

2017

Skills USA

Additive Manufacturing Skill Performance

Competition Elements

Skill Performance:

This contest will be a team-oriented event. Teams will consist of two contestants for the same school in the same division. This contest includes two elements to evaluate teams for employment in additive manufacturing fields.

The first element, to prepare in advance of the competition, will be a model of a two speed gearbox. The gear range must be selectable. The input/output ratios for each speed are 1:1, and 2:1, respectively. The model must be no larger than 4" x 4" x 5". The gearbox case must have an open top. The design will show the benefits of additive manufacturing by incorporating complex geometric features.

Models must be submitted to RCBI for 3D printing no later than March 30th, 2017.

Process considerations:

1. Self-supporting angles are 45 degrees.
2. More support means longer build time because the machine takes time to switch from model to support on each layer.
3. Air gap for freedom of movement in parts => 0.023".
4. How the file is oriented to be built will affect the amount of support material being built and the overall time of the build.
5. The processing software has 3 different internal fill patterns that will affect material usage and time of build.
6. See <http://www.stratasys.com/3d-printers/technologies/fdm-technology/faqs> for additional information about the printers.

For the second element, completed onsite at the SkillsUSA competition, teams will receive a challenge to perform within a set timeframe involving a design change to the gearbox model. Each team member will be required to participate in the design change to demonstrate design program competencies. The printed design and design change in software will be presented to judge along with an engineering notebook. Engineering notebook will demonstrate design history and intent of both original design and design change.