Lucerne Bridge Project

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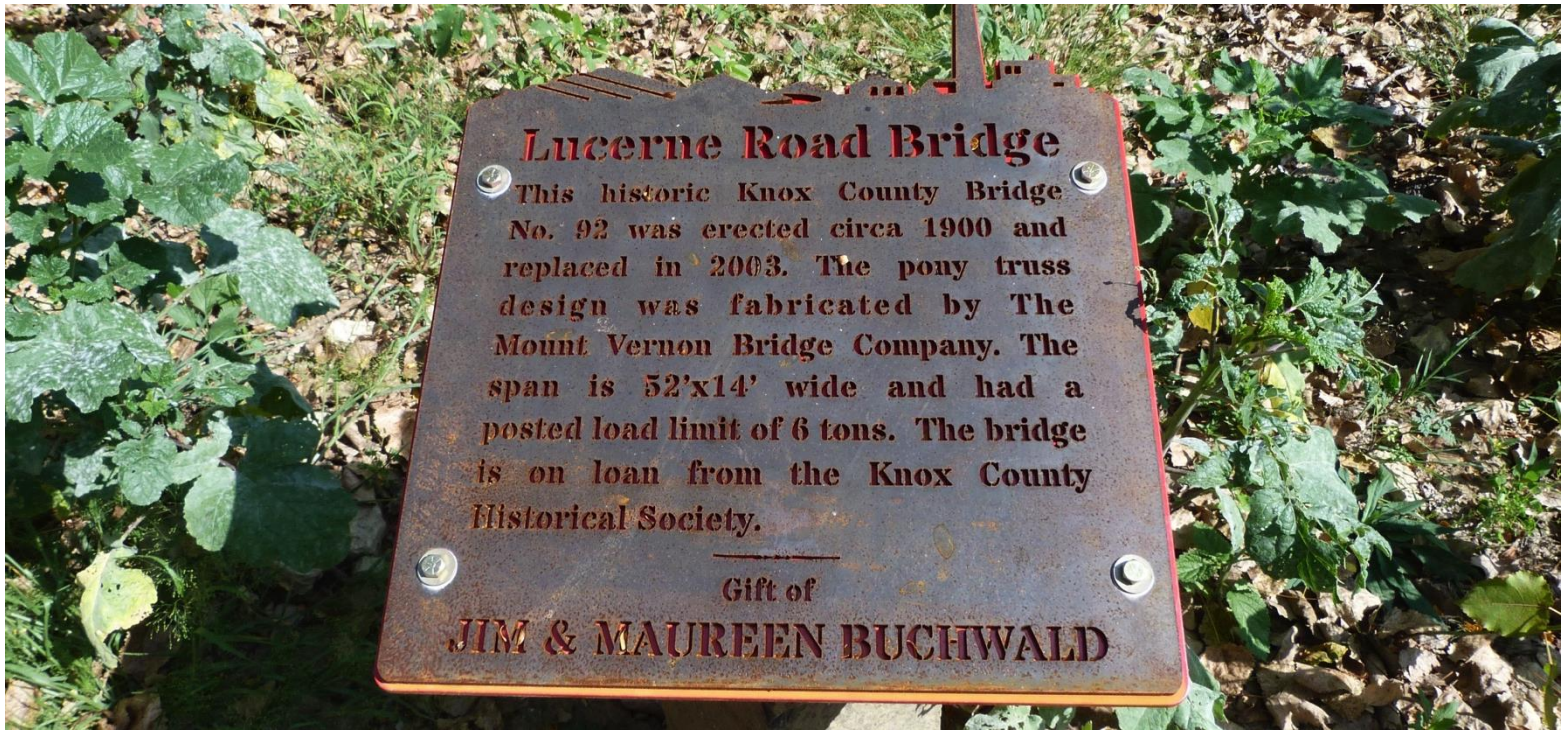
December 2016

