

SAFETY

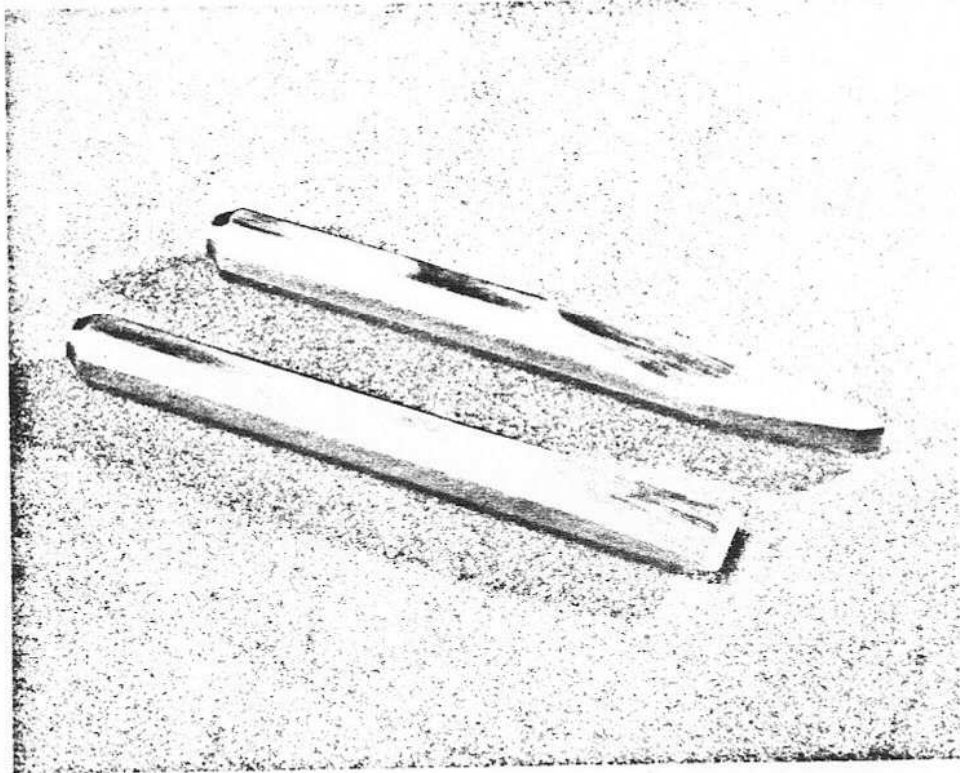
SAFETY ON BENCH HEARTH

1. Always make sure that nothing inflammable has been left on hearth.
2. Use protective gloves or aprons when suitable for a particular job.
3. Make sure that the appropriate liquid for quenching is at hand before heating job.
4. Use correct handling tongs.
5. Switch off heat source after use.
6. Do not leave hot jobs lying about unless with appropriate notice.

FIRST YEAR

BENCHWORK
FITTING
MACHINING
TASK 2 EM(1)

TWO CHISELS



RISLEY APPRENTICE TRAINING

SAFETY NOTES APPENDED MUST BE STUDIED
BEFORE COMMENCING RELEVANT OPERATION

UKAEA RISLEY APPRENTICE TRAINING

BENCHWORK & FITTING

LATHEWORK

TASK 2

FLAT & CROSS-CUT CHISELS

Practical	Reference Dwgs-C of P-STD3
Elementary Forging. Further development of materials (ie Carbon steels) Further, Filing and Simple Lathework. Use of Forging Tools. Heat Treatment. Hardening and Tempering, Shaping, Off-hand Grinding. Use of the chisel on several exercises.	

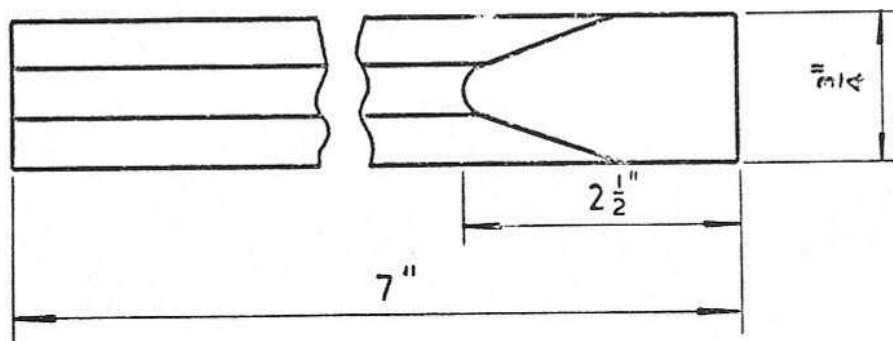
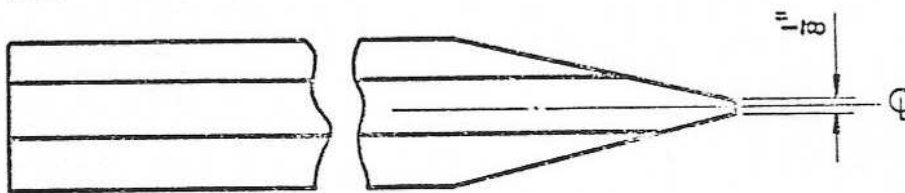
FLAT CHISEL



<u>MATERIAL</u>	—	$\frac{3}{4}$ "	OCTAGONAL	STEEL	
<u>COMPOSITION</u>	%				
			0.9		C
			1.2		Mn
		0.3	0.5		Cr
		0.1	0.2		V
		0.35	0.5		W

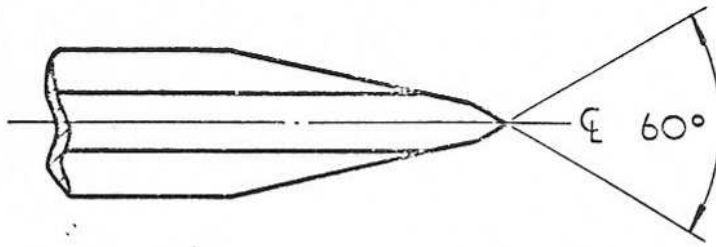
CUT TO LENGTH + $\frac{1}{4}$ "

SMOOTH ALL EIGHT SURFACES WITH SMOOTH FILE. AND EMERY.
 KEEPING CORRECT FORM.

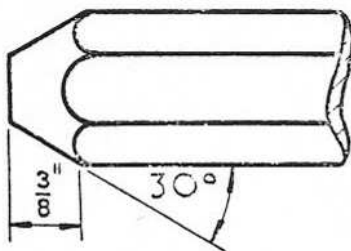


REMOVE SURPLUS MATERIAL TO SHAPE ABOVE. DISCUSS
 METHOD OF REMOVAL WITH INSTRUCTOR.

INSTRUCTORS GUIDANCE TO BE GIVEN ON
 ALL OPERATIONS



SHAPE CUTTING EDGE
BY FILING (ROUGH-SMOOTH)



* SHAPE OPPOSITE END IN LATHE AND FACE UP TO
CORRECT LENGTH. INSTRUCTOR MUST BE INFORMED
OF INTENTION TO USE LATHE.

ANY:

INDENTATIONS OR MARKS TO BE REMOVED BEFORE
HEAT - TREATMENT.

HEAT TREATMENT:- (EXTENDING $1\frac{1}{2}$ " FROM CUTTING
EDGE) HEAT TO 800°C (RED) QUENCH IN OIL.
POLISH AND RE-HEAT TO 200°C (LIGHT STRAW) QUENCH
IN WATER

TEST:-

TEST CUTTING - EDGE ON MILD STEEL.

POLISH BY HAND USING VARIOUS
GRADES OF EMERY.

* THIS TASK TO BE COMPLETED DURING THE TURNING
MODULE.

INSTRUCTORS GUIDANCE TO BE GIVEN ON
ALL OPERATIONS

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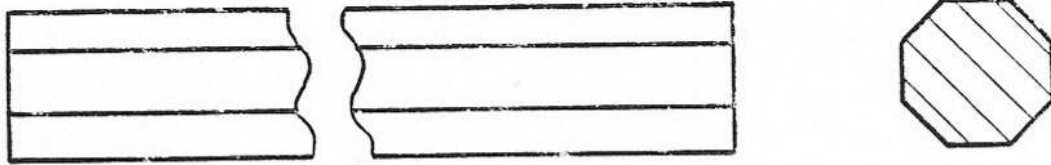
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CROSSCUT CHISEL

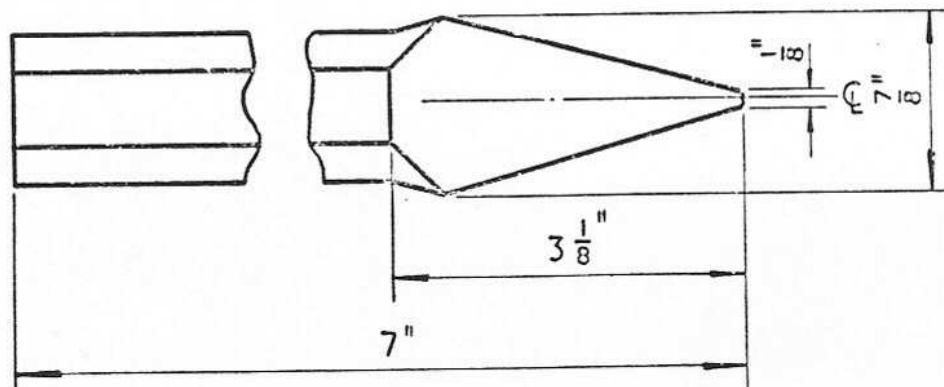
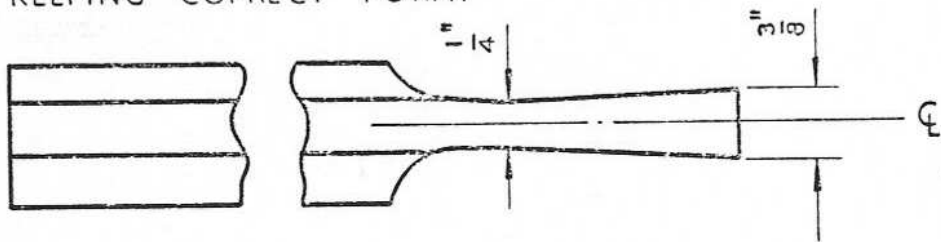


MATERIAL — $\frac{3}{4}$ " OCTAGONAL STEEL

<u>COMPOSITION</u> %	0.9	—	C
	1.2	—	Mn
	0.3 — 0.5	—	Cr
	0.1 — 0.2	—	V
	0.35 — 0.5	—	W

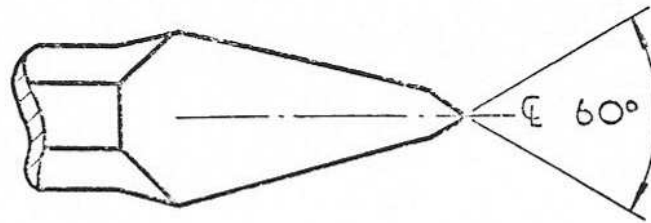
CUT TO LENGTH + $\frac{1}{4}$ "

SMOOTH ALL EIGHT SURFACES WITH SMOOTH FILE AND EMERY,
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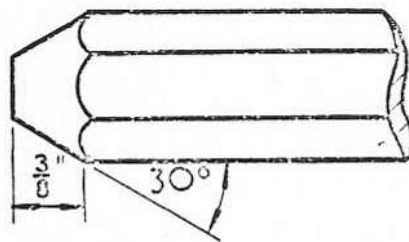


SHAPE BY FORGING
REMOVE SURPLUS MATERIAL
DISCUSS METHOD OF REMOVAL WITH INSTRUCTOR.

INSTRUCTORS GUIDANCE TO BE GIVEN ON
ALL OPERATIONS



SHAPE CUTTING EDGE
 BY FILING (ROUGH-SMOOTH)



*

SHAPE OPPOSITE END IN LATHE AND FACE UP TO CORRECT LENGTH. INSTRUCTOR MUST BE INFORMED OF INTENTION TO USE LATHE.

ANY:

INDENTATIONS OR MARKS TO BE REMOVED BEFORE HEAT-TREATMENT.

HEAT TREATMENT :- (EXTENDING 1 1/2" FROM CUTTING EDGE) HEAT TO 800°C (RED) QUENCH IN OIL. POLISH AND RE-HEAT TO 200°C (LIGHT STRAW) QUENCH IN WATER.

TEST :-

TEST CUTTING EDGE ON MILD STEEL

POLISH BY HAND USING VARIOUS GRADES OF EMERY

THIS TASK TO BE COMPLETED DURING THE TURNING MODULE

*

INSTRUCTORS GUIDANCE TO BE GIVEN ON ALL OPERATIONS

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UKADA RISLEY APPRENTICE TRAINING

TWO CHISELS

FINAL ASSEMBLY

1. Remove all burrs - sharp edges - and corners - high polish finish.
2. INSTRUCTOR to inspect.

NOTE:

Instructor's guidance to be given on all operations

DESIGN PREPARED BY		APPROVED BY	
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UKAEA RISLEY APPRENTICE TRAINING

TWO CHISELS - INSTRUCTOR'S REPORT AND COMMENT

APPRENTICE

1. Comment on Job Approach:

2. Comment on Amount of Attention Required:

3. Comment on, Quality:, Accuracy Finish ...

Speed:

Efficiency:

Relevant Points:

Instructor's Signature

Date

DETACHABLE

SAFETY

HANDTOOLS AND BENCHWORK

More accidents occur from the use of hand tools than from any other source. One of the reasons is that many hand tools are used improperly. Here are a few safety suggestions which will help you avoid injury.

MARKING OUT TOOLS

1. It is very dangerous to carry sharp tools, such as scribers, dividers and screw-drivers, in your pocket.
2. Place marking out tools on the bench in such a way that the sharp points cannot puncture your hands.
3. Carry all sharp-pointed tools with the points down.
4. Sharp tools are safer to use than dull ones. Always inspect scribers, center punches and dividers before using them.
5. Place all heavy objects, such as angle plates, surface plates and work-pieces, so they cannot drop off the bench and injure your feet.
6. Form the habit of handling all tools carefully.

VICES

1. It is unsafe to play with the handle on a bench vice. Your fingers may be pinched between the knob of the handle and the vice screw.
2. When using jaw caps made of sheet metal, be sure there are no sharp points or sticking up that will cut your hands or fingers. Use a hammer to tap them down.
3. Use a brush to clean metal filings from the vice or the work. Never attempt to blow them away - they will fly back in your eyes.

HAMMERS

1. Accidents with hammers are caused by greasy or sweaty hands. A greasy handle causes the hammer to slip. Keep the handle clean and free of oil or grease, and wipe your hands before using one.
2. Inspect your hammer before using it to make certain the handle is not loose or split. Check the wedge to make sure it is tight.
3. It is not safe to grip a hammer near the head. Learn to hold and use a hammer correctly, and it will never injure you.
4. Check plastic and rawhide hammers for loose tips. Badly worn or damaged faces on these hammers are not safe.
5. Be careful not to strike sharp hardened edges with a hard hammer. Pieces may break off and fly at great speed, causing a serious injury.

PLIERS

1. Always select the correct type and size of pliers for the job. Using the wrong type may result in injury.
2. When applying considerable pressure, keep your fingers away from the jaws, so if the work slips, you will not be injured.
3. Never hammer with a pair of pliers. To do so may injure them and you too.
4. Pliers must not be used on finished machine parts, or to turn bolts or nuts.

FILES

1. Using a file without a handle is dangerous.
2. Dirty files may be the cause of an accident. Keep yours clean.
3. Do not let the file touch the vice jaws. The jaws are hardened, and the file will slip over them and may cause an injury.
4. Files are very brittle. If struck against other metal parts, they will break. The flying pieces may cause an injury.

WRENCHES

1. Always select the best type of wrench available, and check its condition before using it.
2. It is safer to use box or socket wrenches on hexagon bolts and nuts as a first choice. Use open-end wrenches as a second choice. Avoid adjustable wrenches unless there are no others available.
3. When using a wrench around a machine, always stop the machine first.
4. A sudden jerk or tap on a wrench will produce better results than steady pulling when loosening a bolt or nut.
5. When using large, heavy wrenches, keep yourself well braced so you do not lose your balance if the wrench slips or the bolt loosens suddenly.
6. Remember, you should always pull on a wrench - never push.
7. It is a good idea to keep the following point in mind: "What will happen if the wrench slips?"

SAFETY

LATHES

1. You must not attempt to operate a lathe until you have received instructions from your instructor.
2. Correct dress is important. Remove rings and wrist watches. Roll up your sleeves, wear safety shoes, safety spectacles, cap and hair net when the hair is long.
3. It is both dangerous and foolish to try to lift heavy chucks and attachments alone. Always get help.
4. Always make certain your work is set up securely and tightly when using chucks and collets.
5. When holding work between centres, make sure you use the correct size of centres with good points. Never use a soft centre in the tailstock. Soft centres may be used in the headstock spindle only. Apply oil or white lead to the tailstock centre, and adjust it properly. If too tight, the point will heat up and burn off.
6. Tool bits must be sharp and ground to the correct shape. Be sure they are set at the proper height and angle to the work and clamped securely.
7. Guards over belts, chuck guards, chip guards and gears must never be removed unless you first get permission from your instructor. The power must be shut off at the switchboard before removing guards for any reason.
8. After setting up the lathe, remove all wrenches, oil cans, and other tools from the work area. When work is held on a faceplate, turn the faceplate by hand for a complete revolution to make certain the work will not strike any part of the lathe.
9. Always stop the lathe before making adjustments of any kind to tool, work or machine. Avoid trapping between workpiece and tool.
10. Do not change spindle speeds until the lathe comes to a dead stop.
11. Never attempt to measure work while it is turning.
12. Never file lathework unless the file has a handle.
13. It is dangerous practice to leave a chuck key in the chuck - even for a moment.
14. Keep rags, cotton waste, and brushes away from knurling tools while knurling the work.
15. It is unsafe to have small-diameter work extending more than an inch or two from a chuck or collet unless it is supported by the tailstock centre.
16. You should always know in what direction and how fast the carriage or cross feed will move before you turn on the automatic feeds.
17. Be very careful not to run the carriage or compound slide into the turning chuck.

SAFETY

SAFE USE OF A BENCH OR PEDestal GRINDER (OFFHAND GRINDING)

SAFETY

1. Always wear safety glasses or a face shield, even though the grinder is equipped with safety eyeshields.
2. Make sure the tool rest is set close to the wheel. It should be no more than about 1/16 inch from the wheel for safety. Most accidents happen when the workpiece becomes wedged between the revolving wheel and the tool rest. This can break the wheel and cause a serious injury.
3. Never let your fingers touch the wheels while they are turning. A grinding wheel is a cutting tool.

HINTS FOR USING A GRINDER

1. Use only the face of the wheel, never the sides.
2. Keep the wheels dressed properly. It is impossible to do good work on wheels that are grooved or rounded.
3. Move the work across the face of the wheel while grinding. To hold it in one place puts a groove in the wheel.
4. When sharpening small chisels, scribers, or punches, always hold the points up on the wheel away from the tool rest - never near it.
5. An offhand tool grinder is mainly for sharpening hardened steel cutting tools. It is not good practice to grind soft metals on these grinders. To do so clogs up the wheels quickly, which requires dressing them before a tool can be sharpened. Soft metals can be filed or machined.