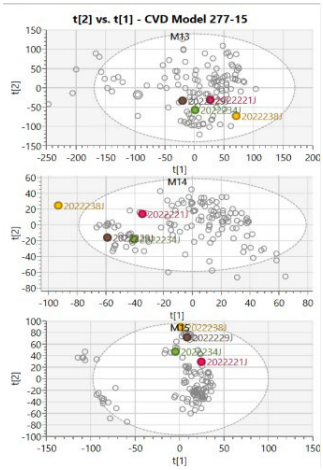
Master thesis - Multivariate Data Analysis (MVDA) based quality indicators

At Seco Tools we develop and offer advanced products and solutions that simplify cutting processing. We work with our customers to identify and implement the best solution for their needs. Common values unite Seco Tools' nearly 4,300 employees in over 75 countries: Passion for our customers, Family Spirit and Personal Commitment.

Background and purpose



Seco Tools is a global market-leading manufacturer of cutting tools and tooling systems for metal machining applications. These cutting tools are usually made of cemented carbide, of which many are coated with up to a few tenth micrometers thick hard and wear-resistant coating by, e.g., physical- (PVD) or chemical (CVD) vapor deposition techniques. This project will focus on the CVD process.

The CVD production systems and their deposition process recipes are complex. In this context, multivariate data analysis, MVDA, has been shown to generate improved understanding and control of the CVD process. MVDA provides means for reducing waste, understanding, and taking appropriate actions of unwanted variations in the products, and consumption of resources. To achieve the highest quality, it is vital to understand and monitor the processes as well as to predict any deviations that may occur.

Work description

In this project, you will apply MVDA to the CVD process generating robust production system- and coating models as well as quality predictors on both single- and hierarchical batch levels. You will use streamed data from connected CVD systems, to develop real-time models for coating process control and a range of quality predictors, e.g., system status, estimates for the need for preventive maintenance, and predictions of key coating quality indicators, e.g., coating thickness and coating texture.

Various MVDA models will be explored and generated with the Simca software package following the “golden”-batch strategy. The developed models and quality predictors will be evaluated and tested in production using the Simca online production tool.

Your profile

You are preferably a master’s student within the field of Chemistry, Materials Science or Production Technology. Previous experience in MVDA is meritorious but not mandatory. Since we are a global business, you have excellent communication skills in English, both in writing and in speaking.

Extent, contact and application

The work consists of 30 credits and may start in the beginning of 2023. The position is placed in Fagersta, Sweden.

Initially, you will undergo a training in Simca which is used for MVDA approach.

For more information or to submit your application, please contact:

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