

## **Development of nano structured coating on cutting tools for machining custom 465 steel**

**Scholar: Prasath V**

### **Abstract:**

First phase of work involves developing an optimizing the TiN coatings. The morphological analysis also revealed the existence of strongly faceted nano-grains with a triangular shaped morphology. The second phase of research involves developing TiN, Si<sub>3</sub>N<sub>4</sub> monolayer and TiN/ Si<sub>3</sub>N<sub>4</sub> bilayer coated inserts using the PVD. Their structural, morphological, topographical, mechanical properties were examined. The third phase of research work investigates the machinability evaluation and tool life of newly developed TiN/ Si<sub>3</sub>N<sub>4</sub> bilayer and Si<sub>3</sub>N<sub>4</sub> monolayer coated inserts during milling of custom 465 steel under dry environment.

Multi objective optimization was done through TOPSIS. The tool wear investigations revealed that the TiN/ Si<sub>3</sub>N<sub>4</sub> bilayer coated inserts have extended the tool life by 4.6 meters and outperformed uncoated and Si<sub>3</sub>N<sub>4</sub> monolayer coated inserts, and proved to be most suitable for machining custom 465 steel