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AN INNOVATIVE SEISMIC RESISTANT COMPOSITE BEAM-COLUMN JOINT

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ABSTRACT

Nowadays in Italy steel truss-concrete beams have been more and more used because they allow high construction speed, minimum site labour and economical convenience.

They are composed by prefabricated steel trusses, during the first phase self-bearing without any provisional supports for their own weight and the weight of the slab, and then collaborating within site concrete casting.

This structural typology has been developed for isostatic beams and now also for hyperstatic ones.

An innovative beam-column joint, that allows the employment of these “hybrid trussed beams” (HTB) even in seismic resistant frame, is presented.

The new joint is designed to obtain adequate strength, to eliminate brittle mechanisms, to promote ductile ones and above all to confine concrete.

The proposed joint has been tested under static and dynamic conditions by means of nonlinear numerical analysis, using finite element programs based on continuum damage mechanic (Saetta, Scotta and Vitaliani [2001]) and fracture mechanic (Atena by Cervenka [2007]).

The proposed joint can be profitably used in conjunction with various column typologies such as concrete filled steel tube ones.

The design of the joint and the analysis has been made in view of the successive experimental tests in which the performance of the new HTB beam-column joint will be compared with high ductility ordinary reinforced concrete beam-column joint one.

Regarding these preliminary numerical analysis, it can be concluded that the proposed joint allows to extend the advantages of HTB, particularly the construction speed, to seismic resistant frame.

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