Lucerne Bridge at Foundation Park in Mount Vernon, Ohio

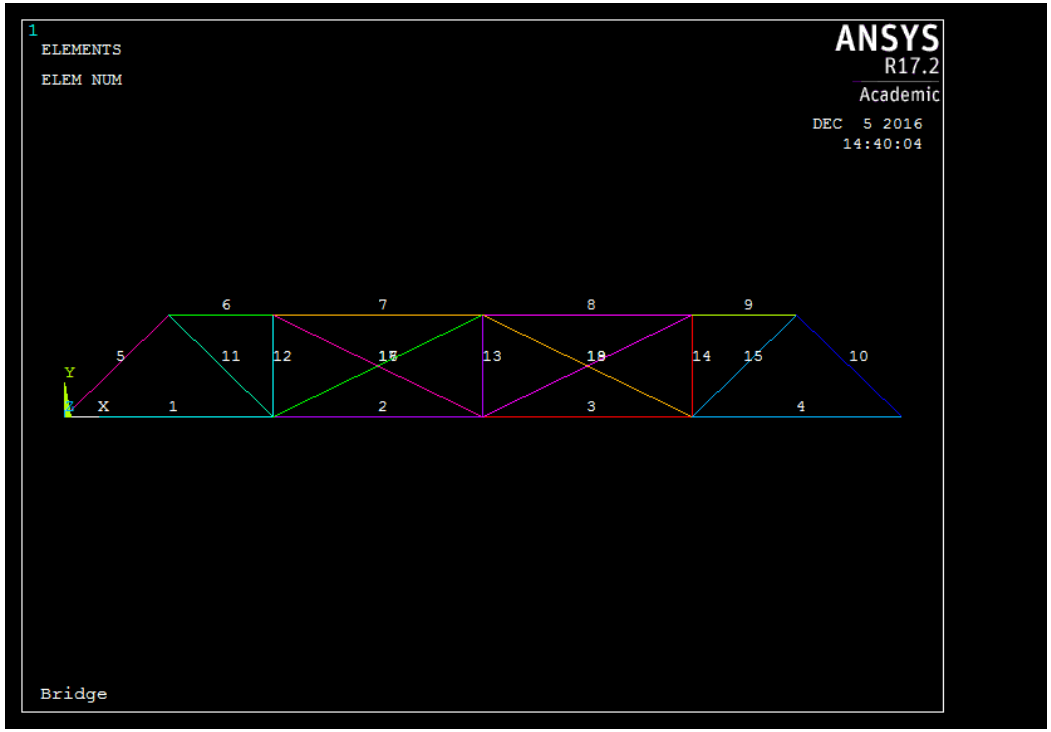
http://historicbridges.org/bridges/browser/?bridgebrowser=ohio/arielfoundationpark_lucerne/

The maximum load limit claims to be 6 tons



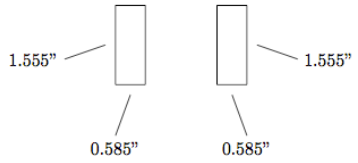
http://historicbridges.org/bridges/browser/?bridgebrowser=ohio/arielfoundationpark_lucerne/

ANSYS representation of the truss



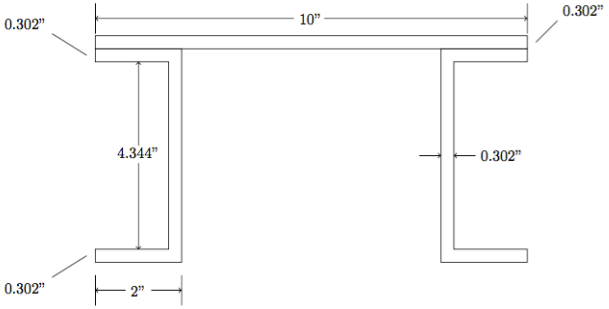
Cross sectional areas of all the members in the truss system

Elements 1-4



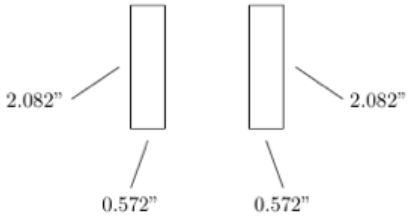
The cross sectional area of this figure is $0.910in^2$.

Elements 5-10



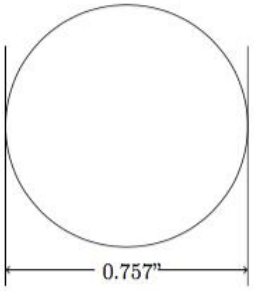
The cross sectional area of this figure is $8.06in^2$.

