

R-FOR CIR - 610 FILE

STUVA

**TEST OF TECHNICAL APPLICABILITY OF
DUROSEAL SEALING PROFILE**

OF BBZ

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1.) Assignment

BBZ, Willich, commissioned STUVA to test the DUROSEAL SEALING PROFILE with a cross section of ca. 47 mm x 28 mm technically for its sealing ability. After several hours of contact with water DUROSEAL begins to swell. This raises the pressure exerted by the sealing profile onto the joint and consequently a sealing effect is produced. It was to be determined what the largest width of crack was, that could be sealed against a water pressure of 5 bars.

2.) Test Procedure and Results

The reinforced concrete used for the test consisted of 4 parts (figures 1 and 2). To carry out the test the two middle slabs were placed on top of the bottom slab, and the top slab on top of them.

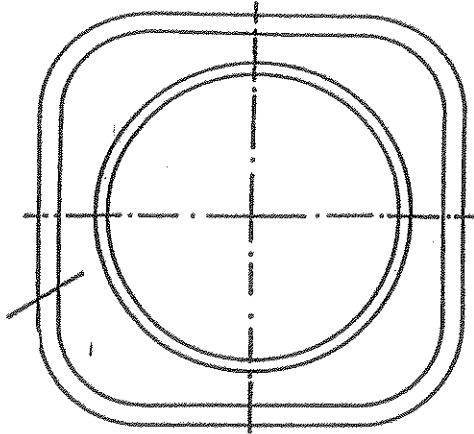
This produced two horizontal and two vertical joints, each ca. 25 cm long (figure 2). Consequently the imperviousness of T-joints could also be tested. On sealing the joints, recesses with a cross section of 50 mm x 10 mm (figure 1) were made in the test concrete, in which the sealing profiles to be tested were placed (figure 3). The installation of the sealing profiles was done in the STUVA laboratory by the promoter. Both of the horizontal sealing rings in the top and bottom slabs were made with a butt. Where the sealing profiles joined together in the bottom slab a butt-joint was produced, and in the top slab a adapted butt under 45° celsius incline above the height of the cross section. Both the vertical sections of the sealing profile were connected to the top and bottom horizontal ring of the sealing profile by butts.

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Top slab

Underside view

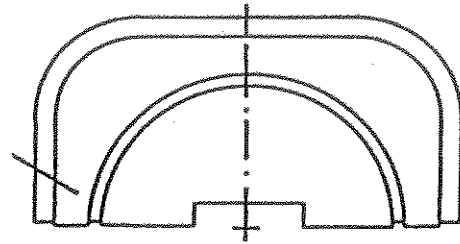
Recess for
sealing
profile



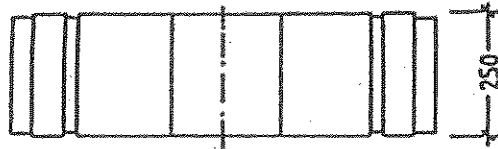
Middle slab

Top view

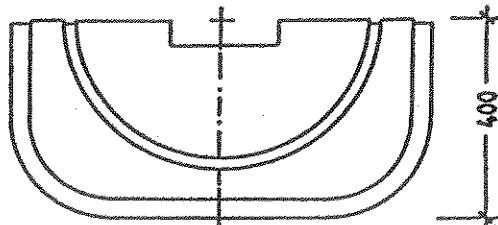
Recess for
sealing
profile



End view

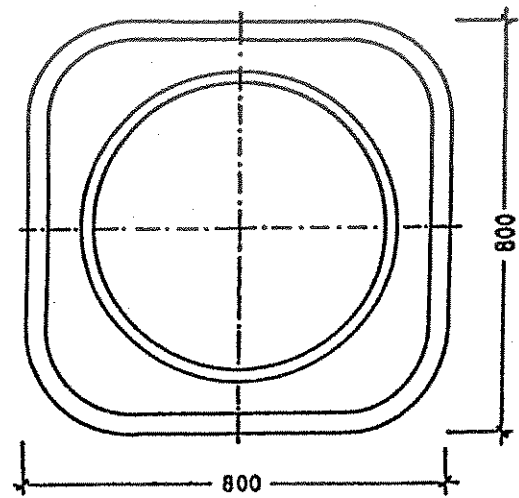


Bottom slab

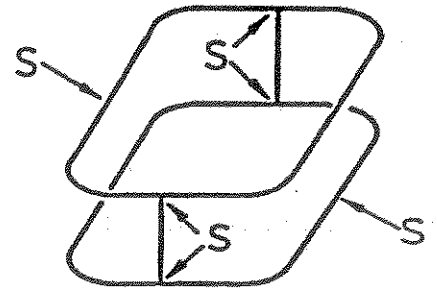


Bottom slab

Top view



Course of sealing profile



S = butt-joint

Figure 1: Test concrete with joint recess

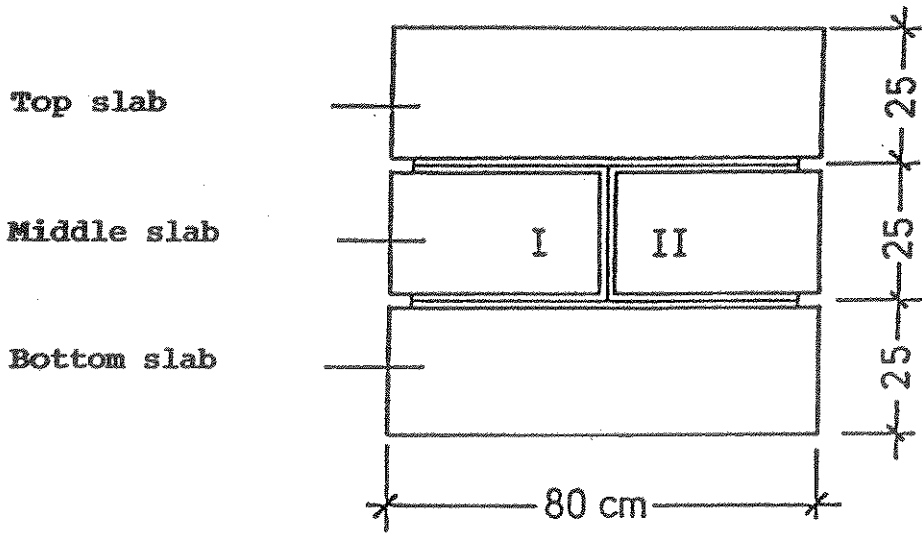


Figure 2: View of the completed test concrete

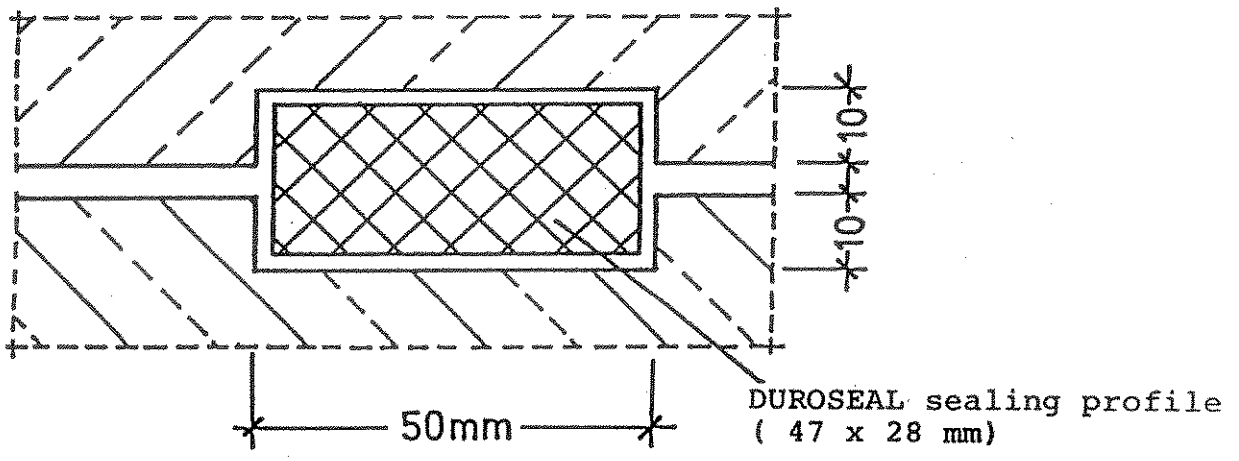



Figure 3: Cross section of the joint recess with Duroseal

After installation of the sealing profile and construction of the test concrete block, all joints were connected to 2 mm wide exit groove and water was passed without pressure into the test concret. After the profile had swollen for about 20 hours the water pressure test took place. The water pressure was raised in steps of 1 bar to a maximum of 5 bars. Each separate water pressure was left for a minimum of 4 hours. Once the highest pressure value to be tested had been reached and the joints had stayed watertight for at least 4 hours at that pressure, then the water pressure was lowered to 1 bar and the groove opened a further 1 mm (approx.) If after 4 hours of observation the joint was still watertight, the pressure was raised another 1 bar. In this way a total crack width of 5 mm (crack opening 3 mm plus exit groove 2 mm) could be sealed by Duroseal Sealing Profiles against 5 bars of water pressure. After the crack was widened, the joints leaked in isolated places for short durations. However, the established leaks were stopped again after the Duroseal had swollen for another hour.

3.) Concluding Comments

The tests proved that in a laboratory the tested Duroseal Sealing Profiles can seal joint cracks as large as 5 mm in total against a water pressure of 5 bars. It must also be considered that after the joint crack had been widened, the joints leaked continually, although temporarily. Only after sufficient reswelling of the Duroseal Sealing Profile could occur, were the joints once again watertight. When the sealing profile was removed from the concrete block, mechanical damage was noticeable on the Duroseal. Therefore Duroseal Sealing Profiles should only be installed where mechanical damage to them can be ruled out.


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(Dr.-Ing. A. Haack)


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(Dr.-Ing. J. Schreyer)