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date: 8 September 1992

OBOM University of Technology Delft

CTC INDEX

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**presented at the
international conference**

**FACILITY MANAGEMENT
EUROFORM '92**

Rotterdam

September 1992

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CAPACITY TO CHANGE

Every building has the capacity to change and to adapt to changing needs. However the building industry knows a long tradition to look at buildings in a static way. In this paper the point is made to develop a method which determines the capacity to change.

PROBLEM: STATIC BUILDINGS IN A DYNAMIC ENVIRONMENT

A combination of three real estate agents has published "the REN Code", a checklist to describe office buildings and office sites. (Zadelhof e.o, 1991). Almost all of the over fifty check points refer to the status quo of offices and offices sites. Some more dynamical points like "continuity" and "exploitation" describe the quality of building materials in relation to maintenance. The checklist gives little indication of the building's capacity to change. The element of change introduces a dynamical aspect to buildings that are static by nature. The element of change needs to be looked at in more detail.

Changing demands

We all know examples from our own experience of buildings too small to accommodate the required programme. This is illustrated by the new building for the Ministry of Housing, Physical planning and Environment in The Hague. Even before completion it turned out to be too small to house all its employees.

Obviously the demand has changed relative to the programme when the building was designed.

Non-fit of supply

A quick look around tells us that many (new) office buildings are for sale or for rent, especially in newly developed office areas at the periphery of big cities, close to the intersections of highways.

Obviously the supply anticipates on a not (yet) existing demand.

Quality of the environment

The quality of a building is largely determined by its surroundings. The infrastructure makes the building work. The buildings capacity to change also depends on the infrastructure and the way the connection is established.

The infrastructure can be looked at in terms of energy supply, communication facilities, traffic connections and so on. In addition it includes the physical environment, in other words the quality of urban space. The quality of the environment is another important element with regard to the capacity to change. Office districts may become ghost towns after office hours, lacking free social control and therefore resulting in high security and maintenance costs. The quality of a building is determined by its environment, the environment is made by its buildings. Buildings and environment are interrelated.

Office buildings in attractive environments make the buildings more competitive and therefore more likely to become subject to change.

Capacity to change: a new characteristic

Changing demand raises the question of changing buildings. Whether or not adaption of buildings is justified depends on the building's capacity to change and on the quality of the environment in relation to the building. If the capacity to change can be described unambiguously it would give us a tool to compare office buildings. This can be useful in new buildings as well as in the existing stock.

Levels of decision making

The concept of levels (Habraken, 1983) gives an indication of one aspect of change. It distinguishes different levels of decision making in the built environment (for example: the building environment, the building and the infill of the building). It tells us something about the *dependency of decisions* on the levels mentioned.

Structure

The support structure as well as the internal traffic structure of office buildings is another indication of the capacity to change. Support structures can be categorised. Every category has its own possibilities and problems to cater for internal changes. This categorisation tells us something about the *dependency of support structure, ducts and services*. (SBR, 1980).

Building parts

Change of buildings always takes place by reorganising building parts. Building parts can either be closely connected or loosely fitted. The way building parts are connected and can be taken apart is another indicator of the capacity to change. *The dependency of building parts* can be pictured in dependency diagrams (Habraken, e.o 1985, 1987).

CTC Index

The combination of the three above mentioned characteristics could result in a "finger print" of the office concerned. Let us give it a name, let us name it the CTC index, the Capacity to Change. The CTC index could be a useful addition to the check points mentioned in the REN codes. The REN code describes the statical aspects of office buildings, the CTC index the dynamical aspects.

CONCLUSION

Office buildings are in a constant process of change. Every building has its own capacity to change, it would therefore be interesting to take the building's finger print of change. This can be valuable information for decision makers in the building industry.

The CTC index can be a means to describe the performance of new buildings. If the CTC index can be determined for an existing building, the same can be done for a design. The CTC index can be a tool to judge office buildings in the design stage.

the CTC index can be used to compare existing buildings on their capacity to change, thus being a tool in the management stage.

