

Conference Paper Presentation

Anglia Ruskin University

Experimental and numerical analysis of heat on the tensile properties of layered aluminium parts made by composite metal foil manufacturing

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- Background
- Additive Manufacturing Technologies
- Composite Metal Foil Manufacturing
  - Process Details
- Experimental Procedure
- Results
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  - Tensile Test
- Potential of Application

BACKGROUND

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- Additive Manufacturing (AM) refers to a group of techniques used to quickly fabricate a scale model of a physical part or assembly using three-dimensional computer aided design (CAD) data.

- Standard applications include design visualization, prototyping/CAD, manufacturing, architecture etc.

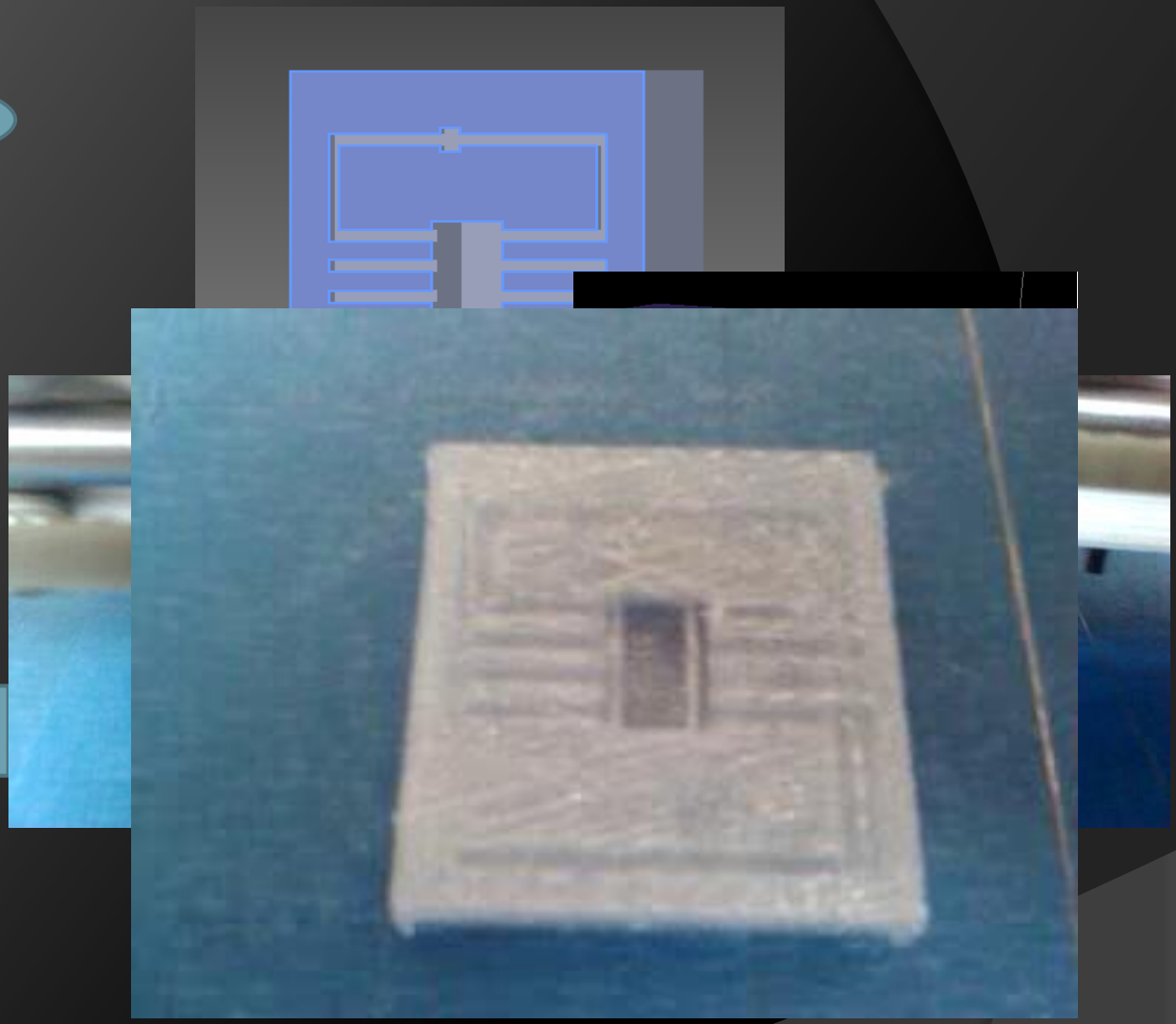
3D CAD Model

Conversion to G-codes

Slicing into cross-sections

Layer by layer construction

FINAL PRODUCT



COMMERCIAL ADDITIVE MANUFACTURING TECHNOLOGIES

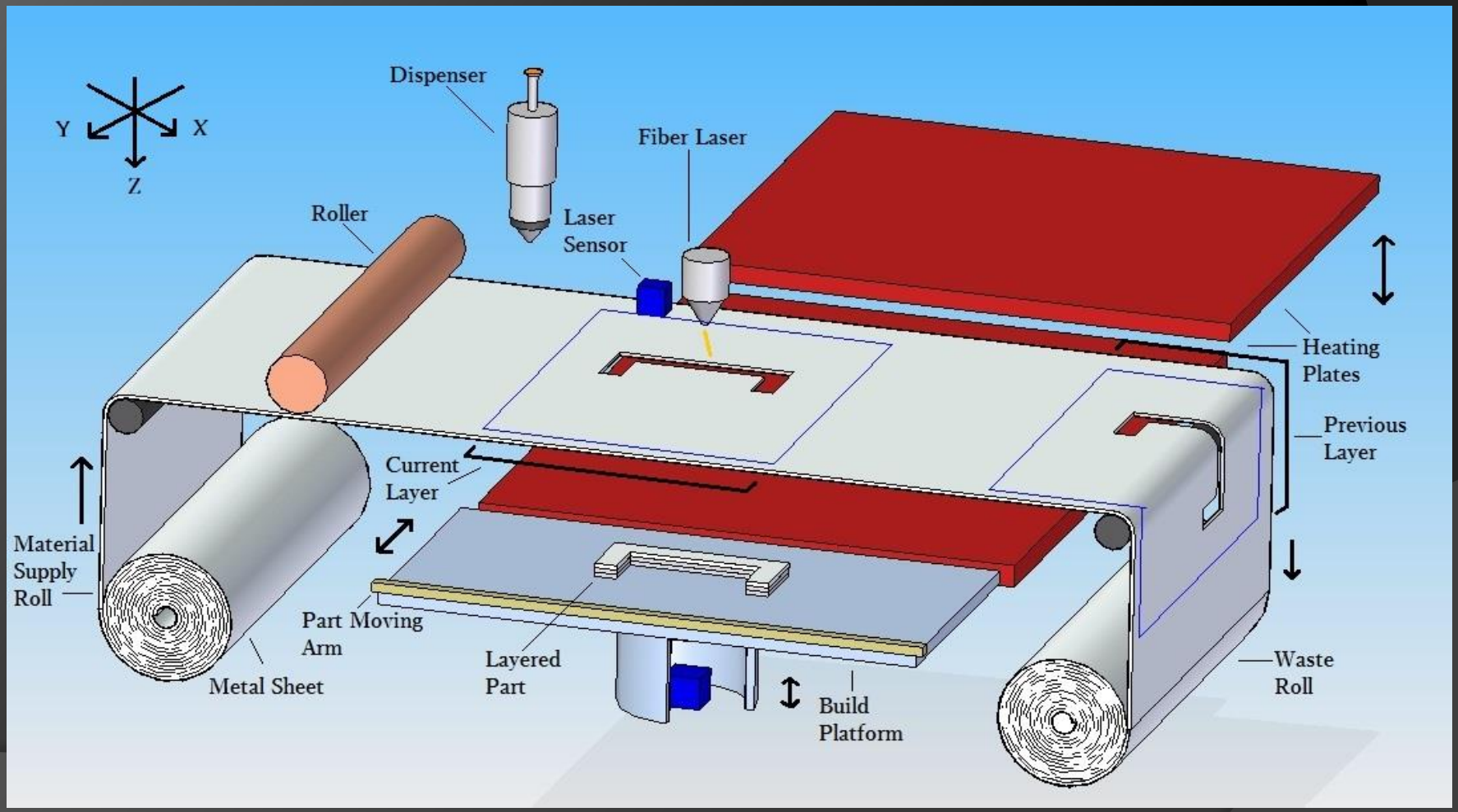
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- Stereolithography
- Selective Laser Sintering
- Direct Metal Laser Sintering
- Fused Deposition Modeling
- Laminated Object Manufacturing
- Electron Beam Melting
- 3D Ceramic Printing
- 3D Printing

PROCESS

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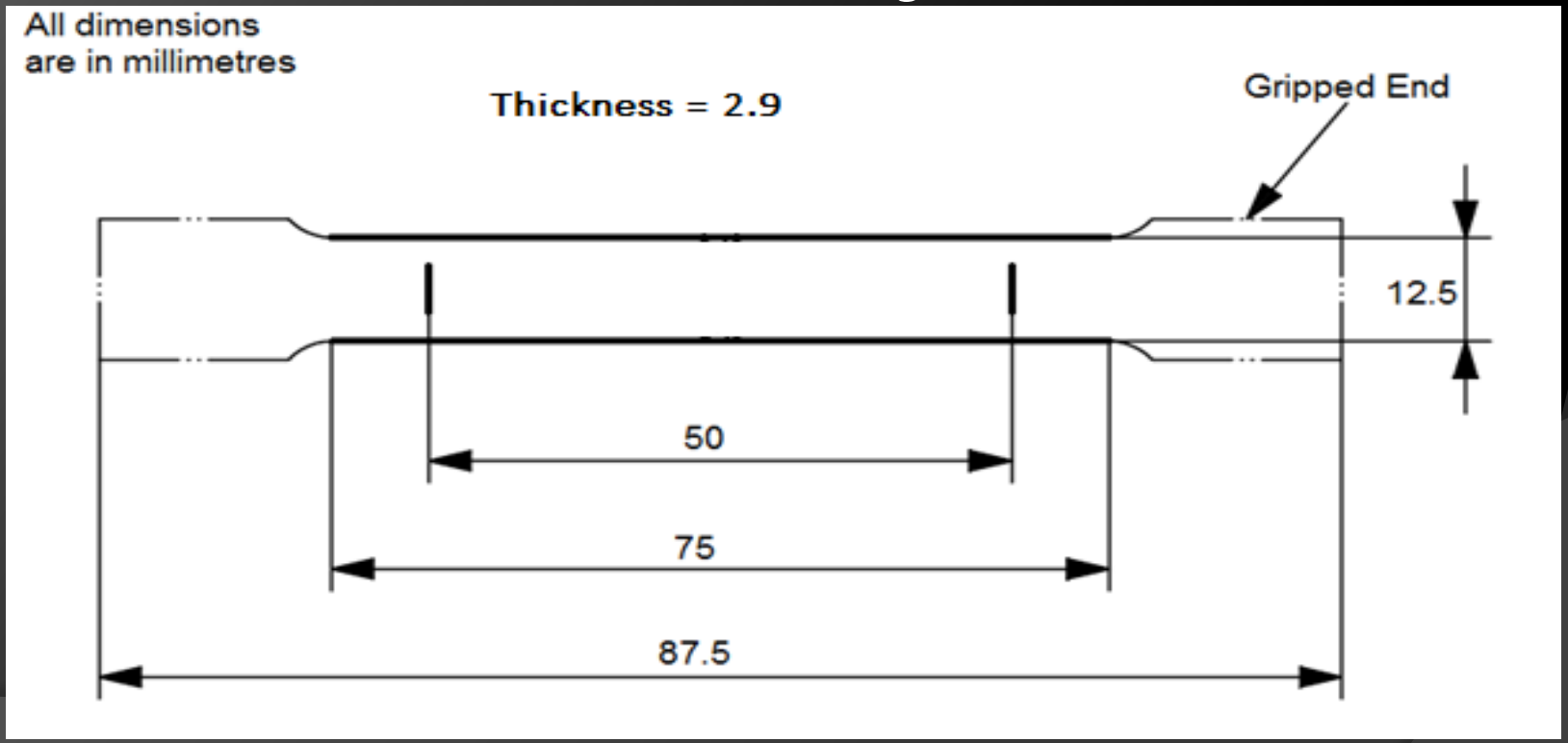
- Composite Metal Foil Manufacturing
  - Laminated Object Manufacturing
  - Brazing



EXPERIMENTAL PROCEDURE

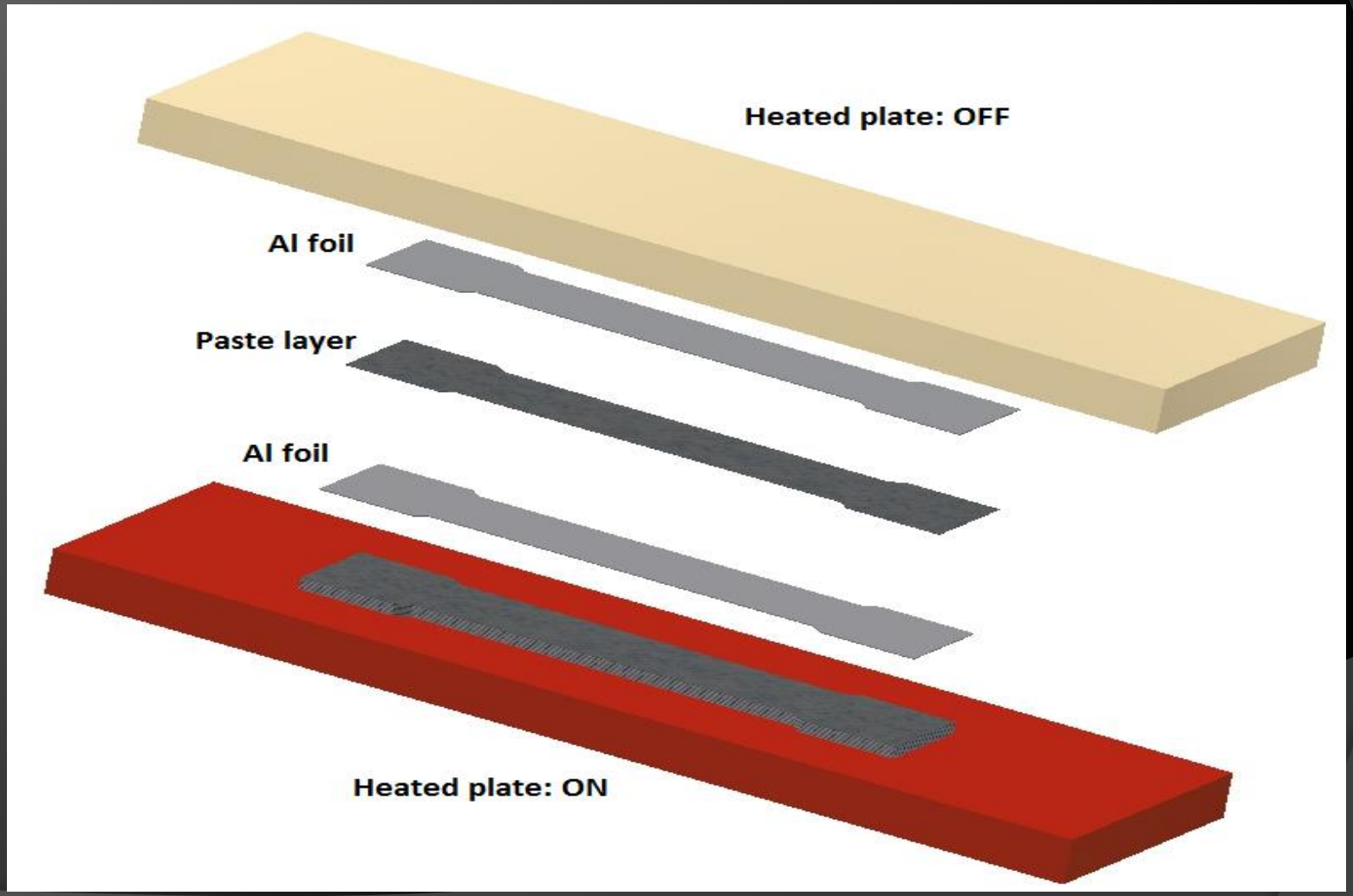
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- Aluminum 1050 H14 half temper foils (200 micron thick)
- 80% zinc and 20% aluminum brazing paste (410-470 °C)
- 19 layers (10 metal foil and 9 paste layers)
- INSTRON 5582 testing machine
- BS EN ISO 6892-1: 2009, Tensile testing



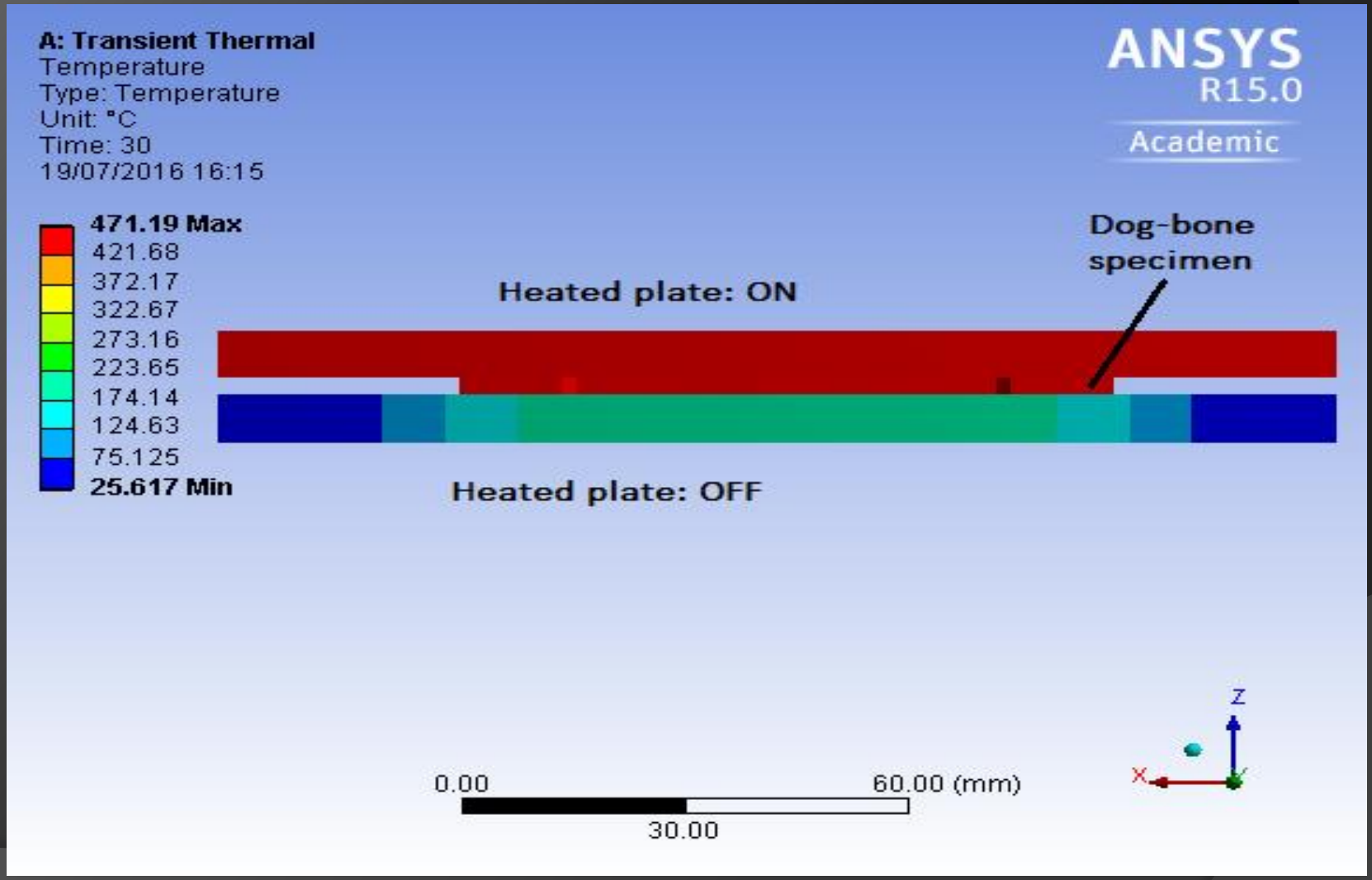
TRANSIENT THERMAL ANALYSIS

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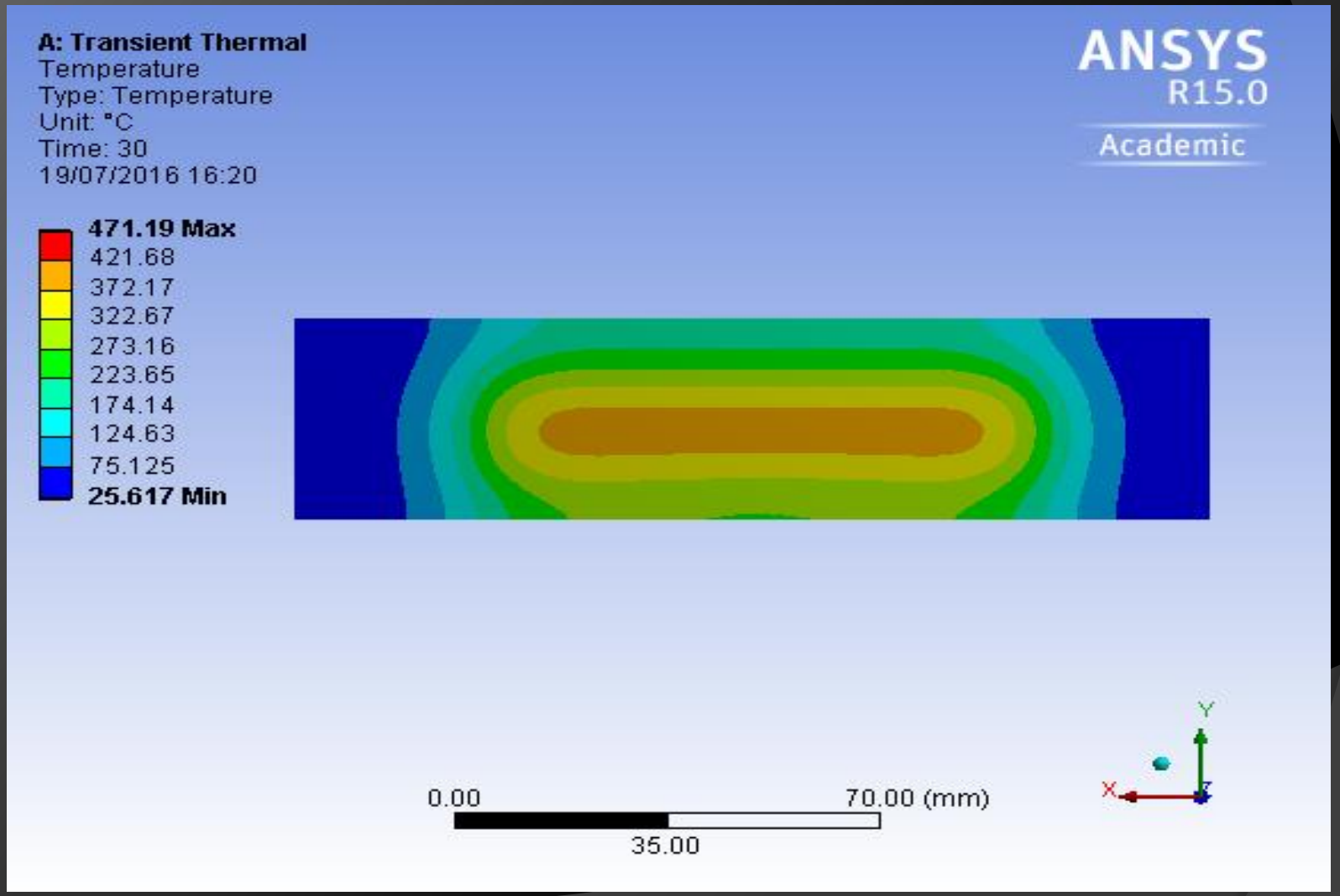
RESULTS: TEMPERATURE DISTRIBUTION

