

Professor Mitchell Gohnert

BSc, MEM, PhD, PrEng, CEng, AStructE, FSAICE

Mr. Yousuf Daya
Royal Concrete

9 August 2013

Dear Mr. Daya,

At your request, six concrete beams were tested at Wits University. The objective of the test was to determine the failure strength, and the load at which horizontal shear occurs. The beams were tested from 28d, starting 5th August to the 7th of August 2013. The span of the test specimens was 1800 mm and four point loads were applied to simulate a uniform distributed load. The results of the tests are given in Tables 1 and 2 below:

Table 1: Results of flexural tests

Specimen	Rib Dimensions (Width x Depth) (mm)	Overall Dimensions (Width x O/A Depth) (mm)	Failure Load (kN)	Mode of Failure
Beam 1	155 x 60	100 x 270	126	Shear failure along interface
Beam 2	155 x 55	105 x 250	140	Shear failure along interface
Beam 3	150 x 50	120 x 230	107	Shear failure from load point to support
Beam 4	150 x 60	140 x 260	148	Shear failure along interface
Beam 5	150 x 60	150 x 250	120	Shear failure along interface
Beam 6	150 x 60	125 x 260	110	Shear failure from load point to support
Average	152 x 58	123 x 253	751	Shear failure along interface

Table 2: Cube tests

In situ Concrete		Rib Concrete	
1	15.58	1	40.71
2	25.56	2	37.60
3	23.38	3	29.96
Average	21.84MPa	Average	36.09MPa

Comments concerning results:

1. The test results should be given to the responsible structural engineer for information concerning the interfacial shear strength (i.e., the shear strength between the in-situ concrete and the precast rib).
2. The South African concrete code (SANS 10100:1) requires the concrete strength at transfer to be 25 MPa and the 28d strength to 40 MPa.
3. The interfacial shear may be improved by ensuring that the top surface of the precast rib is roughened to at least 3 mm.
4. Future cube test should be 100 mm x 100 mm x 100 mm. Standard moulds should be used.

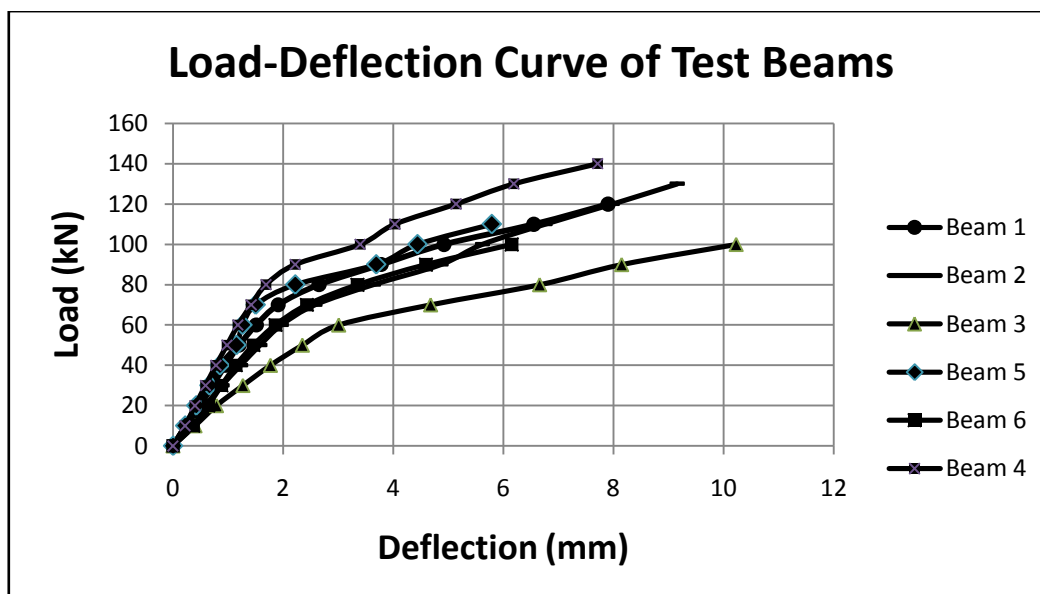


Figure 1: Load-deflection curve of test beams



Figure 2: Failure pattern of test beam 1



Figure 3: Failure pattern of test beam 2



Figure 4: Failure pattern of test beam 3



Figure 5: Failure pattern of test beam 4



Figure 6: Failure pattern of test beam 5



Figure 7: Failure pattern of test beam 6