Prototyping Injection-Molded Parts.

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- Abstract

- Molds for injection-molded parts traditionally correspond with high costs, long lead times and marginal changeability. Yet it is essential to generate a small amount of physical parts to verify market-reaction and actual function at lesser costs, in faster lead-times, in ways that allow part re-design.
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- The optimum path toward meeting this goal relies upon a heavy up-front dose of — prior experience in developing prototype parts for injection molded parts, including: rapid market research; hand-built concept modeling; design-engineering expertise; understanding a wide range of manufacturing-processes – including tolerances and visual limitations; heavy reliance on CAD; early integration of styling; early construction of functional-prototypes via the combination of machined-parts, SLS-parts and SLA-parts; and the elimination of aluminum and non-production molds.
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- SLA (Stereolithography Apparatus) and the newer, SLS (Selective Laser Sintering) provide new opportunities to further optimize the path toward the construction of prototype parts, prior to the fabrication of production molds for injection molded parts.
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- We will discuss the advantages and opportunities of making SLA and SLS parts within the context of properly converging upon the fabrication of full-production molds for injection-molded parts.
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- **BIO, Rick Howell**
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- Rick Howell is a former 8-year Senior Product Manager and Director of Marketing for a large German ski binding company, who later founded the first clipless bicycle pedal and shoe company, CycleBinding; and is the developer of Tubb's first high-tech snowshoes – which caused Tubbs to capture an 80% market share and expand the total snowshoe market 50-X. Howell is educated in engineering-management and operates Howell Product Development [www.HowellProductDev.com] in Stowe, Vermont.

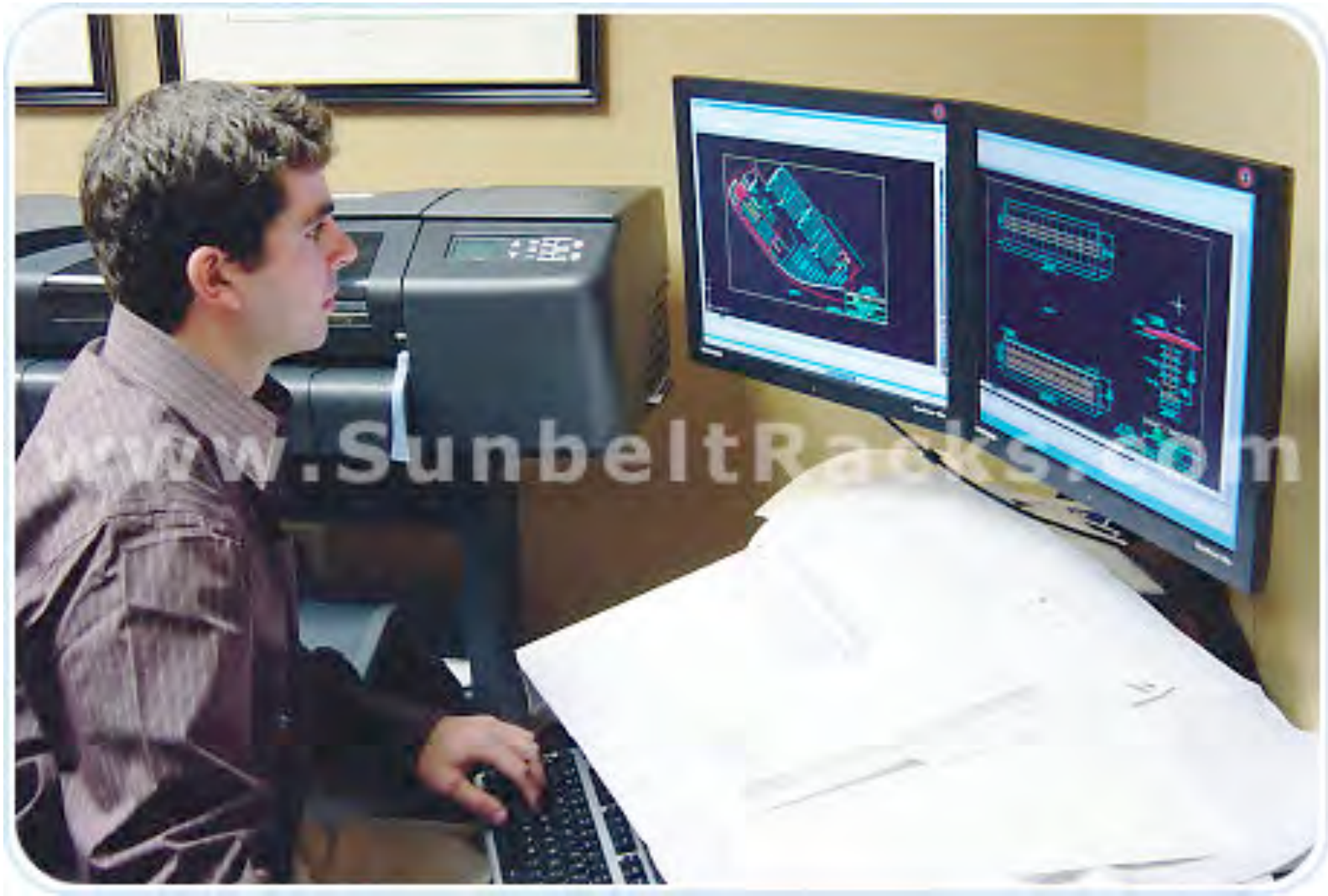
Production-Molds for Injection-Molding.

High Cost, Long Lead-time, Difficult to Change.

Early Market Research.

Early Field Testing.

Part re-design.

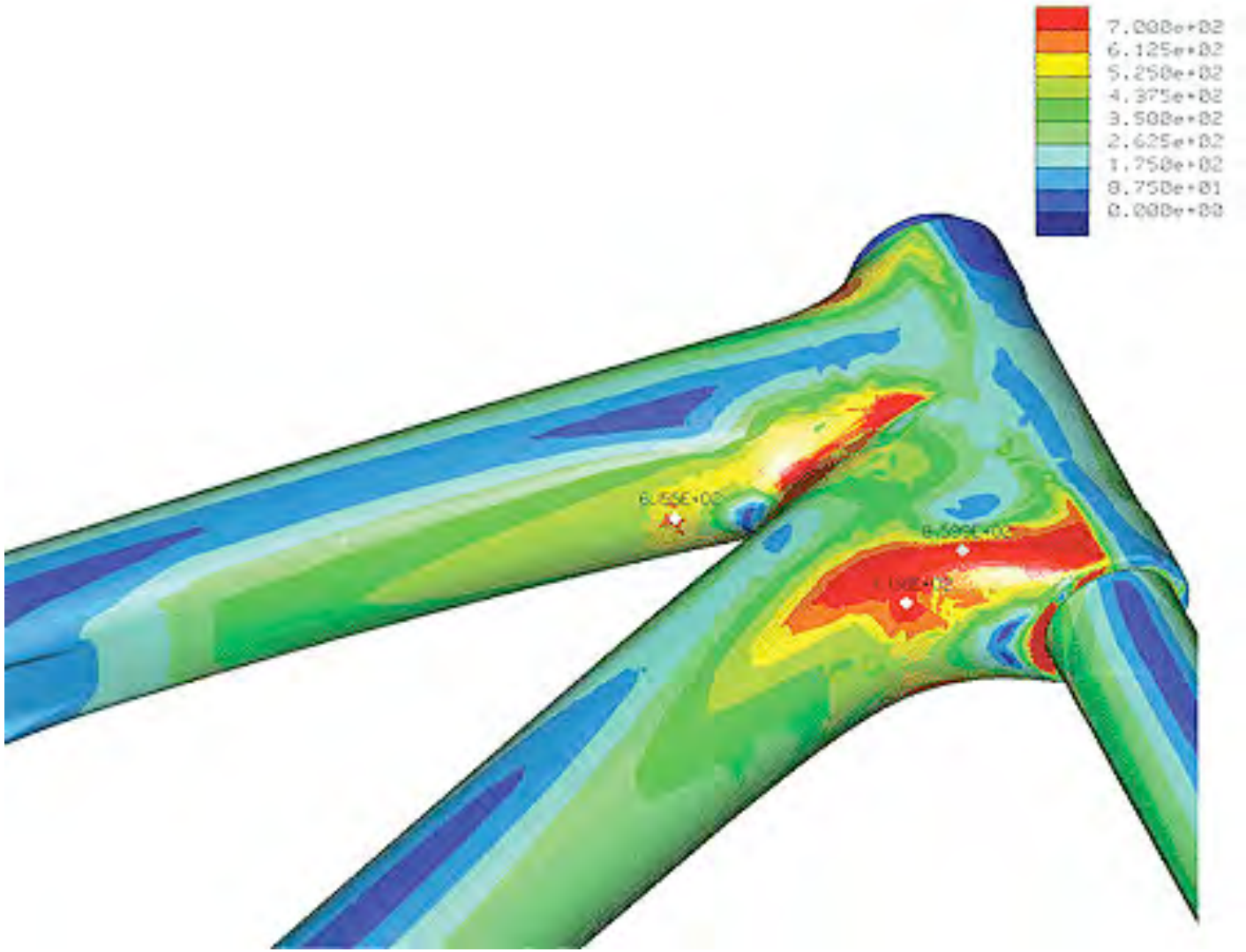


Prior-experience developing prototype injection molded parts.

Rapid grass roots market research.

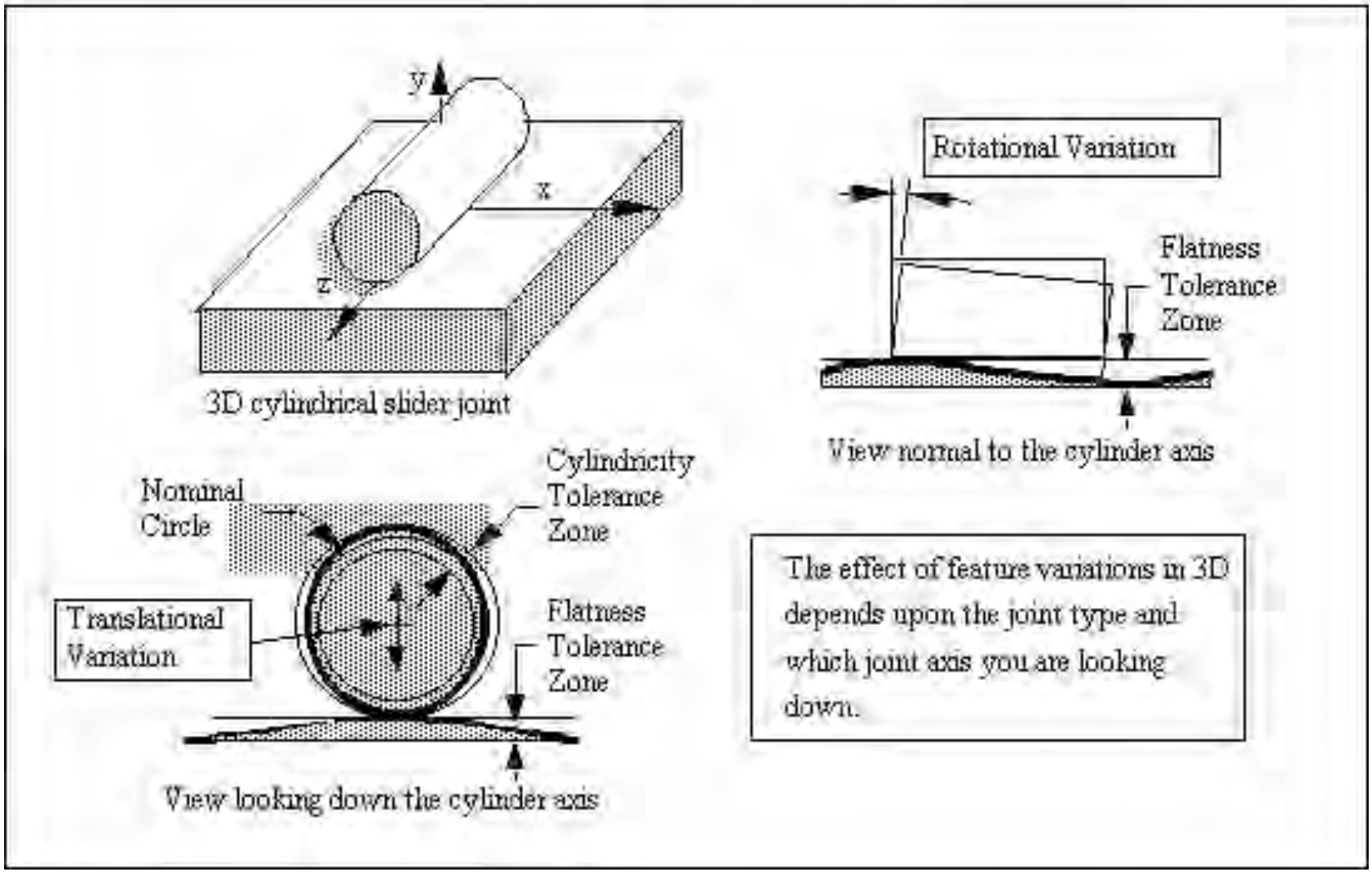
Hand-built Concept Models.

Design Engineering Expertise.

