Polymer Additive Manufacturing:

Fact or Friction?

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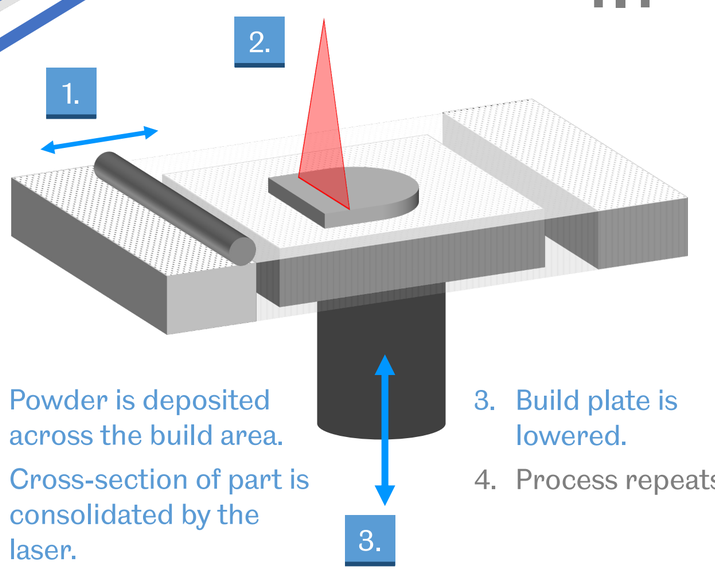
1.0

1.1 Polymer Laser Sintering (LS)

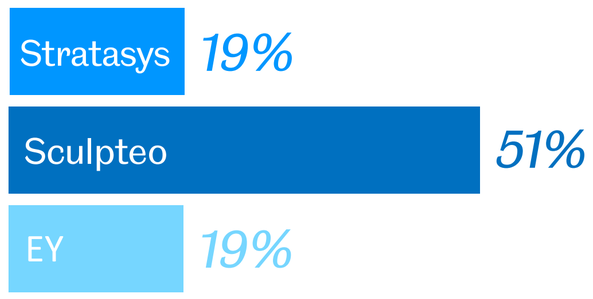


1. Powder is deposited across the build area.
2. Cross-section of part is consolidated by the laser.
3. Build plate is lowered.
4. Process repeats.

1.2 Why Isn't Polymer AM More Popular in Industry?

Part quality is a major challenge companies face using polymer AM

% in agreement as reported by:

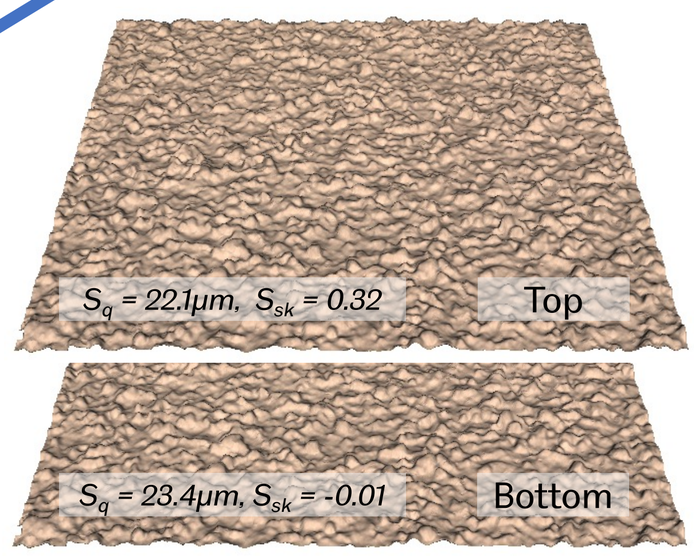


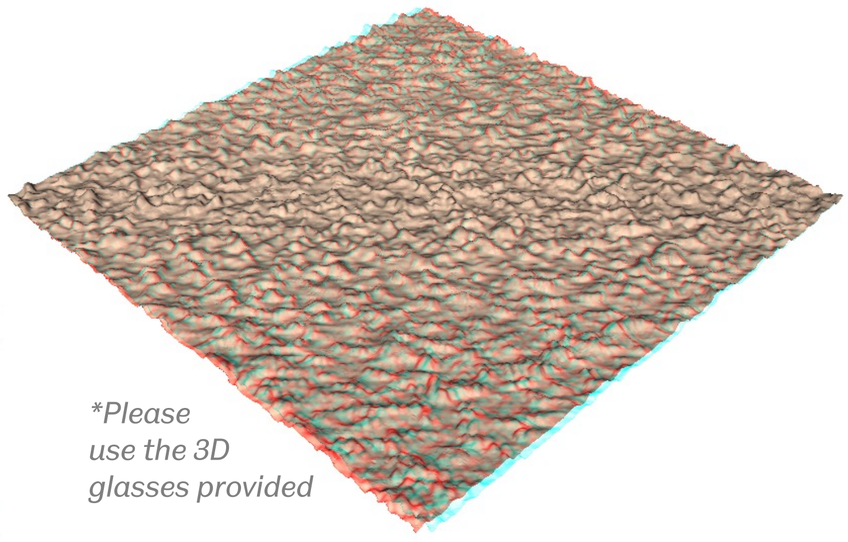
1.3 Introducing ... Tribology

*Tribology is the science and technology of interacting **surfaces** in a state of relative motion, and covers **friction**, lubrication and **wear** in all mechanical contact situations.*

