

# Structural Durability Analysis of Powertrain Mounting Bracket

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**Introduction:** Powertrain mounts have great effect on the NVH characteristics of the vehicle. They are subjected to heavy dynamic loads of the powertrain in the operating conditions. To ensure that the design is foolproof, it is necessary to bring down the stress levels to a permissible limit.

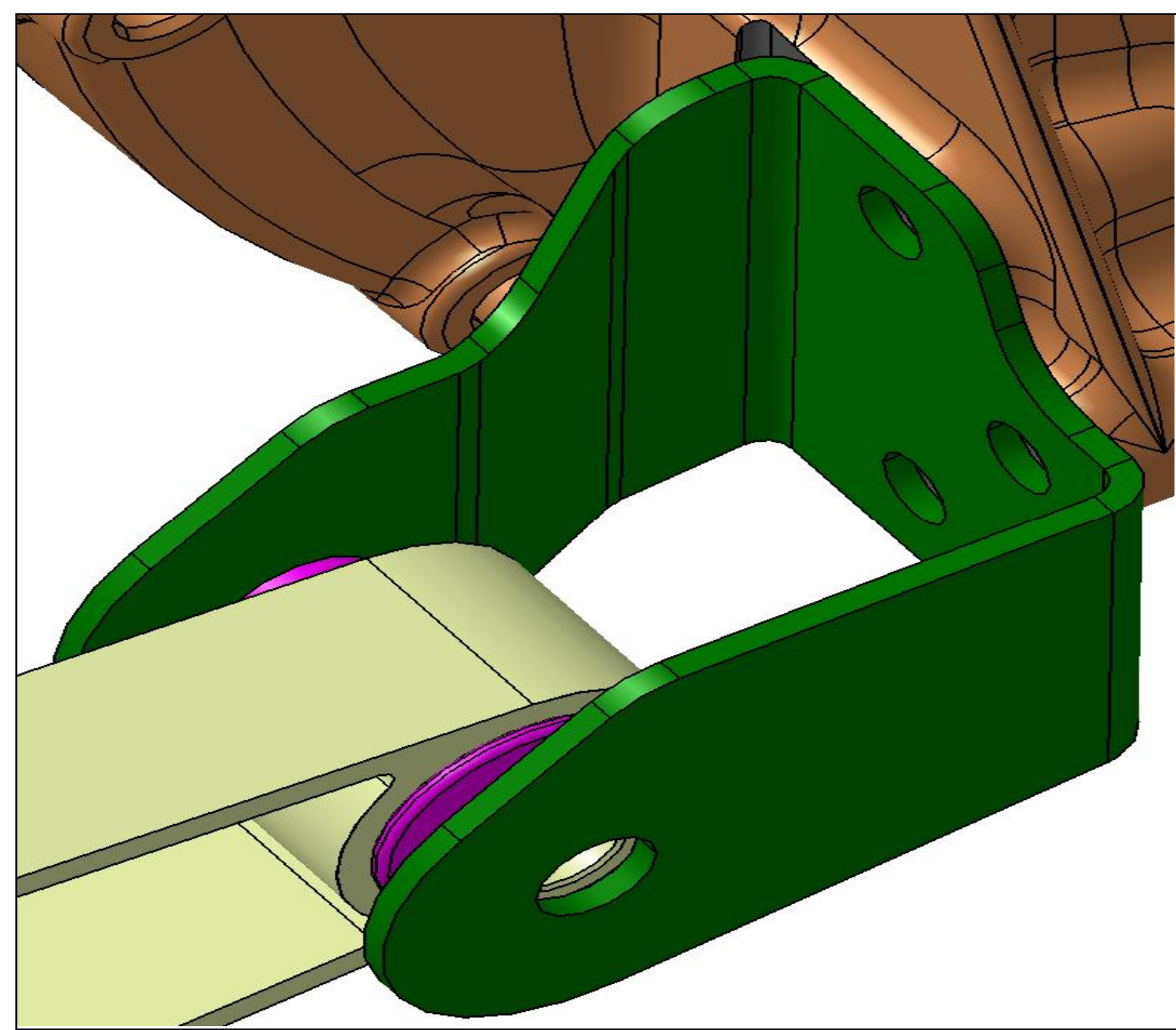


Figure 1. Powertrain Mounting Bracket

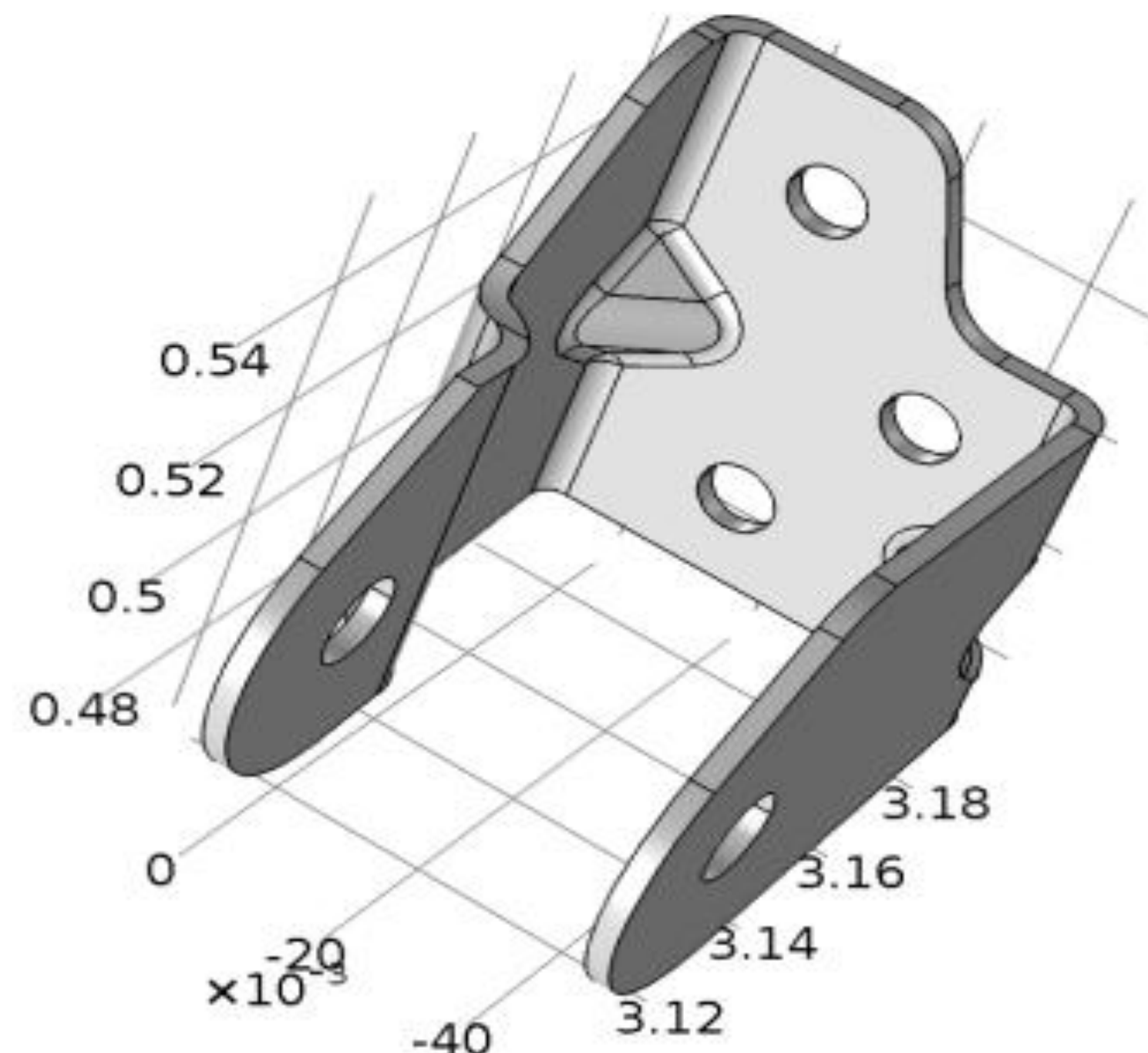


Figure 2. Meshed Bracket

Material	Structural Steel
Density	7850 kg/m <sup>3</sup>
Ultimate Tensile Stress	410 MPa
Yield Stress	270 MPa
Endurance Stress	210 MPa

Table 1. Title of the table

## Results and Post-processing:

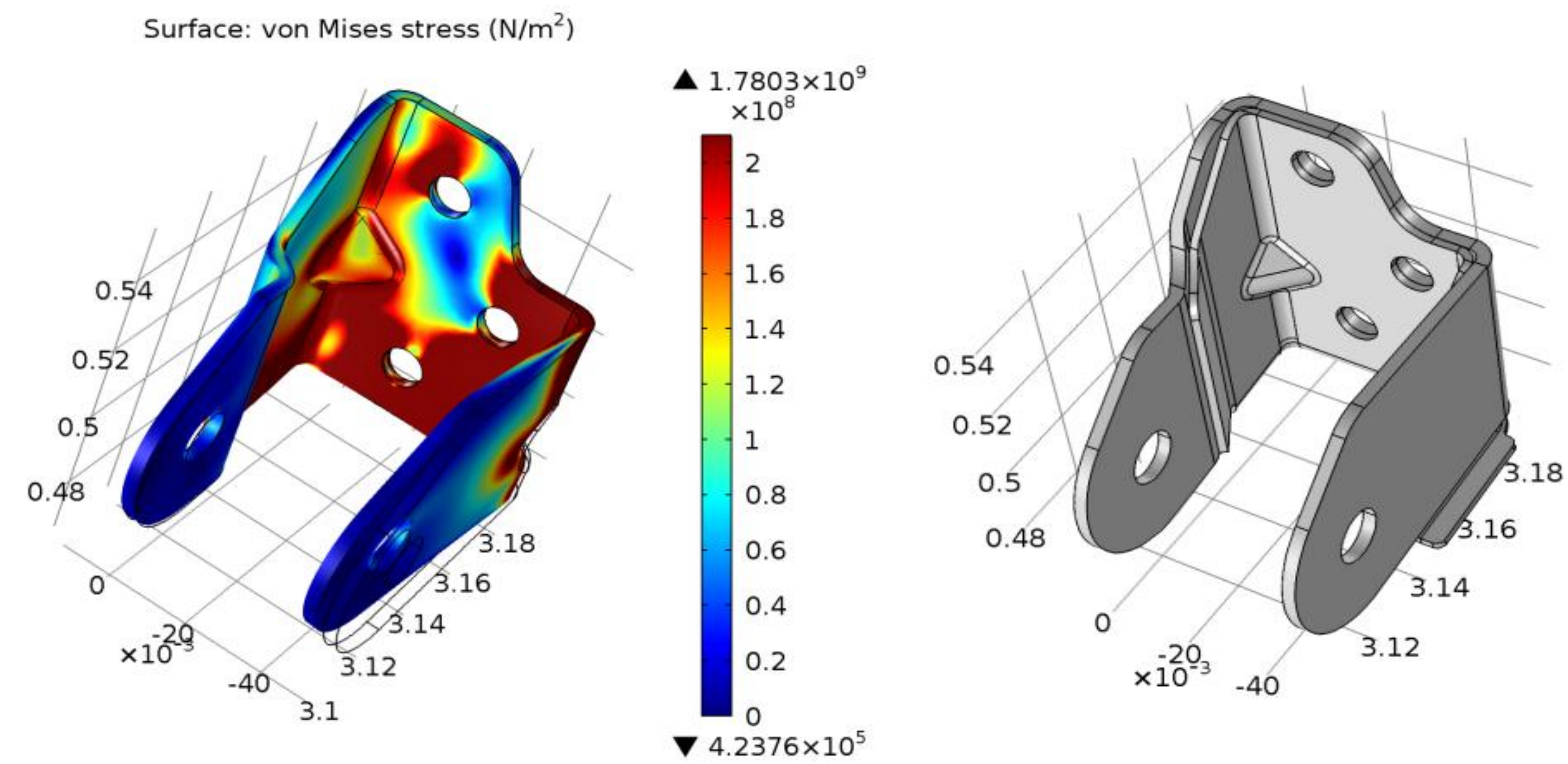


Figure 4. Stress Plot

Figure 5. Modified Bracket

**Computational Methods:** Finite Element Analysis (FEA) involves Discretization, Formation of element equation, Assembly of Element equation, Applying Boundary conditions, Solution and Post-processing.

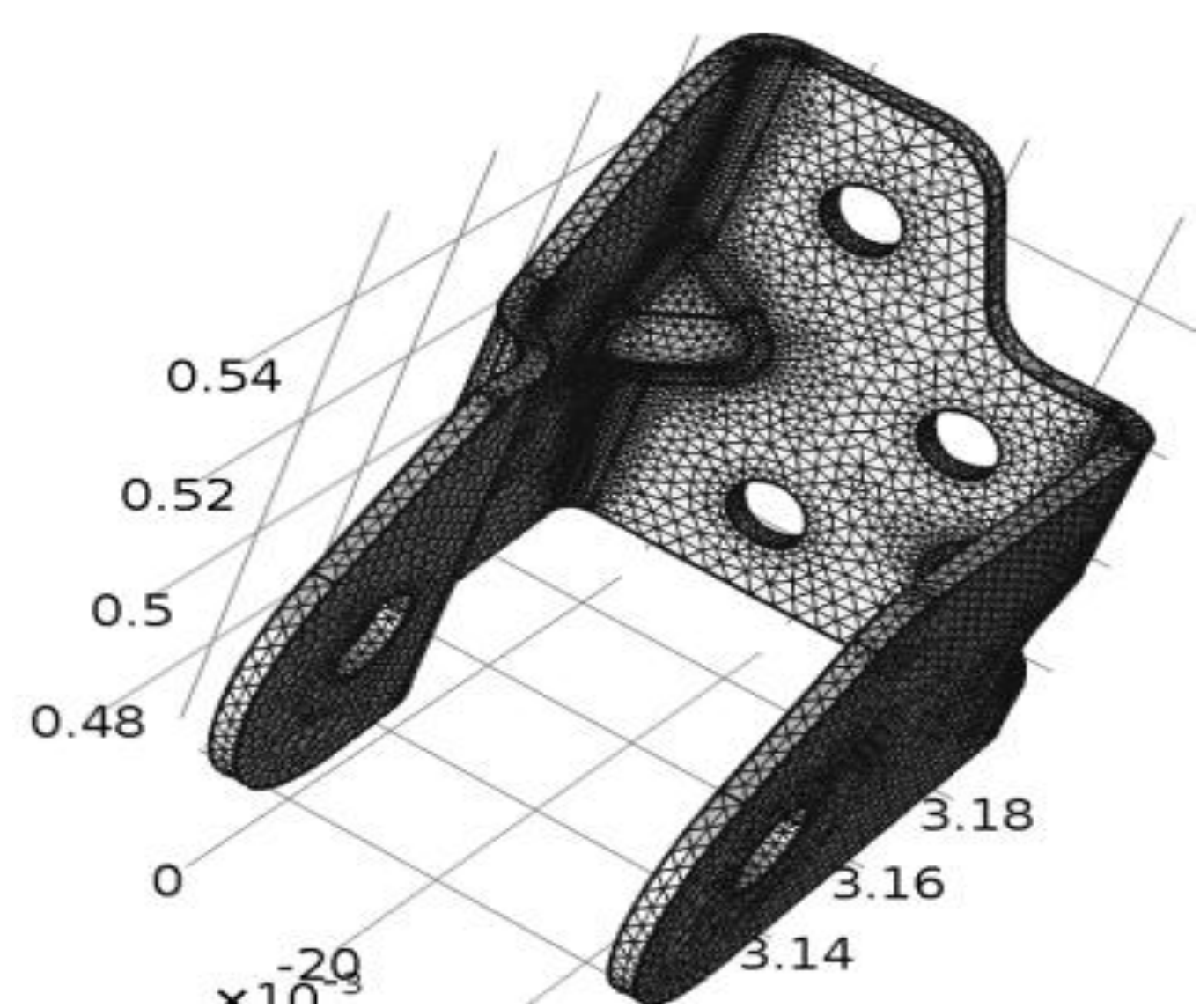


Figure 3. Boundary Conditions

Governing equations

$$u = \sum_{i=1}^n u_i \psi_i \quad [K^e] \{u^e\} = \{F^e\}$$

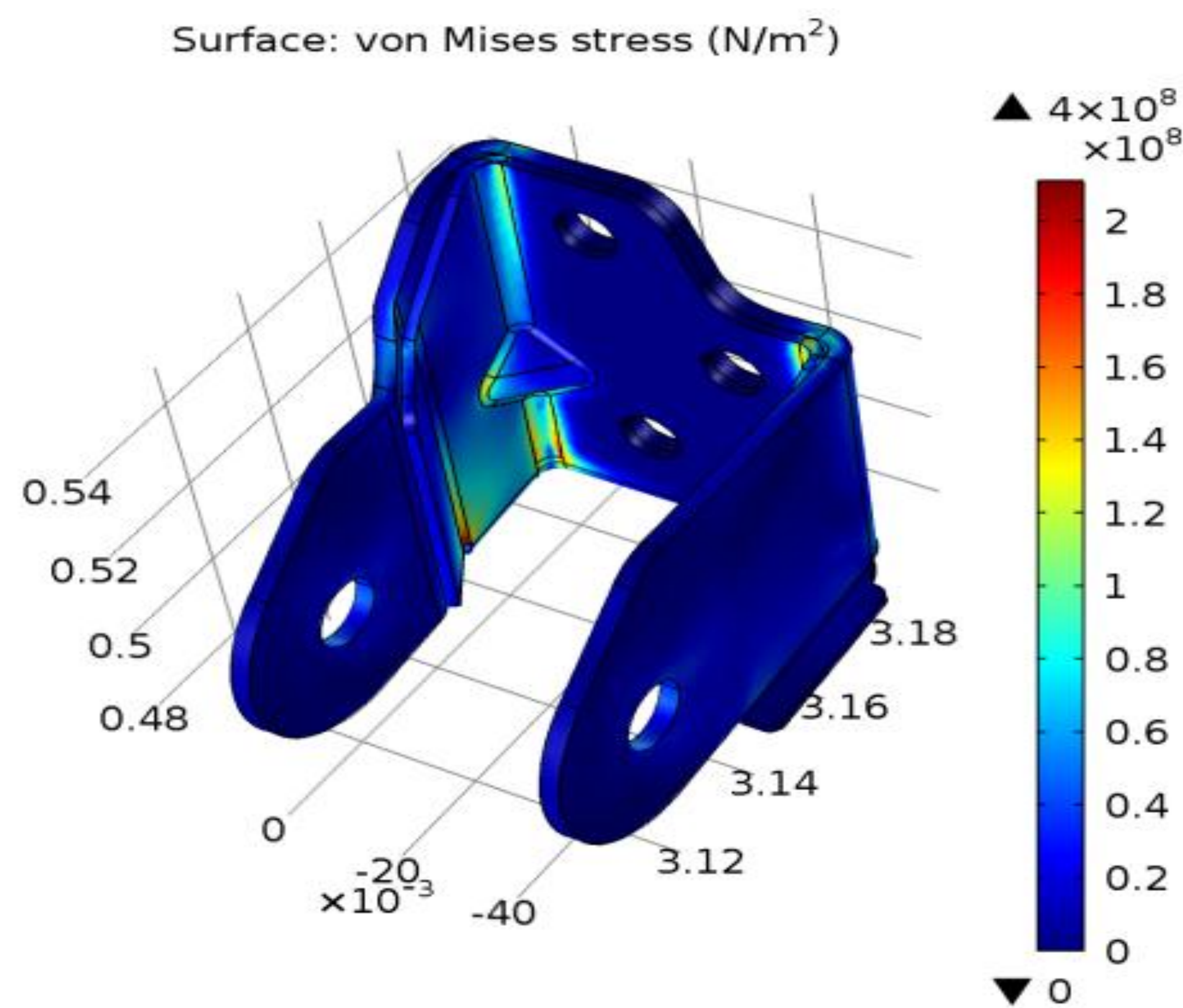


Figure 6. Stress Plot for Modified Bracket

**Conclusions:** Structural analysis of powertrain mounting bracket was performed. Required design modifications were done to meet the strength criteria. The modified bracket passed the strength criteria.

## References:

1. J.N.Reddy, 'An Introduction to Finite Element analysis', McGraw-Hill Inc.1993.
2. Taylan Altan and A. Erman Tekkaya, 'Sheet Metal Forming - Processes and Applications', ASM International.
3. 'Automotive Handbook', BOSCH, 8<sup>th</sup> Ed.