



# **Maritime & Coastguard Agency (MCA)**

## **Workshop Skills Training**

### **Guidelines**

#### **70 Guided Learning Hours Course.**

# MCA “Workshop Skills Training” - Guidelines - 70 Guided Learning Hours Course.

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## **Additional information about the unit**

## 1. General

- 1.1 Workshop Skills Training course approvals and re-approvals must be undertaken in accordance with these guidelines. These guidelines confirm the guided learning hours for the Workshop Skills Training course. The total running time of the Workshop Skills Training course is guided to be at least 70 hours. This course should last for two weeks, with 35 learning hours per week. Existing courses should now transition to the new requirements of this document within 6 months of this document being published (by 22 October 2022). A desk top submission should be sent for approval to your local Marine Office or, in the case of overseas training providers, the Seafarer Services Branch. This should demonstrate changes in your procedures and course content to meet the new requirements. If you are unable to transition within this period, then you should write to the Chief Examiner ([stc.courses@mcga.gov.uk](mailto:stc.courses@mcga.gov.uk)) providing a valid explanation and action plan for your transition.
- 1.2 This training is relevant to a wide range of personnel that require the knowledge and understanding to build up a career as an Engineer of a Small Vessel.
- 1.3 The Workshop Skills Training is a Non-STCW certificate. This is issued directly by MCA-approved training providers.
- 1.4 The Workshop Skills Training course is a basic theoretical learning and relevant practical hands-on training course. It aims to provide a base foundation as a Small Vessel engineer for course participants and enables students to carry out regular servicing of onboard machinery/equipment by developing a greater understanding of possible faults before they develop into major problems.

## 2. Aim of the Course.

- 2.1 The aim of this course is to get candidates familiar with common workshop practices and repair methods, the tools to use and, the safe methods and procedures to use tools and repair equipment. The candidate should take away a basic knowledge of how contractors should perform when employed on board to carry out repairs and be confident in procedures ensuring correct methods have been employed.

Note: This short course provides the foundation to enable operational engineers to safely carry out regular servicing, be more aware of possible faults before they develop into major problems and can carry out basic repairs to vessel systems to get them to a safe haven.

- 2.2 The course also aims to give the basic training to the engineer officers who want to pursue a career on “Small Vessels” (Fishing Vessels, Yachts, Tugs, Workboats, Standby, Seismic Survey, Oceanographic Research Vessels and Government Patrol Vessels). The necessary training outlines the certification structure and training requirements. It also explains the regulatory requirements regarding the implementation of intended training elements, as may be applicable.
- 2.3 The overall aim is to provide Small Vessel engineers with the necessary knowledge, understanding and proficiency to carry out safe and effective operations onboard.

### 3. Background of the Course.

- 3.1 Article IX of the STCW Convention allows an administration to adopt alternative arrangements of education and training for special types of ships and trades. The MCA has utilised this alternative arrangement to create a certificate structure for this course.
- 3.2 This document includes the criteria for the development of courses to deliver training for service on ships.

### 4. Health and Safety: Conduct of Training

- 4.1 At all times the safety of learners and staff delivering training must be ensured.
- 4.2 Practical exercises should be designed and delivered solely to meet the course criteria.
- 4.3 All training centres must adhere to applicable regulations made under the Health and Safety at Work Act 1974, as amended, and take proper account of the advice given in associated guidance documents and 'Approved Codes of Practice'. Outside the UK, training centres must adhere to relevant national legislation and have a routine inspection to ensure a safe working environment for students broadly equivalent to the UK's standards (Health and Safety at Work Act 1974).
- 4.4 Training centres are required to make assessments of any potential risks to the health and safety of staff and learners that may be associated with their activities. They are also required to identify, implement, monitor and review effective measures for minimising and controlling risks.
- 4.5 Centres are required to make effective arrangements for dealing with any emergency, incident or accident that may occur during the training course. In the UK, the foregoing is required in accordance with the Management of Health and Safety at Work Regulations 1999, as amended.
- 4.6 Centres must draw up their own safe working procedures to meet statutory Health and Safety obligations.

