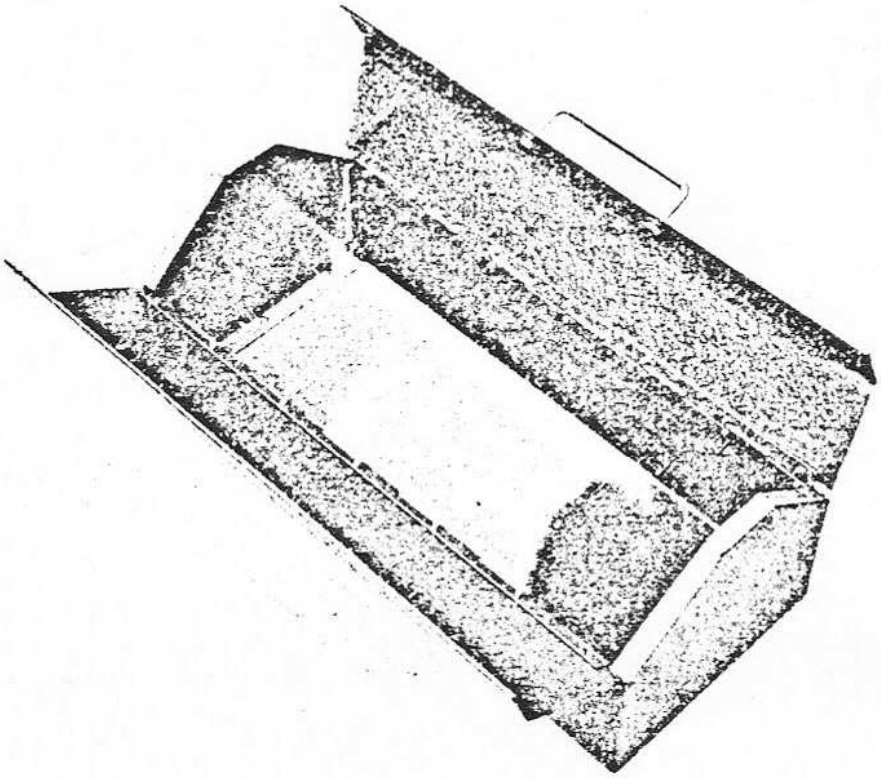
DRAFT

FIRST YEAR

BENCHWORK AND FITTING
TASK 1 EM(M)

FITTER MET 1986.

TOOL BOX



SAFETY NOTES APPENDED MUST BE STUDIED

BEFORE COMMENCING RELEVANT OPERATION

SAFETY

The instructor must be informed of the intention to use the Guillotine and Bending or Folding machine and operation of these machines must be explained by the instructor.

