

FINITE ELEMENT ANALYSIS LAB REPORT

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Section: B

Semester: VII

Introduction

This report presents a complete analysis of a hexagonal model undergoing both Static Structural and Explicit Dynamic simulations in ANSYS Workbench 2020. The purpose is to understand the stresses, deformation patterns, and structural response under various loading conditions. Images extracted from the original simulation are included with detailed descriptions.

Figure 1



Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 1. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 2

Structural

▼ Isotropic Elasticity

Derive from	Young's Modulus and Poisson's Ratio
Young's Modulus	95000 MPa
Poisson's Ratio	0.28
Bulk Modulus	71970 MPa
Shear Modulus	37109 MPa

Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 2. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

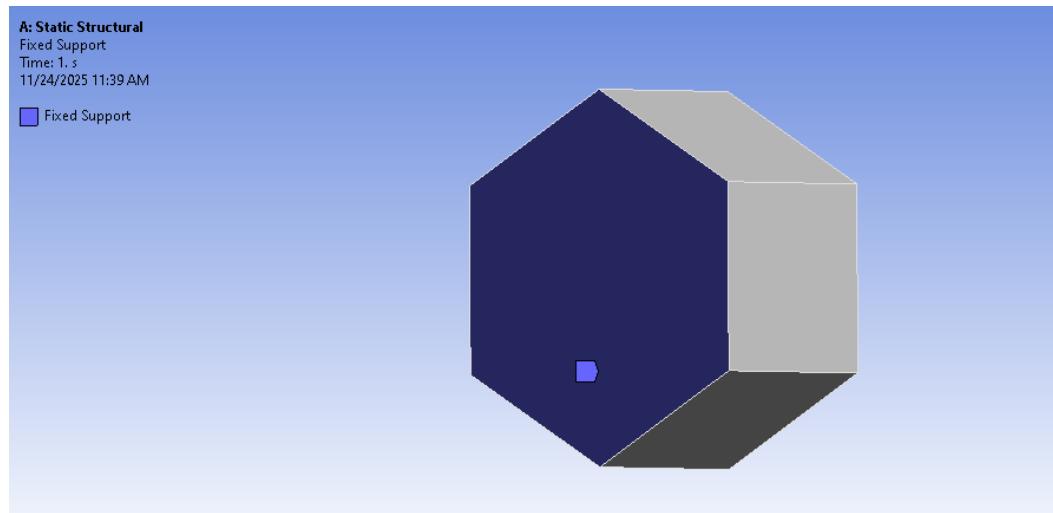
Figure 3

A	B
1 Static Structural	1 Explicit Dynamics
2 Engineering Data ✓	2 Engineering Data ✓
3 Geometry ✓	3 Geometry ✓
4 Model ✓	4 Model ✓
5 Setup ✓	5 Setup ✓
6 Solution ✓	6 Solution ✓
7 Results ✓	7 Results ✓

Static Structural Explicit Dynamics

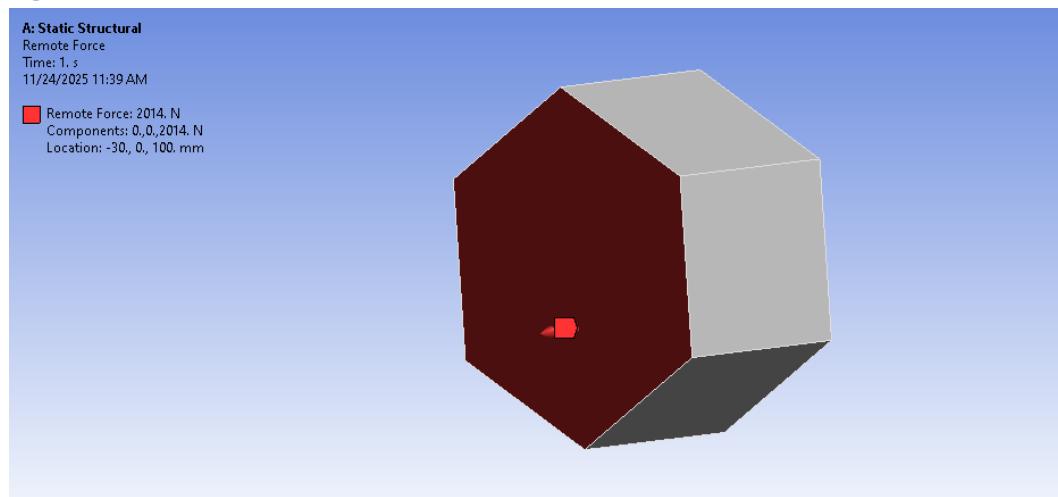
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 3. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 4