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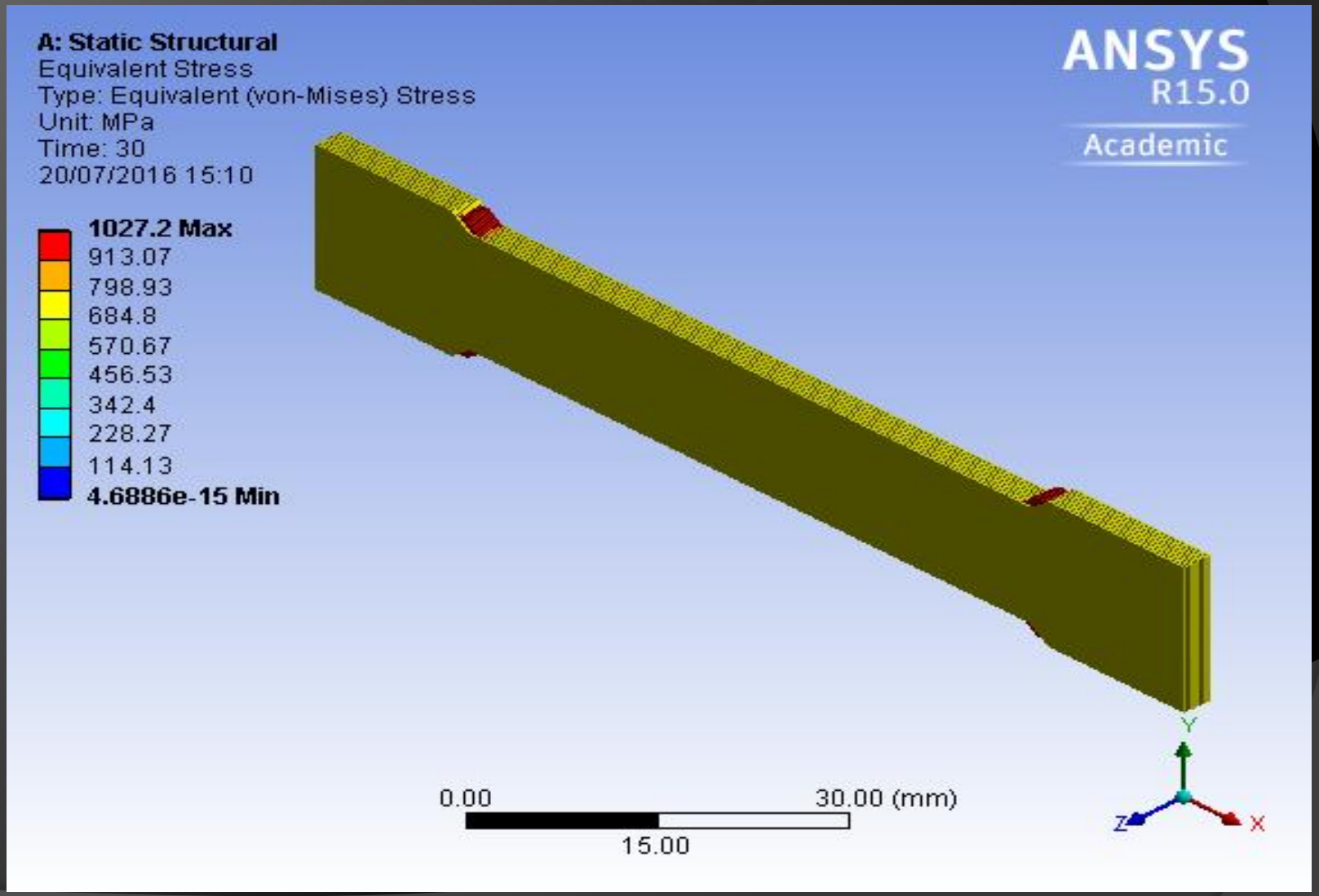
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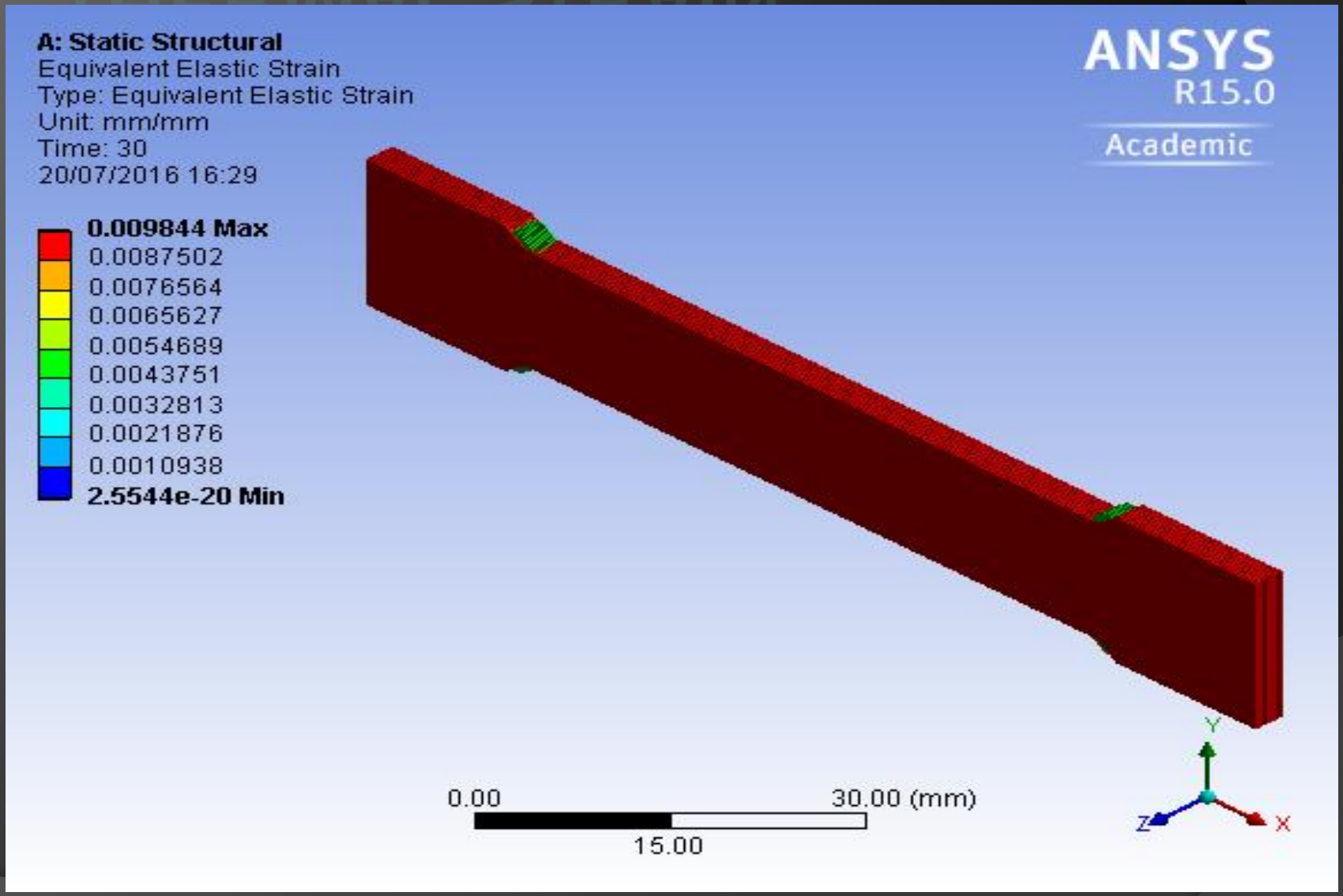


