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Master of Science in Architecture
Honors theses

Sanitary structures out of limit conditions. Analysis and hypothesis for surgical emergency units

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This Graduation Thesis sprang out of the light from my voluntary experience in “Emergency Ong Onlus”, an Italian association established in 1994 to treat war’s world wide civil victims.

It had been required to plan a surgical centre to be used in case of disaster (i.e.: natural catastrophes, wars, ...): the objective of the project, therefore, was to provide with an intermediate solution between field hospitals and Advanced Medical Posts (PMA) of II Level.



Hypothetic plant realization of the structure

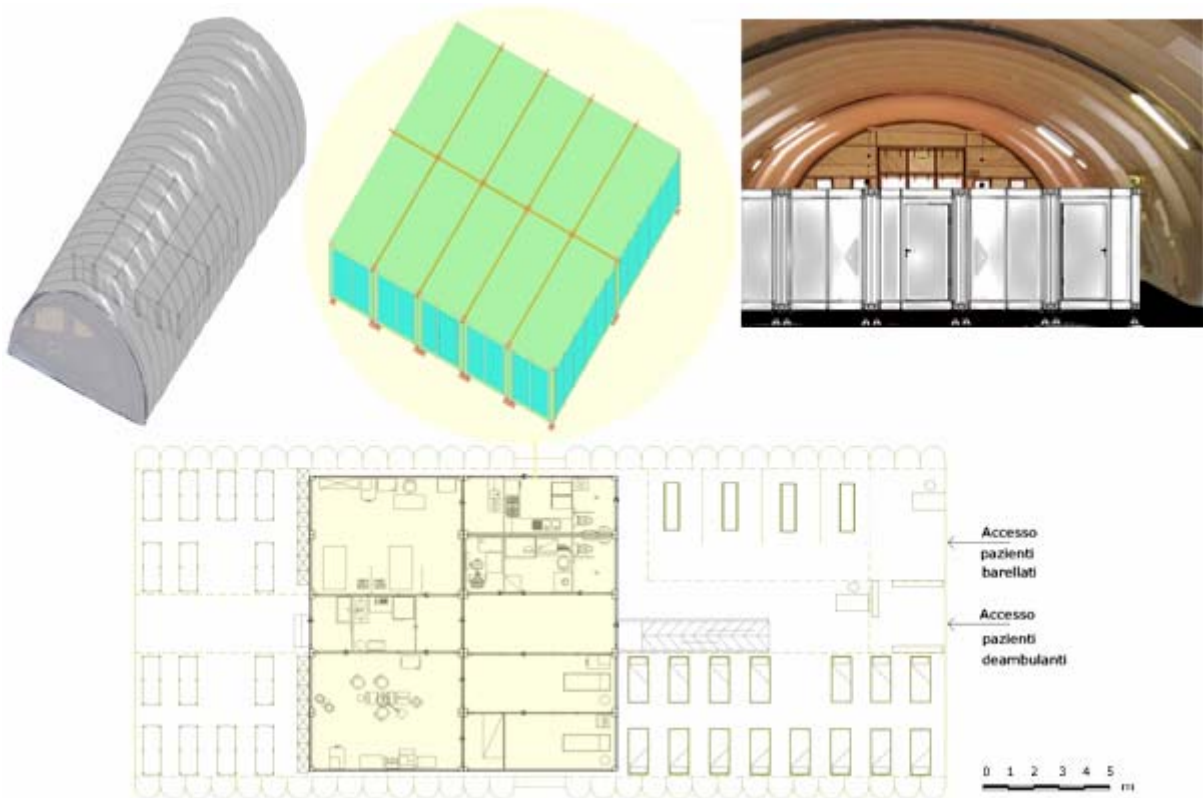
After first inquiry about natural and anthropical catastrophes in which wars have been studied as principle field of the Association intervention. Therefore, I examined Emergency chronicle, the countries where it acts and its most important activities.

It's shown a research about Corporations and Organizations working on post disaster intervention and about their means; bearing in mind the research was limited to Italian Organizations.

Then a catalogue about temporary structures is proposed (not only medical but also residential, office, ...), subdivided in technological categories: light prefabricated, building systems with preassembled units, containers, expansible and movable units. The planning starts according to a method that puts the specific requests coming from the prefigured scenery (like transportation, quickness of use, suitable to sanitary use, limited cost, mountable structure, modular kind of construction, and fitness of solution) keeping the supposed solutions in mind.

Starting from the necessities it has been studied:

- the shape of single modules: containers ISO 20' where found the most adapted;
- the material used is resin poliesterre with fibreglass, a light material, whose cost can be low if the production cycle utilizes moulds and, in case of breakages, it can be easily restored with simple instruments provided in a kit;
- the development of structure plant is composed with ten units (including an operating theatre, a preparation and awakening ward, an intensive care unit, a sterilization department, an analysis laboratory, x-ray treatment, sanitary fittings, little kitchen and a warehouse).



The complex is covered with a pneumatic tent of big dimensions as a second skin

The internal spaces turn around a central passage made of a module which in its transportation phase it is used as the tent container and, during the sanitary phase, it's used to arrange the internal rooms.

During the planning stage we have restricted the modules which needed waterworks and sewer system; while every module is provided with air conditioned, the operating theatre is provided with filtering air and medical gas.

Some accessory structures are suggested to the surgical centre according to different organizing modalities.

The complex is provided with a very large tent which cover all the structure and basic services like triage, patient recovery ward, refectory and bedrooms for working people.

This is also used like a double skin to permit natural cooling of the whole the surgical centre.

The structure is assembled and disassembled by non specialized staff but by someone who has followed a specialist training directed by a logistic instructor.

The instruments to use during the assemblage are simple and easy to find even in developing countries, eventually the parts of the modules present common characteristics and the high flexibility reached permit an easy assemblage.

abstract of the index

INTRODUCTION: Ranges of application of proposed study work

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- 1.3 Emergency: the organization and humanitarian activities
- 1.4 The civil protection during catastrophes: logistic and organizative aspect of the field structures

CHAPTER 2

- 2.1 Emergency and technology
- 2.2 Catalogue about technologies of temporary buildings systems

CHAPTER 3

- 3.1 The prefigured scenery
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- 3.3 Technological details: problems and possible answers
- 3.4 First distributive hypothesis of planning for surgical emergency modules
- 3.5 Review of the hypothesis of distribution and technological proposal

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- 4.2. Final technological hypothesis for surgical emergency modules

CONCLUSIONS AND FUTURE SUGGESTIONS

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Abstract of the index with most important aspects of the work with an abstract of 18 enclosed tables

The modules are sent on place and prepared by the necessary equipment. The distributive project of emergency complex is the result of the continual confrontation with the hospital technicians and the operators in phase of emergency. It has been also provided with an equipment and the instruments to prepare the surgical centre with approximative indications whose choice has been effected on the base of convenience, small dimensions and performances obtained from visits at sanitary and emergency trade exhibition.

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