

W060 - Performance Concept in Building

A highly productive meeting was held by W060 in Brussels on 3rd and 4th April last against the background of the International Conference on Technology Watch and Innovation in the Construction Industry.

Coordinator George Ang and Secretary Marleen Hermans produced a comprehensive account of what took place and extracts are reproduced below.

As they note: The Performance Concept in Building is an area with a broad research domain, which extends to all phases of the construction process, all stakeholders and all parts of the building.

This in turn means that the activities of W060 frequently impact on the activities of other Working Commissions that specialise in one or more sectors of this domain. Consequently it is advantageous for W060 to join forces where feasible. The CIB Pro-Active Approach acts as a catalyst in this interaction.

George Ang and Marleen Hermans have supplemented their report on the Commission Meeting by an interesting compilation of the different aspects of this interaction.

W060 Commission Meeting

Firstly to the meeting itself, whose participants received a cordial welcome from host Georges Klepfisch, CSTC, Belgium and himself a CIB Coordinator.

Developments Within CIB

To begin with, CIB Secretary General Wim Bakens reminded participants that CIB was currently focusing the research activities of its Working Commissions and Task Groups on priority themes. All WCs and TGs were asked to support those priority themes and to initiate activities on them.

One of the priority themes is "PBB Performance-Based Building" which comprises three main tasks:

1. To prepare a compendium of validated models of building performance
2. To prepare a report on economic benefits of using the performance approach
3. To prepare a compendium of statements of objectives and functional requirements

At its last annual meeting in Vancouver in 1999, W060 identified a number of tasks within these themes as key projects and appointed task leaders for each of them. It is envisaged that the first results of those tasks will be presented at the CIB World Congress in 2001 in Wellington.

Alongside those so-called "committed projects" there was also a possibility to start "Collaborative CIB Member Projects", where CIB member organisations cooperated in financing and executing research tasks. The earlier mentioned Compendium in the PBB Programme Task 1 is such a project under the lead of CSIRO, in cooperation with NIST, NBRI and W060.

Introduction of TG37 in W060

George Ang then welcomed TG37 Coordinator Beth Tubbs to the meeting.

The purpose of Beth's attendance was to liaise with W060 since the goals of W060 as a Working Commission coincide with those of TG37. Beth gave an update on the areas that TG37 is exploring and

the projects they are pursuing. She gave an insight as to how she saw TG37 interacting with W060.

More information on TG37 is readily available from Beth Tubbs, email: tubbs@icbo.org.

Value of Commissioning for the Performance Concept in Building

Tor Malmström described his work in the area of commissioning of building ventilation systems. He has been engaged on models and computer simulation programmes that can assist in assessing the expected performance of climate and ventilation systems. The concept of these models is very interesting for W060 since they focus on comparing design and actual performance as a means for operation control. It can also form a part of the Compendium to be made for Project 1.

The KTH in Sweden has developed a methodology to compare measured performance to design performance, derived from simulations for the actual operating conditions and outdoor climate. Deviations between measured and design performance indicating reduced performance are examined. Then, the simulation models are calibrated with measured data for the building, which then allows performance predictions for operating conditions other than those at the measurements.

The simulation models could then be used for operation control during the service life of the building. By comparing calculated and measured values, malfunctions could be detected and possibly diagnosed. Also, optimal operating strategies could be found. Using a graphical interface, this method could be a powerful tool for the building operation staff.

A model, produced to acquire experience from climate and ventilation systems, has been tested successfully in several buildings.

(Gudni Jóhannesson, Per Levin, Tor-Göran Malmström, Simulation as a commissioning tool for buildings. Measurements and measurement accuracy, KTH, Sweden, 1999.)

Lexicon, a Digital Construction Object Library

LexiCon is an object-oriented computer based tool for managing construction terms. The terminology refers to Built Objects and their attributes. The terms identify the products resulting from construction activities, such as buildings, roads and their parts, as well as products to be incorporated in these construction products or to be used as construction aids.

The Built Objects are described by the three characteristics: Components, Functions and Quantities. Furthermore, the Built Objects have links to external sources which are called References.

