

# GFRP Laminate Tensile Test

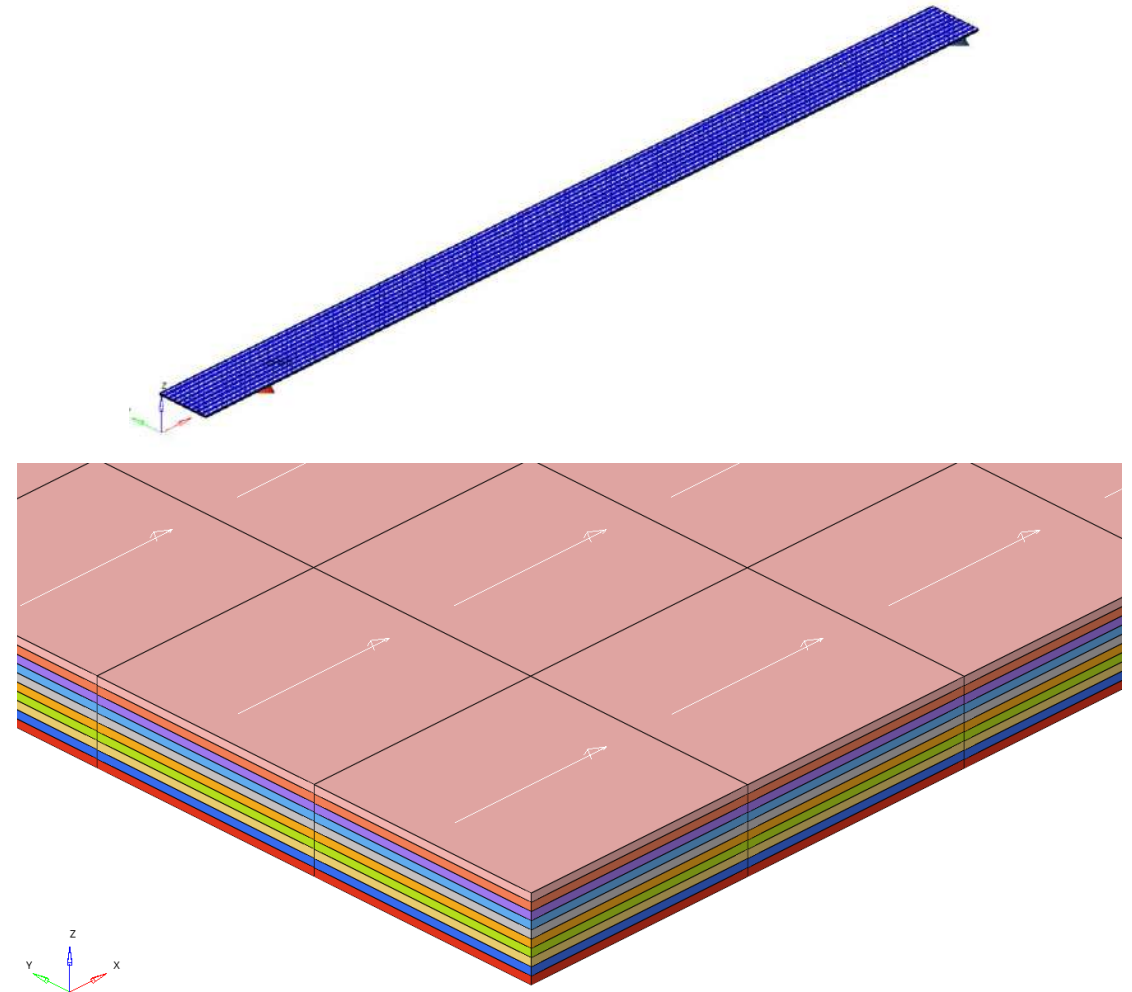
*For questions fill out contact form*



**ALGO**  
**Engineering**  
Simplifying FEA

# Model Description

- Tensile test of a GFRP laminate is based on experiments documented in the following paper:
  - B. Fazlali et al., “Specimen designs for accurate tensile testing of unidirectional composite laminates,” *Composites Part A: Applied Science and Manufacturing*, vol. 175, p. 107799, Dec. 2023, doi: <https://doi.org/10.1016/j.compositesa.2023.107799>.
- Analysis conducted for an Unidirectional Fiber Glass Laminate with 10 plies..
- Stress – Strain Relationship is compared to test data documented in paper.
- Simulation is done for the 1<sup>st</sup> configuration (Rectangular specimen without end tabs)

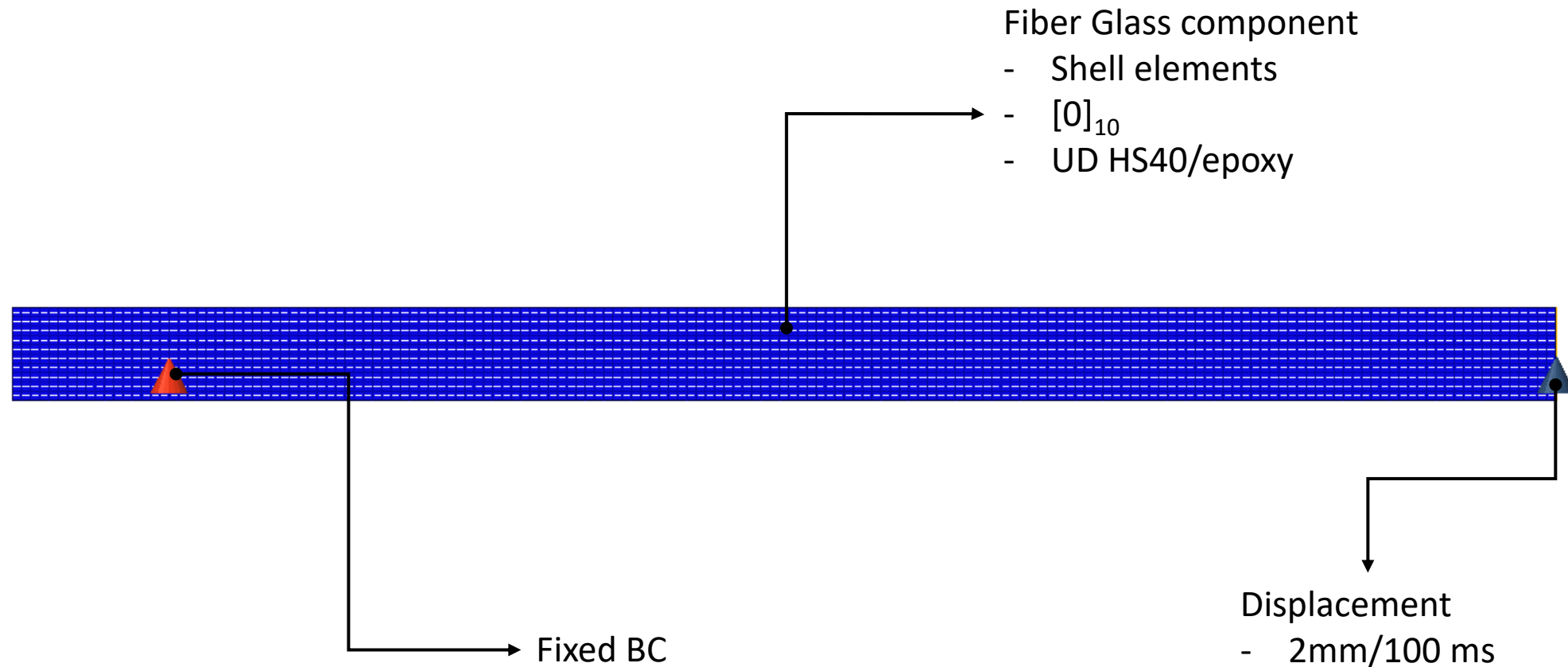


# Model Parameters

Entity	Type
Solver	Altair Radioss
Version	2022.1
Processors	2
Threads	2
CPU	Intel(R) Core(TM) i7-9750H CPU @ 2.60GHz
Total run time	5696.76 sec

FEA Entities	Type
Analysis Type	Dynamic Explicit
Unit System	kg, mm, ms
Element Type	PCOMPP
Material Type	M25_COMP SH (CRASURV formulation)

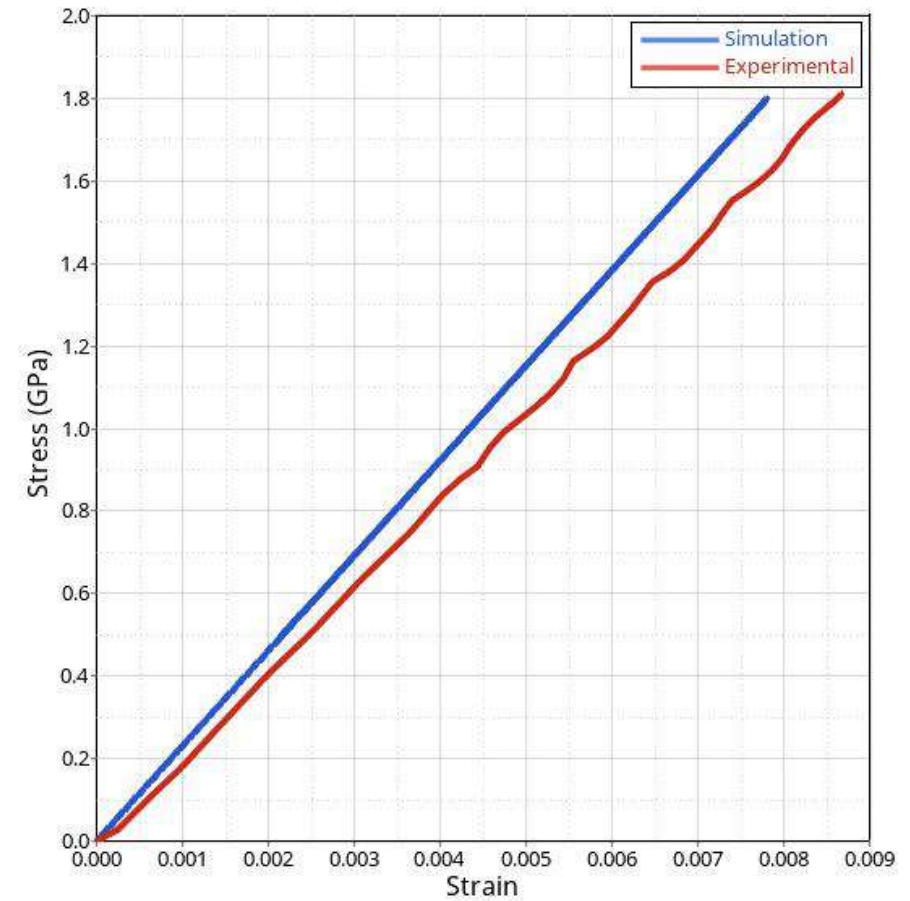
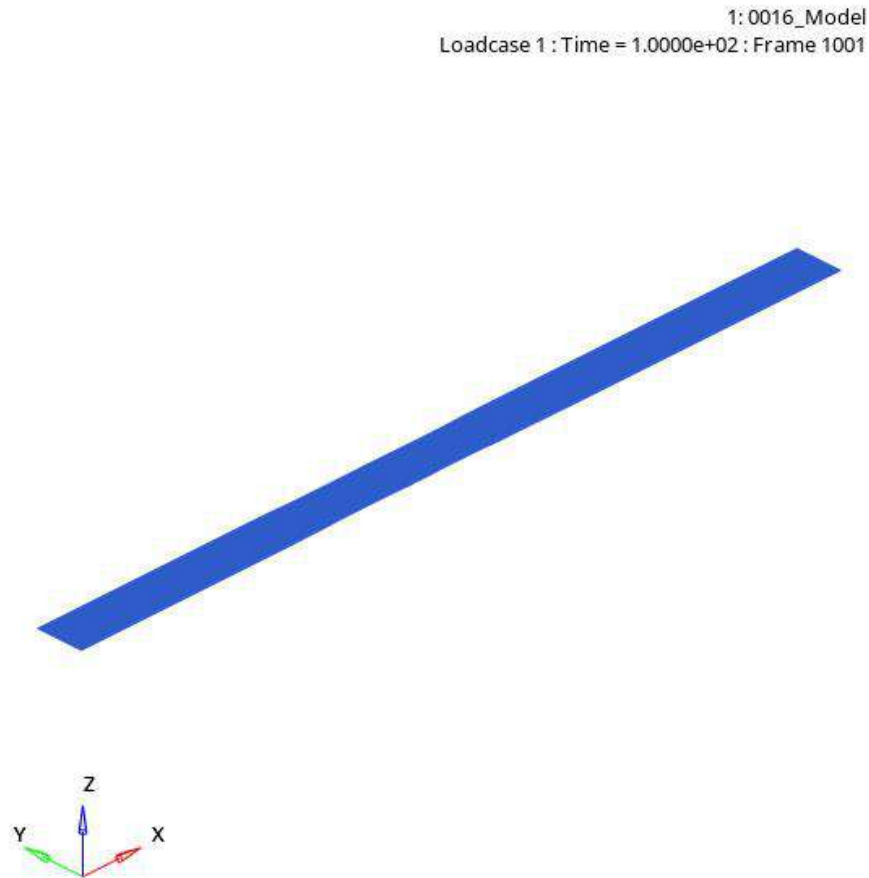
# Analysis Setup



# Analysis Assumptions and Limitations

- Density of the material is not mentioned in the paper and is thus assumed.
- Rate of Displacement is increased in the simulation to reduce the runtime.

# Analysis Results



# Conclusions

- Tensile test analysis of a Fiber Glass Laminate is conducted using Altair Radioss based on the paper listed in slide 2.
- The simulation shows good correlation in stress strain relationship when compared to test data presented in the paper.
- This model provides a good starting point for Composite laminate FEA and can be further utilized to model damage and failure. The user can also explore the effect of different element formulations, mesh size and material models.