Eunsoo Choi et al., J Material Sci Eng 2017, 6:1 (Suppl)
http://dx.doi.org/10.4172/2169-0022.C1.058

Crack-closing of super-elastic NiTi SMA short fibers in mortar beams

Eunsoo Choi[1], **Chanyeong Jeon**[1], **Seungjin Park**[1], **Hanchul Park**[1] and **Kyoungtaek Yang**[2]
[1]Hongik University, South Korea
[2]Daelim University College, South Korea

This study was conducted to investigate the crack-closing capacity of super-elastic shape memory alloy (SE SMA) short fibers embedded in mortar beams. For this purpose, NiTi SMA fibers with a diameter of 0.995 mm and a length of 36-42mm were used. Four types of SMA fibers were prepared, namely, straight (RF, reference), L-shaped (LS), double L-shaped (DL) and spear-head-shaped (SH). Before the crack-closing test, a pullout test of each type of fibers was conducted to check the interfacial bond strength between the fiber and mortar matrix. The dimensions of the cement mortar beam are 40 mmx40 mmx160 mm (BxHxL). Two SE SMA fibers were placed at the bottom center of the beams along with an artificial crack-guidance-film of 10 mm depth and 1mm thickness. From the hysteretic bending test, this paper evaluated the crack-closing capacity by comparing with the deflections upon loading and unloading. From the pullout test, it was covered that the only SH fiber could generate the super-elastic behavior due to the sufficient bond resistance although there was a small initial slip of fiber. However, the initial slip was critical cause of failure for the crack to be closed upon unloading condition. For the flexural crack control, only a perfect bond between SE SMA short fiber and mortar matrix can generate the super-elastic behavior of the beam.

Biography

Eunsoo Choi is a Professor of Civil Engineering at Hongik University, Korea; Director of Korean Society of Steel Construction; board member of Korea Institute for Structural Maintenance and Inspection and; Director of Korea Railway Association. He completed his Doctorate Degree in Department of Civil and Environmental Engineering at Georgia Institute of Technology. He contributed greatly to the advancement of technology of seismic capacity assessment and seismic retrofit in the Central East region, USA. Afterward, he has started his research on “Applying shape memory alloy to civil engineering fields for the first time in Korea” and has lots of papers and patents regarding the fields.

eunsoochoi@hongik.ac.kr

Notes: