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Probabilistic Capacity Model for Concrete-Filled Steel Tubes

Alessandro Contento
alessandro@fzu.edu.cn
College of Civil Engineering, Fuzhou University
Fuzhou, China

Angelo Aloisio
angelo.aloisio1@univaq.it
Department of Civil, Construction-Architecture and Environmental Engineering, University of L'Aquila
L'Aquila, Italy

Junqing Xue
junquing.xue@fzu.edu.cn
College of Civil Engineering, Fuzhou University
Fuzhou, China

Giuseppe Quaranta
giuseppe.quaranta@uniroma1.it
Department of Structural and Geotechnical Engineering, Sapienza University of Rome
Rome, Italy

Paolo Gardoni
gardoni@illinois.edu
Department of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign
Urbana, Illinois, USA

Bruno Briseghella
bruno@fzu.edu.cn
College of Civil Engineering, Fuzhou University
Fuzhou, China

ABSTRACT

Concrete-filled steel tubular (CFST) columns are increasingly used around the world due to their significant structural and economic advantages. Although considerable research and several experimental tests have been carried out on CFST columns, there are no mechanics-based probabilistic models of their axial capacity. The present research proposes a mechanics-based probabilistic capacity model for the assessment of the ultimate axial capacity of CFST columns. The
accuracy of the numerical predictions obtained with the proposed formulation is compared with that of existing capacity equations already in use within technical standards or available in the literature.

Keywords: Axial capacity, concrete-filled steel tubes, probabilistic capacity model.

1 INTRODUCTION

Concrete-filled steel tubular (CFST) columns are largely employed around the world because they offer two significant advantages. The first one is the composite action of the steel tube and infilled concrete, which enhances the strength and ductility of the columns. The steel tube effectively confines the concrete core, thereby providing a highly ductile response under compression and increasing the overall energy dissipation capacity (Johansson, 2002). The second advantage is the use

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