

Report on the preservation of the State Theatre in Hong Kong and its possible nomination on a Heritage list (1952).

By Jos Tomlow

DOCOMOMO International, Lisbon, (email of 07.03.2016 by Sara Saraiva, Collaborator DOCOMOMO International) asked the writer, to give his opinion on the heritage value of the former Empire Theatre on King's Road in Hongkong. The writer is member of DOCOMOMO International Specialist Committee - Technology. Some documentation like exterior old and new photographs and old drawings referred here for this report. One focus of the request was *"Regarding this subject (preservation of the State Theatre), it came up a relevant question on how rare the State Theatre's parabolic concrete roof trusses are. DOCOMOMO International was informed that this kind of hanging structure is unique in Hong Kong, but an opinion from a specialist is needed to confirm its uniqueness in the world."* The writer can be regarded as a specialist on modern light weight architecture, as may be clear by his bibliography and activities in organizing meetings on the theme. For time reasons no special references of literature or (well known) buildings are given here. These may be delivered on a later datum, when affordable.

I regard this theatre as very interesting from a technical and architecture historical point of view.

The New Empire Theatre built in 1952, designed by G.W. Grey, FRIBA and S.F. Liu can be considered as a piece of commercial architecture with high regards for functional aspects and at least partly an excellent piece of concrete construction both in architectural expression, structural logic and material execution.

The word "commercial" means that the building has an extremely lightweight character, what in that time was a way to save material, despite much labor, and what saved money. The published costs with 2 000 000 Dollars for a Theatre of 1173 seats (in one oblique level) and annex functions, may be regarded not very expensive for the after war time. The original drawings show an extremely thin wall and roof. Special attention is given to acoustics. On the other hand the given information suggests lesser care for the interior climate and the way the specific Hong Kong humid climate affects it.

1. city-scape

The building shows responds with its façade to dense city traffic (street crossing of King's Road). The oblique angle of the site caused by the roads asks an inventive solution for the plan lay out. The angle of approx. 127°, has been recognized by the architects as a possibility to arrange the façade in an almost symmetrical manner (to the left of the axis shorter than to the right, along King's Road), enforced by decorative motives in modern style, adapting vaguely old Chinese architecture. The true exterior feature, however, of this building are concrete arches, which I call here "parabola-like" which rise high over the building. Their shape will be discussed later and they are not precise parabolas! The façade formally disguises these structural elements somewhat.

2. Original Functionality

The building contains many special functions, like a car parking (more or less in a sous-terrain), entrance, ticket booths, shops, exits of fire staircases, a foyer bar, and a room for previews (120 seats). Certain stage space is included for presentations, next to films. The dimensions are roughly 7 m for the annex zone and 20 meters width of the auditorium, which has a total length of approx. 35m (from rear to fimscreen) and a maximum height of 13 m. The arch's top is approx. 27 m over street level.

3. Static and Technical features

The varying arch' height is a result of the general egg shape of the auditorium. The span between the arches is roughly 4 m, which is a normal distance for a roof slab. In this case the wall and ceiling structure is not to be understood as a continuous shell structure, but as a ribbed monolithic slab structure. Moreover the straight and inclined floors, with slabs carried by ribs, also with smaller spans, to find an economic girder height in the parking, are held by columns in a modular order. All foundation are executed to responds to point loads, of columns and of the arches. The auditorium roof is double curved like an (eggshell part, sector of an Ovaloid shape). Its solution is remarkable, because it is suspended from free parabola-like arches. In literature connections to acoustical properties are made for this structural system (The New Empire Theatre, p. 22). As far as the writer may interpret the original intentions of the architects and engineers, the idea is to avoid heavy concrete parts, which tend to transport traffic noise. The choise for the arches may be explained thus that they, having a vertical tangent in their lower part, are regarded as enlarged columns, thus avoiding any thrust forces, which only could have been competed with heavy buttresses. On the other hand, the horizontal connections between the arch ends are twofold. Even the ribs over the roof, can cope easily with the thrust tendency (horizontal loads) of the arches. This structural solution can be regarded logical and economic in material quantity used. The hangers, also in concrete but taking only tension forces, are nine in number. The ach shape can be regarded as equal for the top part. They have a slightly pointed shape for the four top intervals. The connection to the columns is more or less circular. This shape enables the designer to change height of the arches, sa needed by the Ovaloid over-all shape of the auditorium.

