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Summary

Pre-fabrication and Standardization
(page 37)

Pre-fabrication and standardization are very much in the forefront of discussion nowadays. There have always to some extent been pre-fabrication and standardization, for after all what are bricks and a great part of carpenter, glazier's and cabinet work but just this? But today pre-fabrication covers solid construction elements, e. g. supporting walls, partitions, etc. Increasingly large concrete elements, which we have been accustomed to see poured on the site are now produced in the shop and set up ready-made on the construction site. Although in a less spectacular manner, standardization has also been steadily spreading into the building trades. It should be clear to everyone that standardization of finished construction parts such as windows, doors, etc., i. e. restriction to a few types, which are then in large numbers rationally and therefore more cheaply manufactured, in the first instance leads to significant economies. Factory production of construction elements is in part a result of rising wages and displacements within the labour market in favour of specialized workers. In addition, pre-fabrication in the shop is prefered because it frees the builder from adverse weather conditions, which often delay construction and run up costs. Just as standardization inevitably leads to a certain excessive scale in dimensions of buildings, so pre-fabrication leads to the same result in the structural elements. Often the sizes have to be increased owing to transport and assemblage requirements. And on closer examination, it is frequently found that the relatively complicated assemblage methods partially cancel out the savings resulting from pre-fabrication and standardization. However, it is still much too early to form a clear conception of the relative advantages and disadvantages of pre-fabrication. Pre-fabrication and standardization are expressions of the modern spirit in building.

Multiple-Family Houses with Steel Skeleton at Porte des Lilas in Paris
(pages 38—39)

This is a fortunate combination of steel-skeleton and reinforced concrete in which all finished concrete surfaces were poured in such a way that they can be painted directly as ceilings or take flooring material directly on other surface. Basement and ground floor are of reinforced concrete. The steel skeleton takes all vertical strains and the force of the wind. It consists of transverse frames which are welded together as one unit throughout the entire height of the building, i.e. eleven stories, and set up in one piece. Ceiling elements poured on the site. Elevations are also of pre-fabricated elements 4.40 width (interval of steel skeleton). On the gable ends storey-high elements 440/250 cm. were utilized. These elements were on the longitudinal elevations placed on the floor elements which project from the steel skeleton; on the gable ends they rest on brackets which are welded to the steel transverse girders. Thus the elevation elements at all points are placed in front of the steel skeleton, so that difficulties arising from buckling are easily avoided. The interior partitions are non-supporting and consist of Dufaylite. They are also pre-fabricated so that no rendering is necessary.

Point-Houses of pre-fabricated concrete and porous concrete elements in Stockholm (pages 40—41)

Supporting parts: Partition elements one-storey high of non-reinforced concrete. Pre-fabricated parts: 1. Partition elements of non-reinforced concrete, 100 and 50 cm. wide. 2. Elevation elements of light concrete. 3. Stairs.
Sweden has an almost unique experience over the years with construction in elements. The point-houses published here reveal only one of many element-construction systems which have been developed in the last ten years in Sweden and are now being applied on a very great scale. An examination of the plan of one of the houses shows that point-houses here are built mostly of meter-wide concrete elements 12 and 14 cm. thick set up next to one another. The finish consists only of paint or plastic sprayed on for wall slabs and ceiling under surfaces.

Apartment and Office Buildings on the Quai Gambetta at Boulogne-sur-Mer
(pages 42—44)

Boulogne suffered heavily during the last war; more than one half of the buildings of the city were destroyed. The new city plan was undertaken with resolution and energy. The Quai Gambetta reconstruction comprises four staggered, point-houses alined east and west, leaving free view over the mouth of the river. Shop pavilions take up the intermediate green spaces. A heating plant for the whole complex adjoins the northernmost point-house. The problems arising out of reconstruction led to a marked development of rationalization in building; scarce and costly materials had to be utilized sparingly. Handwork had insofar as possible to be replaced by machine work. The concrete skeleton with widths of 3.60 m. and 4.50 m. is composed of longitudinal and transverse beams. The transverse beams are of reversed T-shape and support the ceiling elements. The elevation elements consist of 9 cm. thick water-proof reinforced concrete slabs. Their facing of hard, green beach gravel provides effective weather resistance. The slight weight of the exterior wall elements facilitates transport. The overall advantages of this system consist in the elimination of extensive facing and consequent scaffolding and in a simplification and unification of procedure, all of which results in an appreciable saving of time.

