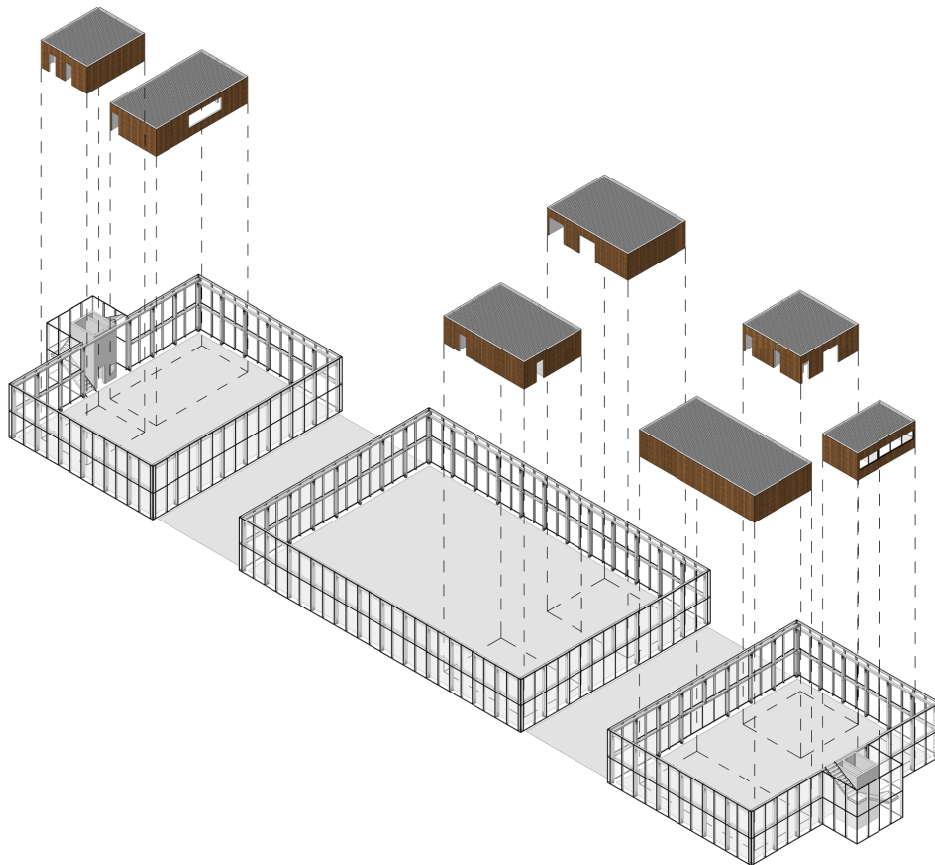
realized to insert administrative facilities and clean rooms inside bigger spaces.

In the case of this project the concept has been widened to achieve the possibility to have very heterogeneous functions dealing closely with each others.

In terms of climate and services the boxes are working as independent systems, connected to the main building by the only plumbing and ventilation ducts. Inside is possible to

find from workers resting rooms to toilets, the kitchen for the restaurant, administration offices and clean rooms needed for the production such as the bottling line or the press compartment.

To respect the language of the rest of the building to the modular aluminium and panels structure of the boxes has been coated in european oak wood planks of 9 cm of width

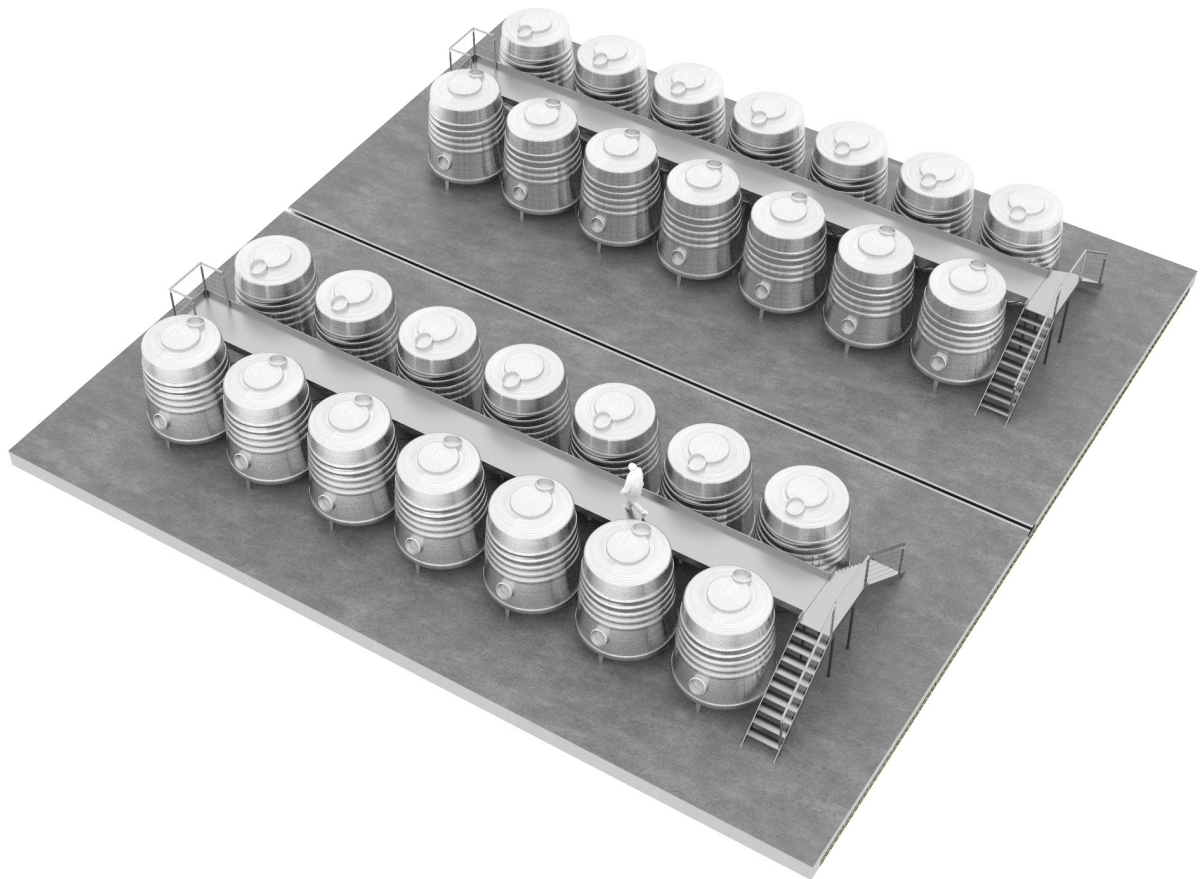


**The fermentation room**

The very delicate process of fermentation, even if short, requires maximum attention and the presence of the operators is almost continuous. In order to achieve a good functionality around the vats has been designed a fully customized set of fermenters and relative catwalks. To maintain the height of the facility contained into the limits, the height of the tanks does not exceed the 4 meters. In second instance the catwalks

have been located in between two rows of them instead of above, to grant an easy and comfortable access to the top door without climbing big heights that could constitute dangerous situations. Two staircases leads each passage raching an height of 2 meters. The disposition of the vessels inside the room can be modified in function of the needs. Under the bridges, a interspace of 1.5 meters allows to hide the piping of the independent

cooling system for the vats, leaving the fermentation area completely free and easy to clean.



