



Master Thesis / Diploma works

Erasteel Kloster AB

2020

1. Machining Performance Testing

High Speed Steels (HSS) are highly alloyed steels primarily used for cutting tools such as drills, taps, milling tools, saws, and so on. Different grades of HSS features different properties which will make them suitable for certain applications, but not for others.

During the development of new advanced HSS grades the mechanical properties of the steel is measured to give an indication of how well suited it is for a given application. However, the best way to test a material for its intended application is to actually use it in that application and monitor the performance. This is not always practical or possible during the early stages of development of a new grade. Instead, a simpler test is preferred which simulates the conditions of the final application.

We are looking for an engineering student that can help us develop and validate such tests for high speed steels meant for cutting tools through a master thesis. The work will include practical and theoretical work within the area of machining and surface analysis.



CAD model showing milling test to simulate gear cutting

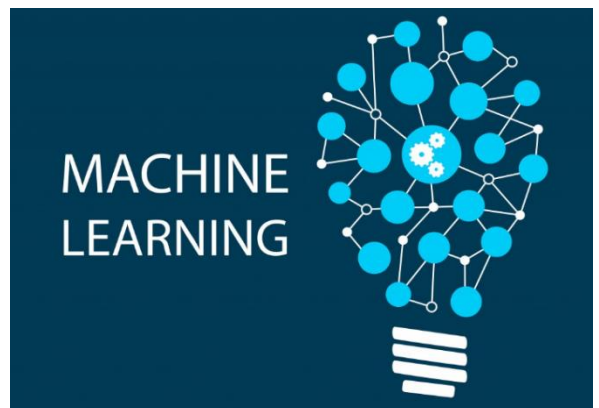
2. Develop usage of process data – Machine Learning and AI

Erasteel is in an expansion phase where the handling and utilization of process data (logging of process parameters and outcomes) is facing a paradigm shift. New data collection equipment in our atomization creates opportunities to visualize the process in real time and monitor critical parameters to be able to enhance the manufacturing.

We face several possible assignments within process data that can be adapted to the student's orientation and interest to match our needs, for example:

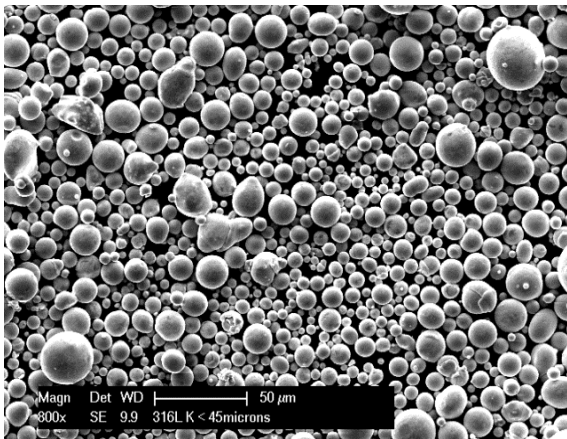
- Analysis and usability of existing signals from machines and processes
- Analysis and recommendation of signals that can add value
- Identify a pilot case for machine learning and present how to take it further
- Work in collaboration with an external consultant to implement a pilot case for machine learning
- Develop documentation for AI-assisted process monitoring
- Visualize key figures that have a direct impact on the process
- Analyze parameters affected by wear and create guidelines for preventive maintenance
- Investigate RPA (Robotic Process Automation) to collect process data that is currently manually entered. Make a pilot case and implement.

Depending on the scope of the question, the assignment can be formulated as either an investigation of a topic or to practically drive and implement a pilot case, or a combination thereof.



3. Properties of powder for additive manufacturing

With additive manufacturing (AM), or 3D printing, it is possible to produce parts without the design constraints of traditional manufacturing routes. The range of steel powders used for 3D printing is rapidly extending. Certain powder properties such as size distribution, flowability and tap density determine how well the powder performs with the chosen 3D printing technology. In this diploma work, suitable for master or candidate degree, the task is to work with process optimisation of powder sieving and analyse the resulting powder properties. The work includes aspects of powder manufacturing, profitability, and practical tests at our powder lab in Söderfors.



Erasteel produces and sales gas atomized metal powder, top. The powder can be used for AM manufacturing of different kind of parts, bottom.

4. Optimization of NDT technique

Within Erasteel Kloster AB in Söderfors, a non destructive test (NDT) station for bars exists. This test station is old and Erasteel have an ambition to upgrade the test line with new modern technique and at the same time if possible integrate additional functions in the station.

Upgrade and modernisation of the test station with the goal to:

- Increase the size range in diameter of bars
- Modernise the ultrasonic and eddy current equipment
- Integrate a device for controlling the geometrics of the bars.

The diploma work consists of a pre-study for the investment project of an upgraded NDT station in the billet line.

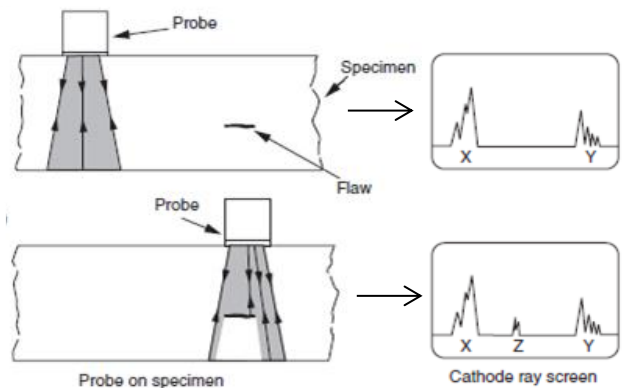


Illustration of the ultrasonic NDT technique used at Erasteel

If you find any of these diploma works interesting (or perhaps even have ideas for other ones that you think could be of interest for Erasteel) do not hesitate to contact us.

Final application date is 6th of December and should be sent to HR at:

stian.pharo@eramet-erasteel.com

The master thesis are done on site in Söderfors, between Uppsala and Gävle. We pay a fair compensation for thesis projects that are approved by both us and the university.

Fore more information about our products and companies, please visit:

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