Jahid Zeghiche, J Civil Environ Eng 2015, 5:5
http://dx.doi.org/10.4172/2165-784X.C1.002

OMICS International
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World Congress and Exhibition on
Construction & Steel Structure
November 16-18, 2015 Dubai, UAE

Further tests on thin steel and composite fabricated stubs

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Results of tests conducted on thin cold fabricated steel-concrete stubs are presented. The studied sections were made of two cold formed steel plates with U shape welded to form a steel box or an I-shaped steel section. The steel cross section dimensions were: 100×70×2. mm. The main studied parameters were: The stub height, the welding fillet nature and its location, the steel cross section shape, the in-fill concrete and its age. A total of 48 stubs were tested, 22 empty and 26 filled with concrete that gravel made of crushed slag from blast furnace as natural gravel substitution. All failure loads were predicted numerically using ABACUS and by Euro codes EC3 and EC4 for steel and composite respectively. From test results it was confirmed that the discontinuous welding fillet for empty stubs had a drastic effect on the load carrying capacity and the failure mode was rather a premature local buckling mode. I-shaped steel stubs had higher compression strength a lower load decrease rate compared to rectangular steel stubs. Providing rectangular steel stubs with continuous welding on mid-depth improved the load carrying capacity for rectangular empty steel and composite stubs. Meanwhile the age of concrete at 3 years enhanced considerably the performance of rectangular composite stubs with discontinuous welding. Both numerical and test results were in good agreement whereas EC3 and EC4 predictions were not conservative.

Biography

Jahid Zeghiche is an Associate Professor at Civil Engineering Department, University of Al-Baha, KSA. He was the Head of Civil Engineering Department at Annaba University, Algeria. Since 1989 he teaches steel structures and conducted many research work in the field of composite steel and concrete columns. He has published many articles in established journals. He has supervised many theses for the degree of Master and Doctorate. He had a long experience in directing many Design Offices in the city of Annaba, Algeria. He is an active person to promote the use of composite structures to overcome many seismic problems in Algeria. He temporally teaches at Al-Baha University, since 2008.

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