Glass roof with load bearing glazing

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Summary

Within the last years the Institute of Building Construction, Technische Universität Dresden, has been decisively involved in the development of transparent space grid structures. These structures base on steel space structures, at which all steel members in the compression layer are replaced by in-plane load bearing glass panes. In 2009, the first glass roof of this new construction type was erected above the inner courtyard of the Berlin palace Reichstagspräsidentenpalais. The roof consists of a single curved, double layer transparent space grid structure with dimensions of 14 m x 21 m. The load transfer in the compression layer is ensured by insulating glass units with regular dimensions of 1.80 m x 1.26 m. This contribution describes the concept, the structural design, the testing and the erection of the first transparent space grid roof with load bearing structural glass.

Keywords: glass, roof, space structure, transparent, load bearing glazing

1. Project

1.1 Introduction

In the Berlin city centre, direct opposite to Berlin Reichstag, the architect Paul Wallot designed the palace Reichstagspräsidentenpalais, which today hosts the parliamentary society. The building possesses a u-shaped plan, which wings embed an inner courtyard. The forth side of the courtyard is bordered by the neighbour building. During the reconstruction of the Reichstagspräsidentenpalais the Institute of Building Construction of Technische Universität Dresden, Germany and the Berlin architect Winfried Brenne Architekten took part in the realization of the glass roof above the inner courtyard.

This glass roof is the first project realization of the new developed transparent space grid structure with load bearing glazing [1]. The construction was developed within a recently finished research with participation of the Institute of Building Construction of Technische University Dresden. This contribution describes the geometry, architectural and structural design and the testing necessary for an individual approval as well as the prefabrication and the assembling of the glass roof on the construction site.

1.2 Fundamentals

Transparent space grid structures base on steel double layer space grid structures, at which the steel bars of the compression layer are replaced by load bearing glazing. The load application into the glass panes in realized in the knot at the pane corners. At transparent space grid structures the

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