### 5. Training Structure

- 5.1 Centres will need to develop a training programme covering the Workshop Skills Training syllabus requirements and then submit their training plans to commence the approval process. **Approvals within the UK should be directed to the local Marine office. Outside of the UK approval requests must come to the Seafarer Services Branch ([STC.Courses@mcga.gov.uk](mailto:STC.Courses@mcga.gov.uk)).**
- 5.2 The training plans must define education and training objectives and the related standards of competence to be achieved. The levels of knowledge, understanding and skills appropriate to the assessments required under these criteria are required to be identified.

5.3 The training should be structured around the outcomes although centres should devise their own training schedules and detailed lesson plans to ensure effective and logical delivery of the subject matter and achieve the objectives of the training.

## 6. Training Day and Training Duration

6.1 A training day is defined as one which has no more than eight contact hours and cannot be in excess of 10 hours, including relevant breaks.

6.2 The training shall be not less than 35 contact hours per week and will be delivered as a stand-alone module.

## 7. Entry Requirements

7.1 Minimum 18 years of age.

7.2 The candidate must have completed AEC I and II prior to commencing the Workshop Skills Training Course.

## 8. Trainer to Learner Ratio.

8.1 The trainer to learner ratio should not exceed 1:8 for practical and non-practical sessions. However, an approved training provider may raise this to 1:10, if they can complete a risk assessment to ensure that there is adequate equipment for all candidates to work simultaneously and they have sufficiently skilled staff so that all training outcomes can be monitored and assessed.

8.2 The training centre, having due regard to health and safety and the objectives of the training, should determine other staffing requirements.

## 9. Qualifications of Instructors and Assessors

9.1 Instructors and assessors are required to be qualified in accordance with the requirements of Regulation 1/6 STCW. Guidance on relevant qualifications & experience required to deliver & assess the training is given in Annex C.

## 10. Facilities and Equipment

10.1 Training centres seeking approval will need to demonstrate availability of suitable facilities for practical, general and theoretical instruction, appropriately equipped with teaching and learning aids and designed to enable each learner to fully engage, in the learning process.

10.2 All facilities must be approved, maintained and where appropriate, inspected and tested in accordance with applicable regulations, current standards and manufacturers recommendations.

10.3 A classroom, or equivalent, must be provided for general instruction and the theoretical aspects of the course, to include suitable presentation facilities and audio-visual aids (e.g. DVDs, posters, diagrams)

10.4 Sufficient and suitable equipment must be provided to enable practical sessions and assessment of learning objectives.

10.5 A list of minimum recommended equipment is given in Annex B, for guidance. The training centres may use additional or similar equipment, as considered to be suitable, to deliver their training course.

## 11. Assessment Requirements

11.1 Assessment must be organised so that learners can, through demonstration and verbal engagement, show that they meet the competences stipulated, as identified in the Workshop Skills Training syllabus.

11.2 The assessment system, methods and practice must be valid, reliable and authentic.

11.3 Each learner shall receive an assessment plan at the start of the training.

11.4 The assessment system should support appeals made by learners against assessment decisions.

11.5 A variety of sources of evidence may be used and must include evidence of learners' ability to meet the criteria for evaluating competence.

11.6 A range of direct observation, practical demonstration and verbal engagement (Q&A) throughout the course are considered ideal approaches to generating much of the evidence required.

11.7 All assessment must be formally documented and be made available for verification on request.

11.8 The practical exercises must be conducted, and achievement of competency must be assessed throughout the course, under the supervision of trainer. (Requirements set out in Annex C).

## 12. Certification

On achievement of the desired standard of competence, a certificate will be issued by the centre in the MCA approved specimen certificate format, as given in Annex D.

## 13. Course Outcomes:

There are seven learning outcomes within the course:

Outcome 1 - The learner demonstrates competent knowledge of the general principles of basic hand tool skills.

Outcome 2 - The learner demonstrates competent knowledge of choice, condition of, safe operation of and use of appropriate power tools.

Outcome 3 - The learner demonstrates competent knowledge of workshop safety procedures, safe working practices on board and threats to the Marine environment from their actions.

Outcome 4 - The learner demonstrates competent knowledge of the general principles of pipework using copper and plastic.

Outcome 5 - The learner demonstrates competent knowledge of construction and repairs using Fibre-Reinforced Plastic (FRP).

Outcome 6 - The learner demonstrates competent knowledge of the general principles of basic welding skills.

Outcome 7 - The learner demonstrates competent knowledge of the procedures required to safely dismantle, inspect and rebuild basic ships equipment.

#### 14. Course Learning Outcomes:

**Outcome 1** - The learner demonstrates competent knowledge of the general principles of basic hand tool skills.

##### **Learning Objectives:**

- 1.1. Demonstrate knowledge of the common mistakes, risks of misuse, corrective and remedial actions, and personal safety equipment required when using common toolbox tools.
- 1.2. Identify appropriate measuring devices.
- 1.3. Demonstrate knowledge of the limitations of and the need to calibrate and adjust a variety of measuring devices, as necessary.
- 1.4. Provide basic descriptions of the tools to be used on ship, ship equipment and systems drawings.
- 1.5. Describe the manufacturing process of a “General Fitting Plate” (Annex F).
- 1.6. Demonstrate competent skill in dismantling, reassembling, and performing internal inspections of a marine plant using hand tools.
- 1.7. Demonstrate knowledge of the tools required for safety checks and inspection required on firefighting appliances.

**Outcome 2** - The learner demonstrates competent knowledge of choice, condition of, safe operation of and use of appropriate power tools

##### **Learning Objectives:**

- 2.1. Demonstrate knowledge of the common mistakes, risks of misuse, corrective and remedial actions, and personal safety equipment required when using common power tools.
- 2.2. Demonstrate competent knowledge of how to inspect and use handheld power tools.
- 2.3. Demonstrate competent knowledge of the Bench Grinder.
- 2.4. Describe and demonstrate the safe working practices when using a pillar drill.

**Outcome 3** - The learner demonstrates competent knowledge of workshop safety procedures, safe working practices on board and threats to the Marine environment from their actions.

**Learning Objectives:**

- 3.1. Demonstrate knowledge and practical use of workshop safety procedures.
- 3.2. Demonstrate knowledge and practical use of safe working practices required on board as per appropriate sections of COSWP.

**Outcome 4** - The learner demonstrates competent knowledge of the general principles of pipework using copper and plastic.

**Learning Objectives:**

- 4.1. Demonstrate knowledge of common pipe working tools.
- 4.2. Demonstrate knowledge of the decision-making process for the selection of pipe material considering dissimilar metals and isolation.
- 4.3. Describe the principles of working with copper pipe.
- 4.4. Describe the principles of working with plastic pipe.
- 4.5. Demonstrate the skill to pressure test on completion of work using hydrostatic testing.
- 4.6. Demonstrate the skill to plug leaks.

**Outcome 5** - The learner demonstrates competent knowledge of construction and repairs using Fibre-reinforced Plastic (FRP).

**Learning Objectives:**

- 5.1. Describe the method of construction and repairs using FRP.

**Outcome 6** - The learner demonstrates competent knowledge of the general principles of basic welding skills.

**Learning Objectives:**

- 6.1. Demonstrate knowledge of the processes, applications and potential hazards for: Gas (including cutting), TIG for Steel and Aluminium, and MIG for Steel and Aluminium (MMA/ SMAW).
- 6.2. Describe how to test welded components and assess the quality of a weld.

**Outcome 7** - The learner demonstrates competent knowledge of the procedures required to safely dismantle, inspect and rebuild basic ships equipment.

**Learning Objectives:**

- 7.1. Demonstrate competent practical and theoretical knowledge of procedures required to safely dismantle, inspect and rebuild basic ships equipment using manufactures instructions as a guideline
- 7.2. Demonstrate ability to carry out work as per manufacturer's instructions and guidelines, utilising learning from outcome 3.