Elements 11 & 15



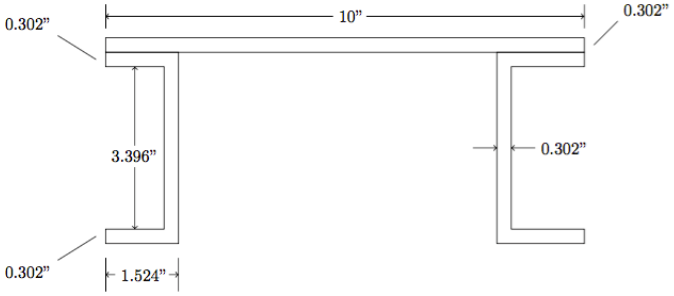
The cross sectional area of this figure is $0.404in^2$

Elements 17 & 18



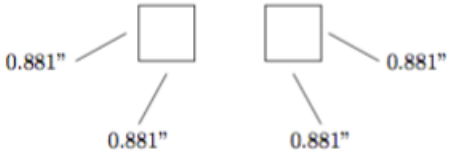
The cross sectional area of this figure is $0.45in^2$

Elements 12-14



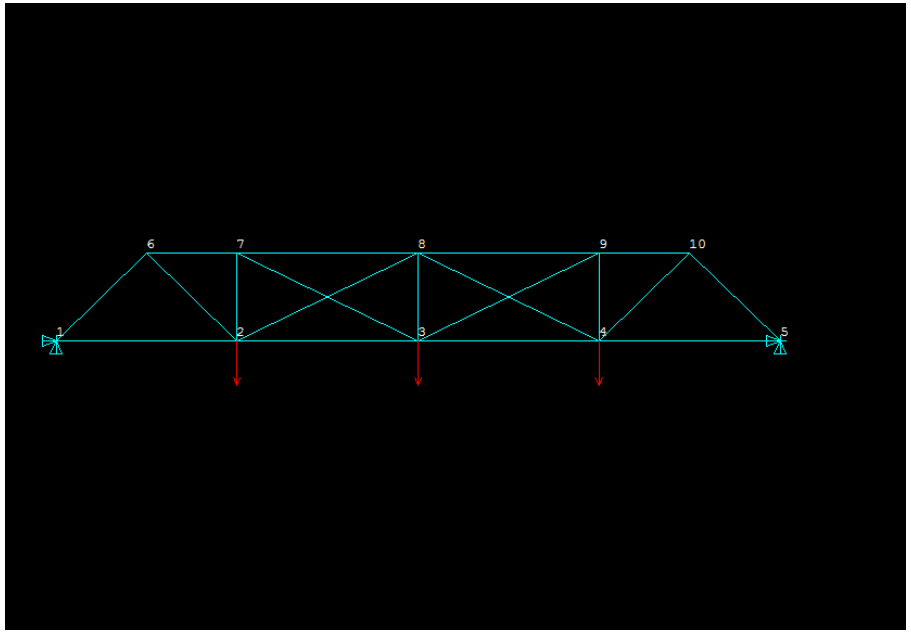
The cross sectional area for this figure is $6.728in^2$.

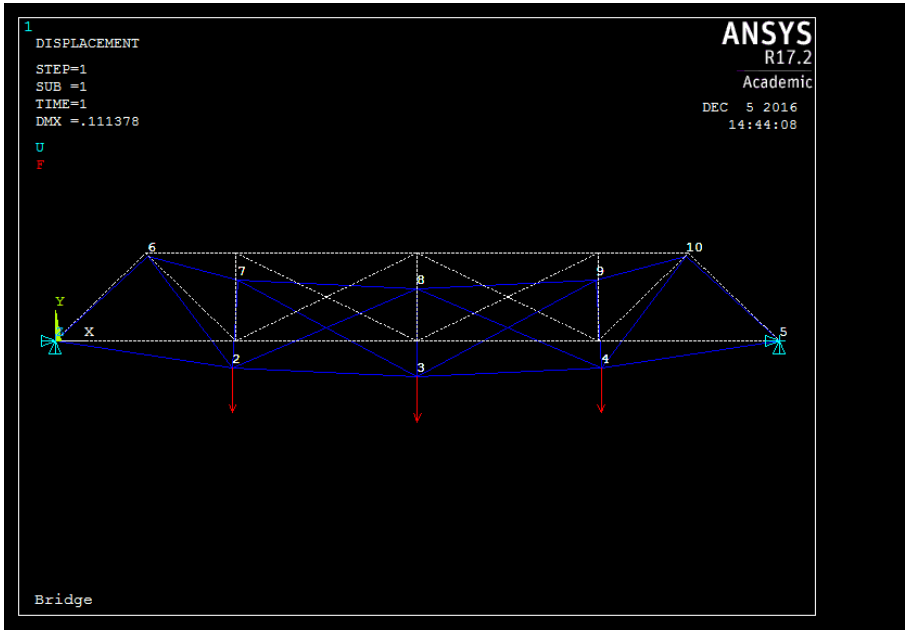
Elements 16 & 19



The cross sectional area for these members is $1.552in^2$

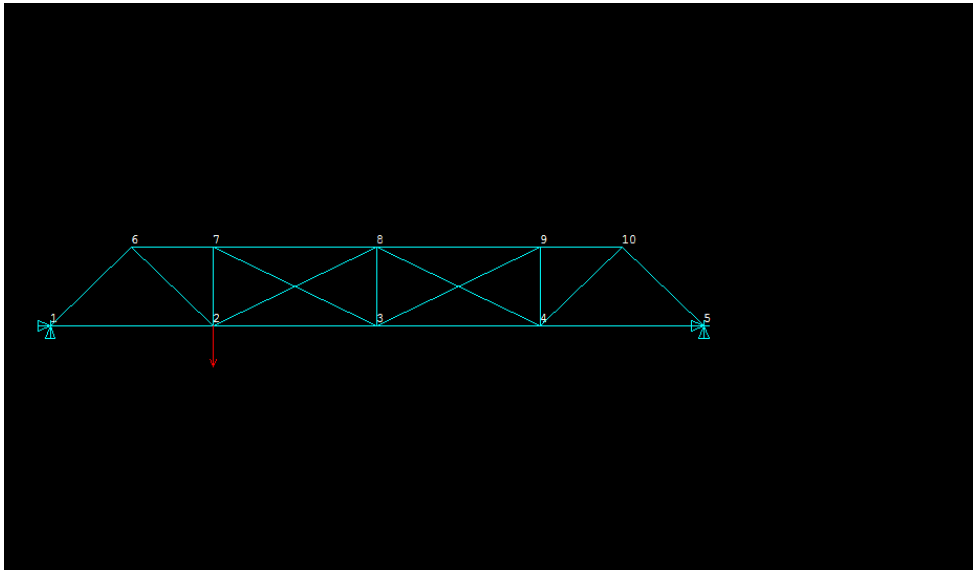
Uniform load of 2,000 lbs. at nodes 2, 3, and 4

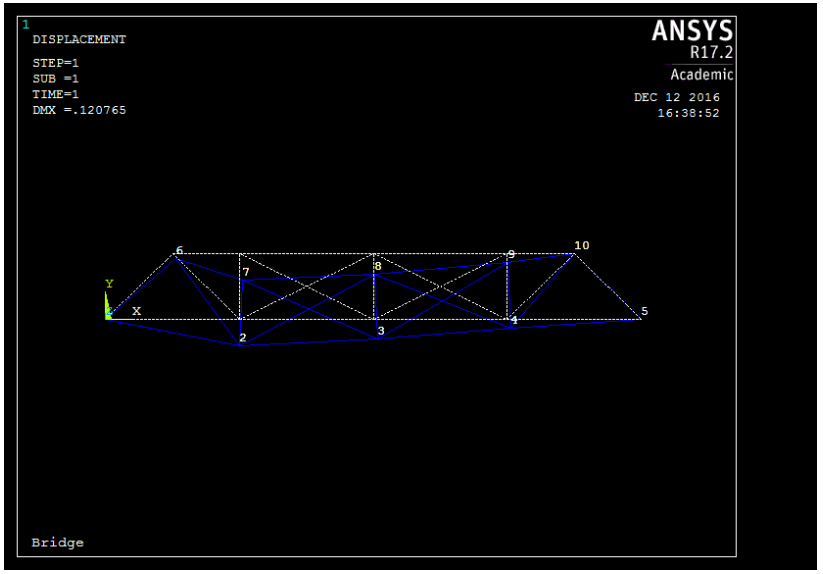




Max Stress = 5,322 psi in elements 11 & 15
Max Deformation = 0.1138 in. at node 3