DIMENSIONS IN MILLIMETRES

(X) DIMENSIONS ARE IMPERIAL
DUE TO MATERIAL STOCK POSITION
& MACHINERY

UKAEA RISLEY APPRENTICE TRAINING

BENCHWORK & FITTING

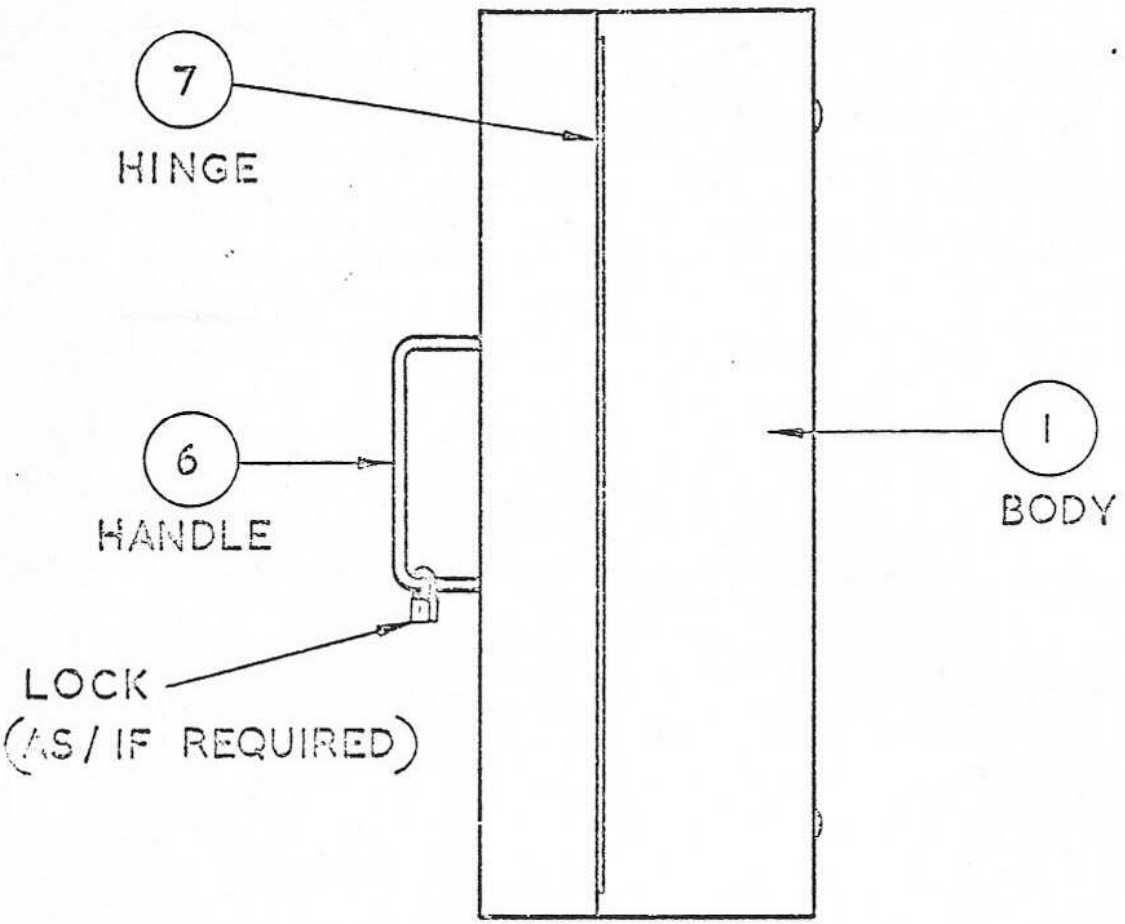
TASK 1 EM (M)

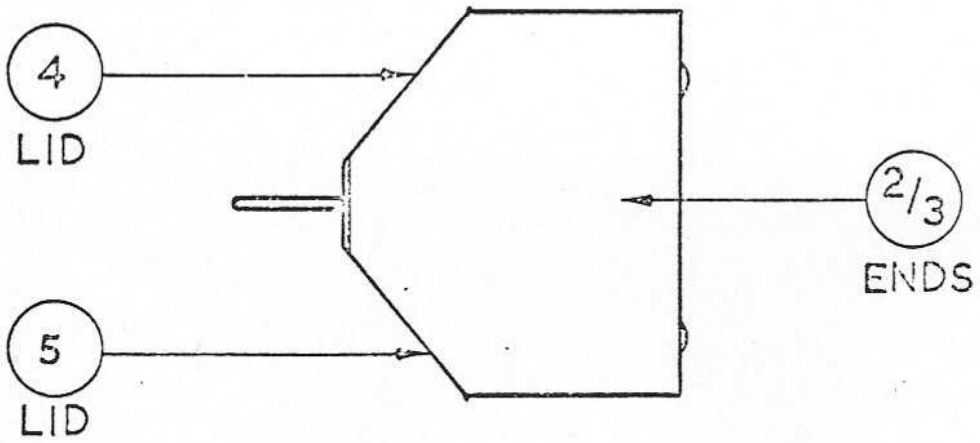
TOOL BOX

Practical	Reference Dwgs - CofP - STDS
Introduction to reading a drawing, working to measurements, workshop terminology, and safe working methods. Content of work calls for use of rules, scriber, dividers and odd leg calipers. Centre punch, hammer, square and protractor. Files and filing. Hand machines used on this exercise will involve the folding machine, Fly Press, introduction of the drilling machine, drills, and drilling, clamping and safety. Drill cutting speeds and off-hand drill grinding is introduced at this stage. Simple jigs and templates being used for informative and practical reasons. Correct stances, safe working methods on machinery, uses of protective clothing and equipment, ie guards, goggles, gloves, cleaning tools are introduced at this formative stage of training.	