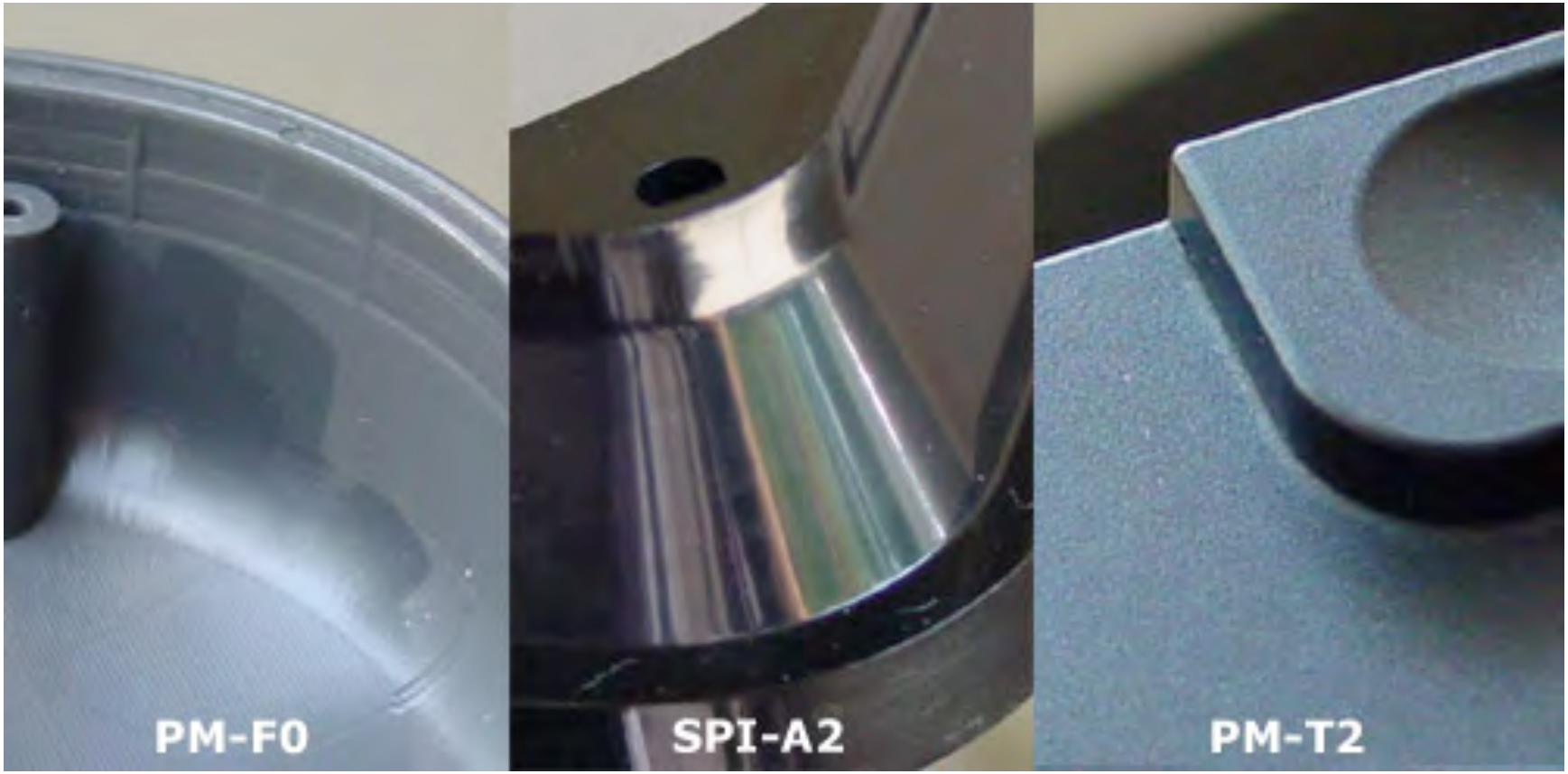


Understand Wide-Range of Manufacturing Processes.

Understand Wide-Range of Process-Tolerances.