## Conditions for MCA Approval of Short Courses

1. Training centres offering training and assessment leading to the issue of a certificate of proficiency must be approved by the Maritime and Coastguard Agency.
2. MCA approval requirements are for a functional Quality Management System to be in place that ensures:
  - a. Continued satisfactory delivery of the programme to the current standards, reflecting changes of technology and best practice;
  - b. The training programme entry standards are met;
  - c. The agreed assessment process is maintained;
  - d. Only those who complete the training programme and meet any other necessary requirements are issued with certificates/documentary evidence;
  - e. Certificates are issued in a format that meets the MCA requirements, as per the examples provided for the operational and management levels within sections two and three of this document;
  - f. Records of certificates issued are securely maintained until the 70th birthday of the certificate holder or five years from the date of issue whichever is the longer;
  - g. The record system enables authenticity of certificates to be verified and replacement certificates issued;
  - h. This course cannot be approved for peripatetic delivery,
  - i. The approving MCA Office is informed of dates, timing and venues of all courses delivered;
  - j. Any changes made to the course content, facilities, equipment, training staff or other matter that may affect the delivery of the programme are reported to the approving Marine Office without delay.
3. Monitoring of the training programme by the MCA proves to be satisfactory.
4. Re-approval by the MCA is carried out within 5 years of the approval or re-approval. Such approval and re-approval will incur costs in line with the fees in force at that time.
5. If, as the result of an audit, or if the MCA otherwise becomes aware that the Training Centre is no longer complying with the conditions of approval, or has serious non-compliance issues as regards health and safety, the MCA reserves the right to suspend or cancel the approval of the course.
6. Should the training establishment cease to trade then all records of certificates issued should be sent to the MCA to enable them to carry out the verification and replacement functions.

## Workshop Skills Training Equipment List

**Outcome 1** - The learner demonstrates competent knowledge of the general principles of basic hand tool skills.

- 1.1 Files, file handles, file cards, hacksaws, hacksaw blades, hammers, chisels, centre punches, scribes, rules, dividers, odd leg callipers, combination squares, workbench, vice, PPE, steel plate, bar, angle, and aluminium.
- 1.2 Vernier callipers (manual and digital), micrometers, internal micrometers, depth mics, DTIs, feeler gauges, engineers blue, and "engineers tables (Zeus)", samples and components (cylinder liners, machine parts etc.).
- 1.3 As per 1.2.
- 1.4 Selection of suitable technical drawings.
- 1.5 Pieces of steel or Aluminium to form a simple test piece, drills, taps, and dies.
- 1.6 Various marine associated equipment, valves, coolers, pumps, separators, basic hydraulic and pneumatic systems, electric motors, large pumps, compressor, diesel engine, electric motors, ships valves, hydraulic cylinders, or similar.
- 1.7 Multiple types of handheld extinguishers in various conditions (including defective), spare charges, fire hose, and videos of fixed systems.

**Outcome 2** - The learner demonstrates competent knowledge of choice, condition of, safe operation of and use of appropriate power tools

- 2.1. Assortment of hand power tools in various conditions, cables with damage, and tools in damaged condition.
- 2.2. As per 2.1.
- 2.3. Bench grinder with adjustable steadies, spare wheels in various conditions, grades.
- 2.4. Floor standing pillar drill with various speeds and an adjustable drill table, guards, drills, drill vice, and a clamping set.

**Outcome 3** - The learner demonstrates competent knowledge of workshop safety procedures, safe working practices on board and threats to the Marine environment from their actions.

- 3.1. N/A.
- 3.2. COSWP.

**Outcome 4** - The learner demonstrates competent knowledge of the general principles of pipework using copper and plastic.

- 4.1. Pipe cutter, pipe wrench, bending springs, pipe bender, blowtorch and solder, fluxes, glass bandage and resin, assorted temp repair fittings, and Straubs etc.
- 4.2. Assorted sections of tube & pipe.
- 4.3. Assorted sections of tube & pipe, types of fittings for the various materials, adhesives, solder, cleaners, and equipment listed in 4.1
- 4.4. As per 4.3.
- 4.5. Pump for hydrostatic test.

4.6. As per 4.3 and 4.5.

**Outcome 5** - The learner demonstrates competent knowledge of construction and repairs using Fibre-reinforced Plastic (FRP).

