

Cardboard housing emergency units

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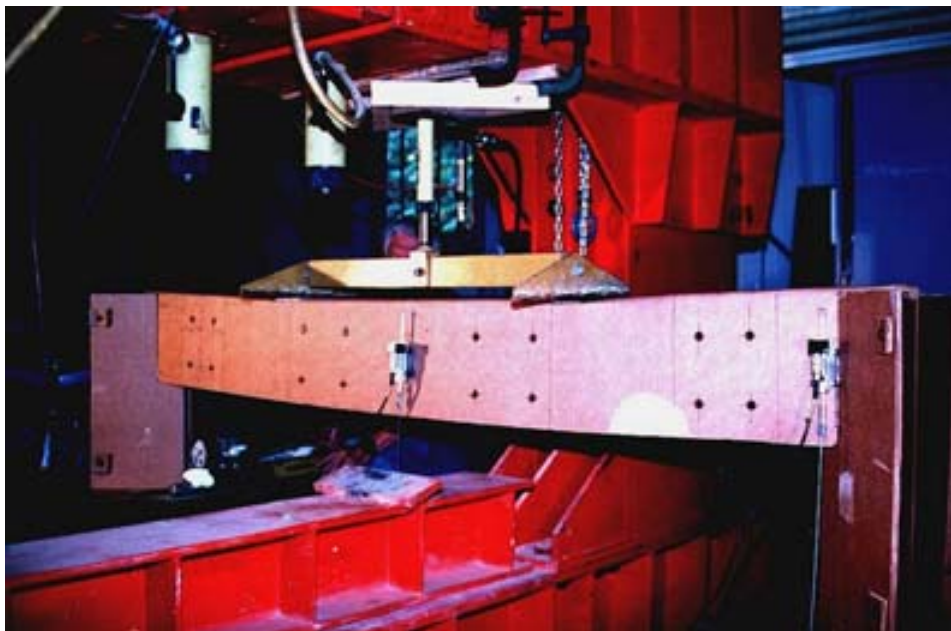
The emergency house is in the chain of assistance to the populations hit by calamities the first shelter if not the first safe refuge. Unlike the temporary houses which are assembled in a second time and are occupied for all the period of reconstruction the emergency "units" should be available a few hours after any disaster and should guarantee a safe home until the units are ready.

For this reasons emergency houses require speedy transport and easy assembling in order to be immediately ready for homeless people. After analysing the recent calamities and the use of this type of housing it has become evident that can be used due to the high maintenance costs.

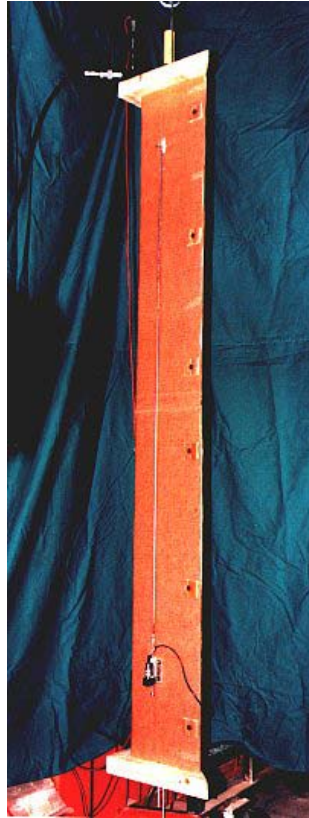
Following these and other considerations, it has been thought to project a "house" which would last as long as it needed.

This hypothesis of housing "use and throw away" has encouraged the research of a unit which could be industrially produced, at low price. It should be built in light and not polluting material. Among all the materials taken into consideration has been thought to offer the necessary requirements.

A close analysis on the type of cardboard actually available on the market, has shown that the triple corrugate one (made up of 3 internal waves and 5 plain sheets) offered the best characteristics : lightness, handy and resistance to be retained fit for the purpose.

