Truss report

Business

The load W is adjustable using a screw jack.

From the theory of equilibrium, we are able to calculate the support reaction at point A and E in terms of W. Finally, from the support reaction at A and E, we are also able to calculate the force at each member using method of joint and method of section. Experimentally, every member is connected to a data acquisition system that can change its voltage if a load is applied to it. The voltage sent to a module that is connected to a computer will show the reading in terms of volts, where every 1 mili Volt of voltage is proportional to 100 Newton of orce (1V is proportional to 100 kN). After obtaining the experimental results, we are able to compare the results with the theoretical results in Model Calculation.

4. Experimental Procedure 1. Ensure that the pinned support is properly secured to the frame. 2. Attach the screw jack to the joint to be loaded.

3. Loosen the screw jack so that the truss is free from applied load. 4. Connect the wire from the load cell to the data acquisition module, each load cell occupying one channel of the module. 5.

Run the Winview CP Plus software. 6. Select the ‘ setting’ option to set the channels to be acquired and the conversion factor to convert mV output from the load cell to the measured units. 7. When the setting is complete, return to the sub menu and press the start button. Turn the screw jack handle to apply loads in the downward direction and observe the readings of the screw jack.

When the desired load is reached, press the stop button and stop turning the screw jack. 5. Data Sheet: Member | Reading (volt) | | Jack | 2. 51 | 4. 42 | 6.

34 | 8. 26 | 10. 18 | 12. 09 | 14. 01 | | 1 AB |-2.

88 |-0. 96 | 0. 96 | 2. 88 | 3. 84 | 5.

75 | 8. 63 | | 2 BC | 3. 83 | 5. 75 | 9. 59 | 10. 55 | 12.

46 | 16. 30 | 18. 22 | | 3 CD |-2. 8 |-4. 79 |-7. 67 |-9.

59 |-9. 59 |-11. 50 |-13. 42 | | 4 DE | 0 |-2. 84 |-7. 67 |-11.

51 |-13. 42 |-17. 25 |-20. 13 | | 5 AD | 1. 92 | 3.

84 | 6. 71 | 9. 59 | 10. 55 | 14. 38 | 17. 26 | | 6 BD |-0.

96 |-2. 88 |-5. 75 |-6. 71 |-8. 62 |-10. 54 |-11.

51 | Table 1 Readings in volts Member | Reading (kN) | | Jack | 251 | 442 | 634 | 826 | 1018 | 1209 | 1401 | | 1 AB |-288 |-96 | 96 | 288 | 384 | 575 | 863 | | 2 BC | 383 | 575 | 959 | 1055 | 1246 | 1630 | 1822 | | 3 CD |-288 |-479 |-767 |-959 |-959 |-1150 |-1342 | | 4 DE | 0 |-284 |-767 |-1151 |-1342 |-1725 |-2013 | | 5 AD | 192 | 384 | 671 | 9. 9 | 1055 | 1438 | 1726 | | 6 BD |-96 |-288 |-575 |-671 |-862 |-1054 |-1151 | Table 2 Readings in kN 6. Model Calculation [pic] Members: Member 1 = Member AB Member 2 = Member BC Member 3 = Member CD Member 4 = Member DE Member 5 = Member AD Member 6 = Member BD | Member | Force | | | Force | Tension/Compression | | 1 AB | W | Tension | | 2 BC | W(1. 14) | Tension | | 3 CD |-W | Compression | | 4 DE |-2W |

Compression | | 5 AD | W(1. 414) | Tension | | 6 BD |-W | Compression | Table 3 7.

Results and Discussion Member | Reading (kN) | | Jack | 251 | 442 | 634 | 826 | 1018 | 1209 | 1401 | | 1 AB | 251 | 442 | 634 | 826 | 1018 | 1209 | 1401 | | 2 BC | 354. 91 | 624. 99 | 896. 48 | 1167. 96 | 1439.

45 | 1709. 53 | 1981. 01 | | 3 CD |-251 |-442 |-634 |-826 |-1018 |-1209 |-1401 | | 4 DE |-502 |-884 |-1268 |-1652 |-2036 |-2418 |-2802 | | 5 AD | 354. 91 | 624. 99 | 896.

48 | 1167. 96 | 1439. 45 | 1709. 3 | 1981. 01 | | 6 BD |-251 |-442 |-634 |-826 |-1018 |-1209 |-1401 | Table 4 Theoretical results based on Table 3 From the results obtained, the tension force of the members increases when the load increases.

On the other hand, the compression force decreases when the load is increased. From the table, there is big difference between experimental and theoretical values. This happened might due to certain errors such as physical and surrounding. The air that is blowing from the air conditioner might affect the truss system as well as the reading. Other than that, the angle between the members might not be exactly 45degrees as in theoretical. Besides, there are no reaction forces included in the experimental as in theoretical.

8. Conclusion In conclusion, the tension force in the member is proportional to the applied load while the compression force is inversely proportional to the applied force. Somehow, there are several errors that might be affecting

the readings of the results such as the blowing air, inaccurate 45degrees angle and the reaction forces. The percentage error can be done by graphical methods. Hence, the experiment should be conducted with more cautious in order to get more accurate readings.