

SUSTAINABLE DEVELOPMENT OF HOSPITAL STRUCTURES

presentation with the object

Korça (Korca) is a city in southeastern Albania, 186 km far from the capital of the state. The city is the capital of the district, with a population of nearly 255,000 inhabitants. It has mainly mountainous relief. There are villages in remote areas, where roads connected to the city are completely degraded, and, although not so far from the city, it takes 2 and a half hours to arrive at the hospital.

The object is The Regional General Hospital "Teti Koroni", available to all the Region. There are 3 separate hospital poles under the same administration, separated by a certain distance. The Main Hospital Complex (the proposed) includes the largest number of healthcare services, and the two smaller ones are: the Obstetrics & Gynecology Hospital, and the Pneumology Hospital.

Despite their degradation conditions, there are a number of respectively 120 and 90 available and functional hospital beds, with a usage index of 30%.

The first building dates back to the early 30's, and later were built the others, with occasionally reconstruction interventions time after time, until the early 2000's.



The Hospital offers these health care and medical services:

- Total Health Care Services
- Surgical Services
- Pediatric Services
- Obstetrics, Gynecology
- Pneumology Services
- Infectious Services

2. General Functional Issues

Obstetrics and Neonatal Departments are located in another building, away from Department of Pediatrics in Main Hospital Complex. Department of Pneumology and Ambulatory Care Center are also away from the Main Hospital Complex.

General issues of Main Hospital Complex are:

- Communication difficulties between departments for patients, medical staff, and other in- and outdoor services.
- There seems to be many entries without a specific target group of users, which makes them difficult to control.
- Target group paths aren't well-defined inside hospital hallways.
- There are mixed paths for transporting both sterile and infected products.
- Lack of dedicated access for emergencies.
- Departments of Radiology, Neurology, Pediatrics, and ORL aren't connected with indoor constructions.
- Lack of elevators for patients transport with stretchers.
- Lack of common areas, and general services for patients, patients' companions, and visitors.
- Lack of reception halls, and meeting rooms with patients.

European Hospital Design In Based On:

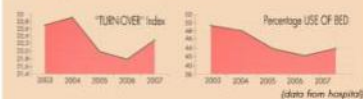
- Flooring related departments, and services close to each other or one above the other.
- Clearly differentiation of an ambulatory health block, and separation of it by the recovery rooms.
- Creating an area separated from health activity.
- Projecting all surgical units of the same floor, creating a surgical block.
- Dividing exits and separate outdoor roads for: emergency, morgue, visitors, and staff.
- Connecting Department of Emergency, Department of Radiology, and Surgical Block with the shortest distance and straightest route possible.
- Installing elevators for sterile and infected products separately.
- Possibility of building underground hallways for products with elevation dist. no from route.
- Considering "Main Street" of a great importance in Slab Type Hospitals.
- Necessity of Radiology and laboratory in all the departments.
- Projecting signage logics.
- Considering the reception hall and public areas as "heart of the visit", based on both European Standards, and actual building structures.
- Including Pneumology, Obstetrics-Gynecology, and Neonatology Departments among Main Hospital Complex.

3. Hospital Data Study

Diseases situation: Common diseases in the region are:

- Diseases of the respiratory system.
 - Complications during pregnancy.
 - Diseases of the gastrointestinal system.
 - Diseases of blood circulation system.
- Recently is shown an increased number of people affected by cancer and breast cancer in men (very rare case).

"Turn Over" Index. The average of "Turn Over" index for 5 years from '03 till '07 is 22%. The average of the bed use index is 45%.



Confrontation with European Standards for indexes

"Turn Over" Index. According to Italian Standards, the "Turn Over" index should be approximately 45%, and bed usage around 80%. The Hospital needs an Oncology Department and a Pain Clinic. Cardiology Department, Internal Diseases, Gynecology and Neonatology Department need to be resized. Based on indexes above, it is necessary to resize Departments which have surplus or deficiencies in beds. The results is the necessary to reduce the number of beds.

1. Hospital Category and Typology

The object under study is included in the category of REGIONAL GENERAL HOSPITAL. All the Albanian cities has the same system of hospital buildings scattered in the city, like very rarely seen in Europe or not at all. The Main Hospital Complex is composed by 6 Departments, divided in three buildings. This is why the hospital is called a Ward Type.

European Hospital Category and Typology

Except for mentioned-above services, European Hospital of the same category has: Urology, Nephrology, and Dialysis Services. Inherited Ward Type Hospitals in Europe are being replaced with compact constructions, like Monoblock-Construction Type, Lower Type-Construction, or Slab Type Construction. They have also Urology, Nephrology, and Dialysis Departments. They are connecting separated volumes with new constructions.

