



Short Courses in Model-based Problem Solving in Machining

Course 2

Cutting Tool Selection A Model-based Approach

This course is more detailed and considered to be a follow-up to Course 1. With a focus on performance measures of tool wear, surface quality and stability, this course delves into greater detail on the effects of tool geometry (edge preparation, tooth profile) with additional application exercises. Much of the content represents the latest research of Dr. Endres and others in the machining R&D community. The more detailed treatment and supporting data presented allow one to make better-educated selections of cutting tools from a geometric perspective.

Day 1	
1 Process Performance Measures	
1.1 Tool Wear	8:00 – 8:15
1.2 Surface Quality — Dimensional Accuracy, Finish & Burring	8:15 – 8:45
1.3 Stability/Chatter	8:45 – 9:00
Break	9:00 – 9:10
2 Effects of Edge Micro-geometry (Preparation)	
2.1 Processes and Variability	9:10 – 9:40
2.2 Effects on Tool Wear	9:40 – 10:10
Break	10:10 – 10:20
2.3 Effects on Surface Quality	10:20 – 10:50
2.4 Effects on Stability	10:50 – 11:20
Lunch	11:20 – 12:20
3 Effect of Corner Radius	
3.1 Effects on Tool Wear	12:20 – 13:20
Break	13:20 – 13:30
3.2 Effects on Surface Quality	13:30 – 14:00
3.3 Effects on Stability	14:00 – 14:30
Break	14:30 – 14:40
3.4 Variable Edge Prep	14:40 – 15:40
Adjourn	15:40
Day 2	
4 Application Exercises	
4.1 Minimizing Cylinder Boring Errors — Tooth Profile Specification	8:00 – 9:00
Break	9:00 – 9:10
4.2 Improving Tool Life in Turning, Boring & Face Milling — Variable Edge Prep	9:10 – 9:40
4.3 Drill Thrust Reduction — Multi-Facet Drills	9:40 – 10:10
Break	10:10 – 10:20
4.4 Minimizing Drill Corner Problems — Wear and Burring	10:20 – 10:50
4.5 Chatter-robust Valve Seat Machining — Edge Prep Effects on Stability	10:50 – 11:20
Lunch	11:20 – 12:20
5 Chalk Talk — Discussion of Attendee-raised Issues	
5.1 Attendee Issue 1	12:20 – 12:50
5.2 Attendee Issue 2	12:50 – 13:20
Break	13:20 – 13:30
5.3 Attendee Issue 3	13:30 – 14:00
5.4 Attendee Issue 4	14:00 – 14:30
Adjourn	14:30