IPRO 304

ILLINOIS INSTITUTE OF TECHNOLOGY
Transforming Lives. Inventing the Future.

INNOVATING PROCESS IMPROVEMENTS IN MANUFACTURING OPERATIONS

OVER 100 YEARS OF AMERICAN INGENUITY & PROGRESS.

PROBLEM
˝ A. Finkl & Sons Co. needs a way to detect broken teeth on their milling machines
˝ Currently they are losing 125 minutes a day in replacing broken teeth
˝ $200– $250 is being spent towards this problem per day

ACCELEROMETER
˝ A device that measures vibrations
˝ Idea is to attach to head of milling machine to measure the vibrations.
˝ When a tooth breaks it will cause vibrations & this activity will be recorded

RESEARCH
˝ Different accelerometers were compared
˝ Techkor was found to be best
˝ Accelerometer collects and transmits vibration data securely via a wireless link
˝ Data collection parameters are configured from a networked Windows PC
˝ Data memory
˝ Internal battery

˝ Bigger bandwidth
˝ Faster frequency response
˝ Temperature sensor
˝ Internal antenna
˝ Transmits secure data

PROJECT GOAL/OBJECTIVES
˝ To develop a robust, working prototype
˝ Automatic monitoring
˝ Detection of broken teeth in milling machine

EXPERIMENTAL DESIGN
˝ First attached two accelerometers on the head/spindle of the milling machine
˝ One perpendicular to head; one parallel to head
˝ Attached with a metal "arm"

˝ Attached with magnets
˝ Different orientations

˝ To account for any mistakes

LASER APPROACH
˝ Researched different approaches
˝ Laser used to detect broken teeth
˝ After looking into several companies, found that it would cost Finkl more money than they would want to spend
˝ Finkl machines are outdated
˝ Retrofitting milling machines with laser controls would be too much work
˝ Better to buy brand new machines instead of laser detection

DATA GATHERING
˝ Data was gathered using different situations to compare
˝ Data taken with no broken teeth
˝ Data taken with 8 broken teeth
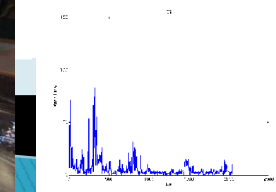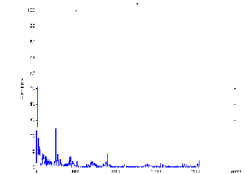
CONCLUSION
˝ At this time we need more time to analyze the data properly
˝ So far the accelerometer is best option