fermenters in the fermentation area

## Concrete

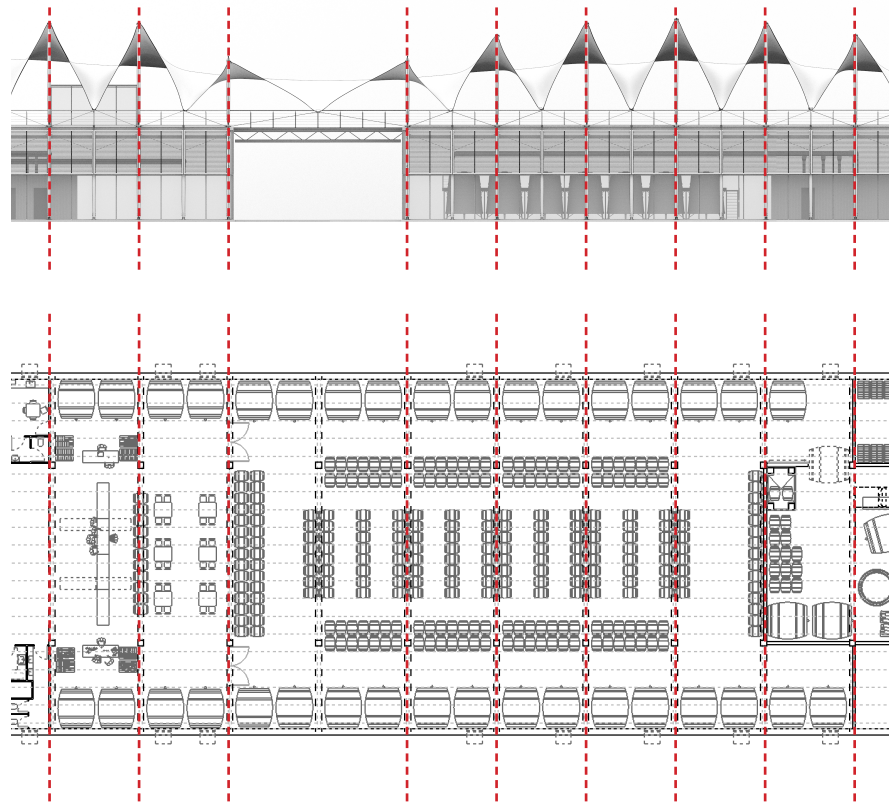
In order to maintain the flexibility within its function, the building has been designed keeping in consideration. The only heavy constructive parts are located in the underground level, where the needs of a sturdy and solid base brought to the adoption of the reinforced concrete as mean. The system for the foundation is constituted by a series of prefabricated pillars 40cm x 40cm that are holding prefabricated concrete arcs of the same depth. The span in between these elements is 6 meters. The light is covered by a series of precast hollow core slabs of 26 cm thick and 6 meters long, laid directly on the arcs. Stability is granted by the 40 cm thick structural wall enclosing the cellar, on which the side arcs are fixed. To allow the connection of the posts on the above floor, a concrete top element is added on the wall, that passes from 40 to 110 cm and keeps the axis of the main structure aligned with it.

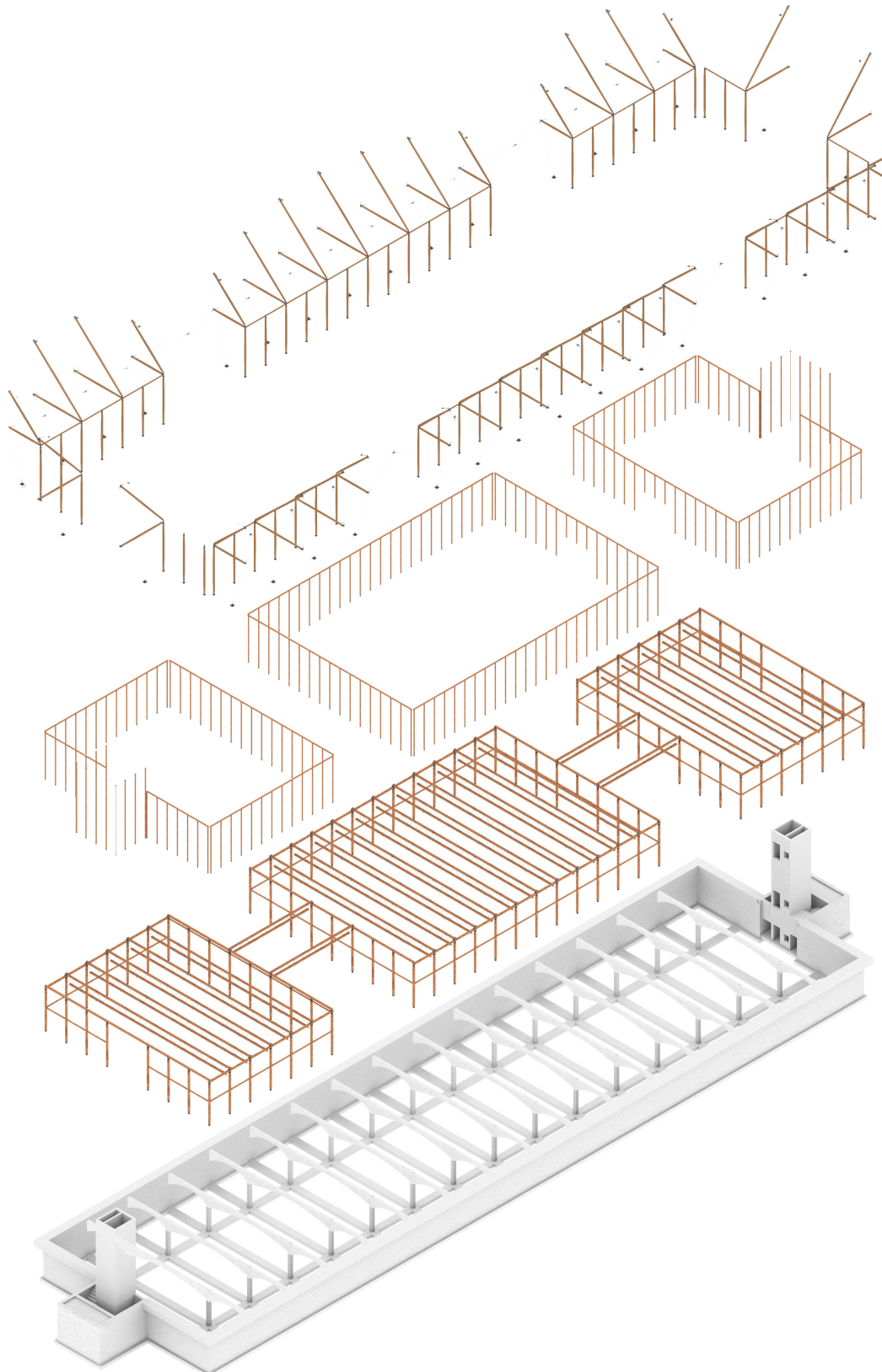
On the above floor the structure changes for a frame in laminated wood and steel connections. The frame is composed by 20 x 20 cm wooden posts bolted to a concrete base by the mean of a steel foot. This floor is completely open and there are no structural elements standing in between the plan, allowing great possibility of reorganization of the program.

