Abrasive Wheels Course

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Welcome & Introductions

- Introductions, me & you!
- Housekeeping: Fone, Food, Fire, Finish!
- Notes
- Great expectations!
- Assessment: Written test, Skills demonstration

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Contents

- What? Why?
- Legislation
- Methods of marking
- Inspection, Handling, storage & transporting
- Hazards, risks & controls
- Components
- Mounting, dressing & trueing
- Operating

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Course Aim

The aim of this course is to provide you with the Knowledge, skills and attitude to be able to train others how to inspect, select and mount abrasive wheels

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Unit 1 What & Why?

The aim of this module is to provide you with an understanding of what abrasive wheels are.

At the end of this module you will be able to:

- Explain what abrasive wheels are.
- List the different types of abrasive wheels.
- State the characteristics of these
- Explain why training is required

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Abrasive Wheels

What Abrasive Wheels are:

- A wheel consisting of abrasive particles held together used for cutting or grinding

Examples of Abrasive Wheels equipment?



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Organic bonds

- **How?**

Cured at low temperatures.
Bonded by resin, rubber.

- **Characteristics?**

Tough, shock resistant, self dressing

- **Uses?**

Non precision grinding and cutting off

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Inorganic bonds

- **How?**

Vitrified: Fired in a furnace at high temperature

- **Characteristics?**

Strong, Hard, brittle, require dressing

- **Uses?**

Precision grinding on pedestal grinder

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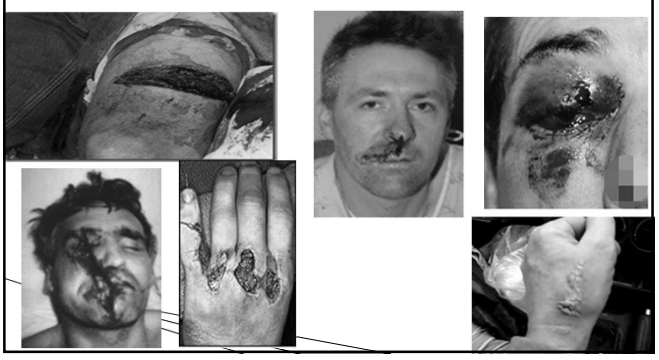
Abrasive Wheels Injuries

- What parts of the body? Caution graphic images!!



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Why?

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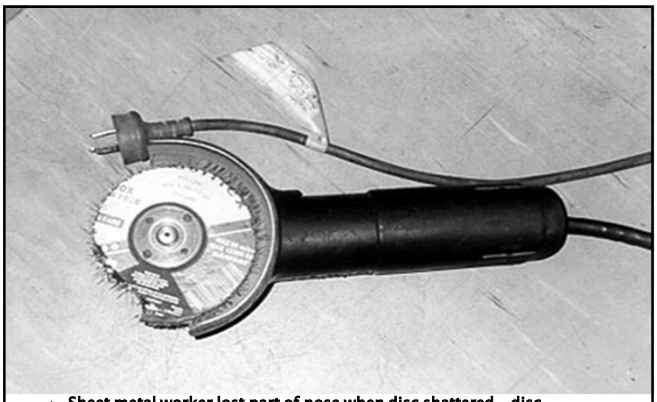

- Sheet metal worker lost part of nose when disc shattered – disc subjected to excessive bending and pressure, overheated and shattered.

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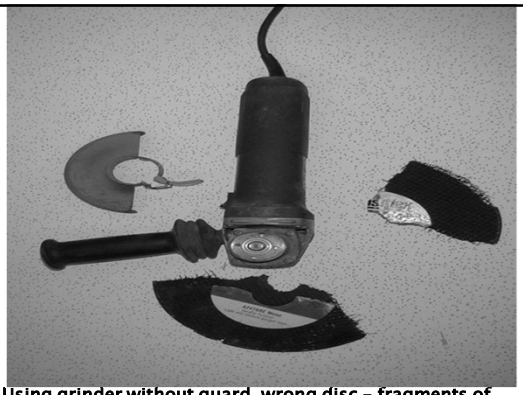

- Using grinder without guard, wrong disc – fragments of shattered disc penetrated chest & stomach resulting in fatality of operator.

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Q & A

- Abrasive Wheels?
- Organic: How? Bonds? Characteristics? Uses?
- Inorganic: How? Bonds? Characteristics? Uses?
- Why?

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Unit 2 Legislation

The aim of this module is to provide you with an understanding of your rights & responsibilities

At the end of this module you will be able to:

- List the duties of the employer and employees,
- State and explain the requirements of the Abrasive Wheels Legislation 2016,
- Explain the implications of not complying with these requirements.

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Safety Health & Welfare at Wo

Duty of the employer	Duties of the employee

- Safe Place of Work
- Safe Access & Egress
- Safe Systems of Work
- Safe Plant and machinery
- Provide PPE
- Training
- Risk Assessment
- Supervision

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Abrasive Wheels Regulation 2016

- Must be suitable to the work
- Must have expiry date, speed, restrictions of use
- Must have any other information for safe use
- Every machine must be marked with speed
- Properly mounted by authorised personnel
- Guards must be provided, secured, maintained
- Enclosed except where required for work
- Rests must be provided, adjusted & secured
- Provide flanges where required for safe use

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Case Study

- Using 5-inch angle grinder on wrought iron gate
- Abrasive wheel broke and pieces flew off
- One piece flew off severing a large artery of leg
- Wheel rated for 6,000 rpm, grinder 10,000
- 9 inch Wheel on 5 inch grinder
- Guard not in place

What would you like to know in deciding on whether he got compensation?

Training?
Who told him?

Compensation?

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Recap- Questions & Answers!

- Duties of employers?
- Duties of employees?
- Abrasive Wheels Regulation requirements?
- Implications for non compliance?

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Unit 3 Method of Marking

The aim of this module is to provide you with an understanding of the marking on a wheel

At the end of this module learners should be able to:

- State the information on an abrasive wheel
- Explain what this information stands for

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What information?

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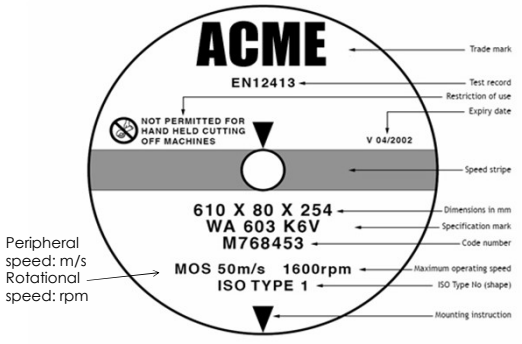
Wheel selection: Marking



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EUROPEAN SYSTEM FOR MARKING ABRASIVE WHEELS

Order of marking	0	1	2	3	4	5	6
	Type of abrasive*	Nature of abrasive	Grain size	Grade	Structure	Nature of bond	Type of bond etc*
Example	51	A	36	L	5	V	23

Aluminium Abrasives A

Silicon Carbide Abrasives C

Coarse	Medium	Fine	Very Fine
8	30	70	220
10	36	80	240
12	46	90	280
14	54	100	320
16	60	120	400
20		150	500
24		180	600

Soft — Medium — Hard

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Spacing: From the closest to the most open	
0	8
1	9
2	10
3	11
4	12
5	13
6	14
7	etc.

V	Vitrified
S	Silicate
R	Rubber
B	Resinoid Synthetic resins
BF	Resinoid (Synthetic resins reinforced)
E	Shellac
Mg	Magnesia

* Optional Symbols. The symbols 0 and 6 are the manufacturer's own

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Restrictions on use of Abrasive Wheels

- RE1: Not permitted for hand-held and manually guided grinding;
- RE2: Not permitted for hand-held cutting-off machines
- RE3: Not suitable for wet grinding;
- RE4: Only permitted for totally enclosed working area
- RE6: Not permitted for face grinding.

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Recap- Questions & answers

- Wheel information?

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Unit 4 Inspection, Handling & Storage

The aim of this module is to provide learners with an understanding of how abrasive wheels should be inspected, handled & stored

At the end of this module learners will be able to:

- List what an abrasive wheel should be tested for;
- Inspect an abrasive wheel;
- Carry out a ring test;
- Explain how abrasive wheels should be handled;
- Explain how abrasive wheels should be stored.

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Handling of Abrasive Wheels?

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Storage & transportation

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Visual inspection?

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Ring test

- Use non metallic implement
- Tap wheels about 2 inches from edge
- Rotate the wheel 45 degrees and repeat the test.
- Thud = Dud

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Ragged & exposed fibreglass

Insufficient clamping
Incorrect product grade

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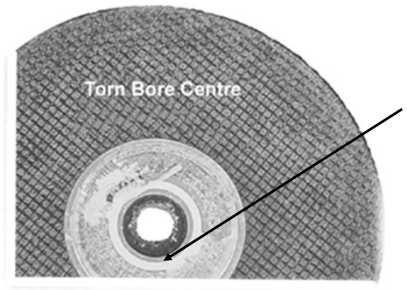
Torn bore



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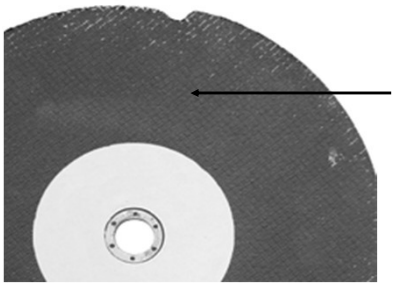
Snagging in the cut



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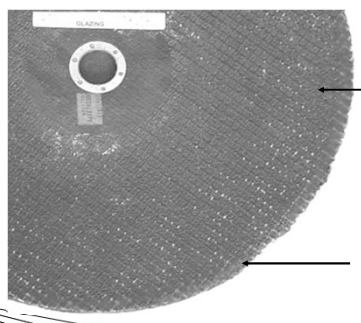
Glazing



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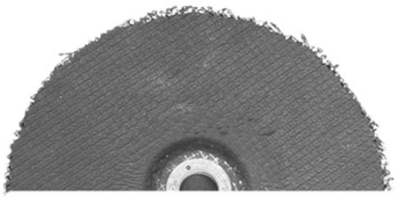
Back chipping 'Straw Hatting'



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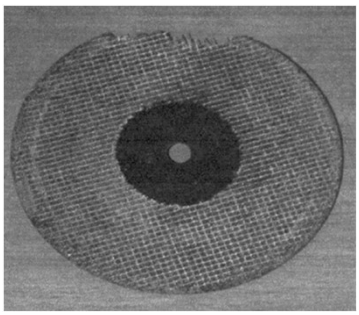
Facial wear to reinforcement



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Recap

- What do you inspect them for?
- How do you carry out a ring test?
- How should they be handled?
- How should they be stored & transported?

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Unit 5 Risk Assessment

The aim of this module is to you an understanding of the risks associated with abrasive wheels

At the end of this module you will be able to:

- State the hazards and harm associated with abrasive wheels;
- State the precautions required to control these.

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Explanations

What is Risk Assessment?

What is hazard?

What is harm?

Controls?
Arrangements in place to reduce risk

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Hazards, Risks & precautions?

Hazards	Harm	Controls

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Recap

- Hazards/ harm?
- Precautions?

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Unit 6 Components

The aim of this module is to you an understanding of the different components of equipment

At the end of this module you will be able to:

- List the components of AW equipment
- State their function
- List the precautions to be taken with these

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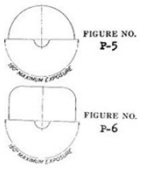
Guards

Function:
To protect against contact and ejected materials

Precautions. Make sure safety guards:



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Flanges

Function:
To secure the wheel

Precautions. Make sure flanges are:

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Blotter

Function:
Prevent slipping at lower clamping force

Precautions: Make sure blotters are:
- covering the entire flange contact area.
- not scuffed or damaged
- free from wrinkles

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Bushes

Material:

Plastic or metal

Function:
Used to reduce the hole size on abrasive wheel

Precautions: Make sure bushes are:
- measured correctly
- not in contact with the flange
- cannot come loose inside recess of flange
- Fits freely on the spindle

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Spindle

Function:
- Rotates the wheel

Precautions: Ensure spindle is:

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Recap Q & A

- Bushes, Function? Precautions?
- Guards, Function? Precautions?
- Blotters, Function? Precautions?
- Flanges, Function? Precautions?

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Unit 7 Mounting, dressing, trueing and using an abrasive Wheel

The aim of this module is to provide you with an understanding of how to mount, dress and true an abrasive wheel.

At the end of this module you will be able to:
- State the steps and precautions for mounting
- State the steps and precautions for using
- State the steps and precautions for dressing
- State the steps and precautions for trueing

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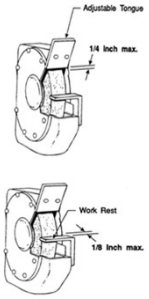
Mounting (Bench Grinder)

- Disconnect from power source
- Use correct tool to loosen outer nut
- Remove inner nut/ flange/wheel
- Check guard, flange, spindle
- Check wheel and information
- Hand tighten outer nut
- Adjust tongue guard and work rest
- Ensure guard is secure
- Rotate wheel to check rotation



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Wheel operation

- Wear appropriate PPE
- Stand to one side and test for 1 min
- Avoid bumping
- Do not jam work between wheel and tool rest
- Gradually apply pressure
- Don't use side of wheel to grind
- Move material back and forth across face of wheel
- Use right wheel for the job

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Dressing & Trueing (bench)

- Use star or diamond dresser
- Trueing- restoring even and circular shape
- Vibrates excessively
- Apply pressure evenly
- Never use work piece to dress or true a wheel

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Mounting a handheld grinder

- Disconnect from power source
- Use key to loosen outer nut/ flange
- Take care not to catch fingers
- Remove old disc
- Remove inner nut/ flange
- Check for particles between contact surfaces
- Check guard, flange, spindle, disc
- Ensure disc is orientated correctly
- Tighten outer nut/flange (Do not over tighten)
- Ensure guard is oriented correctly
- Rotate disc to ensure it is rotating correctly

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Handheld grinder operation

- Wear appropriate PPE
- Check environment for fuel
- Allow to reach its operational speed
- Ensure correct disc for the job
- Ensure correct stance
- Ensure work-piece is secured correctly
- Avoid bumping or twisting blade
- Apply pressure gradually
- Allow to stop before placing down

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Fitting an abrasive wheel on a Con Saw

- The engine must be switched off
- Use pin & wrench to loosen the screw.
- Remove the flange & wheel
- Check, guard, flange, spindle
- Check condition and information on new disc
- Note the direction of rotation when replacing
- Tighten the screw with wrench.
- Draw the locking pin out of the guard.
- Rotate wheel to check it is mounted correctly

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Recap Q & A

- Safe operation?
- Demonstration

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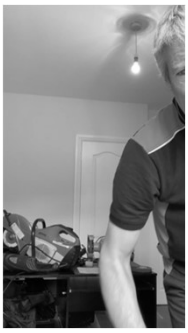
Changing Wheel on bench grinder



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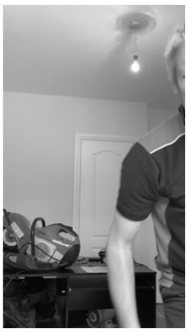
Changing Disc on handheld grinder



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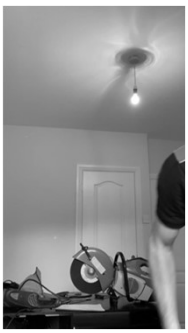
Changing Wheel on Consaw



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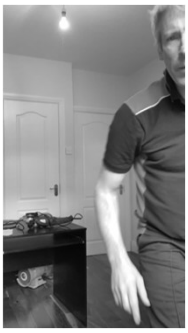
Changing the disc on a handheld Grinder



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Changing Wheel on bench grinder

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