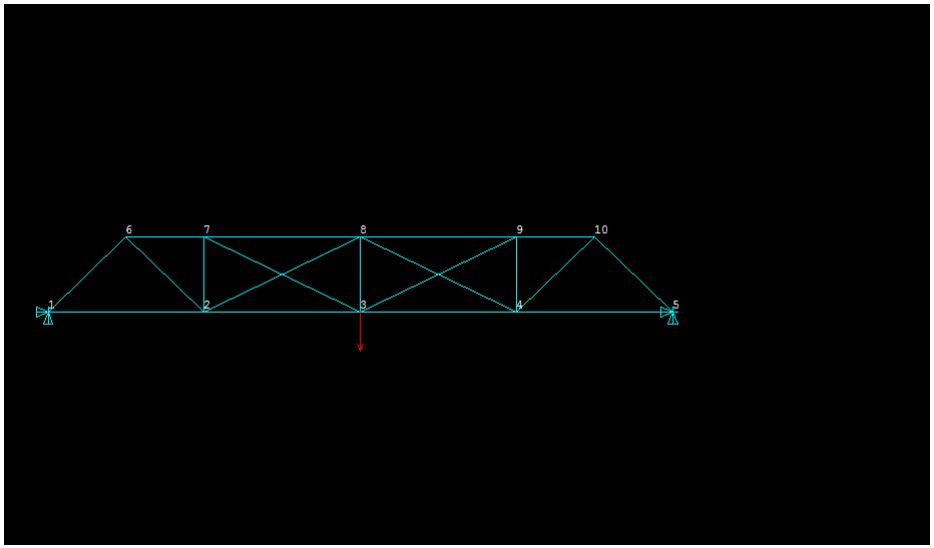
Concentrated load of 3 tons at node 2

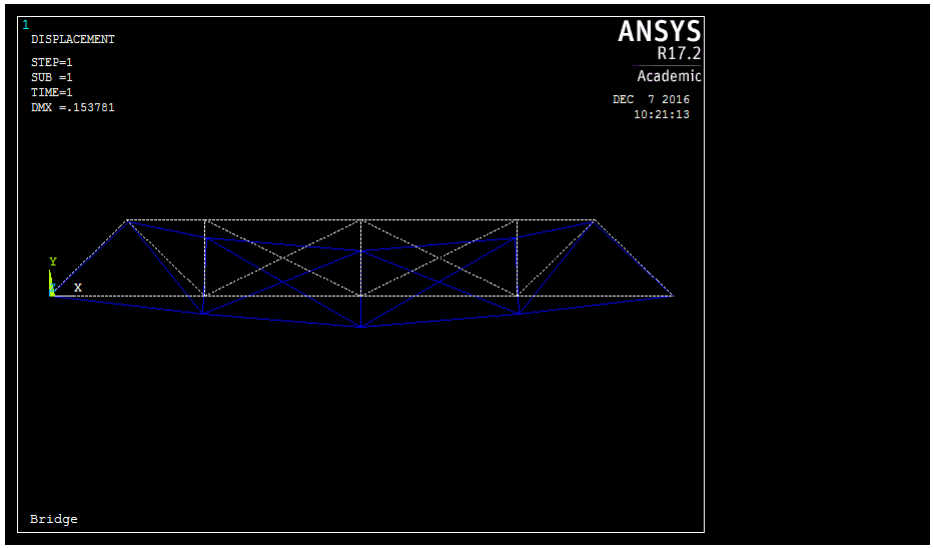




Max Stress: 7,983.5 psi in element 11
Max Deformation: 0.1208 in. at node 2

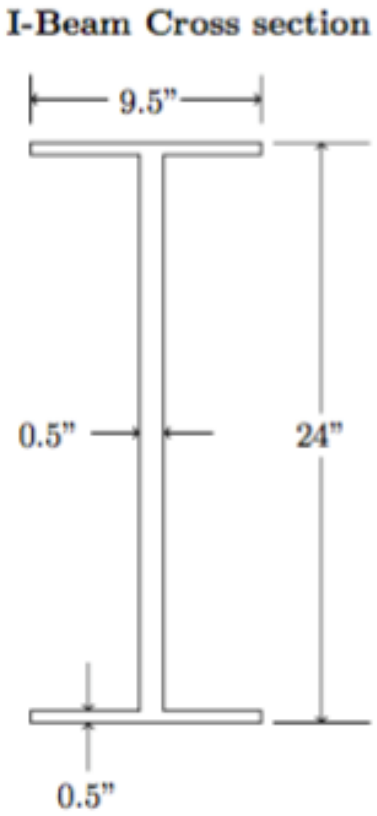
Concentrated load of 3 tons at node 3



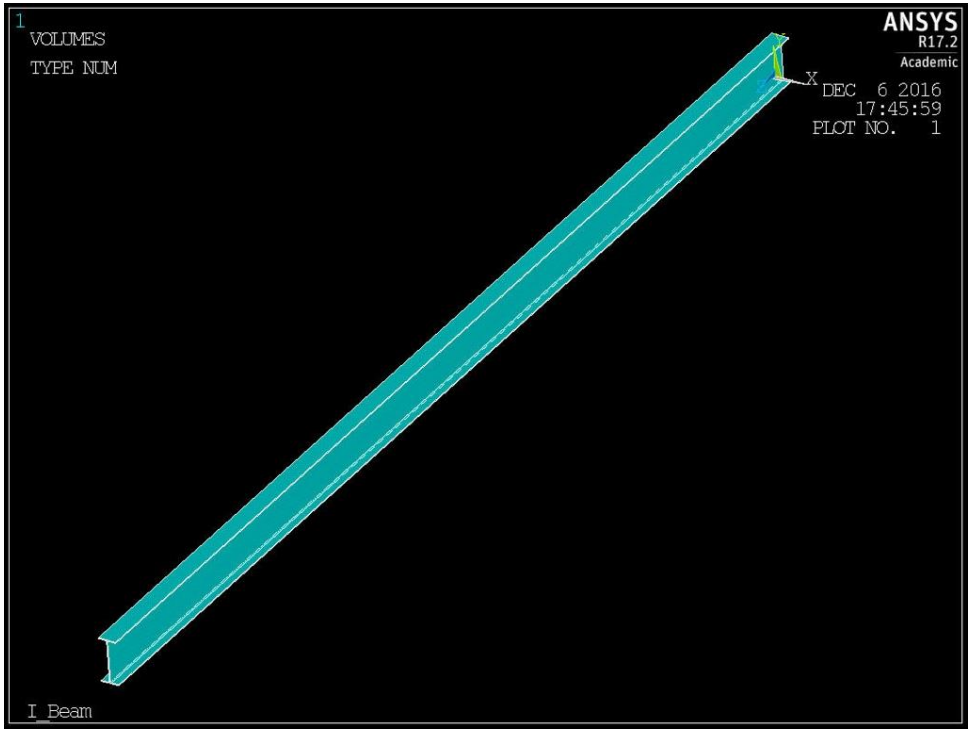