TASK 1 EM(M) (CONT)

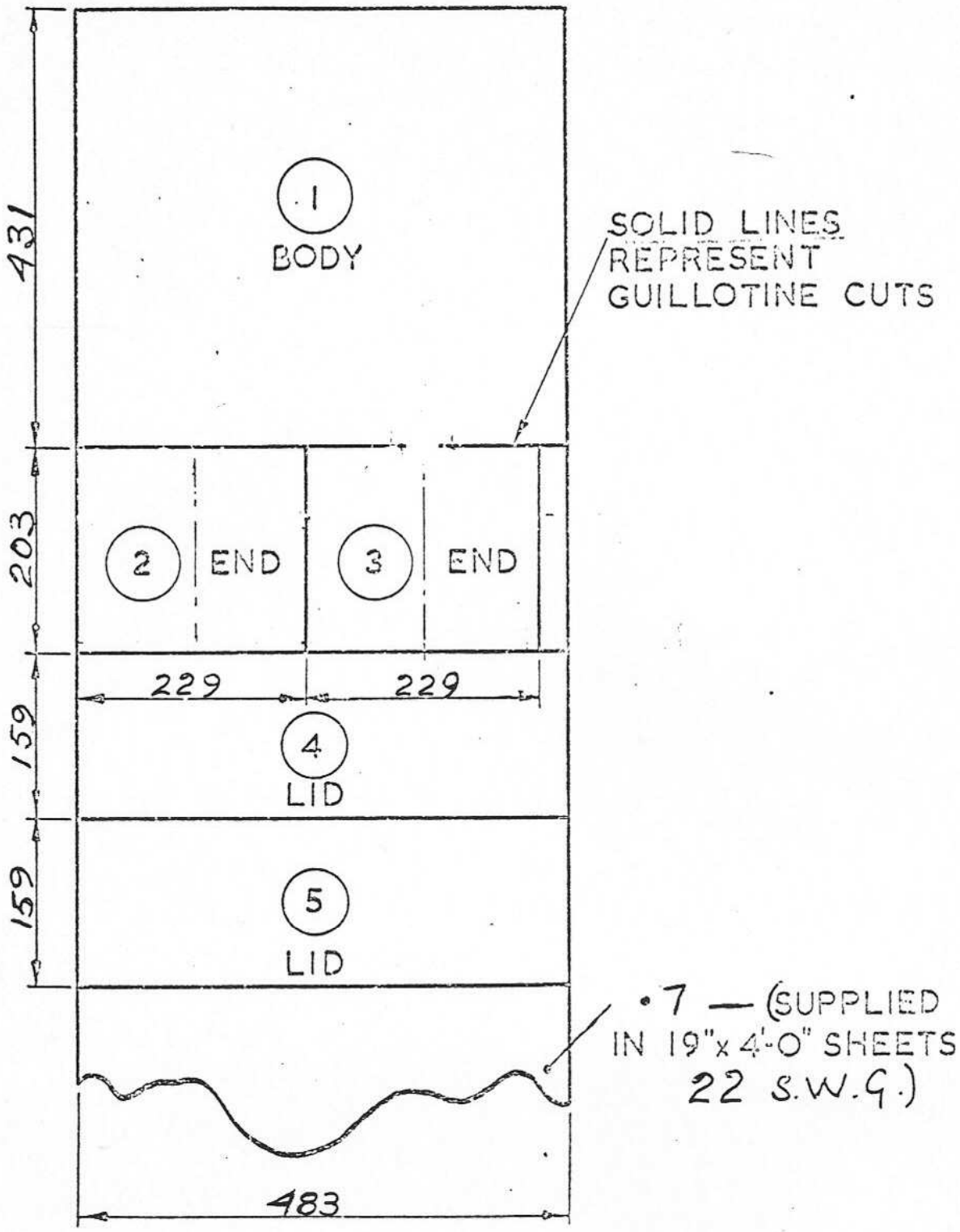
Theory	Reference Dwgs - CofP - STDS
Marking out. Use of datum lines and centre lines. Degree of accuracy obtainable by the use of measuring instruments and gauges listed in the practice column. Reasons for the correct use of tools. Different types, and their uses of files, hacksaws, hammers, chisels. Methods of achieving and safeguarding a required finish. Workshop hygiene and maintenance of clean working conditions. Marking out for drilling and methods of avoiding and correcting errors and run out tendencies. Types of drills. Drill speeds and feeds. Cutting angles. Cutting fluids, lubricants and coolants.	





