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Devices To Monitor Blind Spots Near Large Haulage Equipment

Background

During 1999, there were six fatalities in surface mines involving haulage equipment colliding with a smaller vehicle or person, or backing over the edge of a dump point. All of these fatalities can be attributed to the extensive blind areas around large haulage equipment. Researchers at NIOSH are investigating various technologies that can be used to monitor these blind areas and provide information on nearby obstacles to an operator. So far, the technologies listed below have been tested on dump trucks used in surface mining. The selection of these systems was based on their ability to handle the tough environmental conditions found in mining operations and how well they detected obstacles out to 40 or 50 feet beyond the rear of large dump trucks. Some of the manufacturers of available collision warning and camera systems are also listed.

Electromagnetic Signal Detection

These systems use small electronic tags that are attached to smaller vehicles, workers on foot, and other structures in the mine. These tags detect an electromagnetic signal transmitted from an antenna on the haulage equipment "equipment and answer with their own unique identification code." An alarm is generated both on the tag and in the driver's cab if a tag enters a preset danger area around the equipment. The driver is alerted by both audible and visual alarms that indicate the owner of the tag. There are several systems for large haulage equipment available or being developed that use some variation of this detection scheme. More information can be found by contacting the following:

Nautilus International, Canada, (604) 430-8316
Advanced Mining Technology, Australia, 61-2-4351-1778
Mintronics, Canada, (705) 474-4759
NIOSH, Pittsburgh Research Laboratory, (412) 386-6835

Radar

Radar technology has been applied to the detection of obstacles behind delivery vans, automobiles, recreational vehicles, construction equipment, and other over-the-road trucks. These systems sound a warning in the cab if an object or person is detected in the radar beam. Most of these systems are not meant for large haulage equipment, and test results showed that their range and the area of the detection zones are limited. They also generated occasional false alarms. However, the available systems have the advantage of being low in cost and may work on front-end loaders and smaller dump trucks. Improvements to several of these systems are underway and may result in reliable operation on large equipment. Systems manufactured by the following companies were tested at NIOSH.

R.F. Knapp Co., (800) 831-4609
Preco, (800) 453-1141
S and S Distributing, (800) 998-0555
Multispectral Solutions, (301) 590-3978
Vision Techniques/Ogden Safety Systems, England,
44 1254 679717

Video Cameras

Several video camera systems are available for large surface haulage equipment. One or more cameras can be mounted on the equipment to monitor blind spots to the front, rear, and side. A video monitor in the cab of the equipment provides the camera views. NIOSH has tested two camera systems, and the Mine Health and Safety Administration (MSHA) has conducted an extensive survey of mines currently using camera systems. Cameras are a good method of monitoring blind spots, but care must be taken by the equipment operator to ensure that the video monitor is checked for obstacles. A combination of cameras and one of the above technologies that provides an alarm would be an even better solution.

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Some camera system distributors will provide a camera system to interested mines for a free evaluation. Contact MSHA at (304) 256-3200 for more information specific to this program. The following camera distributors are participating.

Safety Vision, (713) 896-6600 or (949) 251-0040
The Truckdok, (520) 425-5009
Intec Video Systems, (949) 859-3800 or (724) 929-5500
Comserco, (760) 245-8462
Sunwest Supply, (520) 882-5717
RM Wilson Co., (304) 232-5860
Southwest Technology, Inc., (520) 402-0123



Figure 1.—Testing a radar system on the back of a Caterpillar 793 haulage truck.

For More Information

Additional information and research reports can be obtained by contacting Todd Ruff at (509) 354-8053, e-mail ter5@cdc.gov, Spokane Research Laboratory, 315 E. Montgomery Avenue, Spokane, WA 99207.

To receive additional information about occupational safety and health problems, call **1-800-35-NIOSH (1-800-356-4674)**, or visit the NIOSH Web site at www.cdc.gov/niosh

Mention of any company name or product does not constitute endorsement by the National Institute for Occupational Safety and Health.

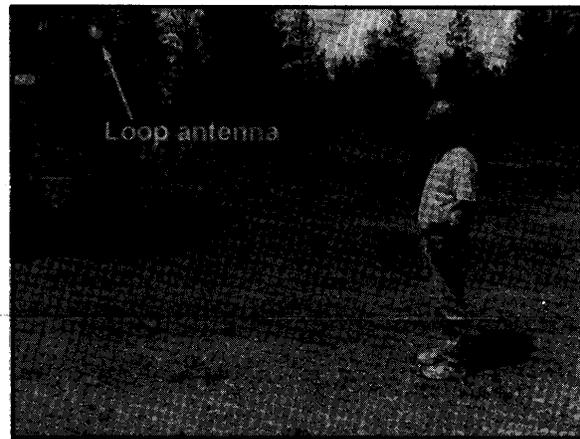


Figure 2.—Testing a radio-frequency identification (RFID) system on a Komatsu 210M dump truck.