

Planning and executing CAD-based inspections using PolyWorks | Inspector™ and CNC CMMs

Objective

The objective of this 3-day training is to allow metrology operators, technicians, and engineers, who are already familiar with the PolyWorks Metrology Suite through the use of portable metrology devices, to perform 3D inspections using CNC CMMs and tools found in PolyWorks | Inspector™. More specifically, it aims at creating measurement plans and executing measurement sequences with CNC CMMs.

Prerequisites

- Trainees are familiar with their CNC CMM and its related equipment, including calibration, component usage and operational parameters (best practices), performance, as well as maintenance and care.
- Trainees must have successfully completed a basic training for portable metrology or have experience operating a portable metrology device with PolyWorks | Inspector.
- Trainees must have basic knowledge of metrology and be able to read engineering drawings.
- Trainees must have basic computer skills on Windows operating systems.

Outline

- Create and edit a machine configuration
- Define a measurement plan and create a measurement sequence to perform the automated measurement of a part, online and offline
- Measure surface deviations and control part dimensions by CNC probing
- Measure surface deviations and control part dimensions by CNC scanning (if applicable)
- Align measured part to the CAD model
- Review, report, and share inspection results
- Inspect multiple pieces

Content

Create and edit a machine configuration

- Create and edit a machine configuration
- Create and locate reference spheres
- Create tools
- Create and locate tool changers, specify ports
- Create and calibrate tool orientations

Define a measurement plan and create a measurement sequence

- Define a typical inspection workflow
- Import a CAD model and use as a Reference object
- Create features, comparison points, and cross-sections
- Set dimensional and GD&T controls and tolerances
- Create a measurement sequence to perform the automated measurement of objects
- Accelerate measurement sequence creation using the assisted sequence creation tool
- Detect and avoid potential collisions
- Adjust the inspection project for a different device
- Prepare an inspection project using the Offline Simulation mode

Measure by CNC probing

- Measure objects using the Probe and CNC Probe methods
 - Features and comparison points

Measure by CNC scanning (if applicable)

- Configure a scanning device
- Scan a polygonal model using quality metrics
- Clean data while scanning using a clipping plane
- CNC Scan using define paths: area or linear
- Measure deviations to Reference object surfaces using data color maps
- Extract measurement objects from scan data
 - Features, comparison points and cross-sections

Align measured part to the CAD model

- Align using a CMM Prealignment
- Align using Surface Points
- Align using objects
 - Perpendicular Planes
 - Plane, Axis, Center Point
 - Best-Fit Measurement Objects
- Best-fit Data to Reference Objects
- Align using Datum Reference Frames
- Create coordinate systems

Review, report, and share inspection results

- Review measurement results using the Control Reviewer
- Structure measurement results using control views
- Create formatted reports using snapshots and tables
- Share and review inspection results using PolyWorks | Reviewer™

Inspect multiple pieces

- Create a piece template for multipiece inspections
- Review multipiece inspections using Object Control SPC