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New tool recognition technology for high-speed, reliable broken tool detection

Machine shops all over the world are regularly faced with the problem of broken tools during production. Identifying where and why the tool was damaged can be problematic, whilst scrap, re-work, machine downtime and delay are all additional factors contributing to a reduction in productivity and an increase in cost.

By using a tool breakage detection device, productivity and profitability can increase whilst scrap, rework and downtime become a thing of the past.

Conventional non-contact broken tool detection systems depend on the laser beam being blocked (tool OK) or not blocked (tool broken).

The TRS1 is different. It offers benefits beyond other tool breakage systems, as it does not merely look for a change in light levels. The new tool recognition technology distinguishes between the tool and coolant or swarf, whilst it is also fast and reliable under real machining conditions.

Renishaw's new system projects a beam of laser light at the tool and monitors the scattered light that is reflected to determine if the tool has been broken.

This recognition process ensures that individual tools can be rapidly checked at the beginning or end of a machining cycle.

The device comprises a single unit containing the laser source and detection electronics that enable the TRS1 to be mounted outside of the working envelope, safe from collision and saving valuable space on the table.

The TRS1 can be mounted to any rigid surface on the machine, as the positioning of the device relative to the tool is not critical. It is simple and quick to set up, as it does not require accurate alignment with the machine's axes.

Cost effective, fast and reliable, the single-sided device can detect tools as small as Ø0.5 mm, with the tool typically spending about 1 second in the laser beam. The TRS1 uses Renishaw software, specifically written for, and supplied with this new product.

The TRS1 can detect a whole range of solid centre tools, including drills, taps, end mills, slot drills and ball nose end mills. The compact unit can detect tools between 0.3 m and 2.0 m away, making it suitable for a wide range of machines.