

Homework 5: ETM 467

Tom Boynton
3/16/2009

Homework 5:

Problem Description:

In this homework, a buried construction plate is to be analyzed for maximum deflection using the Algor Fine Element Analysis software. The cross-section of this plate is analyzed as a 2-D element with a mesh size of 400.

Results:

This 2D element was shown to have a deflection of 5.46×10^{-5} meters at the midpoint 2.5 meters from each end. This deflection is in the $-z$ direction. This is shown in the Algor analysis in figure 2.

Model Description (figure 1)

- **Geometry:** The 2D element which models the cross-section of this plate, measures 5 meters long and 0.25 meters high (*the original plate is 5 meters long, 0.25 meters high and 20 meters deep*).
- **Loads:** The element has a uniform distributed pressure of 2 MPa along the top 5 meter surface.
- **Boundary Conditions:** All nodes along both the element sides are constrained in the z direction and a single node on each side is additionally constrained in the y direction.
- **Material Properties:** This element is made of Reinforcing Steel (high strength) with a Modulus of Elasticity of 1.9995×10^{11} and a Poisson's Ratio of 0.32 This is obtained from the Algor Material Library (figure 3).
- **Initial Conditions:** There are no additional initial conditions

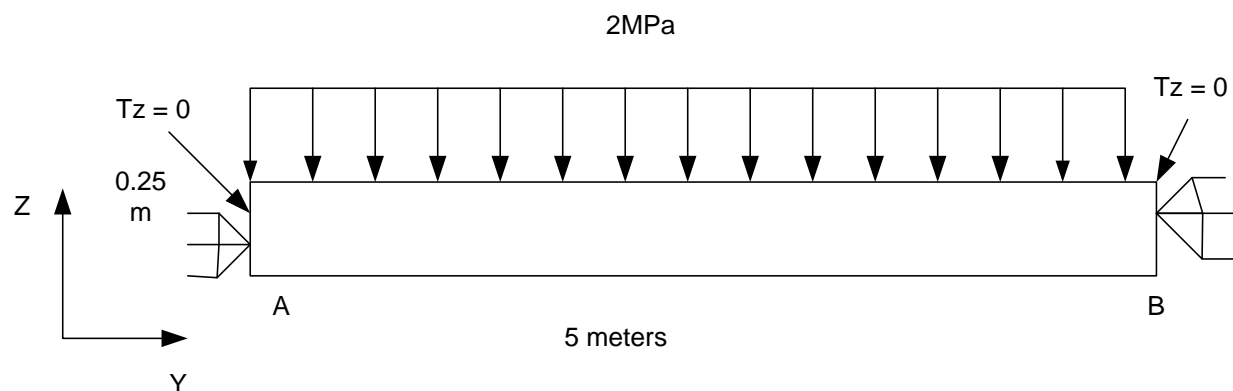


Figure 1: Buried Construction Plate

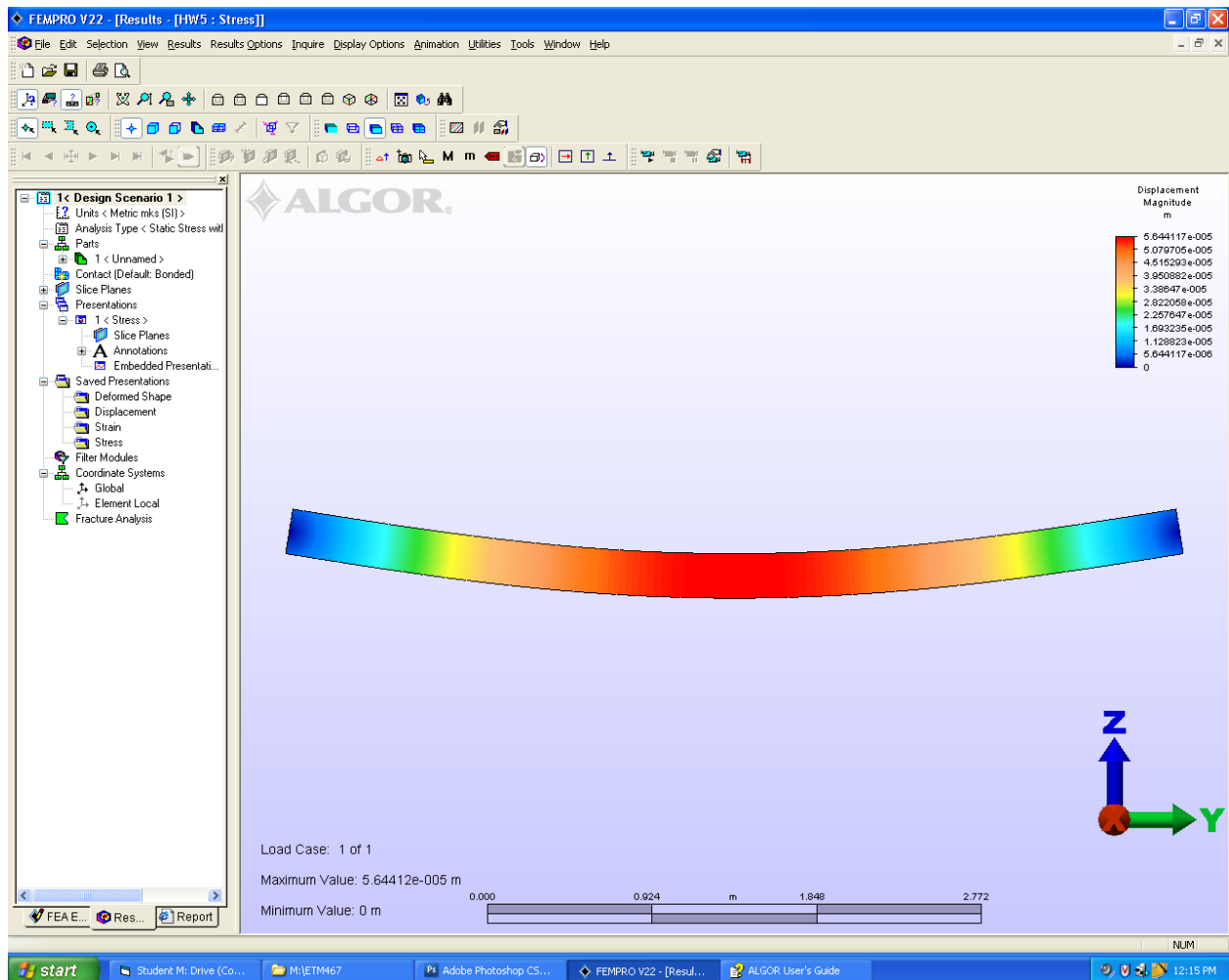


Figure 2: Element Displacement

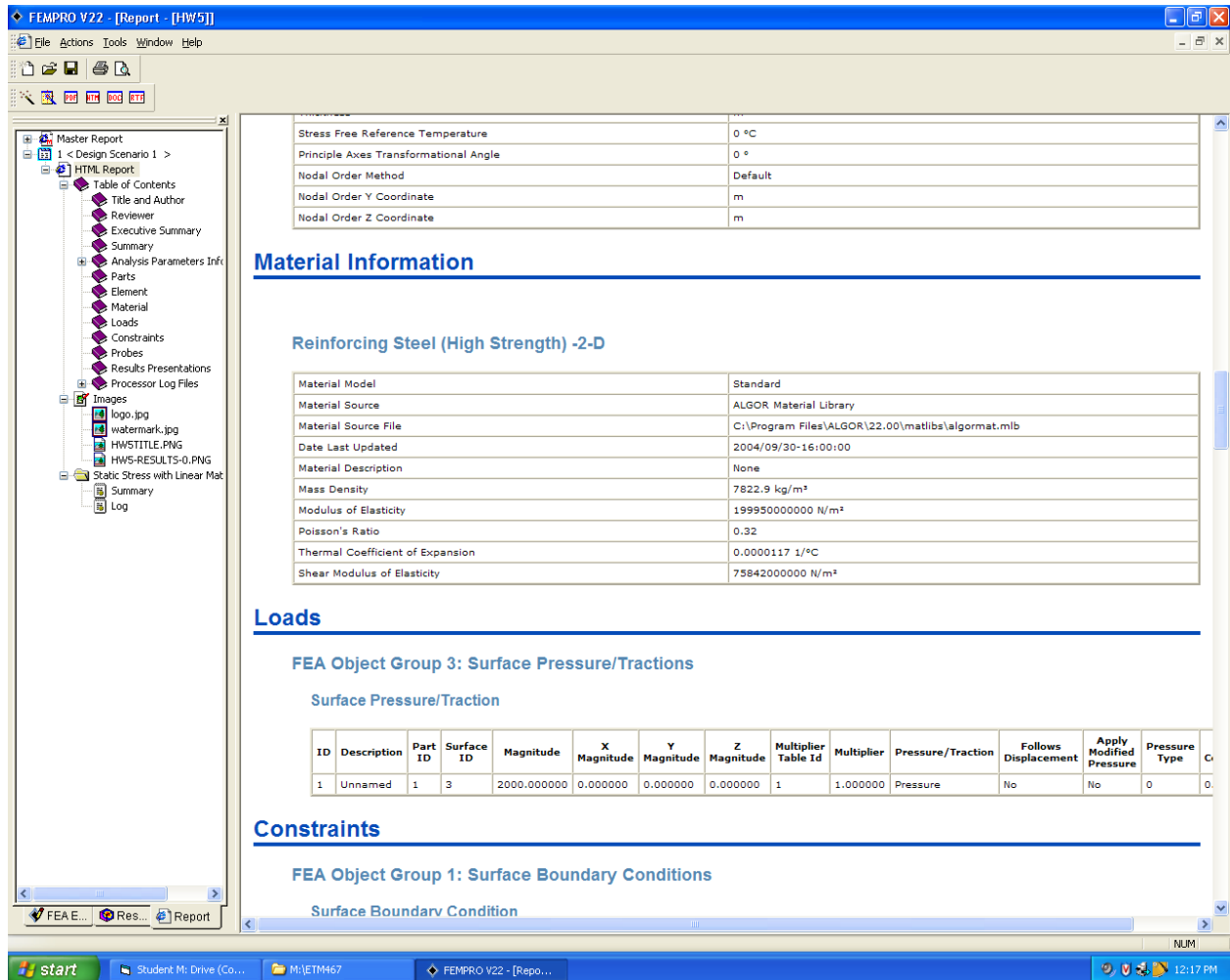


Figure 3: Algor Material Properties for this Element

Discussion: Discuss the element selected for the model.

The element used for this model is a 2D element. This element has no strain or stress normal to the thickness and has only two degrees of freedom per node as it is 2 dimensional.

No attachments: