With tolerances in production constantly reducing it is necessary to know the capabilities of machine tools. A major source of inaccuracy in machine tools is down to spindle errors. It is therefore the aim of this project to assess the effect of these errors on part production depending on machine and operation, with a view to enabling easier spindle checks and therefore predictive maintenance.

**INTRODUCTION**

**TECHNOLOGIES**

- **Eddy Current Sensor**
  These work using a magnetic field to sense the distance to the target

- **Laser Displacement Sensor**
  These work using a high frequency laser triangulation to sense distance to the target

- **Capacitance Sensors**
  These work using an electric field to sense the distance to the target

- **Accelerometer**
  These usually use a piezoelectric material generating voltage proportional to acceleration

**Requirements & Considerations**
- Non-Contact Measurement Required for Dynamic Tests
- Spindle Speeds (typically up to 120000rpm)
- Sampling Frequencies necessary dependant on bearing size against spindle speed
- Spindle Sizes and tool holder interfaces

**TECHNOLOGIES**

- **Non-Contact Measurement**
- **Types**
  - Spindle Bearings
- **Vibration Cause / Effect**
- **Bearing Life**

**Measurement Uncertainty**

**Advantages**
- **Disadvantages**

**PROJECT AIM: TO INCREASE SPINDLE ANALYSIS EFFICIENCY AND ACCURACY**

**NON-CONTACT MEASUREMENT AND ANALYSIS OF MACHINE TOOL SPINDLES**

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