2.0

2.1 LS Nylon-12 Surfaces ... in 3D



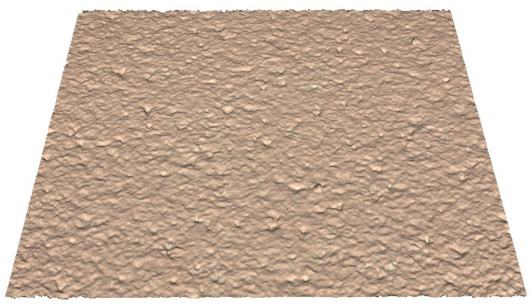


**Please use the 3D glasses provided*

2.2 Process Modified LS Top Surfaces

Building with alternative end of build actions results in a significant change in top surface topography:

- **68% reduction in S_q**



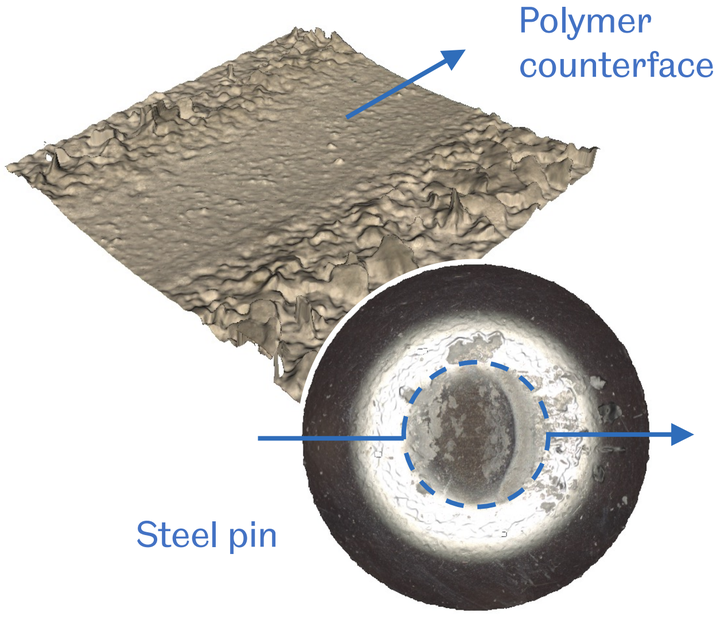
**Please see illustrative parts*

3.0

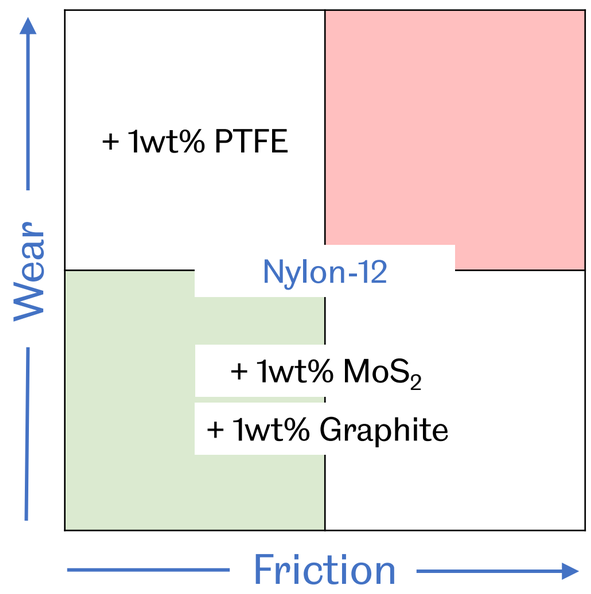
3.1 Friction and Wear Testing

Ball-on-flat, pin-on-disk wear test

Universal Mechanical Tester (UMT)



3.2 Nylon-12 + Solid Lubricants



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Other Research Activities

Characterising the steady-state wear behaviours of Laser Sintered Nylon-12.

Elucidating how varying operating conditions (load, speed & temp) affect the tribological performance of resultant components.

Optimising the friction and wear properties of solid lubricant filled Laser Sintered Nylon-12 samples.

Modifying the composition of solid lubricant filled polymeric composites to reduce their resultant friction and/or wear responses.

Carrying out corresponding work on High Speed Sintered Nylon-12 samples.

Characterising their surfaces; steady-state friction and wear behaviours; and responses when reinforced with solid lubricants.

University of Sheffield | MAPP Manufacture using Advanced Powder Processes EPSRC Future Manufacturing Hub | The Leonardo Tribology Centre

Scan to find out more: