

PROJECT

Liberty Bell Replica
Denver, Colorado

CLIENTS

Anthony & Associates, Inc.
Fort Collins, Colorado

PROJECT DESCRIPTION

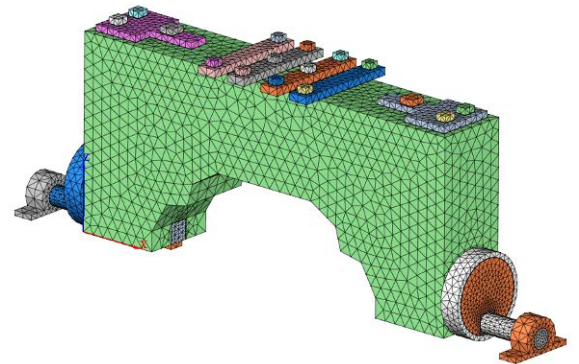
The wood and steel components supporting the weight of the Bell showed signs of weathering and distress. Atkinson-Noland & Associates was retained to conduct a structural analysis of the support structure and evaluate whether the current support system can adequately support the Bell over time. Due to the complexity of the problem, a 3D finite element analysis (FEA) was implemented to evaluate the original design of the support structure and investigate what caused the distress. In order to realistically simulate the structural behavior, advanced nonlinear interface elements were employed to model the contact between steel and wood, allowing the two materials to move independently. By implementing this technique, our engineers were able to determine that the existing structure had enough strength to support the Bell. This allowed the original yoke to be retained, preserving the historic look of the Bell.

SERVICES PROVIDED BY ATKINSON-NOLAND

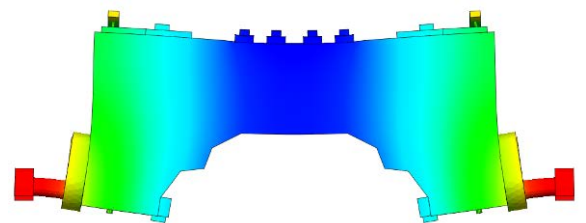
- 3D finite element analysis of the Liberty Bell Replica support frame
- Provide suitable repairs and preservation options



Liberty Bell Replica in Denver, Colorado



3D model used in the FE analysis



Vertical displacement contour plot showing the deformed shape of the support frame



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