4. State of Conservation

The concrete structure looks remarkably well preserved. The façade with modern big pictures on scaffolding structure, can be regarded negative for the impact of this thetre, but lucly this skin addition will be completely reversible.

5. Possible connections to typical features connections before and after 1952.

The responding to the site of this innovative theatre design is a parallel to the very important **Cineac theatre in Amsterdam (Dutch state heritage 1934, Reguliersbreestraat 31, Jan Duiker a.o.)**, analyzed by Jan Molema/Wessel de Jonge in depth. Also there foundation aspects have been solved in relation to the paraboloid shell of the auditorium, with horizontal axis and an economic light weight addition of annex spaces. The use of parabola-like arches to hold by hangers a roof in a formally free way has early proposed by **Le Corbusier** in his competition entry for the **Soviet-Palace (Moscow, Russia 1930, not executed)**. It is comparable to a standard bridge designs, where parabola-like arches can been put beneath or over the street. An example of a bridge with two concrete arches with hangers holding the street deck is the system "**Marsh Rainbow Arch Bridges**". They were built often between 1900 and 1940, but

unfortunately they were mostly destroyed. Another connection may be seen with wood roof structures of churches or theatres from the Gothic, baroque and modern time. Underneath the pitched roof an arch is protected against the weather. The flat ceiling of the hall space underneath is held by hanger elements, in smaller cases only by one vertical wooden element (mostly double beams holding the ceiling girder) sometimes also three or more. This kind of structure, called **truss frame** (German: Hänge-Sprengwerk) has been revolutionized by the **Swiss family Grubenmann**, also spelt Grubbemann, in the 18th C. (Literature reference: Josef Killer: Die Werke der Baumeister Grubenmann, Dietikon Switzerland 1998.) For a theatre building with an arch inside a roof space one can find some examples, like the theater in Zittau (Jos Tomlow, Sabine Spitzner-Schmieder, Das Grenzlandtheater in Zittau, 1934-1936, Zittau 2015), including reinforced concrete and steel hangers covered after execution with concrete for fire protection. The idea behind this system influenced also the development around 1800 in France of sophisticated iron trusses, which were thought possible for fire protected theatre structures, combining welded steel bars with light brick vaults (Monsieur Eck, „Potteries et Fer“, Paris 1836). This development failed in most cases, because the trusses had a random, yet not statically calculated lay out, and the profiles were simple circular or square rods, very heavy. On the other hand, futuristic designs by an architect and engineer collective led by Hermann Henselmann 1958 for central East Berlin with for arches carrying a disk, has not a real static function for holding the “disk” of the between the four legs. Also the “encounter restaurant” in an executed design for Los Angeles international airport, is not comparable. Rather often are used parabolic-like arches in churches, but there they are the substructure of the roof of pitched or curved shape. Compare also the highly innovative market hall in Wroclaw in concrete (Hala Targowa, Richard Plüddemann, 1906-08). They are a development of the diaphragm arches in the Monks’ dormitory space in the Monastery of Santa Maria de Santes Creus in Spain (Catalan: Reial Monestir de Santa Maria de Santes Creus; Cistercian monastery around 1300). To the writer the Hongkong design as executed is **unique for a theatre** and a correct static system.

6. Heritage Value

For the many important qualities of this design the writer regards this small and unique building complex, not only in respect to Hong Kong but to the World Heritage, as an excellent Monument, needed to get the highest possible care for its preservation.

Recommendation: More and on the topic of concrete structures very competent opinions may be given by the Construction History Society in Great Britain as well as by the Gesellschaft für Bautechnikgeschichte in Germany, as well as by Marieke Kuipers, DOCOMOMO ICS-R member, TU-Delft.



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