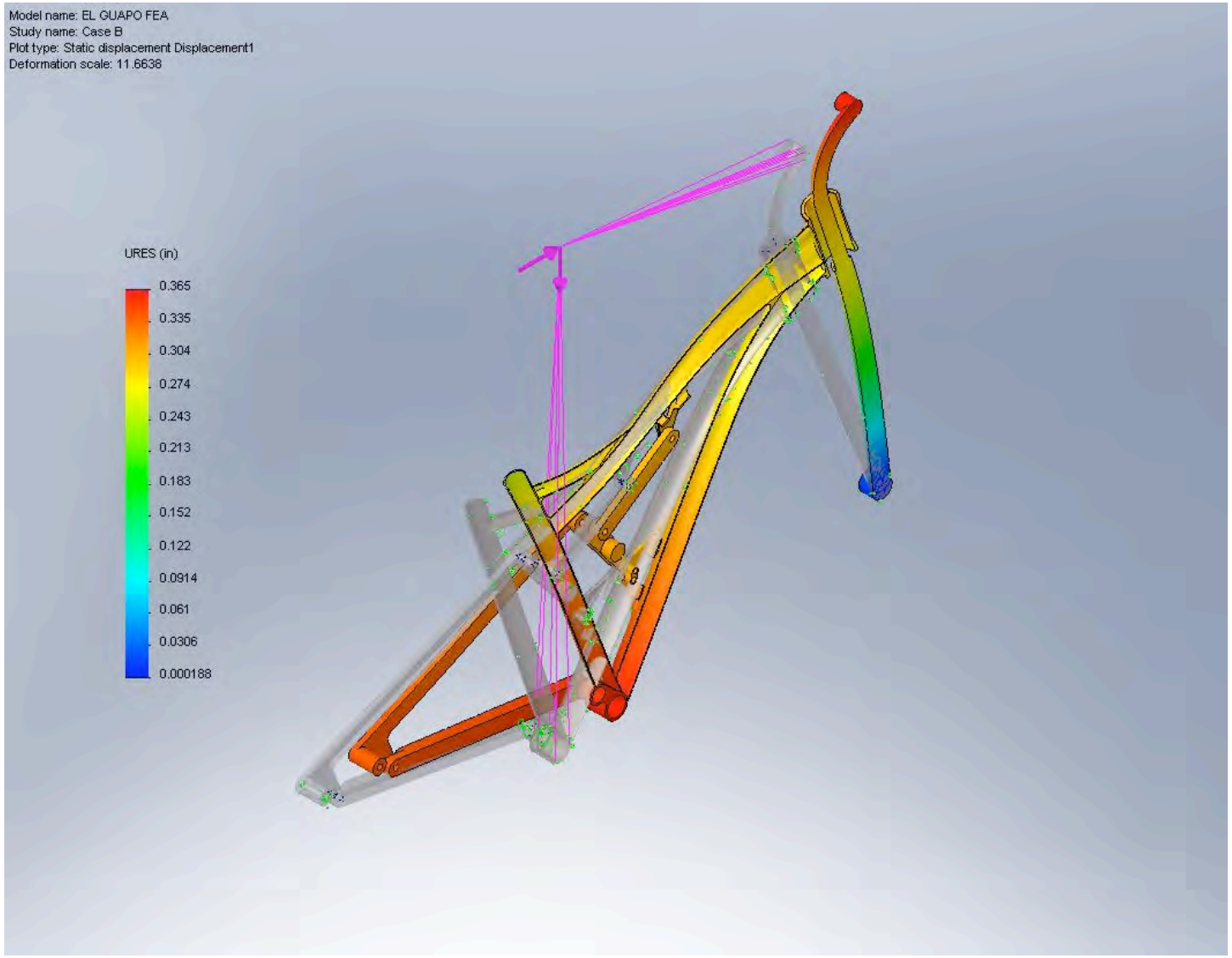


Understand Surface Finish Options.



Understand Visual Limitations.

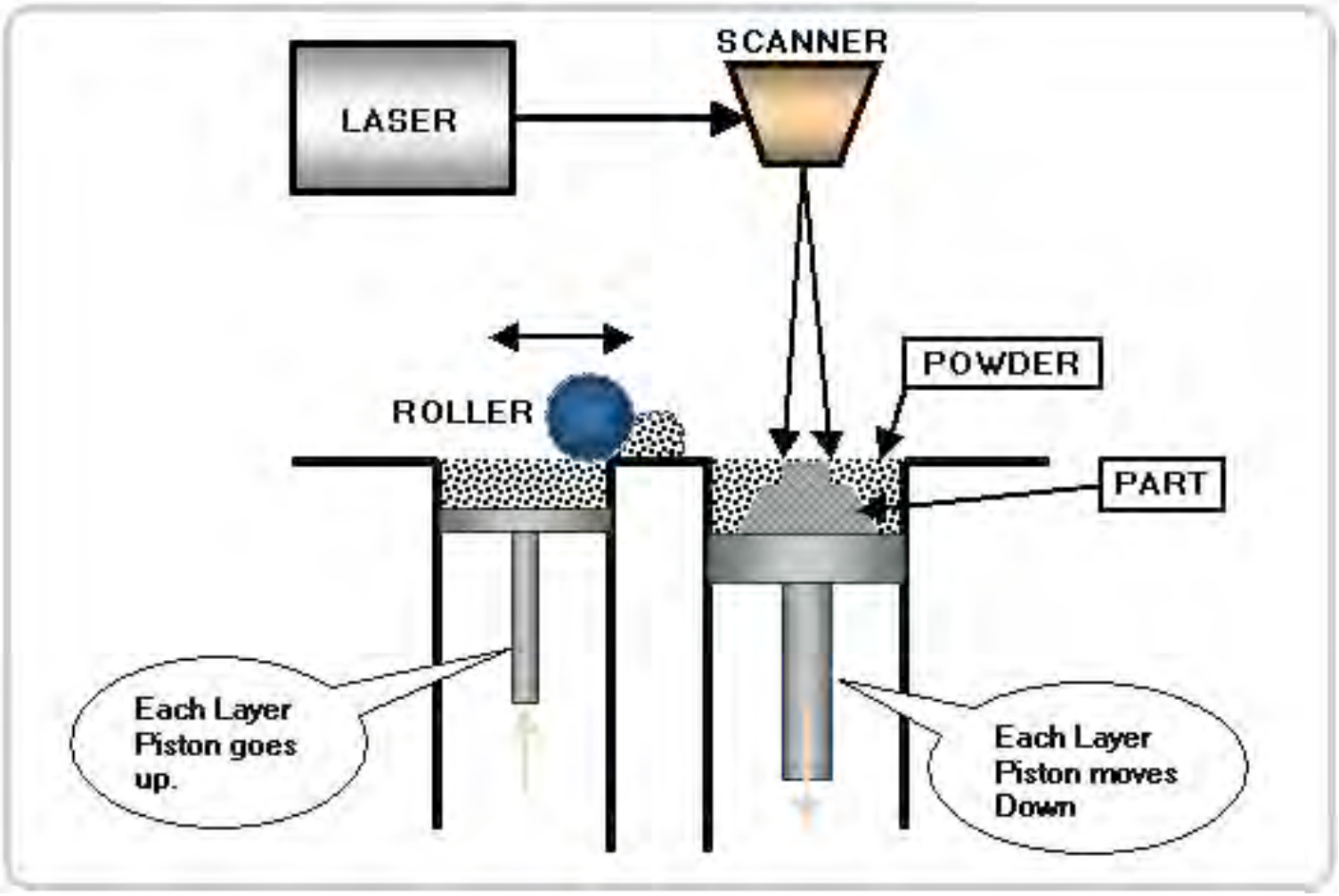
Heavy Reliance on CAD.



