1. BACKGROUND

Based on discussions in RILEM TC 147-FMB, an invitation is hereby issued for a RoundRobin Analysis and Test on Bond.

2. PROBLEM

To analyse and/or test the bond behaviour of a deformed bar, cast in a concrete prism. Axial, tensile forces are exerted on the bar until collapse of the specimen. A specimen with a square cross section is cast, modelled according to the instructions in Fig. 1. The following ribs dimensions are of interest: ø8, ø16, ø32 mm. Steel bars should have inclined lugs and be of grade 500 MPa (according to ENV 10080:1994). The parallel transverse ribs on the bars shall be placed upwards and downwards during casting and testing, see Fig.1.

A normal-strength concrete (NSC, C30) and/or high-strength concrete (HSC, C100), is used. The maximum aggregate size of the concrete is limited to 8-10 mm. For NSC, it is recommended to use a cement content of 240 - 300 kg/m³ and crushed aggregate. The specimens are to be cast horizontally and cured in water for seven days. Then they are to be stored at approximately 60% relative humidity and at about 20°C up to the age of at least 28 days.

The experiments are preferably to be performed in displacement control. A test should be completed within 30 minutes to 3 hours. Material parameters (concrete compressive and tensile strength) should be tested according to CEB-FIP Model Code 90. The fracture energy of the concrete is verified by means of RILEM three-point bend tests on notched beams.

In the numerical analysis both square and circular sections could be investigated. The recommendations of the CEB-FIP Model Code for material properties should be used as input data. The approach for the numerical analysis should also be specified. A minimum requirement is to test/analyse the ø16 mm bar cast in NSC with a cover of 2ø = 32 mm.

3. RESULTS

The following results should be given:

1. Description of model of analysis and/or test method.
2. Material properties at the time of testing/analysis.
3. Load-displacement curve (peak load, relative displacement of the bar, post-peak response).
4. Crack patterns and crack widths and corresponding mean strain of reinforcement bar.
5. Failure mechanisms.

Results should be reported before 31 May 1997 to:

Lennart Elfgren, Division of Structural Engineering, Lulea University of Technology, S-971 87 Lulea, Sweden, Fax +46 920 91 913, Email: Lennart.Elfgren@ce.luth.se; or http://www.ce.luth.se

Fig. 1 – The features of the specimens used in the Round Robin Analysis and Tests on Bond. The table gives the recommended variation of parameters. If you can only perform one case, choose the circled one.