Wilkins Safety Group

H & S Guidance - Abrasive Wheels

An abrasive wheel is usually defined as a wheel consisting of abrasive particles bonded together using organic or inorganic substances such as resin.

LEGISLATION

Provision and Use of Work Equipment Regulations 1998 (PUWER 98)

Supply of Machinery (Safety) Regulations 1992 (as amended)

HAZARDS

Includes wheel breakage/bursting, contact or entanglement with running wheel, physical injury from component being ground, noise and dust inhalation.

The risk of breakage is inherent in every abrasive wheel. Statistics show that nearly half of all accidents involving abrasive wheels are due to an unsafe system of work or operator error.

PROVISION & USE OF WORK EQUIPMENT REGULATIONS 1998 (PUWER)

The primary objective of PUWER is to ensure that work equipment, including abrasive wheels, do not give rise to risks to health and safety, regardless of the work equipment's age, condition or origin. PUWER applies to all workplaces and work situations subject to the Health and Safety at Work Etc. Act 1974 (HASWA) and revoked the remaining provisions of the Abrasive Wheels Regulations 1970.

PUWER requires all machinery to be suitable for it's intended use; to be properly maintained; and that persons using, supervising or managing the use of abrasive wheels are fully informed and adequately trained for health and safety purposes. The Approved Code of Practice and Guidance to the Regulations contains the following advice, specific to the use of abrasive wheels:

(a) To minimise the risk of bursting, abrasive wheels should always be run within the specified maximum rotation speed.

(b) If they are large enough, this will be marked on the wheel (a requirement of regulation 23)

(c) Smaller wheels should have a notice fixed in the workroom, giving the individual or class maximum permissible rotation speed.

(d) The power driven spindle should be governed so that its rotation speed does not exceed this.

(e) Guarding must be provided to contain fragments of the wheel that might fly off if it did burst, to prevent them from injuring anyone in the workplace. The guarding has an additional role in helping to meet the requirements of regulation 11; it should be designed, constructed and maintained to fulfil both functions.

(f) Providing information and training of workers in the correct handling and mounting of abrasive wheels (including pre-mounting and storing procedures) is also necessary to prevent the risk of bursting.

HSE's Guidance Document 'Safety in the Use of Abrasive Wheels' (HSG17) expands on how the general requirements of PUWER relate to abrasive wheels and should be read in conjunction with the PUWER Code of Practice. Dust, vibration and noise matters are dealt with in other guidance documents.

PRECAUTIONS/SAFETY MEASURES

Given an abrasive wheel is of sound manufacture, mounted on a well–designed machine, safe operation depends largely on proper maintenance and on the treatment to which the wheel is subjected when in use. The following are among the main operating precautions to consider. Each is further explained and discussed in the guidance publication HSG17 and detailed information is also given on the marking systems for wheels, suitable storage facilities, mounting procedures and tables of maximum permissible speeds for each type of wheel. **Reference to this document is essential if you use abrasive wheels at work.**

- **Training** -Regulation 9 of PUWER requires all persons using, supervising and managing work equipment to receive adequate training for the purposes of health and safety. HSG17 suggests the components that should be included in a training programme and recommends that a record of training be kept. A suggested format is given as follows:

Appointment	**Revocation**

Name of Person	Class or description of wheels for which the appointment is made	Date of appointment	Signature of occupier	Date of revocation of appointment	Signature of occupier

- **Examination** -by visual examination and, if practicable, by 'ring' test with a light non-metallic implement. Also need careful handling and secure/suitable storage.
- **Speed of rotation** –·is EXTREMELY IMPORTANT as the centrifugal force increases as the square of the speed. Recommended peripheral speed must never be exceeded.
- **Restrictions of use**-·Certain markings will indicate restrictions of use, eg: RE3: not suitable for wet grinding
- **Shelf life**-All organic bonded wheels will bear a use-by date of three years from the date of manufacture.
- **Grinding Machine** Considerations include suitability of spindles; machine bearings; speed contol; work rests (steel, renewable top plate, securely clamped, adjustable); insufficient power; stopping devices; magnetic tables and chucks; proper mounting of wheels; guarding; wheel enclosure angles specified for various types of machine; portable, hand held, internal combustion and pneumatic grinders; electrical considerations (double insulated, abrasion resistant cabling, reduced voltage); planned inspection and maintenance; tidy work environment/even floor surface around machine.
- **Operation**--Wheel to be 'trued & dressed' (to avoid excessive vibration, impaired cutting action) and balanced.Side grinding is dangerous unless operator is competent in its application in specific circumstances.Choice of grinding fluids may adversely affect strength of wheel if chosen incorrectly.Dust from the grinding of magnesium alloys can create a fire and explosion risk if ignited and fatalities have resulted when clothing has caught fire and explosions have occurred in dust extraction and settling systems. Precautionary measures include: 'the prohibition of smoking, open lights, fire and other causes of ignition; the provision of appliances for the interception, removal and drenching of dust by exhaust appliances and scrubbers; and the provision of protective clothing. Dust extraction and settling systems should be kept clean and free from deposits

of dried sludge, which must be removed from the scrubber and the work room.Eye protection/shields **must** be used when using power-driven cutting off wheel, truing or dressing or dry grinding where there is a risk of injury from thrown particles. Loose clothing, ties, coat sleeves are easily drawn into a revolving wheel and should not be worn.

CHECKLIST - ABRASIVE WHEELS

1. Have you informed and adequately trained those involved in the use, mounting, supervision of persons to mount abrasive wheels? YES NO
2. Have you recorded relevant details of the above training and distribution of information,instructions, etc.? YES NO
3. Do you have a procedure/system for maintaining your grinding machine? YES NO
4. Do you keep records of maintenance/inspections of machines? YES NO
5. Do you provide & maintain suitable eye protection/shields/dust protection? YES NO
6. .Do you provide suitable storage for abrasive wheels? YES NO
7. Do you check that safety precautions are being observed? YES NO

REFERENCES/FURTHER DETAILS

Publications

1. Booklet HS(G)17

   Safety in the use of Abrasive Wheels (HSE)

   (ISBN 0 7176 1739 4)(2000) (£7.00)
2. Booklet L22

   Safe Use of Work Equipment – Approved Code of Practice and Guidance on Provision and Use of Work Equipment Regulations 1998 (HSE) (ISBN 0 7176 1626 6)