Re: Rotary Knife Turning Machine Safety

Background to current information sheets No's 28 & 37

The B.W.T.A. have had a working relationship with the H.S.E. which can be traced back to 1988 when a working party was set up to co-operate with them to agree standards and technical methods of improvement and a code of practice. Following a number of joint meetings with the H.S.E National Interest Group at Luton a draft of standards relating to Rotary Knife Turning Machines referencing the " Code of Practice for Safeguarding of Woodworking Machines BS 6854: 1987" and the "Guide to Woodworking Machines Regulations 1974" was produced

It should be noted that a number of important points were accepted by the B.W.T.A. in the document submitted to the H.S.E. , in particular:

1) **Guarding**
2) **Noise reduction.**
3) **The checking of the condition of knife and mounting bolts**
4) **The use of a torque wrench when setting**
5) **The need for effective dust extraction**

In 1992 the B.W.T.A. agreed to reconvene the working party to meet the H.S.E. at Luton to look again at the aspects concerning lathes in the light of New European and British regulations which would shortly come into force (in 1993). It is believed that on this occasion the working party consisted of the Secretary and Peter Dunlop, Chairman. As a result of the meetings the H.S.E. produced a final draft document in May 1993:

ROTARY KNIFE TURNING LATHES:
SAFEGUARDING AND REDUCING RISKS TO HEALTH

This document was later to form the basis of the H.S.E. information sheet No. 28: Rotary knife wood turning lathes: safeguarding and reducing risks to health, published October 1994.

It stated that the "Key legal requirements covering the use and supply of these machines are contained in":

The Supply Machinery (Safety) Regulations 1992

The Health & Safety at Work Act 1974

The Provision and Use of Work Equipment Regulations 1992 (PUWER)

The Woodworking Machines Regulations 1974

The Control of Substances Hazardous to Health (COSHH) Regulations 1988

The Noise at Work Regulations 1989.

The main points contained in this document are:

Definitions (Scope)

1) A "manually-operated" lathe. A lathe in which the workpiece is located by hand on a saddle and is then advanced towards the cutters by a manually operated lever.
2) A "semi-automatic" lathe. A lathe where machine operates on a single cycle where one or more of the following functions is automated:

- **clamping of the workpiece (tail stock);**
- **advancing the workpiece onto the cutter-block;**
- **advancing the cutter-block onto the workpiece;**
- **magazine loading.**

For example, the workpiece is magazine loaded onto the saddle and presented by a manually-operated lever onto the cutter block, or the workpiece is located by hand and the pneumatically fed onto the cutter block.

3) An automatic or fully automatic lathe. This is a version of the semi-automatic lathe which is magazine fed. The operator has only to feed stock into a magazine or onto a conveyor and workpieces are discharged automatically on completion.

Guarding.

***New* machines should be designed so that during normal operation contact with cutters is prevented by effective enclosure of the cutter head. Access should be prevented by a interlocked guard with guard locking which cannot be opened unless the cutters are at rest. Guard locking will not be required if the machine is fitted with an automatic brake which stops the tool in sufficient short time.**

***Existing* machines should be modified to achieve the same standards of new machines where this is practicable through automation etc. Where it is not practicable to meet the standard for new machines, a rise and fall shutter guard should be provided at manually-operated and semi-automatic machines. The guarding should be such that the cutter is enclosed at all times including when the workpiece is being turned. All machines should be guarded to this extent where there is a danger of operator contact.**

Wood dust and Chipping's.

***New* machines should be designed to extract wood waste efficiently. The level of total inhaleable dust in the operator's breathing zone should be below the maximum exposure limit (MEL) of 5mg/m³**

Captor hoods should be placed as close as possible to the point of generation of the dust laden air-stream.

The most effective design would allow automatic feeding through an integrated interlocked noise enclosure, incorporating an effective extraction system.

***Existing* machines should be modified to meet the standards of new machines. Approved respiratory protective equipment may be needed as an interim measure, whilst engineering solutions are being developed. Nuisance dust masks and Hygiene packs are not appropriate.**

Ejection of cutters.

The risk of flying cutters should be minimised. In some cases, this may be achieved by positive retention, where the cutters are held by bolts through closed slots.

A safe system of work should be specified for the tool setter, including the manufacturers torque settings for each type of tooling used.

Torque wrenches should be used to minimise the risk of flying cutters, particularly as a consequence of over-tightening or under-tightening bolts. Only suitable high tensile bolts should be used.

See page 39 para B.5.6. CEN Draft "Extension of spanner or tightening using a hammer blows will not be permitted".

Maintenance.

Cutters, cutter mountings and associated bolts should be kept in good condition and visually inspected at frequent intervals. Components appearing defective or damaged should be repaired or replaced. The integrity of engineering controls and noise enclosures should be regularly checked.

The effectiveness of any waste extraction control system depends on its performance being routinely monitored. ----------tested by a competent person at least every fourteen months.

Training.

Everyone who works on a woodworking machine should be trained on that machine, be authorised to use that machine and must be familiar with the requirements of the Woodworking Machine Regulations 1974.

Setters require particular detailed training and experience before taking responsibility for cutter setting.

An appropriate system should be introduced to ensure that the knife security is systematically checked before the start up of any machine.

N.B. Sheet No. 28 was published to reflect the H.S.E's. position in respect of the regulations in place at that time; since then there have been a number of changes for example PUWER 92: has been re-issued to incorporate amendments to become PUWER 98: We now have the Management of Health and Safety at Work Regulations 1999 and COSHH 88: was up-dated in 1999 and again in 2002. In view of these changes I believe that in addition to making changes to the bibliography (reference documents) the H.S.E. will in all probability will want to beef up the information regarding the following:

- **the provision of interlocked guarding;**
- **the provision of braking;**
- **the use of Limited Cutter Projection Tooling (LCPT).**

Further, a number of other new regulations and guidance notes have been issued since 1994 which the H.S.E. may wish to incorporate or make reference to in a re-written information sheet.

It should also be noted that as was reported at the meeting in February this year there is now moves to make a number of fundamental changes in the COSHH and Noise Regs, in particular:

COSHH there proposals for an amendment which will reduce the current upper limit of 5 mgr /Mtr3 of atmospheric born wood dust to 2 mgr / Mtr3. It is said that if dust extraction equipment was well designed and maintained the new limit should not be a problem, but there is a need for regular testing and continuous maintenance of dust extraction systems; current regulations allow max. 14 month intervals. Further, as required under the COSHH Regulations monitoring of individual employees exposure by the use of air sampling equipment should be undertaken.

Noise Regulations. A new directive from the EU had been adopted by the UK in respect of harmonising noise standards within the EU. This will be implemented by the new Noise Regulations 2005. The requirements under this regulation will be more stringent action values. The present action level of 90 dB(A) will be reduced to 85 dB(A) and the present action level of 85 dB(A) will be reduced to 80 dB(A). The new Regulations will also introduce a new exposure limit value of 87 dB(A) above which exposure, taking into account hearing protection used, is prohibited.

With regard to sheet No. 37, PUWER 98: Selection of tooling for use with hand-fed woodworking machines

You may recall that in 23 September 1993 we became aware that a new European Standard on cutters, cutter mounting and chip limitation was being drafted regarding regulations which would effectively ban the use of hexagon sleeving with cutter holders (brackets) and also discs (plates or drums). It was agreed that Peter Chalke should go to the meetings in Lisbon and Munich so as to give evidence to the European Standards Committee on cutters. As a result of these visits he was able to agree a form of wording which was felt to be acceptable by the BWTA and was later incorporated into the information sheet No 37 PUWER 98: Selection of tooling for use with hand-fed woodworking machines, this deals with Limited Cutter Projection Tooling (LCPT) and was published in November 1998.

I will confine my comments regarding Sheet 37 to the particular relating to Rotary knife turning machines, but I advise all members to read it in full since it has an impact on the type of tooling used on a wide range of machines. It should be noted that the changeover to LCPT should be made when replacing tooling or by 5 December 2003, whichever is the sooner.

Information Sheet 37 asked the question: "On which machines do I have to use limited cutter projection tooling?"

Answer with regard to rotary knife turning machines:

- **Rotary knife and copy lathes where the hazards of ejection and contact with the tool are not prevented by:**
  - **i) a system of fixed guards and/or**
  - **ii) interlocked moveable guards and/or**
  - **iii) self closing guards;"**

That is to say if you do not have any of the above guarding systems you require LCPT.

It also makes a note of stating: Limited cutter projection tooling should be used in addition to the normal guards, protection appliances(jigs etc.) and safe working practices, not as an alternative.

<u>Tool Fixing .</u>

"Cutters and limiters should be capable of being mounted in such a way as to prevent them being ejected. This is usually achieved by the use of either:

- **locking pins;**
- **serrated-backed cutters; or**
- **'key' or wedged-shaped cutters ---------- etc.**

The question is posed: "Are there any machining operations where it is not possible to use limited cutter projection tooling?"

> **"The use of limited cutter projection tooling should always be the first option considered as part of tool selection procedure. Other types of tooling should only be used where the desired profile cannot be achieved with the use of limited cutter projection tooling ----------."**

H.S.E. information sheets No 28, states: "The risk of flying cutters should be minimised. In some cases,

this may be achieved by positive retention, where the cutters are held by bolts through a closed slot" Further, "A safe system of work should be specified for the tool setter, including the identification of manufacturers torque settings for each type of tooling used" etc.

With regard to sheet No. 38: PUWER 98: Retrofitting of braking to woodworking machines, I will confine my comments to the particular relating to Rotary knife turning machines.

The prime objective of this regulation is to stop the tool in a sufficiently short time (defined in CEN standards as 10 seconds or less*, up to 35 seconds for certain larger machines se p31, para 134 ACOP* **) if there is a risk of contact with a tool while it runs down.**

"Regulation 15 of PUWER 98 requires work equipment to be provided with controls which bring the work equipment ..... to a safe condition in a safe manner"

The main ways of providing braking are to:

- **replace the existing motor with a braked motor;**
- **fit a direct current (DC) injection braking device to the existing unbraked motor;**
- **fit a power-operated mechanical brake;**
- **fit a manual or foot operated brake.**

You can apply these methods singly or in combination,.....

When fitting braking to a machine sheet 38 states, "The overriding consideration should be to bring the machine to a safe stop. The rundown time should be less than the runup time with an overriding maximum of 30 seconds (35 seconds for bandsaws)".

Also it states, "If the risk assessment shows that there is no added safety benefit, then braking does not have to be provided. One example would be where the cutters are enclosed by interlocked guards which incorporate guard locking, so that the guards cannot be opened until the cutters have come to rest. (Alternatively, the whole machine might be enclosed, e.g. by a noise hood, but the same interlocking requirements as above will apply)".

"There are some occasions where it might be necessary to temporarily disable the braking system.....In these situations, it is essential that:

- **the controls for starting are only operable in the hold to run mode;**
- **the disablement function is automatically overridden and braking is applied if any guard is opened or if the emergency stop control is operated"**

Fitting of Braking Devices.
Date for compliance.
5 December 2003. Circular saw benches, dimension saws, powered and hand-fed cross-cut saws, single end tennoners and combined machines incorporating a circular saw and /or tenoning attachment.

5 December 2005 Narrow bandsaws, re-saws, vertical spindle moulding machines (unless fitted with a manual or foot operated brake), hand-fed routing machines, thicknessing machines, planing/thicknessing machines and surface planing machines.

5 December 2008 For any machine not specified, but for which the risk assessment shows braking to be necessary.