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Summary

Craig Ellwood Associates, Los Angeles

Plant for Electronic Computers in El Segundo, near Los Angeles

(Pages 42–49)

Craig Ellwood had to confront three problems in the building of this plant:

1. The owner wanted his building up as soon as possible.
2. The construction costs were not to exceed 10 dollars per sq. ft. (or around 100 dollars per sq. meter). $ 100. per sq. Meter).
3. The building was to possess o certain architectural quality.

Ellwood finished the building 6 weeks before the deadline set, less than one year after the drawing up of the construction program. The total construction cost is 2,400,000 dollars, or 9.50 dollars per sq. ft.
The structure consists of a steel skeleton with a span of 13 meters. Lattice girders have been placed, in the north-south direction, on steel columns. On each pair of columns, there has been set a projecting element, and, in between, a suspended element. Between the main girders, there have been placed secondary lattice girders, at intervals of 2.5 meters. These girders carry a roof with a steel-slat structure. The final main girders are 5 meters away from the east and west faces.
The distinctive feature of this construction is the exterior supports, set 1.5 meters in front of the elevations. This system creates working and office space running right over to the glazed walls. These supports, set in front of the building, are all composed of 4 steel I-sections which are cruciform in plan.
The lattice girders are likewise projecting. The exterior walls are built of nonsupporting interstitial elements, of reinforced concrete poured in situ. The visible surface is faced with coarse-grained concrete stucco.
At the point where each lattice girder penetrates the exterior facing, i.e., in the axis of the supporting system, there can be seen narrow glazed slits. Thus, apart from the main shed, the lighting and ventilation of the building are effected on an entirely artificial basis.
In the offices there has been installed a lower ceiling. The building represents a perfect unity, an uncompromising construction.

Aarno Ruusuvuori, Helsinki

Printing shop in Tapiola, near Helsinki

(Pages 50–55)

In a pine forest in the suburb of Tapiola near the Finnish capital, a new printing plant is being erected. The first quarter of the building was completed in 1966.
The basic principle underlying the construction envisaged, on the upper floor, an area reserved for production, if possible without supports, whereas the ground floor was reserved for storerooms and office space. The first floor measures 54×54 meters, divided into 4 squares of 27×27 meters. Each of these squares has a central support on which rests the roof. The ceiling has a construction height of 1.50 meters.
The foundation deck, underneath the production floor, has a load capacity of 200 kg/m². It rests on the pillars of the ground floor, with intervals of 9 meters.
To protect the paper from the sunlight, the production floor is lighted simply by means of a series of small windows beneath the ceiling along 3 walls of the shed. On the other hand, the northwest wall is entirely glazed.
The 4 pillars carrying the load of the roof measure 3 meters in diameter. The ventilation ducts are located inside these pillars.
Four emergency stairways run from each corner of the production shed directly to the outdoors. The production floor elevations are of prefab concrete panels.

J.-M. Lamunière, Geneva

Printing shop and bookbindery in Lausanne-Renens

(Pages 56–62)

The plans of the "Imprimeries Réunies" of Lausanne were published in Issue 1/65 of Building+Home. In connection with this building, 2 new structures have just been erected by the same architectural firm. What is involved here is an offset printing shop belonging to the Imprimeries Réunies and a bookbindery for Mayer & Soutter SA.
The 2 buildings are open on the north-east side. The heating plant serving the 2 enterprises is situated in front of the bindery. These buildings have a steel skeleton frame with reinforced concrete prefab ceiling elements. The steel skeleton is situated outside the production surface proper.
Pairs of connecting elements with U NP 40 masts run from one floor to the other via transverse steel girders (100/30) and are tied in with the roof by means of lattice girders. Between two steel supports we have glazed partitions, with translucent thermolux glass above and below, and, in the middle, transparent thermopane glass. The glazed partitions are reinforced by means of steel U sections.
Upon the transverse girders there have been placed reinforced concrete prefab elements. Their capacity is 1.5 t per sq. meter. On the upper level there have been affixed aluminium ceiling elements of the "Aciéroid" type. The walls of the stairwell are of raw sandstone. The 2 factories are furnished with air-conditioning installations and are fireproof.

Siegfried Lagerpusch, Flensburg

Hyperbolic parapoloid and folded structure

(Pages 63–66)

Figure 1: This represents an entirely new system of construction developed out of the utilization of 2 current systems already known to architects. The folded structure is familiar. Also well known is the hyperbolic paraboloid (Hp) and its geometric interpretation, growing out of 2 straight intersecting generatrices.
In the new construction method (Cf. figure 1), 2 folds are produced in cruciform plan, one over the other, in such a way that their angles are congruent with the straight generatrices of a Hp. Thus they form a spatial network of folding angles. This network is located in the surface of a Ph.
The two folds are contiguous at the points of intersection of the folding angles: figure 2.
Two folds enclose the doubly bent surface of a Hp without its folding strips being twisted. The geometric conditions are visible in figure 3:
The Hp is located on a square plan. The directrices have the same inclination and are divided into 5 equal segments.
The corresponding points of division are perpendicularly interconnected. These junction lines are straight generatrices of a Hp. The surfaces which they define with the segments of the directrices are parts of the doubly bent surface of the Ph.
In the quadrangle 33′4′4′, the diagonal has been drawn between the division points 3′ and 4′ located higher up. Thus 2 slightly inclined triangles are produced. They constitute a folding element above the Hp surface.
A second possibility is offered by the junction line between the diagonal points situated lower. Here, to the straight generatrices, there is added a folding element detached from the Hp surface.
At the second folding element, above the quadrangle 44′5′5, the diagonal points are situated on the straight generatrices prolonged outside the Hp. They can be fixed independently as desired.
The diagonal folding angle of intersection can be considered as the line of penetration of two planes emerging from the streight generatrices.
The various folding elements can be projected as many times as the desired fold required. See examples in figures 4 to 7. Moreover, the Hp can also be divided into different sized parts, as in figure 8.
The fold, in figure 9.1, is made up of 5 equal folding elements. The fold augments regularly and gradually towards the centre, above the two directrices. The straight generatrices each have the same length, and the Hp sector is no longer limited by the directrices, but by two spatial curves.
In the development of this fold there is obtained a rectangle divided into strips all of which have the same width: figure 9.2. The folding strips thus from a compact surface. This is significant for the folds mentioned heretofore, because they can be extended and compressed just like the bellows of an accordion. The accordion folds (figure 10) differ from the folds presented in section (figure 11). The latter are not extended nor do they compress without tearing the strips.
Figures 12 to 15 indicate the manner in which a Hp is covered with plane figures, use being made of the accordion folds.
In principle, each Hp can be surrounded by a plane that is folded regularly or irregularly (figures 16–18).
Since the Hp is a double generated surface, there can be projected on each of these folds a pendant. These folds and counter-folds form ta cross. They meet at the points of intersection of their folding angles: figures 17.1.
The moment of resistance of the folding elements can be modified thanks to the possibilities of their folds above the Hp surface. If we study 2 extreme cases, we shall see the importance of that in the supporting strength of this Hp:
Case 1: The spatial supporting apparatus which rests on its low points yields a fold which is as low as desired. According to the membrane theory, we know that the forces, in a mould, are displaced towards its edges there to be taken up and directed towards the support points which ought to be able to take up the vertical and horizontal forces.
Case 2: All the folding elements possess a high fold height.
Case 2.1: The supports can take vertical and not horizontal forces.
Between the supports, a curved beam takes the load on two supports. The beam possesses the required moment of resistance. The remainder of the Hp field projects on the 2 sides of the curved beam. The mould effect disappears in the application of this support system.
Case 2.2: The supports take vertical and horizontal forces. The forces are converted into longitudinal forces in the direction of the pressure parabola. The remainder of the Hp field projects on the 2 sides of the vaulting. The moment of resistance of Case 2.1 is hardly utilized.
Case 2.3: The supports can take restricted vertical and horizontal forces. The forces are deflected either into longitudinal forces or as flexion forces. The moment of resistance obtained is utilized in part for the conversion of the forces. The supporting force can be considered as an intermediate state between 2.1 and 2.2.
In the 3 cases, a marginal term is no longer necessary since only a small part of the forces is deflected above the edge, towards the supports. What is involved here is precisely the new factor of this construction. Up to the present time it was possible to influence the flux of forces solely by means of the formation of the marginal term. Now, this result is likepise obtained by means of the folding and the support conditions. Therefore the marginal term is dispensed with: figure 18.