MATERIAL ·7 (22S.W.G) M.S. SHEET

IMPORTANT: INSTRUCTORS GUIDANCE TO BE GIVEN ON ALL OPERATIONS

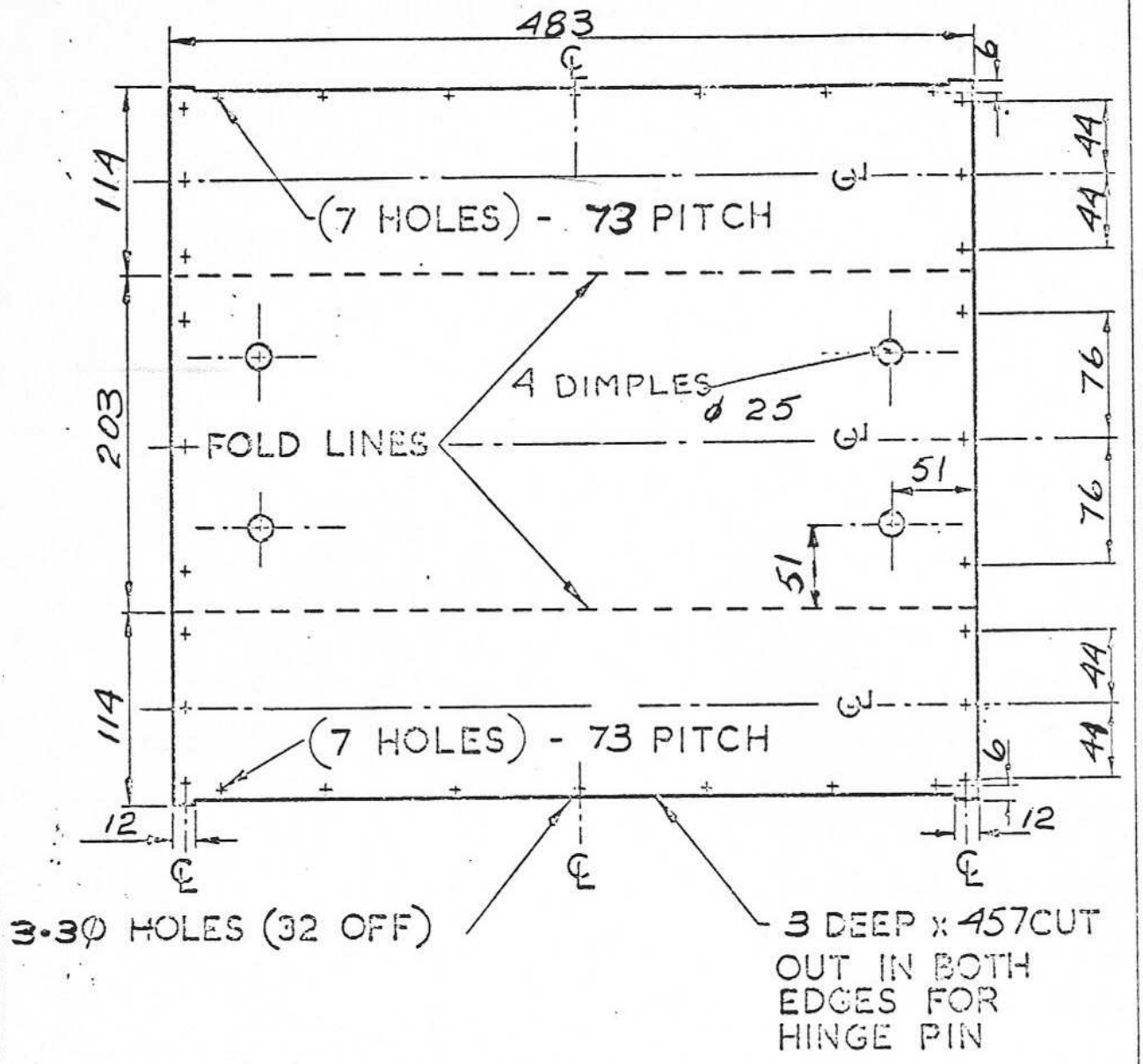


MARK OFF ITEMS 1 TO 5 AS SKETCH ——— 1

CUT ALL STRAIGHT LENGTHS ON GUILLOTINE ——— 2

INSTRUCTORS GUIDANCE TO BE GIVEN ON ALL OPERATIONS

TOOLBOX: ITEM 1 - BODY



FOLDED CONFIGURATION

