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| MxD 14-07-03 | Category: Recurring Manufacturing, PO to 1st Article |
| Title: | Intelligent, Adaptive Fixturing for Machining of High Value Large Castings and Fabricated Assemblies |
| Completion Date: | 2016-08-31 |
| Project Team: | PDA LLC, American Foundry Society, Arizona State University (ASU) |
| Coordinator Contact: | Jiten Shah<br>info@pda-llc.com |
| For Additional Information: | If you are a member of MxD (formerly DMDII), go to https://portal.dmdii.org/.<br>If you are not a member of MxD, contact Tyler Vizek (Tyler.Vizek@mxdusa.org). |

Summary:
The project software IAMfix significantly reduces the set up time for machining raw castings and fabrications with piece to piece dimensional variability and virtually eliminates scrap and rework due to mis-machining and non-machinable parts. IAMfix with AutoFix produced 80% reduction in the set up time for the first few operations which utilize as-cast target surfaces. During the demonstration, a few castings, which would could have resulted into the scrap and rework, were captured ahead of loading into the machining fixture.

Although the current project has successfully demonstrated this technology and software for machining of one design for aluminum sand-castings, the very same technology is applicable to other materials (iron, steel) and to large welded assemblies, such as hulls of military assault vehicles. In addition to metal casting and fabrication, the technology can be applicable for any custom molded process including polymeric composite, FRP and forgings.

Deliverables:

- A software enabler tool called 'ASU-AutoFix®' and the process map
- A set of instructional manuals on how to use the tool with examples
- Demonstration article related data:
  i. Fixture adjustment values for the 1st operation
  ii. Rough casting and finished casting Scanned STEP files for every article
  iii. Performance improvement metrics with set up times, scrap and rework if any

Software Tools to utilize 'ASU-AutoFix®':

- ACIS and Interop – Spatial
- Visual Studio – Microsoft
- CREO – PTCA

Technical and System Requirements:

- Core I5 processor, or better
- 4 GB of Ram, or better

Other industry use cases: Although the current project has successfully demonstrated this technology and software for machining of one design for aluminum sand-casting, the very same technology is applicable to other materials (iron, steel) and to large welded assemblies, such as hulls of military assault vehicles. In addition to metal casting and fabrication, the technology can be applicable for any custom molded process including polymeric composite, FRP and forgings.