Installations and Laboratory Equipment of the Chemical Institute of the University of Munich (pages 45—47)

Up to now we know of only two examples where the laboratory installations were conceived as an organic part of the whole building: the Plastics Institute under construction in Darmstadt and the Chemical Institute of the University of Munich.
The Steininger team intended here to put an end once and for all to the "lab" atmosphere. They tackled the problem from the installation side. In addition to the ordinary building installations for light, heat, etc., a chemical laboratory on this scale also has to have ducts and lines, which can be changed to meet requirements and which can be extended if need be, for fresh water, hot water, distilled water, and drainage; furthermore, for gas, steam and compressed air; then, high and low voltage electric power lines and finally the ventilation and exhaust air ducts. All these lines, measuring here about 100 km., have to be brought together into the building and then distributed where they are needed into the various rooms. This distribution network is the starting point of the new plan; it led to the conception of dividing the central supports of the reinforced concrete rib structure and the cross girders to create shafts and passages to house the ducts and lines. The shafts are accessible at all points by doors, and the lines to the lab work tables run through conduits between the floor girders. The ventilation ducts are suspended from the corridor ceilings and are distributed from here into the rooms. The lines for fresh water, hot water, steam, gas, heat, compressed air and electric power are distributed horizontally in the basement and then led vertically into each axis.

New Paper Factory at Versoix
(pages 48—49)

Thorough studies led to the working out of a grid measuring 7.50 x 5.00 m. In spite of the various requirements this could on the whole be applied successfully. The traditional method indeed resulted in slender profile sections and slight bulk but at the same time entailed high facing costs. Pre-fabrication eliminates this disadvantage because less facing material and scaffolding is required. Three possibilities were examined for the girders spanning the 20.00 m. wide and 97.50 m. long shed: classical concrete construction, pre-fabricated and pre-stressed girders and steel construction. Concrete construction proved to be too expensive, steel construction proved to be too costly to maintain. The humidity here comes only to 70 % and the air has low acidity, and so only slightly deleterious. Small-pored concrete of Vobag elements proved in this connection to be highly resistant. The solution using Vobag pre-fab elements therefore involved a divided girder system to lessen the weight. The entire ceiling could be put in place within three weeks.

Pre-fabricated Houses in Vienna
(pages 50—53)

The architects were confronted with the assignment of working out a system of pre-fabricated elements for the erection of completely furnished and equipped houses. The aim was as far-reaching pre-fabrication as possible. For this reason purely grade-level single-family houses without basement and attics were prescribed, with 2—3 bedrooms and 66—112 sq.m., on the average 83 sq.m. of living area, sanitary rooms and wardrobe space. Every house possesses a storeroom located next to the kitchen, a completely equipped kitchen with range, sink, refrigerator and washing-machine, bath with tub, porcelain wash-bowl, hot water heater and WC and is abundantly fitted out with built-in wardrobes of all kinds in living- and bedrooms. The colour scheme is restricted to white, black, grey and the pure primary colours yellow, red and blue. All plans had to be based on use of one-meter wide slabs. The interior space is in part divided up by wardrobe elements, in part by non-supporting partitions. A pre-fabricated installation element was used in eleven houses. All houses are heated by gas-fired, thermostat-regulated hot air heating with hot air ducts in the floor and heating vents under the windows. Three houses are covered on the outside with asbestos-cement; two houses are boarded outside and inside with plywood.

Houses of pre-fabricated concrete elements (pages 54—55)

The material selected to meet these demands was concrete. Concrete is the cheapest and most popular construction material and when carefully worked one of the most beautiful. The basic element is a concrete slab measuring 1 x 1 m. The surface of this slab can be treated in various ways depending on whether it is to be used as a floor-, wall- or ceiling-slab. Owing to simplification of pre-fabricated concrete elements, there can be produced in the factory one house of medium size per day. The assembly of a house requires on the average four days of work, inclusive of reinforcing and concrete finishing of the roof and wall skeleton.

Row-House Project in Tapiola (page 56)

Cheap row-houses for families with many children were to be erected in connection with the garden city of Tapiola. They contain five rooms and kitchen with a maximum living area of 87 sq.m. The elevations are constructed of pre-fabricated wall elements two to three stories high, sizes from 0.7 x 0.5 m. to 2.6 x 6.3 m. Ceiling girders are concrete elements. Roof trusses are timber, also pre-fabricated. Roofs covered with galvanized sheet iron. Partitions consist of fibre-board slabs on wooden grid. Utility rooms located in one-storey out-buildings.

