

Group #07

Bridge-00

18g, 1700N



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16.7%

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1 Design

1.1 Assumptions

During the design process, the following assumptions have been made (Hibbeler and Yap, p. 264):

1. All loadings are applied at the joint,
2. Weight of the members neglected,
3. Joints are smooth (friction-less) pins,
4. Each member has no more than two joints.

Final bridge design can be seen in Figures 1 and 2.

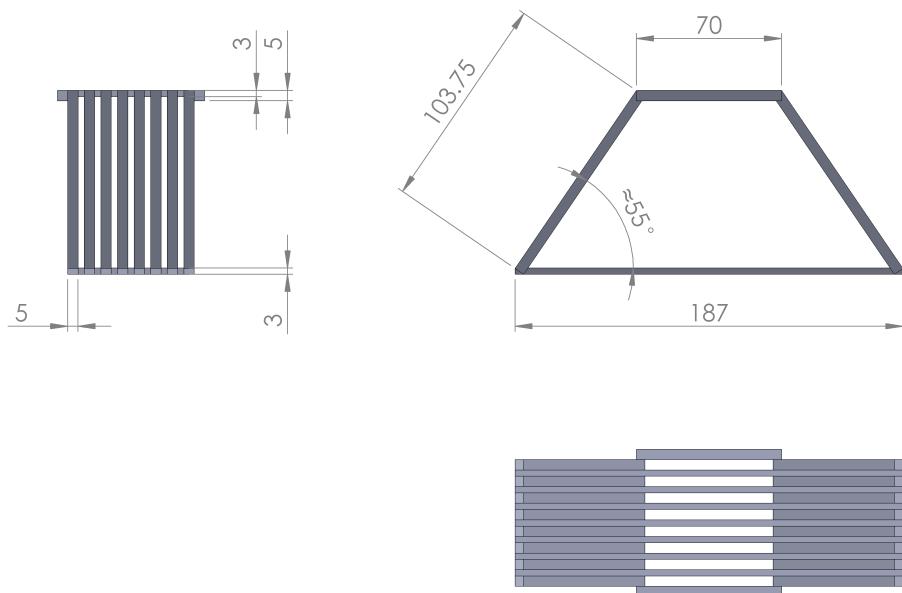


Figure 1: Dimensioned drawing.



Figure 2: 3D-Projection.

1.2 Methods

2 Analysis

Due to the unconventional design, to ease the calculations during the analysis, it was assumed that the load is equally distributed between eight trapezium-shaped trusses. Thus, a single trapezium truss was analyzed, and then extended to approximate the entire bridge.

The table of forces in each member of the trapezium truss under a load of 100N across the top two nodes can be seen in Table 1.

Table 1: Member loads

70 3x3 mm (top)	34.14 N (c)
103.75 5x5 mm (side)	60.54 N (c)
187 3x3 mm (bottom)	34.14 N (t)

3 Results

References

R. C. Hibbeler and Kai Benh Yap. *Mechanics for Engineers: Statics*. Pearson.