

كبارى و درسيه

عبدالرحمن

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Faculty of Engineering
Department of Civil Engineering
Year : Fourth Civil
Name : Prof. Dr. Mohamed Naguib Abo Elsaad

Date : 21/5/2016
Time Allowed : 3 Hours
Full MARK : 70 Points
Subject: Steel Bridges
Final Exam : 2 Pages
Academic Number :

Any data missing may be assumed
Material of Construction is Steel 44.
Steel Egyptian Code and steel table section properties are allowed to used in the examination.

Maxmium Credit = 75 Points
All rivets used is H.S.B. 23 mm grade 8.8

Question 1 65 (20+20+20+5)

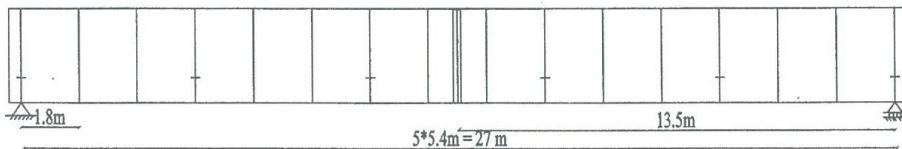
A road- rail way bridge with three main girders , warren trusses, Fig.(1) with span of 50 ms., panel length of 5 ms and height of 5.0 ms. The cross-section (Fig.(4)) of the bridge has a 14 ms , road width and one side walks of 2.0 ms . The spacing between stringers is 2.0 ms (road way part). The road floor has 20 cm of reinforced concrete , 7 cm asphalt in the road width and 12 cm RC and 4 cm asphalt for side walk. All details and dimensions are given in page 2/2.

Data assumptions

Weight of floor for road = 0.70 t/m²

Weight of floor for side walks = 0.40 t/m²

- 1-Design an intermediate stringer for rail way part (B.F.I.B) as a simple beam and design stringer for road way part as a S.I.B. (continuous beam).
- 2-Calculate the moment design and shear design for both x-girders in rail and road parts due to dead, live, and impact loads. Check for cantilever part for x.girder (road way) as given as B.F.I.B 60 . Design the connection between stringer (simple beam) and x-girder in rail way part. Draw to scale 1:10 an elevation and plain for designed connection.
- 3-Design the main girder as welded plate girder for simply supported beam Fig.(5), having an span of 27 m and subjected to dead load and live load including impact of uniform distributed load of intensities of 3t/m and 12t/m, respectively. Take height of web=2.7 m, and thickness of web = 1.6 cm . The span of main girder is divided into 5 panels with 5.4 m spacing and having vertical stiffeners fasteners 1.8 m spacing. Design a vertical intermediate stiffeners and a Field splice at mid-span of beam and draw an elevation and plain for the part of main girder including the splice.
- 4-Design member1 in the lower bracing and stringer bracing in rail way part.



2.7m
Fig.(5):

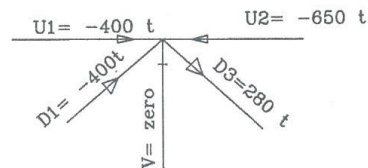
Question 2: 30(20+10)

The main girder of a roadway deck bridge are trusses of warren type with panel length and height of 5.0 ms.

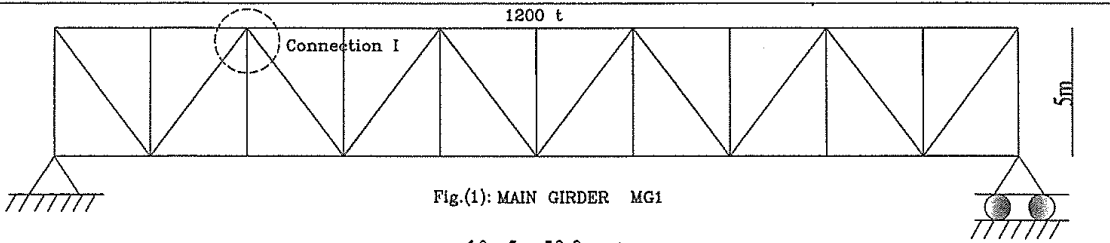
- 1-Design sections for all members and its connection with 14 mm thickness and 300 mm as an inside distance between gussets.

Take high strength bolts of 23 mm diameter.

- 2-Draw an elevation to scale 1:10 for the connection considering the cross girder as B.F.I.B. 100.



[GOOD LUCK PROF. DR. ENG. Mohamed Naguib.]



10x 5 = 50.0 meters

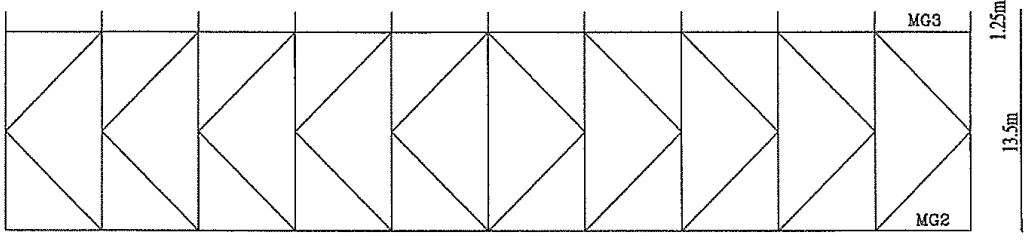


Fig.(2): UPPER WIND BRACING BETWEEN MG2 AND MG3

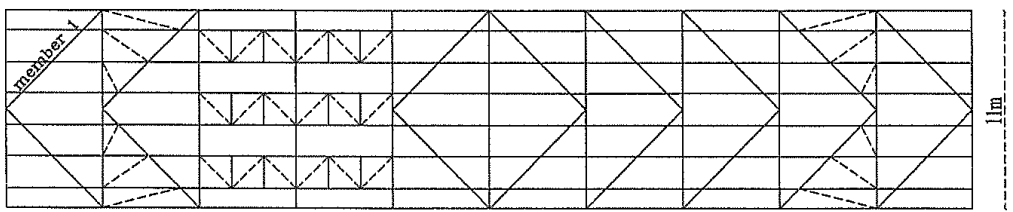


Fig.(3): LOWER WIND BRACING BETWEEN MG1 AND MG2

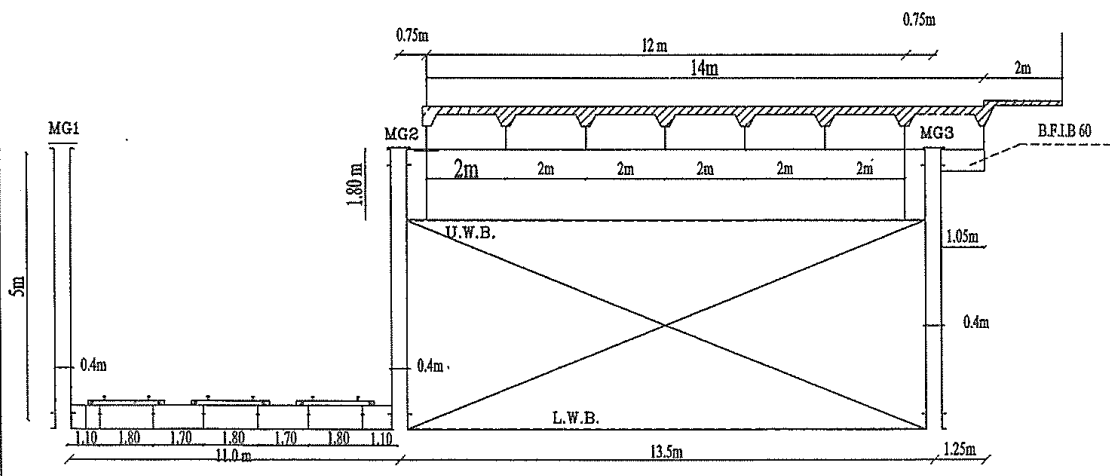


Fig.(4): CROSS-SECTION OF THE BRIDGE