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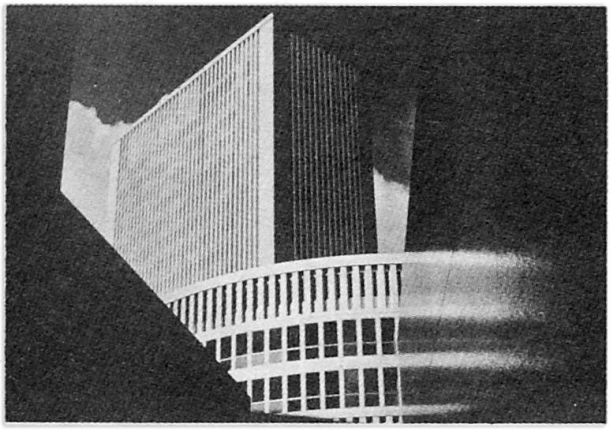
Vereinsnachrichten: Specification and performance in building standards

5. Specification and Performance in Building Standards[1]



It seems self evident, since we construct in order to obtain buildings that satisfy stated needs, that this satisfaction should be obtained by ascribing certain necessary properties to the structural units of which they are composed. This seems such normal practice among technical designers in all industries that anyone engaged in building should have no problem in applying the same notions of performance needs.

The burden of empiricism

Nevertheless, it is only a short time since this practice in building has grown, and plenty of people do not know what it is all about. There are two main reasons for this:

First of all, building is one of the most ancient activities, predating by many centuries the industrial era and the scientific principles on which it is based. Certainly building satisfied the needs of clients, but we did not always know ***how*** it did so; we knew how to build in a certain way but not why. This knowledge of good working methods – an accepted requirement in contracts, etc., – is transmitted by apprenticeship and in the form of simple «Do it this way» instructions. The rules are usually passed on verbally, in fact they are very rarely written down. Nevertheless, the terms of the building contract draw frequent attention to good practice or specify a particular technique. Recently, an effort to standardize materials has been undertaken, and this standardization also tends to be prescriptive.

The second factor which confounds recourse to performance specification is that there are two phases of conception in building and thus two groups of performance attributions.

There is the conception of the whole building and the mass of structural working detail.

The idea of «synopsis»

A rational approach to conceptualising would be, rather than strictly following tradition, for the architect to show its physical features and assign performance requirements to the whole construction or to certain parts of it – subassemblies or elements composing them: envelope, foundations, installations – at the same time as blueprinting geometric features.

At the blue print stage one would thus have a «synopsis»[2] of performance and a draft plan. At the planning level one would have architectural plans and a performance description of the structural details.

Whether it be by documentation or by classic architectural plan the first phase of design finishes here, with the conception of the whole building.

Next comes the realization of the structural elements, which traditionally falls to a sub-contractor and thence to a workshop or factory. There the working methods are applied by people who have learnt by apprenticeship and example. They know how to create traditional structures of course. But they can create in detail new structures which respond to the need for traditional performance in terms of the whole building. It is for them to create structures which will furnish the performance needs that could result from both «synopsis» and non-traditional performance descriptions.

All this is clear enough, so where is the difficulty? Basically it is that since 1945 professions have moved outside their established territories. Thus an architect is sometimes called upon to cope with the detailed design. One cannot deduce from this that the two phases of general and detailed conception must be confused, but simply that the designer now impinges on the workshop or factory tasks. Similarly, when a contractor is consulted on a client's programme or in relation to a rough plan he takes on part of the work of that client's architect.

The new ISO performance standards

To put such an organizational approach into practice normative documents are needed. What are they? (It should be noted that the United Nations Economic Commission for Europe has begun publication of a *Compendium of Model Provisions for Building Regulations* which is in the pure performance requirement style.)

During the 1970s, ISO/TC 59 *Building construction* was engaged in establishing a set of international standards which would be self-sufficient. It was realized that there was not the slightest chance of succeeding in the establishment of the several hundred standards required using the prescriptive approach. In performance requirements the number of standards necessary is reduced since a single performance standard covers all materials and products – for example windows of wood, steel, aluminium or plastics can all conform to the same performance requirement.

[1] Shortened version of an article which appeared in «iso bulletin september 1986».

[2] The word «synopsis» to designate «performance draft» of a building is little used at present, but the notion is fundamental to the change from empricism to rational conception.