Max Stress: 5,322 psi in elements 11 & 15
Max Deformation: 0.1538 in. at node 3

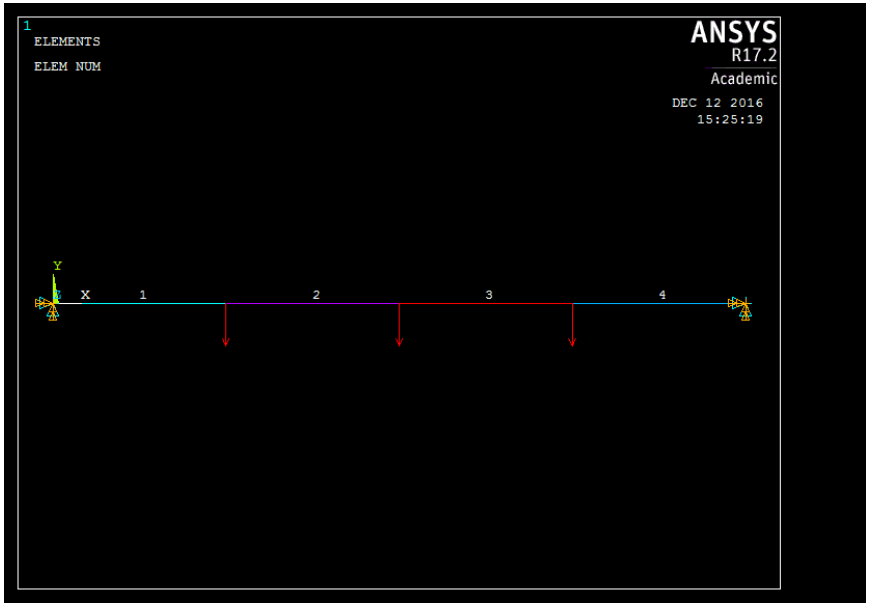
Cross sectional area of I-Beam

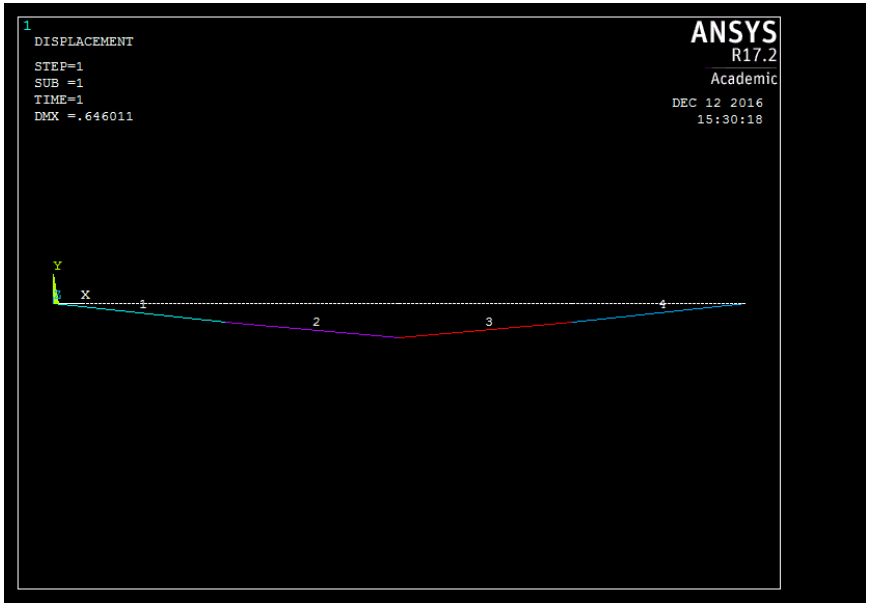


ANSYS representations of the I-Beam



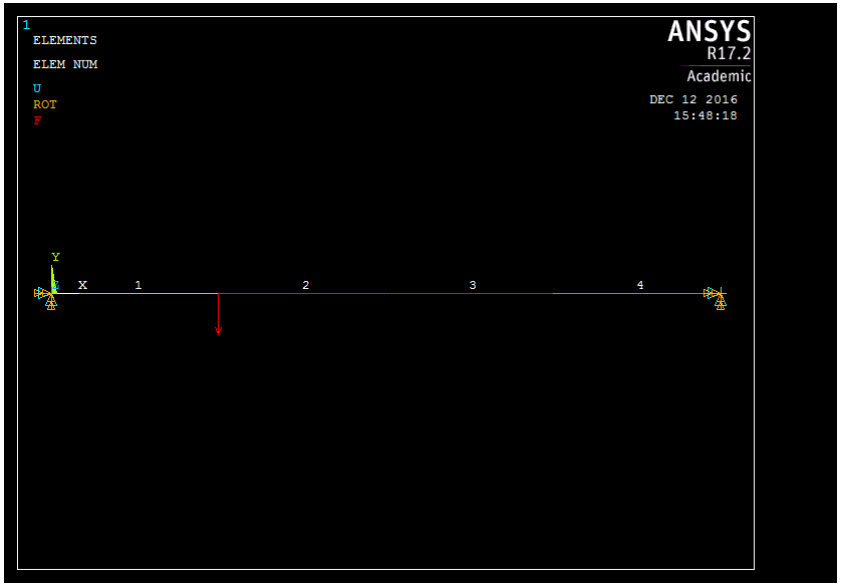
Uniform load of 572 lbs. at each node

