Question:

QUESTION 1

A gusset plate is attached to a column, as shown in **Figure Q1**, which supports a load of ***P***. Design the rivets/bolts in region ***A*** where the load is applied eccentrically, having a group of bolts/rivets. The thickness of the plate is 16 mm. The parameters that should comply as follows:

Parameter	Description
Number of bolts/rivets	design assumption must be equal to or greater than three (≥3).
Safety factor and allowable shear stress	the design of safety factor values must in the range of 2.4 - 2.6, and the allowable shear stress must be in 38 MPa – 42 MPa.
Diameter of Bolts/rivets and bearing stress	the selection of the diameter of bolts/rivets in Table 15.2 must consider the bearing stress does not exceed 50 MPa.

a) Determine the maximum force, ***P*** the rivet can withstand if the yield stress on the most heavily loaded rivet is 200 MPa.

b) Calculate the possible mode of failures, i.e., bearing on the plate and shearing failure of the edge of the plate if the closest distance from rivet to the edge of the plate is 8 mm.

(20 marks)

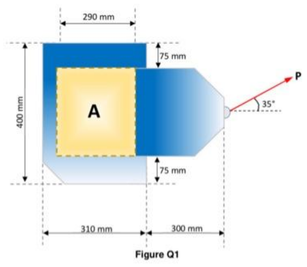

Figure Q1

Expert answer:

Answer 1: