

Handling, Storage and Inspection of Grinding Wheels

INTRODUCTION :

Grinding wheels are ceramic products and therefore breakable and some are very fragile. Extreme caution must be exercised in the storage and handling of grinding wheels to prevent them from sustaining when in operation. Good housekeeping in storage invite care in handling and is therefore essential.

A grinding wheel is a high-quality cutting tool and deserves to be treated with care. It should have its proper place in a storage rack and should be carefully handled from the moment it is unpacked until the time it is fully discarded.

INSPECTION BEFORE STORAGE

Grinding wheel manufacturers take all precautions to see that the wheels are in perfect condition before and during packing. However, due to the possibility of damage in transit, it is important to inspect all wheels as soon as possible on delivery. A damaged container

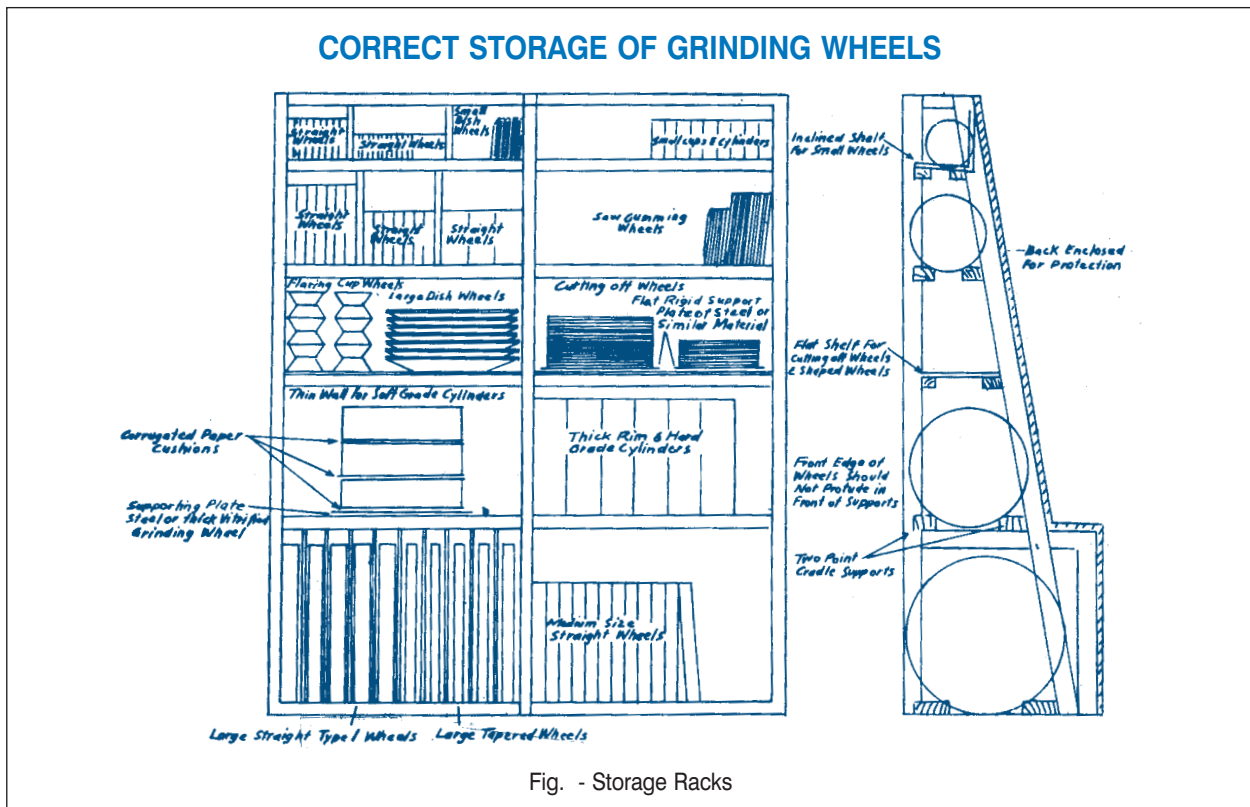
indicates that a shipment has been roughed-up and may or may not indicate whether the contents have been damaged. Further, a wheel can be damaged by accident in transit without showing any external damage to the container. Thus all wheels should be carefully inspected when received, regardless of the state of the container.

