



# How to reduce your hand knife injuries

## Plastics Processing Sheet No 12

### Introduction

This sheet was produced by the Health and Safety Executive (HSE) in consultation with the Plastics Processors Health and Safety Liaison Committee (PPHSLC). This committee comprises HSE, employers and employee representatives in the plastics industry.

HSE statistics and company surveys suggest that hand knife injuries typically account for between 25-50% of all lost time accidents in the plastics processing industry. They occur in all parts of the industry, including film production, moulding, extrusion and fabrication.

This sheet outlines the actions you need to take to reduce hand knife injuries, including how you could possibly eliminate them completely. Case studies describe the improvements that some plastics companies have already achieved, and how they did it. By reading them you will see how you can apply these ideas in your own factory.

### What can we learn from the statistics?

Hand knife injuries usually happen when the knife slips during cutting or trimming. In most cases the blade comes into contact with the worker's other hand, causing a laceration to the hand and/or fingers. Injuries do also occur to other parts of the body, including the knife hand itself. Table 1 analyses which parts of the body were injured in accidents reported to HSE.

**Table 1** An analysis of injuries from hand knives reported to HSE

Finger	51%
Hand	33%
Arm	5%
<b>Upper limb total</b>	<b>89%</b>
Toe	2%
Foot	0%
Leg	8%
<b>Lower limb total</b>	<b>10%</b>
Torso	1%
<b>Other parts total</b>	<b>1%</b>
<b>All injuries total</b>	<b>100%</b>

The same analysis showed that 94% of injuries were lacerations and 6% stabbings. On 84% of occasions the knife had slipped, in 2% it had been dropped and the remaining 14% of injuries occurred from other causes. Statistics collected by individual companies support this general picture.

### What can I do to prevent such incidents?

The most reliable course of action is to eliminate the use of hand knives. Where this is not possible, more proactive management control will be required. Work through each of the following steps for every task where hand knives are currently used:

#### Step 1 - Elimination

Try to eliminate the use of hand knives from all or part of the task by:

- redesigning the tooling or process to eliminate or reduce trimming;
- improving mould maintenance to reduce or eliminate flash;
- introducing different methods, eg cryogenic deflashing or vibrating bath and pebbles;
- automated cutting (such as a flying knife); or
- using a safer cutting tool (ceramic knife/deburring tool/scissors).



**Figure 1** Deburring tool

If it is not possible to eliminate the use of hand knives completely then work through Steps 2-7. Some of these steps will still be relevant even when a safer cutting tool is introduced. Where user trials are recommended, they are not a substitute for management assessing suitability for safe use. Management should identify a suitable range and the workforce can select from this.

#### Step 2 - Specify the right knife

Consider the range of knives available, conduct trials and invite the users' views. Having done all this, specify the knife/knives to be used for each task and withdraw any others currently in use, including employees' own knives brought in from outside. If possible specify knives with:

- retractable blades;
- round-ended blades where a sharp point is not needed for the work (eg on softer materials) to remove the potential for stabbing injury;
- handles which allow a firm and comfortable grip;
- left- and right-handed types available, as required.

It is perfectly acceptable to have different hand knives available to the workforce, provided they are all deemed safe for the work and have been assessed as such following user trials. Users are far more likely to accept a change in cutting tool if they are allowed some choice for each job.

### **Step 3 - Ensure spare knives and blades are available**

It is essential that spare knives and blades are always readily available if employees are to be able to use the correct tool for the job. You should have proper management arrangements for stock control and access. You also need to specify whether the knives are on personal issue or to be shared, and the PPHSLC strongly recommends the former in any borderline decisions.

### **Step 4 - Provide safe storage for knives/blades**

It is important to prevent situations where knives are left lying loose on work benches/surfaces or where individuals carry them in their hands from one place of work to another. Such poor practice has led to injuries to both the knife user and others, including people walking into each other with exposed blades. You should:

- provide suitable storage facilities, eg racks, slots, boxes etc adjacent to the place of work;
- allocate suitable belts or sheathes to employees who need to move around carrying knives;
- strictly enforce rules prohibiting the carriage of knives in the pocket or in the hand from one place of work to another;
- provide used blade disposal points, eg sharps containers.

### **Step 5 - Specify the right PPE**

The right personal protective equipment (PPE) needs to be provided. The equipment should be specified according to the task and to the type and site of injury possible. Table 2 gives guidance on the selection of PPE and refers to relevant European Standards (ENs) although your supplier should be able to advise you on these. Whatever PPE is chosen must be CE marked.

As with the selection of knives, conduct trials and invite the users' views on the PPE. It is acceptable to have different PPE available for the workforce, provided it is

deemed safe for the work and has been assessed as such. Users are far more likely to use the PPE properly if they help select it. Once provided, its use needs to be properly supervised if injuries are to be prevented. Never allow exemptions for those jobs which take 'just a few minutes'.

