Spatial Concrete Plate Structures

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ABSTRACT: Spatial concrete plate structures are a classic example of a fruitful interdisciplinary dialogue between architect and structural engineer. Few other construction types enable such a comparatively complete fusion of architecture and structural engineering. The planning process of two selected properties are illustrated from design to execution, and the areas of interdependence shown. This involves presenting the architectural boundary conditions as well as describing the development of the loadbearing structures. Special reference is made to problems raised by dimensioning the structures and the special requirements of execution.

KEYWORDS: Concrete structures, the relationship between architects and structural engineers

1 INTRODUCTION

In contrast to skeleton structures, where the loads are basically transferred directly to the foundations, in the case of spatial plate structures the load is transferred via cross-walls. The active use of storey-high concrete plates as loadbearing elements is an economical and comparatively efficient structural method for accommodating large spans and wide cantilevers.

2 REASONS FOR USING SPATIAL CONCRETE LOADBEARING STRUCTURES

Spatial concrete loadbearing structures can be used to design and develop buildings like sculptures. They enable architects to achieve maximum flexibility when dividing up the space on the basis of the desired volumes, aesthetic demands and use requirements, without the need for massive support elements. The load transfer here is independent of defined grid points, the principle of “indirect load take down” is determining the structural design of the spatial plate structures. This vastly increases the planner’s freedom of design, but corresponding attention must be given at the design stage to the correct positioning of the walls.

3 CONDITIONS FOR THE PLANNING OF THE LOADBEARING STRUCTURE

As a result of the particularly close links between architecture and loadbearing structure, the development of spatial loadbearing structures involves intensive dialogue at the planning stage between architect and structural engineer. This conceptual cooperation must begin at the design phase of the building, and all the requirements and inputs of the other specialist areas, such as the building services, must be taken into

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