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### The New Martini Hospital Groningen

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The Martini Hospital was founded in 1991 after a successful merger of two medium-sized hospitals, the Roman Catholic Hospital Groningen and the general Christian Diaconessenhuis Groningen. Until the opening of the new building in 2007, the hospital is situated at two separate locations. The Martini Hospital is a large general hospital. In 2005 more than 46 000 patients were admitted; approximately one third of them in day care. More than 270 000 patients visited the outpatient departments in 2005. The hospital has a top reference function for specialised burns care. One of the three Dutch burns units is housed in the Martini Hospital. Besides, the hospital has top clinical functions such as neurosurgery and hemodialysis/ peritoneal dialysis. Furthermore, the hospital is a teaching hospital. The hospital is situated in the capital of the Province of Groningen, Groningen City. Groningen City also accommodates the University Medical Centre. In the eastern part of the Province of Groningen there are three smaller hospitals.

The sustainability of healthcare buildings has decreased strongly in recent years. This is partly due to the fact that the technical and economical life span of buildings does not correspond with their functional life span. No one can predict what healthcare will look like 20 years from now. Any hospital will have to be able to grow with its users and the rapid changes in healthcare. Industrial buildings seem to be the right answer.

The starting point for the construction of the new Martini Hospital was to make the building flexible and "future proof", enabling it to grow alongside rapid developments in care.

The hospital chose the integral application of industrial, flexible and demountable construction (IFD construction techniques), which had never been used so extensively in hospital buildings in the Netherlands before. For this, the hospital received demonstration status from the Ministry of Housing, Spatial Planning and the Environment.

Furthermore, the hospital chose a patient-focused design in an attempt to create a healing environment for patients. By doing this, the building supports the hospital's philosophy that by paying attention to details, value is added to the care of patients. So, the interplay of many colours in combination with a lot of daylight will lead to a light and warm building where patients and professionals will feel at ease. For this article only the theme of flexibility and sustainability will be discussed.

#### IFD Concepts

Flexible building was chosen, too, according to Industrial, Flexible and Demountable (IFD) building principles. The new hospital will consist of eight building blocks of approximately 1000m<sup>2</sup> each per level, which are linked together like two chromosome pairs.

Central facilities, stairs and lifts are housed at the junctions. By cutting the total building block into eight parts, it is simple to dispose of parts of the new building should a shrinking scenario emerge.

A fundamental choice has been to deviate from the standard width of a hospital building block. Instead of a deep building block of 40m x 25m in width, a narrow block of 60m x 16m was chosen. This produces 30% more daylight, which does not only have a favourable impact on patients' recovery and the biorhythm of patients and staff, but also offers the possibility of converting building blocks into offices or residences without excessive interventions.

The building is flexible at all levels because of the uniform building blocks.

Installations are placed in a central shaft per building block, which consists of 80% generic spaces and 20% specific spatial destinations, so that the main structure stands apart from the chosen healthcare concept. Two building blocks have a more traditional hospital size and accommodate among others operating quarters, imaging techniques and nuclear medicine facilities. For these two building blocks, another form of flexibility was chosen, through insulated pipes outside on the façade so as to keep an optimum of arrangeability of the available space for the future. The generic spaces on these two building blocks might be exchanged for example for an extra operating theatre. Flexibility was sought in the construction, the exterior and the interior as well. On the outside of the building, extensions of 2.40m x 7.20 m can be added locally, potentially increasing the surface by 10%.

The Martini Hospital also applies a system wall which can be replaced or removed without having to be demolished and installations remain easily attainable. The design of these system walls effectively produces a sound insulating value of 48 dB from architectural floor to architectural ceiling.

#### Care Model Principle

The care model for the new Martini Hospital has been constructed around two principles, namely dividing care into elective and acute care and the forming of a nursing chain. Starting point for this care model is the fact that elective care (app. 85% of total care) is hardly or not disrupted by acute care. This concept is translated into the design for the new building.

The "heart" of the building is formed by the operating rooms which are divided into an acute part (high care) and an elective part (low care). This nursing chain going from the high to low care part of the Operating Block assures that it is not the size of the building block that defines the size of a nursing ward. The size of a nursing ward is flexible because the nursing wards are designed in the form of a chain. Wards can shrink and extend by using beds from an adjacent ward.

#### Floor Levelling

Seen from the care concept the physical separation of elective and acute (emergency) care is translated into the function plan. This enables wards which strongly interact to be linked up horizontally and/or vertically. Concretely, the distance from the ambulance entrance to the operation block entrance is less than 30 meters. Where on the high care side above all the input of the patients is the guiding principle, on the low care side it is the input from the operating rooms. On this side the volume for most of all the ever increasing number of day care is determined by the speed with which a patient can go to day care after an operation via as short a stay at the recovery room as the recovery rooms and day care units "overflow" area.

#### Space

Almost all spaces are equipped with a demountable system wall which includes at regular intervals a metal built-in rail. In this built-in provision there is a click-in possibility for sockets for the use of wall plugs, data connections and medical gases. The wall plugs can be connected by means of a flexible line with connector to a distributing-box above the lowered ceiling. This wall makes it possible to alter spaces in a dry and efficient manner. However, it is to be expected that the same space will alter in function so that other appliances must be taken up. Here extending the number of data points and the adding of medical gases should be kept in mind. Certainly with the expectation that much more apparatus than at present will be connected to a central network, it is good for present day building elements to offer adequate solutions.



#### Customers and the New Concept

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The flexibility of the construction plan has a two-sided effect on the users. On the one hand it makes them feel they can change everything if need be, increasing their empowerment and consequently their motivation, but on the other hand it also has the effect of having people think they can change plans at any moment. During the building process this is certainly not the case as one depends upon contracted building planning.

### **Conclusion**

Because of this optimization, accommodation has become an important theme for Dutch hospitals. Topics such as activity-bound spaces instead of person-bound spaces, widening hours of opening and working, so that spaces and capital-intensive apparatus are used more are now regularly discussed. ICT is a crucial element in this debate, as space for healthcare activities must now be made available independent of time and place.

### **Flexibility**

As a starting point for the new plan flexibility, changeability and durability of the building concept were chosen. The building would have to be able to grow as it were together with its users and the rapid changes in health care. Industrial building seems to be the appropriate answer. In the new Martini Hospital this is carried through in detail.

The new building of approximately 58 000m<sup>2</sup> adjoins the eastern side of the existing hospital (35 000m<sup>2</sup>). A sophisticated housing vision has been developed for an optimum usage of the available space on the plot for the coming 40 years. In the coming period new buildings at the end of their life cycle can be removed easily via a sophisticated hopscotch and new buildings can be built alongside as well.

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