

Focus on IFA's work

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Guards on stationary grinding machines

Problem

Guards on grinding machines must protect persons and the area around the machine against flying debris from grinding tools. During many processing tasks, such as the grinding of toothings, the complex workpiece geometry does not allow to use a guard. In such cases, the protective function must be provided by wide-area encapsulation of the machining area or of the machine as a whole.

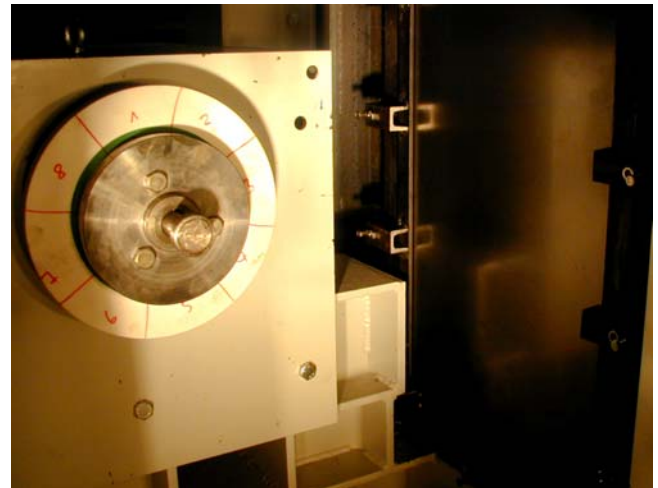
This raises the question of the required wall thickness for such encapsulations in order for them to offer the same protection as conventional grinding tool guards .

The values found in wall thickness tables such as those in the EN 13218 standard cannot be applied to such encapsulations. The usual design of the protective equipment and the resulting strain are not comparable with those of the relatively rigid guards closely enveloping the grinding tool.

Activities

Based upon burst tests performed on standard grinding wheels, practical criteria were to be developed for the design of guards on stationary grinding machinery which must be operated without grinding tool guards.

The impact resistance of steel sheet DC01 and polycarbonate was tested. These are typical materials from which guards are manufactured.



Burst test bench with grinding wheel fitted

The studies were conducted together with the German Social Accident Insurance Institution for the woodworking and metalworking industries (BGHM).

Results and Application

The impact resistance of the materials increased with both increasing thickness of the test samples and increasing width and decreasing strength of the grinding wheels. Doubling of the width of the grinding wheel resulted in the impact resistance being approximately doubled.

For the rating of guards on grinding machines, the maximum kinetic energy of the flying debris is not

the sole deciding factor, but also its ratio to the impact surface. Narrower grinding wheels may have a more critical bearing upon the impact resistance than wider wheels.

The impact resistance measured here permits the design of guards with substantially lower wall thickness than when the wall thickness tables and formulae of EN 13218 are used.

Area of Application

Manufacturers of machine tools, test and certification bodies, parties involved in occupational safety and health within plants

Additional Information

- DIN EN 13218: Machine tools – Safety – Stationary grinding machines (09.10). Beuth, Berlin 2010
- Mewes, D.; Herbst, P.: [Trennende Schutzrichtungen an ortsfesten Schleifmaschinen ohne Primärschutzhaube](#). Technische Sicherheit 2 (2012) No 4, pp. 32-36

Expert Assistance

IFA, Division 5: Accident prevention – Product safety

Literature Requests

IFA, Central Division