



STRUCTURAL STEEL

STEEL BUILDING WITH LASER

A SUCCESS STORY

The use of laser technology allows higher architectural freedom and efficiency, both at a structural and productive level. For a long time, BLM GROUP has been involved in the study and implementation of ad hoc solutions for this sector.

Our Italian tradition shows solid buildings, made of stone and bricks that have survived over time, some even for millennia. In the last century, we have mainly built using reinforced concrete, believing in its “eternity”, even though our recent history has shown a very different reality of damaged, deteriorated, collapsed buildings requiring repair after 20-30 years.

At the beginning of the third millennium, it is evident that this kind of development is no longer practical and that we need new building standards: reduce land consumption, restore and salvage buildings, use recyclable materials and products, repurpose buildings at the end of their service life with attention to social and environmental costs. Steel is the most important material of this constructive philosophy, which

interprets the most recent synthesis between engineering and architecture and creates construction that results in favorable investments over time.

Steel is an effective solution: seismic, flexible, traceable, high performing and cost-effective. It has a high architectural and expressive value and reliable construction timing. Use of steel saves energy, allows thermal and acoustic efficiency and it is 100% recyclable which supports a circular economy. It is also ideal for requalifying existing building assets.

To quantify these countless advantages, a qualitative and quantitative investigation was carried out (analysis by the Foundation for Steel Promotion with the collaboration of the manufacturer Stahlbau Pichler, March 2017) which, during this first step, focused mainly on bearing structures, the state of art of pros and cons of the most common constructive systems.

The analysis involves a case study of different types of buildings with different structural solutions: the first made of concrete and the other made of steel. The steel solution is remarkably more advantageous in means of timesaving and construction time (without considering direct costs). The estimate of direct costs shows that there are no big differences between the two types. When considering all other costs, such as foundations, security, on-site qualified personnel and public land occupation, the steel solutions provide interesting savings. Steel constructions are seismically safe due to their lightness and ductility that can scatter more energy than other structural materials.

Construction technology has a significant impact on the time spent building a multi-story structure. With a dry steel stratified construction system, the processes are very industrialized; the load-bearing structures are entirely pre-assembled by the manufacturer as mechanical elements. Construction on site is much faster than the solutions that



involve concrete pouring. Lifting and unloading tools are generally much lighter and allow operating in problematic urban areas with the presence of existing infrastructures.

The **Lasertube cutting** technology contributes to the production of steel structures. It is a very useful tool for creating innovative, light, precise, pre-assembled structures that can be interconnected with each other quickly without the costs and delays of adaptations often required on site. The freedom to find new joints between structural elements offers designers new scenarios that contribute to further enhancing the benefits of steel construction. Lasertube technology not only replaces the more traditional building methods, it also creates added value because it allows to conveniently achieve what previously only the great and expensive Starchitect could afford to.

Lasertube technology automatically allows for design and production of parts including various operations previously performed on different machines such as: sawing, drilling, trimming, grinding, etc. Its precision allows for the design of joints and junctions that were previously unfeasible. The result is remarkably more precise than the tolerances of the raw material. Various processes, such as measuring cycles, compensation of the deformations of the tube or profile allow the machining to comply with the tolerances of the whole structure. The remarkable reduction of welding equipment contributes to time and cost savings. This can be done with a just-in-time approach that, in addition to avoiding some process steps, eliminates the intermediate storage of unfinished parts. Another advantage is the possibility of cutting both orthogonal and tilted respect to the metal surface, thus creating chamfers that simplify following welding operations.

The potential of this technology is huge. It is now time to take advantage of it!

