DIESEL MECHANIC

MINING QUALIFICATIONS AUTHORITY

CODE: MMG

MAINTAIN A PEDESTAL GRINDER

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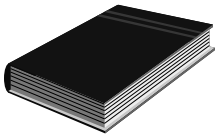
TRG 9

INDEX

The following elements are contained in this learning guide:

SOURCE REFERENCES



Mines Health and Safety Act

Manufacturers and Suppliers Specifications

In-company Standard Operating Procedures

In-company documentation

Training video : Use Hand Tools Part 2

Demonstration by a competent person e.g. Training Officer

OBJECTIVE

You will be learning towards the outcome “Maintain a pedestal grinder”. Whilst learning towards the outcome you will be required to achieve the following:

- Inspect a pedestal grinder and report findings.
- Replace the grinding wheel of the pedestal grinder.
- Dress the wheels of the pedestal grinder.
- State the safety rules to be observed when using a pedestal grinder.

On completion of this module, the learner must be able to:

- Inspect and maintain a pedestal grinder.
- Replace a grinding wheel on a pedestal grinder.
- Dress a grinding wheel.
- Use a pedestal grinder safely and correctly.

During this process you must adhere to certain specified requirements as listed in the Module.

ASSESSMENT AND EVALUATION CRITERIA

You will be assessed, when you are confident that you may achieve the outcomes as listed, to determine your competence as measured against the required criteria. This assessment will be in line with accepted best practices regarding assessment.

- A practical assessment will be set at the end of the module and must be completed without using reference.
- The learner will be required to:
  - Inspect and maintain a pedestal grinder in a safe condition.
  - Replace a wheel on a pedestal grinder.
  - Dress a grinding wheel.
  - Demonstrate and explain the safety rules and procedures applicable to grinding with a pedestal grinder.
- The following standards must be achieved:
  - The grinder must be inspected and maintained to the standard set in this module.

  - The replacement grinding wheel must be to set specifications.
  - Spacer pads must be fitted on each side of the wheel.
  - The grinding wheel nut must be tight.
  - All guards must be properly secured to the machine.
  - The tool rest must be as close as possible to the wheel. (Not more than 1mm)
  - The tool rest must be parallel with the wheel.
  - The wheel must run true with the shaft.
  - After being dressed, the wheel must no longer be glazed or loaded.
  - All the safety rules for grinding must be stated and demonstrated correctly.
- All appropriate safety procedures must be adhered to when working on and with the pedestal grinder.
- All answers must be correct and in accordance with the module content.

HAZARD IDENTIFICATION AND CONTROL (HIAC) FORM

MMG

MAINTAIN A PEDESTAL GRINDER

STEPS IN OPERATION / PROCESS	POTENTIAL ACCIDENT / INCIDENT	CONTROLS (BY RESPONSIBLE PERSON)
1. Adjust and maintain a pedestal grinder.	• Injury due to rotating parts.	• Isolate and lock the machine out before working on it. • Allow wheel to stop before working on it.
2. Use pedestal grinder.	• Eye injuries due to flying particles when grinding.	• Wear appropriate, enclosed safety goggles.
	• Injuries when loose clothing gets cought in rotating wheel.	• No loose clothing. Wear cap or hair net in case of long hair.
	• Disintegration of cracked or damaged wheel can cause serious injury.	• Always inspect wheel before commencing work. • Stand aside and allow wheel to run at full speed for a short while.
3. Use hand tools.	• Using damaged tools or wrong tools for the job can cause injury and damge to equipment.	• Always use the correct tools for the job. • Ensure tools are in good condition. • Use tools correctly. • Wear appropriate PPE where necessary. • Always take good care of tools. Maintain, clean and store it properly.

NOTE: Before doing the practical work contained in this module, the learner must study the content of the above HIAC form again and then sign the statement below.

The above risks, which will be encountered in this module, are fully understood and will be controlled during the practical work.

Signature of learner: _____

Signature of Training Officer: _____

Date: _____

1. THE PEDESTAL GRINDER

ITEM / TASK: Construction.

DESCRIPTION:

A. The pedestal grinder consists of an electric motor with a grinding wheel mounted on each end of the spindle. (Fig 1) For general purposes, one wheel is usually a coarse grained wheel for the fast removal of metal, while the other is a fine grained wheel for finish grinding.

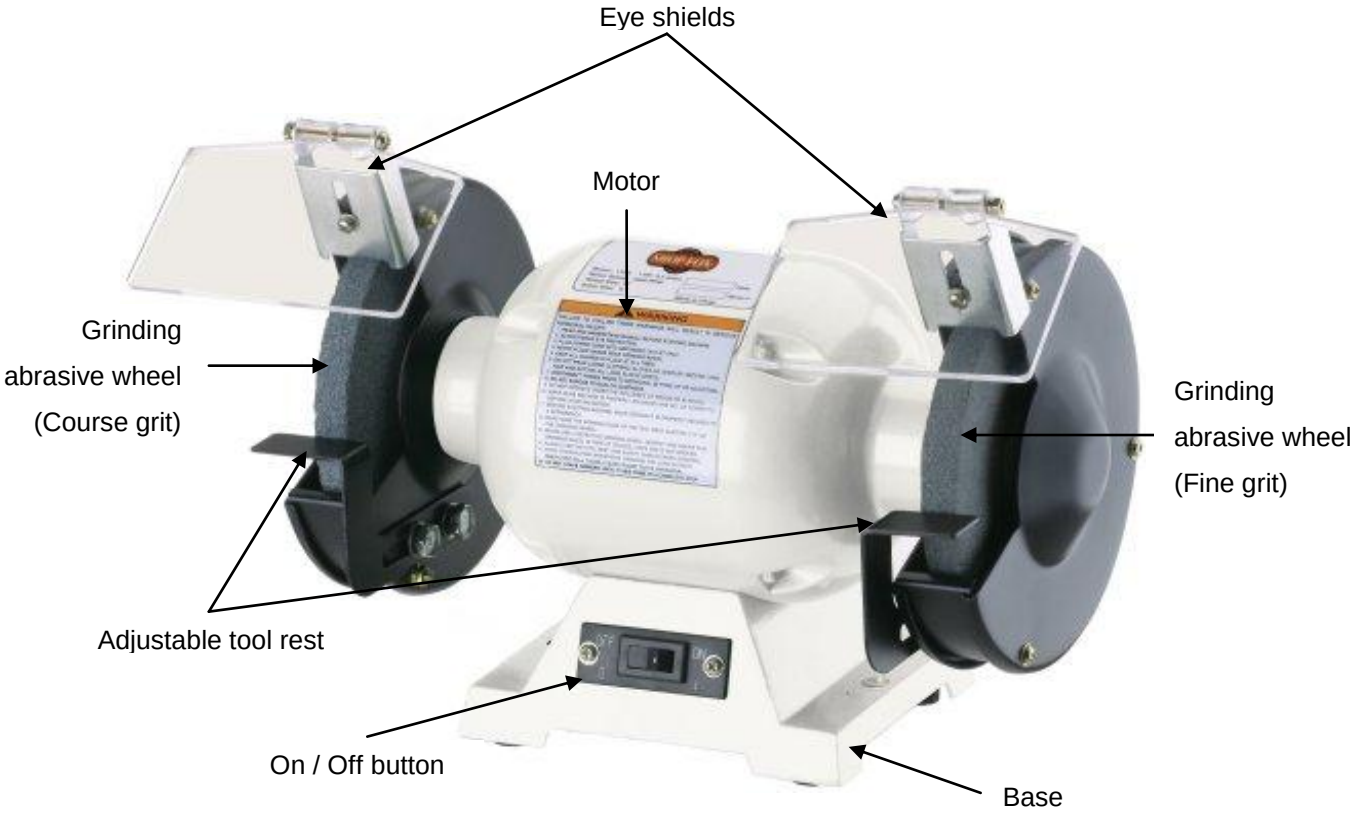


FIG 1.

B. The grinder base normally bolts onto a pedestal, which will be bolted to the floor.

C. In a machine shop, one wheel usually has a greenish colour and is used for grinding tungsten tipped tools. The other is a medium grained greyish colour wheel and is used for grinding high speed tools.

D. On the ordinary pedestal grinders, i.e. those which are usually used for grinding tool bits, drills, etc. provision is not made for cooling the work during grinding. However, a water container into which the tool may be dipped is provided. This water must be free from soluble oil.

ITEM / TASK: Inspection and maintain a pedestal grinder.

DESCRIPTION:

A. Before using a pedestal grinder, it must be inspected for the following, and any defects must be corrected:

- Make sure the grinder is isolated.
- Condition of grinding wheel – must not be chipped or cracked. Replace if necessary.
- Wheel must be properly secured.
- The tool rest must be as close as possible (not more than 1mm) from the wheel and parallel to the wheel. Adjust if necessary.
- The wheel is not loaded or glazed. Dress the wheel if necessary. (See later in this module)
- Switch on and check if the wheel runs true. If not, switch off and correct.

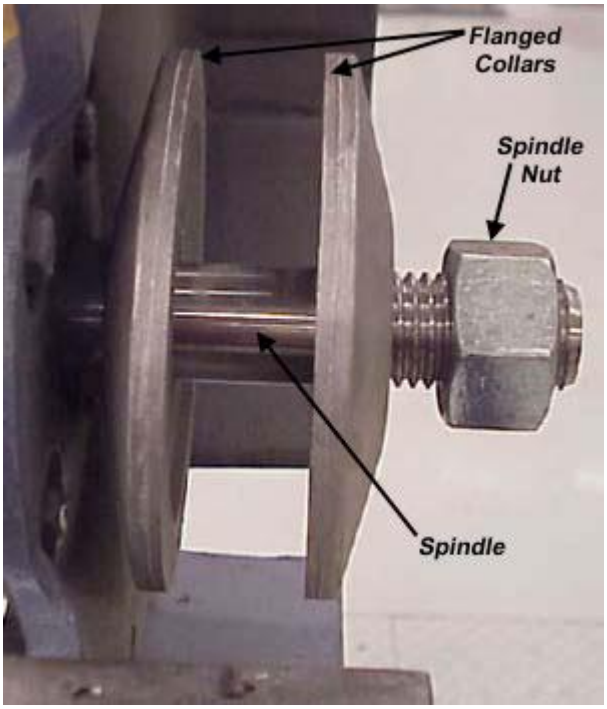


FIG 2 - COMPONENTS / PARTS SECURING THE WHEEL.

2. REPLACE A GRINDER WHEEL

ITEM / TASK: Reasons for replacing a grinding wheel.

DESCRIPTION:

A. When the grinding wheel reaches the stage where it is worn to the diameter of the spacer pads, or when the tool rest is at its extreme, and there is excessive clearance between the rest and the wheel, the wheel must be replaced.

B. If a wheel is chipped or cracked, it must be replaced.

NB:

Fine cracks that are not obvious can be detected by doing the following sound test on it. Balance the wheel with your fingers through the bore and tap it with a non-metallic instrument, e.g. the handle of a screwdriver or mallet. See Figure 3. If the wheel is undamaged, it will give a clear tone.

FIG 3.

C. Ensure the correct grinding wheel is used for the type of material to be ground. Always ensure that a wheel with the correct specifications is replaced.

NB:

Grinding wheels are marked to indicate the type of wheel e.g. abrasive, grain size, type, etc. a typical marking might be 32A60 – K5VBE. See figure 4 below.

FIG 4.

<u>32A60 – K5 VBE</u>

32A	=	Abrasive type
60	=	Abrasive size (Grit)
K	=	Grades
5	=	Wheel Structure
VBE	=	Bond Type

The specification code of the grinding wheel usually consists of the following basic parts:

- **Abrasive Type (32A)**
  The index for the type of abrasive grain used is shown at the beginning of the code.
- **Abrasive Size / Grit Size (60)**
  This defines the size of abrasive grains used in the grinding wheel.
  This number can range from between 10 up to 800. The smaller the number, the coarser wheel.
- **Wheel Grade / Hardness (K)**
  This letter denotes the grade or hardness of the grinding wheel.
  The letters A to Z characterises the degree of hardness with A referring to the softest and Z as the hardest.
- **Wheel Structure / Porosity (5)**
  The structure number is shown immediately after the grade letter. This denotes the porosity of the grinding wheel. The higher the number, the more porous is the grinding wheel.
- **Bond Type (VBE)**
  The bond type is defined by a letter immediately after the structure number. This is the material holding everything together and is *usually* either 'V' (Vitrified) or 'B' (Resinoid or resin) but there are a few others.

ITEM / TASK: Replace a grinding wheel.

DESCRIPTION:

A. Switch off and lock out the power to the pedestal drill and ensure the wheel is stationary before commencing work.
B. Remove the covers.
C. Remove the nut.

NB:

The spindle on the left hand side when viewing from the front will have a left hand thread. Holding the right hand side with a suitable wrench and turning the left hand side in a clockwise direction will loosen the left hand wheel.

D. Remove the flanges.
E. Remove the wheel.
F. Ensure that the RPM on the grinder do not exceed the RPM of the relevant grinding wheel. If the information on the stone is not visible, do not fit the grinding wheel.
G. Fit a clean recessed inner flange onto the spindle.
H. Check that the wheel is fitted with spacer pads and intact.
I. Slide the wheel over the spindle without using force.
J. Tighten the nut to hold the wheel firmly in place. See figure 5 below.
K. Replace the wheel guard.
L. Spin the wheel by hand and check the run – out and freedom of movement.
M. Adjust the tool rest that it is as close as possible (not more than 1mm) from the wheel. See Fig 6 below.

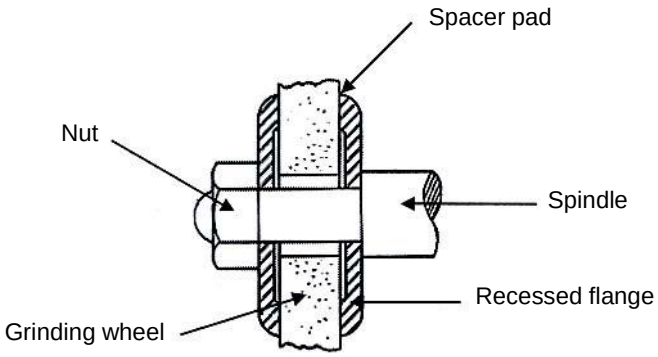


FIG 5.

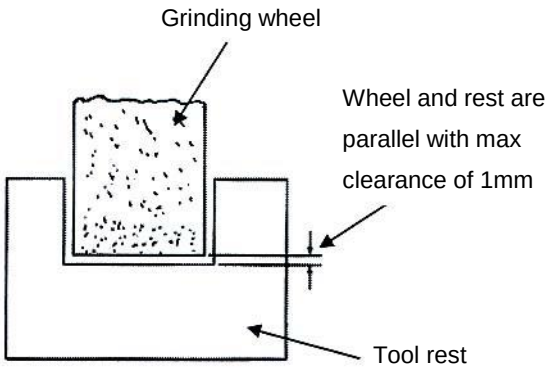
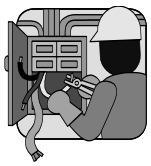


FIG 6.

DO THE PRACTICE ON THE NEXT PAGE.



PRACTICE

1. Inspect a pedestal grinder in the workshop and report your findings.
2. Replace the grinding wheel of a pedestal grinder.

Ask your Training Officer to check your work and if it is correct, to sign below and then go on to the next section.

LEARNER	TRAINING OFFICER
DATE :	DATE :
SIGNATURE :	SIGNATURE :

3. DRESS A GRINDING WHEEL

ITEM / TASK: Reasons for dressing a grinding wheel.

DESCRIPTION:

A. When non – ferrous metals such as aluminium, copper, etc. are ground on a grinder, they will clog the pores of the wheel and prevent it from cutting. This condition is indicated by pieces of metal being embedded in the surface of the wheel. The wheel is then said to be ***loaded*** and must be dressed.

B. If the surface of the wheel develops a smooth, shiny appearance, it is said to be ***glazed***. This indicates that the wheel is blunt and will not cut properly.

C. When the cutting surface of the wheel is not running true or is not parallel with the tool rest, it can be corrected by dressing the wheel.

ITEM / TASK: Dress a grinding wheel.

DESCRIPTION:

A. Adjust the tool rest so that the lugs of the dresser can be hooked over the back of the rest. See Figure 7 below.

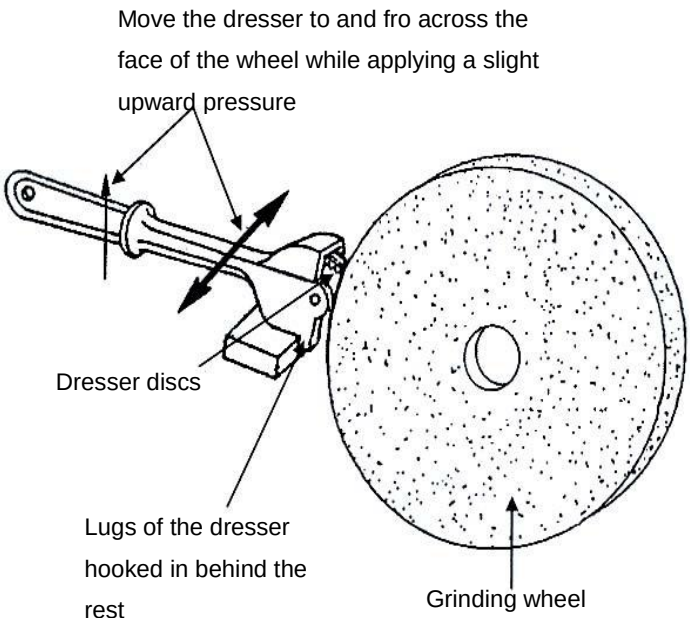


FIG 7.

B. Check the inside face of the tool rest to make sure that it is straight.

If it is not straight, the dresser will follow the shape and reproduce the same pattern on the face of the grinding wheel. See Figure 8 below.

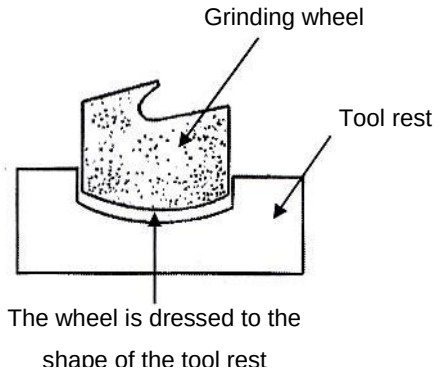
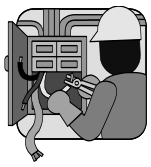


FIG 8.

C. Put on safety goggles to protect your eyes. (User and bystanders)
D. Use ear protection if necessary. (User and bystanders)
E. Stand aside and switch the pedestal grinder on. Allow the wheel to reach maximum speed before commencing with dressing the wheel.
F. Hook the lugs on the dresser over the back of the rest.
G. Slowly move the dresser back and forth across the wheel and apply pressure between the rollers and the wheel by lifting the handle of the dresser. Refer back to Figure 7.
H. Repeat the previous step until the surface of the wheel is clean and flat.
I. Re-adjust the tool rest. The rest should be as close as possible to the wheel. (Not more than 1 mm)

DO THE PRACTICE ON THE NEXT PAGE BEFORE CONTINUING WITH THE REST OF THE MODULE.



PRACTICE

Dress the wheels of the pedestal grinder.

Ask your Training Officer to check your work and if it is correct, to sign below and then go on to the next section.

LEARNER	TRAINING OFFICER
DATE :	DATE :
SIGNATURE :	SIGNATURE :

4. SAFE WORK PROCEDURES

ITEM / TASK: Safety rules when grinding.

DESCRIPTION:

A. The pedestal grinder must be isolated prior to any adjustment being made to the pedestal grinder.
B. The operator's standing area must be free from any lubricant and loose material to prevent slipping or tripping, which may result in the operator falling onto the moving part of the pedestal grinder.
C. The operator's hands must be free from oil or grease to prevent slipping of the work piece.

D. Loose fitted clothing must not be worn as it may be caught in the moving part of the pedestal grinder.
E. Safety goggles or a face shield must be worn when grinding to protect the operator's eyes.

F. Ear protection can be used if necessary.
G. The operator must stand aside and let the wheel run until it has reached maximum speed, before beginning to grind.
H. Never operate a grinding wheel at speeds higher than those recommended by the manufacturer.
I. Never use hand gloves or rags when grinding.

DO THE SELF-TEST ON THE NEXT PAGE.

SELF TEST

State the safety rules that must be observed when using a pedestal grinder.

Check your answers against the notes.

Ask your Training Officer to check your work and if it is correct, to sign below.

LEARNER	TRAINING OFFICER
DATE :	DATE :
SIGNATURE :	SIGNATURE :

REMEMBER ALWAYS WORK SAFE

Once you have passed the entire practices and self test, you are now at liberty to request a Formative Assessment from your Assessor.