



Shoreline Community College
16101 Greenwood Avenue North
Shoreline, WA 98133

Advisory Committee Meeting –Machine Maintenance Skills Panel

March 14, 2014

Minutes

Present:

- Cliff Bergeson – Shoreline Community College
- Dan Fey – Shoreline Community College
- John Goes – Ellison Technologies
- Steve Holmes – Umbra Cussinette Inc.
- Chris Lindberg - Shoreline Community College
- Brian Keever – Shoreline Community College
- Jeff Purdy – Shoreline Community College
- Keith Smith – Shoreline Community College
- Heather Stapleton – Shoreline Community College

1. Greetings and Introductions – Keith Smith

2. Minutes from 11-19-2013

Minutes from the Advisory Committee meeting held on 11-19-2013 were read and approved.

3. Outline of the Curriculum for the Machine Maintenance Program – Cliff Bergeson

Cliff talked about the development of the Machine Maintenance program classes. The preventative maintenance class will be offered beginning this spring. The focus of this class will be for standard operators and will teach students how maintaining oil and coolant tanks, but will also give an understanding of what goes on behind the panels. It will cover pumps, bearings, spindles, ways, and machine alignment. Students will also be prepared to earn NIMS certificates in machine maintenance. The other machine maintenance classes will look at basic CNC machine and electronic component repair. Cliff then outlined the framework for the discussion today which will be to focus on the other aspects of machine maintenance.

Discussion

The following topics were raised and discussed that pertained to the machine maintenance curriculum development.

Geometric Maintenance

- Checking the Z axis with an indicator

- 3 axis relationships x to y to z
- Performance of the cutting of the part

Intense visual inspection.

- Students need a visual perception to get the machine into a precision tools needed for machine maintenance

Bringing the machine into condition desired

- Demonstrate to customer measurements at installation
- Periodic preventative maintenance watching the machine age
- Unwadding the machine (80%) of what Ellison does
- Assessing the current state of the machine
- Does the machine hold the accuracy of the machine day in and day out
- Each individual company sets up the preventive maintenance program

Lean Manufacturing

- If a machine cannot make the part to the required accuracy then it fails lean in every way.
- Safety of the machine
- Preventive maintenance
- Many of the geometric tests can be done on the good tools- make the seller verify the geometric tests
- Need an understanding of how a mechanical ATC works
 - Diagnosis failures in ATC's
 - How do you recover the machine?
 - Basic maintenance function students should know
 - Biggest maintenance issue will be collisions

Hydraulics and fluids

Electronics

- Schematics/ Ladder diagrams- translate into the features on the machine and the digital signals that drive it
- Virtually everything done by the computer
- Where are the wires, where's the button signal?
- Inability to diagnose- observe the behavior and identify what is going on.

Diagnostics what's happening, why, logical thinking

- Contact i/o
- How do you know it is the electricity?
- Ladder- software logic
- Need instrumentation- good for a live-fire exercise

Breakdown Maintenance

- The collision shop
- Systems recovery
- Why did, didn't that arm move?
- Lots of theory that doesn't work any more. Track down the module and replace the module. R&R the module.
- Rather than in depth electronic knowledge need system knowledge (block approach)
- Doesn't matter what this vacuum tube do?

Documentation

- Differs greatly between countries

Job shadowing, no way students can have experiencing the machines they will be working on in the field (keep his/her hands in his/her pockets)

Mechanical- all of the moving parts

No stepper motors anywhere

Need to go over Servo motor vs. induction motor- stay generic

Quality CNC machine tools, servo systems much better- feedback problems

Feedback and close loop servos

Spindle motor close looped servo on most contemporary CNC machines

Synchronized control

Accumulator

Definitely the drawbar- short stock of high throw springs- fracture- tool retention force (periodic maintenance/inspection)

Lockout/ tagout module- Stored energy

Need to get some more input from maintenance people at Royale and other companies!!

Many companies realize they need some maintenance staff- more a time problem- more costly than in the past- larger companies, existing larger companies.

Tools students will need to be trained to use

- Use of a laboratory grade square
- Vertical level - tells where the coolant will run
- Measuring tools to 50 millionths
- Quality test bar for the spindle
- Run-out test bar for inspecting the condition of the spindle

Drawbar Dynamometer needed- assumes data to check it against (manufacturer's documentation as the machine went out the door state)

4. Adjourn