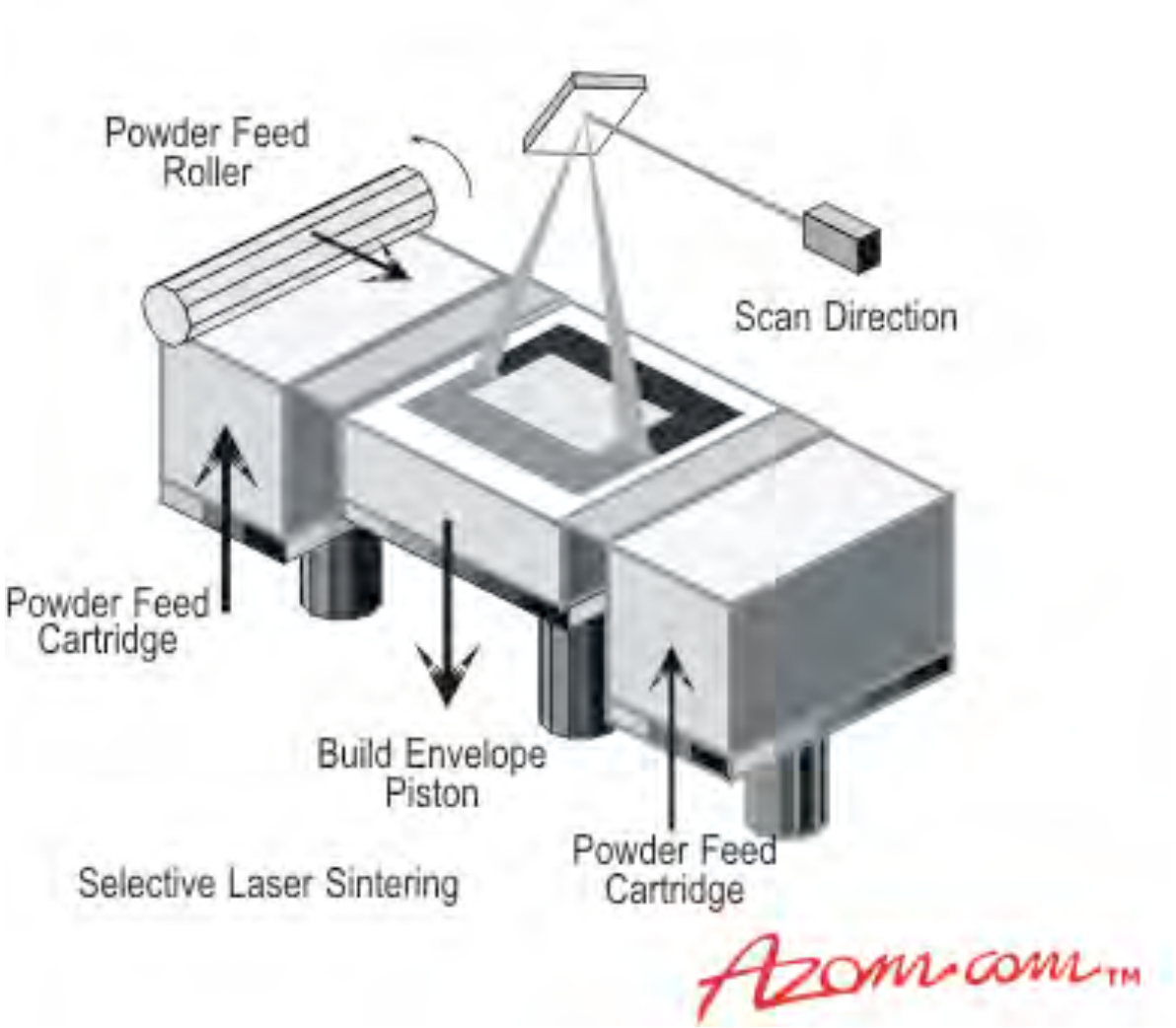
Early Integration of Styling.

Early Construction of Functional Prototypes.

Early Utilization of SLS.

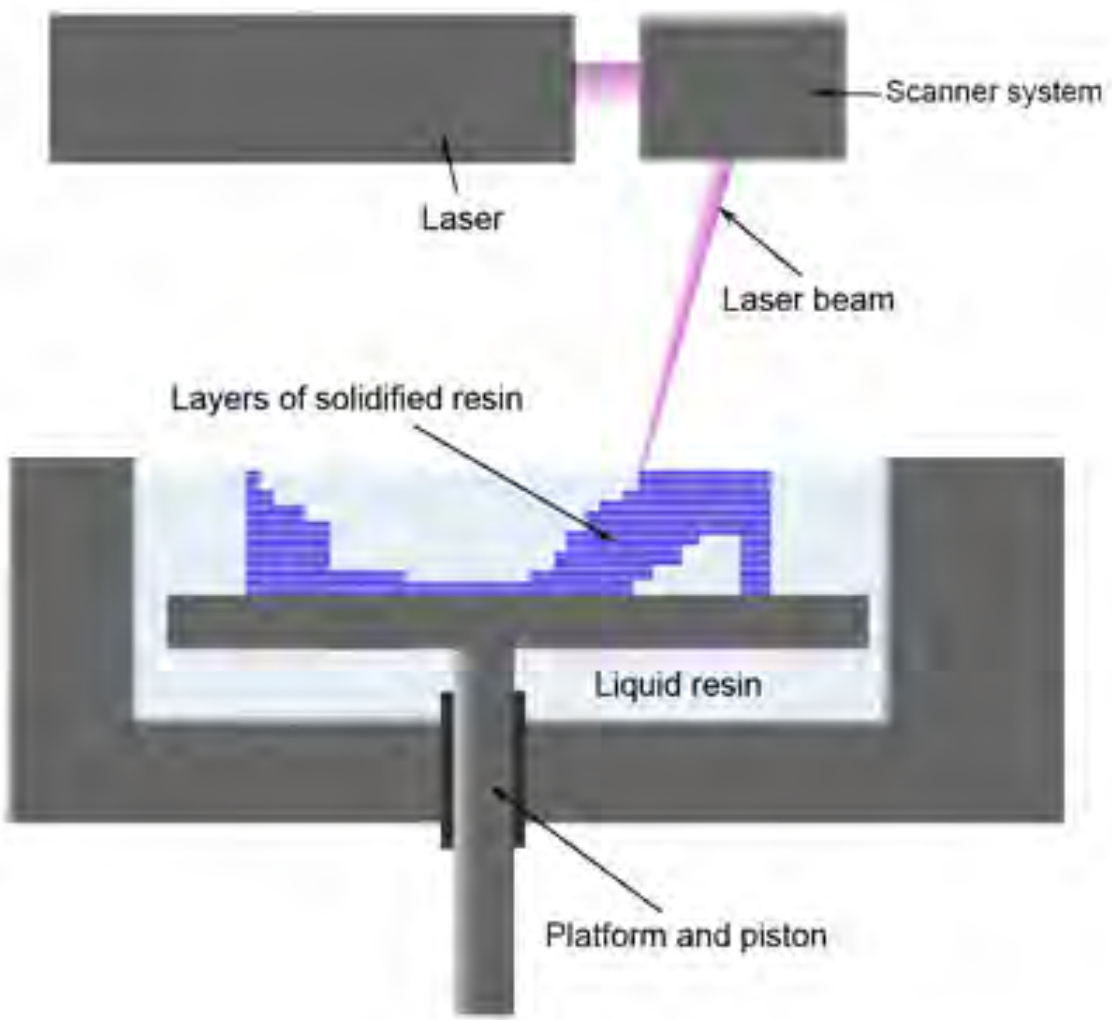


Early Utilization of SLS.