**Table 2** Selection of PPE

<i>Part of the body (Type of PPE)</i>	<i>Typical materials</i>	<i>Standard</i>
Hand (glove)	Leather, rubber, plastics, cloth and knitted fabrics	BS EN 388: 1994 <i>Gloves against mechanical risks</i>
Hand/arm (glove, gauntlet, armguard)	Leather, rubber, plastics, cloth and knitted fabrics and chain mail	BS EN 1082-1: 1997* and prEN 1082-2: 1997 <i>Gloves and arm guards made of chain mail (Part 1) and material other than chain mail (Part 2) protecting against cuts and stabs by hand knives</i>
Torso/legs (apron/leggings)	Chain mail and plate link	BS EN 412: 1993* <i>Aprons for use with hand knives</i>

\*These standards give guidance on the selection of the appropriate size of equipment.

All PPE comes in a variety of sizes and the range of sizes needed by the workforce should be provided at the outset (with spares available as replacements). Care should be taken in selecting the right size for each individual - particularly with gloves where people are less likely to be familiar with the size ranges available.

Protective footwear which provides adequate resistance to slipping and protection against penetration from a dropped knife should be worn. Slipping while holding a knife could result in a serious injury, and a dropped knife could easily penetrate sandals or soft-topped shoes.

### **Step 6 - Consider the working environment**

Follow these basic housekeeping rules:

- The floor surface should be even and provide sufficient slip resistance.
- Containers should be provided for waste materials.
- Floors and work surfaces should be kept free of debris and production waste.
- Spillages should be cleaned up promptly.

Also, each person using a knife should have enough working space to move freely and allow them to operate in a safe manner without endangering themselves or others. Work surfaces should be set at a comfortable height for the individual to work at. Adequate lighting levels should also be provided.

## **Step 7 - Develop and deliver training**

People need to be given adequate instruction in safe working practices so that they are not a danger to themselves or others. This general rule is particularly applicable to the use of hand knives. Training should cover the following issues:

- the general use, care and maintenance of hand knives (including typical accidents, cutting away from the body and the danger of blunt knives);
- the correct tool and protective equipment for each task they have to perform;
- the correct way of working at any particular job and any safe operating procedures that need to be followed (eg the frequency of blade changes or the criteria for rejects); and
- in-house company rules (eg on storage or carriage of knives).

Newly trained staff should be introduced gradually to high-speed production operations if this is necessary to reduce the risk of injury. Each operator should be supervised until they are skilled enough to work safely at full production rates.

### **Cutting tool suppliers**

A number of suppliers offer surveys and advice to help with the selection of safer cutting tools. They also offer advice on appropriate PPE.

### **First aid**

A serious stabbing injury can result in heavy external and internal bleeding, particularly if a main artery is punctured. Prompt first aid action could save a life. At least one person who is trained to deal with stabbing injuries and heavy bleeding should be available on site to provide first aid.

### **Case studies**

#### ***Plastic film manufacturer***

Rexam High Performance Flexibles identified that hand knife injuries were contributing to over 50% of its total accidents. They decided upon a medium-term strategy to tackle the high number of these incidents and introduced initiatives over a number of years to reduce this total. Between 1992 and 1998, they introduced new safety rules and better PPE and training. The number of accidents fell from 102 in 1992 to 31 in 1998 - a drop from 54% of their total accidents to 22%.

#### ***Plastic film manufacturing group***

British Polythene Industries plc recognised that over 50% of all their injuries were hand injuries. In August 1998 their Chairman launched a hand safety initiative with a video and posters. The process was driven by departmental teams, headed by a supervisor.

The teams identified tasks/activities where hand injuries could occur in their own work area; looked at accident statistics and reviewed all hand knife accidents over the previous 12 months to determine if unsafe conditions or unsafe behaviour contributed; discussed problems and proposed solutions; and produced an action plan for the Managing Director.

The action plans were sent to the Safety Committee who prioritised the actions and told the teams the reasons why. The plans were reviewed and audits carried out to check that they had been implemented. The results to date show that the total number of hand injuries has reduced by over 50%.

#### ***Injection and rotational moulder***

Paxtons (a division of McKechnie Plastic Components Ltd) appointed a new safety manager who noticed that hand knife injuries accounted for a significant percentage of the company's total injuries, particularly those from fixed blade knives.

Managers and supervisors were asked to identify where hand knives could be eliminated or replaced and what precautions were needed where they would remain in use. An improved accident reporting system was also introduced. This led to the replacement of knives for a significant number of tasks, eg snips to remove spews/flash and deburring tools for flash removal. Knives were only used if there was a difficult or awkward cut or thick flash (due to old moulds) which could not be dealt with by safer tools. Their use was supported by the necessary PPE, instruction and training. Supervisors are now checking more vigilantly that the correct tools, PPE and cutting methods are used.

The newly introduced accident reporting system initially recorded an increase in the number of hand knife injuries. This has now reduced and is below the original baseline figure from the previous reporting system because of the actions taken.

#### ***Pipe extrusion company***

On analysing their accidents for 1997/98 Polypipe Civils Ltd noted that their largest category of injuries were cuts - eight per month. Of these 75% were caused by knives.

The type of knife most commonly used was a plastic-handled disposable type which was lightweight and had a flexible handle. They were used for trimming flash from the ends of pipes and opening bags of plastic granules.

The company trialled a range of different knives and deburring tools and decided to withdraw the disposable knives at the beginning of May 1999. They were replaced with deburring tools for trimming pipe ends and a heavy duty metal-handled knife with retractable blade was introduced for bag opening and other tasks.

The number of hand knife injuries has dropped to two per month. A further benefit is that the newly introduced tools last longer than the cheaper disposable type they had before.

#### ***Polyurethane elastomer component manufacturer***

CRP Group Ltd introduced measures to eliminate the use of trimming knives because of the number of knife incidents, including using closed tools and mechanical cutting aids. However, operations still existed which needed hand knives.

There was consultation between the management and the workforce and it was decided to look at all trimming operations and to identify the most appropriate trimming device for the job. If continued use of a knife was justified, then the departmental team had to specify the correct method of trimming the

component. A training programme was introduced to deal with this, the importance of using sharp blades, correct disposal of blades and use of correct PPE. A knife policy has also been introduced.

Knife accidents now account for only 11% of total accidents down from around 25%. The company continues to review and update their work procedures to identify new ways of tackling the issue.

### **Rotational moulder**

Amber Plastics Ltd decided in 1994 that they needed to tackle the issue of hand knife safety because the number of hand injuries from knife cuts was accounting for 30% of the total accidents reported.

The company decided upon a medium-term strategy to tackle the high number of hand knife related incidents and have eliminated the use of hand knives wherever possible by having the finishing work done by router cutters on pantograph arms. However, knives are still needed for fine detail work and where a good cosmetic finish is important. Knives are issued to each employee who needs them, with different knives being used for different tasks. Replacement blades are readily available.

Specific measures taken on hand knife safety include:

- induction training on the use of hand knives;
- provision of knitted anti-slash gloves;
- issuing gloves to each new employee during induction;
- introducing disciplinary measures for not wearing PPE;
- introducing a more robust knife with better safety features;
- introducing a leather palm pad following a stabbing accident;
- introducing more arm (sleeve) and body (apron) protection following accidents;
- issuing warning letters to those not complying with knife safety rules.

Knife accidents now account for only 6% of total accidents, down from around 30%.

### **Plastics manufacturing group**

Linpac Plastics Ltd launched their hand safety campaign in 1997 and have already achieved significant success in reducing hand injuries by 55%. The steps taken in their campaign were:

- Chairman's backing with supporting material including a video;
- a glove questionnaire completed by all employees;
- training given and a hand safety card issued;
- team discussions on PPE (the right gloves for the job), work method, storage, knives (some people need more than one, the right knife for the job), additional training.

This led to a 55% reduction in hand injuries for all of the Group's operating companies.

and any hand knife initiative therefore needs their visible backing.

Practical steps a Director or senior manager can take include:

- Launch the changes personally and make sure the workforce knows of your involvement.
- Ask for regular progress reports.
- Place the issue on the management agenda.
- Monitor in-house hand knife injury statistics.
- Ask staff about the use of hand knives/cutting tools when touring the factory.
- Praise good practice and support disciplinary action for persistent offenders.

### **Further information**

HSE priced and free publications are available by mail order from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA. Tel: 01787 881165 Fax: 01787 313995. Website: [www.hsebooks.co.uk](http://www.hsebooks.co.uk)

HSE priced publications are also available from good booksellers.

British Standards are available from BSI Customer Services, 389 Chiswick High Road, London W4 4AL. Tel: 020 8996 9001 Fax: 020 8996 7001.

For other enquiries ring HSE's InfoLine Tel: 08701 545500, or write to HSE's Information Centre, Broad Lane, Sheffield S3 7HQ. Website: [www.hse.gov.uk](http://www.hse.gov.uk)

This leaflet contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.

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### **Practical steps for senior managers**

The importance of senior management commitment to the success of any new working arrangements is well known, and this is especially true when the attitudes of the workforce also have to be changed. The attitudes of senior managers will set an example for others to follow,