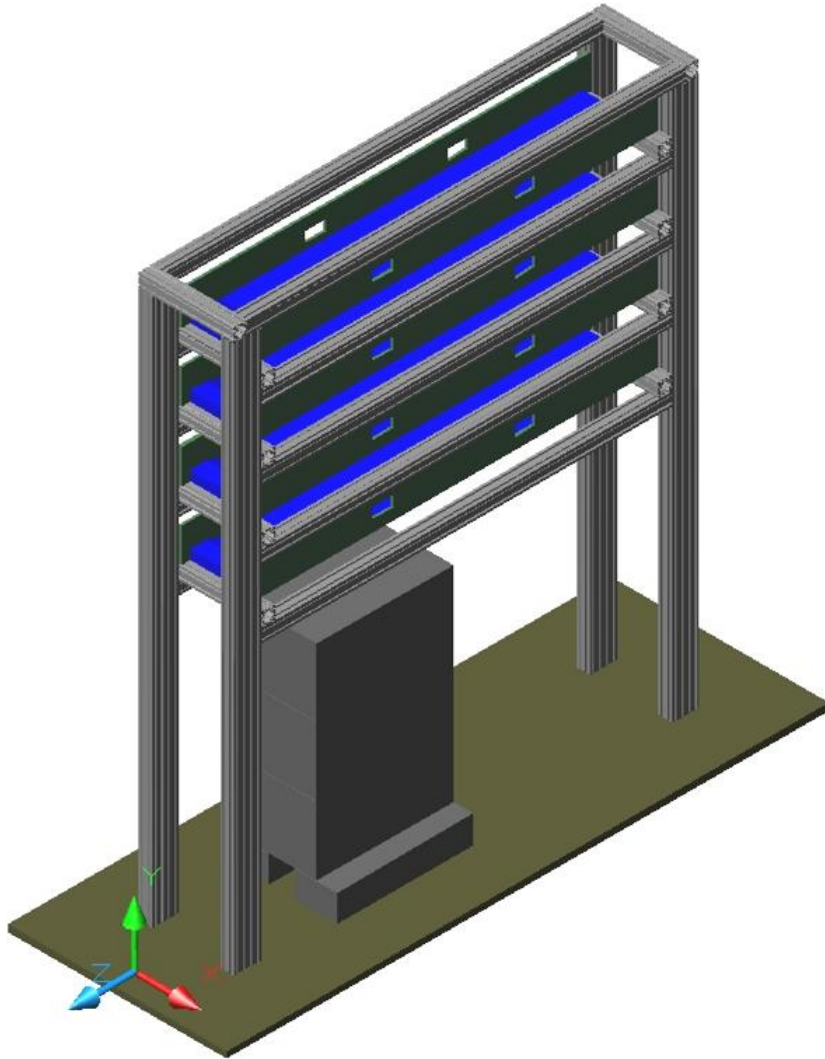The following slides represent a preliminary set of structural FEM analyses for the CRT strongback concept previously presented by MR on 10 May 2012.
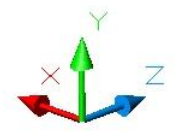

(This is a "test drive" of new modeling software for MR: COMSOL 4.2)

TOP module strong-back concept for CRT use,
based on vertical hoist with fork-lift type adapter.

