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RESEARCH UPDATE

Update U95-8

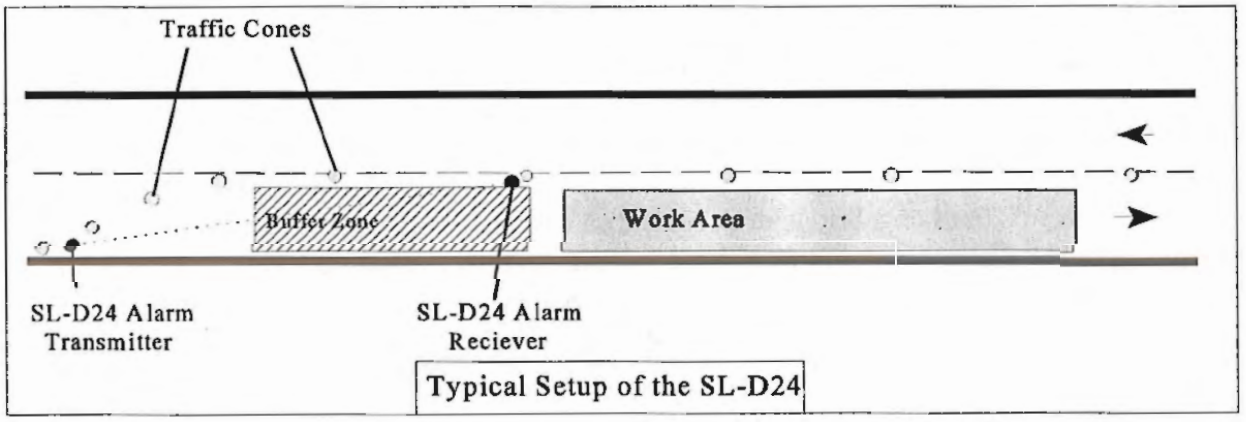
SHRP INTRUSION ALARM

(INITIAL REPORT)

REFERENCE: WP 95-R-13.

HISTORY: Safety has always been a primary concern on Vermont's highways. Recent events, such as accidents involving workers injured by vehicles entering the work area, have prompted the Agency of Transportation (AOT) to heighten its safety awareness. One of the methods chosen to help protect workers is an Intrusion Alarm System developed in conjunction with the Strategic Highway Research Program (SHRP).

PRODUCT: The Safety Line Intrusion Alarm System (SL-D24), is manufactured by ASTI Transportation Systems of New Castle, DE. The SL-D24 is an optical instrument that projects and receives an infrared beam of light, up to a distance 750 feet. It is equipped with a high pitch horn as an alarm device.



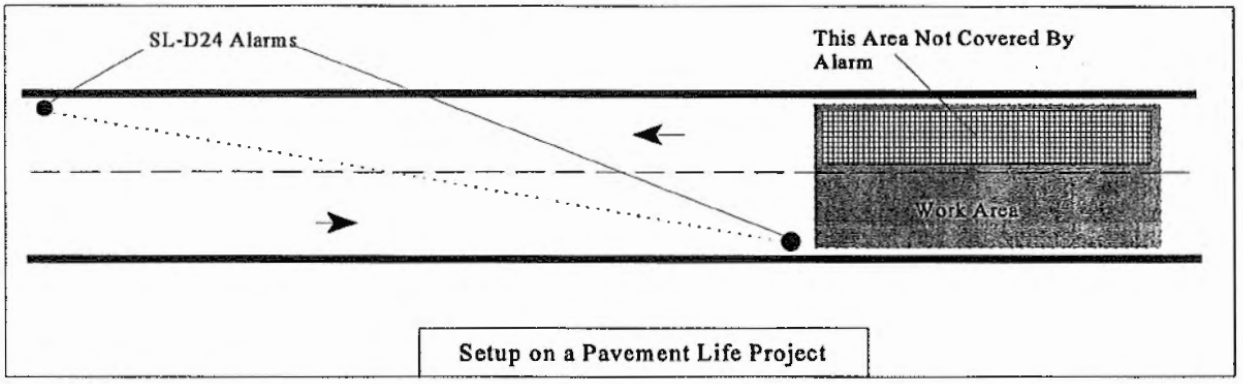
Typical Setup of the SL-D24

SETUP: The SL-D24 is intended to be set up with the receiver close to the workers and the transmitter at the far end of the "safe area" or buffer zone. The device is meant to complement present traffic control procedures as outlined under the Manual of Uniform Traffic Control Devices (MUTCD). It is not intended as a replacement for present traffic control devices.

EVALUATION: The SL-D24 was tested in early 1995 during a bridge deck condition survey. The survey required closing one lane while maintaining traffic in the remaining lane. The system was installed and aligned according to procedures described in the supplier's operations manual. Once the device was activated, it operated satisfactorily. Numerous crossings of the beams, by both vehicles and individuals activated the horn system. The horn alarm was clearly audible over all equipment, i.e., a truck, a generator, a compressor, and a rotary hammer. The work area was quite small, however, with the alarm never more than 12 to 20 feet away from workers.

On August 23, 1995 the SL-D24 alarm was tested on VT 128 in Westford, to determine the feasibility of utilizing the device in a relatively mobile work zone. AOT personnel evaluating roads under the Pavement Life Study spend 10-15 minutes at a 100 foot test site evaluating cracking and rutting. It was felt that the SHRP Alarm would provide an additional level of safety.

The initial setup took 5 to 10 minutes, with a great deal of time spent lining up the device (See illustration below). It was finally determined that the best way to ensure proper alignment was to set the alarm on the pavement itself. Some concerns were noted pertaining to this type of use. For example, the alarm could cause a driver to become confused and cause an accident, or the alarm itself could be damaged by being in the traveled way.



Setup on a Pavement Life Project

On August 28,1995, the alarm was tested to determine its effectiveness at different distances. As a result of this testing it was determined that the alarm was effective only up to a distance of 160 feet with distances greater than this requiring a great deal of fine tuning in the setup procedure. After installing new batteries and a new transmitter and receiver, it was again tested, and was found to be effective at distances up to 400 feet.

The alarm was used on a bridge deck survey on Interstate Route 91 on September 21, 1995 and worked much the same as in the first bridge deck test. A vehicle did break the beam of light, but due to the fact that the alarm was over 200 feet away, and truck traffic was passing across the bridge, personnel were unable to hear it. Separating the horn, either by wire or another method, from the electronic unit should solve this problem.

CONCLUSION: Due to the nature of this alarm, the best use of this device would be in a static work zone. On short, mobile operations, such as a Pavement Life Survey, the time required to set up the intrusion alarm would take more time that the actual job. The alarms would most likely need to be in the traveled way, only covering one lane (See above illustration). Due to these concerns, this particular SHRP intrusion alarm may be best suited for a bridge survey type of activity. Further study should be undertaken on placing the horn closer to workers, possibly connecting the horn remotely to the sensor via a length of wiring.

FOLLOW UP: The system will continue to be used to further test its effectiveness.