Experimental Study of Compressive Strength of CFRP Reinforced Steel Columns

Takeshi Miyashita

Nagaoka university of Technology, Nagaoka, Japan

Yuya Hidekuma and Syunta Sakurai

Nippon Steel Chemical & Material, Tokyo, Japan

Kazuo Ohgaki

Institute of Technologists, Gyoda, Japan

Masafumi Hattori and Ryouta Takahara

Nippon Expressway Research Institute Company, Machida, Japan

Contact: mtakeshi@vos.nagaokaut.ac.jp

Abstract

Seismic reinforcement for steel members employing carbon fiber reinforced plastic (CFRP) bonding, which has been recently implemented in the repair and reinforcement of steel structures, can be expected. However, no examples exist wherein the superstructure is seismically reinforced using CFRP. Therefore, the author's group intends to perform tension loading tests, compression loading tests, and cyclic loading tests to examine the suitability of the CFRP bonding technique as a seismic strengthening method for axial members with H-shaped or rectangular cross sections in steel truss and arch bridges. In this paper, the outcomes of monotonic compression loading tests for H-shaped column specimens, with a focal point on local buckling, is presented.

Keywords: seismic reinforcement; steel truss bridge; steel arch bridge; H-shaped column; carbon fiber reinforced plastic (CFRP); monotonic compression loading test; local buckling

1 Introduction

After the Great Hanshin-Awaji Earthquake in 1995, the seismic design of road bridges in Japan was revised, resulting in the standard use of dynamic response analysis. Steel members such as the lower chords and diagonal members of steel truss bridges utilized in various expressway projects have a small cross-sectional area. Dynamic response analysis judges these members incapable of supporting sufficient loads and therefore they undergo seismic reinforcement.

Seismic reinforcement for steel members employing carbon fiber reinforced plastic (CFRP)

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