Flat beams: 2989mm long x 250mm high x 20mm thick, modeled in
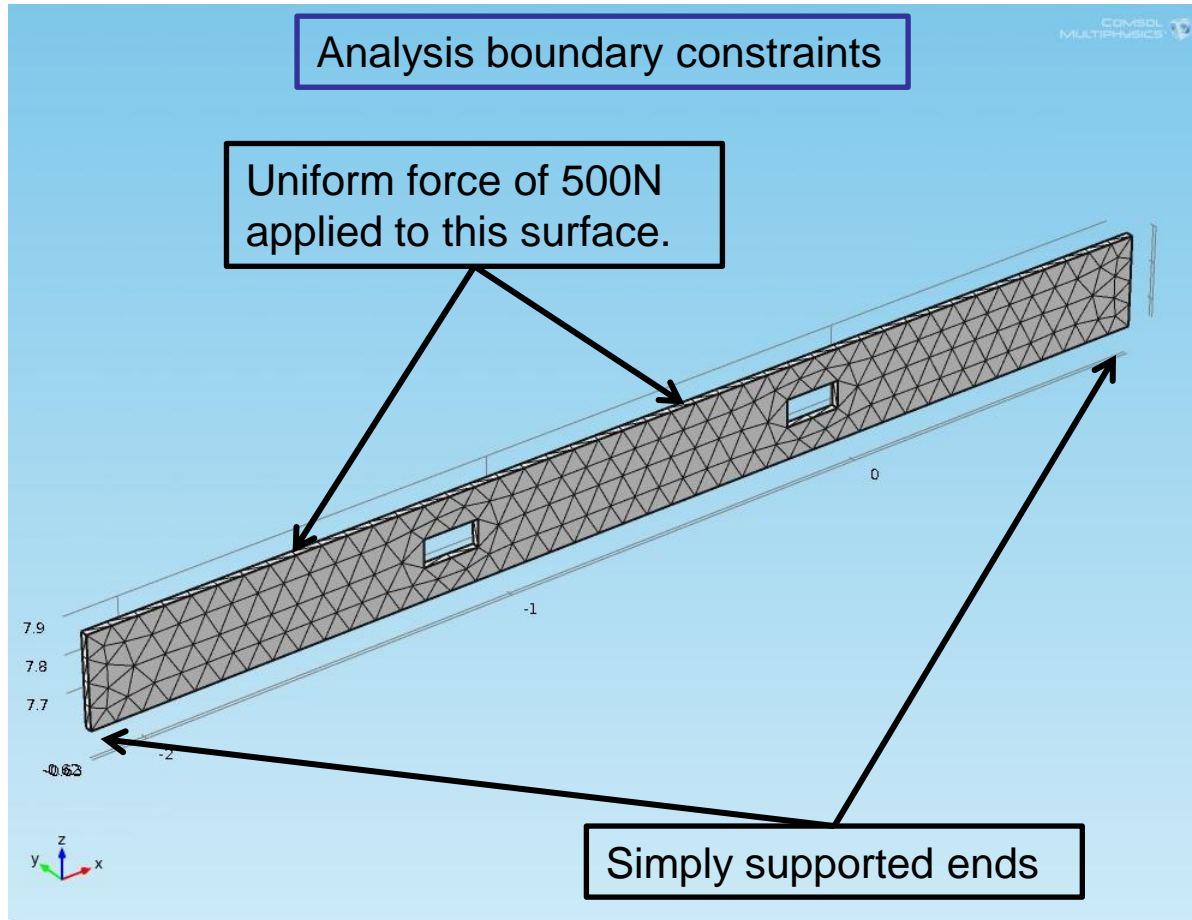structural