



Multihalle Mannheim – a Contribution to the Discussion about Maintenance Ideas and Visions for Future Utilization

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Abstract

Multihalle Mannheim, a megastructure designed by Carlfried Mutschler and Joachim Langner, Frei Otto and Ove Arup & Partners for the Federal Garden Exhibition 1975, still is the world largest timber lattice shell structure and is protected as a cultural monument since 1998 due to its architectural uniqueness and filigree material-minimized construction. Technical reports on the structure and the roof skin describe a great need for renovation. Currently, various possibilities for further handling of the multi-hall are being examined. The work is carried out in close coordination with the Landesamt für Denkmalpflege in Karlsruhe. The paper will give an insight into current research works and discuss some of the maintenance ideas like addition of a third layer (Fast + Epp), pneumatic reinforcement or monitoring taking into account the spirit of Frei Otto.

Keywords: lightweight structure; Frei Otto; Arup; timber grid shell; lattice shell; large span; reinforcement; monitoring; pneumatic structures; adaptable structures;

1 Previous History and Starting Point

The Mannheim multi-hall was built as a temporary building for more or less one summer. Due to its spectacular design method, the city of Mannheim decided after the end of the Federal Garden Show for the preservation of the building. The hall is worldwide famous for the unbelievable lightness of its timber roof structure. There is no other megastructure of this dimensions and this span in the world with such a lightweight loadbearing structure mainly under compressive stress. The extraordinary lightness constitutes the significance and importance of this prominent piece of structural heritage.

1.1 The Design and Construction Process

The German Expo Pavilion in Montreal 1967 and the Olympic Roofs in Munich 1972 brought Frei

Otto's lightweight structures a worldwide reputation. The Mannheim multi-hall became the third important megastructure in the work of the German structural designer Frei Otto (1925-2015). For his life's work he was honoured with several awards like the Aga Khan Award for Architecture, the RIBA Royal Gold Medal in 2005 or posthumously the Pritzker Prize in 2015.

Mannheim had been chosen as the venue for the garden show 1975 in January 1970. Architects Carl Mutschler + Partner won a national competition and so were subsequently able to develop an overall plan for the Herzogenried Park. The architects wanted to structure the exhibition site with an east-west information axis. They decided on a multi-purpose hall on one side of a little bridge and a café and restaurant area on the other side as the spine of this axis and also as the centre of the entire complex. They thought about rows of