To this structure is added a secondary one, holding the curtain wall, constituted by timber posts of 16 cm of depth on which

is attached an aluminium mullion/transom grid and topped with upper transom beams sustaining the finishing element of the roof slab. External and independent from the main structure of the building is the system of posts and beams holding the tensile roof and the louvres, also realized in timber and connected to the ground through bolted steel elements. The span of the elements holding the roof is 6 meters, but an additional post is

added in between the structural ones to raise the stability and hold the louvres. The choice of employing three different structures is aimed to achieve independence in between the systems and open new possibilities of evolution, change, reorganization and refunctionalization.





aksonometric  
exploded view

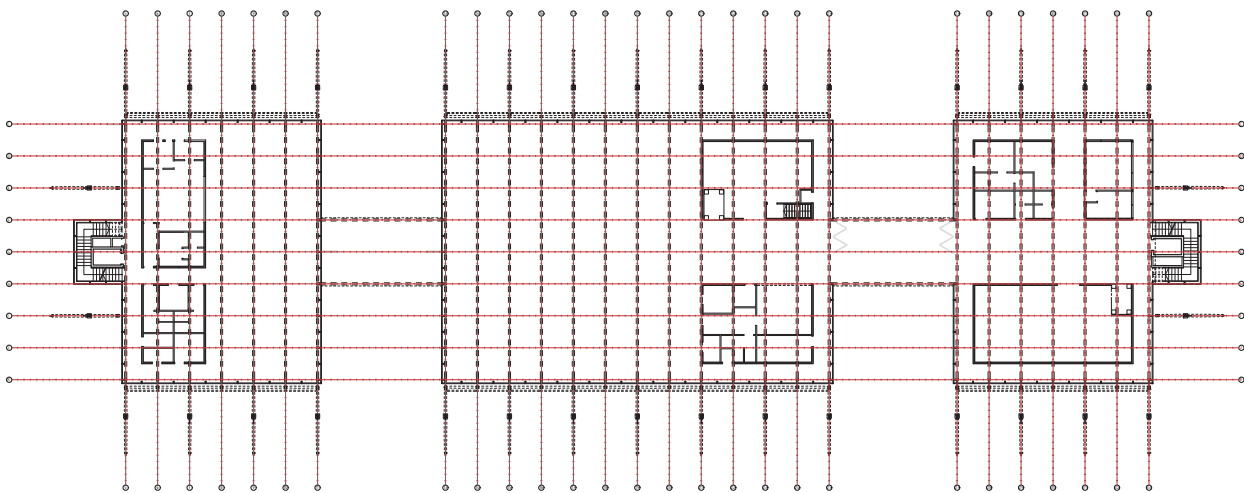
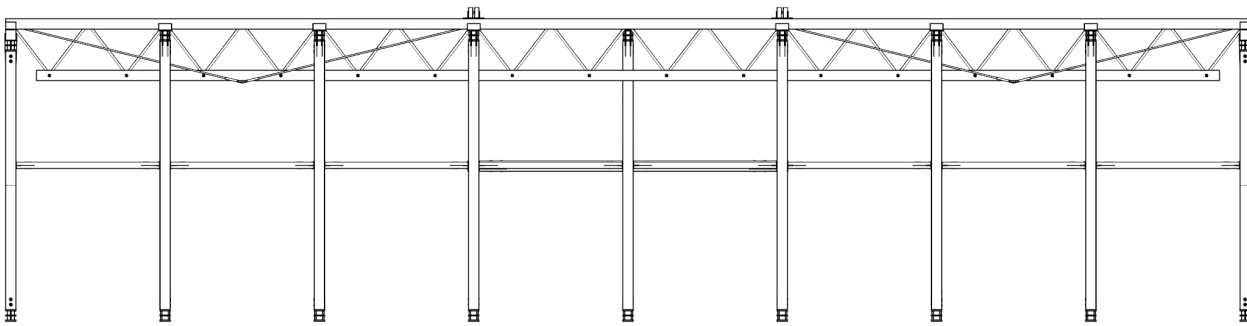
# A TRULY MODERN WINERY | STRUCTURE

## Timber

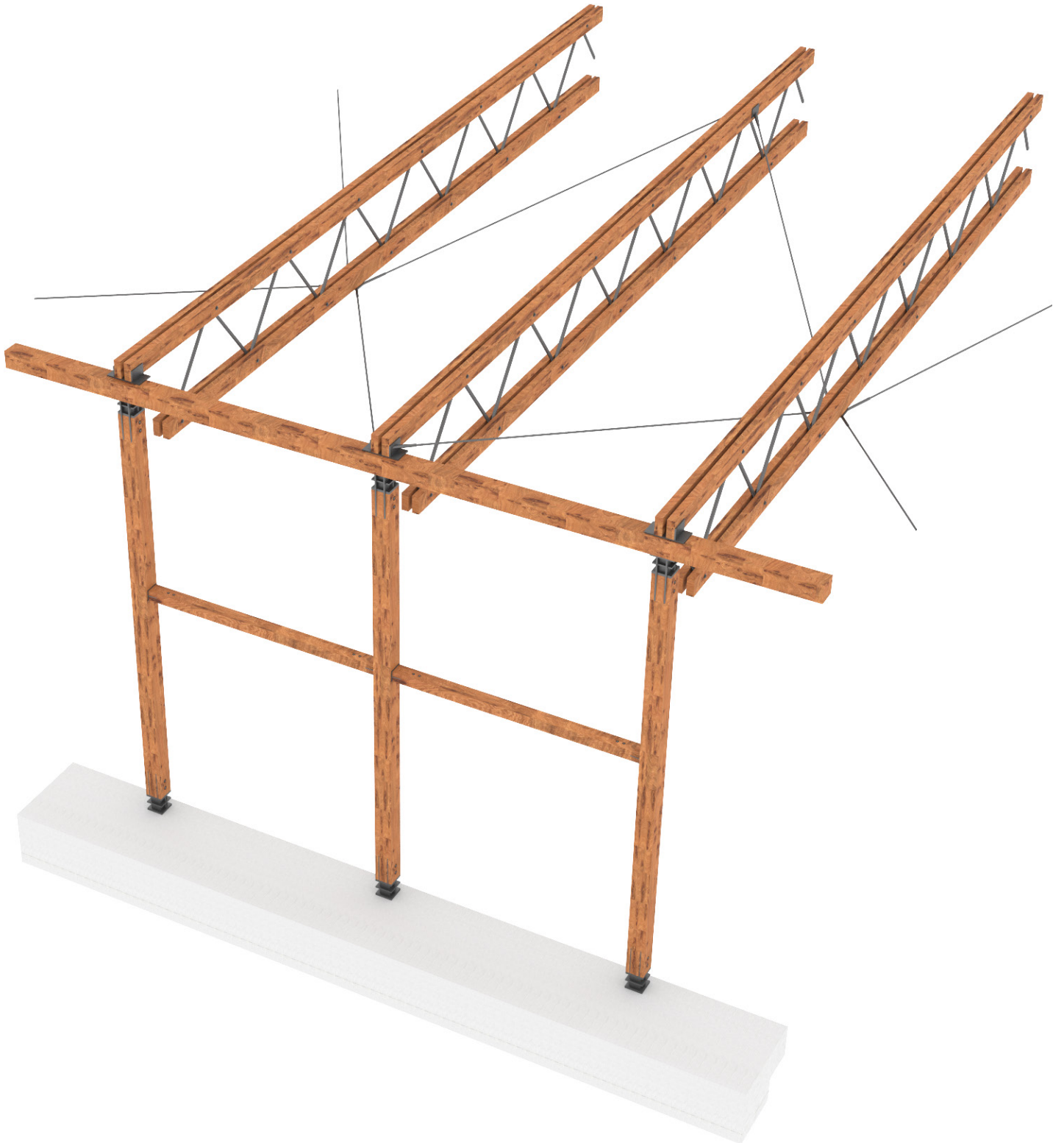
The main structure is realized in laminated timber organized in a system of 20x20 cm posts, 6 meters perimeter beams and composite timber/steel open web trusses. The system is stabilized thanks to the employment of additional horizontal cross bracing under roof. All the connection in between wooden elements is realized in steel. The maximum span of the trusses is 24 meters post to post and they form a series

