

FE-Competition - DIANA Users Association Celebration 25 years contest

Problem definition:

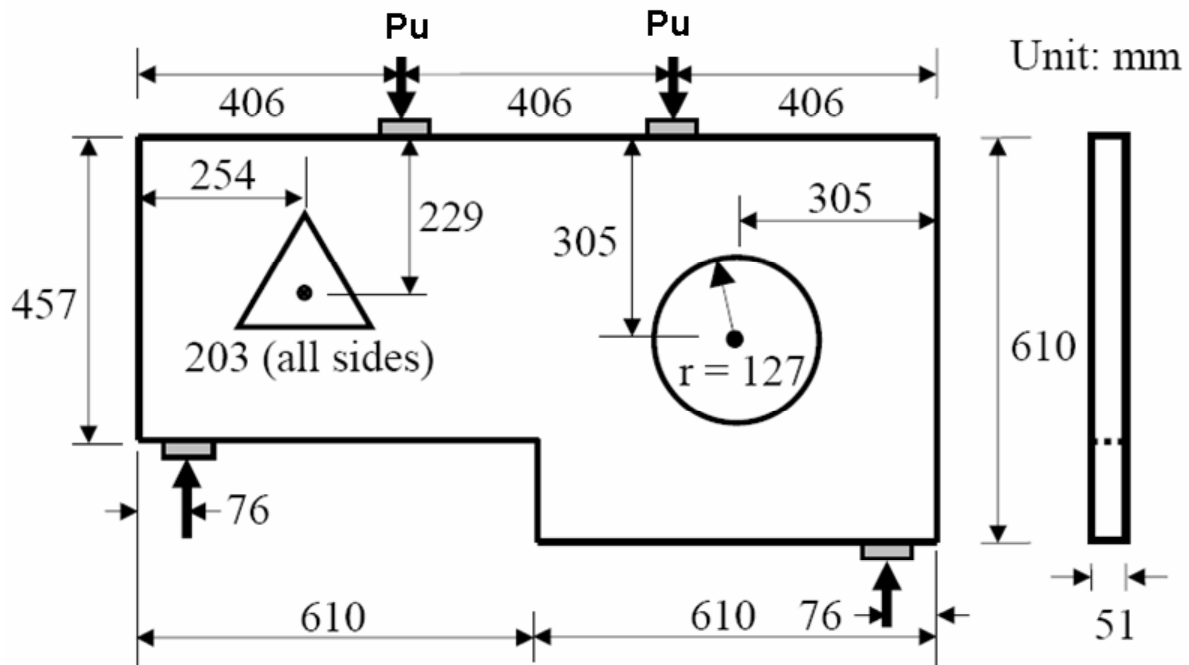


Fig. 1 Side view of the beam + cross section beam

Table 1: Materials

Materials		
Specimen	Compressive strength	Reinforcement Weight
Units	MPa	N
Beam	26	23.0
Maximum aggregate size = 9 mm		
Fracture energy Gf according CEB/FIP Model Code 1990		

The loading and support plates have a length of 76 mm, a width of 51 mm and a thickness of 25 mm. The material of these plates is neoprene.

The principal steel reinforcement used in the test specimen was 4 and 6 mm diameter deformed rebar.

The spiral reinforcement (bar diameter 4 mm) used at the loading & support locations is 100 mm in diameter smooth wire (see figure 2), deformed to an elliptical shape of 140 by 40 mm², while the thickness of the wall is 51 mm.

The smooth wires have a height of 90 mm. The grid spacing of the bars is 25 mm in all directions.

The total weight of reinforcement of the specimen is listed in Table 1.

Table 2: Yield stress of reinforcement

Reinforcement	Yield stress, MPa
4 mm deformed bar	565
6 mm deformed bar	665
10 gauge confining steel	577
14 gauge welded wire mesh	483

The properties of all the reinforcing steel are provided in Table 2.

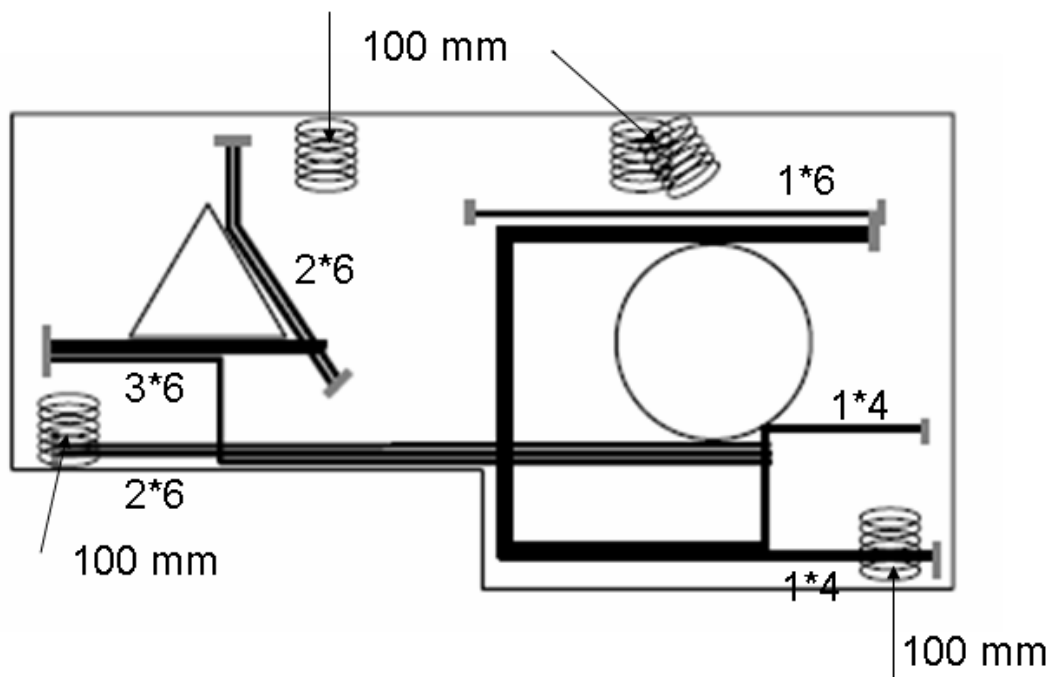


Fig. 2 Reinforcement configuration

Questions FE-Competition:

- 1) What is the ultimate load of this configuration ? Show this with a load deflection curve (figure 1) of the corner midspan node at the most bottom fibre.
- 2) Show the crack pattern halfway the ultimate load stage (figure 2) and at the ultimate load stage (figure 3).
- 3) Show the plasticity pattern of the concrete (figure 4) as well as the reinforcement (figure 5) at the ultimate load stage.

Time schedule:

Final submission of the 5 figures before 29th May 2009. Submission of the figures can be send by email to: info@dianausers.nl

Who:

Every DIANA user may submit the five figures to the email address.

Prizes:

There will be only one prize: a travel cheque of 500 euro. The election of the winner will be taken place at the Celebration Seminar on the 3th June 2009 in Delft.