Max Schlup, Biel
Associates: M. Scascighini, E. Studer

Convention Hall with indoor swimming pool and high-riser in Biel

Plan 1957
Execution: 1961–66

(Pages 67–80)

In 1944, on the occasion of the building of the Federal Athletic Institute at Macolin, the authorities of Biel undertook to construct an indoor public swimming pool. In 1956 there was initiated a competition for the construction of this swimming pool and of an administrative building. Nevertheless, the increasingly urgent necessity for a public centre with concert halls, lecture halls and theatre caused the swimming pool and the convention hall to be integrated in a large complex, on the old site of the railway station, in the centre of the town.
The site is level. It measures 10,400 sq. meters, one half of which is actually occupied by buildings.
The chief problem confronting the architect was to design a building meeting the special needs of the city, and the externals of the building were to correspond to its internal functions, any attempt at monumentality being carefully avoided. The 3 principal elements of the complex are represented by the low-silhouette tract, the high-riser and the suspended roof accommodating beneath it the foyer, the large swimming pool and the concert hall.
The convention hall constitutes the main part of the new building. It comprises 3 large halls, i.e.: a concert hall with a seating capacity of 1300, an assembly hall (seating capacity 300) and a lecture hall (seating capacity 200).
The restaurant, the swimming pool and the high-rise building are accessible from the foyer, which is constantly open. On the lower level we have the kitchen of the restaurant.
The entrance of the indoor swimming pool as well as the small and the large pools are connceted with the foyer, which fact contributes to the creation of a certain animation in this part of the building.
The indoor swimming pool comprises:
A pool measuring 15×25 meters with 3 and 1 meter diving-boards. Separate facilities for men, women, girls and boys.
A sauna, massage baths and showers for men and women.
A gymnasium.
Technical installations.
The 14 floors of the high-riser accommodate offices. They measure 220 sq. meters in area. 4 floors are occupied by complicated technical installations (telephone central, cooking school, etc.). The core of the high-riser houses the stairwell, lifts, freight lifts and shafts taking the mains.
To one side of the building, on the southwest side, are the smokestacks, the ventilation shafts and the emergency exits.
For the foundation structures there has been selected a combination of Bentonit slotted walls and injected insulation. The points where the 4 supports are located have been reinforced. The parts of the construction situated in the ground-water table have been faced with plastic insulation material.
The large swimming pool has been concreted in one single operation with a view to obviating joints. The coating selected is relatively water-tight.
The foyer, the large swimming pool and the concert hall have been conveniently united under one roof resting on 4 supports. Thanks to the construction of a suspended roof, it has been possible to dispense with other supporting elements. The high-riser is constructed by means of steel supports with concrete facing. It was only natural and indispensable that all the tracts had to be well ventilated and well heated and that the bathing be kept at a constant temperature. The heat for the whole complex is produced in a central plant containing 2 huge boilers. The hot water is then fed into exchanoers where the cold water from the mains can be brought up to the desired temperature. The entire installation is regulated and coordinated from a central switch-board..
The water in the pools is renewed 6 to 8 times a day by means of a regeneration plant. The water is purified by being passed through a filter. The water is chlorinated.
The 2nd basement level accommodates a high-frequency transformer station feeding all departments. Emergency generators guarantee a supply of electric power in case of a break-down in the public power system.
The illumination is effected by means of halogenic incandescent lamps in the halls and the swimming pool. In the foyer, there are clear bulbs whereas the high-riser, the changing rooms and the sauna are lighted by fluorescent tubes.