THERMAL STRESS

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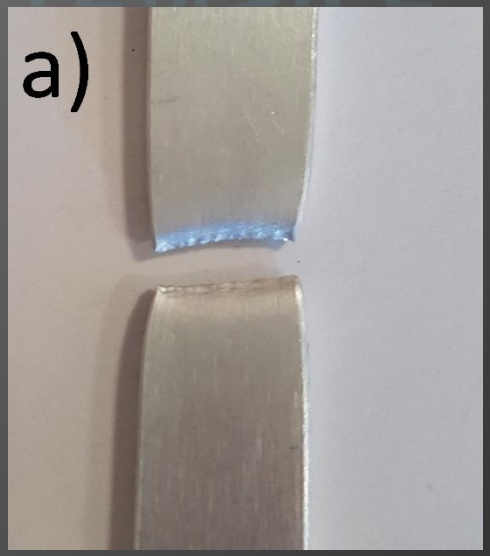
THERMAL STRAIN



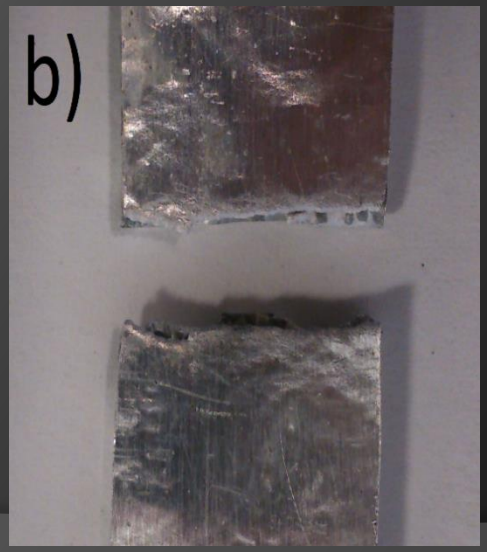
TENSILE TEST

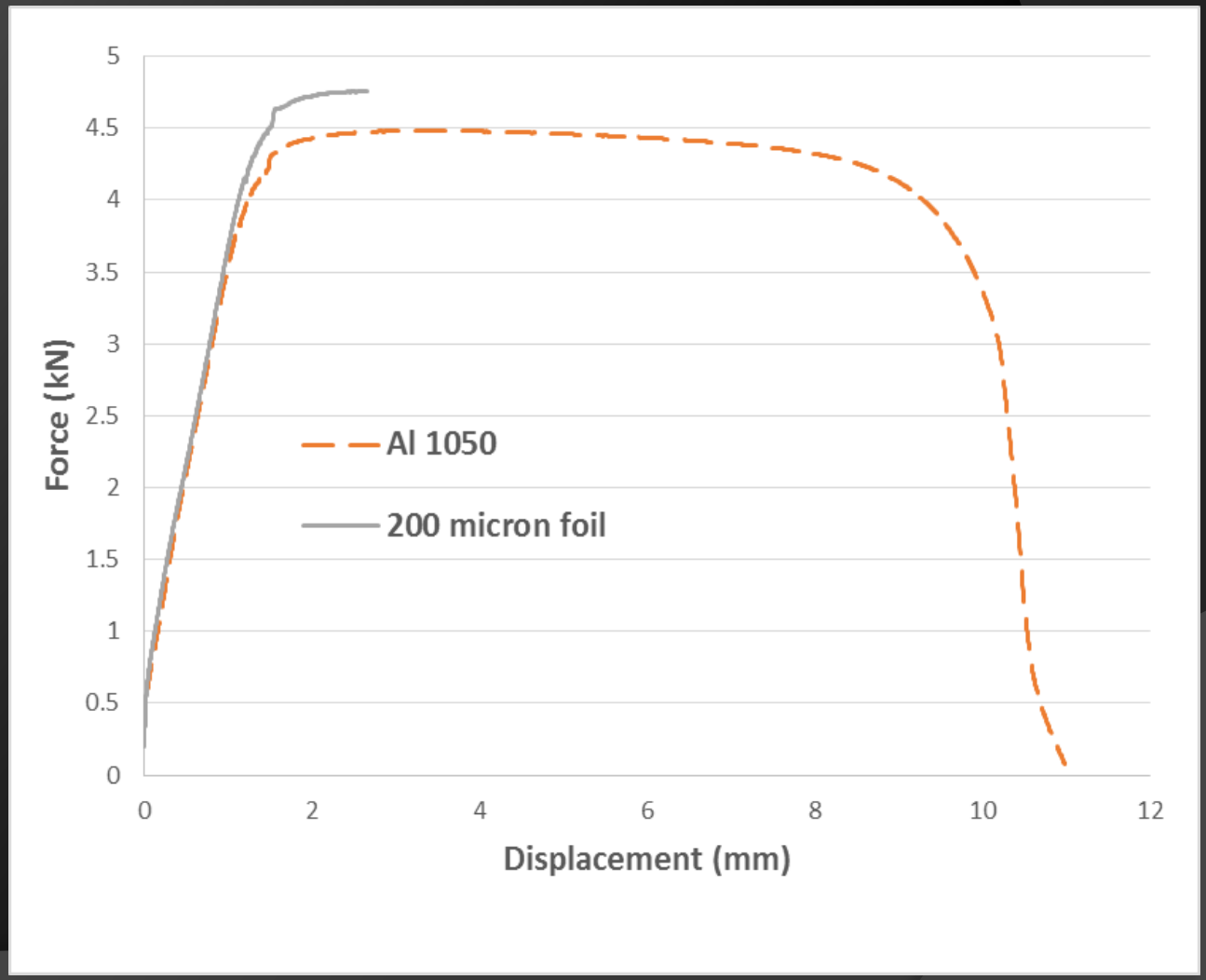
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a)



b)





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IMPLICATIONS