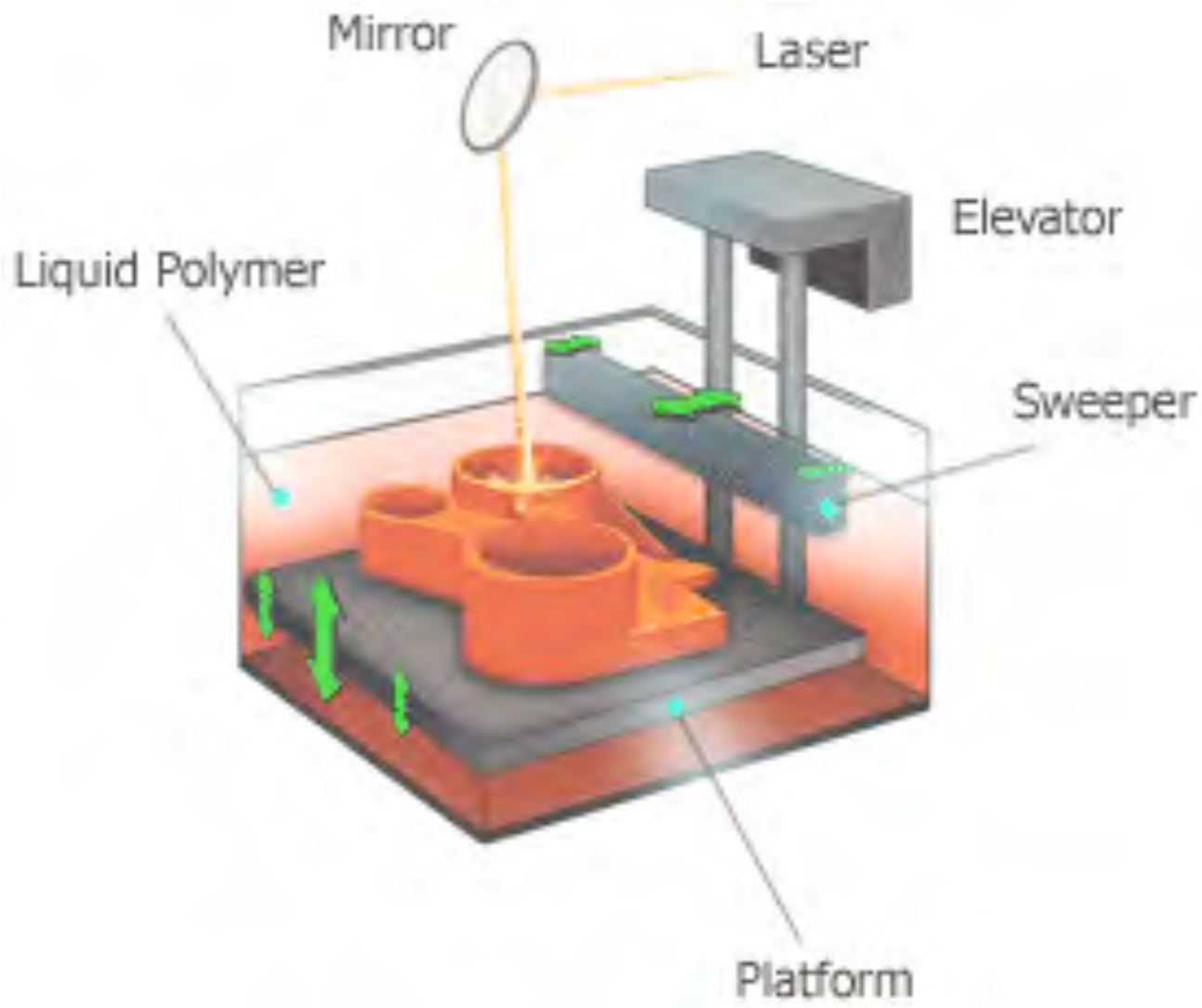


Early Utilization of SLS.

Early Utilization of SLA.



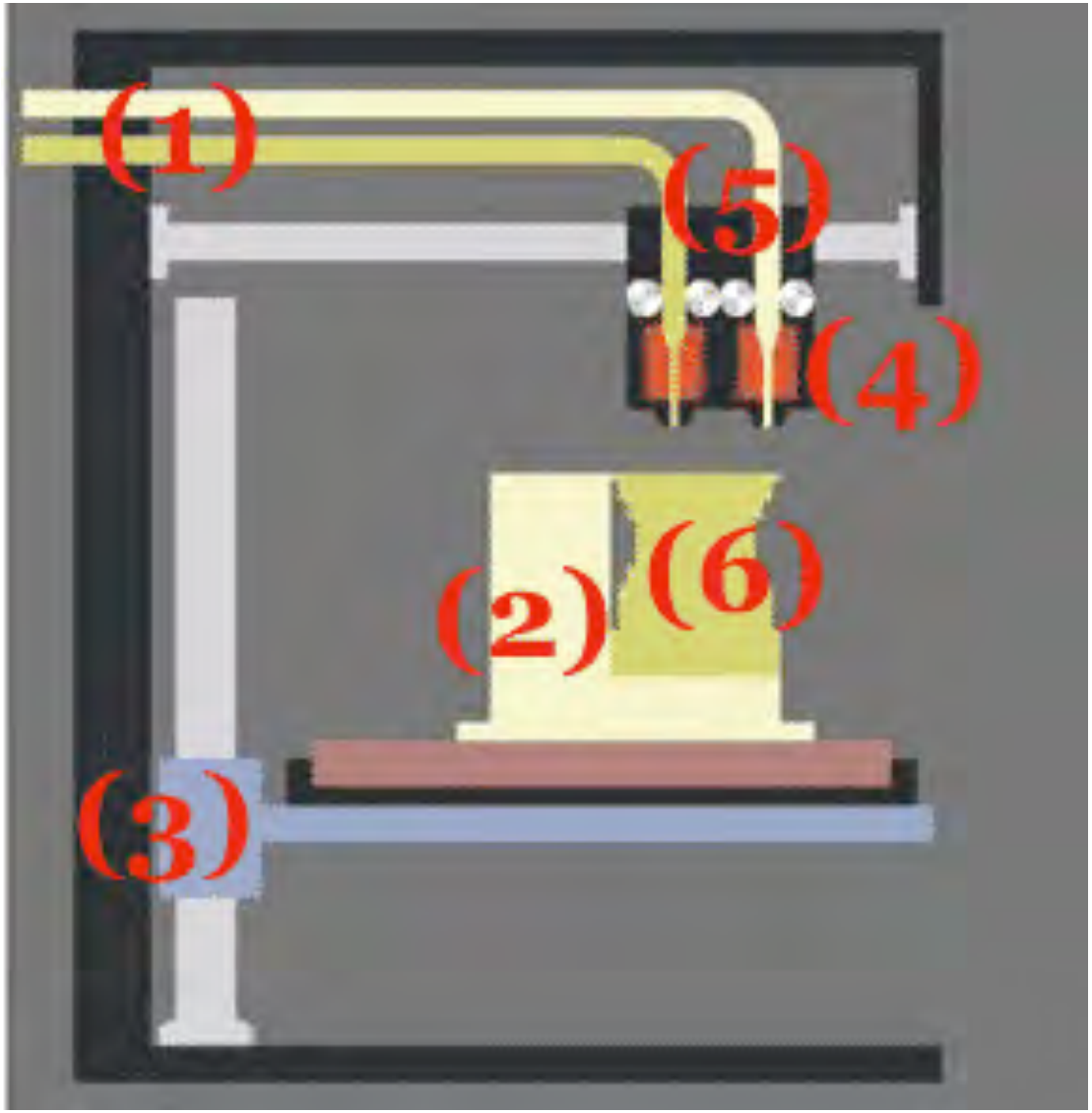
Early Utilization of SLA.