Wheels should be unpacked carefully and gently placed on the floor - not dumped. Each wheel should be physically inspected for visual cracks, chips or other defects and should then be given a "ring-test" as described later.

STORAGE

Grinding wheels when not in use should be stored away in a rack carefully, to protect them against chipping or breakage and to allow space for efficient and convenient removal. This applies to new or partly used wheels.

Grinding wheel storage-racks should be so



designed, constructed and located so as to best fulfil the particular storage needs of a character and are sifted from methods in common use in plants of many large users of grinding wheels as well as in the stock-rooms of grinding wheel manufacturers and their distributors.

LOCATION OF SPACE

Grinding wheels should be stored necessarily in a dry area in rooms not subjected to high-humidity, freezing temperatures and extreme temperature changes. Some types of bonds may be seriously effected by dampness and temperature variations. The racks should be located away from traffic pathways where there is danger of damage from passing truck, crane loads.

RACK CONSTRUCTION

Grinding wheel racks, bins, drawers, trays should be so constructed as to take in each of the various types of wheels in use and should be rigid and strong, enabling it to take the heavy load. Each section of the storage-rack should be so constructed as to keep the wheels from rolling off and sustaining damage.

Marking or racks :

The storage-racks should be clearly and comprehensively marked with the complete identification of the wheel stored, including the date received, so that earlier stock can be selected for operational use first.

ORDER OF STORAGE

Grinding wheels of the same size, type and specifications should be stored together separated by a partition from the other types. Then, any wheel needed from stores can be lifted from the end if they are on edge (see fig. 1 - St. wheel), or from the top if they are stacked-up (see fig. 1 - cup 7 dish wheels). This obviates the necessity of digging vaguely into the middle of a row or stack of wheels thus minimizing the amount of handling and the possibility of chipping or damage. Storage should be arranged to facilitate the selection of the earlier stock of wheels of each type, first.

Straight and tapered wheels :

Most straight and tapered wheels are best supported vertically on edge in racks. These racks should have some two-point cradle supports to prevent the wheels from rolling and must contain a sufficient number of partitions to prevent the wheels from tipping over to one side. For a wheel of unusual shape or large diameter thin type 1 (straight) wheels e.g. 750mm x 38mm or 500mm x 25mm (see fig. 1, large, straight and tapered wheels) individual partitions are recommended.

Thin organic bonded wheels :

The organic bonded grinding wheels should be laid on flat rigid horizontal surface, away from excessive heat to prevent distortion and excess moisture to prevent deterioration. A heavy steel-plate of a slightly larger diameter than the organic bonded wheels makes a solid foundation for stocking. A similar plate then placed on the top of the stacked wheels will prevent warping. No blotters should be placed between stacked thin wheels. If thin wheels are supplied with blotters attached then suitable separators should be used to help preserve flatness.

Cloth backed thin discs :

Cloth-backed thin discs must also be supported and weighted as described above and should be stacked alternatively cloth to cloth and grain to grain facing, so as to avoid damage to the cloth backing. This also helps prevent warping.

Cup and saucer wheels :

Cylindrical wheels and large straight-cup wheels may be stacked on the flat side with corrugated paper or similar cushioning material between them or they may be stored in racks similar to those used for large straight wheels.

For storing large flaring-cup wheels the optimum method of storage is by placing them flat on a horizontal shelf, alternating their positions so that they will be stacked base against base and face against face (see fig. 1 - flaring-cup wheels). Small saucer cup and dish wheels not having a thin easily damagable edge or rim may also be stored on edge.



Fig. 2

Shaped wheels are rested or stacked, segments are stored one on top of another in boxes and small wheels or mounted points in drawers, boxes or small bins.

Small wheels :

Small cups and other shaped wheels such as plugs, cones etc. and also small internal wheels can be stored in trays, boxes, bins or drawers with the contents of each clearly labelled on the outside for quick retrieval.

Fig. 2 and 3 illustrates a storage system in use by a company that discovered that proper storage of grinding wheels pays dividends.

HANDLING AND INSPECTION OF GRINDING WHEELS

STRENGTH OF GRINDING WHEELS

All grinding wheels must be handled with care. Some wheels are stronger than others, but all grinding wheels can be damaged in handling.

The strength of a grinding wheel is determined by the end application it is designed to perform. As the outer abrasive grain layer becomes dull from grinding, they must be able to fracture exposing new sharp cutting edges. The factors influencing the strength of a grinding wheel are : bond, grit-size, grade and dimensions of the wheel.

If a grinding wheel is dropped or suspected of damage then it should be returned to the manufacturer for re-inspection.

INDIAN SAFETY CODE RULES

The "ISI" Indian Safety Code for grinding, wheels,



Fig. 3

Storing grinding wheels properly protects them from chipping or breakage and aids in locating them quickly. Straight wheels are stored on edge, the larger sizes in the bottom of the rack.

"IS-1991-73" for the Use, Care and Protection of Abrasive Wheels contains these mandatory rules.

- Handle wheels carefully to prevent dropping or bumping.
- Don not roll wheels (Hoop fashion).
- Use truck or suitable conveyors which provide support and protection in transporting all wheels which cannot be carried by hand.
- Place wheels carefully on a shelf or rack or in bins, boxes or drawers.

INTER DEPARTMENT TRANSPORTATION

When grinding wheels are removed from stores and transported from one place to another they can very easily be chipped or damaged unless proper caution is exercised.

Small wheels can be moved easily in wooden boxes or deep trays/bins and larger wheels in trolleys or trucks. Hand and electric trucks should be well-padded and the wheels protected from falling or from receiving any hard or sudden blow.

VISUAL INSPECTION

The transported container must be examined for damages or indications of rough handling. If there is visible evidence of this the pack should be refused and if accepted special care must be exercised in the inspection of that particular batch of wheels.

Immediately after unpacking all wheels should be closely inspected for visual cracks or fissures to ascertain that they have not been damaged in transit.

"RING TEST"

The wheel should be dry and free of packing material. If the wheel is not too heavy it may be suspended from its bore on a small pin or your finger. Heavier wheels should be allowed to rest in a vertical position on a clean, smooth, hard floor.

Tap the wheel gently with a non-metallic tool such as a wooden screw-driver handle for light wheels or a wooden mallet for heavier wheels. The best spot to tap a wheel for the "ring-test" is about 45° either side of the vertical centreline and about 25 mm to 50 mm from the periphery (see fig. 4 & 5). If struck directly along the vertical centre-line the "ring" even in a good-condition sound wheel is sometimes muffled and may lead one to wrongly assume that the wheel is cracked. This specially true of larger wheels which are supported on the floor when the test is conducted (see fig. 5). Sometimes, this is also noticed when the wheel is suspended from the

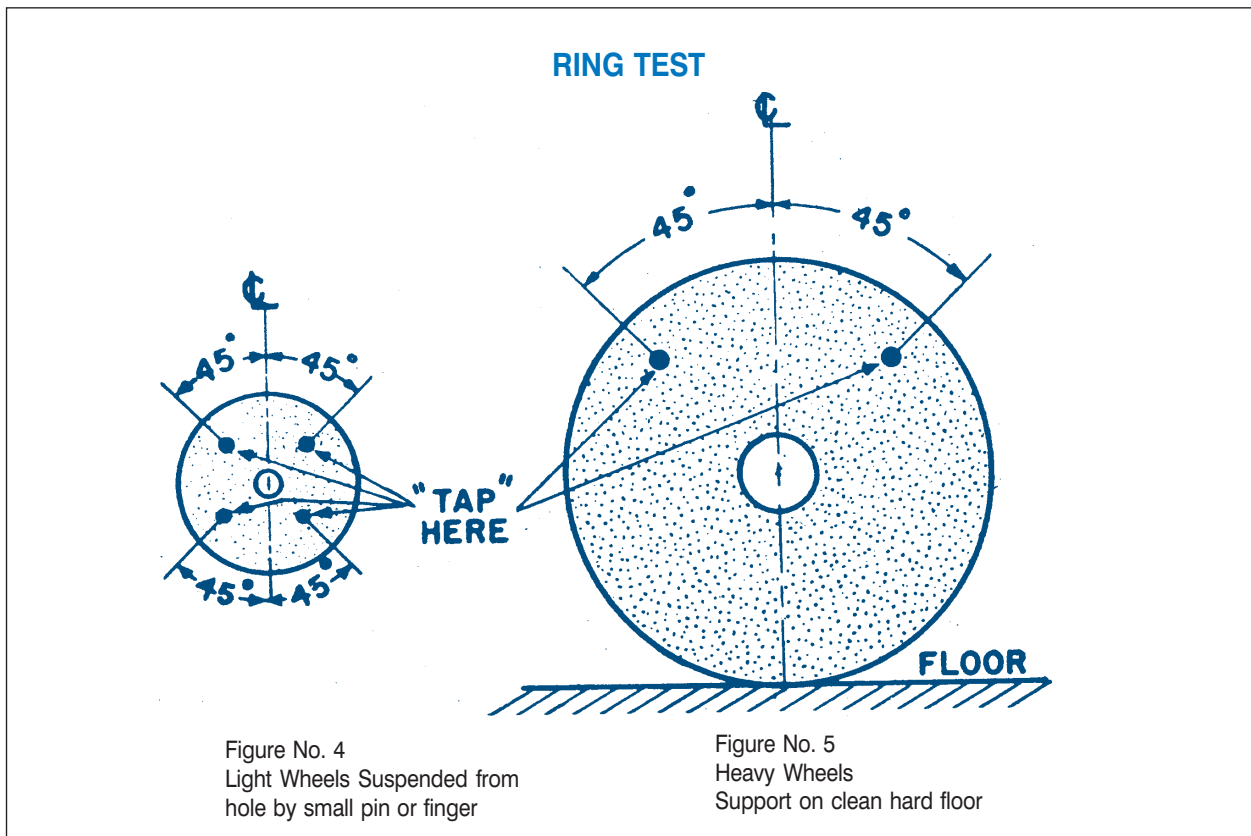
bore. It is recommended that the "ring test" be repeated after rotating the wheel 45° to the left or right. A sound and undamaged wheel will give a clear metallic tone. If the wheel has any cracks it will return a dead sound and not a clear "ring" when tapped.

Repeat this "Ring test" immediately before mounting either a new or used wheel on to the machine, especially if the wheel has been in storage or out of service for a considerable time. Every wheel does not make the same sound when given a "Ring test". There are differences in "ring" from one type to another. Wheels bonded with organic material do not give out the same clear metallic ring or tone as do the vitrified and straight wheels.

It is helpful if a characteristic "ring" for a certain wheel-type can be established. This can be done by "ring testing" one or more similar wheels at the same time. If any wheel sounds different it must necessarily come under question.

STARTING WHEELS

The "ring test" will usually detect an external or internally cracked wheel and should be a part



of the regular procedure, but it is not a positive indication that a wheel is sound especially if the test is performed by inexperienced personnel. Therefore an extra precautionary "run-in" test is essential.

After mounting the wheel that has passed the "ring test" stand to one-side then run the wheel at full operating speed remember to put the wheel-guard in its place during the 'run-in' test. Special care is to be exercised when there is a possibility or suspicion that a particular wheel might have been dropped or exposed to stress. Such wheels should be returned to the manufacturers for re-inspection.

HAZARDS CREATED BY UNUSUAL CONDITIONS

Sometimes wheels in storage area subjected to unusual conditions caused by fire, floods, escaping steam, extreme temperature or humidity variations etc. some bond types may not be adversely affected by such exposure while others may become unsafe. Thus when such conditions arise, a detailed list of the wheels involved should be sent to the manufacturer along with a detailed complete report of what happened. The manufacturer may recommend that all or some types of the exposed wheels be returned for re-inspection.

HANDLE GRINDING WHEELS WITH CARE.

REMEMBER THERE IS NO SUCH THING AS AN UNBREAKABLE GRINDING WHEEL