

Industry Sponsored Research in Advanced Manufacturing and Materials Processing

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Advanced Manufacturing:

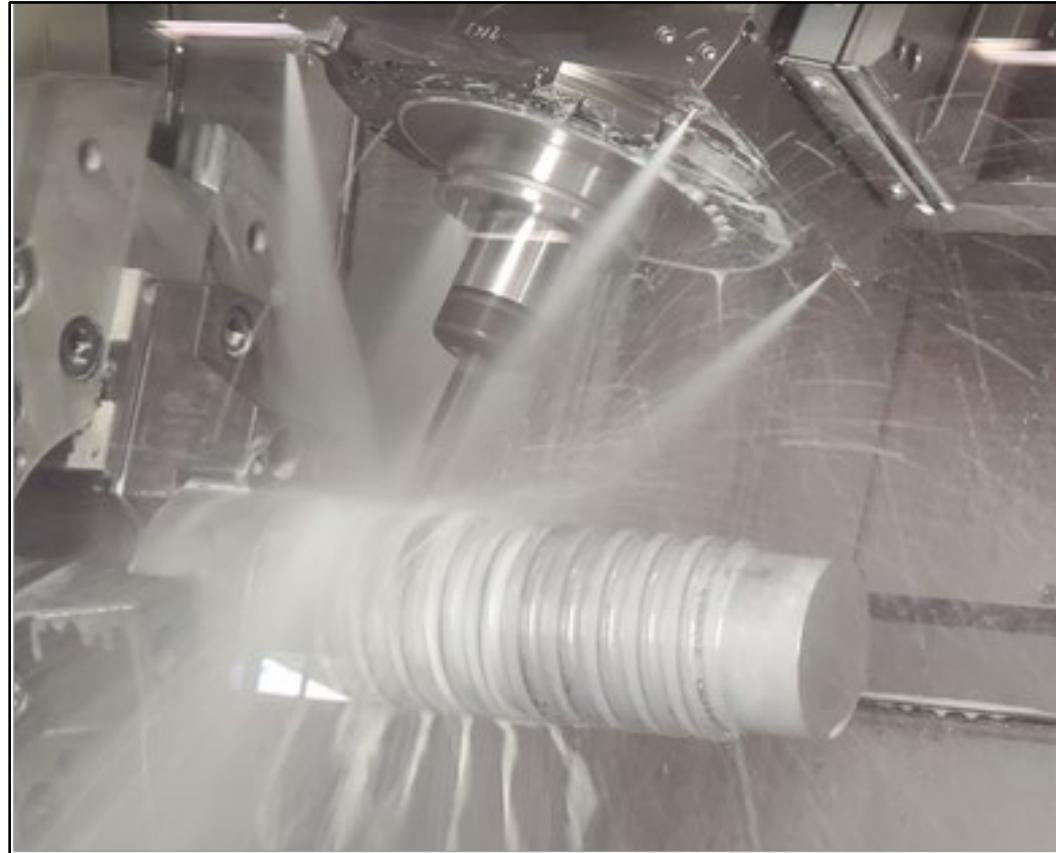
Project	Role	Funding Agency	Amount	Year Awarded	Status
Solid State Recycling of Thin Cross Section Metals	Principal Investigator	Oregon Best	\$75,000	2017	Completed
Ball Screw Rapid Forming	Principal Investigator	OMIC R&D	\$44,192	2018	Completed
Rapid Tooling with Additive Manufacturing	Principal Investigator	OMIC R&D	\$101,765	2018	Completed
Center of Excellence for Cutting Tools Inspection	Principal Investigator	Business Oregon	\$500,000	2018	Completed
Cutting Tool Geometry Inspection and Optimization	Principal Investigator	OMIC R&D	\$85,101	2019	Completed
Decision Tool for Additive Manufacturing Application	Co-Principal Investigator	OMIC R&D	\$54,596	2020	Ongoing

Advanced Materials Processing:

Project	Role	Funding Agency	Amount	Year Awarded	Status
Developments in Alloys with Multi-Principal Elements for Cutting Tools Applications	Principal Investigator	OMIC R&D	\$127,729	2020	Ongoing

Ball Screw Rapid Forming

- Multi-Step Manufacturing; Expensive approach while eliminating strength of the materials due to the high-temperature processes.
- Objectives:
 - To reduce the number of steps and use of specialized equipment in manufacturing of ball screws.