LexiCon provides an instrument for the semantic storage of construction data. It supports the exchange of these data between applications.

STABU is the Dutch national master specification and is the main designer of the LexiCon. The development of LexiCon is the result of international cooperation in, among others, several ISO Committees. LexiCon probably may be of help in executing Task 3 of the Performance Concept in Building: the compendium of terminology.

(Information based on "The Lexicon", by Kees Woestenenk, STABU Foundation, 2000.)

Project 1. Compendium of Validated Models Based on the Performance Approach

This is a CIB collaborative member project of CSIRO, NIST and W060 (Greg Foliente) whose end product will be a publication entitled CIB Compendium of Building Performance Models.

The Publication is expected to serve as a "one-stop shop" for the industry and research community. The compendium will offer an overview of models that are needed to support, implement and further develop the performance concept in building and construction.

The request was made to W060 Members to help to fill the Compendium and, if possible to commit themselves to provide information on models in a specific region.

Funding for this project is being made available.

(More information on this project can be obtained through Greg Foliente, email: greg.foliente@dbce.csiro.au.)

Project 2. Economic Benefits as a Consequence of the Performance Approach in Building

The output required from this project is a Report on the economic benefits of using the performance approach in building and construction. The Report will contain benchmarking and evaluations methods that allow quantification of benefits and should provide relevant case studies.

Three key topics will be covered within the framework of the project:

1. Benefits of performance approach: a broad look at the beneficiaries and the kinds of benefits that they get from the application of the performance concept in building and construction.
2. Costing, Benchmarking and Methods of Comparison: to be able to quantify the economic benefits, some methods of benchmarking and comparison or evaluation are needed.
3. Case studies: Overview of projects where the performance concept has been used, using benchmarking and comparison methods to quantify the benefits of the performance approach. Evaluation of results.

Participation by other CIB W060 members is required to give feedback on the framework, to send in information on literature on economic benefits and on calculations models, and to supply information on possible case studies. As concerns funding the aim is to attract financial support from or through CIB.

(More information can be obtained from Marleen Hermans, through hermans.marleen@kpmg.nl.)

Project 3. Compendium of Statements of Objectives and Functional Requirements Based on the Performance Approach

Project 5. Strategic Real Estate Performance and Serviceability

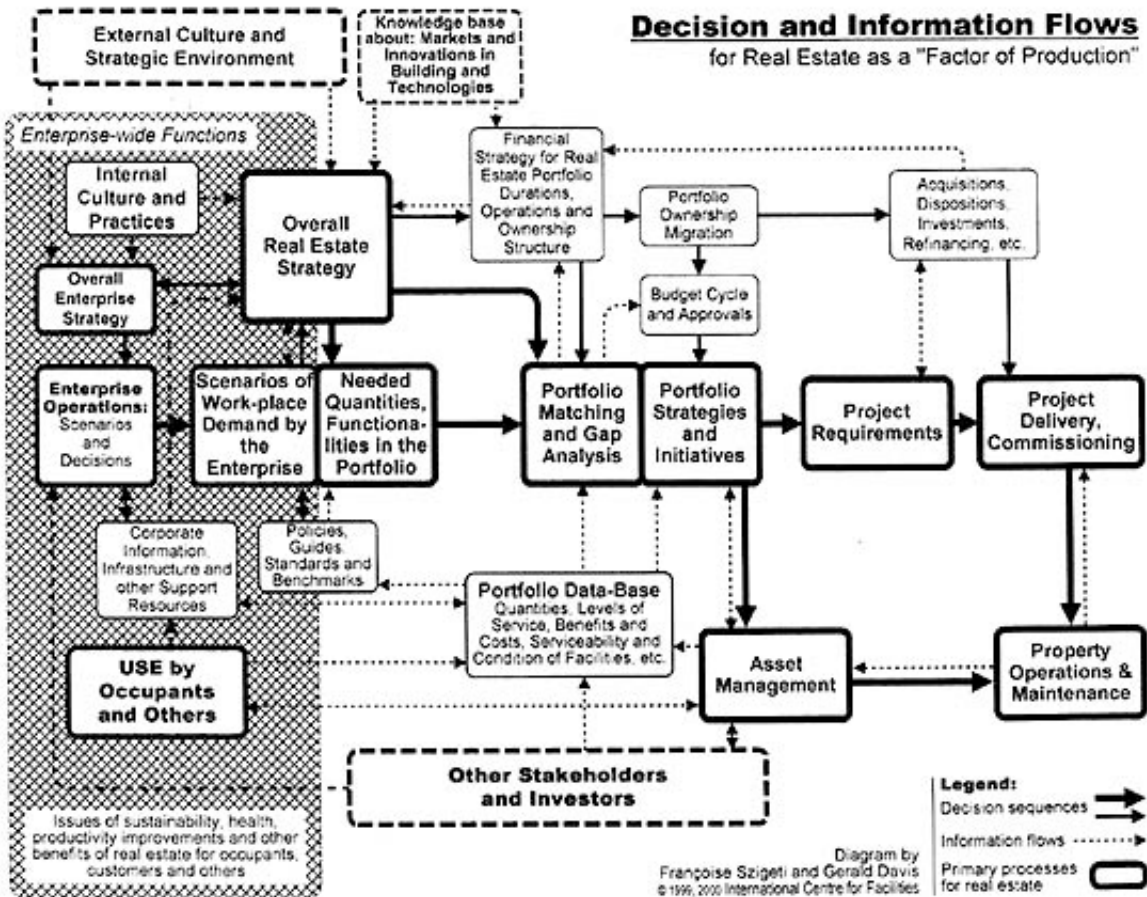
Gerald Davis and Françoise Szigeti presented their work on Projects 3 and 5.