5.1. Glass or fibre sheet, resins & hardeners, appropriate tools, and PPE.

**Outcome 6** - The learner demonstrates competent knowledge of the general principles of basic welding skills.

6.1. Welder, rods, materials to practice welding and preparation, NDT equipment (dye pen), and samples of failed or cracked welds.

6.2. As per 6.1.

**Outcome 7** - The learner demonstrates competent knowledge of the procedures required to safely dismantle, inspect and rebuild basic ships equipment.

7.1. A selection of pumps, coolers and other basic ships equipment (not covered in AEC I & II). Pumps: Centrifugal, Gear, Rotary vane, Mono/screw, Jabsco, Reciprocating, Diesel fuel/Jerk, Semi Rotary. AC/Fridge compressor, condenser, Evaporator. Valves, SDNR, SL, Quick close, Butterfly, Cock. Gearbox/Clutch components. AC Electric motors & Starter, Transformer. Heat Exchangers. Filters – various types. Diesel Engine. Clutch/transmission. Air compressors: Piston, Screw, Rootes type. Turbo charger.

7.2. Guidance on standard procedures/ SMS instructions (lock out tag out, isolation).

### **Instructor/Assessor Awareness, Qualification and Experience Requirements**

All training and instruction should be given, and assessments carried out, by suitably qualified and experienced personnel. This annex provides guidance regarding the suitability and acceptability of qualifications and experience for personnel designated to carry out training, instruction and assessment in Workshop Skills Training courses. The list is not exhaustive, and suitable equivalent qualifications and experience will be considered.

All trainers and assessors should:

- a) Understand the specific objectives of the training;
- b) Be familiar with the use, operation and handling of various machineries and equipment commonly found in onboard pleasure or merchant vessels; and
- c) Have an understanding of basic fault finding, before breakdown.
- d) Regularly undergo internal training and verification to ensure continued compliance

### **Instructors' qualifications and experience**

All instructors and assessors should have:

- a. A minimum Yacht 4, Small Vessel EOW, Merchant vessel EOW, or higher Certificate of Competency. Other equivalent qualifications and experience may also be considered by the MCA, on a case for case basis only – you must email [stc.course@mcga.gov.uk](mailto:stc.course@mcga.gov.uk) for equivalency approval (e.g. other commercial sectors tugs, fishing etc). The MCA may consider the use of shore based maritime engineers with the relevant marine based experience (e.g. ship building, ship repair, ship maintenance etc) – Shore based engineers must be approved by the Seafarer Services Branch on a case by case basis: email [stc.courses@mcga.gov.uk](mailto:stc.courses@mcga.gov.uk).
- b. A knowledge of instructional techniques, training methods and training practice at least to the level of IMO Training for Instructors;
- c. An understanding of assessment methods and practice;
- d. Practical instructional and assessment experience;
- e. The practical exercises must be conducted, and achievement of competency must be assessed throughout the course under the supervision of trainer.

### **Requirements for Training Centres**

Training centres should have procedures in place to enable staff to update their profession knowledge of onboard machinery and equipment, plus their knowledge of instruction and assessment techniques, in accordance with Continuous Professional Development practices.

### Specimen Certificate

Certificate of completion of MCA Workshop Skills Training, covered within the Workshop Skills Training syllabus (to be produced and registered locally by the issuing authority).

Certificate No: (Unique identifier number allocated by the training centre)

MCA Approval Certificate Number: (issued by MCA)

Address and contact details including telephone and email of the issuing Authority (Approved Training Centre)

#### **Workshop Skills Training Course Completion Certificate**

This is to certify that (Full name)

Date of birth (MM/DD/YYYY)

**Has successfully completed a programme of theoretical and practical training sessions that delivers the knowledge requirements, set out in the Maritime and Coastguard Agency, Workshop Skills Training Course syllabus.**

This certificate is issued under the authority Maritime and Coastguard Agency, of the United Kingdom of Great Britain and Northern Ireland, an executive agency of the department for transport.