Furthermore, experience has shown that it is quicker and easier to get international agreement on new concepts than on harmonization of existing and divergent national positions. ISO standards may be classed on three levels:

Level 1: fundamental or organizational standards giving principles or providing models for standards in the next level.

Level 2: standards common to a family of products in terms of performance, performance tests and dimensional features.

Level 3: specifications describing products.

Level 1

The following fundamental standards are published or are at an advanced stage.

ISO 1006 *Modular coordination – Basic module.*
ISO 2848 *Modular coordination – Principles and use.*
ISO 6240 *Performance standards in building – Contents and presentation.*
ISO 6241 *Performance standards in building – Principles for their preparation and factors to be considered.*
DIS 6242 *Expression of functional requirements of users – Thermal comfort, air purity, acoustical comfort, visual comfort and energy saving in heating.*
DIS 6243 *Climatic data for building design – Definitions and symbols.*
DIS 7162 *Performance standards in building – Contents and format of standards for evaluation of performance.*
DIS 7164 *Performance standards in building – Definitions and means of expression for the performance of a whole building.*

To which should be added standard vocabularies.

Clearly there is already a substantial basis here for the next level.

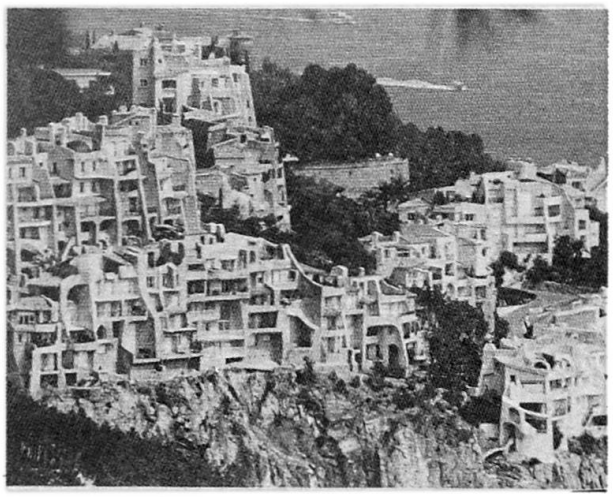
Level 2

The aim of international standardization is the exchange of products. In order that this should happen the most essential thing is not to fix their performance values (or ranges of values) but first to clarify how we express them and how to determine them.

Standard test methods are most urgent, but to make a list of them one would have to know what standards it is convenient to establish. This is why the work of TC 59 at level 2 began with draft standards expressing the performance of various elements. The test methods required were deduced from that.

The present position with this work includes:

ISO 7360 *Performance standards in building – Non-loadbearing partitions made of components from the same source.*
DIS 7361 *Performance standards in building – Performance standards relating to façades of components from the same source.*



DIS 7892 *Impact bodies – Impact resistance of vertical building elements.*
DIS 7893 *Partitions – Impact resistance tests.*
DIS 7894 *Partitions – Test for resistance to wind (static pressure and slamming doors).*
DIS 7895 *Façades – Tests for resistance to positive and negative static pressure generated by wind.*
DIS 7896 *Performance standards in building – Roofs made of components of the same source.*
DIS 7897 *Façades – Impact resistance tests.*
DP 8412 *Façades – Air permeability test.*
DP 8413 *Façades – Tests for ability to withstand suspended static loads.*
DP 8414 *Façades – Tests for ability to withstand suspended static loads on the internal face.*
DP 8415 *Roofs – Impact resistance tests.*
DP 8416 *Roofs – Tests for resistance to positive and negative pressure generated by wind.*

Other documents in progress include water retention of roofs, air- and waterpermeability of façades and several relating to dimensional coordination.

In fact the greater part of the required standards for test methods are virtually ready. Standards for expression of performance have been the subject of exhaustive study and it has been established that there are, for example, 31 performance standards that can be listed for a façade, of which only a dozen are in common use.

Moreover, standards for performance apply to «component structures». The components are those products the most likely to be the object of international commerce. Few modifications are required to apply these standards either to novel or traditional structures.

Thus from now on plenty of normative documents necessary to support the new ideas are available (often in the form of drafts). We can now justifiably hope that this is the beginning of a rational approach to building design.

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Building construction