The OBOM Research Group has done extensive research on the

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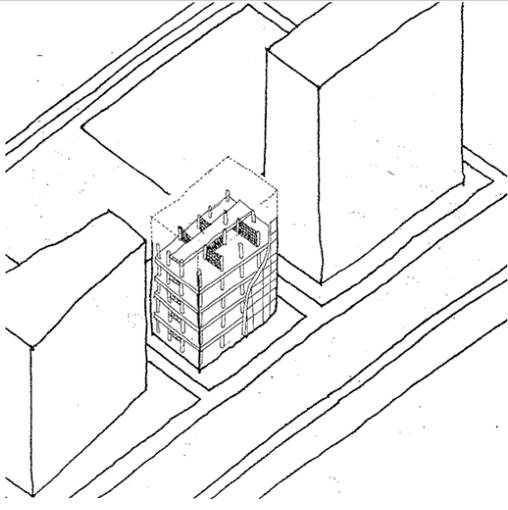
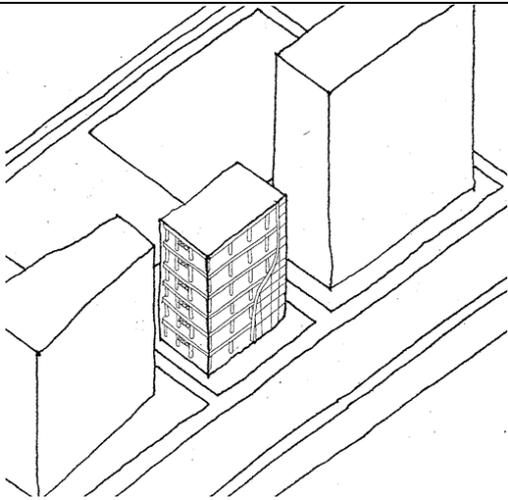
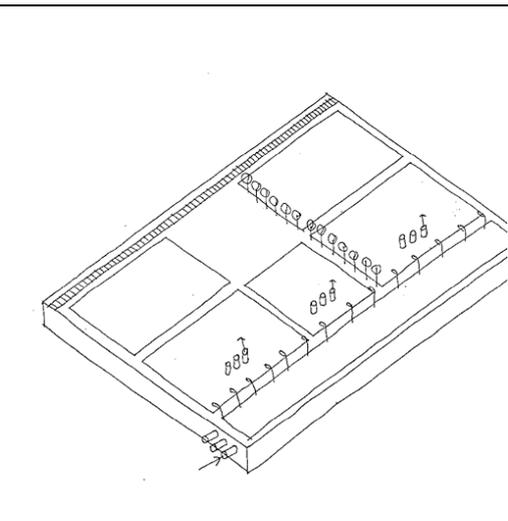
issues touched above and would like to take this research further with the help of parties involved in the office market.

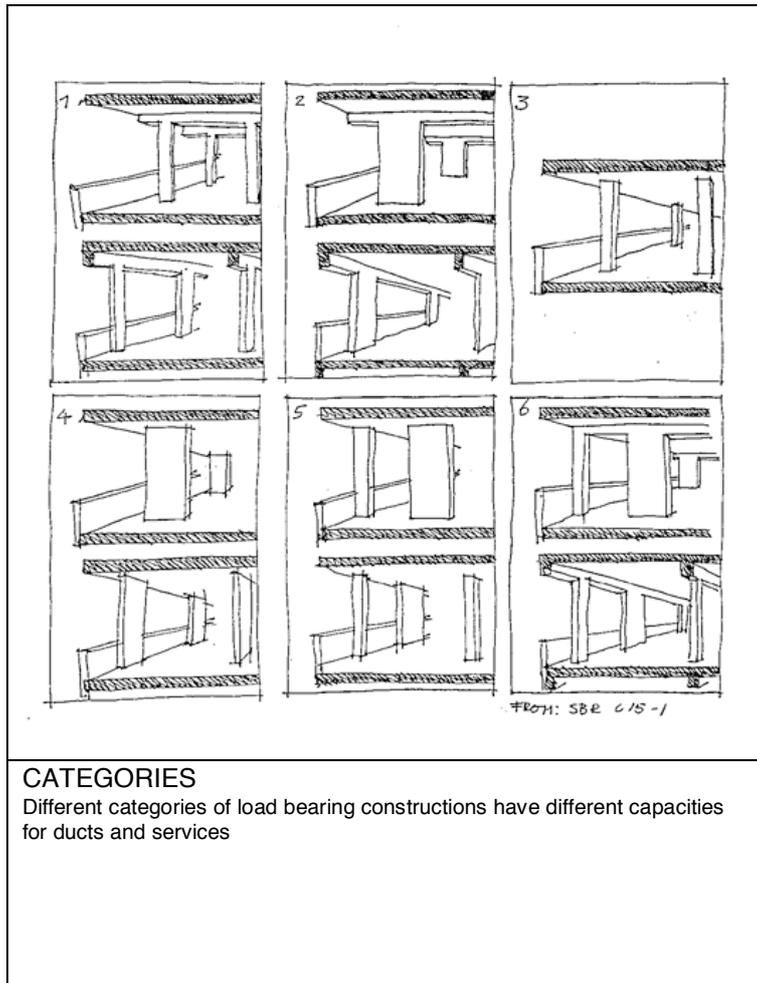
Delft, 8 September 1992

Professor Jan Brouwer,
Ype Cuperus.

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	<p>INFILL</p> <p>Infill level: Inner partitions</p> <p>Complies with rules and constraints of the (higher) level, has the capacity to contain the lower level, being furnishings and sets the constraints for the furnishings</p>
	<p>BUILDING</p> <p>Support level: Load bearing construction, building envelope, internal distribution of infra structure</p> <p>Complies with rules and constraints of the (higher) tissue level, has the capacity to contain the (lower) infill level and sets the constraints for the infill</p>
	<p>URBAN FABRIC</p> <p>Tissue level: Infra structure and building rules</p> <p>Has the capacity to contain the lower support level and sets the constraints for the buildings</p>



<p>FROM: ARCHITECTURE SYSTEMS</p>	<p>DEPENDENCY DIAGRAM 1</p> <p>Door and window frame The arrows point from the dependent towards the dominant elements.</p>
	<p>DEPENDENCY DIAGRAM 2</p> <p>Complicated diagram indicates complicated handling during construction.</p>
	<p>DEPENDENCY DIAGRAM 1</p> <p>Simple diagram indicates easy handling during construction.</p>