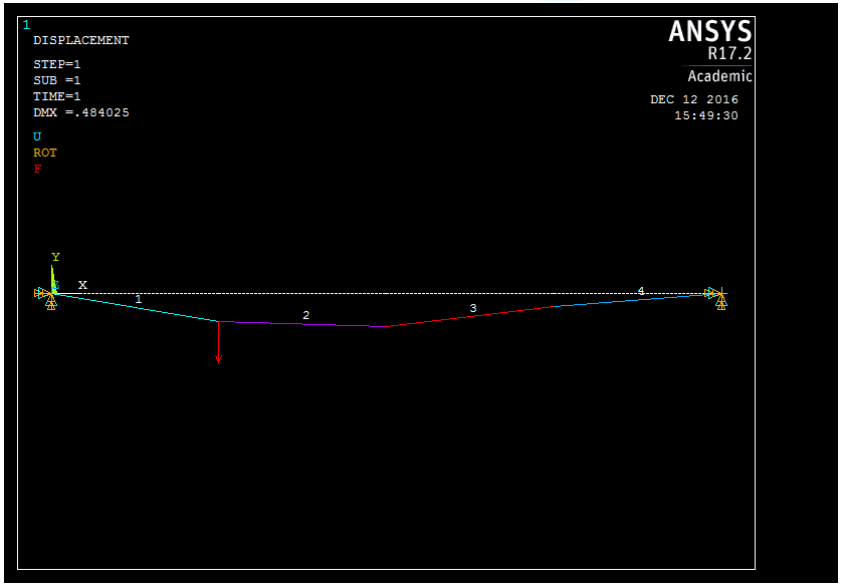




Max Stress: 7,201.3 psi
Max Deformation: 0.646 in. at node 3

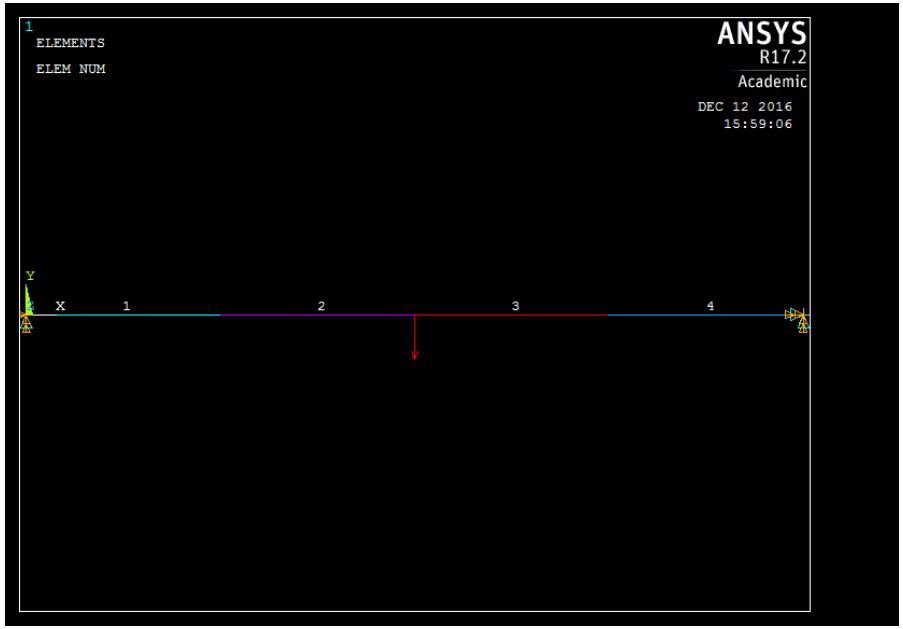
Concentrated load of 1,715 lbs.. at node 2

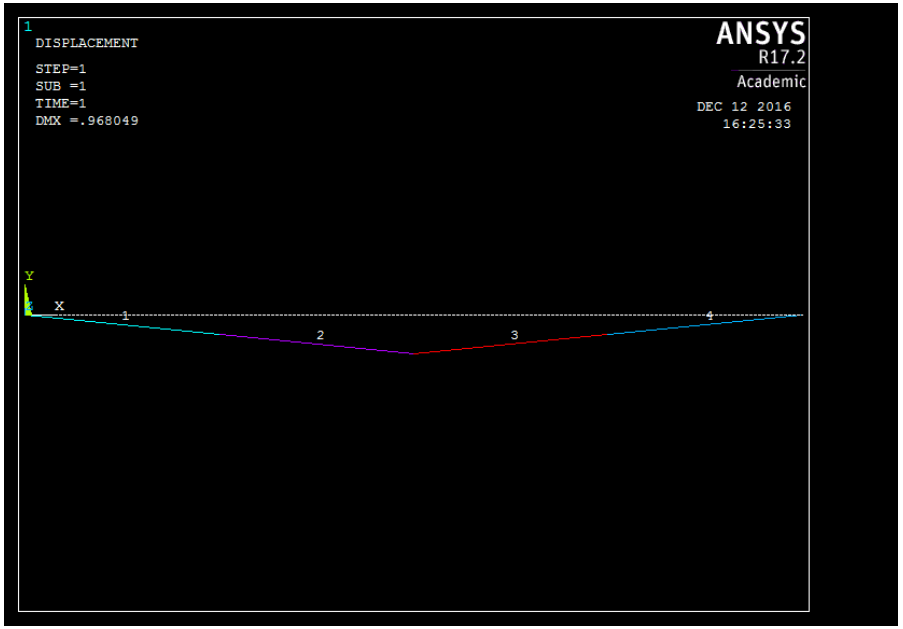




Max Stress: 4,857.4 psi
Max Deformation: 0.484 in. at node 3

Concentrated load of 1,715 lbs. at node 3





Max Stress: 8, 632.8 psi
Max Deformation: 0.9681 in. at node 3

Conclusion

* The truss system can only support 5.4 tons within the factor of safety of 5.
* The I-Beam can only support 4.98 tons within the factor of safety of 5.
* We would recommend a posted limit of 4.9 tons