steel, Ti, and Al. using COMSOL Multiphysics 4.2.
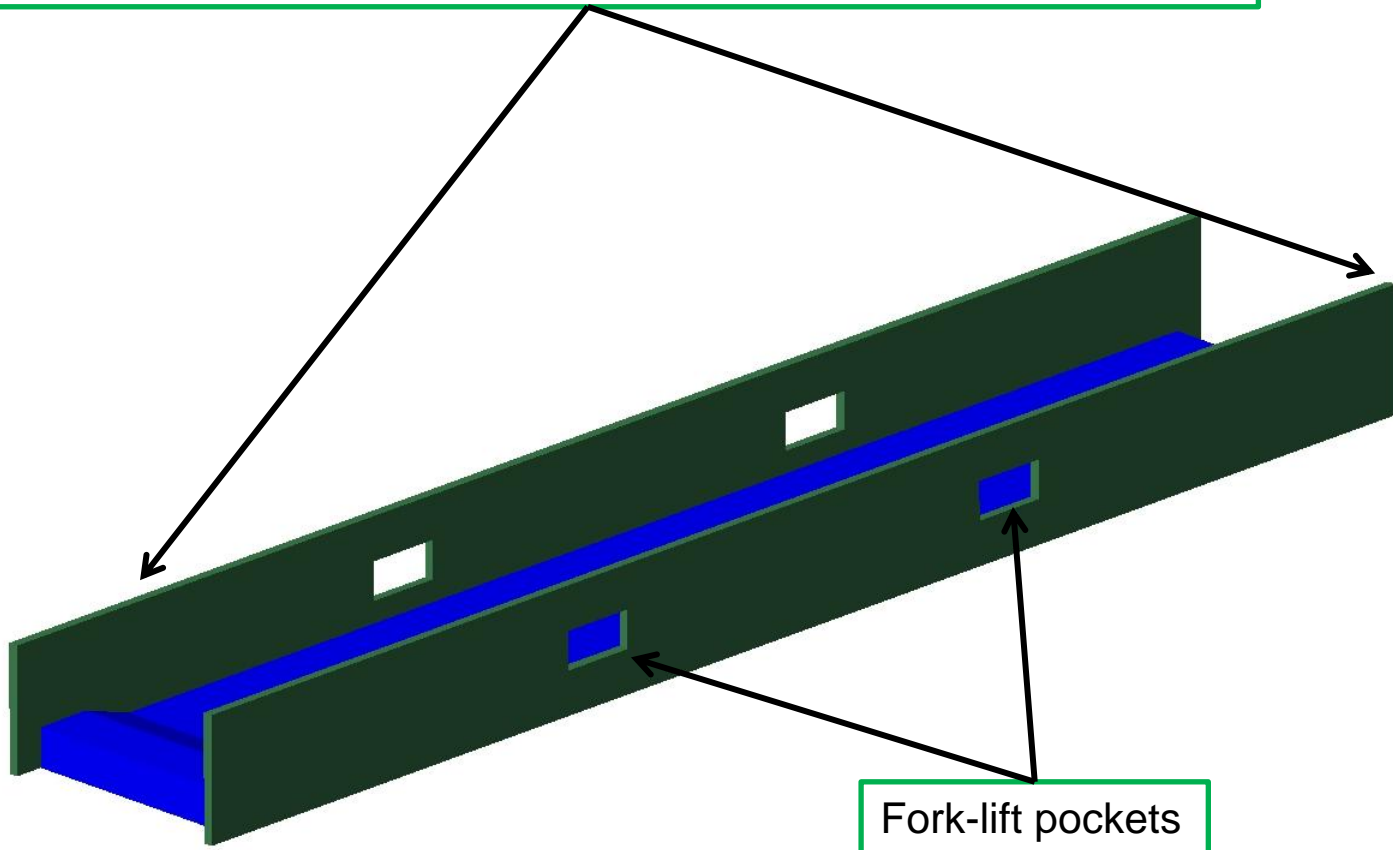
Fork-lift pockets

