Sandvik Coromant in Stockholm is offering a

Master's Thesis Project: Tool Wear in Milling Titanium Alloys

Sandvik Coromant is the world’s leading supplier of cutting tools and tooling systems, with more than 70 years of experience in the metalworking industry. Today, our tools are used all over the world in manufacturing all different kinds of products, from airplanes and smart phones to beverage cans. Being a world leader demands knowledge of how different cutting tools are affected by different tool-workpiece combinations, in order to recommend the cutting tool most suitable for given machining operations. The Grade Development department in Västberga now aims to increase understanding of how wear mechanisms act in titanium alloys during Milling.

Titanium and its alloys are used in a wide range of lightweight applications, where the mechanical properties, in combination with an excellent corrosion resistance, are highly prioritized. Today, the major application areas for titanium alloys are within aerospace, automotive, medical, chemical, and energy segments. Designers within these segments are constantly looking for new and better materials for their components. With demands on mechanical properties and material structures increasing, requirements on the cutting tools and their performance increase accordingly.

Cemented carbide (WC/Co) forms the basis of many tools used in the field of metal cutting. A substrate consisting of hard WC particles embedded in a Co-based matrix, often coated with thin PVDE or CVD coatings for extra wear resistance, are the most common tools used for metal cutting today. The cemented carbide substrate and the coating is designed and modified to optimize the performance in a given application area.

During titanium machining, very high cutting temperatures will be achieved at the tool-chip interface because of the properties of titanium, specifically low thermal conductivity and high chemical reactivity.

This Master thesis work offers possibilities for developing practical skills within metal cutting and characterization of materials, as well as the study and monitoring of tool wear. The Master thesis emphasis is placed on observation, analysis, interpretation of the results and reporting.

Aim and work description
This Master's thesis work includes a study of relevant literature and experimental work, as well as the writing of a report and preparation of an oral presentation. Emphasis is placed on executing cutting experiments, analysis and interpretation of the results, as well as reporting.

Examples of activities are:
- Literature study: tool wear and titanium machining
- Planning and executing machining tests
- Analysis of wear patterns through microscopy (LOM, SEM, EDS)
- Oral and written presentation (English)

Student background
Appropriate schooling is a Master of Science in Engineering, Mechanical Engineering or a similar field, preferably specializing in material science or tribology, Applied Mechanics or Machining.

We actively work to create a workplace that is characterized by diversity and inclusion.

Duration
The project lasts 20 weeks full-time (800 working hours), and should include project planning, project execution, report writing and oral presentation.

The work is to be performed at Sandvik Coromant R&D in Västberga, Stockholm. Please note we have no possibility to help out with accommodation. The thesis work should be started in the beginning of 2016.
Application
Send your application as soon as possible, but no later than end of November 2015. To apply, please email:

Roland Bejjani, roland.bejjani@sandvik.com
Johan Gullander, johan.gullander@sandvik.com

Your application should include a letter of application, CV, transcript of records and possible references.

Contact information
For more information about the thesis program, please contact above email.

Sandvik is a global industrial group with advanced products and world-leading positions in selected areas – tools for metal cutting, equipment and tools for the mining and construction industries, stainless materials, special alloys, metallic and ceramic resistance materials as well as process systems. In 2013 the Group had about 47,000 employees and representation in 130 countries, with annual sales of about 87,300 MSEK.