of parallel frames distanced 3 meters from each others. The webs are realized in 2.5 cm diameter tubular elements of steel. The truss measures 1 meter from the top chord to the bottom one.

The employment of a timber structure reduces the building impact on the environment after resulting aesthetically more natural and integrated with a rural environment.







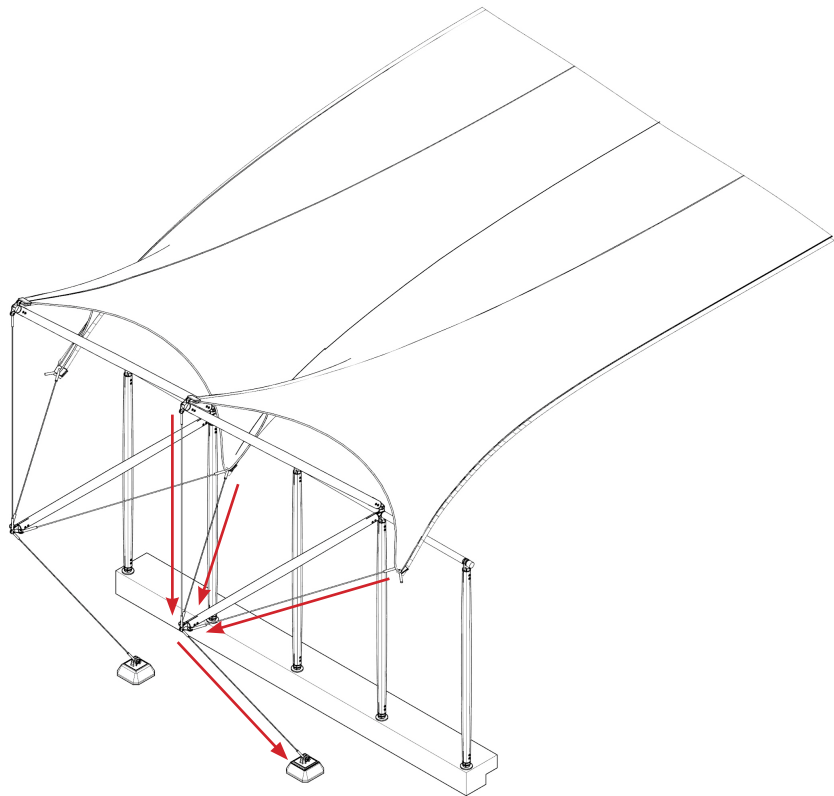
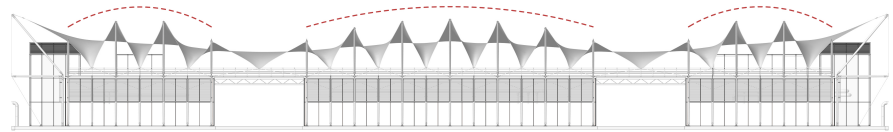
timberwork of main structure