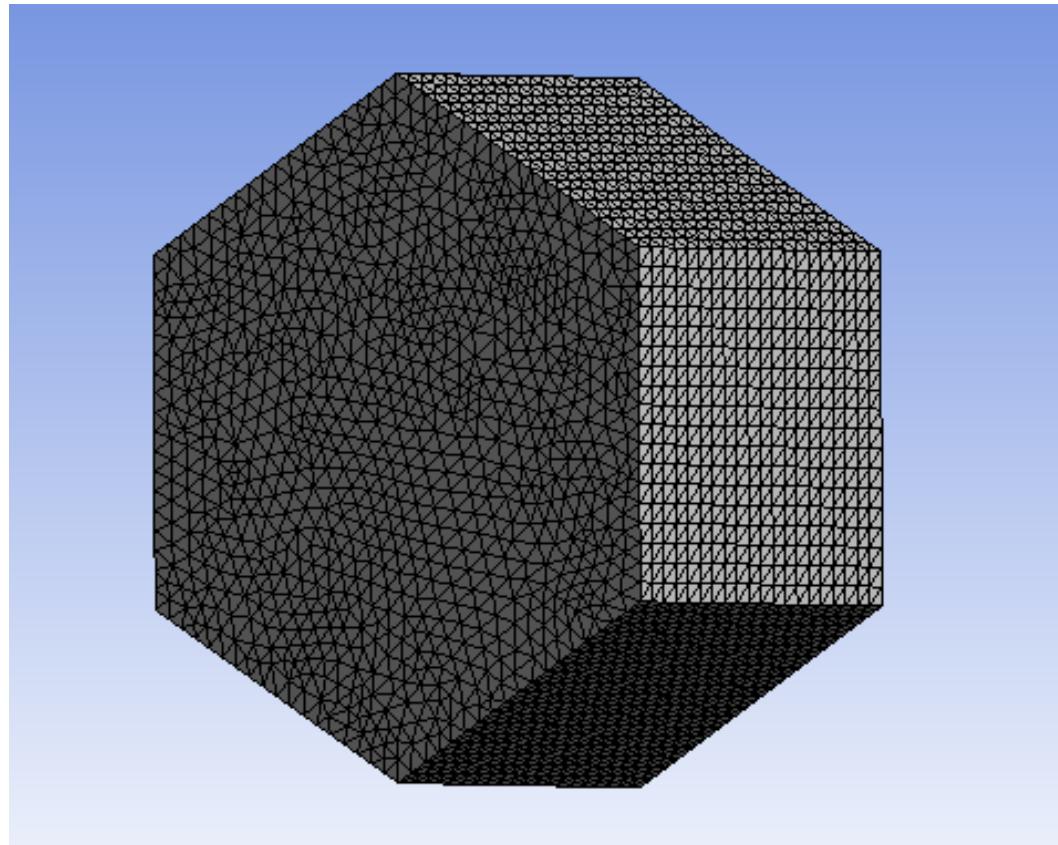
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 4. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 5



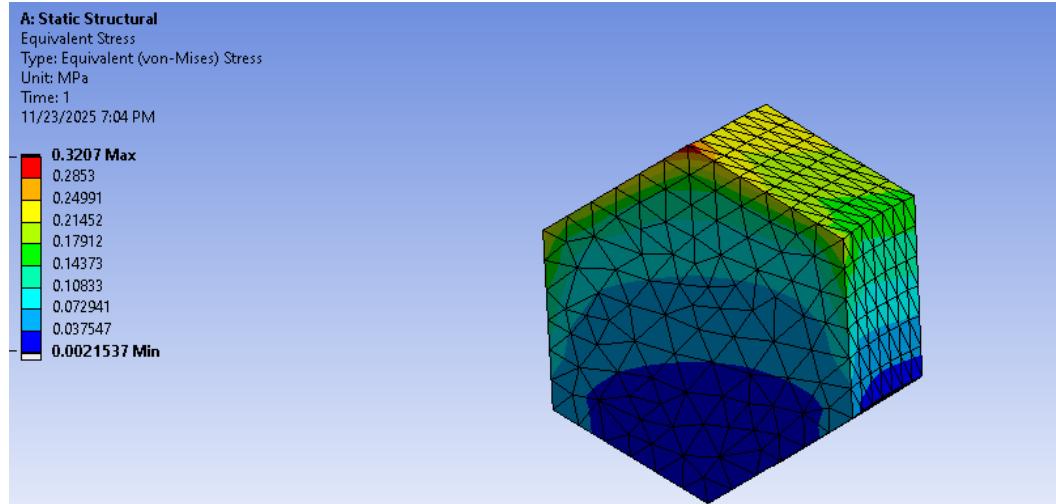
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 5. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 6



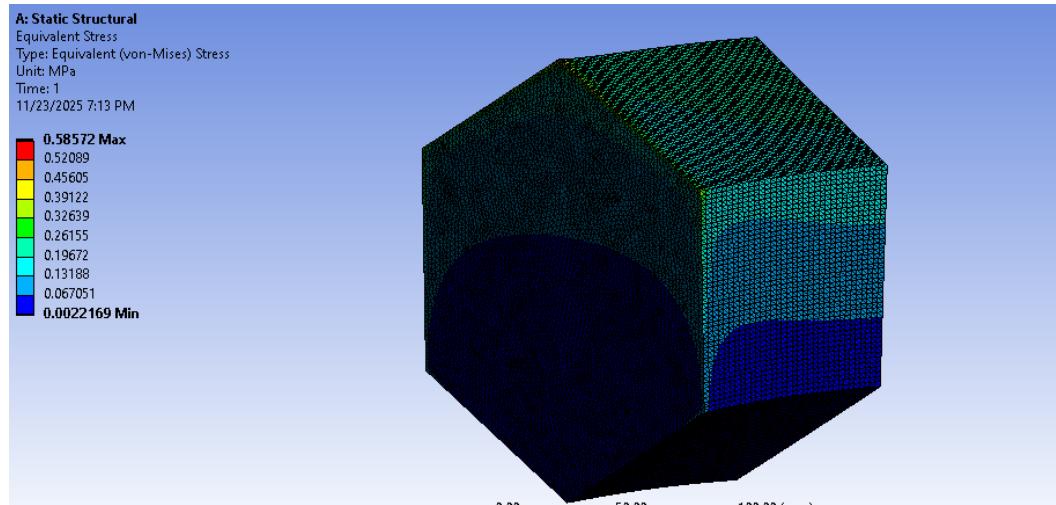
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 6. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 7



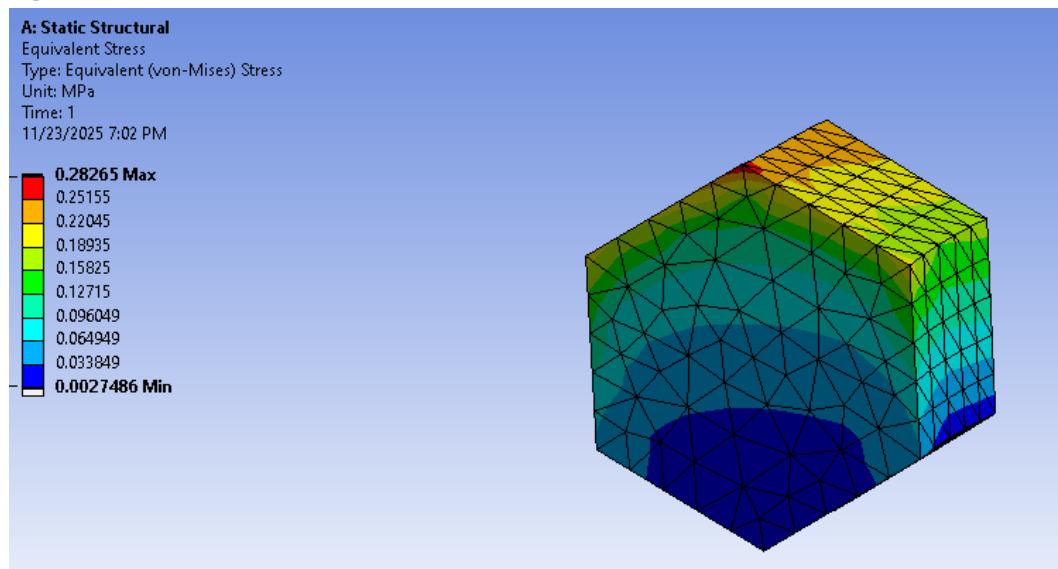
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 7. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 8



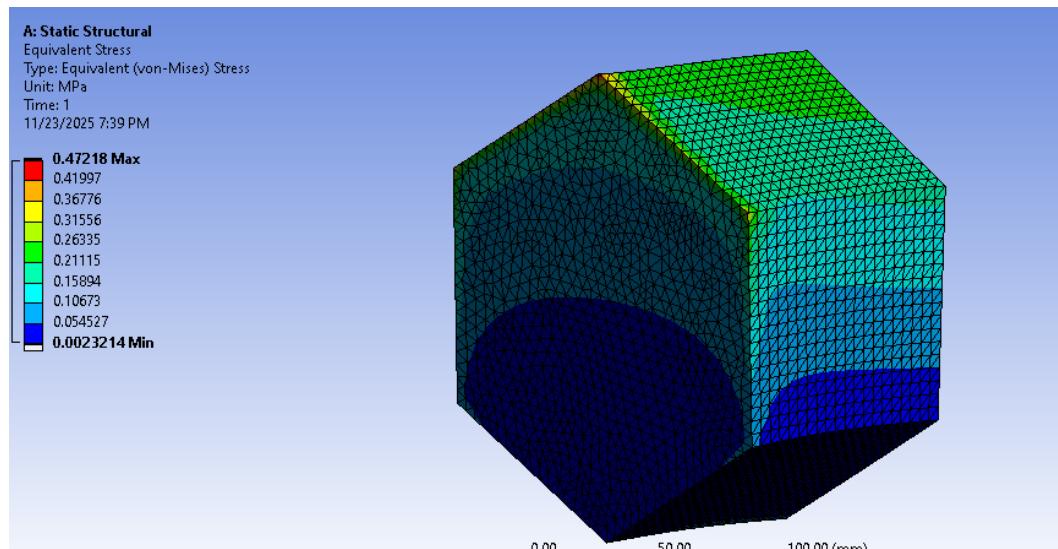
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 8. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 9



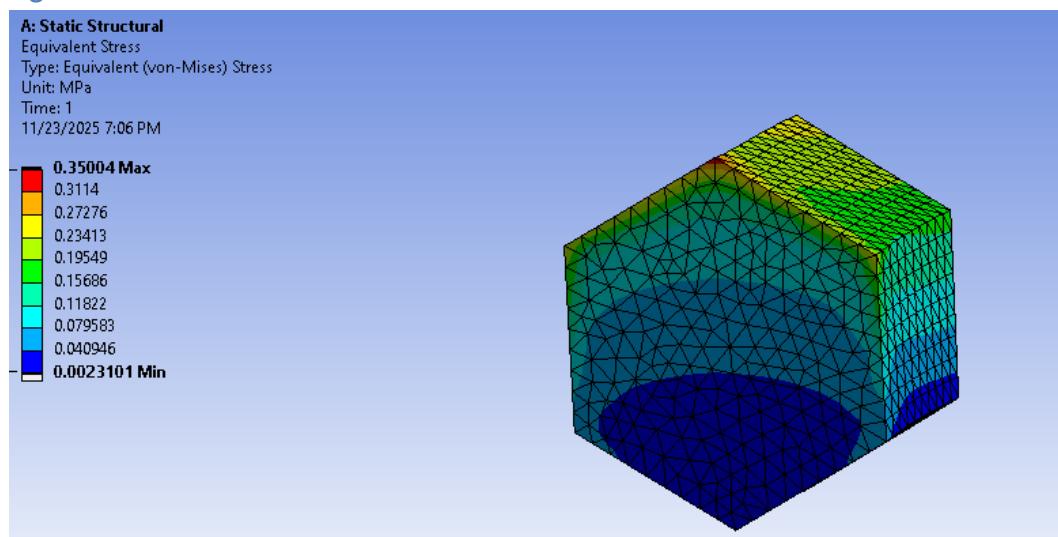
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 9. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 10



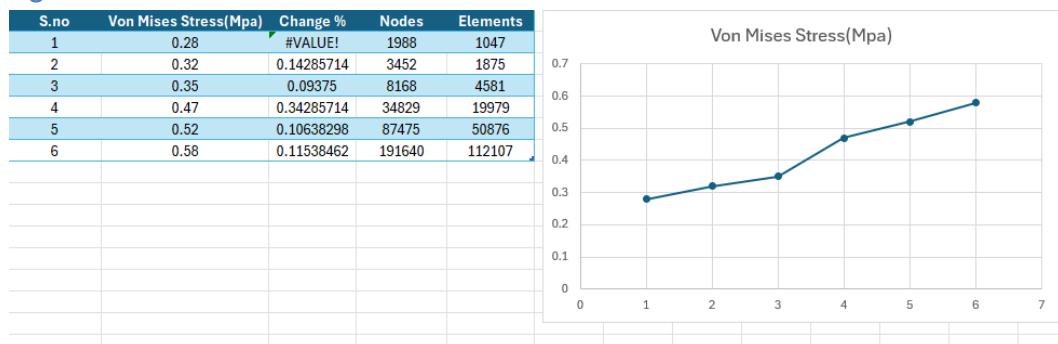
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 10. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 11



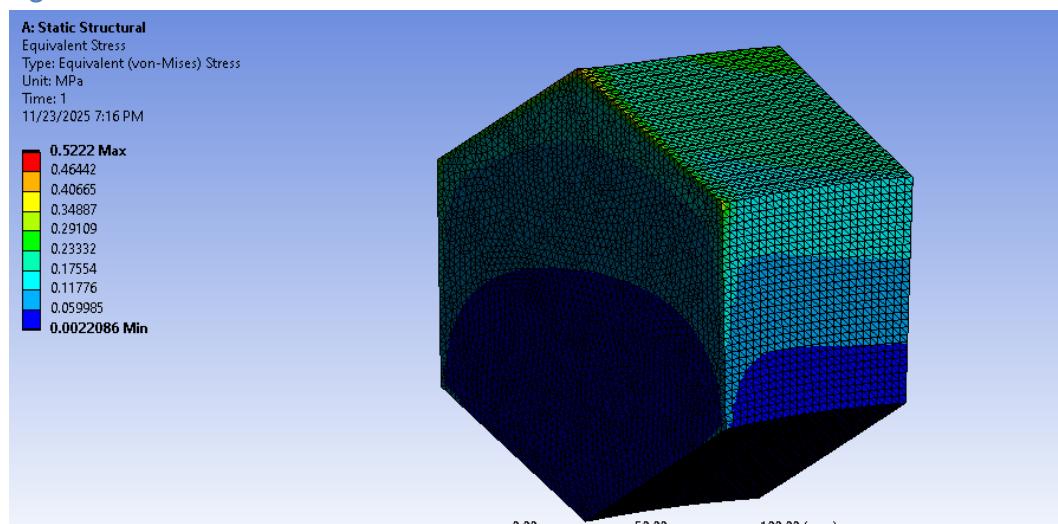
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 11. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 12



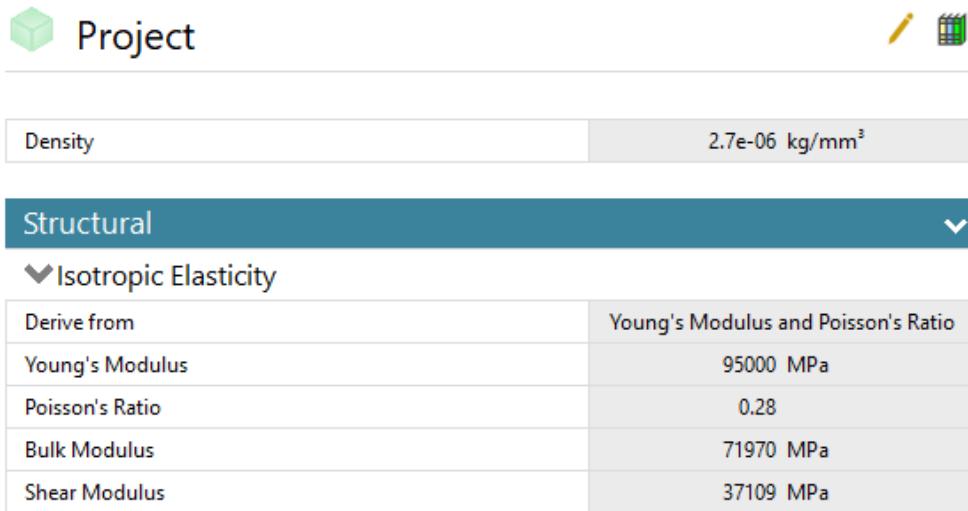
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 12. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 13



Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 13. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 14



Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 14. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

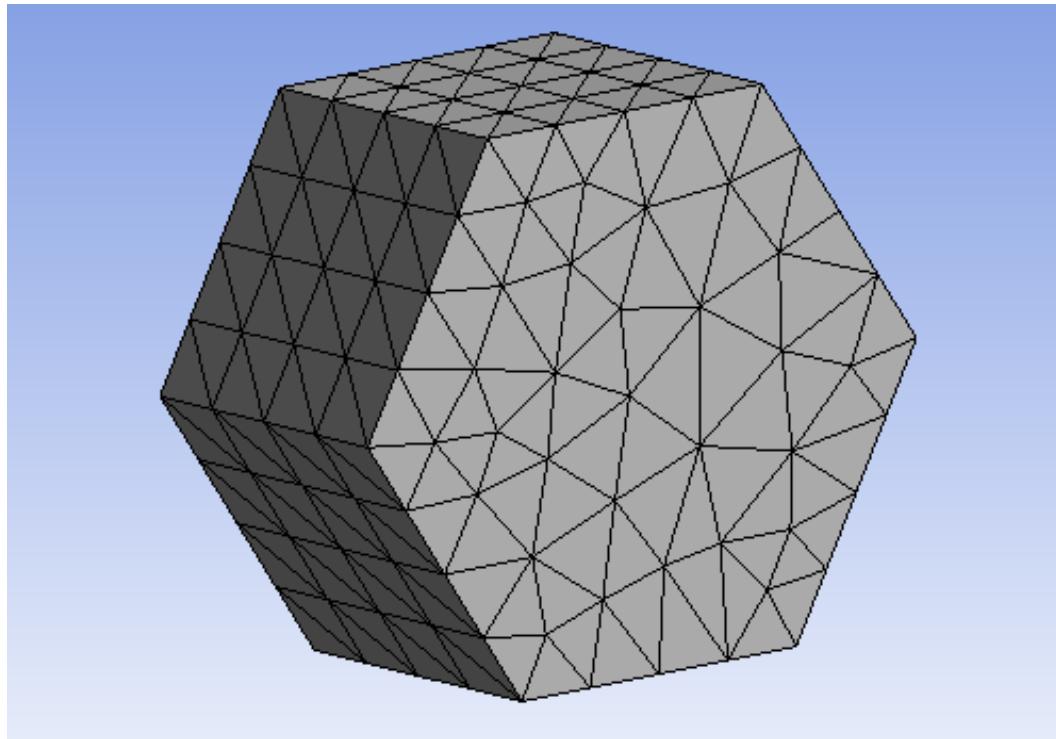
Figure 15

A		B	
1	Static Structural	1	Explicit Dynamics
2	Engineering Data ✓	2	Engineering Data ✓
3	Geometry ✓	3	Geometry ✓
4	Model ✓	4	Model ✓
5	Setup ✓	5	Setup ✓
6	Solution ⚡	6	Solution ✓
7	Results ⚡	7	Results ✓

Static Structural Explicit Dynamics

Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 15. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

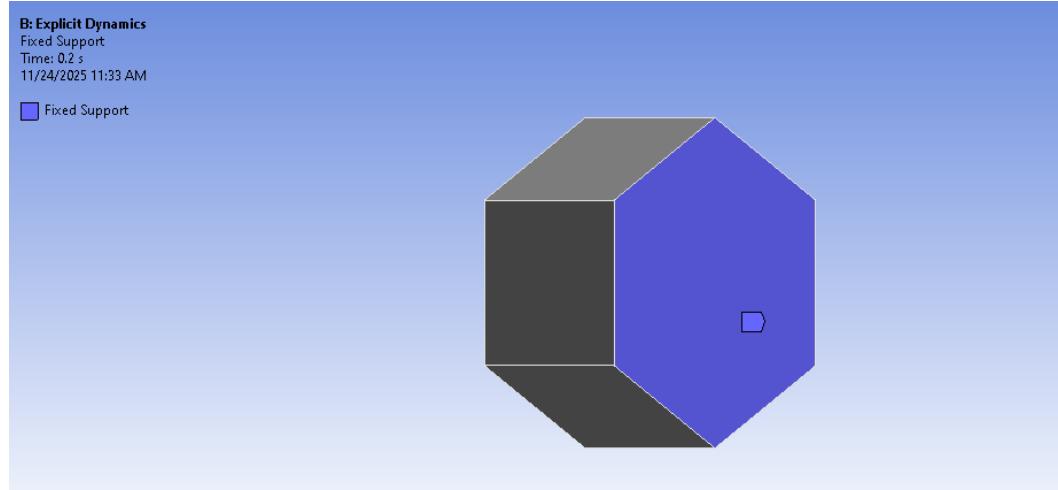
Figure 16



Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 16. The image illustrates simulation data, such as

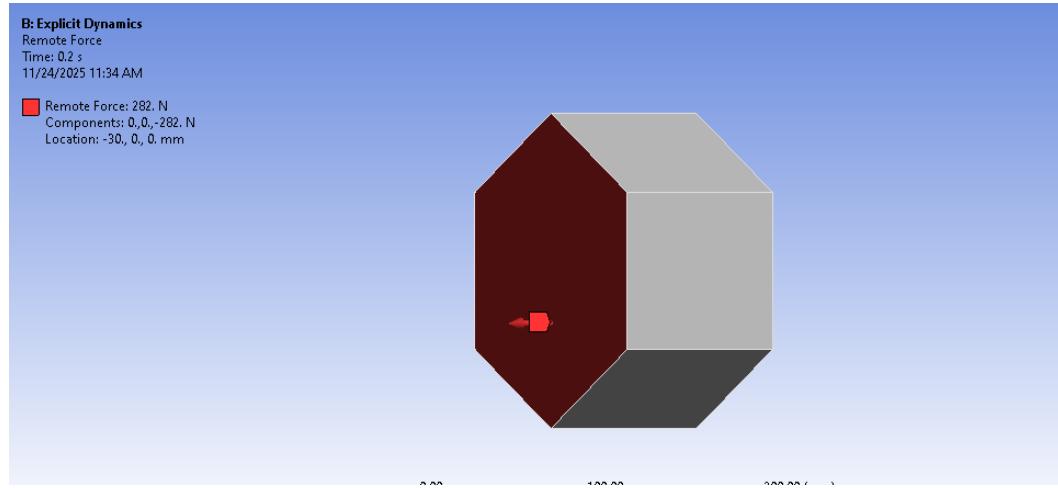
meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 17



Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 17. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 18



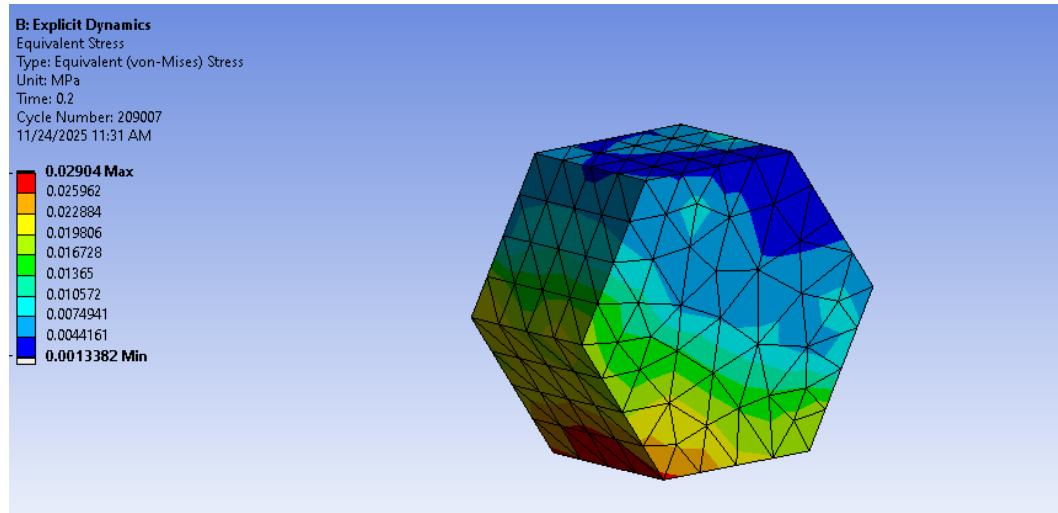
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 18. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 19

The screenshot shows a web browser window for the Ansys Innovation Space. The top navigation bar includes links for Learning Center, Free Courses, Learning Tracks, Certifications, Premium Learning, Knowledge (which is highlighted in yellow), Streaming, Ansys Learning Hub, and Events. There are also buttons for "FREE STUDENT SOFTWARE" and "LOGIN". The main content area displays a knowledge article titled "How to deal with ""Problem terminated — energy error too large""?". The article contains text explaining the issue with energy reference cycles in Explicit Dynamics and how to handle it. It is tagged with "17, EXPLICIT - AUTODYN, MECHANICAL, STRUCTURAL-MECHANICS". The date "January 25, 2023 at 7:34 am" is shown at the bottom right of the article. On the left side of the page, there is a sidebar with various icons and a user profile section.

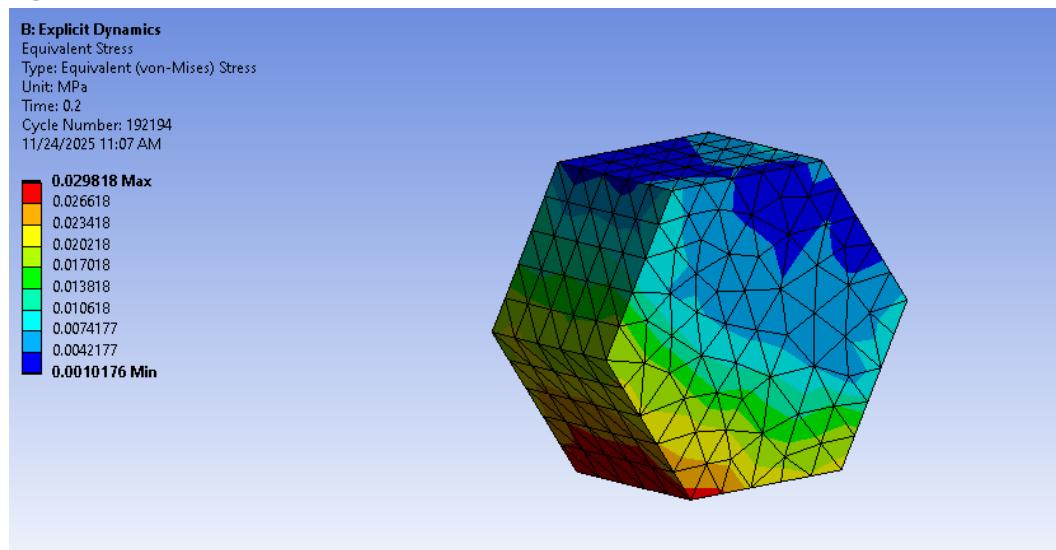
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 19. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 20



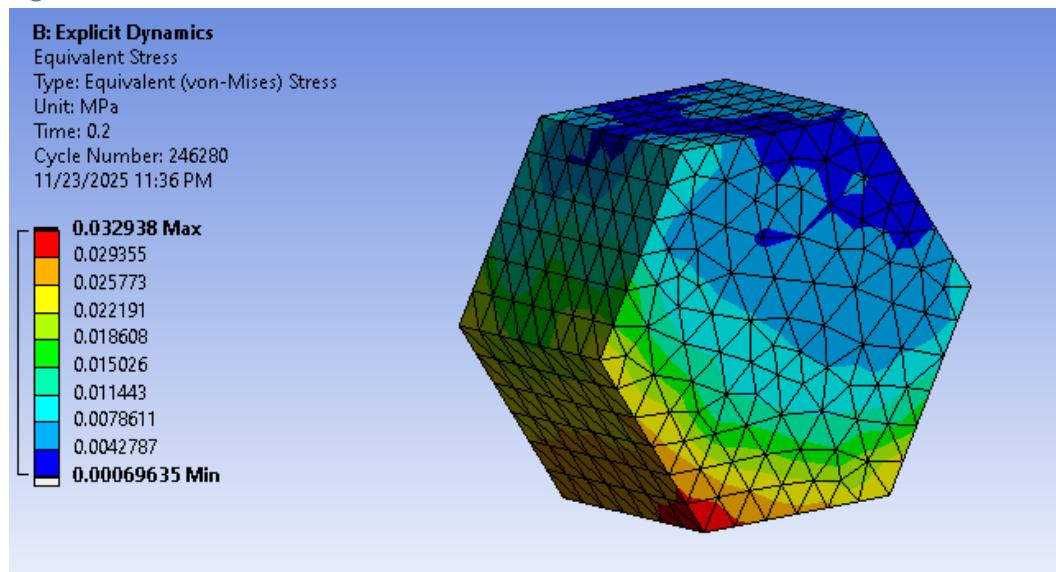
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 20. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 21



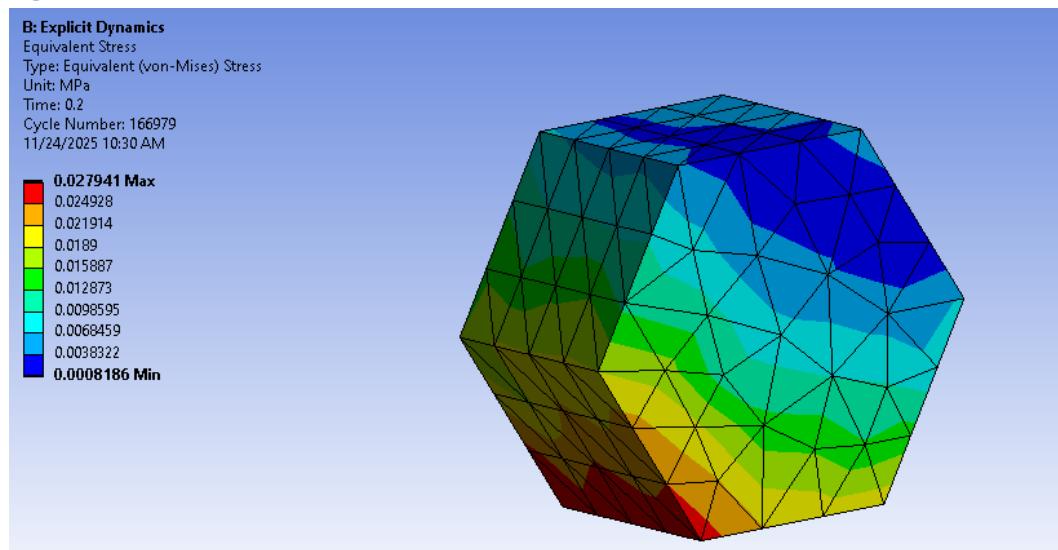
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 21. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 22