Name and signature of Principal or  
Authorised Representative of the  
Approved Training Centre

Issuing Authority  
Stamp and Date

Deep emboss OR Hologram

Signature of the person to whom this certificate was issued

## MCA “Workshop Skills Training” Syllabus

### 1. Hand tools skills appreciation

- 1.1. The learner demonstrates knowledge Common mistakes, risks of misuse, corrective and remedial actions, and personal safety equipment required when using common toolbox tools.
- 1.2. The learner can identify appropriate measuring devices.
- 1.3. The learner demonstrates knowledge of the limitations of and the need to calibrate and adjust a variety of measuring devices, as necessary. Explore measuring devices, vernier callipers (both manual and digital), micrometer internal, external and depth. Practical calibration exercises. Practical measuring exercises. Discuss tolerances regarding practical applications.
- 1.4. The learner demonstrates knowledge of ship equipment and system drawings. Use drawing M & F fitting plate to identify the need for understanding tolerances and acceptable limitations
- 1.5. The learner demonstrates knowledge of the manufacturing process of a “General Fitting Plate” (Annex F). Complete practical exercises to demonstrate understanding of:
  - 1.5.1. Drawing;
  - 1.5.2. Marking out (scribing / centre punching);
  - 1.5.3. Creating datums;
  - 1.5.4. Filing;
  - 1.5.5. Hacksawing;
  - 1.5.6. Drilling;
  - 1.5.7. Use of gauges and;
  - 1.5.8. Thread tapping and recovery;
  - 1.5.9. All disciplines and common mistakes. This should be led by the instructor who has dispensation to re-dimension as required. Learner to measure and analyse their own work to recognise their own limitations.
- 1.6. Demonstrate competent skill in dismantling, reassembling, and performing internal inspections of a marine plant using hand tools. The Learner must demonstrate competence in:
  - 1.6.1. Use of hand tools to agreed safety standards;
  - 1.6.2. Risk assessment;
  - 1.6.3. Use of correct PPE;
  - 1.6.4. Use of correct lifting gear;
  - 1.6.5. General cleanliness.
- 1.7. Demonstrate knowledge of the tools required for safety checks and inspection required on firefighting appliances:
  - 1.7.1. Tools required for safety checks on fire extinguishers and fixed systems;
  - 1.7.2. Alarm testing;
  - 1.7.3. Performing periodic checks, defective units to be provided for learners to inspect.

### 2. Power tools skills appreciation

- 2.1. Common mistakes, risks of misuse, corrective and remedial actions, and personal safety equipment required when using common power tools.

- 2.2. The learner demonstrates knowledge of how to inspect and use handheld power tools including:
  - 2.2.1. Battery/corded & air operated power tools;
  - 2.2.2. Self-locking chucks;
  - 2.2.3. Speed control and;
  - 2.2.4. Ability to identify and reject faulty hand tools.
- 2.3. The learner demonstrates competent knowledge of the Bench Grinder including:
  - 2.3.1. Safety devices and guarding;
  - 2.3.2. Inspection of abrasive wheels;
  - 2.3.3. Use of grinders;
  - 2.3.4. Identify defects on abrasive wheels, covering points in COSWP 18.19;
  - 2.3.5. Observe instruction on abrasive wheels by a competent person.
- 2.4. The learner can describe and demonstrate the safe working practices when using a pillar drill. These include:
  - 2.4.1. How to drill;
  - 2.4.2. Marking out;
  - 2.4.3. Clamping down;
  - 2.4.4. Calculating drill speeds;
  - 2.4.5. Use of centre drills;
  - 2.4.6. Drilling under 10 mm;
  - 2.4.7. Drilling over 10mm;
  - 2.4.8. Adjusting speed and clamping devices;
  - 2.4.9. Chain drilling and;
  - 2.4.10. Use of belt driven drills to allow learners to clearly see the drive and how to change the belt to obtain different speeds.

### **3. Workshop safety procedures, safe working practices on board and threats to the Marine environment**

- 3.1. The learner demonstrates knowledge and practical use of workshop safety procedures.
- 3.2. The learner demonstrates knowledge and practical use of safe working practices required on board, complying with the ship's SMS and the appropriate sections of COSWP.

### **4. Pipework using copper and plastic**

- 4.1. The learner demonstrates knowledge of common pipe working tools and techniques including:
  - 4.1.1. Pipework supporting;
  - 4.1.2. Requirement of not stressing push or plastic fittings;
  - 4.1.3. Basic Steel pipes, flanges & jointing to include temporary repair by various means, (glass bandage, Straub, flexible couplings).
- 4.2. The learner demonstrates knowledge of the decision-making process for the selection of pipe material considering dissimilar metals and isolation:
  - 4.2.1. Copper;
  - 4.2.2. CuNiFe;
  - 4.2.3. Steel;
  - 4.2.4. Plastic.
- 4.3. The learner demonstrates knowledge of the principles of working with copper pipe including:

- 4.3.1. Types of fittings (Compression/ Yorkshire);
- 4.3.2. Cutting pipe to length for use with fittings;
- 4.3.3. Bending simple bends using springs and HILMOR and elbows;
- 4.3.4. Use of fluxes;
- 4.3.5. (Practical) Pipe prep, cleaning and soldering using Butane/propane hand torch.
- 4.4. The learner demonstrates knowledge of the principles of working with plastic pipe including:
  - 4.4.1. Types of fittings (Push/ press/ glued);
  - 4.4.2. Cutting pipe to length for use with fittings;
  - 4.4.3. (Practical) Pipe prep, cleaning and fixing using press fits and glued joints
- 4.5. Demonstrate the skill to pressure test on completion of work using hydrostatic testing.
  - 4.5.1. Conduct an exercise to fit jig in both plastic and copper. Pressure test on completion to 1.5x working pressure using hydrostatic testing.
- 4.6. Demonstrate the skill to plug leaks including:
  - 4.6.1. Splits;
  - 4.6.2. Small pin holes;
  - 4.6.3. The use of new insets;
  - 4.6.4. The use of small pipe clamps;
  - 4.6.5. Pressure testing of the repair on completion to 1.5x working pressure using hydrostatic testing.

## **5. Construction and repairs involving FRP**

- 5.1. The learner demonstrates knowledge of the method of construction and repair using FRP, including:
  - 5.1.1. Mixing the resin and hardener,
  - 5.1.2. Safety and PPE requirements;
  - 5.1.3. Temporary repairs should there be damage to the vessel or boats;
  - 5.1.4. Hand lay-up or spray lay-up moulding;

