The University of Akron
Center for Precision Manufacturing

Manufacturing Educational Workshop

ADVANCED FINISHING TECHNOLOGY LTD.

Title: Grinding Fundamentals and Cycle Design (1.0 CEU*)

Date: November 29 and 30, 2022 (2 Days)

Instructor: Dr. Fukuo Hashimoto

Mode of Delivery: In-Person in Class at University or Online-Synchronized (you choose)

Schedule:

Day 1	AM	SESSION 1: 9:15 AM – 10:30 AM
		SESSION 2: 10:45 AM – 12:00 PM
	PM	SESSION 3: 1:00 PM – 2:15 PM
		SESSION 4: 2:30 PM – 3:45 PM
Day 2	AM	SESSION 5: 9:15 AM – 10:30 AM
		SESSION 6: 10:45 AM – 12:00 PM
	PM	SESSION 7: 1:00 PM – 2:15 PM
		SESSION 8: 2:30 PM – 3:45 PM

*A continuing education unit (CEU) is a measure used in continuing education programs to assist professionals to maintain their license in their profession.

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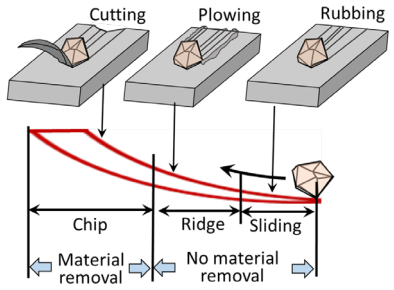
Outline:

1. Introduction
2. Grinding wheels and methods
3. Grinding machine structures
4. Basic relationship in grinding
5. Grinding system analysis
6. Grinding cycle design
7. Grinding accuracy and productivity
8. Summary and Q/A

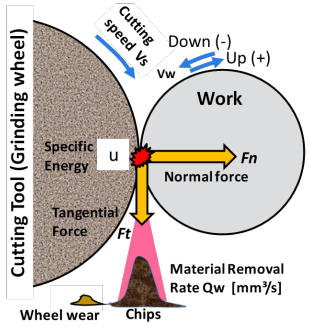
Participants will build these knowledge:

- Grain actions and wheel specifications
- Dressing parameters
- Stiffness of grinding machine structures
- Fundamental parameters in grinding
- MRR, forces, and energy
- Grinding system and the time constant
- Spark-out time and grinding accuracy

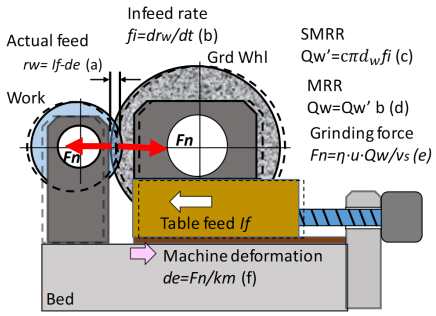
Bore grinding



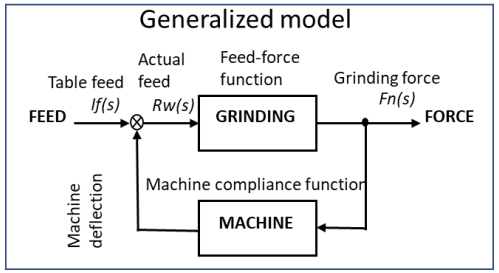
Grain actions



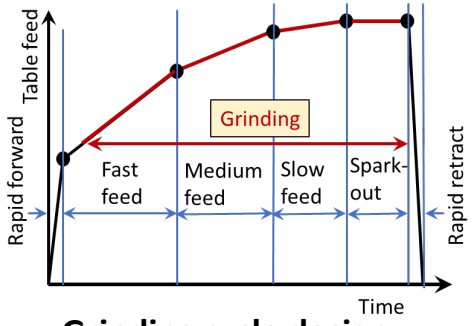
Grinding parameters



Grinding system



Block diagram of grinding



Grinding cycle design

Workshop Overview

In the manufacturing sequence for precision components, grinding is the most crucial finishing process affecting not only the product accuracies but also the functional performance, such as fatigue life, torque, noise, etc. The workshop is assembled for students, process engineers, and production managers to make the knowledge connection between the grinding basics and the grinding machine structures. By applying systematic knowledge about the grinding system gained from the course, the participants enable to set up the proper grinding operations and design the grinding cycle for maximized productivity. The course is composed of eight sessions. The participants will build the following knowledge. 1) abrasive grain actions and grinding wheel specifications with dressing conditions, 2) grinding machine structure and stiffness, 3) fundamental grinding parameters such as material removal rate and grinding energy, etc., 4) grinding system and time constant, and 5) step-by-step procedures for grinding cycle design. Finally, the strategies for improving accuracy and productivity are discussed. The learned knowledge is confirmed by exercising prepared questions and Q/A sessions.

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Brief Biographical Sketch of the Instructor

Dr. Fukuo Hashimoto is an adjunct professor at The University of Akron. He is the president of AFT Ltd. and a retired Director and Senior Scientist at The Timken Company. Throughout his career in the production engineering field for over 40 years, he has been focusing on the development of advanced manufacturing technology and the scientific assessment of new process technologies. He joined The Timken Company in 1988, with prior job experience as an Associate Professor at Tokyo Metropolitan College of Aeronautical Engineering. In 1984, he obtained a Ph.D. degree from the University of Tokyo with a dissertation titled “The Synthesis of Centerless Grinding Process.” He has published over 100 technical papers in academic societies including over 20 CIRP (International Academy for Production Engineering) papers. Most of the papers are related to the centerless grinding process, ultra-precision grinding technology, and characterization of finished surfaces. He completed the SEP program at Stanford University in 2000. He is a fellow member of CIRP and was a Chairman of CIRP STC-G (Grinding Academy). He is a fellow member of SME (Society of Manufacturing Engineering). Also, he has been serving the local community as honorary president of JANO (Japanese Association of Northeast Ohio, USA).

Adjunct Professor, University of Akron
President, AFT (Advanced Finishing Technology) Ltd.
Contact: fukuohashimoto@gmail.com

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Registration Fee:

- Industry Employee – Members*: $790 per person- (186-1086)
- Industry Employee – Members (Group Registration): $3490 for 5 persons(186-1093)
- Industry Employee – Non-Members: $990 per person(186-1094)
- Industry Employee – Non-Members (Group Registration): $4490 for 5 persons(186-1095)
- UA Students: $590 per person(186-1096)
- Outside UA Students and Veterans: $790

(186-1097)

Each trainee will receive:

- Two Days Parking Pass
- Coffee/Juice, Pastries/Fruit at Breaks
- Lunch Box
- A Binder for Workshop Handouts
- A Certificate of Attendance

*Members of the Center for Precision Manufacturing (CPM)