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Novel Overhang Support Designs for Powder-Based Electron Beam Additive Manufacturing

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Status:

Seeking R&D and/or licensing partner

Patent Pending

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Overhang Support Designs

- Structure design to support 3-D metal-printed components that are meant to have an overhang portion of the object that need to be free-standing during use
  - Builds support from the build plate
  - Places a support surface underneath an overhang with a gap that is then filled in with un-melted metallic powder
- Support structures acts as a heat sink to enhance heat transfer, reduce temperature and thermal gradients
- Support structure is not connected to the part, so it may be removed easily without breaking bonds

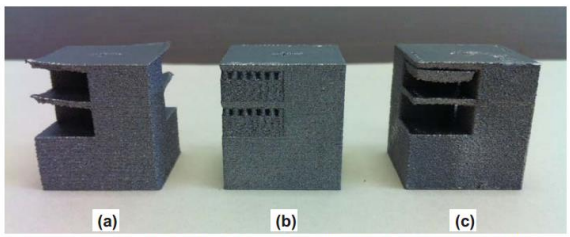
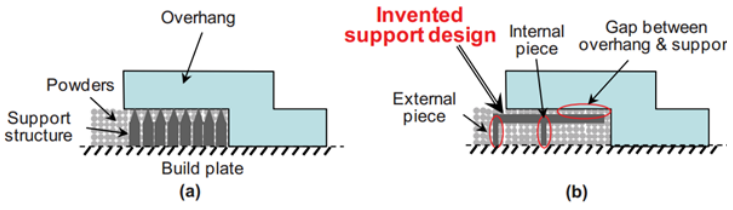


Figure 6. Comparisons of defects and supports between 3 cases: (a) with no support, (b) with conventional support, and (c) with the invented support design.

Advantages of Overhang Support Design

- Simplifies production by eliminating step of physically removing support system in post-processing
- Eliminates deformation of overhang during drying
- Improves quality/function of 3-D manufactured product
- Requires less material than current techniques
  - Saving time and money
- Reduces geometric defects common to additive manufacturing
- Eliminates issues of curling



Comparisons between (a) conventional supports, and (b) invented support design.

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