

Basic trades for small island nations

Small Engine User Maintenance

Student workbook



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Credits

The idea of a Basic Trades programme was originally proposed at the PATVET Institute in 2002 and then was explored and documented at a workshop held in Suva, Fiji in June 2003. This workshop involved ideas and input from representatives of mainly smaller island nations in PATVET:

Kiribati	Taeboa Tabanga
Nauru	Ande Dubuae
Niue	Charlie Tohovaka
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The following companies products have been used to illustrate or describe examples in this course material

AC	Denso	Shell
Autolite	Honda	Stihl
Bosch	Johnson	Suzuki
BP	Mercury	Techumseh
Briggs and Stratton	McCulloch	Valvoline
Caltex	Mobil	Victa
Castrol	NGK	Yamaha
Champion	Ryobi	

While these are all excellent products, COL does not endorse them as being available or especially suitable for any of the many and varied locations and situations of the intended use of this course.

What is this course for?

This course is a basic introduction to the simple operator maintenance of small engines.

It helps you to:

- Understand how engines work.
- Understand the major parts of an engine and what they do
- Stop engine problems happening
- Carry out basic servicing jobs
- Know your limits – what you should NOT try to do
- Find simple faults
- Use basic tools.

You will work with engines, materials and tools that are available locally.

The focus of this course is on outboard engines for small boats, but the theory and practical maintenance apply to most other small engines – such as mowers, brush-cutters, chain saws and generators.

The course is for school leavers and community groups who have limited knowledge or experience working on small engines.

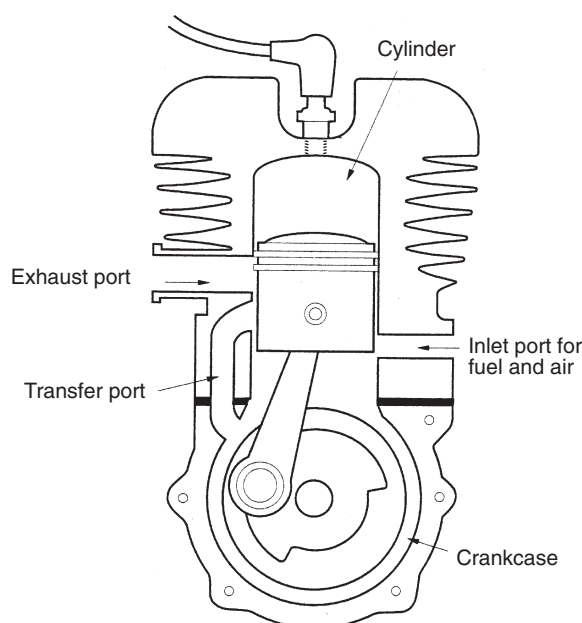
When you have finished this course you should be able to work on simple engine maintenance on your own. You will still need to send more complex work to an experienced service mechanic.

What does the course cover?

Small engine user maintenance covers four main topics:

How small engines work

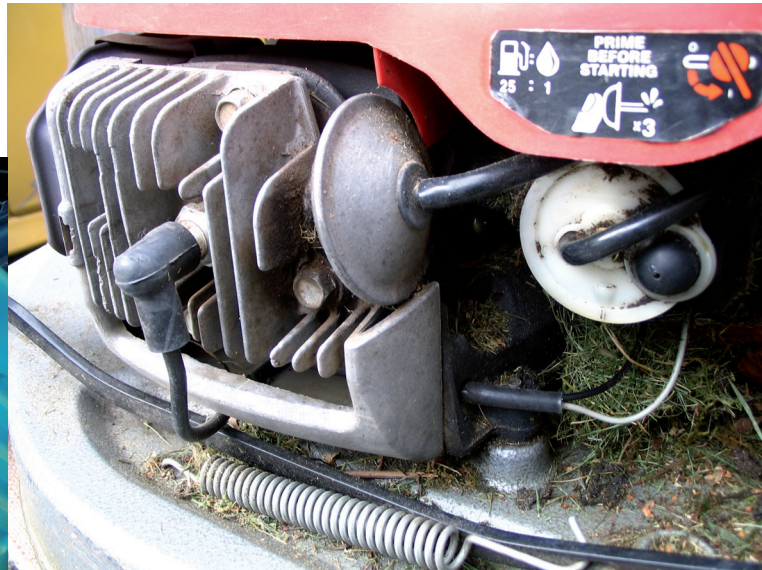
You learn about the basic 4-stroke and 2-stroke cycle engines and the types of equipment they power. The course concentrates on outboard motors. You find out what types of engines, parts and materials are available in your area and where to get them from.



Major engine components - operation and maintenance

You learn about the main parts needed for an engine to run. You look at the different parts used for:

Air, fuel, electrics, cooling and oil.



You learn about the things you can do to help keep an engine trouble-free (preventative maintenance). You then practice servicing all the parts you should check, clean or replace on your own engine.

Maintaining the non-engine parts of your equipment



These are worksheets to help you maintain the things that your engine drives. Gear-boxes, controls, belts, chains. For example, the propeller and lower gear case of your outboard.

Fault finding

You follow logical steps in a guide to find the cause of basic engine faults.

Tools and spare parts

Suggestions for the tools and spare parts the students need to carry out operator maintenance. You will find out what service parts you need for *your engine* and where you can get them from.



Safety

This a checklist to remind you about safety at all times. Safety is also covered in each module.

How is the course put together?

The course is a basic introduction for people who know little about looking after a small engine.

The course **must** be led by a tutor or experienced trades person who can show you the steps, how to use tools correctly and guide you on developing your skills.

The course will work best with small groups of students who can talk about things and learn from each other.

Students' Workbook

This Workbook has exercises, pictures and explanations as well as space to make your own notes.

Your Workbook also has a copy of a Worksheet and an activity sheet for most of the big steps.

Your tutor will work through each worksheet with you, talking about the parts, tools and materials and showing you how to use them.


You should not use the worksheets to learn on your own, but they should make good notes for you to look back at later on.

Fuel
Student

What you will learn

When you have finished this module, you should be able to:

- Choose the right fuel for the engine
- Mix the right petrol and oil for a 2-stroke engine
- Know the main parts of a fuel system
- Check fuel tanks, lines and primers
- Check and replace fuel filters
- Know about safety with fuel



Things you need before you start

Materials

Paper and pencil

Engine, filters and fuel tank

Tools

Containers for mixing fuel

Screwdrivers, spanners and pliers

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The role of the Tutor

Your tutor for this course is a competent tradesperson with knowledge of small engine mechanics. They will talk with you about different engines, how things work and then show you how to look after them.

Your tutor will:

- Have samples of engines, tools and equipment for you to work with
- Lead you through the course
- Explain the written material
- Show you what you should maintain on your engine
- Show you how to use tools correctly and safely
- Watch you work and tell you how you are doing.

Activities

During the course you will work on an engine to use the skills you have learned. If you have your own engine, you can work on that as well as practising on other types.

This course tells you a lot about engines, parts and adjustments, but you need to be able to do the maintenance and use the tools – not just talk about them.

The course books and your tutor can show you how to do things – but take plenty of time to practice in the activities.

Whenever you can, work with two or three students. You can

- watch and give each other feedback on how you are doing
- learn from watching them.