TOP module strong-back concept for CRT use.
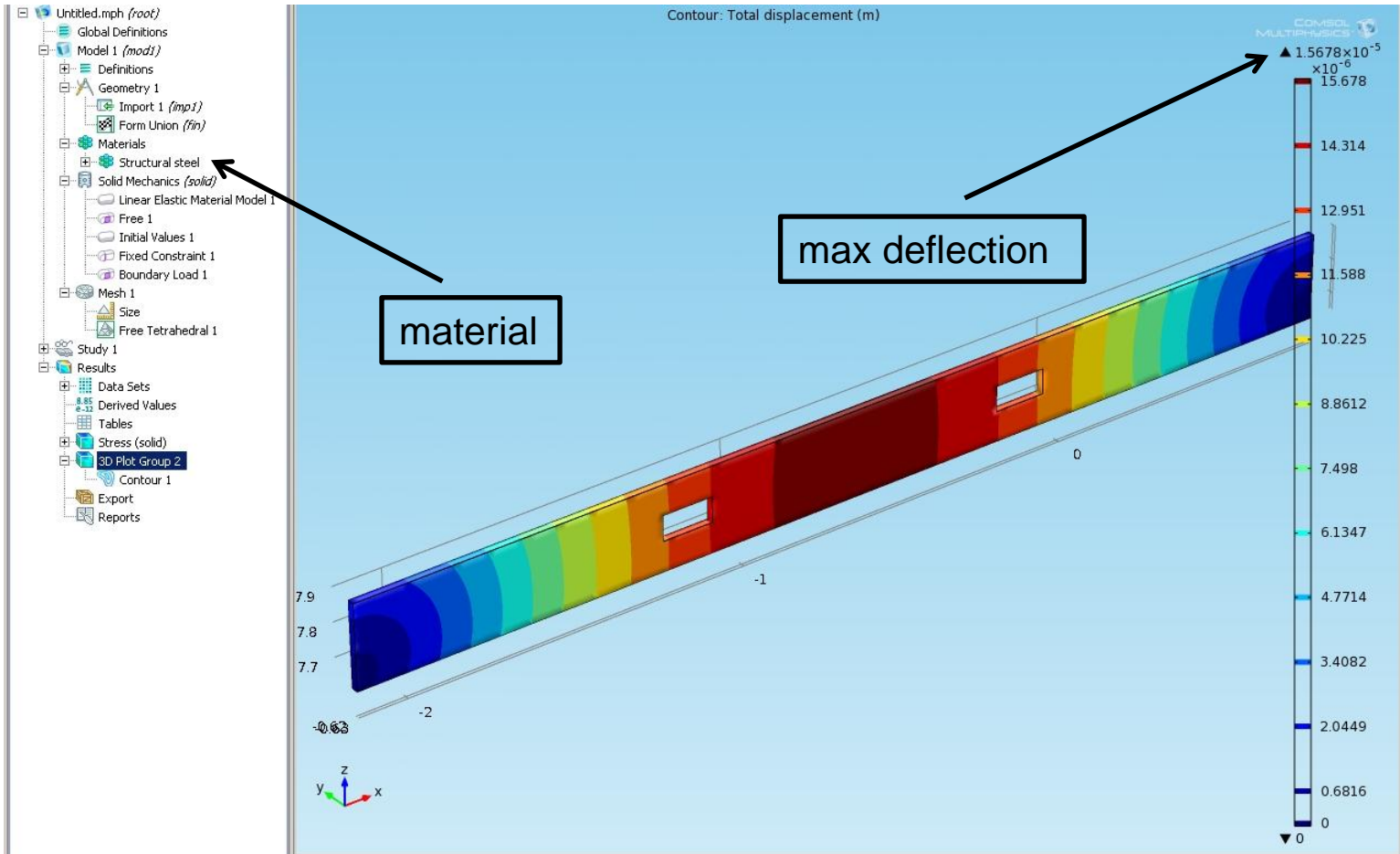
Flat beams: 2989mm long x 250mm high x 20mm thick.

