

Focus on IFA's work

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Using laser scanners

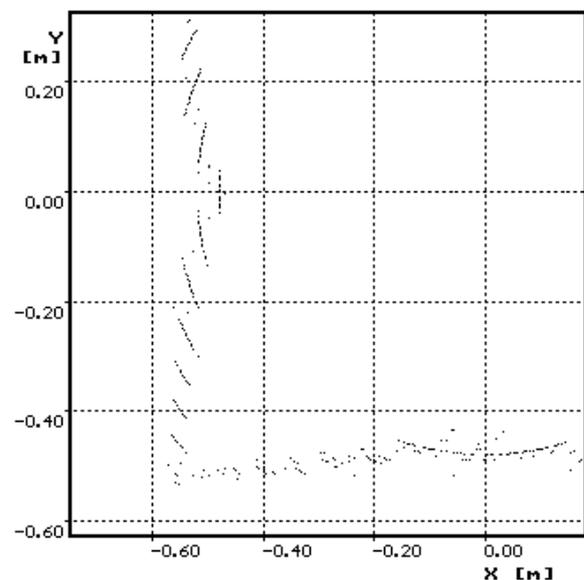
Problem

The development of laser scanners to safeguard hazardous areas and for protection against collisions on equipment such as automated guided vehicles has provided considerable advantages to users of protective equipment in flexible production. Laser scanners offer the possibility of setting detection zones for each individual application as required. Common practice has nonetheless shown that the detection zones are sometimes of incorrect dimensions. The study was conducted to determine which errors occur in setting the dimensions and how these errors could be avoided.

In terms of their functioning, laser scanners are primarily distance measurement instruments. The distances they measure include a certain measuring error. The illustration shows how two flat perpendicular walls (on the planes x, z and y, z) are "seen" by a laser scanner. The detection is very imprecise in the fringe areas. When setting the dimensions for the detection zones, the manufacturer's instructions that a supplementary quantity should be added to guarantee safety must be observed.

Activities

The use of laser scanners was studied in mobile applications where they were used on transport vehicles to safeguard the area between the vehicle and a fixed transfer station or where they were used for collision protection on industrial



What the laser scanner senses

transport trucks for accessing high-bay racks in narrow aisles. It was investigated whether the manufacturer's instructions for the necessary supplementary safety distances were taken into consideration when setting the detection zone dimensions.

Results and Application

In practice, it has been found that manufacturers' instructions for supplementary safety distances are often ignored or that users had a poor understanding of how scanners work. If users configure a detection zone using the included software tool in a way that conforms to the instructions, the devices commonly used today

have an unprotected area along the boundary of the configured zone that is described in the manufacturer instructions. This is described as a measurement error or as a necessary supplementary safety distance and it has to be added to the derived values for safe distances. A configured detection zone still has to maintain a minimum distance between the detection zone and the surroundings described by the manufacturer. If this is not done, sporadic availability errors can occur because the laser scanner “accidentally” detects parts of the surroundings.

In summary, it can be said that observing the “plus/minus measurement error” provided by the manufacturer is an important criterion for safety and reliability when using laser scanners. A certain measurement error in the fringe area or the detection of small objects (such as fingers) may lead to wrong measurement readings under the influences of reflectivity, distance to the detection object or environmental interference, such as temperature, ageing or failure of components. All these influences are covered in combination only when users observe the supplementary safety distances given by the manufacturer.

Area of Application

All areas in machine protection using electrosensitive protective devices for detecting persons; occupational safety specialists; manufacturers and operators of protective equipment and machinery

Additional Information

- Bömer, T.: Hinweise zum praktischen Einsatz von Laserscannern. Kennzahl 310 243. In: IFA-Handbuch Sicherheit und Gesundheitsschutz am Arbeitsplatz. 36. Lfg. XII/99. Hrsg.: Deutsche Gesetzliche Unfallversicherung (DGUV), Berlin. 2. Auflage. Erich Schmidt, Berlin 2003 – Losebl.-Ausg.
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- Reinert, D.; Bömer, T.; Borowski, T.: Berührungslos wirkender Auffahrschutz an FTS. F + H Fördern und Heben 44 (1994) Nr. 7, S. 544-546

Expert Assistance

IFA, Division 5: Accident prevention – Product safety

Literature Requests

IFA, Central Division