Early Utilization of SLA.

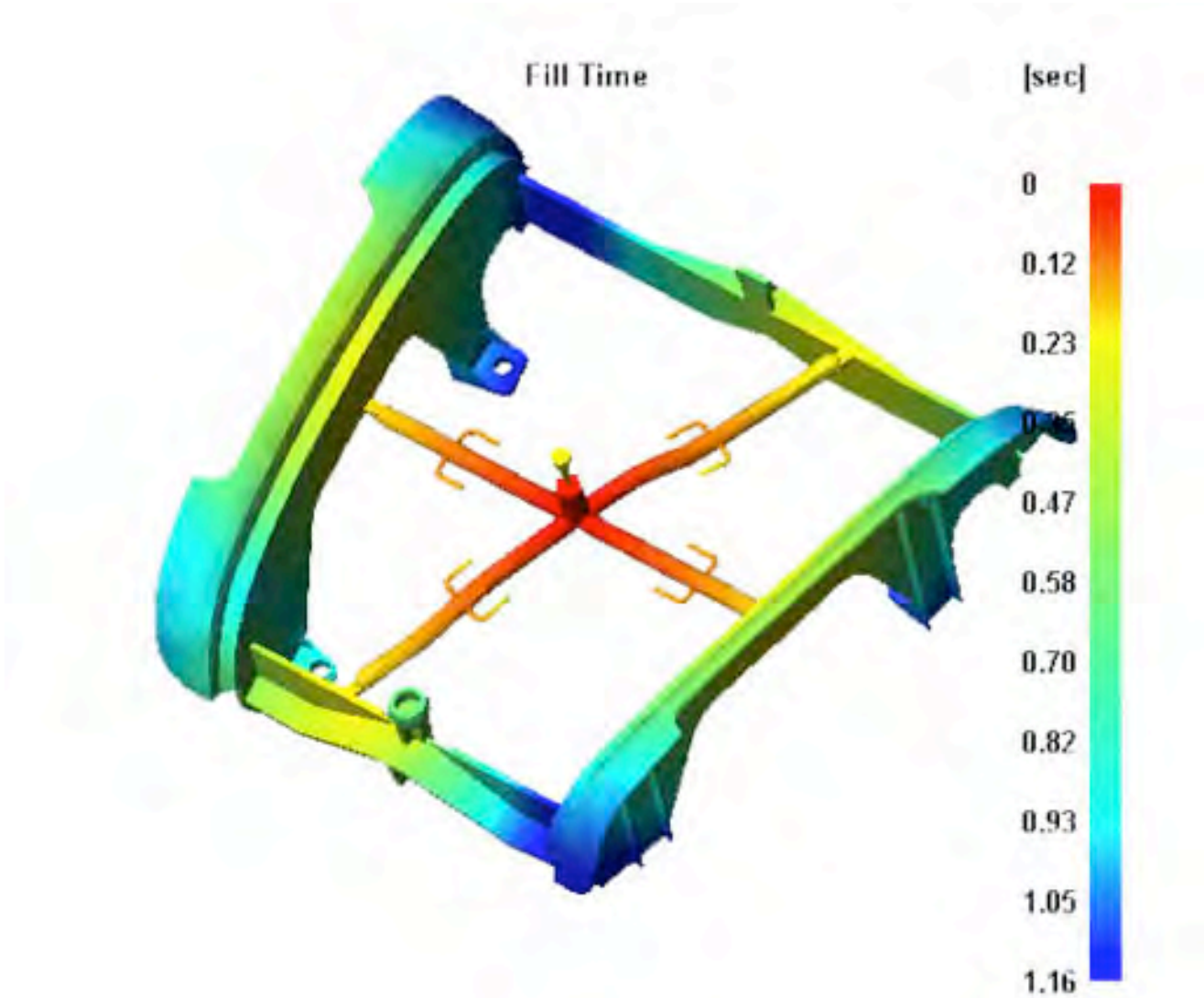
Early Utilization of SLA.

Fusion Deposition Modeling – Moot.

