

Health and Safety Executive		Sector Information Minute	
Agriculture and Food Sector			
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Target Audience:
All FOD inspectors

DITCH DIGGERS MOUNTED ON TRACTOR THREE-POINT LINKAGE

This SIM alerts inspectors about a recent fatality involving a tractor mounted ditch digger and action to take if they come across these machines.

BACKGROUND

1 Three-point linkage mounted diggers are commonly called a backhoe and the potential risk of being crushed between the machine and tractor parts has long been recognised. A recent incident involving a new machine has brought the matter back to the attention of the Sector.

2 These digger attachments generally have their own PTO driven hydraulic pump and are operated from a rear-facing seat located above the main frame (see figure 1).

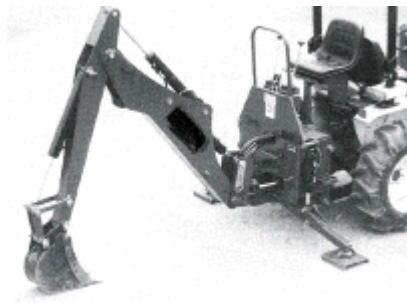


Figure 1. Example of rear-mounted digger

3 A user was fatally injured when he was crushed between the control levers of the mounted digger and the safety frame of the compact tractor it was attached to.

4 The mounted digger involved was made in Italy and CE marked. However, it was not accompanied on supply in the UK by operator instructions or Declaration of Conformity written in English.

5 The equipment involved in this incident was supplied to a domestic user so the Police and Trading Standards, assisted by an HSE Specialist Inspector, carried out the investigation. The equipment itself is primarily designed for workplace use so HSE has taken the lead on supply issues.

6 A Prohibition Notice has been served on the UK supplier to prevent further sales. In conjunction with Safety Unit, enforcement action is being taken with the Italian manufacturer and Safeguard notification will be made to the EU Commission as per Article 7 of the Machinery Directive.

GENERAL DESIGN ISSUES

7 The risk arises on machines that are fitted with an operator seat on the digger carriage frame. When the tractor linkage is raised, or the digger imparts an upward force on the linkage, the operator can be crushed between the seat or controls and parts of the tractor safety frame or cab if there is insufficient clearance (see diagram 1).

