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Health and Safety Executive		Sector Information Minute	
Field Operations Directorate Manufacturing and Construction Sectors		SIM 03/2004/19	
Cancellation Date	25/2001/02	Open Government Status	Fully Open
Version No & Date	1: 25/01/1999	Author Unit/Section	Food

Target Audience:

HSE Inspectors covering Manufacturing, Quarrying and Construction industries
Specialist Inspectors (Electrical and mechanical engineering)

BAVELLONI STONE & GLASS SHAPING MACHINES GUIDANCE TO INSPECTORS

This SIM alerts inspectors to potential and existing hazards on Bavelloni Stone and Glass Shaping machines, actions taken by the suppliers, the Manufacturing Sector and FOD E&SE Division and advice to inspectors when these machines are encountered.

INTRODUCTION

1. Inspectors should note that the need for this SIM arises from the ongoing joint Police/HSE investigation of a fatal accident and that the comments within this minute stem from visits to several Bavelloni Computer Numerically Controlled (CNC) stone shaping machine users.
2. Inspectors from FOD E&SE and the Police are investigating the death of a worker at a stone shaping company in May 2003. The worker was operating a Bavelloni EGAR 103S CNC stone shaping machine. He received fatal injuries when his head was crushed between the moving head of the machine and a control panel on a fixed part of the machine.
3. These CNC stone and glass shaping machines are similar in design to CNC milling machines. They consist of a flat bed on which the work is mounted and a powered head which moves around the material in three axis at speeds of up to 0.57 m/s. The head returns to a moving tool store to change tools and then onto a fixed reference point at each tool change. Movement of the head is controlled by computer programme which can result in the head pausing during the cycle. As with CNC milling machines there is the risk of the operator interpreting a pause in the cycle as the machine reaching the programme end.
4. These machines are typically found in premises manufacturing stone and marble bathroom fittings, kitchen tops, fireplaces and monumental masons and glass processors.

The EGAR/ALPA Series

5. The Bavelloni stone shaping machine EGAR 103S is from the 101S/102S/103S series. The similar ALPA series exists for the shaping of glass.

6. The main safety feature of the machines is a single photoelectric beam on each side of the machine bed which if broken stops the machine running when in automatic mode.

7. Examination of several machines at various locations has found that in some instances the photoelectric beam stop function has been “wired out” and other safety critical devices such as interlocked guards have been over-ridden. These are matters of evident concern.

8. In addition to such maintenance issues it has been found that:-

- a. Access to crushing traps within the danger area of the machine is possible by reaching round/over fixed parts and guards of the machine.
- b. The main control panel (outside the photoelectric beam area) may be accessible from within the danger area.
- c. The control panel position may not give the operator a clear view of all areas within the danger area.

9. It is believed that the 101S/102S/103S series machines are no longer made.

10. Controls incorporated into successor models such as the 250-4 and 320-4 vary. Companies should be encouraged to carry out full assessment of subsequent models with particular attention paid to the issues listed in para [7 & 8](#).

11. The standards required for stone and glass shaping machines are defined by the Supply of Machinery (Safety) Regulations 1992 and the Essential Health and Safety Requirements of those regulations. “C” standards have not been produced specifically for stone shaping machines. These machines are analogous to metal working machine centres and therefore safeguarding in accordance with the standards BS EN 12417:2001 and BS EN 13128:2001 is appropriate.

12. Specific guidance on metalworking machine centres is given in NIGM 03/A/1997/12.

Manufacturer/Supplier Actions

13. Following the accident the supplier has written to known users of each of the (approximately) 70 Bavelloni CNC shaping machines in the UK stating

“Re: Machine Safety. It has come to our attention that some Bavelloni machines are being operated without the safety light beams connected.”

Operator safety is of paramount performance to Bavelloni and therefore it is essential that all light guards, fixed guards and other safety devices are connected and working.”

PI Supplier is working with the manufacturer/ supplier to address issues on the range of models. This may include direct contact with users by either the manufacturer/supplier and/or HSE.

Manufacturing Sector Actions

14. The Manufacturing Sector will be pursuing issues of machinery safety with all suppliers of stone and glass shaping machinery.

Inspector Advice

15. If CNC stone and glass shaping machines are encountered during inspection and/or investigation their safety should be compared against the criteria set out NIGM 03/A/1997/12, the EHSR's and EN's quoted above. Key points to be considered are:

- a) For CNC controlled machines safeguards must be provided to ensure that access to the spindle, moving equipment such as slides and trapping points cannot be made whilst the machine is running.
 - i. If photo-electric guarding is used then it should be equivalent to that seen on press brakes, i.e. a curtain of photo-electric beams set at distances to prevent access over, through or under the beams. HSE publication "Application of electro-sensitive protective equipment using light curtains and light beam devices to machinery" HSG 180 provides further details.
 - ii. The reach distances set out in BS EN 294 should be used to position photo-electric curtains.
- b) If access is required to the machine during setting (with guards open) then the following should be applied:-
 - i. Spindle speed should be limited to 50 rpm or braked within 2 revolutions.
 - ii. The travel of the beam and head should be via hold to run controls (limited to no more than 2m/minute or a jog mechanism limited to 6mm/ movement).
 - iii. Tool head movement should only be possible when both the operators hands are outside the danger zone.
- c) It should not be possible to initiate controls from within the dangerous area (except when in setting mode). Controls should be at a sufficient

distance or shrouded to prevent reaching from within the danger area.

- d) Measures should be taken to ensure that the machine cannot be initiated with operators inside the dangerous area, e.g. by use of presence sensing devices (horizontal photoelectric curtains, scanning devices, etc), measures which physically prevent persons remaining in the danger zone, perimeter guarding with trapped key interlocks, etc.

16. The Manufacturing Sector would support the use of Prohibition Notices in any instance in which safety devices such as photoelectric beams or guards are missing or by-passed.

17. Prohibition is also supported on any machine on which it is possible to operate the control panel from within the danger area, when it is either positioned inside the danger area or can be reached from within the area. However, inspectors should not request demonstration of this action unless the machine has been isolated.

18. Prohibition/ Improvement action is also supported on any machine on which it is possible to reach trapping points (see EN 349 for minimum distances to avoid crushing parts of the human body) from outside the photoelectric beams without tripping them, such as by reach around/through fixed parts.

19. Inspectors are invited to notify the Sector of the findings of their inspections and any other concerns at stone and glass processing companies.

Further Information

20. Enquiries should be directed to Paul Harvey, Manufacturing Sector, Cardiff, vpn 511 3044

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