

Effectiveness of Two Methods of Reinforcing Polyethylene Fabric with Glass Yarns for Fabric Formwork

Mr. Jun Xiong

M.Sc. Candidate, Department of Textile Sciences, University of Manitoba

Mr. Xiong earned his Bachelor of Commerce degree from the University of Manitoba in 2007. He then worked for 3 years in an apparel firm in Winnipeg as product manager for fabric development. As a result of his experience in fabric development, Mr. Xiong became very interested in textiles. In 2010, he was admitted to the pre-master's program in Textile Sciences at the University of Manitoba. After completing all the pre-master's requirements, he proceeded to the M.Sc. program in Textile Sciences. He has recently defended his thesis on methods of reinforcing PE fabrics with glass yarns for fabric formwork. He is expected to receive his M.Sc. degree in February 2014. As Mr. Xiong carried out his thesis research, he became very interested in the use of textiles in Civil Engineering. Consequently, in 2013, he began to pursue a Bachelor of Engineering degree in Civil Engineering. Currently, he is in the third year of his engineering program and he wants to continue to integrate knowledge of textiles in his Civil Engineering education as often as possible. Today, he will share with some of the results from his M.Sc. research work.

Abstract

The effectiveness of two methods of reinforcing a woven polyethylene (PE) fabric used for fabric formwork with glass yarns was investigated. The need for reinforcement stems from problems associated with the creep behaviour and instantaneous elastic deformation (IED) of PE when used for fabric formwork. The first method of reinforcement entailed stitching glass yarns onto an existing PE fabric; the second method involved laminating glass yarns onto the same woven PE fabric. The results showed that while both reinforcement methods reduced the IED significantly, creep was reduced significantly in samples reinforced by the stitching method. However, the reinforcement was only effective when the tensile load was lower than the total strength of the reinforcement glass yarns. Preliminary tests involving casting small columns of concrete using the glass yarn reinforced PE fabric by stitching method suggested that the glass yarn must face outside of the fabric formwork to avoid damage of both fabric surface and column surface.