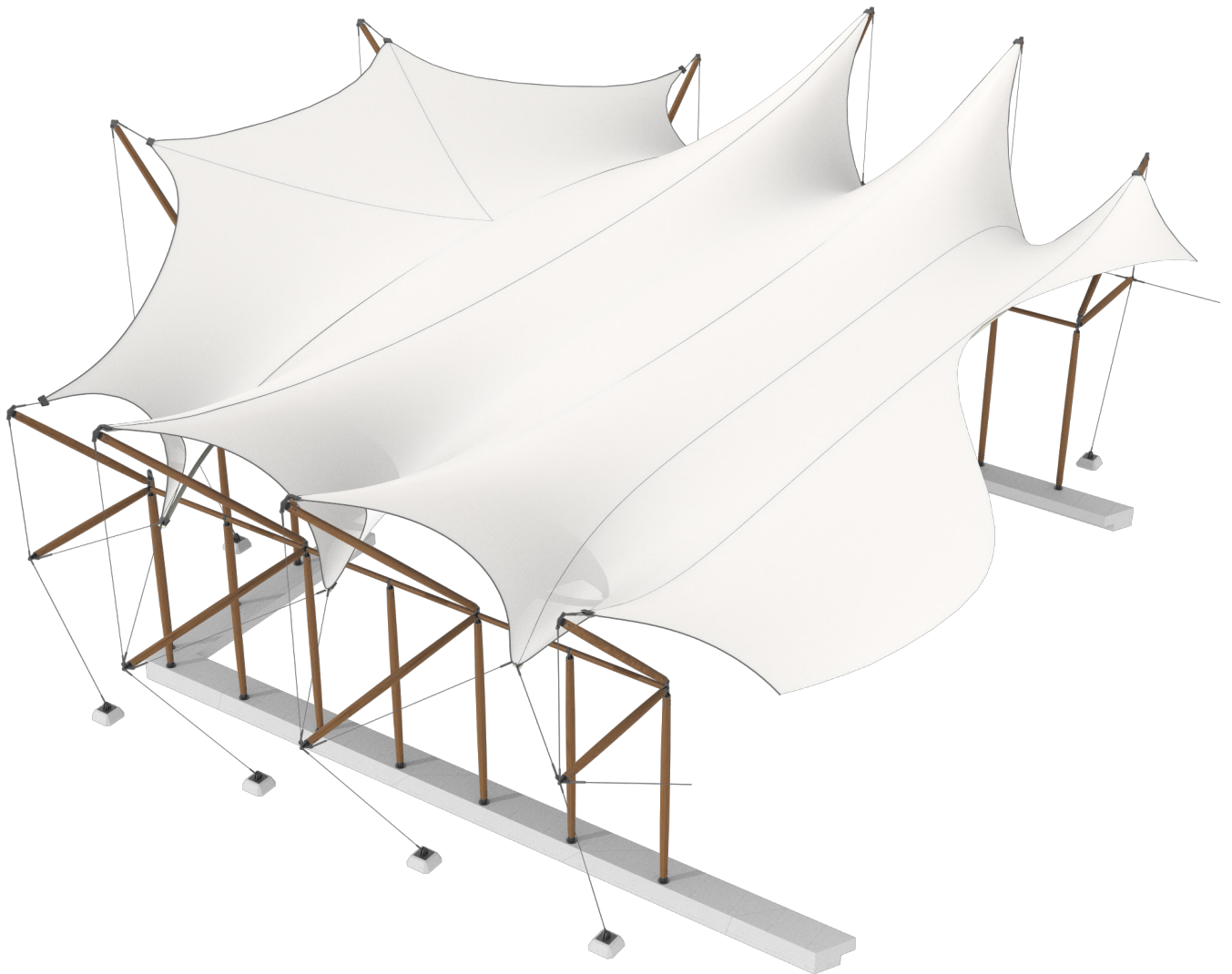
## Membrane

The membrane roof overhanging the facility is held in place by a system of glulam wood structural elements of 25 cm of diameter (20 cm at the base) with steel connections. The main posts are firmly anchored at the base by a reinforced concrete beam that is running all around the perimeter of the building by submerged steel bolts. The connection in between the steel element and the post is realized through a knife plate bolted to the down part of the glulam post. On top of the post another steel element makes possible the connection with an horizontal and an oblique timber element. Stability is granted by a 4th element that is connecting each post with the next one. The tension of the roof is achieved thanks to a system of stainless steel struts of 1.5 cm of diameter. At the ground level the struts are anchored to steel plates bolted to underground concrete feet

The PTFE (Teflon coated fibreglass) membrane is reinforced on the main stress-lines with additional steel ropes to ensure the right stiffness.

The progressive inclination of the wooden structural elements permits to achieve a perceptible curvature on the surface that grows in height till the middle of the roof deck and decreases again at the extremes.

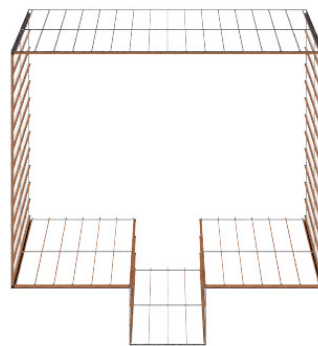
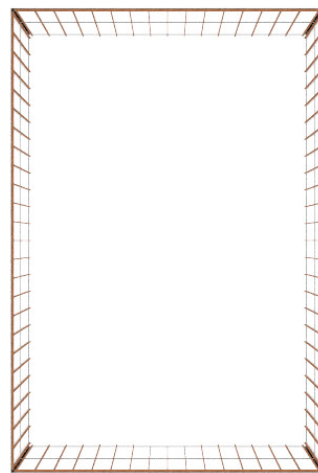
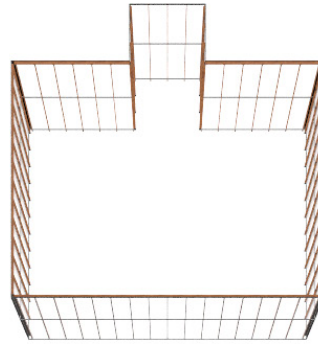
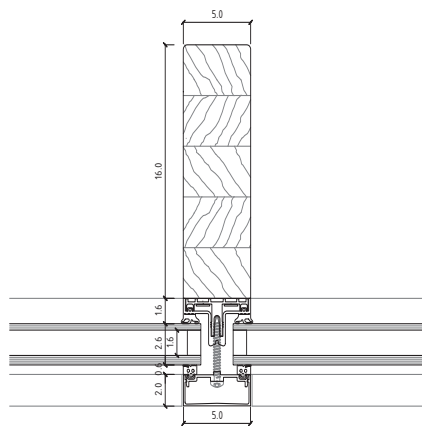




membrane roofing

**Curtain**

To reach the level of transparency required by the concept, has been employed a curtain wall system to clad the entire building. The choice of the material has been led by the will of maintaining a limited palette of elements to construct the building so the curtain wall sustaining structure is made out of the same glulam wood used for the main structure of the building. A series of posts 16 x 5 are giving the support to an aluminium mullion/transom system holding single chamber double glazing that provides the correct thermal insulation. The choice for a composite system aluminium-timber resides also in the fact that doing so the thermal resistance of the whole facade increases. The fixing of the glass to the mullions is realized by the mean of screws and covered by a clipping profile that hides the connection. The posts holding the facade are additionally connected punctually to the main structure to increase the stability of the wall itself.







timber frame with panels of cladding system

# A TRULY MODERN WINERY | BUILDING PARTS

## Louver System

The external system of window shadings is mounted on a 10 cm thick 3x3 steel frame held by four steel supports mounted on the wooden structure of the tensile roof system with screws. The invisible connection in between the louvers and the frame is made thanks to two supporting screws per side. The louver itself is realized out of 2 cm thick and 140 cm long planks of laminated european oak wood with an ogive section. Each frame counts 64 louvres. Every plank is rotated 20 degrees down to grant the correct level of shading during the central and hottest hours of the day.

The dimensioning of this element is related with the rhythm of the façades standing in front of two curtain wall panels and covering the same 3 meters span as the main structure of the building. Thanks to that, even though the curtain wall panels are proportioned 2:1, the overall look of the façades comes to the eye as a square grid.

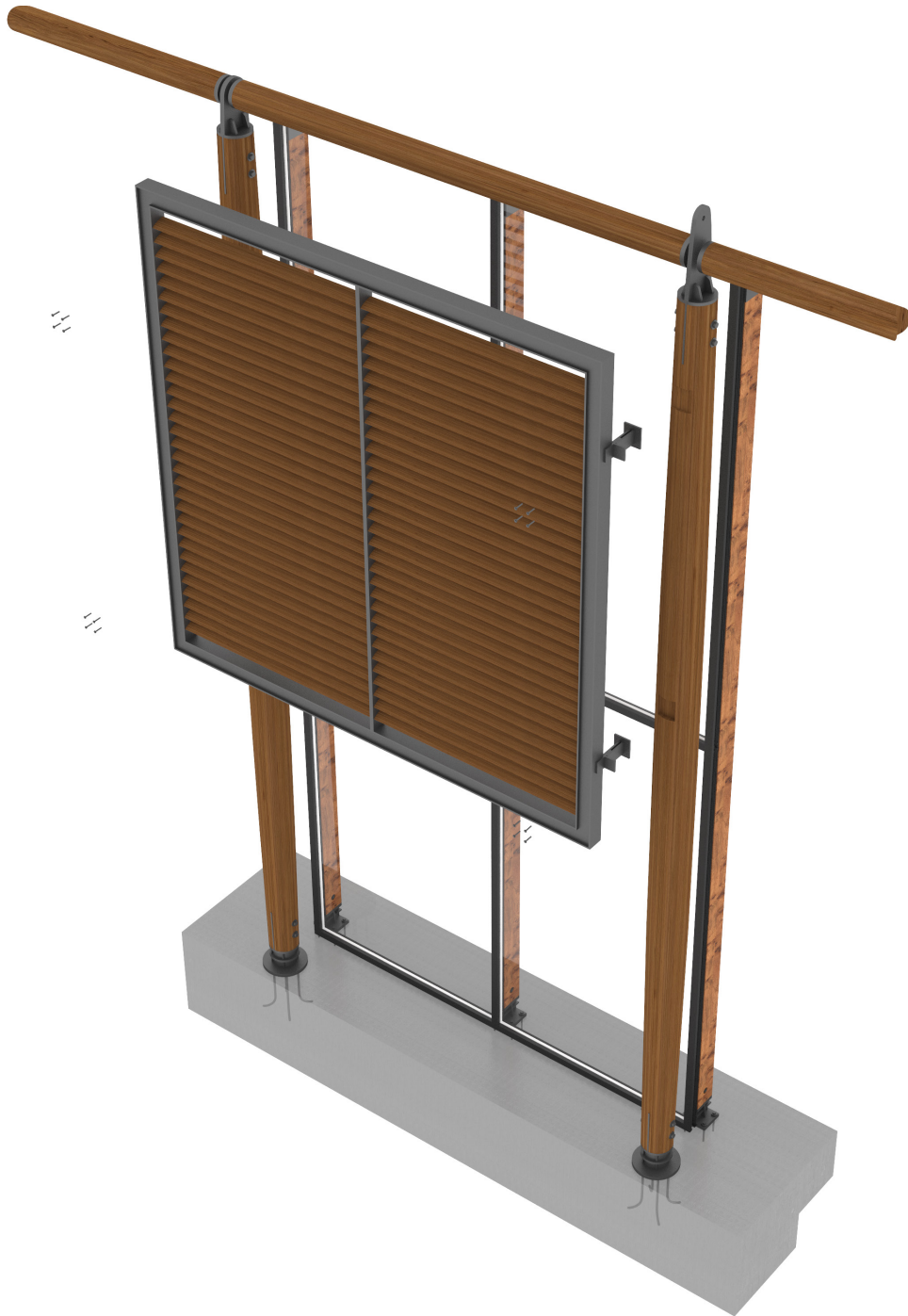


GRADUATION STUDIO

'The Ideal of Tranquility'

Eindhoven University of Technology

facade covered with louver system



timber posts with louver system

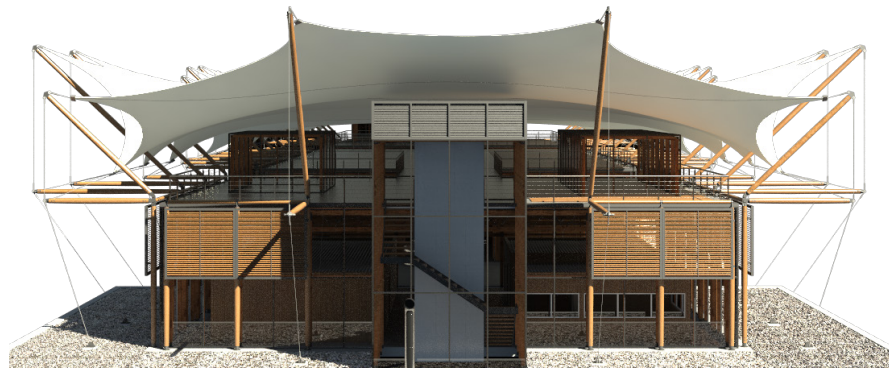
## Cores and ventilation

The circulation through the three levels of the building is made possible by the presence of two opposite staircases cores located on the northern and on the southern façades. This two spaces are equipped with a fully functional elevator hosted in a reinforced concrete core and that works as stability element. On the side of the elevator is located a hollow space that on the restaurant side gives room to a dumb waiter for the transportation of food from the kitchen to the upper and lower visiting spaces. Next to the circulation the cores are integrating also the ventilation system of the building collecting the air through a system of ventilation ducts that introduces clean air from the ground floor through a pipe and expels it from the roof deck, where a secondary air handling unit is located. The space for the main air handler is obtained from the understairs of the cellar ramps and is easily accessible from the same underground level.

The staircases above the ground level are enclosed with the same curtain wall system of the rest of the building and they maintain the same module with the only exception of the attachment with the rooftop, where the panels from 3 meters of height pass to be 2.85 to gain the same height with the other rooftop boxes. The ending of the staircase is topped by a steel box that encloses the terminal of the ventilation and covers the top cabin of the elevator. Maintaining the same

subdivision and the materialization of the rest of the building the air handling unit is not perceivable from outside the building and does not disturb the image of the façades.

Through this double ventilation system it is possible to achieve a separated climate in the various rooms of the building and moreover, the central block that is hosting the fermentation process can count on an additional unit for the filtering of the carbon dioxide produced by the fermentation process





