



Transfer zone cracking research of a new type of prestressed floor slab

**Jorge
RUEDA-CONTRERAS**
Civil Engineering
INTEMAC
Madrid, Spain
jrueda@intemac.es

Jorge Rueda-Contreras, born 1979, is a PhD student at the Technical University of Madrid (UPM). He is an Engineer at INTEMAC Department of Structures. His research interests include transfer length and end zone tensile stresses.

**Enrique
GONZÁLEZ-VALLE**
Former Professor
INTEMAC
Madrid, Spain
egonzalez@yahoo.es

Enrique González-Valle, born 1941, received his PhD from the Faculty of Civil Engineering at UPM. He is an Adviser at INTEMAC. His research interests include shear at the interface between concretes cast at different times.

**Elena
DÍAZ-HEREDIA**
PhD Civil Engineering
INTEMAC
Madrid, Spain
ediaz@intemac.es

Elena Díaz-Heredia, born 1976, received his PhD from the Faculty of Civil Engineering at UPM, where she is professor. He is an Engineer at INTEMAC Department of Structures. His research interests include shear strengthening.

**Jorge
LEY-URZAIZ**
PhD Civil Engineering
INTEMAC
Madrid, Spain
jley@intemac.es

Jorge Ley-Urzaiz, born 1962, received his PhD from the Faculty of Civil Engineering at UPM, where he is professor. He is the Director of the INTEMAC Laboratory. His research interests include NDT for forensic engineering.

Summary

This paper discusses a new typology of precast concrete slab designed for one-way floors. The members, without transverse reinforcement, are prestressed with pretensioned wires or strands. Due of the unusual cross-section geometry of these slabs, and the closely related spread of the prestressing forces, the design is highly susceptible to appear cracking at prestress release. This cracking is related to the existence of high tensile stresses. This explains the documented existence of brittle failure in these members during building construction. Different analytical models have been used to calculate the end zone tensile stress, and the results are disparate. Due to these circumstances, authors are currently performing a research at Technical University of Madrid, whose aim is to find an analytical model to resolve the aforementioned problems.

Keywords: prestressed concrete, prestress transfer, pretensioned prestressing steel, built up of prestress, bond stress, bursting, spalling, transfer zone.

1. Description of the typology under consideration

A new typology of precast concrete members designed for one-way composite floors was developed in Spain at the beginning of this century. Currently is also produced in other European countries. The members, without transverse reinforcement, are prestressed with pretensioned wires or strands. The cross-section consists in a lower flange and four vertical webs. Interjoist elements lay over the flange, and an upper concrete flange is cast on-site (Fig. 1).