Design Strategy for Industrialized Building System

Stratégie pour la conception d'un système de bâtiments industrialisés

Entwicklungsstrategie für eine industrialisierte Bau konstruktionsart

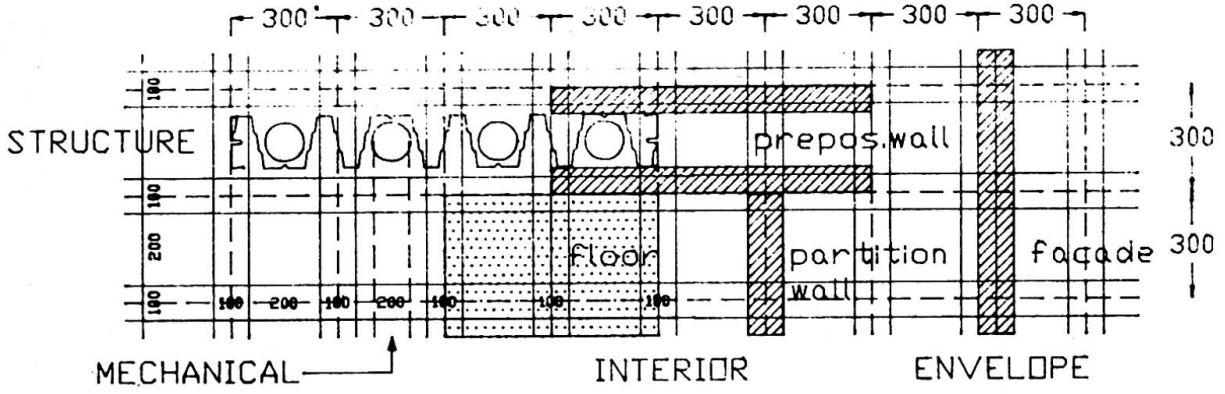
J.F.G. JANSSEN
Ing., Archit.
Eindoven Univ. of Technology
Endhoven, The Netherlands

The Industrial load bearing system for housing based on (de)mountable sheet-steel elements "STRUCTURE" developed by ir. J.O. Bats at the Eindhoven University of Technology forms a very precise and dimensionally stable environment, based on the principle of modular coordination, so that the finishing systems can be industrially produced with predictable tolerances and fitting components.

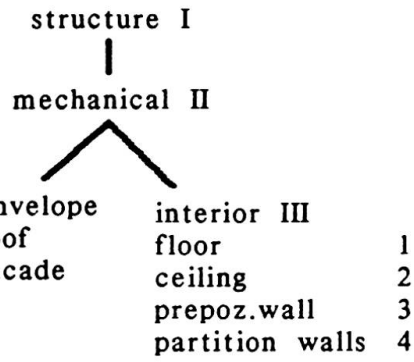
In addition to "STRUCTURE", we can distinguish another three main systems for finishing the building namely: "ENVELOPE" (subsystems: façade, roof), "INTERIOR" (subsystems: floor, ceiling, prepositioned and partition walls), "MECHANICAL" (subsystems: electricity, gas, water, central heating supplies, sewerage and communication).
The main conditions for developing these four main systems: structure, envelope, interior and mechanical are: (1) industrial production, (2) (de)mountable at all levels, (3) flexibility in use and (4) suitability for an open building system.

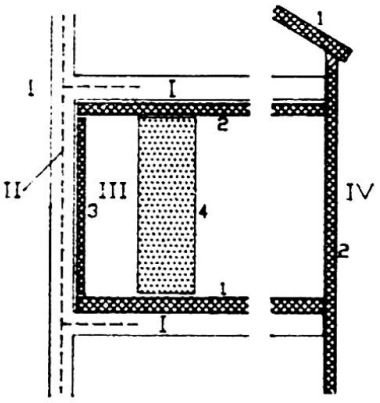
In order to develop of these four main systems, it is necessary to specify:
1. their place within a modular grid,
2. the building sequence,
3. the level of integration of the connections between the building components,
4. the technical requirements of the systems and their connections.

Ad 1. the location of every building component in the four main systems is defined by the same particular tartan grid based upon a 300 mm grid.

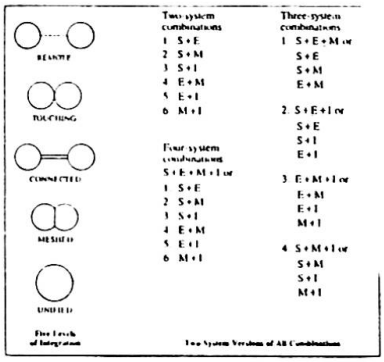


Ad 2. the building sequence of the three finishing systems: interior, envelope and mechanical, is also prescribed by scenario alterations for guaranteed flexibility in use and with different lifespans of the building components in mind. Accessibility of the piping systems is important in this respect.



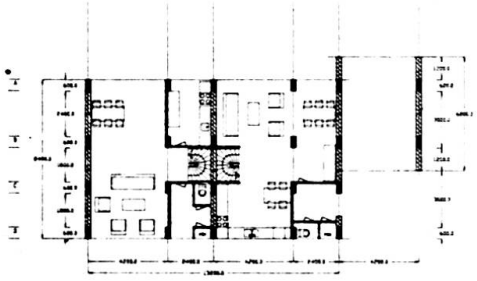


Ad 3. The connections between the building components are divided into five categories: remote (no direct relation), touching, connected, meshed and unified. In this sequence, five levels of integration are indicated.
The required level of integration of connections was approximated from a case study of planning an alteration from one spatial layout of a dwelling to antoher, for which considerable less building time is needed, if the connections between building components are as contiguous as possible and the building materials within a subsystem are to be as "unified" as possible, to ensure easily manageable building components.

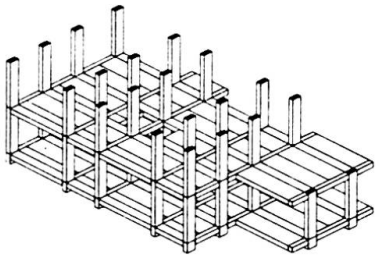


Ad 4. In addition to theoretical fire-protection, acoustics and strengthrequirements research is in progress on an experiment, scale 1:1 to test the building components in combination with each other in the field of fire protection, acoustics, handling and utility.

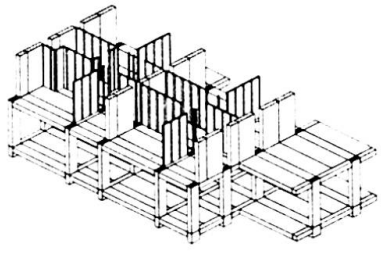
After describing the building components of the four systems it is relatively easy to make design studies and calculations of the projects by using CAD.
This includes:
- all the components of the load-bearing system . . . . . structure
- all the components of the subsystems, such as:
  floor - ceiling prepositioned walls and partition walls . . . . . interior
  façades and roofs . . . . . envelope
- all those of the installations . . . . . mechanical
- and all the agreements on modular coordination between the systems.
  These libraries become now related to each other in a special tablet within Autocad.



plan



structure



interior

References

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2. **Kantelberg, B.M.F., Optimalisatie van de variabiliteit van een componenten bouwsysteem (case study) (in Dutch) Afstudeerrapport T.U.E. 1991**
3. **Bats, J.O., Janssen, J.F.G., a new concept for Industrialised Housing. Proceedings IFHP-international congress, Chiba, Japan, IFHP 1989, pp. 35 - 42.**

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