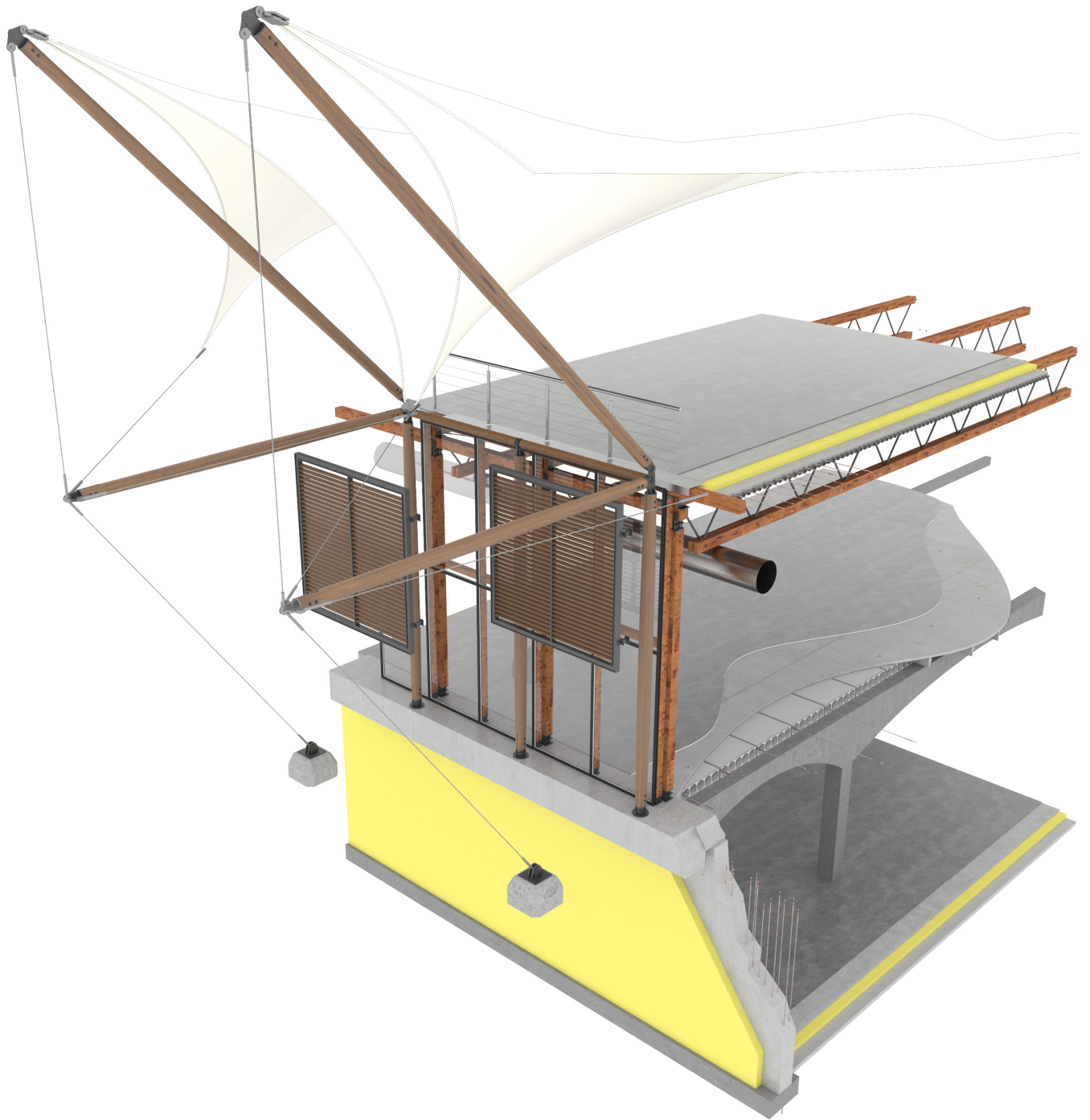


staircase core

## **Standardization, prefabrication**

One of the key aspects of the industrial buildings is their extreme flexibility and the usage of mostly prefabricated elements that allow rapid times of construction and reduction of the costs. In order to develop a facility that is in line with the modern industrial production, an architectural language based on prefabricated pieces has been developed. From the basement to the roof, the building is developed as a sum of juxtaposed parts the combination of which results in the final factory and its performance. Escaping the ordinary, and creating unique pieces is rising the costs and the building complexity. As a consequence of these thoughts one of the main design goals has been reaching a limited usage of singular pieces and to employ mostly dry constructive elements. The standardization begins with the grid of the facade that measures 3 x 3 meters. The measurement arises from multiple factors. In first place the need to find a flexible module around which build every single part and enabling to make dialogue the three different typologies of structure. The smallest element in this grid is the glass cladding panel that measures 3 meters in height and 1.5 meters in width. Starting from that, the main wooden structure appears to be double this measurement with vertical elements every 3 meters. The louvres frames are following the same module but they also shares the structure with the tensile roof

that has vertical supporting elements every 6 meters. This same module is found in the cellar where the standardization regards the precast sustaining arcs, limited to two different span dimensions, 6 and 12 meters. Above the arcs are laid 6 meters deep and 1.20 wide precast hollow core slabs. The whole timber structure is also prefabricated and standardized, the whole perimeter of the building is covered by only two typologies of posts and two typologies of transoms. The open web trusses can be appearing in only one typology. Big attention has been paid to the curtain wall that counts singularities only in the corner panels and in the rooftop boxes, where the height is reduced of 15 cm. The system used to produce the boxes hosting the functions of the building is also modular and prefabricated, allowing rapid assembly and easy changeability of the subdivisions of the spaces.



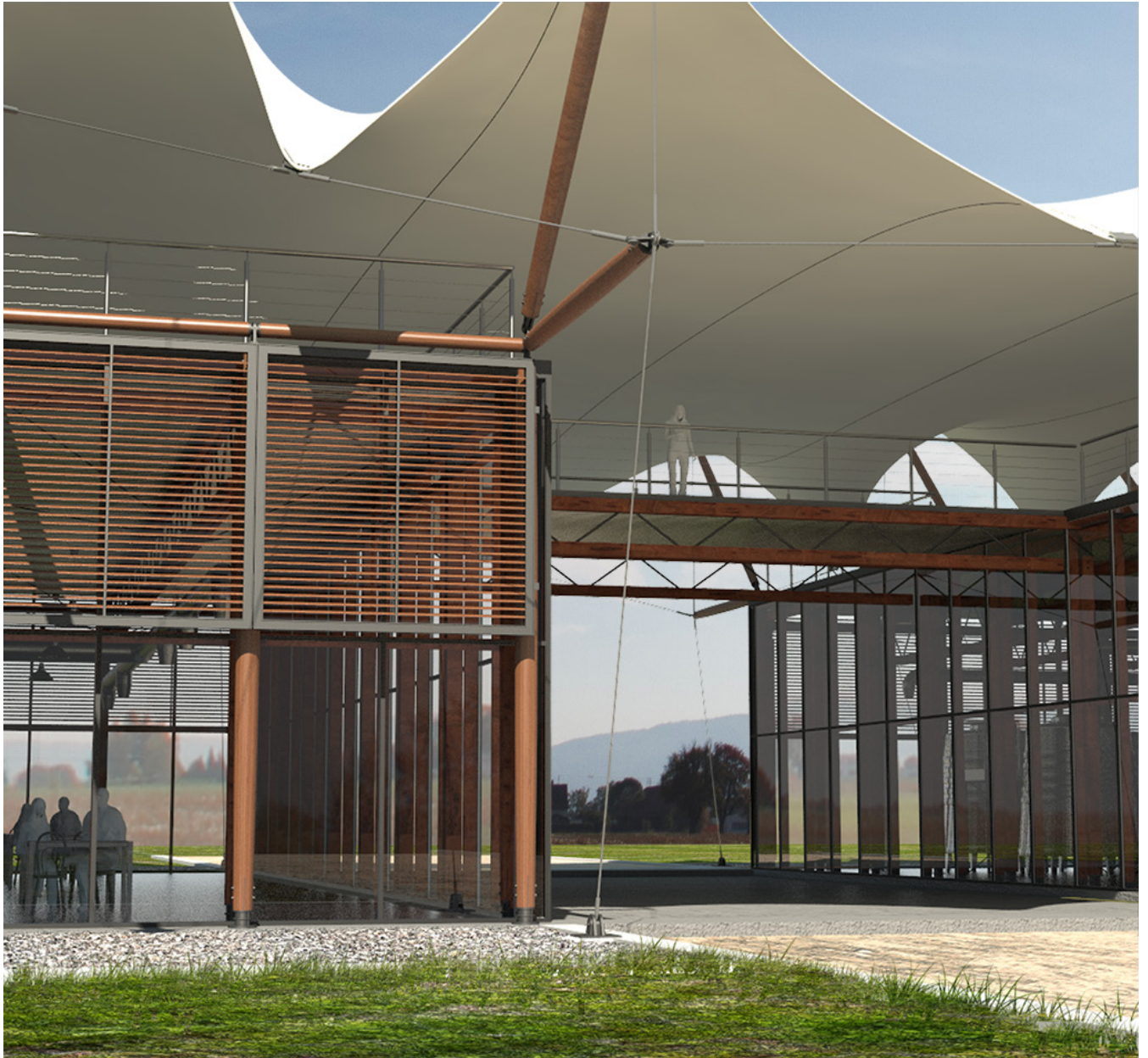
final assemblage  
of structure and elements  
with materials