Analysis boundary constraints

Uniform force of 500N applied to this surface.

Simply supported ends

Structural Steel Analysis:

Young's modulus = 200e9Pa
Density = 7,850kg/m^3
Mass of part = ~114kg
Deflection = ~16um

Ti-beta 215 Analysis:

Young's modulus = 105e9Pa
Density = 4,940kg/m^3
Mass of part = ~72kg
Deflection = ~30um
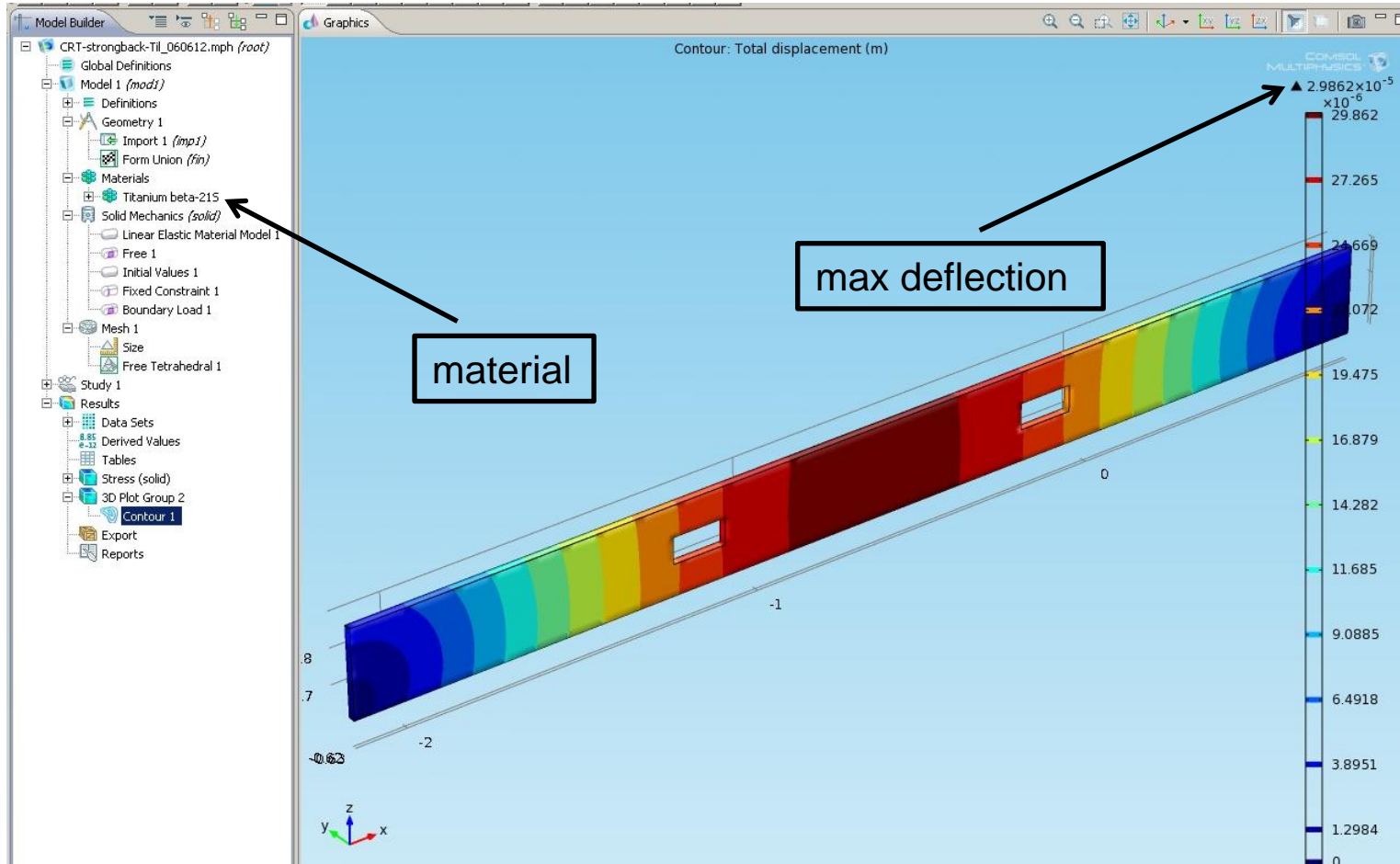
Al 6063-T83 Analysis:

