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Additive Manufacturing Design Guides

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Current Design Guides

- Few design guides exist

- AWE
- Print Shops
- Academia



Plunkett
Associates

Design Guide for Additive Manufacturing



- Why?

- Proprietary information
- Difficult to characterize manufacturability details
- Printability varies between printers and models



Designing for the DMLS Process

David Bentley
Production Manager, DMLS - Proto Labs
May 20th, 2014

1. INTRODUCTION

Laser additive manufacturing (LAM) is a wise manufacturing process which uses a laser and solidify material in a powder-bed according corresponding three-dimensional computer (3D-CAD) model. Stepwise production can complex 3D geometries into simpler two-dimensional steps.¹⁻³

Lightweight design studies, e.g., in the already successfully demonstrated LAM's field of application due to its geometrical freedom. Weight reductions of up to 80% compared to manufactured counterparts were feasible.⁴⁻⁷ studies were generally created by experience the process inherent restrictions are not yet known. Even though LAM's geometrical freedom is higher compared to conventional approaches, it has process specific restrictions which strongly differ from conventional processes when designing parts.

Creating design guidelines are thus of importance in order to allow a wide industrial use. Available studies on design guidelines for LAM currently only give recommendations regarding the basic process inherent restrictions, influences, part design as well as general



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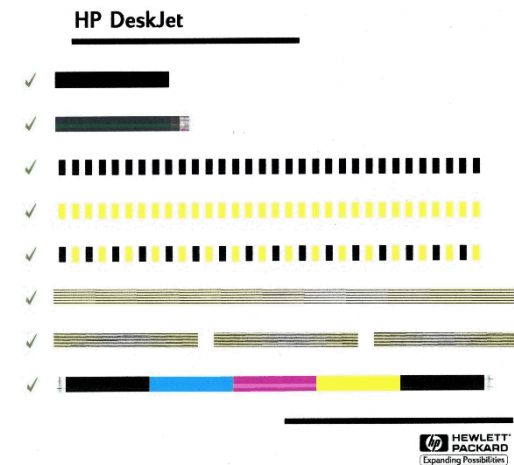
Why important?

- Improve manufacturability
 - Stop the guess and check
 - Reduce design cycle time and waste
 - Enables wider adoption of AM technologies

- Other industries have guides:
 - Design for conventional manufacturability
 - Machining, Stamping, Molding, etc.
 - Microelectronics design guides

Considerations

- Development of standard coupons
 - Similar to paper printer calibration page
 - Evaluate machine to machine capabilities
- Enable use for non-technical users
 - Diagrams, examples, and common language
- Cover multiple materials and machines
 - Enable different design options to new designers
- Reduce “tribal knowledge” from additive manufacturing



Questions

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