



A Study on the Applicability of Replacing GI Wires with Plastic Cable in Structural Members

Nevin Y. Balibrea¹, Louie Mart M. Montrias¹, Gregorio S. Uymatiao III¹, Kelvin Gerard N. Yao¹,
Dr. Bernardo A. Lejano²

¹ Civil Engineering Department, GCOE, De La Salle University, Manila, Philippines

² Associate Professor, Civil Engineering Department, GCOE, De La Salle University, Manila, Philippines

*bernardo.lejano@dlsu.edu.ph

Abstract: Reinforced concrete has been a popular choice in the construction of structures due to its strength and durability as well as its availability. Basically, concrete is reinforced with steel bar assembly, and GI wires are used to hold the assembly in place. However, the traditional procedure in assembling the steel bars can be tedious and time-consuming especially for a non-skilled worker. This study aims to investigate the possibility of replacing GI wire with commercial plastic cable ties and evaluate its effect on the structural integrity of a reinforced concrete member. The two major factors that shall be focused in this study is the overall strength of the structural member and the time consumed to tie steel bars using both tie materials. Since there is no direct test for tie strength determination in reinforcing steel, the researchers modified the standard method of pull-out strength test for steel bar imbedded in concrete (ASTM C900) in order to get an approximate tie strength. A reinforced concrete column was also tested based on the Standard Compression Test (ASTM C39) to assess the effect of using plastic cable as tie wire. From these tests, the researchers determined that although the strength of the plastic cable is slightly weaker than that of the GI wire in the modified pull-out test, the resulting strength from the compression test of the reinforced concrete column samples is still higher than the requirement stipulated in the 2010 National Structural Code of the Philippines. As for the tying speed of an amateur worker, the time used for tying with plastic cable is almost one-third only of that of the GI wire.

Key Words: plastic cable tie; tie substitute; tie strength; GI wire