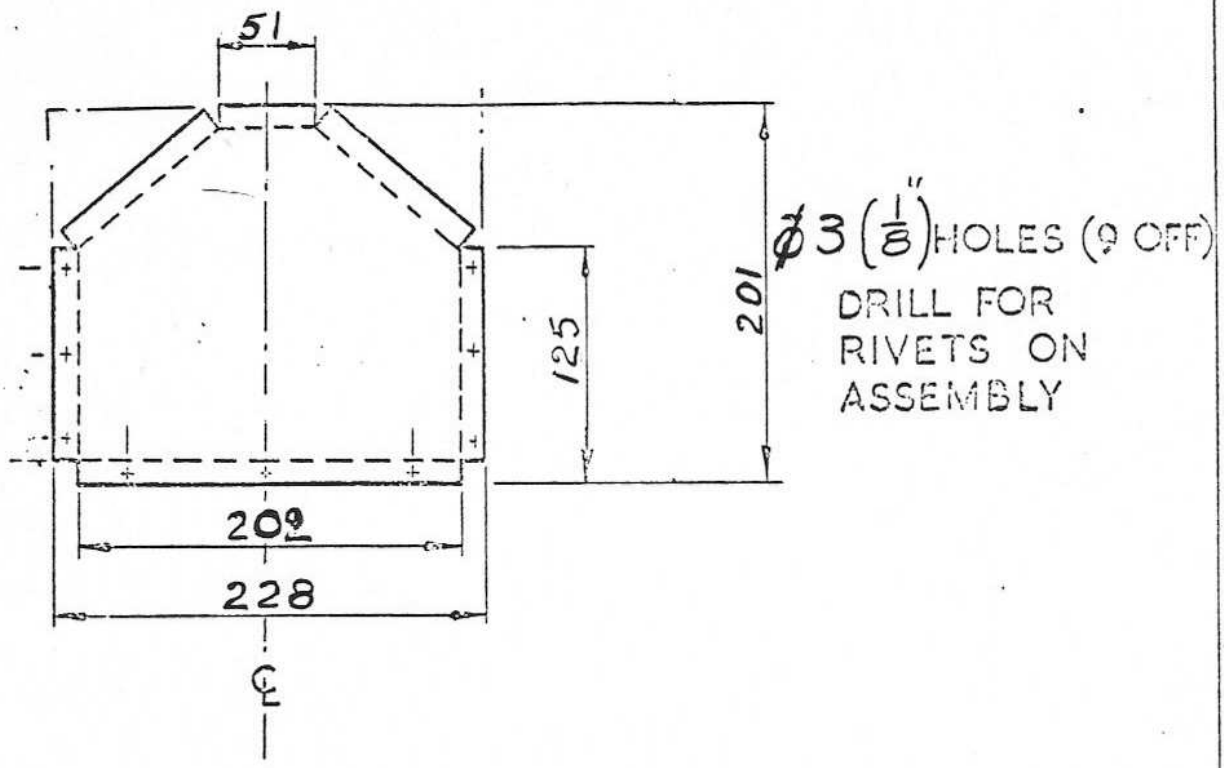
REMOVE HINGE CUT-OUTS — DRILL HOLES — 3

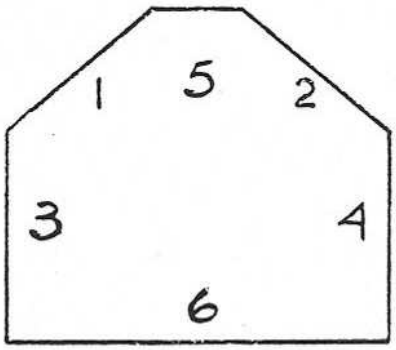
-USING TOOLS & CARE AS PER SAFETY INFORMATION SHEETS ATTACHED-

FOLD ITEM 1 AS SKETCH- — 4

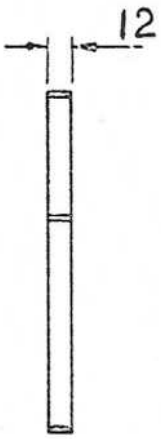
INSTRUCTORS GUIDANCE TO BE GIVEN ON ALL OPERATIONS