### Materials

The chosen material palette is coming from the search for a connection with the building and the production that is hosting.

Modern wine making gravitate around simple materials partially related with tradition and partially with innovation. One of the most visible examples is the employment of stainless steel vats for the fermentation process on one side and the traditional oak wood of the barrels on the other. In order to respect the essence of the production the entire building has been designed considering a limited palette of construction and finishing materials and keeping in mind the essence of this constant coexistence. The custom designed fermentation vats, the catwalks, and the system for the illumination of the working areas are realized in brushed steel. The main structural elements and the posts of the secondary structure that is holding the curtain walls are wooden while their connective elements are forged in gunmetal grey. The same relation wood-steel appears in the exterior elements. The structure of the tensile roof is represented by a series of posts in laminated european oak with gunmetal steel connections and in the same way are treated the louvres, with steel frames and european oak wood blades. Thanks to this materialization the building maintains its industrial nature.

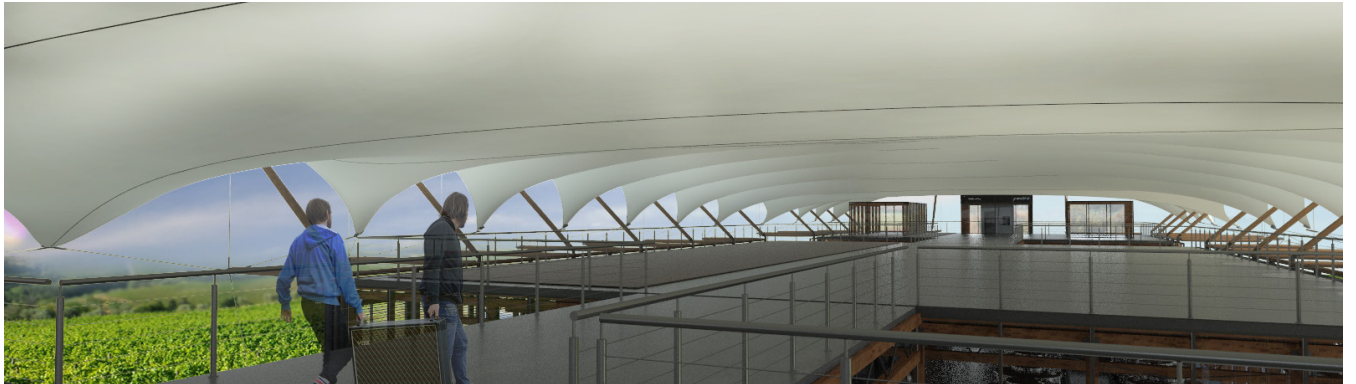




view on the eastern facade  
with passage between  
fermentation area and dining space

## Inside spaces

The inside spaces are designed to maintain a seamless contact in between man, production and environment. Visiting the facility it is possible to have a constant glance of some aspect of the wine making process, from the restaurant is possible to see the fermentation room and the vineyard, from the underground tasting area the barrels are used as a background to the lounge zone. Even from the roof deck, the bridges are permitting to maintain a constant view on the surrounding vineyards and the productive areas on the floor below, giving to the visitor a continuous experience of the process.



Up: view of the roof deck

Middle: Visiting spaces in the cellar

Down: Fermentation room



### Conclusions

The finished design demonstrates how, through an integral design approach and the use of standardized elements, could be possible to produce industrial buildings that fulfil the needs of a modern production but at the same time result well placed in their surroundings. It is also evident how amplifying the concept of factory, opening the production to the public and introducing variations in the traditional program of a winery can lead to an improvement of the facility itself, but also of the area in which the facility is inserted. The relation in between building and context, in the specific case of the winery, is not anymore a formal or aesthetic exchange, but, taking advantage of the strongest connection in between wine-making and territory, becomes also conceptual. Through the transparency of the building envelopes and the introduction of attractive aspects such as an emblematic and evocative roofing, the building open itself to the exteriors and communicate in a new way with the landscape and the territory. The production itself is protagonist of the scenario of a complex context, in which the natural values and the intervention of the man on these values are colliding in a weak equilibrium easy to break. The design of the wine factory in such a context has to be take in consideration then the risk of producing discontinuities, ruptures. The initial thoughts about the problematic scale

of the built environment has been in part reconsidered. Big productions need big productive spaces, and this is a matter of fact. The approach here proposed tries to deal with this aspect rather than deny it is possible to create interest around a 96 meters facade allowing the surroundings becoming part of it trough the transparency of the cladding. It is also possible to create complexity out of the repetition of elements and their juxtaposition. It is possible to maintain the industrial vocation of a building even allowing big presence of visitors in it. The interplay of different building elements allows new possibilities still left unexplored. A tensile roof structure over the building is then justified by the increase of the thermal performance of the roof deck and gives an excuse to make possible to visit this level to the public that has a new overview on the territory and allows, to use a lightweight construction on the below floor, but also by the need of give a clear identity to the building itself and to improve its visibility for faraway without constituting an element of disruption of the skyline. An underground cellar can become both the aging space but also part of the reception facility and the retail thanks to the different systems of ventilation and the subdivision of the program. To not forget in last instance the attention for the characteristics of the landscape area. The territory in this case played an

important role in defining which element of the morphology of the building should have lead. A very depersonalized plot, lacking of a common identity has been completely rethought to produce a series of elements that help to preserve the characteristic of the location. The parking lots hidden in between the vineyards and the use of the backfill to reshape the ground and give visual screen is another example of approach to the topic of the industrial building inserted in a protected territory without interfering with it.



view on the eastern facade



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