IMPACT



POTENTIAL

APPLICATIONS

This is my thank you dance!



Merci!

Efharisto!



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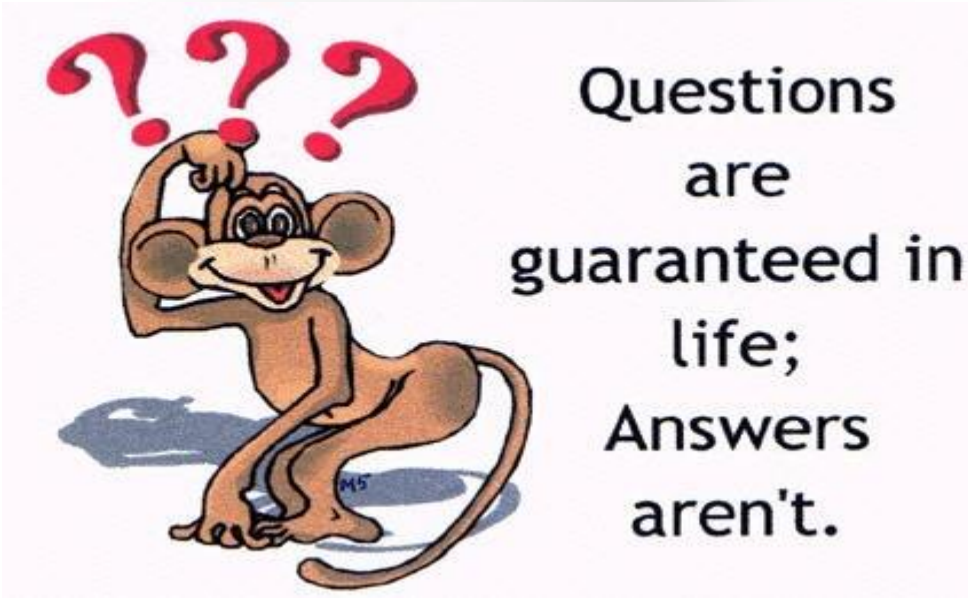
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QUESTIONS






Questions
are
guaranteed in
life;
Answers
aren't.