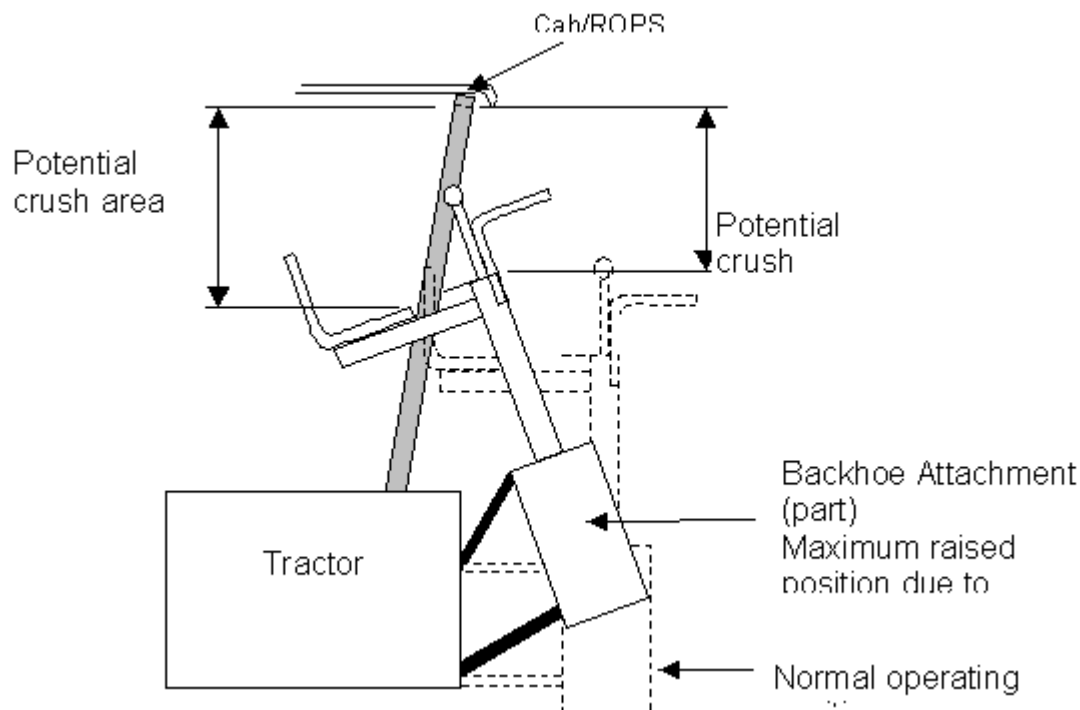


Diagram 1. Relative movement of digger on 3-point linkage

8 This crushing action may be compounded further by the unintentional operation of the controls as the operator becomes trapped. From the operator's seat, the action of moving the main boom lever forward pushes the bucket into the ground and imparts an upward force on the digger frame moving it up and towards the tractor safety frame. Once trapped in this position the operator would be unable to move the control lever backwards to relieve the pressure.

9 Some tractor linkage arms when fully raised by the tractor hydraulics can be given further vertical movement if an upward force is applied to these arms. When linkage mounted diggers are fitted this additional force combined with any slack in the digger or tractor linkage can be sufficient to reduce the clearance gap to an unsafe distance.

10 The Sector has been in contact with known UK manufacturers and none of these supply tractor rear mounted diggers unless they are attached by means of a sub-

frame on the tractor chassis or have some means of restricting the tractor hydraulic arm movement (see figure 2).

11 There are several EU manufacturers of this type of equipment (mainly Italian) but no other suppliers have yet been identified in the UK. It is possible that this equipment could be used in a range of sectors including construction, landscaping, amenity horticulture and services as well as agriculture.

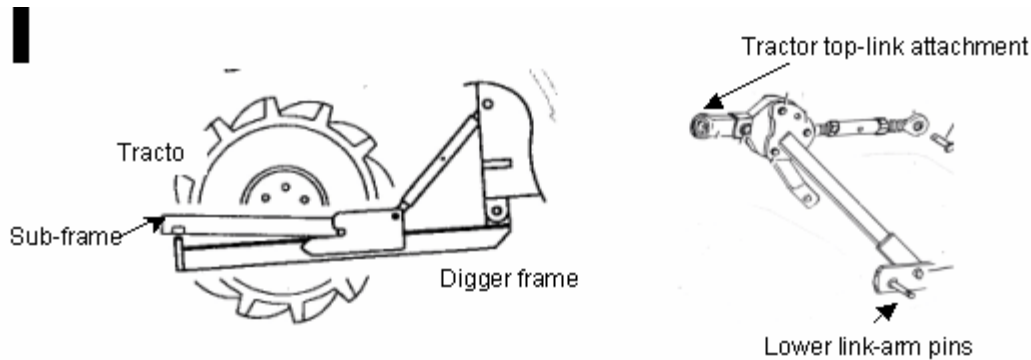


Figure 2. Examples of tractor mounted digger attachments

12 Unless designed to do so, a tractor roll-over protective structure (ROPS) should not be removed or altered to allow operation of mounted diggers. If there is insufficient clearance between the digger seat and ROPS for the operator to sit correctly then the equipment is not suitable.

13 Control levers must be properly marked with mode of operation and any warnings or instructions given in English.

14 Control levers must be adequately protected against unintentional operation e.g. barrier rails, shrouds, interlocking.

ACTION BY INSPECTORS

15 Linkage mounted diggers that are not provided with a mechanical means of preventing link-arm movement create a high risk of crushing injury and/or injury through uncontrolled movement.

16 When inspectors see tractor mounted diggers in a workplace they should check whether link-arm movement is prevented and if it is not then the use of the equipment should be prohibited if there is any risk of crushing or other injury due to this movement. Full details of the equipment, paperwork (CE mark and Declaration of Conformity) and supplier should be recorded so that an ICSMS record can be created. Any modifications and by whom, should also be recorded.

17 Improvement Notices may be appropriate where instructions have not been provided or translated and for controls that are not properly protected and marked.

18 The Sector should be consulted about any action taken with suppliers as any enforcement on supply of CE marked machines has to follow the safeguard procedure and will be followed up in Europe.

19 Inspectors should be aware that these attachments could be converted for use on the booms of skid-steer loaders. Where the operator is on a seat outside the cab there may be a similar risk of crush injury.

Benchmark standard

20 The benchmark is nil or negligible where movement of the digger attachment on the tractor three-point linkage, giving rise to a risk of crush injury, is prevented by mechanical means. Where crush injury is possible due to the fitting and clearance between the digger and ROPS, an extreme risk gap is indicated in the EMM.

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