OMIC R&D TECHNOLOGY BOARD
CONCEPTUAL ABSTRACT

OMIC
OREGON MANUFACTURING INNOVATION CENTER
R & D

TITLE: Evaluation of Exotic Tool Materials

RELATED ROAD-MAPPING DESIGNATION ID#: A6

SUPPORTIVE INDUSTRY: SECO, Sandvik, Mitsubishi, Sumitomo

PROJECT TYPE: General Project - Alloys & Materials (also relates to Machining).

PROBLEM STATEMENT (What Are We Trying to Solve?): In the machining industry there are certain cutting tool materials that are often labeled as 'Exotic' tool materials, and have unique performance characteristics than typical mainstream 'Coated Carbide' cutting tools. These exotic tools include: Cubic Boron Nitride (CBN), Binderless CBN, Single Crystalline Diamond (SCD), Diamond Like Coating (DLC), and Polycrystalline Diamond (PCD). This project focuses on building industry confidence by way of data-driven decisions on the performance domain of these exotic tools as compared to Carbide. If there is a performance gain to be recognized, the project should also show a cost-benefit analysis.

PROJECT DESCRIPTION: An understanding of the performance domains of these exotic tools can be arrived at by way of the following data compilation:

- Recognizing the optimal intended market segment of each exotic tool material (Workpiece, milling or turning, roughing or finishing, operating parameters, and other unique sensitivities).
- The research should compile data on: Tool life, tool wear, surface finish, chip formation, and repeatability. This data should be benchmarked against industry standard coated carbide cutting tools of equivalent geometries.
- If performance gains in these exotic tools are recognized, then a cost benefit analysis should be conducted against the benchmarked coated carbide tools.

Identify Related OMIC R&D Resources:

- OKUMA M560V
- DOOSAN DVF5000
- DOOSAN SMX-2600 ST
- AXILE
- DOOSAN TT2500SY
- WFL M50
- OMIC Lab: Microscopy, imaging, cutter inspection equipment.
- OMIC Staff: Cody Apple, Josh Koch, Urmaze Naterwalla

PROJECT DELIVERABLES:

- Formal Report, raw data collection template, and related presentation
- Worn cutting tools
- Chip samples
- All images, and video files compiled