Health and Safety Training in Design and Technology

Design and Technology Association

Specialist Level: Secondary Materials Health and Safety (SMHS)

Drilling machine

Forename: _____ Surname: _____

School / College/ Institution _____

Course date: / / RDTHSC: _____

Colleagues must demonstrate their theoretical and practical knowledge, skills and understanding of the use of drilling machines in school workshops by completing the following assessment tasks

Please tick in the appropriate column to confirm your knowledge and understanding and that you have completed the practical tasks set

Assessment Task 1
Hazards and Control Measures

Hazards	Safe system of working (control measures)	Tick
Entrapment	• Long hair and loose clothing secured • Dangling jewellery removed • Gloves or bandages should not be worn • Fixed guards (removable only with a tool) or interlocked guards must enclose drive pulleys and belts	☐
Chuck keys, broken drills, swarf, dust and work pieces can be ejected	• Chuck key must be removed before starting the machine and after the work is completed • Chuck key should preferably be spring loaded • Chuck guard should extend to the bottom of the drill bit when it is in the uppermost position • Table should be adjusted so that as the drill leaves the guard, it enters the work piece • When using a specialist printed circuit board drilling machine, the need for a guard should be determined by a specific risk assessment • Drill bits should be ground and sharpened correctly • Suitable eye protection available near to machine • Eye protection stickers on machine • Eye protection in use at all times	☐
Unexpected spinning of hand held work pieces	• Risk assessment should confirm appropriate clamping arrangements, e.g. use of a vice, clamping the work piece to the table etc., depending upon size of drill and size/shape of material	☐
Drill table slipping down, heavy objects falling from the table	• Suitable footwear should be worn • A safety collar stop should be used if no rack and pinion rise and fall mechanism is fitted	☐
Electric shock/Inadvertent starting of the machine	**The machine must have:** • A means of electrical isolation • Fused switch disconnector • Starter with overload protection and no-volt release • Armoured cable to isolator • A foot operated emergency stop device that can quickly stop the machine in an emergency • Machine must be electrically isolated before position of the drive belt is changed	☐
Sharp edges on drills, work pieces and swarf	• Swarf must be removed using a tool to avoid hand contact	☐
Contact with fluids, oil and grease	• Contact with the skin should be kept to a minimum and hands should be washed thoroughly after use	☐
Lack of space around machine	• Sufficient space around the machine to prevent the operator being pushed by passers-by	☐
Slippery floor surface, loose items around machine	• Floor surface should not be slippery and should be kept free of loose items • See BS4163: 2014 Section 6 Working Area Environment	☐

Teaching Strategies

- It is essential that a risk assessment is completed to cover the use of this machine by learners and colleagues. This will normally involve the adoption and adaptation of model risk assessments, e.g. BS4163: 2014
- It is essential that a regular maintenance programme is put into operation and that a maintenance log is kept. This should involve daily, weekly and termly checks, covering general maintenance and identifying any faults that require repairs
- Learners should be aware of the hazards associated with the equipment and precautions that should be taken during use
- Before using the equipment, learners should be trained and assessed as competent, and a record of their training should be kept
- Learners should be supervised at all times by a trained, competent person
- Drilling machine health and safety rules should be available and observed
- **Demonstration of drilling machines to learners should include:**
  - The position of all controls, i.e. workshop emergency stop buttons, isolator switch, start button and emergency foot stop button on machine
  - The use of eye protection, and dust masks if required
  - How to mark out correctly
  - How to hold work securely
  - The range of appropriate drills/bits
  - Correct choice of feed/speed for size and type of drill and use of cutting fluid as required
  - How to fit the drill bit correctly
  - Safe removal of the chuck key
  - Setting of the table height
  - Setting of the depth stop
  - Setting of the chuck guard
  - The operation of the machine by 1 student at a time
  - How to drill correctly

☐

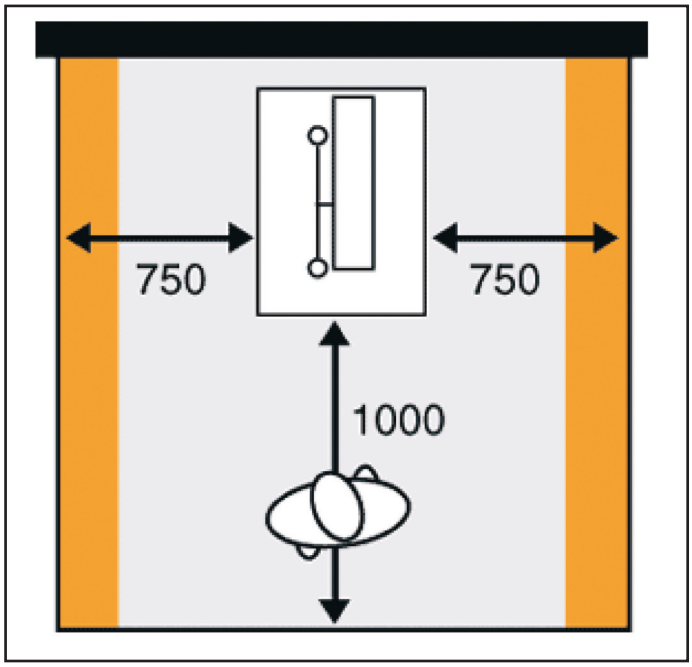
Assessment Task 2
Practical Skills

Machine operation:	
Recognise types of drills suitable for use in school workshops and know how they should be sharpened, e.g.: • HSS drill bits, wood boring bits, flat bits, forstner bits, plug cutters, stepped bits	☐
Drill metal, e.g. mild steel and aluminium/aluminium alloy, to demonstrate: • Marking out procedure • Selection of appropriate types of drill • Correct choice of speed for size and type of drill • Selection of appropriate clamping method, e.g. for flat and round bar and sheet materials • Correct drilling procedure, including feed speed and use of cutting fluid	☐
Drill sheet plastics, to demonstrate: • Marking out procedure • Selection of appropriate types of drill/bit • Correct choice of speed for size and type of drill/bit • Selection of appropriate clamping method • Correct drilling procedure, including feed speed	☐
Drill wood, e.g. both solid and man-made board, to demonstrate: • Marking out procedure • Selection of appropriate types of drill/bit • Correct choice of speed for size and type of drill/bit • Selection of appropriate clamping method • Correct drilling procedure, including feed speed	☐

Supplementary materials

The space-allocation diagram indicates the clear working space required on either side of the machine. Where machines are next to one another, dimensions can be overlapped, as indicated by the shaded zone on the diagram. Distances in front of the machine are assumed to adjoin circulation routes. A 200mm space has been allowed at the back of the machine for cleaning and maintenance.

Pillar drilling machine



http://www.hse.gov.uk/metalworking/index.htm

- Hyperlink to the HSE publication, 'Metalworking Fluids'. Guidance on neat oils or water-based fluids used during the machining and shaping of metals to provide lubrication and cooling, sometimes referred to as suds, coolants, slurry or soap.