Innovating Process Improvements in Manufacturing

Spring 2009
Advisors and Members

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Milling machine (below) contains inserts broken during milling process

From previous IPROs, the use of accelerometer has been proven to be the most effective way to detect broken inserts

Provide A. Finkl & Sons with the proper data & statistics of which solution to invest in
Objective of Current IPRO

- Accelerometer used differently to measure vibrations
- Analyze data and result of fall 2008 IPRO 304
- Continue collecting and analyzing data to compare with last semester’s result
- Better understanding how material of the work piece and cutting parameter affect the milling machine
- With a solid knowledge of behavior of broken inserts in term of acceleration, design a working prototype that automatically detects broken inserts and alerts the operator.
Techkor Accelerometer

Chosen Accelerometer Package Because:

• 0-50G acceleration range
• High Sampling rate, up to 40khz
• Wireless Transmission
• Automatically downloads data
• Hundreds of Accelerometers can be handled by 1 Access point.
• Maintenance Watchdog program can notify operator when a problem has occurred.
Experimental Setup

Spring 2008 mounting

- Many techniques were explored to mount the accelerometers to the area of interest
- As the requirements of the problem changed, the method was changed

Current method
Signal Analysis

Spindle Mounted Accelerometers

- Large magnitude difference

Work Piece Mounted Accelerometers

- Indicates multiple broken inserts

Members

Introduction

Research

Accelerometer

Experimental Design

Data

Current Progress

Future Progress

Questions
• Revalidated last semester’s approach
• Re-established relationship with Finkle
• Multiple data sets measured
• Working data parser
• Prototype data analyzer completed
Future Progress

• Increase data acquisition rate
• Discover algorithm for detecting broken teeth
• Configure software for more relevant results
• Collaborate with Finkl for integration of detection system
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Thank You!

IPRO Team 304