Analysis of 3-D Printing as a Method of Manufacturing Industrial Components

Overview
The current method of procuring and externally manufacturing components for construction applications often results in long lead time and large space requirements for storage of parts. This combined with high shipping fees and assembly fees results in a need to eliminate the external portion of attaining simple parts for a construction site. An analysis of procurement methods compared to additive manufacturing technology allows for a comprehensive view of the potential for using such technology.

Objectives
Determine the feasibility of 3-D printing in Bechtel’s business by the following tasks: Survey and identify the available 3-D printing technologies; compare 3-D printing to traditional manufacturing; test the ability of 3-D printers by producing a simple component with the technology; provide a recommended 3-D printing configuration.

Approach
- Determine optimum method of additive manufacturing for industrial applications.
- Perform patent search to validate the usage of 3-D printing technology.
- Recommend specific brand and model of 3-D printing system for construction site use.
- Reference professors with 3-D printing expertise to gain insight on technical aspects of the technology.
- Analyze costs and benefits of using 3-D printing against traditional manufacturing methods.
- Produce prototypes using different materials and method of 3-D printing to show quality.
- Provide details on the needed changes to 3-D printing technology in order for it to be a viable method of manufacturing.
- Show software compatibility between 3-D printing and typical CAD software packages.

Outcomes
The benefits and implications for this analysis are as follows:
- The recommended 3-D printers for use at a construction site are for metal materials, the EOS M400-4 Metal 3-D System and for plastic material the Stratasys Fortis 900mc
- The overall usage for 3-D printing systems at a construction site is recommended for piping configurations with diameters less than 2 inches or for parts that are highly customized and cannot be manufacturing by traditional means.
- The factor the most impacts the price of using 3-D printing technology is the price of the printers being dissolved into the price of each component. Reducing this would make the cost of 3-D printing much more competitive.