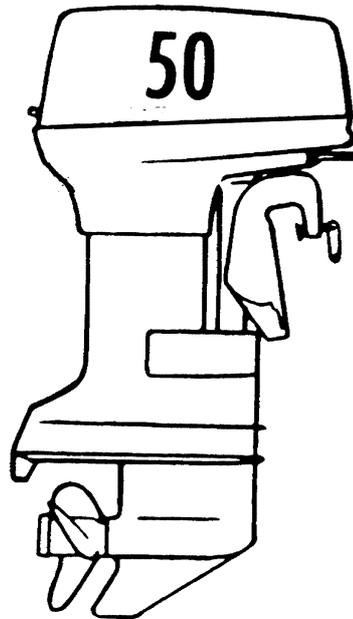


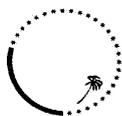
# OUTBOARD MOTORS

FOR PACIFIC ISLAND MARINERS

**RESTRICTED CLASS 6-MASTER/ENGINEER  
SPC 022C**



## TRAINER'S GUIDE



SECRETARIAT OF THE PACIFIC COMMUNITY



GOVERNMENT OF TAIWAN/ROC

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## **PART A      GENERAL INFORMATION**

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### **1.      Introduction**

This Trainer's Guide has been designed to assist trainers who are delivering and assessing the Outboard Motors module (SPC 022C) as part of a Class 6 Master/Engineer course for mariners in the Pacific region. It is a guide to the learning outcomes that need to be delivered, along with suggested assessment methods and assessment criteria (evidence). It is to be used in conjunction with the Outboard Motors Learner's Guide as well as suggested reference material listed in the Course Information section of this guide.

The Outboard Motors module is intended for the skippers of small boats, generally less than 15 meters in length and operating in near coastal waters. The content of the module has been modeled on section 3 of the Engineering module (SPC 022) of the Class 6 Master/Engineer course developed by the Regional Maritime Programme of the Secretariat of the Pacific Community. It has been modified to meet the requirements of small-boat skippers in Pacific Island countries and territories who primarily use outboard motors as the main form of boat propulsion. Compliance with local regulations should be sought before the module is offered.

The intention is that the resources provide a generic module for Pacific Island countries and territories when delivering their country-specific Class 6 Master/Engineer course. The wide variety of boats, outboard motors and types of operations in the Pacific Island region means local priorities will be different and that needs to be reflected in the delivery methodology.

### **2.      Programme development**

The resources were produced with financial support from the Government of Taiwan/ROC and compiled by Grant Carnie, Manager of Fishing & Maritime Programmes, Australian Fisheries Academy, Adelaide, South Australia.

They were developed through consultation with staff of the Fisheries Training Section, Coastal Fisheries Programme, Secretariat of the Pacific Community and regional experts on fishing and maritime training. Resources from Australia and New Zealand, SPC training materials and valuable resource material such as the *Australian Boating Manual* by Captain Dick Gandy were used as a guideline to developing materials that were relevant to small-boat operators in the Pacific Island region.

## **PART B      COURSE INFORMATION**

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### **1.      Module name**

Outboard Motors SPC 022C.

### **2.      Prerequisites**

There are generally no prerequisites for completing the Outboard Motors module however the prerequisites for the Class 6 Master/Engineer certificate (Full or Restricted) are a Safety Certificate and some sea time. Refer to local regulations for any specific country requirements.

### **3.      Course duration**

Two days (at the discretion of the course provider).

### **4.      Assessment**

Assessment methods are suggested in the document for each element of competence, however assessors may feel other combinations are also appropriate. Wherever possible practical demonstration and assessment should be used although this is subject to available resources. With oral and written assessments (when practical assessment is not appropriate or possible), a decision needs to be made in regard to the language or other difficulties a candidate may encounter. An Assessment Guidelines section is included in this Trainer's Guide. It provides a more comprehensive outline of the skills and knowledge a candidate should be able to demonstrate or describe when being assessed and follows the learning outcomes of the course.