It was pointed out that important issues in methods and measurements of client expectations of performance are:

1. Which is the scale of performance to be measured (products, components, materials or whole building and parts as perceived by the user)?
2. Whose expectations are concerned (occupant individuals, occupant groups, enterprises or owner, manager)?
3. Which process is covered (stages of life cycle, feed forward, feed back)?

For a business manager, real estate should support his organisational strategy. Portfolio management, asset management, facility management all are "derived" from this strategy. The performance of a workplace should also be related to it.

A flowchart was presented with decision sequences, information flows and primary processes to describe real estate as a factor of production.



Françoise Szigeti and Gerald Davis introduced a report with terminology and definitions on the functionality of buildings linked to this way of looking at buildings. A proposal on how to approach terminology will be formulated shortly.

As concerns funding the aim is to attract financial support from or through CIB.

(Those wishing to learn more about this project should contact Gerald Davis or Françoise Szigeti at info@icf-cebe.com.)

Project 4. Performance Based Procurement

This project had actually been initiated by former W070 Coordinator Dr. Lee Quah and W060 Coordinator George Ang. Its thrust is towards the orientation and preparation of the International State of the Art on the field of performance based procurement in building.

Currently a joint approach with W092 - Procurement Systems (Coordinator Prof. Steve Rowlinson) is under preparation. (For more information readers should refer to the Article which follows.)

(More information can be obtained through George Ang: george.ang@dot.rgd.minvrom.nl.)

Ideas for the W060 Website

Marleen Hermans introduced the work done by students of Fried Augenbroe, who have progressed to the stage of making a proposal for the lay-out of a website.



David Wyatt outlined proposals for the contents of the Website to be used to fill the lay-out. Important items are the W060 working area and vision, the ongoing W060 projects, its publications, its members (link to CIB homepage) and links to the webpages of related working commissions or research institutes.

Hopefully, the website can evolve to a platform for discussions on all topics relevant to W060.

(More information on the website can be obtained from David Wyatt: d.p.wyatt@brighton.ac.uk.)

Other items which received attention on the full agenda were preparations for the W060 contribution to next year's World Building Congress (contact George Ang george.ang@dot.rgd.minvrom.nl or Marleen Hermans hermans.marleen@kpmg.nl) and the possibilities for cooperation with W102 and W104.

As indicated earlier, these latter two are addressed specifically in the next Article.