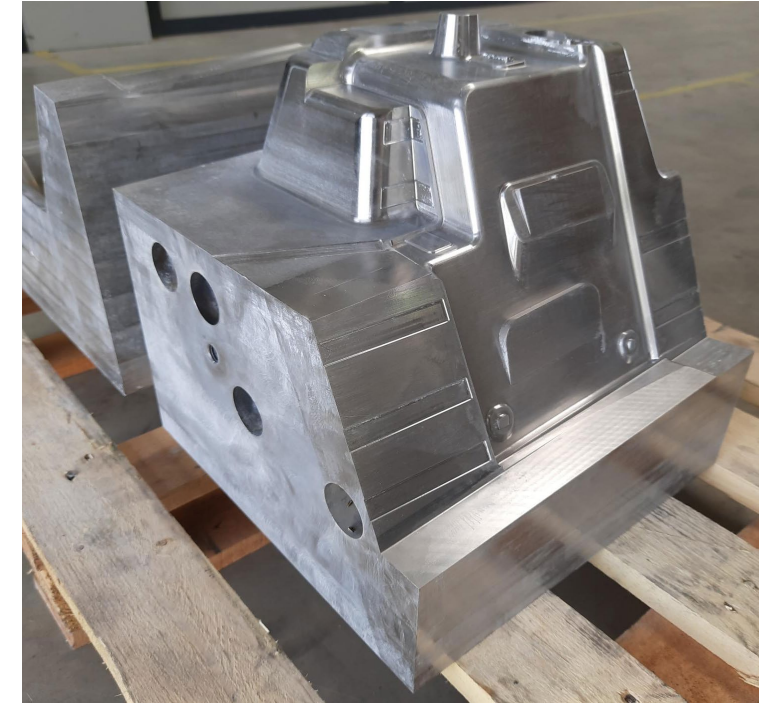
Ball Screw Rapid Forming

- To offer a new solution for rapid forming of a specific type of ball screws.

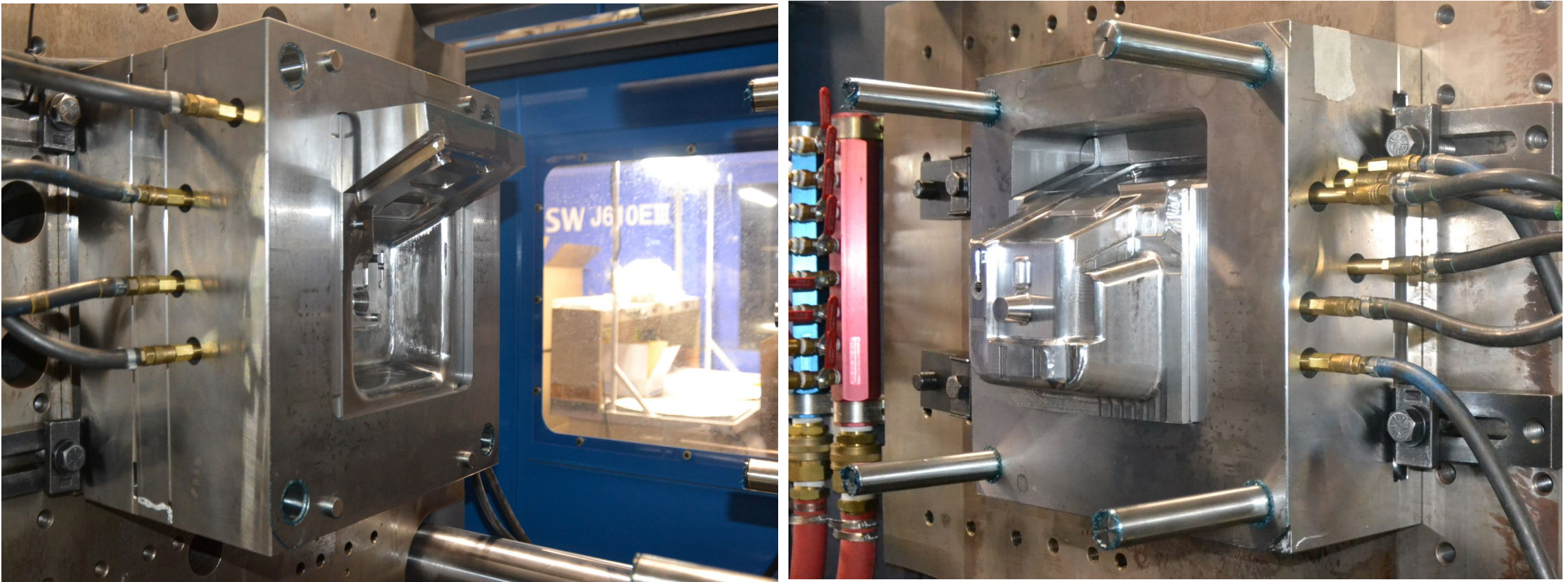


Rapid Tooling with Additive Manufacturing

- Tool manufacturing is costly and time consuming due the nature of machining.
- Objectives:
 - To investigate the capability of additive manufacturing technologies available on the metal manufacturing market for rapid tooling.
 - To leverage the selected AM technology for an optimum design for AM.
 - To produce mold rather than many parts using AM.



Rapid Tooling with Additive Manufacturing



Rapid Tooling with Additive Manufacturing



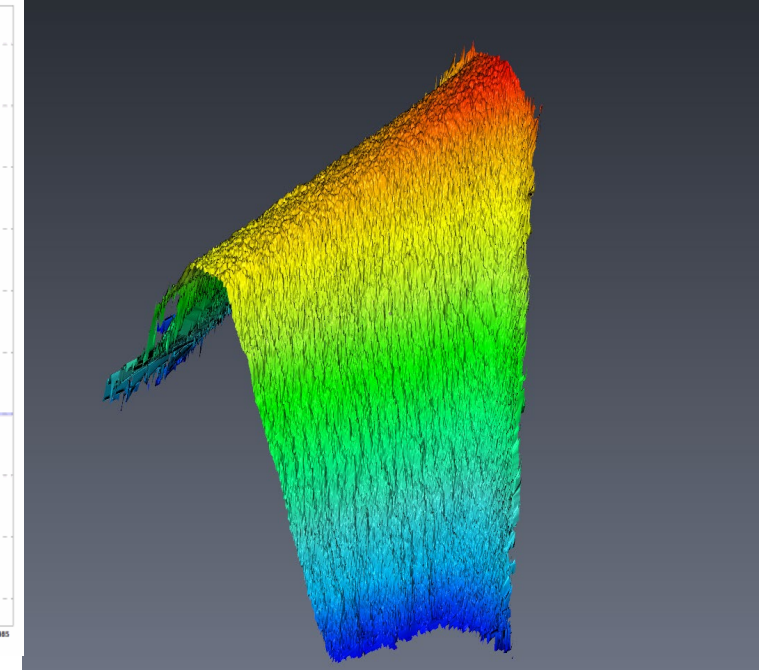
Center of Excellence for Cutting Tools Inspection

- Procurement of the most sophisticated cutting tools inspection equipment that industry is interested in testing.






Cutting Tool Geometry Inspection and Optimization

- Tool life prediction before it is too late!
- Objectives:
 - To develop best practices in optimization of the edge-preparation of drilling tools while learning how to measure the cutting tool microgeometries.
 - To develop edge-preparation optimization methodology for a drilling tool.
 - To develop predictive model for tool life.



Decision Tool for Additive Manufacturing Application

- A team from both PSU and OIT will work together to match the desired project outcomes by developing a suite of software tools to improve awareness, understanding, and confidence of when to leverage additive manufacturing (AM) for manufacturing production support.


Portland State
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OMIC
OREGON MANUFACTURING
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R & D
 
Oregon TECH
Oregon Institute of Technology

Additive Manufacturing Search Engine

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Printer Information

Manufacture
 Printer Name
 Printer Name
 AM Type Primary
 AM Type Subcategory
 Model Year
 Machine Size X [mm]
 Machine Size Y [mm]
 Machine Size Z [mm]
 Machine Weight [kg]

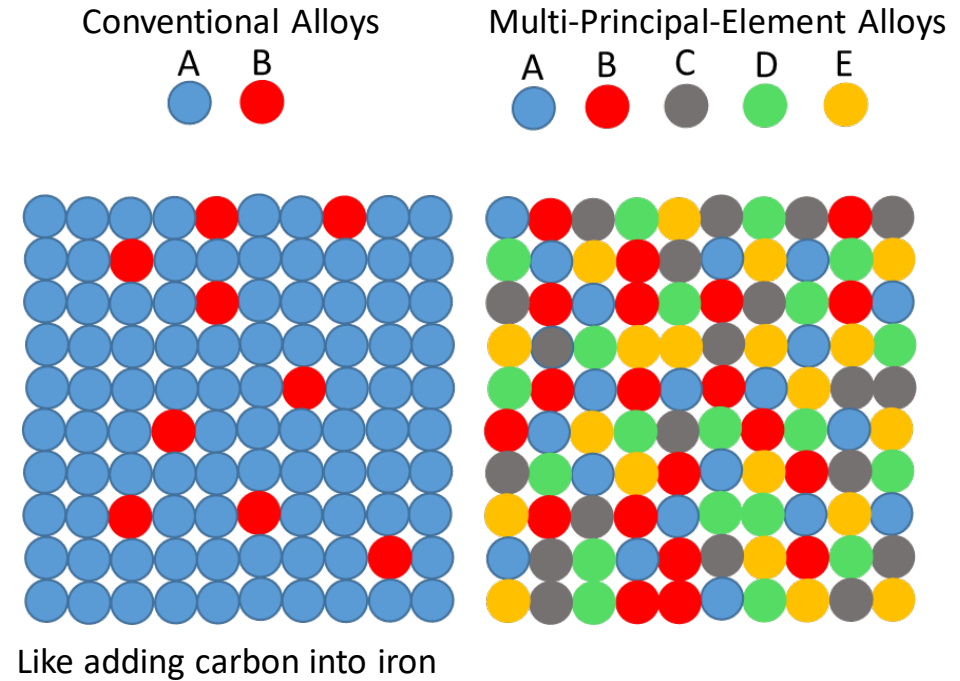
Build Volume X [mm]
 Build Volume Y [mm]
 Build Volume Z [mm]
 Print Layer Height
 Build Rate [cm³/hr]
☐ Can this print
 require post-
 processing from
 another machine?

Material Information

Material Type Major
 Material Type Minor
 Yield Strength [Mpa]
 Ultimate Tensile Strength [Mpa]
 Compressive Strength [Mpa]
 Density [%]
 Hardness
 Thermal Conductivity [W/mK]

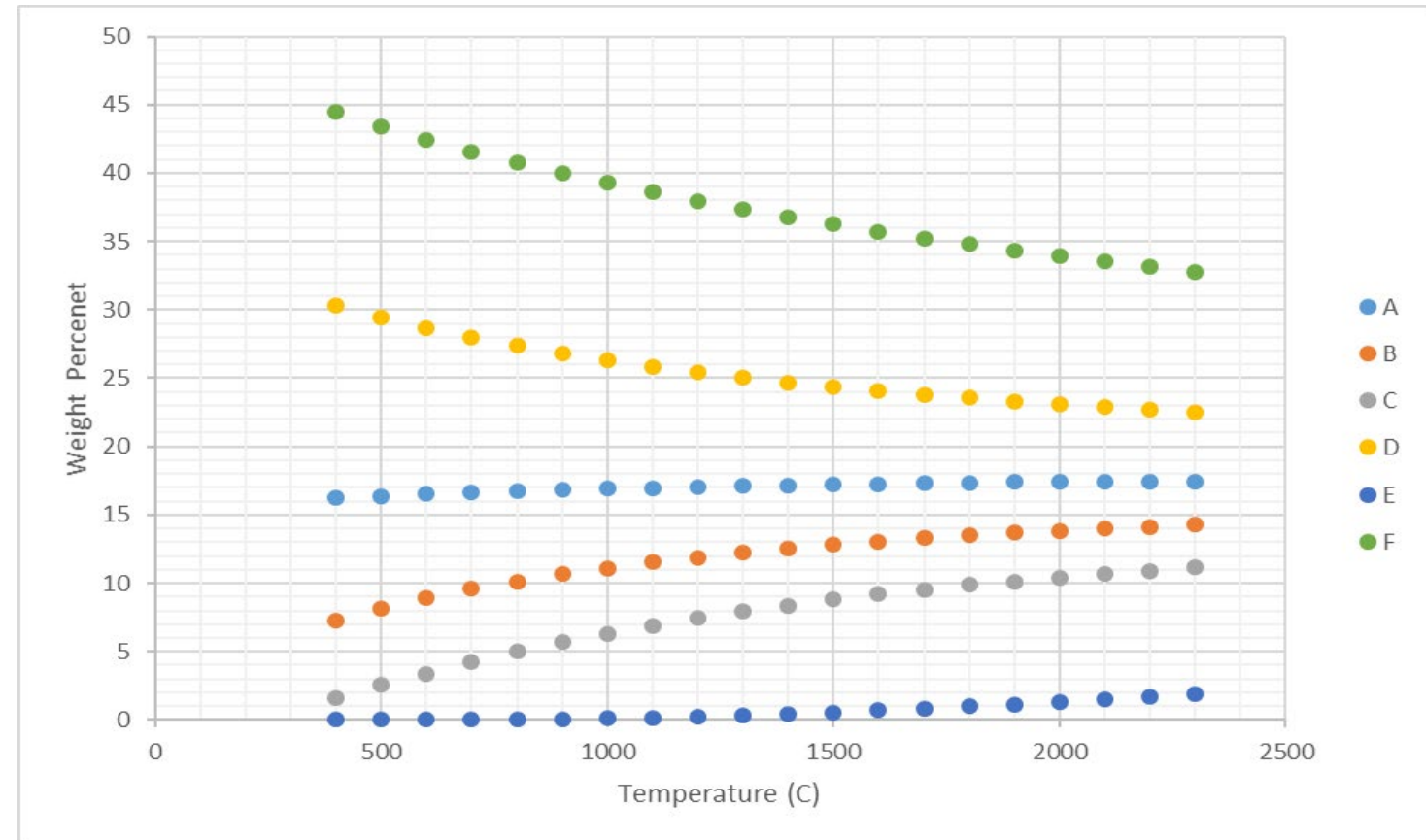
Developments in Alloys with Multi-Principal Elements for Cutting Tools Applications

- How to eliminate cobalt in cutting tools?
- Objectives:
 - To explore capabilities of advanced multicomponent alloys to find an alternative to conventional carbide and ceramic cutting tools.



Developments in Alloys with Multi-Principal Elements for Cutting Tools Applications

- In collaboration with OMIC industry partners, mechanical properties and microstructure of the prototypes will be tested and validated to evaluate the feasibility of the designed alloys for cutting tools applications.





Thank you

Oregon Tech

OMIC R&D

OMIC R&D Members

SPGA Office



Questions?