6. Proposals For New And Clean Technology

The impact of humanity in the environment is taking such dimensions that is affecting the delicate balance between humanity and nature, with direct consequences on human health and nature. This tends to guide us towards a really sustainable hospital who is able as to fulfill the demands of patients with effective and efficient interventions, also to establish a balance between the built structure and natural environment. Such an orientation requires the correct interaction with the environment through the use of intelligent technologies, able to answer the added needs of the hospital, with minimal energy consumption and pollution without provoking natural or human health.

Technologies for thermal comfort;

- Trigeneration furnaces for heating, cooling and electricity; • Passive and active solar systems for the benefit of heat, and electricity; • Active solar systems with thermo-thermal technology for heating and hot water; • Operating wind system for electricity profit.

Through some necessary practices we can have energy savings, as follows:

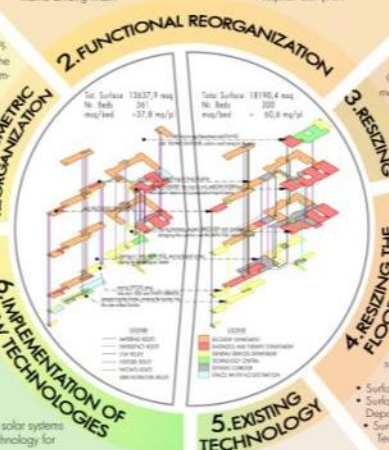
- Good thermal isolation; • Computerized control of lighting system, air conditioning, opening and closing of openings; • Usage of co-generating plants and heat pumps; • Control of thermal losses.

In the consequence the opinion for the functioning of the furnace that must co-generation to:

- Replacing the most polluting fuel (with high discharge of sulfur and carbon) with combustible material with less impact in the environment.

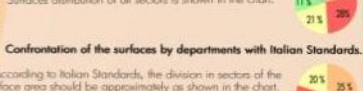
Management and waste treatment technology;

- Separation of waste by category; • Avoidance of the use of materials or unnecessary packaging (best way); • Reusage and recycle of metal objects, glass, plastic and paper; • Sending back all the chemical waste and expired materials and medicines to the pharmaceutical companies; • Usage of an incinerator to burn infectious waste
- Build a waste water purification plant.



4. ANALYSIS OF THE DEPARTMENTS SURFACES

Surfaces distribution of all sectors is shown in the chart:



Confrontation of the surfaces by departments with Italian Standards.

According to Italian Standards, the division in sectors of the surface area should be approximately as shown in the chart. Based on the results obtained above and on sectors facing surfaces, surfaces of sectors are regulated as follows:

- Surface area on Recovery Department is added.
- Surface area on the Diagnosis and Therapy Department is added.
- Surface area on the General Services and Technological Central Department is minimized.

5. EXISTING TECHNOLOGY USED

All facility consumes 202,300 liters of oil for heating, 1,092,107 KW/h of electricity, and 93,011 m³ of water annually.

Technologies used for Thermal Comfort are:

- 3 traditional oil furnaces in the three separate buildings
- 3 groups of chillers (air conditioner), only for the surgery rooms.

The technology used for WASTE treatment is:

- A DISINFECTANT Steam Machine for solid medical materials disinfection.

Hospital produces 1200 kg of non hazardous solid waste, and 250 kg of hazardous waste per day.

Environmental impact results in:

- Large quantities of emissions into the environment.
- The risk of infection spread.

In this topic the Hospital have; lack of proper structure for cleaning discharge into air, land, water, and solid infected materials.

The building interacts with the Natural Exhaustible Resources, WITHOUT An estimate of ENVIRONMENTAL IMPACT COST.

EFFECTS OF THE REORGANIZATION



Hospital can make us feel tired or can help us to relax?

The concentration of all health services in a single structure, completion with the missing spaces, the careful selection of materials, equipment, internal finishes, colors and proper lighting in the interior will help in psychological and comfort well-being of all.

EFFECTS OF THE PROPOSED TECHNOLOGIES



Hospital Can Make Us Sick, Or Can Help Us To Healed?

There is a direct link between the human healing and health of this planet. The intelligent technologies are able to answer the needs of the hospital without provoking additional the environmental pollution.

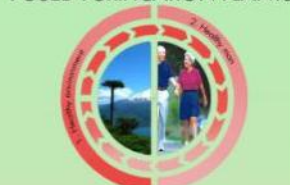
EXPECTATIONS OF THE PROPOSED TECHNOLOGIES



Is it possible that the hospital can maintain the balance between human and nature, or not?

Hospital should reduce the consumption of renewable resources, and complete demands of patients with effective and efficient interventions, in order to define a balance between the built structure and natural environment.

EXPECTATION OF THE PROPOSED PURIFICATION PLANTS



Is it possible that the hospital can maintain the balance between himself and nature, or not?

With the objectives and proposed treatment plants, less smoke and solid waste will be discharged. The waste water purification plant, can make that the clean water could be reused for sanitary services and irrigate the garden. The environment will be cleaner.

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