

**CONCEPTUAL MODELLING OF BUILDINGS**

**CIB W74 + W78 Seminar. October 1988. Lund, Sweden**

**Name : Ir. C.B. Maliepaard/ Ir. H.L. Swets**  
**address : Research Institute for Policy Sciences**  
**and Technology of Delft University of Technology**  
**P.O. Box 5030**  
**2600 GA Delft**  
**date : 12 October 1988**

**Keywords:**

developments in the field of building informatics in the Netherlands

**Abstract**

In spite of the important role of the construction industry in the Dutch economy this industry has been relatively slow in applying the power of modern computing and communication to improve its efficiency.

An initiative has been made by representatives of the national government and the construction industries to improve this situation. Although there are some bottle-necks, there is now a strong movement in Holland focussed on the decisionmaking process, the information process and the automation process in the construction industry: "IOP-bouw."

**TOWARDS AN INFORMATION TECHNICAL INFRASTRUCTURE IN BUILDING INDUSTRIES**

**1 Introduction**

The building process has a highly fragmented structure with many small independent firms, which in many cases have to work together on each project in different combinations. This structure necessitates a multiplicity of information exchange between, but also within, the parties concerned.



Therefore automation and computerization will increasingly dominate the construction industry in the years to come. The internationalization of the common market in 1992 will accelerate this process.

Within the Building Informatics Working Plan of the Innovation-oriented Research Programme in Building (IOP-Bouw), in the course of 1988 a number of spearhead activities are being performed. These activities are most closely linked with the process of automation and computerization. These activities are:

1. research aimed at a building information model (BIM), a generic data model - based on general agreements and standards - by which data that describing the building project in question;
2. research aimed at the creation of a Building Informatics Centre in the Netherlands (BIC-Ned), a neutral centre of building informatics intelligence, developed by and for the building industry.

## 2. Informatics in building: history

In the Netherlands considerable research has already been performed on the data exchange between the partners in the building trade. There have been many initiatives in this area by individual companies and organizations, and there was also a central focal point for all parts of the industry: UGCB (Association for a uniform Basis and Coordination of information in the building industry). One of the aims of the UGCB was to improve the computerised data exchange between the partners in the building industry. The UGCB should provide a platform where the problems of communication and coordination could be discussed. In spite of this central point for data-coordination there was no national coordinated approach. This was one of the main reasons for the UGCB to end her activities.

In spite of this, the developments in the field of information exchange have now proceeded at lightning speed.

Research in the beginning of the eighties showed that building, in comparison with other branches of industry, is lagging behind in the fields of computerisation and application of informatics techniques. The central government noted this and founded an independent body, the Innovation-oriented Research Programme in Building (IOP-Bouq) in 1983 with the aim of furthering innovation in building, including the use of modern automation techniques. The common thread behind this programme was the pressing need for efficient communication between the separate parts of the industry and between individual firms and organisations.

### 3. Information accessible to everyone in the building process

In 1986 the Coordination Team for Informatics was founded within IOP-Bouw. This team concerns itself with the creation of an informatory infrastructure in building: a system of agreements by which all parties involved in the building process can communicate with one another with the aid of automated information systems. By having application-oriented research performed at universities of technology and other research institutes IOP-Bouw informatics has laid the basis for the Building Information Model (BIM). This model offers a structure whereby it is possible for all parties in the building process to exchange data. This fosters efficient working methods.

### 4. The building information model (BIM)

(Leader of the project: Ir. P.H. van Merendonk Data Proces, Amersfoort)

The research performed so far has nearly led to a universally applicable Building Information Model. The first version will be ready in the beginning of 1989. This model can be used by all parties in the building process. The BIM is directed towards defining, describing and recording data on building projects whatever these may be, from a small house to a large office block. Use of the BIM creates a good supply of information, which monitors the link between the different activities and the information required, and, forms a guarantee for the total building process.

The architect, the administrator, the contractor, the principal, the adviser and the subcontractor prove to have a need for this. It saves them time and effort, and thus costs. The description of the data in the model takes place in accordance to international developments in the field of data modelling.

The model is universally applicable, for both large and small firms. The BIM is directed primarily towards the aspects of content: what data occur in building, which process needs what.

In other words: many individual building merchants, design offices, contractors etc. have invested in computer systems for internal communication but there is need for a system of communication between elements of each industry sector. When the BIM is 'ready', the BIM makes it possible to allow an efficient communication between agents in the building process.

The BIM is not dependent on a specific organizational structure or a certain way of management. If the structure of the data satisfies the agreements laid down in the BIM, it becomes possible to exchange data with the aid of computers. Moreover, the BIM can be of service in the presentation of project-independent data, such as building regulations and standards. It can serve as a stimulus for the development of new applications by software houses and as an initiator of agreements on classification, codification, the structure of drawings and of many other things in the building process.

The development phase of the Building Informatics Model can be described as follows:

- a. basic models: to establish coherent models of the parts of the building process e.g. design, construction calculation and maintenance.
- b. sector models: to make an evaluation of the basic models for analysing and structuring the processes of information-flows.
- c. integration-phase: to join the sector models with expected result the first version of the BIM.

### 5. Implementation of a Building Informatics Centre (BIC)

(Leader of the projects prof.dr.ir. H. Priemus, managing director of The research Institute for Policy Sciences and Technology (Dutch initials: OTB) of the Delft University of Technology, Delft)

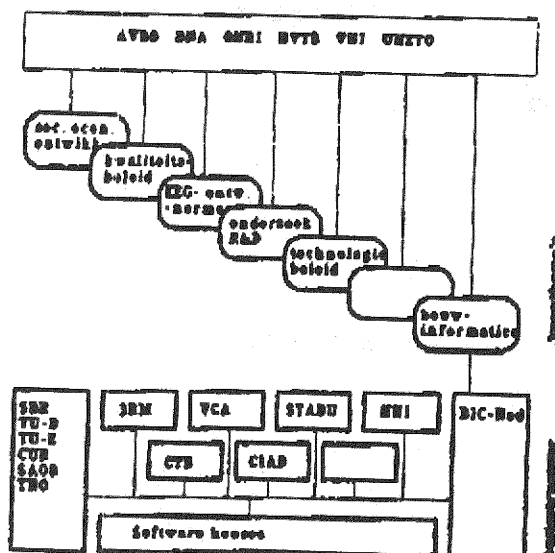
In this research project the Dutch building industry should be provided with a platform where the problems of communication and coordination can be discussed:

1. to develop the BIM;
2. to develop building databases.

And maybe other additional projects e.g. initiation and coordination of research and perhaps technology transfer e.g. courses can be set forth by this platform.

The main aim of BIC-Ned is to increase the business efficiency of individual participants through improvement of the communications of the building industrie as a whole. The most important difference with the UGCB is that informatics and the possibilities of modern technology structure the activities of the BIC and not -in case of the UGCB- the expertise of the structural engineer.

#### Organization scheme Building Informatics Center:



- AVBB = Syndicate of large Building Enterprises
- BNA = Royal Institute of Architects in the Netherlands
- ONRI = Syndicate of Engineers
- NVT = Union of building material suppliers
- VNI = Union of Installation Enterprises
- TUD = Delft University of Technology
- TNO = Technical research centre
- SBR = Research centre of building enterprises
- CUR = Research centre of concrete industry
- SAOB = Foundation of research
- IRM = Project of connectivity of hard and software
- VCA = Union of Architects using computers
- STABU = Foundation for standard specifications
- NNI = Institute of norms
- CTB = Centre for building software
- CIAD = Union of engineers using computers

## 6. Main problems in the field of the building informatics

It would appear that in the Netherlands there is a strong movement -IOP-bouw- solving the problems of data-coordination in the building process. The fact is that there are still some bottle necks.

In short the main bottle-necks are:

- a. One of the problems of the development of the BIM is the absence of a common language for the different agents in the building process in the form of a well performing classification and coding system as well as rules for its use. This is a basic need of efficient use of possibilities of computerization.
- b. A group of relative large constructors organised a platform ('opposited' to the initiatives of IOP-bouw) where the problems of data communication and coordination are being discussed.
- c. International activities such as ISO-STEP are not directly related to the activities of the IOP-Bouw.

## 7. More information:

For further information on the BIM and the BIC you can apply to the Program Office of IOP-Bouw:

The IOP-Bouw Programma Bureau

P.O. Box 20740

3001 JA Rotterdam

The Netherlands

or

Research Institute for Policy Sciences and Technology (OTB)

Delft University of Technology

P.O. Box 5030

2600 GA Delft

The Netherlands