Assessment should be conducted separately for each module section as it is completed and the result recorded. This will allow for flexibility in delivery and give a person initially unsuccessful or absent the opportunity to be reassessed only on the section they have not completed.

### **5.      Recognition of Prior Learning (RPL)**

RPL is an integral part of any competency-based system of training and assessment and should be used where appropriate to assess competence within the Outboard Motors module. Similarly, recognition should be given to an approved certificate, covering the same content, that has been obtained from the same or another training provider.

## 6. Resources

The resources required to successfully deliver appropriate training and assessment for the Outboard Motors module are varied and successful delivery can be accomplished without some resources. However, the Outboard Motors module should be very much a hands-on course and every effort will need to be made to simulate real conditions.

Ideally, the training provider will have access to an area where an outboard motor can be operated and will be able to use an outboard motor familiar to the candidates so that much of the training and assessment can be very practically focussed. For economical and geographical reasons, this is not always possible, however the most successful results will require the greatest practical focus possible.

Resources that may be used include:

- Classroom with desks
- Overhead Projector
- Overhead transparencies for the Outboard Motor module
- Whiteboard
- TV and video
- Appropriate training videos
- Outboard motor and fuel tank
- Parts from the outboard motor

Recommended trainer's reference material:

- *Australian Boating Manual* by Captain Dick Gandy
- *Outboard Motors Learner's Guide SPC 022C* from SPC
- *FAD Fishing Skills Workshops, SPC Module 2, "Safety at sea and Small Boat FAD Fishing"*

## PART C LEARNING OUTCOMES AND ASSESSMENT CRITERIA

Learning Outcomes	Method of Assessment	Assessment Criteria (Evidence)
1.1 Understand the basic operation of an outboard motor <ul style="list-style-type: none"> <li>• Main parts</li> <li>• Fuel system</li> <li>• Cooling system</li> <li>• Lubricating system</li> </ul>	Oral and written	Able to identify and describe (with diagrams if applicable) <ul style="list-style-type: none"> <li>• The main parts of an outboard motor</li> <li>• The fuel system</li> <li>• The cooling system</li> <li>• The lubricating system</li> </ul>
1.2 Know the right procedure to start an outboard motor <ul style="list-style-type: none"> <li>• Attachment of the motor to the boat</li> <li>• Procedures for starting</li> <li>• Warm-up period</li> </ul>	1. Oral and written and/or 2. Practical Demonstration	Able to describe (with diagrams if applicable) or practically demonstrate a knowledge of <ul style="list-style-type: none"> <li>• The correct attachment of the outboard motor to the boat</li> <li>• Trim angles</li> <li>• Procedures for starting an outboard motor</li> <li>• The warm-up period</li> </ul>
1.3 Understand common engine faults and know the actions to take when they occur <ul style="list-style-type: none"> <li>• Engine does not start</li> <li>• Overheating</li> <li>• Electrical fault</li> <li>• Outboard engine submerged in water</li> </ul>	1. Oral and written and/or 2. Practical Demonstration	Able to explain or describe (with diagrams if applicable) or practically demonstrate a knowledge of <ul style="list-style-type: none"> <li>• Checks to make if an outboard motor does not start and actions that may be taken to overcome the problem</li> <li>• Checks to make and actions to take if an outboard motor is overheating</li> <li>• Maintaining and changing spark plugs</li> <li>• Actions to take if an outboard motor is dropped overboard or submerged in water</li> </ul>

Learning Outcomes	Method of Assessment	Assessment Criteria (Evidence)
1.4 Know and attend to the regular maintenance required for an outboard motor	2. Oral and written and/or 2. Practical Demonstration	Able to explain or describe (with diagrams if applicable) or practically demonstrate a knowledge of <ul style="list-style-type: none"> <li>• The areas needing regular attention on an outboard motor (water pump, fuel filters &amp; lines, propeller, spark plugs, gear box oil)</li> <li>• The following basic maintenance procedures               <ul style="list-style-type: none"> <li>✓ Changing filters</li> <li>✓ Cleaning and changing spark plugs</li> <li>✓ Checking for spark</li> <li>✓ Checking and replacing fuses</li> <li>✓ Changing the propeller</li> </ul> </li> <li>• The daily checks and regular services</li> </ul>

## PART D ASSESSMENT GUIDELINES

Learning Outcome	Assessment Criteria (evidence)
1.1	<ol style="list-style-type: none"> <li>1. Able to identify on an outboard motor (or diagram) the main parts and their use <ul style="list-style-type: none"> <li>• Manual start recoil handle</li> <li>• Choke knob</li> <li>• Electric start button</li> <li>• Engine stop button</li> <li>• Gear shift lever</li> <li>• Throttle control and steering handle</li> <li>• Engine securing clamp</li> <li>• Tilt lock (for preventing accidental tilting)</li> <li>• Cooling water inlet</li> <li>• Propeller</li> <li>• Anti-cavitation plate</li> <li>• Rod for adjusting trim angle</li> <li>• Lever for raising motor</li> <li>• Battery lead</li> </ul> </li>   <li>2. Able to describe the fuel system of an outboard motor and identify its components (for both portable and fixed systems) <ul style="list-style-type: none"> <li>• Portable system <ul style="list-style-type: none"> <li>✓ portable fuel tank</li> <li>✓ filler cap and tank filter</li> <li>✓ breather screw</li> <li>✓ manual priming bulb</li> <li>✓ fuel line connection (self locking to the tank and to the motor)</li> <li>✓ connection either a quick release type or automatic shut off)</li> </ul> </li> <li>• Fixed system <ul style="list-style-type: none"> <li>✓ fixed fuel tank</li> <li>✓ filling point</li> <li>✓ anti-siphon fitting</li> <li>✓ fuel tank breather</li> <li>✓ fuel level indicator</li> <li>✓ manual priming bulb</li> <li>✓ fuel filter</li> <li>✓ flexible fuel line</li> </ul> </li> </ul> </li>   <li>3. Able to describe the cooling system of an outboard motor and identify its components <ul style="list-style-type: none"> <li>• The cooling system is the direct, sea-water type</li> <li>• The pump and water strainer intake are located in the lower leg</li> <li>• Water passes through the galleries in the engine and out through the exhaust</li> <li>• The tell tale water stream</li> <li>• Has a thermostat to maintain minimum temperature</li> </ul> </li>   <li>4. Understands the outboard internal lubricating system <ul style="list-style-type: none"> <li>• Two-stroke outboard motors need the crankcase for compression so a lubricating system with circulating oil is not possible. Two systems are available <ul style="list-style-type: none"> <li>✓ oil is mixed with the petrol in the petrol tank</li> <li>✓ oil is mixed as required by an oil injection pump, the Variable Ratio Oiling (VRO), common on modern two-stroke engines</li> </ul> </li> <li>• Diesel and four stroke engines are lubricated by the sump oil through a circulating system</li> <li>• Oil to petrol ratio varies between 1:100 and 2:100</li> </ul> </li> </ol>

Learning Outcome	Assessment Criteria (evidence)
1.2	<ol style="list-style-type: none"> <li>1. Able to describe or demonstrate the procedures for mounting an outboard motor <ul style="list-style-type: none"> <li>• Mounted on stern and clamps tightly screwed</li> <li>• Safety line from motor attached to a strong part of the boat</li> <li>• Trim angle – by moving the adjusting rod to different holes in the the mounting bracket, the trim angle will be changed, making the vessel’s bow to rise or fall and thus affecting the vessel’s handling and stability</li> </ul> </li> <li>2. Able to describe or demonstrate the procedures for starting an outboard motor <ul style="list-style-type: none"> <li>• Lower engine to running position</li> <li>• Pre-start checks (fuel, oil, if engine has separate lube oil tank)</li> <li>• Loosen air-vent screw (if fitted) on the fuel tank</li> <li>• Firmly connect fuel hose</li> <li>• Squeeze primer bulb until it becomes firm</li> <li>• Make sure the engine is in neutral and the throttle control (on steering handle) is in START position</li> <li>• Pull out choke (if starting a cold engine)</li> <li>• Start by pulling the starter handle (manual) or pushing starter switch (electric)</li> <li>• Once going, push choke knob back in</li> <li>• Allow a warm up period before increasing throttle too high</li> </ul> </li> </ol>
1.3	<ol style="list-style-type: none"> <li>1. Able to explain (and demonstrate if applicable) checks to make and actions to take if an outboard motor fails to start <ul style="list-style-type: none"> <li>• Check fuel level</li> <li>• Check fuel lines connected correctly and primed</li> <li>• Check air vent screw on fuel tank</li> <li>• Check engine is in neutral and throttle control in START position</li> <li>• Check emergency stop switch (if fitted) is plugged in</li> <li>• Inspect/clean spark plug</li> <li>• Inspect battery condition and connections</li> </ul> </li> <li>2. Able to describe and/or demonstrate checks to make and actions to take if an outboard motor overheats <ul style="list-style-type: none"> <li>• Check “tell tale” water stream at correct output</li> <li>• Inspect/clear water intakes</li> <li>• Check water pump, thermostat operating correctly</li> <li>• Check oil level (if separate lube oil tank fitted)</li> </ul> </li> <li>3. Able to describe and/or demonstrate checks to make and actions to take if there is an electrical fault in an outboard motor <ul style="list-style-type: none"> <li>• Check for loose/dirty battery connections</li> <li>• Check electrolyte level in battery</li> <li>• Check state of battery charge</li> <li>• Check “kill switch” connected properly</li> <li>• Inspect spark plugs/connections</li> </ul> </li> <li>4. Able to describe and/or demonstrate action to take when outboard motor has been submerged in water <ul style="list-style-type: none"> <li>• Action to be taken immediately</li> <li>• Remove cover and rinse engine with fresh water</li> <li>• Remove spark plugs, drain water</li> <li>• Disassemble carburetor and drain</li> <li>• Disassemble, clean, flush all electrical equipment and treat with water displacing spray</li> <li>• Drain, flush fuel lines, tanks</li> <li>• Reassemble correctly</li> <li>• Follow restarting procedures and run for 30 minutes</li> </ul> </li> </ol>

Learning Outcome	Assessment Criteria (evidence)
1.4	<ol style="list-style-type: none"> <li>1. Able to explain and/or demonstrate knowledge of the parts on outboard motors needing regular maintenance <ul style="list-style-type: none"> <li>• Water pump</li> <li>• Fuel filters and lines</li> <li>• Propeller</li> <li>• Spark plugs</li> <li>• Gear box oil</li> </ul> </li>   <li>2. Able to explain and/or demonstrate basic maintenance procedures on outboard motors <ul style="list-style-type: none"> <li>• Cleaning and changing fuel filters</li> <li>• Cleaning and changing spark plugs</li> <li>• Checking for spark</li> <li>• Checking and replacing fuses</li> <li>• Inspecting and changing propellers</li> </ul> </li>   <li>3. Able to explain and/or demonstrate daily checks and regular services to be carried out on outboard motors <ul style="list-style-type: none"> <li>• Check engine mounts in good order</li> <li>• Engine cooling system flushed with fresh water</li> <li>• Check steering system operating correctly, in good order</li> <li>• Inspect fuel lines for leaks, correct connection</li> <li>• Lubrication points and propeller shaft greased</li> <li>• Inspect battery condition, electrolyte levels</li> <li>• Check oil level in separate lube oil tank (if fitted)</li> <li>• Engine controls operating correctly</li> <li>• Inspect propeller for bent blades, chips, loose pins</li> </ul> </li> </ol>