New courthouse at El Ejido

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Summary

The courthouse at El Ejido has a trapezoid floor plan (47 m x 55 / 26 m) and comprises two distinct volumes that are structurally connected at basement level and by footbridges on the upper storeys. A third trapezoid unit featuring a glazed curtain wall façade cantilevers 8 m off the main façade of the front volume. This façade is a structural diaphragm wall, constituted by nine rows of vertical precast concrete members separated by horizontal cast-in-place, self-compacting concrete chords. The location of the courthouse in a seismic area and the short number of horizontal supports for the façade make this wall potentially vulnerable. The particularly high risk during construction called for careful planning based on a detailed analysis of the interaction between the structure and the ancillary resources used to build it.

Keywords: Architecture; structural concept; seismic action; prefabrication; robustness; temporary activity; structure-scaffolding interaction.

1. Introduction

Against the backdrop of judicial restructuring and a substantial rise in the size of its population, El Ejido, a town in southern Spain, was in need of a new courthouse. The architectural competition organised on the occasion established a series of design conditions, one of the most prominent being the shape of the plot: an isosceles triangle. The schedule of uses, in turn, stipulated that it was to house eight courts of law, cluster the services most heavily used in the area nearest the entrance, and rationalise the flow of user traffic. At the same time, the architecture was to reflect the institutional nature of the premises.

Those boundary conditions inspired a design that entailed highly challenging engineering. The structural main façade, in particular, called for creative solutions to accommodate a combination of area seismicity and the use of precast members. This paper describes the structural approach adopted to build the new courthouse at El Ejido, along with the solutions for a number of structural members and details. Given the considerable risk arising around façade construction, planning and analysis of that phase of the works is discussed in some detail.

2. Architectural design

The El Ejido courthouse, characterised by a trapezoid floor plan whose 55 m and 26 m bases are set 47 m apart (Fig. 1), consists of two visibly distinct parallel volumes. The taller of the two, moreover, is divided into two architecturally and functionally different units. On the ground storey, the front-most unit is set back with respect to the gallery above, as if it were an extension of the new forecourt. This area houses the main vestibule, where the number of users is the highest, as well as the building services. Viewed from the outside, the upper gallery on this unit looks like a separate volume (Fig. 2). The main vestibule also has connections to the rest of the courthouse facilities, such as the stairway that leads to the gallery and the courtrooms on the upper storey. This latter area features a large waiting room with a striking 20 m ceiling that constitutes a roofed courtyard (Fig. 3)

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