

Future of IPRO 304

Future members of IPRO 304 can continue in the development of an advanced detection system through measuring the acceleration of the vibration frequency. This IPRO team was able to address a lot of the known issues that previous IPRO's experienced. We have an advanced computer signal diagnostic program willing and able to easily transform the raw data into usable graphs. This will be a considerable advantage to future IPRO's.

Thanks

We give our thanks to the outstanding faculty guiding us through the semester. We would also like to thank A. Finkl and Sons for providing a medium for us to explore and flex our critical life skills.



IPRO 304

Integration of Process Improvements

Sponsor

A. Finkl and Sons

Faculty

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Team

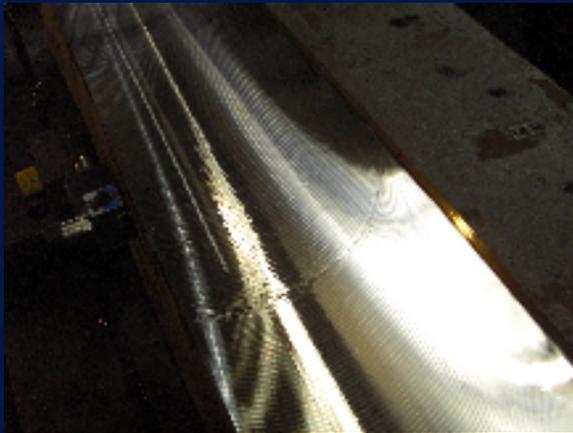
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FINKL
A. FINKL & SONS CO.

The Problem

A Finkl & Sons is experiencing a large amount of tool breakage on their milling machines. This tool breakage is negatively affecting the surface finish of the machined surfaces, reducing productivity and increasing cost.



Objective

The objective of IPRO 304 is to be able to identify when tool breakage is occurring. We approached the problem by trying to identify tool breakage with a change in the vibration frequency. Armed with this information we would like to produce an early failure warning system that will reduce downtime without sacrificing surface finish.

Possible Approaches

The possible approaches to detect tool breakage include measuring the vibration frequency with audio and physical measurements. There is also an approach that involves laser identification. Lastly, there is a video approach that films the teeth and with advanced photo recognition would allow the broken teeth to be "seen". All of these approaches are incorporated in industry at one capacity or another.

Chosen Approach

The route chosen by IPRO 304 was to utilize accelerometers for measuring vibration frequencies. The desired result was to see clear indications in the frequencies between operational and broken teeth.



Economic Impact

The effects of tool breakage have a dramatic affect on the economics of the business in several ways. When there is severe tool breakage the per piece cost to machine components goes up. The down time associated with the changing of the teeth and labor cost associated with that is extremely high. From a quality control standpoint the broken tooling also has a negative affect on the surface finish of the finished piece. Being able to catch the problem and fixing it immediately can save A Finkl & Sons millions of dollars.

Conclusion

Rarely as an undergrad is there an opportunity to apply the knowledge from our education to solve real world problems. The experience of multifaceted problem solving in a dynamic group environment across multiple disciplines is truly a rewarding experience. The synergy of us applying our experiences to help us to teach and learn from each other render this IPRO a success.