Young's modulus = 69e9Pa
Density = 2,700kg/m^3
Mass of part = ~39kg
Deflection = ~45um

max deflection

material
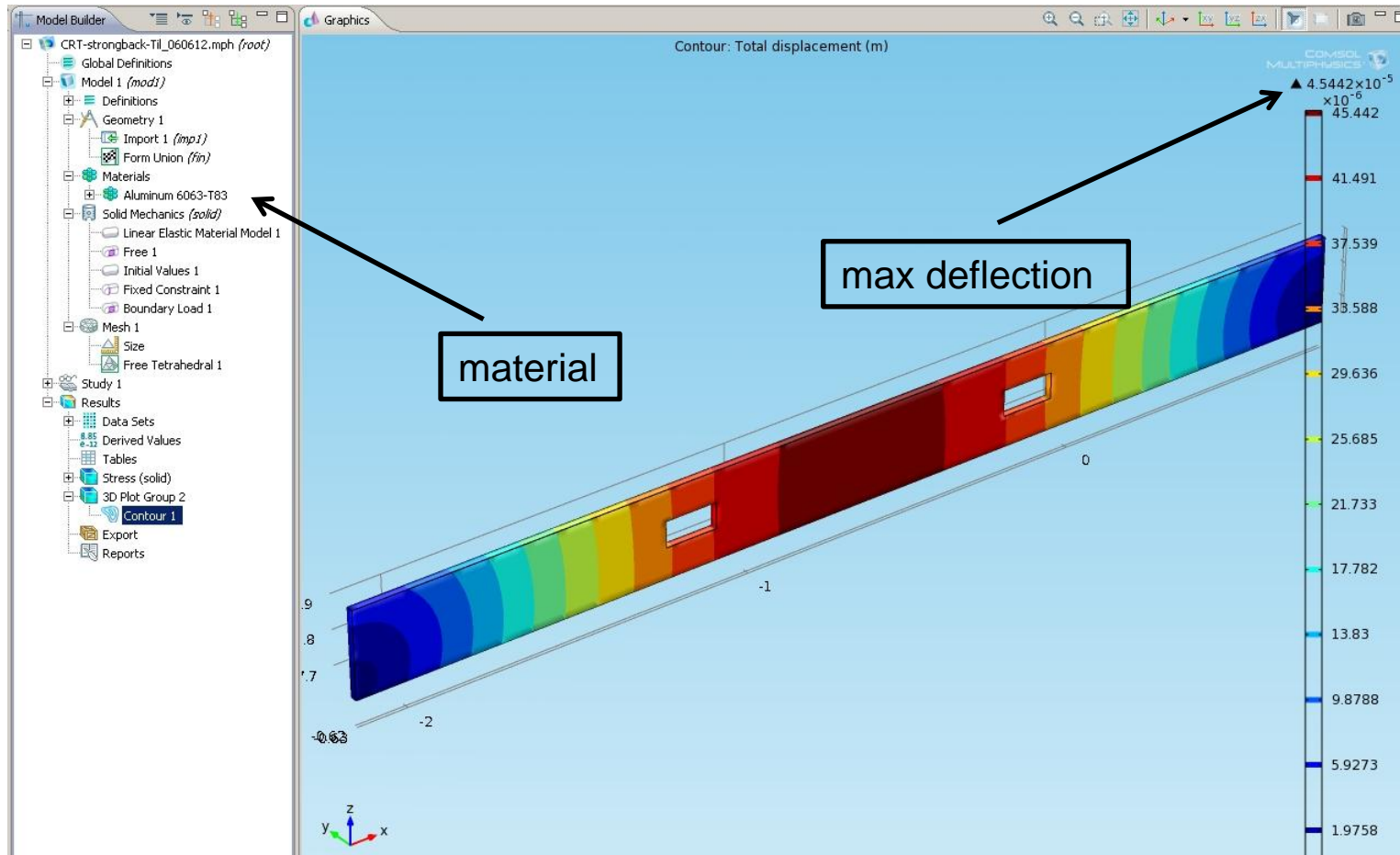
<u>SUMMARY</u>

➢ Preliminary analyses show that a simple strongback design is a reasonable approach for the CRT application.

➢ The models presented here assume that there is no additional support from attachment to the QBB's.

➢ A more comprehensive model is needed that includes fastening between the strongbacks and the QBB side rails.

➢ MR would appreciate additional comments and feedback.