

OMIC R&D TECHNOLOGY BOARD

CONCEPTUAL ABSTRACT



TITLE: Holder Taper Evaluation (Phase 2 of OMP419)

RELATED ROAD-MAPPING DESIGNATION ID#: M41

SUPPORTIVE INDUSTRY: SECO, Mitsubishi, Kennametal, Boeing, Heidenhain

PROJECT TYPE: General Project

PROBLEM STATEMENT (What Are We Trying to Solve?): A cutting tool Holder is a critical link between the cutting tool and the machine spindle in which it is mounted. The Holder-to-Spindle interface (often referred to as the taper) is critical to the performance of the cutting tool and its vibrational stability. Based on industry demand, this research continues to evaluate two additional Holder taper types from the work done in OMP419.

PROJECT DESCRIPTION: In OMP419, the PSU research team had developed the test-stand and testing methodology for evaluating Holder taper performance. Prior work had completed analysis of Holder taper types: *Kennametal's KM4X-100, HSK100A, CAT50-Simul Fit, and Coromont C10*. Although Bending Moment limit is a key spec in Holder selection, the research team was able to demonstrate the importance of recognizing holder performance through the range of loading and unloading of forces (from cutting). Consequently, it raises end-user awareness to selecting optimal Holder-tapers based on required operating parameters (speed, feeds, etc). This research will focus on identical exploration with the following 3 holder types:

- 1) **KM4X-63**
- 2) **HSK63 - Standard**
- 3) **HSK63-80**

NOTE: The industry panel that played a significant supportive role on OMP419 (Phase 1) is committed to offering the continued support. This industry panel will continue to play a key role through each stage of the data collection in Phase 2. Frequent update meetings should be scheduled as part of the research timeline.

Additionally, the Phase 2 will also give attention on the best way to show a comparative analysis of all 4 of the Holders evaluated. Simply put, focus should be given to how industry end-users should make decisions on Holder selection based on user-friendly data matrix (or graphical) comparisons.

Identify Related OMIC R&D Resources: Proposing researchers should use their best judgment in deciding on the optimal resources for the research. To further aid in this decision, the OMIC staff has taken the initiative to best identify on-site resources

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(machines, equipment, and staff) that may relate to the scope of this research. Please recognize that researchers are not limited to these resources.

- Machines and equipment at OMIC can be reviewed at:
<https://www.omic.us/explore/facility>
- OMIC Staff or SMEs
- Test-stand for Holder Taper testing available at PSU

PROJECT DELIVERABLES:

- Final test report
- Final report
- Holders evaluated

SPECIAL NOTE: It should be recognized that this Conceptual Abstract is written based on comments collected during OMIC R&D Road-mapping workshop and based on industries need for applied research. However, researchers as SMEs, are encouraged to lend specific technical feedback to further refine the Project Description and or Project Outcomes. The proposing researcher may do so either directly to OMIC R&D, or in the submitting proposal.

UTILIZATION OF OMIC RESOURCES: Researchers are encouraged to utilize the capital and personnel resources available on the OMIC R&D campus in their proposals. Use of OMIC time and machines should be included in the Proposal funding request. If use of OMIC resources are not identified in a proposal and are requested during, the project sponsor will be responsible for requesting a costed project amendment from the Tech Board.

PROJECT UPDATE EXPECTATIONS: Researchers are required to have monthly update discussion with OMIC R&D to provide a summary update on project status. This is done by way of a user-friendly format known as the OMIC 6-Block update. Typically, these meetings are scheduled on the first Wednesday and Thursday of each month. Secondly, depending on the scope of the project, OMIC R&D's industry Tech Board representatives are often interested in periodic project updates, and even in project participation. Researchers are required to communicate with supportive industry and facilitate communications as required.

PROJECT DURATION: It is OMIC R&D's strong preference that duration of a General Project aligns with the academic calendar cycle (July 2023 to June 2024). It is preferred that the project be completed by June 2024. Researchers are encouraged to factor in variables such as contracting, student hiring (if needed), procurement, holidays, and travel. It has been OMIC R&D's experience that a projects useful working duration is typically 9 to 10 months. Researchers are also

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encouraged to lend feedback, and to adjust the scope of work to best fit this preferred timeframe. Additionally, it is reasonable to even recommend phasing breakdowns to the project. In some unique circumstances, if the project is to take significantly longer than the duration of the academic year, this reasoning should be explicitly explained in the proposal.

CONTACTS AT OMIC R&D:

Urmaze Naterwalla

Head of R&D

Urmaze.Naterwalla@oit.edu

Craig Campbell

Executive Director

Craig.Campbell@oit.edu

Jen Kammerman

Research Administrative Manager

Jen.Kammerman@oit.edu