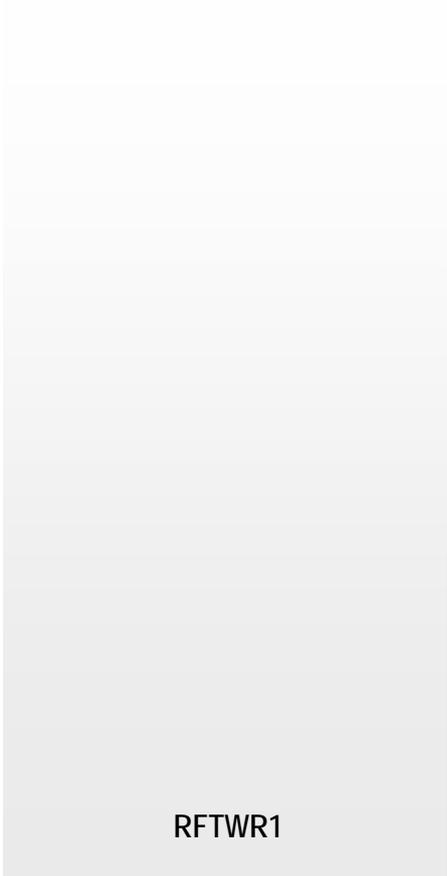




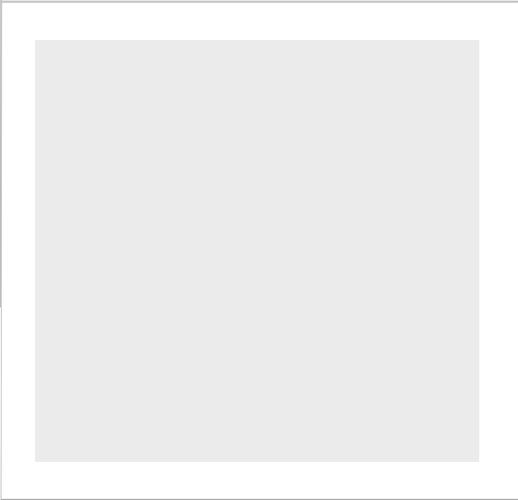
Rural Firefighting

Study Guide

Communicate in the Outdoors Using Two-way Radio



RFTWR1



Status of this Document

This document is issued by the National Rural Fire Authority.

What This Means

It is written to comply with:

- other National Training material
- National Rural Fire Authority best practice
- Forest and Rural Fires Act 1977
- Fire Service Act 1975
- Health and Safety and other relevant legislation
- New Zealand Qualifications Authority requirements
- Fire and Rescue Services Industry Training Organisation (FRSITO) requirements.

The document, its content and specified processes are not to be altered, except through National Rural Fire Authority processes.

Recommendations for Change

National Rural Fire Authority encourages and welcomes feedback on all its products and processes to ensure currency and continuous improvement.

Recommendations for changes to this material should be sent to the National Rural Fire Authority.

Document Title: Communicate in the Outdoors Using Two-way Radio
Published: 1 February 2010
© New Zealand Fire Service

If you wish to copy or reproduce any of the material in this document, please contact:

National Rural Fire Authority
National Training
P O Box 2133
Wellington

Ph: (04)496-3600
Fax: (04) 496-3700

Contents

Acknowledgements.....	ii
Study Guide Introduction	1
Section 1: Radio Introduction	3
Section 2: Radio General.....	5
Radio Channel.....	5
Servicing and Maintenance	6
Section 3: Radio Procedures.....	9
Call Signs	9
Establishing Communications	10
Phonetic Alphabet	11
Pronunciation of Numbers	12
Rules-For-Numbers	13
‘K’ Code Messages	14
Standard Phrases.....	16
Language, Etiquette and Emergencies.....	17
Speaking Protocols.....	18
Recording your Messages.....	19
Troubleshooting.....	19

Acknowledgements

The National Rural Fire Authority (NRFA), New Zealand Fire Service (NZFS) and the Fire and Rescue Industry Training Organisation (FRSITO) acknowledge the help of the many Subject Matter Experts in preparing this material.

Study Guide Introduction

Overview

Welcome to Communicate in the Outdoors Using Two-way Radio. The course is made up of theory and practical training.

During the course, you will learn about:

- radios in general
- radio procedures
- standard phrases and etiquette when using a radio.