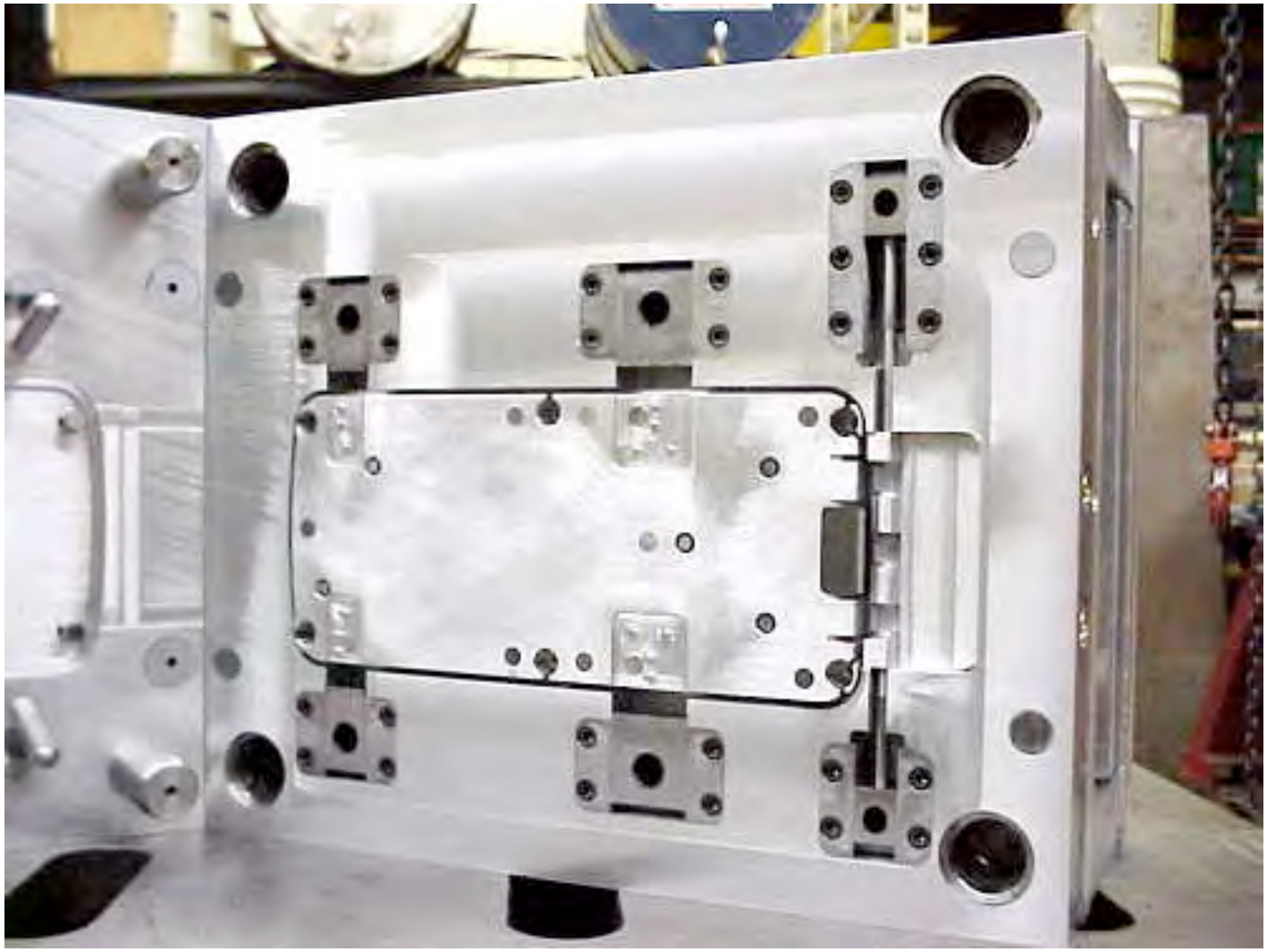


Fusion Deposition Modeling – Moot.

Mold Flow Analysis.



Elimination of Aluminum Molds.



SLS vs. SLS

SLA	SLS
Low Strength (Tensile Strength: 2,000 psi).	High Strength (Tensile Strength: 9,000 psi).
Dimensional Accuracy (+/- 0.002”/ inch).	Dimensional Accuracy (+/- 0.010” / inch).
Fine Surface.	Rough Surface.
Not Applicable to Mold Flow.	Not Applicable to Mold Flow.
Lead-Time: 1 to 3 days.	Lead-Time: 1 to 3 days.
Cost per Part (approx $300)	Cost per Part (approx $300)
Quantities: Low Volume.	Quantities: Low Volume.
Cosmetic Finishing: Difficult.	Cosmetic Finishing: Excellent.

Prototype Stage

Concept Model: Semi-Functional plus Semi-Styled:
Hand-Made; SLS; Cannibalized-Parts.
Functional Model: Performs Functional Requirements (except process-requirements):
SLS + Machined Parts + Cannibalized-Parts.
Styled Model: Looks beautiful, but does not completely function:
SLS + Machined Parts + Cannibalized-Parts.
Integrated Functional / Styled Prototypes:
SLS + Machined Parts + Cannibalized-Parts.
Engineering-Verification Models (Tolerance Check):
SLA + Machined Parts.

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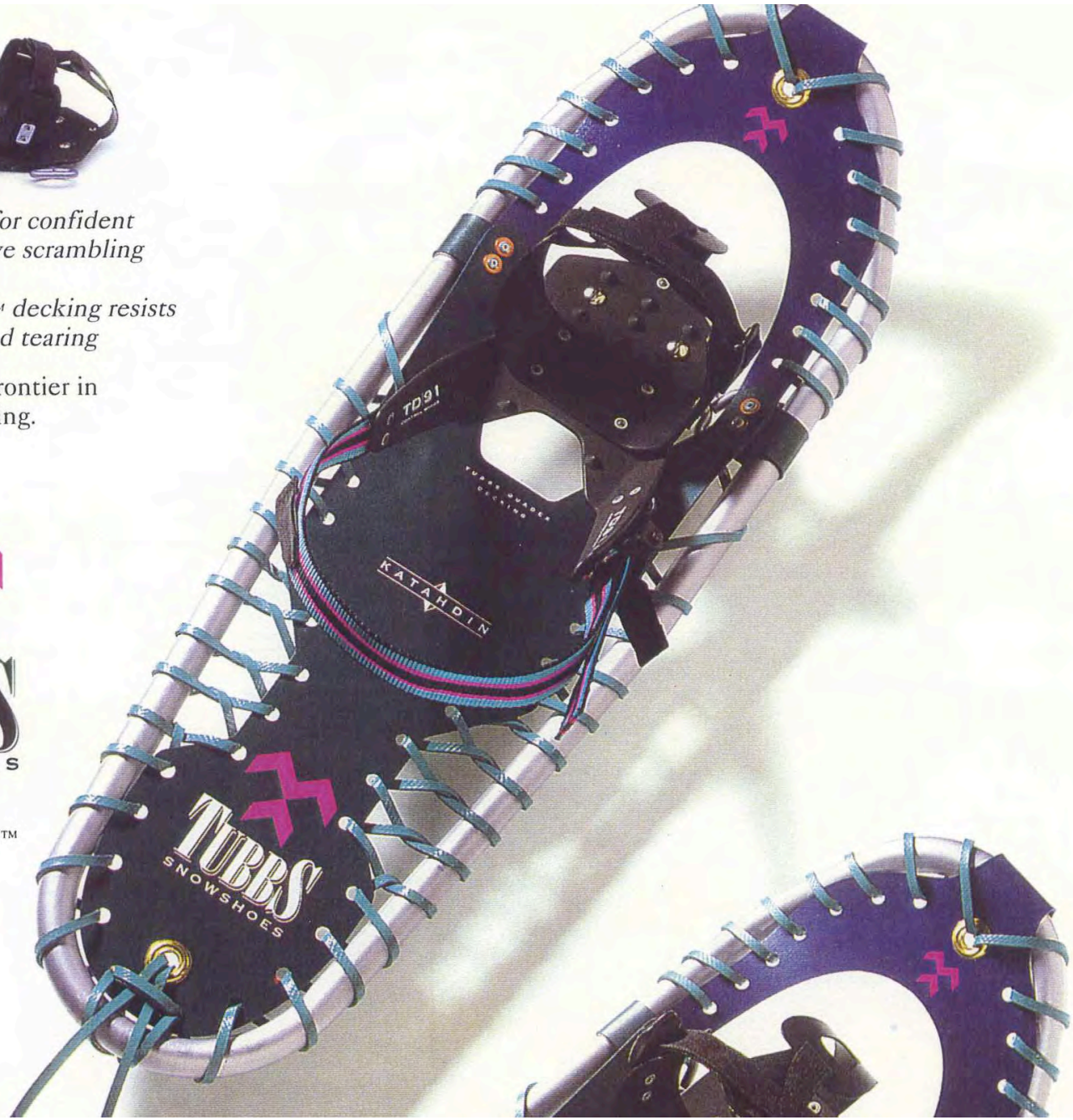

CycleBinding:

The

Next

Step.

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