TESTING OF LARGE BEAMS REINFORCED WITH LARGE DIAMETER GFRP BARS FOR TUNNELING APPLICATIONS

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BACKGROUND
Underground construction is one of the most exiting applications of FRP in RC structures.

For the tunnel boring application for example, it is mandatory to use large diameter FRP bars, due to size of the cross section.

Two beams designed to fail in flexure will be tested in this regard.

OBJECTIVES
Two beams to be tested with different flexural reinforcement.

The first beam was reinforced with conventional GFRP reinforcement.

The second specimen to be tested is to validate the performance of large diameter bar bundles.

APPLICATION
Walls of temporary nature are built to support the ground around a well in tunneling projects. The TBM has to cut the wall in order to start or conclude the tunneling operations. This part of the wall is called “soft-eye”. These walls must be reinforced with FRP to avoid damage to the cutters TBM.

RESULTS
The first beam specimen that was tested, though designed to fail in flexure, failed in shear, highlighting that the shear prediction equations are not adequate to calculate the capacity of large size element strengthened with GFRP bars.