## **6. Welding appreciation and basic skills**

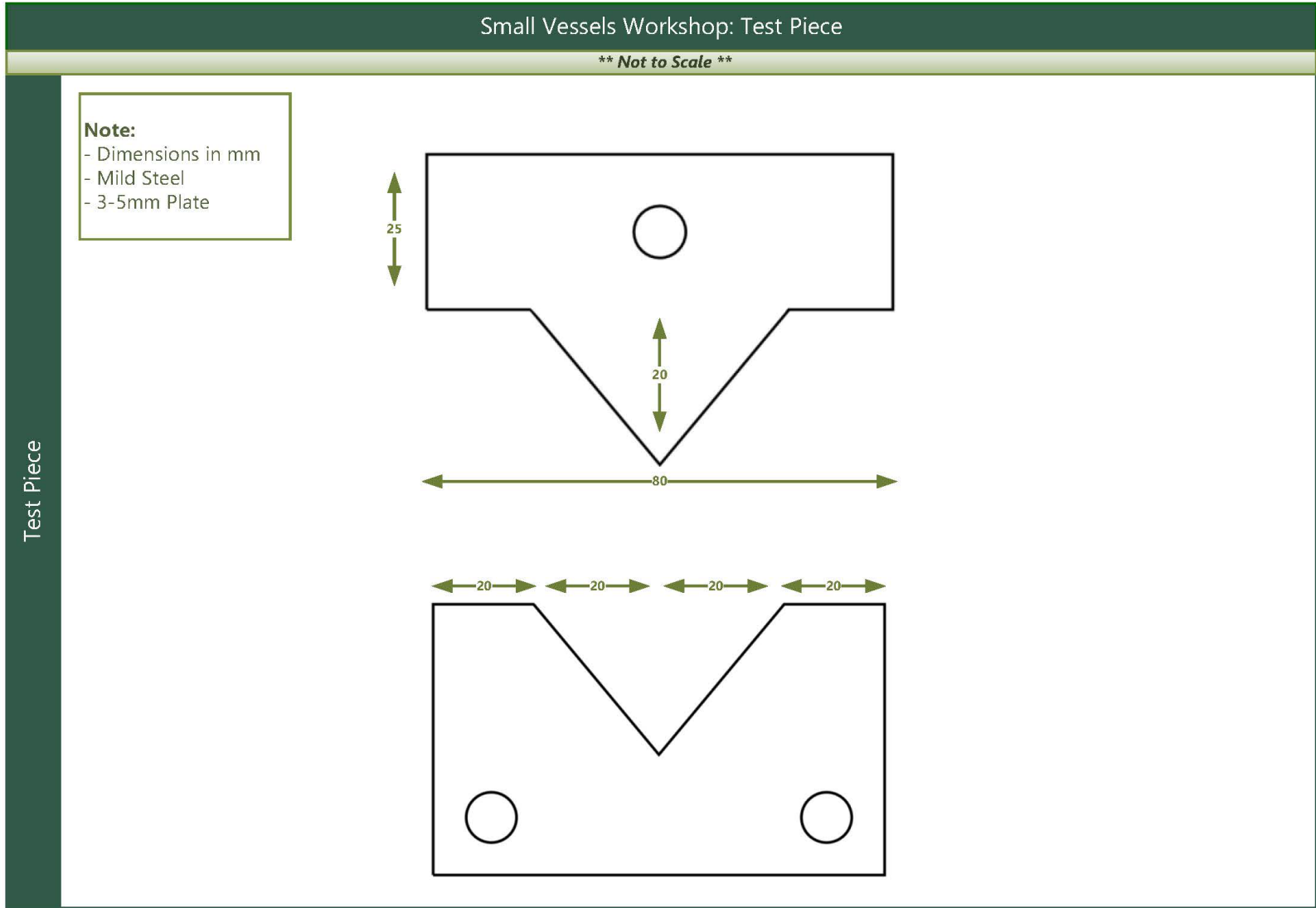
- 6.1. The learner demonstrates knowledge of the processes, applications and potential hazards for: Gas (including cutting), TIG for Steel and Aluminium, and MIG for Steel and Aluminium (MMA/SMAW).
- 6.2. The learner demonstrates knowledge of how to test welded components and assess the quality of a weld:
  - 6.2.1. The learner can identify good and poor welding to ensure the learner can oversee repairs and ensure it is welded to required standards;
  - 6.2.2. The learner demonstrates knowledge of how to test welded components (Dye penetration, magnetic particle);
  - 6.2.3. The learner demonstrates knowledge of basic weld preparation;
  - 6.2.4. The learner demonstrates knowledge of crack repair;
  - 6.2.5. The learner demonstrates knowledge of various methods of welding procedure;
  - 6.2.6. The learner observes a short, instructor led, demonstration of stick welding, the remainder can be video or practical.

## **7. Working with basic ships equipment**



- 7.1. The learner demonstrates competent practical and theoretical knowledge of procedures required to safely dismantle, inspect and rebuild basic ships equipment
- 7.2. The learner demonstrates the ability to carry out work as per manufacturer's instructions and guidelines.

General Fitting Plate Example Drawing



## Additional information about the unit

Unit aim(s)	To provide the learner with the knowledge and practical skills required at the start of a Small Vessel engineer's career.
Details of the relationship between the unit and other standards or curricula (if appropriate).	This unit satisfies the requirements of the MCA Workshop Skills Training course.
Assessment requirements specified by a sector or regulatory body (if appropriate)	MCA
Endorsement of the unit by a sector or other appropriate body (if required)	MCA
Location of the unit within the subject/sector classification system	Transportation
Guided Learning Hours (including assessment)	70 hours. (40 hrs/week with 1-hour break period every day).
Relevant M Notices	MSN 1859, MIN 524 & MIN 594 (or subsequent publications)