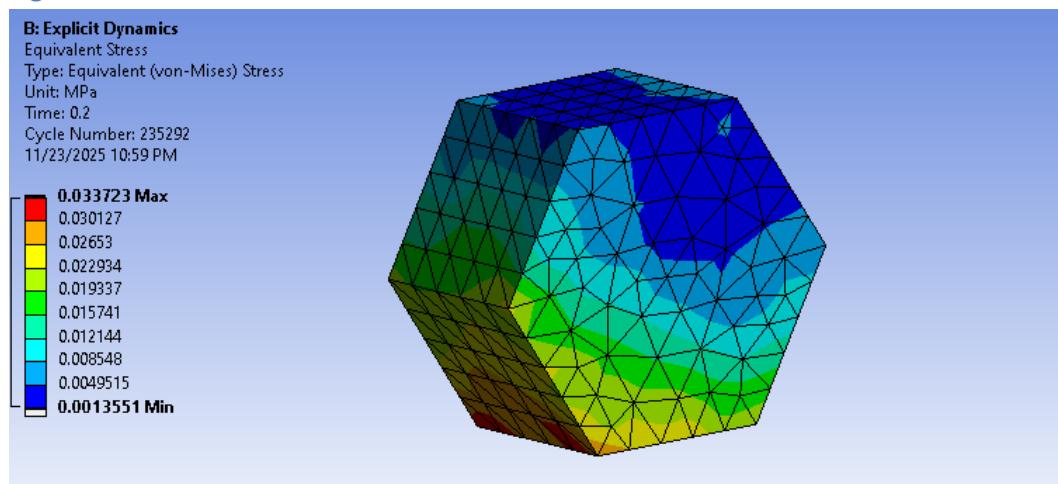
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 22. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 23



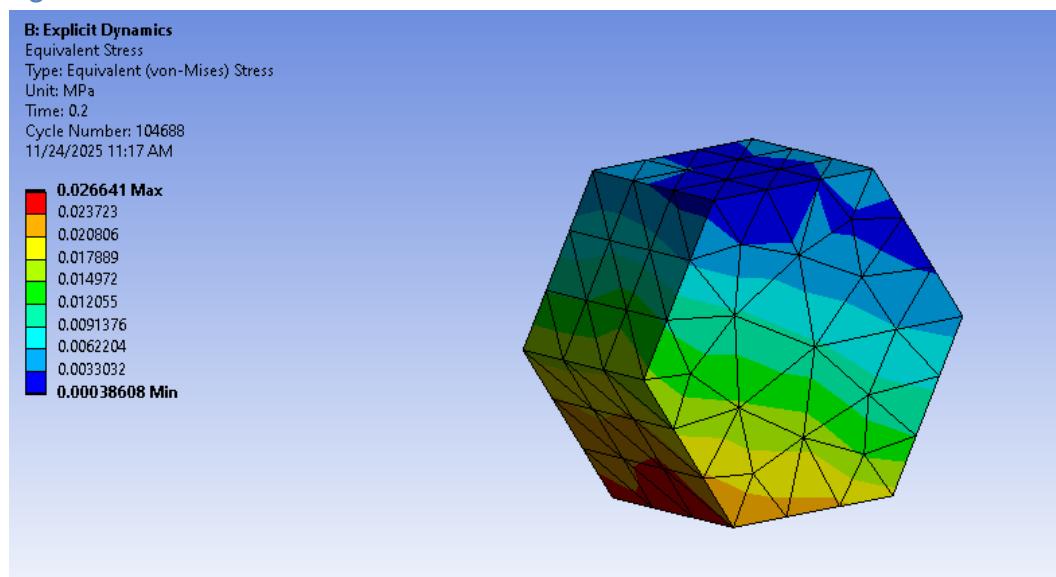
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 23. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 24



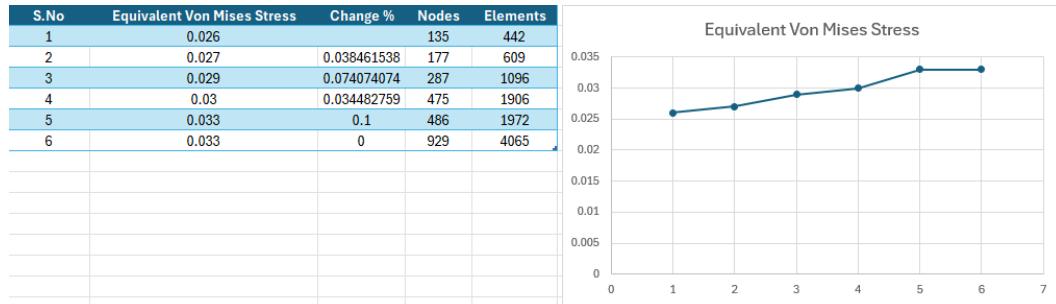
Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 24. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 25



Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 25. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.

Figure 26



Description: This figure represents an output extracted from the original simulation report. It corresponds to the visual result number 26. The image illustrates simulation data, such as meshing, loading positions, convergence graphs, or stress contours depending on the stage of the analysis.