Interaction between W060 and other CIB Working Commissions and Task Groups

By George Ang and Marleen Hermans

This second Article from W060 gives an overview is of the current interaction between W060 and other CIB Working Commissions and Task Groups. The CIB Proactive Programme serves as a catalyst in this interaction.

It should be noted that by way of complementing the activities mentioned below, W060 members also participate in other CIB Commissions and in various ISO Committees.

Interaction with TG37 on Performance Based Building Regulatory Systems

TG37 investigates the possibilities for performance based building regulations. The goals of W060 coincide in part with those of TG37. The main shared area of interest appears to be the establishing of Objectives and Functional Requirements.

TG37 has 4 major tasks:

- Qualitative vs. Quantitative

What parts of building regulations are qualitative and which are quantitative. In this task, TG37 is engaged in collecting case studies and performing country studies. There are different approaches in different countries when determining to what level buildings do perform. The aim is to define a framework to allow decision analysis: what will the building achieve when exposed, for instance, to earthquakes etc.

- Multiple levels of performance

The levels used depend on the type of building. Performance requirements vs. actual performance. The activities in this task aim at drawing up a list of acceptable solutions.

- Acceptable Solutions

Standards of acceptable solutions and the assessment of performance during the building process. Specific links with W060 approach on performance requirements, performance-based briefing, methods of measurement and assessment are expected in the near future.

- Standards

This task tries to set the first foundation of a performance code

W060 appears to have a somewhat broader topic area than TG37. Regulatory issues are not the principal focus but a subset of the total area. Part of the reason is that regulations typically focus on basic safety and not on function and serviceability of buildings. W060's projects focus on the overall process including emphasis on performance procurement process for construction and how that interacts with the overall real estate process. More information on TG37 can be received from Beth Tubbs, email: tubbs@icbo.org.

Interaction with W092 on Procurement Systems

A joint approach with W092 Procurement Systems Coordinator Prof. Steve Rowlinson is under preparation. This project can be considered as a project within the context of the CIB Performance Based Building programme:

- A preliminary project description is available, defining the context, problem and the expected opportunities within the frame-work of the CIB PBB programme.
- An inventory of the terminology used within the area of performance based procurement methods is under preparation and a format based upon this inventory will be designed, suitable to collect data from best practices on the issue.
- Members of W092, W060 and other CIB experts will then be invited to submit their data of best practices in these formats and finally these data will be processed in a joint W092/W060 report and presented at the CIB World Congress 2001.

(More information can be obtained through George Ang: george.ang@dot.rgd.minvrom.nl.)

Interaction with W102 on Information and Knowledge Management

W102 - Information and Knowledge Management Coordinator Colin Davidson and George Ang are currently investigating the opportunities for co-operation between W102 and W060, possibly in a joint project within the CIB PBB programme. It is the W102 belief that adoption of the performance approach to the design of buildings and the subsequent specification of products and materials, imposes novel requirements on the flow of information within and into the building process. The W102 problem areas are:

1. Information required in order to proceed from the functional programming step to establishing appropriate performance criteria.
2. Information required in order to evaluate the performance characteristics of a design in the course of its being developed.
3. Information required in order to specify materials and products in performance terms.

W102 is interested in sharing experience with W060 members in order to develop responses that correspond to a real understanding of the stakes. Nowadays, much can be done by electronic communication and a W102 list server can be found at www.cibat.gc.ca/list (sign up under the CIB W102 option).

Interaction with W104 - Open Building Implementation

At its Conference in Brighton, UK in September 1999, the initiative was taken for a new W104 project "Open Building and Performance Specification", combining the research efforts of W104 and W060. Project leader Ass. Prof. Rob Geraedts, who is a member of both Commissions, states that the objective is to develop a decision making tool that deals with:

- Performance specification of the user demands on the different decision levels on the one hand and
- Assessment of the market supply on the different plan levels on the other hand.

The results of this joint project will form the frame of the performance specification of a decision making tool that can be computerised. A W104-W060 Report is under preparation and a joint paper will be presented at the CIB World Congress 2001. (Information: r.p.geraedts@bk.tudelft.nl)