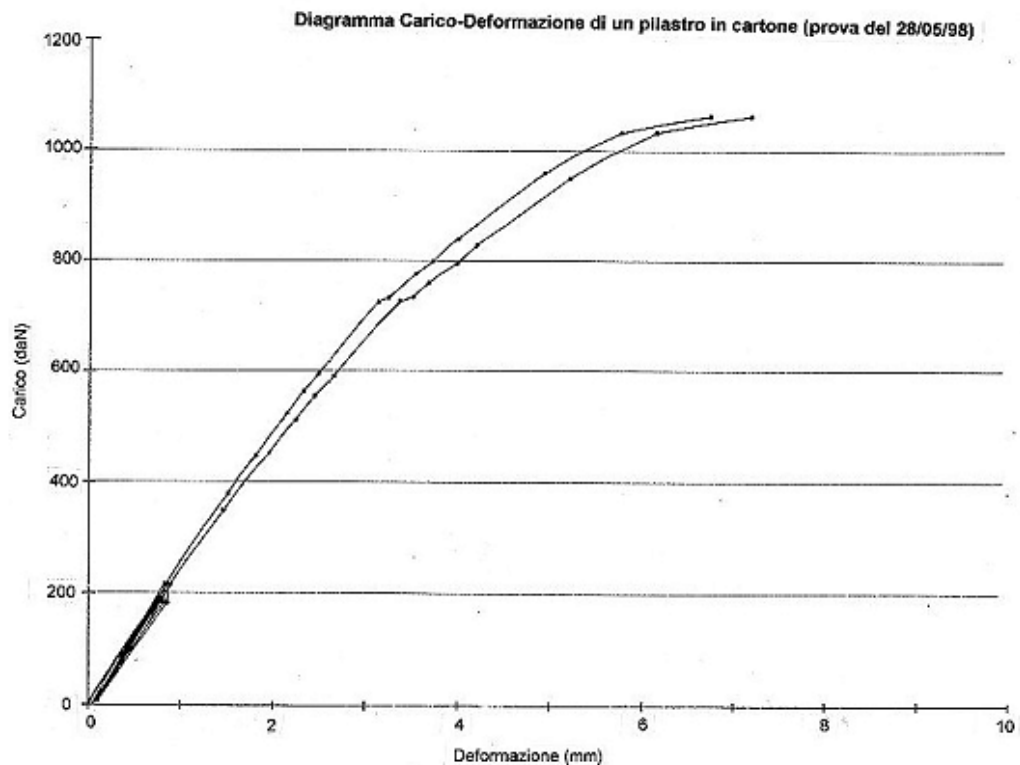


After these preliminaries it has been planned an emergency unit able to be transportable and put together for the use of two persons, facilitating in this sense the auto assembling of the unit. Along with its planning all the material used has been caused by fire and water to the cardboard.



On pieces built on real scale, has been carried out on pillars compression tests on bending beams during which have been recorded the loads weight yielding and the main deformations.

Put under vertical compression, the folded pillar, 215 cm high about 135 cm thick, a section of 450cmq, has kept a homogeneous behaviour standing a kg 1065 weight with a main buckling of about 0.8 cm with the same type of card a beam 2 height has been made 1 length 240 cm which put under bending has reached yielding at 211 kg with the main buckling of 2.3 cm the scarce resistance to water of the used card board has made it necessary to load for productions which would increase its impermeability without compromising its further use. It has been superficially oiled with natural oil, normally used for wooden shutters fastenings. Tests have pointed out that protecting the oil cardboard edges with plastic sections the water absorption after 4 hour of exposure to streams of sprinkling water was null and the cardboard structural qualities was not altered.



Facing fire problem it has become obvious the compatibility of the products, the cardboard and the waterproofing treatment for that reason it has been preferred using a cardboard made with paper sheets heated, during production, with substances based on ammonia.

The planned "home" synthesis of studying and choices introduces itself like cubic modular structure, lifted from the ground by plastic elements with the possibility of applying on the plain roof a covering that besides facilitating the water draining, guarantee on adequate air circulation. The unit's sizes are such that the union of more units allows the housing of six persons, respecting the main dimensions of 5 or 6 mt squares at the type of homeless field by Civil Protection.