TOOLBOX: ITEMS 2 & 3 - ENDS





FOLDED ARRANGEMENT



FOLD ORDER :- _ _ _ _ 1. 2. 3 4 5 6

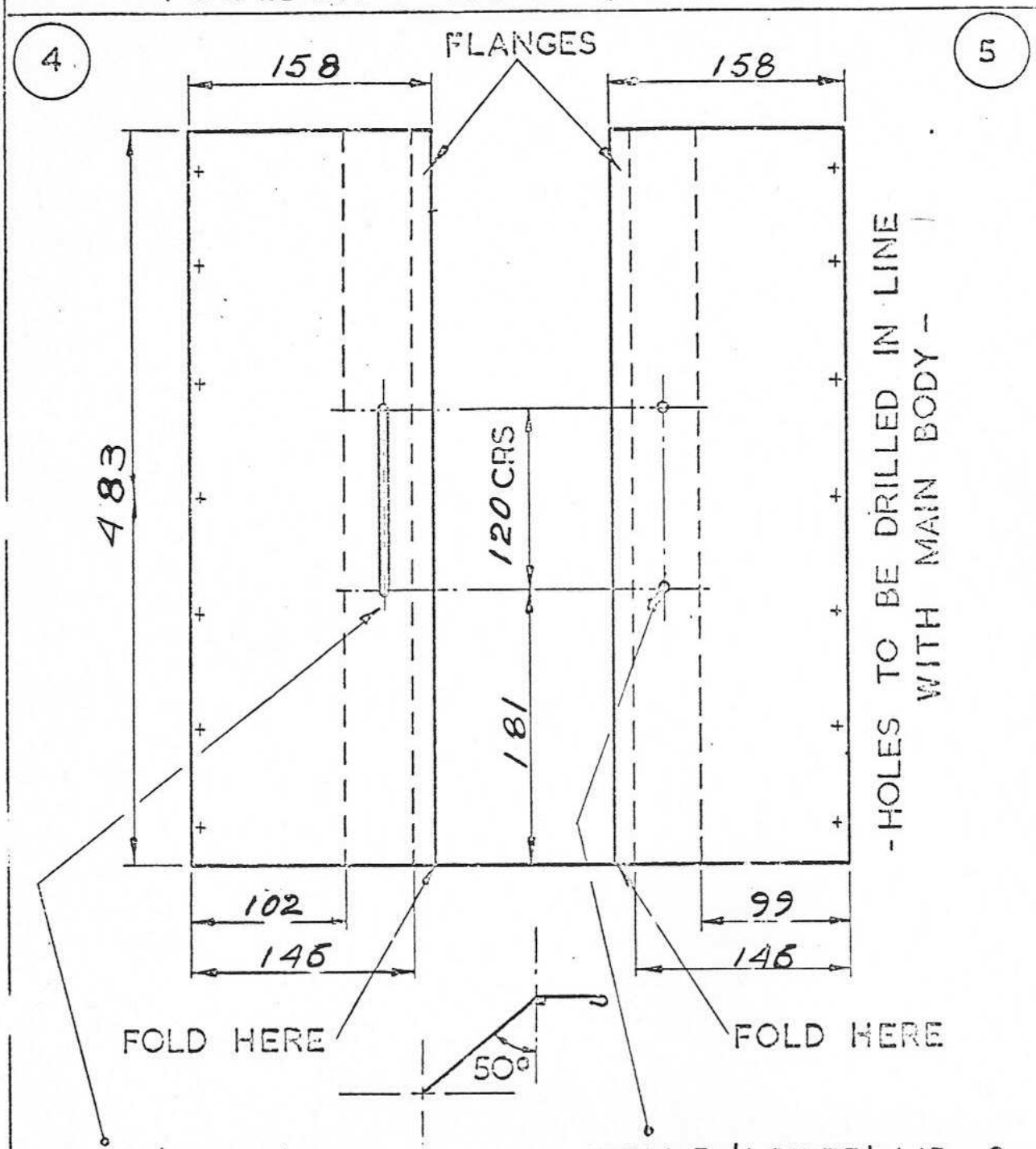
IN MACHINE WITH BLOCKS

ITEMS 2 & 3

REMOVE MARKED OUT CORNERS	5
FOLD ITEMS AS INSTRUCTED	6

INSTRUCTORS GUIDANCE TO BE GIVEN ON ALL OPERATIONS

TOOLBOX: ITEMS 4 & 5 - LIDS



ITEM 4: 'UPPER' LID - SLOT 8 x 120 CRS ON ℄ OF BOX

ITEM 5: 'LOWER' LID - 2 HOLES 6·5ϕ x 120 CRS DRILL ON ASSEMBLY TO MATCH SLOT

ITEMS 4 & 5

MARK OUT ITEMS IN PREPARATION FOR FOLDING —— 7

FOLD ITEMS AS INDICATED —— 8

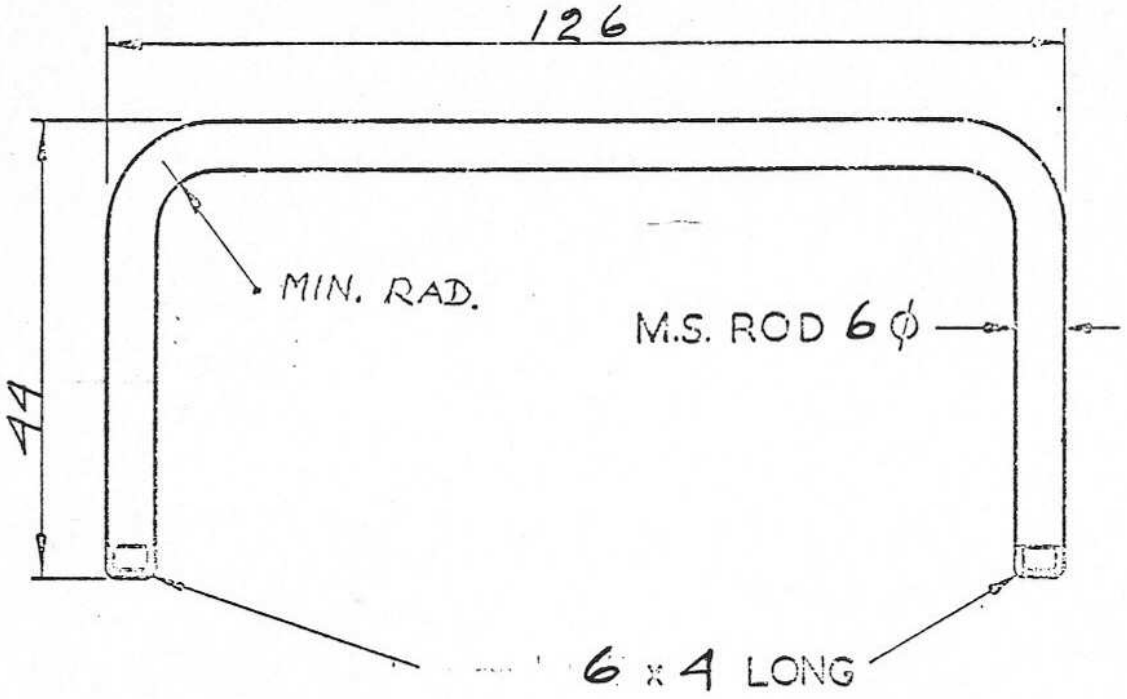
DRILL RIVET HOLES IN CONJUNTION WITH HINGES 9

INSTRUCTORS GUIDANCE TO BE GIVEN ON ALL OPERATIONS

U.K.A.E.A: RISLEY APPRENTICE TRAINING

TOOLBOX: ITEM 6 - HANDLE

E.M.(M)



OTHER ITEMS:

LENGTHS PIANO HINGE (AWRE) 32/39770

32 ALUMINIUM 'POP' RIVETS (DOMED HD) 3ϕ x 0·23", 25/94025/7

2 – 6 m/m HEXAGON LOCK NUTS

DEPRESS 4 DIMPLES IN ITEM 1 (SEE PAGE 5) 10

CUT AND BEND ROD TO DWG. 11

DRESS ALL PARTS FOR ASSEMBLY 12

INSTRUCTORS GUIDANCE TO BE GIVEN ON ALL OPERATIONS

UKAEA RISLEY APPRENTICE TRAINING

TOOL BOX

FINAL ASSEMBLY

1. Place the box ends in box body, drill holes and pop rivet.
2. Fit hinges to lids. (Match-drill-Hinges-pop rivet).
3. Fit lids to body. (Match-drill-Hinges-)
4. Check lids for perfect fit over body, Cut Slot on centre line of box.
5. Pop Rivet Hinges to Body
6. Mark out holes for handle through opposite lid slot - drill.
7. Fit handle with $\frac{1}{4}$ in. BSW nuts and caulk (allow free passage of handle through holes).
8. Remove all burrs - sharp edges - and corners.
9. INSTRUCTOR to inspect.