Plastic Materials and Industrialization in the Building Trades (pages 57—59)

Since the word Pre-fabrication became incorporated in the vocabulary of architects, the precise content of this term has been seriously misunderstood. In great measure the material utilized is responsible for this. For none of the well-known materials, such as metal, wood, concrete possesses all the necessary qualities for erecting a completely pre-fabricated building, produced entirely in advance in the factory. Without raising the question of aesthetics, pre-fabrication—or merely mass-production and standardization of structural elements as Le Corbusier proposes—no doubt fails to make possible a complete exploitation of all cubic and spatial possibilities. But "Industrialization" or quite simply, "Fabrication" is at the present time beginning to assume a concrete significance, and this thanks to a new group of materials: plastics.
Some of the principal properties of these products are as follows:
They permit unrestricted shaping into any desired pattern,
They provide excellent heat and noise insulation,
They are very light,
They are extremely tough,
They do not rot, they are water-proof, etc.
Already today partitions or entire wall sections, insulating solid floor and ceiling sections, complete sanitary installations, furniture, etc. are produced in the factory, ready to be assembled on the site. Tomorrow it will be possible to pre-fabricate entire dwelling, school, sanitary, hospital or industrial units and thus pave the way for a vastly new kind of architecture and town-planning. After these prophetic words we take pleasure in publishing a description of the plastic house shown at the Arts Ménagers spring Exhibition 1956 in Paris. The architect started from quite ordinary ideas on pre-fabrication and ended up by realizing the vast possibilities inherent in this revolutionary new material in the way of amazing designs.

Mobile Hotel Cubicle (page 60)

A mobile hotel cubicle has been developed by the Experimental Centre for the Application of Plastic Materials in Boulogne-Billancourt. It is of polyester-synthetic material and glass fibre, and has standardized, interchangeable parts. It is easily transportable weighing only 700 kilograms. Four adjusting screws enable the cubicle to be set up on practically any desired site. It is connected into the water mains, the sewers and electric power lines by three connections. The plastic material does not rot, is rust-free, fire-proof, provides insulation against heat, cold, noise and air, is shock-proof, completely stained through and as it were requires no maintenance of any kind.

Herman Miller Furniture Collection, Zeeland, Michigan (pages 61—64)

We have already referred in various earlier numbers of our journal to the Herman Miller Collection. In our issue on Pre-fabrication we are presenting element furniture for home and office manufactured by this well-known American firm. Production of uniform series demands great restriction in design and adherence to modest proportions.

Munkegaard Courtyard School at Gentofte near Copenhagen
(pages 65—72)

The plan called for a new schoolhouse for 850 children with a small-scale design creating an atmosphere of intimacy which is so vital in teaching small children. Courtyards measuring 14.36 x 8.52 m. surrounded by building averaging 2.40 m. in height form ideal places for undisturbed outdoor classes. On north two-storey section for special subjects, such as natural sciences and manual training; in centre, the characteristically Danish auditorium with stage, lighted from front. The various offices of the administration are housed in a two-storey projecting wing emphasizing the main entrances by the way in which they come forward into the quadrangle-like school yard. On west, the yard is closed off by a double gymnasium and leads through to the athletic fields. On east, a pavilion with playground for smaller children. Classroom unit is approximately square measuring 7.53 x 7.03 m. offers high degree of freedom owing to easily movable individual desks, which can be combined. Careful measurements and calculations in tests led to most uniform and shadow-free possible light conditions. Ventilation is continuous, not merely during recess periods. The rooms are fitted along their entire north side with an air vent for cross-ventilation. Every classroom has its own cloakroom which does not at the same time serve as corridor for children from other classrooms and for this reason can be used as a second, smaller classroom. All supporting walls running from north to south consist of yellow brick untreated. Partitions between the classroom units are composed for acoustic reasons of two 12 cm. thick walls with 6 cm. sand fill in between. From wall to wall there are laid pre-fabricated and pre-stressed concrete beams. They carry 20 cm. thick reinforced porous concrete slabs of slight weight and high heat insulation capacity. Roofing material consists of 0.8 cm. thick aluminium sheets on an under layer of roofing felt. Acoustic slabs suspended from the ceilings, into which are also fitted the flat, round lamps. The floors are covered with a seamless asphalt layer.