Health and Safety Executive OC 506/1

Field Operations Division

To

Agriculture, Factory and Quarries Inspectors

FCG Specialist Inspectors (Mechanical and Electrical)

THE EFFECT OF ELECTROMAGNETIC INTERFERENCE ON ELECTRONIC

PROXIMITY DEVICES USED IN GUARDING APPLICATIONS

This OC provides information on the potential effect of electromagnetic interference on electronic proximity devices used in guarding applications and outlines action to reduce the effect of such interference.

1 Proximity devices which are used for guarding purposes and which are known to incorporate electronic devices include theMechan safety switch (seeFIC 227/15), Sentinel guard switch, Balogh proximity switch andHenton guard switch. This list is not considered exhaustive nor intended to imply that any or all of the switches are unsafe.

HAZARDS

2 Electromagnetic interference may be generated from a number of sources including radio transmitters. The most severe sources for industrial environments are typically from arc furnaces, induction heaters,RF welders and from variable speed motor drives. Variable speed drives, particularly ac drives, are increasingly being used in industry.

3 Where electronic proximity devices are used in close proximity to the source of such electromagnetic interference, then they may be adversely affected and in guarding applications fail.

ACTION

4 To reduce the effect of such interference the following action may be required.

(1) Reduce the electromagnetic radiation at the source by the correct design and screening of equipment, including, where appropriate, the use of screened or armoured cables or insulated conductors in steel conduit. All such cable and conduit should be earthed. It should be noted that

steel trunking or flexible conduit in general only gives very limited screening.

(2) The distancing of low voltage signal cables between sensors and control units and other cables carrying mains voltage. In no circumstances should they be run in the same trunking or conduit.

(3) The correct earthing and bonding of the equipment to the frame of the machine.

(4) Where necessary the screening of cables between the sensing head and control unit.

(5) The use of filter networks in the control unit to reduce the effect of such radiation.

5 General advice is also to be found in BS 2771: Part 1: 1986 *Electrical equipment of industrial machines, specification for general requirements* (This Standard will be replaced by BS EN 60204 - 1 during 1992).

6 Action has already been taken in the cases where the problem has been known to exist. In one case the device appeared to fail safe but was only operating because of the subsidiary operating device within the unit. The unit reset itself when the source of interference was removed when the guard was opened.

Action by inspectors

7 Where inspectors become aware that these devices are being used in proximity with sources of electromagnetic interference listed in para 2, they should request the user, where practicable, to demonstrate its safe operation.

8 The user should be advised that any modification which requires the addition of non-specified components to a system must only be carried out following discussions with the manufacturer.

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