POLITECNICO DI TORINO

Master of Science in Sustainable Architecture

Honors Theses

Re-Use Architecture. Building systems, products and materials: possibilities, uses and scenarios.

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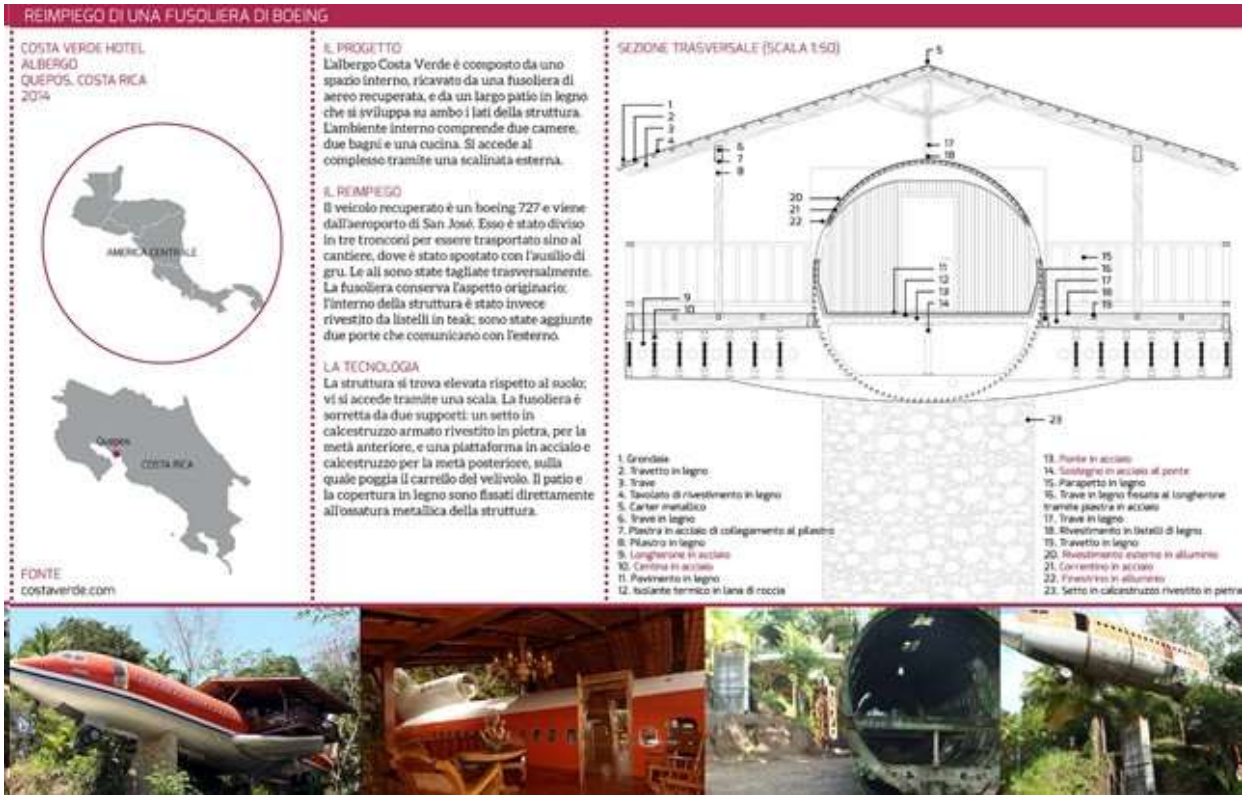
For reuse, we indicate the action of finding for a material, a product or a building system in obsolescence a function different from the one it was born to perform. The goals of the essay are:

- Examine the potentialities of reuse;
- Explore its constructive possibilities through the analysis of 65 case studies;
- Evaluate its convenience.

Nowadays reuse has its roots in the movement of response to the energetic and economic crisis of 1973, and at the same time it is combined with the awareness of waste problem. Although this issue is still an environmental emergency, the legislation about waste management and waste reuse in construction is somewhat intricate. Some laws, often not respected, try to constrain designers: the M.D. n.203 of 2003 fix that, in companies with predominantly public capital, at least the 30% of the need for products has to derive from recycled material. The L.D. n.152 of 2006 sorts by effectiveness the possible strategies of waste management: their prevention and reduction, the recovery of material or energy from them and the landfilling just as remaining option.

So, it can be understood the advantage of reuse: reuse materials, products or building systems implies a reduction of the need to produce new ones, and consequently a saving in terms of energy, raw materials and environmental impact of both mining and productive processes. The advantage is environmental as well, due to a reduction of the landfill, and economic: although waste has often a value inside the recycling market, its cost is still lower than the one of a brand new product.

In the essay, the architectural applications of reuse are enhanced through the study of 65 projects, represented by forms. 45 of them, subdivided in category of waste, explore the constructive possibilities of reuse. The other 20 are technologically characterized by the representation of an excerpt of plausible cross section that highlights the function and the technology of the reused element within the project.



The fact of just considering the advantages of reuse do not allow us to determine its convenience: it is necessary to have a premise. Culturally, the propensity to follow trends implies the need for reuse to grow in popularity before being regarded as a common architecture practice. For this to happen, it is indispensable a good information network, able to diffuse potentialities and constructive possibilities of reuse. Another indispensable premise concerns the life-cycle analysis. The benefits of reuse are exclusively related to the construction phase of a building, while a much wider energy consumption is registered during the use and maintenance phases. It is not advantageous to save raw materials and energy through reuse if the performances provided are less satisfying than those of traditional construction are.
The convenience of reuse in a site depends on some preconditions:

- The transport of the material;
- The possibility of calculating accurately its performances;
- Its quality, which determines the need for maintenance;
- The manpower necessary to adapt it to the new function;
- The energy consumption of this process;
- The costs entailed by transport, manpower and performance calculation.

If the culture of reuse were more widespread, these obstacles would be easily avoidable: the production of components easily dissociable for example, would facilitate their reuse; a market of disuse products would cut the new products flow. Essential, for this purpose, a greater awareness about advantages and possibilities of reuse: the discussion goes in this direction.

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