NOTE: Deliver to paint spray department.

Instructor's guidance to be given on all operations.

DESIGN PREPARED BY		APPROVED BY	

TASK 1

EM(M)

UKAEA RISLEY APPRENTICE TRAINING

TOOL BOX—INSTRUCTORS REPORT AND COMMENT

DETACHABLE

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 .....

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 screwdrivers, 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, centre 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 edges 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 or bang hammer heads together. Pieces may break off and fly at great speed, causing a serious injury.

SAFETY

HACKSAWS

1. To avoid injury, learn to hold the hack-saw correctly.

2. Hack-saw blades will not stand much bending or twisting. If you bend or twist it too much, the blade may snap suddenly and your hand may strike against the vice or sharp edge of the work.

3. When nearly through the piece of work, ease up on the pressure so that the work will not break off suddenly and injure your hands.

4. Saw slowly to prevent injuries. Trying to saw fast only dulls the blade and may be the cause of an accident.

5. When you place a new blade in the frame, never start it in the old cut. Turn the work over and saw from the other side.

CHISELS

1. Be sure you have received instruction on how to hold and strike a chisel before attempting to use one.

2. Always wear safety glasses when using chisels.

3. Never chip in such a way that the chips fly in the direction of another person. You should guard the work with a screen so that chips will not injure others.

4. Dull chisels are dangerous to use. Inspect and sharpen them if necessary before you use them.

5. It is dangerous to use a chisel with a mushroom head. The pieces break off and fly at great speed.

6. Chisels must never be used on hardened steel.

SCREWDRIVERS

1. It is very dangerous to hold small work in your hands while using a screwdriver. The blade may slip and puncture your hand. Rest the small work on the bench.

2. Damaged screwdrivers are dangerous. Learn to grind them correctly and avoid injury.

3. Use only screwdrivers which fit the screw slots correctly.

4. Always inspect the handle to see that it is free of rough or sharp edges. A handle which is split can cause a painful pinch.

5. More pressure can be applied with a long-handle screwdriver.

PLIERS

SAFETY

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 extremely 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.

SPANNERS AND WRENCHES

1. Always select the best type available, and check its condition before using it.

2. It is safer to use box, socket or ring spanners on hexagon bolts and nuts as a first choice. Use open-end spanners as a second choice. Avoid adjustable wrenches unless there are no others available.

3. When using spanners or wrenches 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 spanners or 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 spanner or wrench - never push.

7. It is a good idea to keep the following point in mind: "What will happen if the spanner or wrench slips?"

SAFETY

DRILLING MACHINES

1. Great care must be taken when drilling. The guard on the drilling machine must always be in place before the machine is switched on, and during all drilling operations. Glasses (armour plate), protective shoes, hats (and hairnets where applicable).

2. Never leave the chuck key in the chuck.

3. Keep the floor around the machine clean.

4. Clamp the workpiece securely. Never hold thin or small work with your hands - use a drill vice.

5. Always use a brush to remove chips - never your hands.

6. Don't try to stop the spindle after power is shut off by grasping it with your hands.

7. Never touch or try to handle long spiral chips with your hands.

8. Apply oil to cutting tools with a small brush. Do not spill oil on the machine or floor. A few drops in the right place is all that is needed.

9. Keep your head away from the turning spindle. Your hair will become wound around the spindle, and you will lose your hair and some scalp.

10. Always ease up on the down-feed pressure as the drill begins to break through the hole. Heavy feed will cause the drill to dig in, and the drill may break or pull the work loose.

11. Never attempt to drill brass, copper, or bronze with a drill ground for steel. It will dig in and break, ruin the work, or cause an injury. Ask your instructor to show you how to grind the drill.