Read through this study guide before your practical training date. This will ensure you are familiar with the subject and can highlight any questions for the training session.

Course Objectives

The general objectives for this course are to demonstrate knowledge of using a two-way radio appropriate to your firefighting working environment. After studying this material, you should be able to demonstrate knowledge of:

- using a radio
- basic servicing and maintenance of radios
- radio procedures
- establishing communications and using appropriate 'radio' language and phrases
- troubleshooting.

This course provides evidence towards the achievement of Unit Standard 4573 for fire fighting. This will ensure you are familiar with the subject and can highlight any questions for the training session.

Assessment and Evidence

Because practical experience differs you will need to check with an approved assessor and discuss the requirements for you to achieve the unit standard. This could include attestation of previous practical experience and/or practical assessment.

A properly maintained work record will support your portfolio of evidence for use as evidence for assessment against unit standards. You'll need to maintain a record of relevant work experience, together with an evaluation of tasks completed at an incident by the relevant supervisor.

Practical Training

The practical training session is made up of two parts:

1. The instructor demonstrates the use of using two-way radio equipment in the outdoors and the students practice.
2. Participants work in a crew to use using a two-way radio equipment in the outdoors and practice these skills.

Gaining the Unit Standard

Unit standard assessment may have trainees submitting a portfolio of evidence to a designated assessor. To support the evidence, maintaining a workbook and records of relevant work experience, together with an evaluation by the relevant supervisor of tasks completed at an incident.

Section 1: Radio Introduction

Why use radio?

There are many types of hand held, vehicle and base radios (or transceivers):

1. Handheld / portable radio.
2. Land Mobile Radio (LMR) fire appliance radios.
3. Base radio.

Handheld/portable radio is used to describe lightweight handheld sets with self contained batteries and aerial.

Sometimes handheld/portable radios are also called Incident Ground Communications (IGC).

Some material on radio specifications may be included by your course facilitator.

Some examples of handheld/portable radios include:

- Simoco SRP8020
- Tait Orca
- Icom F11

The advantages and disadvantages of using radio are:

Advantages	Disadvantages
<ul style="list-style-type: none">• Independent of any “public” systems (phones, cell phones)• Robust• Highly portable• Not dependent on ‘mains’ power or cables• Can be used to pass information to many stations at once.	<ul style="list-style-type: none">• Capital intensive• No privacy (can be heard by others)• Subject to interference (man-made & natural)• Limited coverage (geographic – hills)• Reliant on batteries.

Land Mobile Radio – (LMR)

Land Mobile Radio are mounted in fire appliances as a permanently installed or base mounted set, fitted in a cradle and connected to a permanently mounted aerial. The LMR system could be on a separate frequency and may not be used to communicate with handhelds.

Base Radio

A base radio is either fitted into a vehicle or at a base headquarters or office.

Note:

1. Organisations use a range of different radio systems. Each organisation is licensed to use allocated frequencies as per their radio licenses. You will need training on your specific radio system from your local training provider.
2. This study guide covers the requirements for Unit Standard 4573 only.

Section 2: Radio General

Radio Channel

There are two types of radio channel commonly used in fire fighting operations:

- Simplex
- Duplex or Repeater.

Simplex Channels

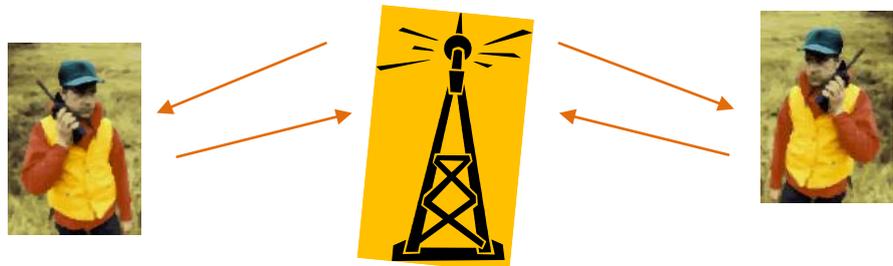
These are usually short range or line of sight channels suitable for controlling fireground operations. This range may be as much as 25 km when working on high ground to as little as 500m in valleys, forests or areas with tall buildings. The transmission is from radio to radio and can be likened to a torch beam. If large objects such as hills interrupt the beam then transmission can be blocked.



Duplex / Repeater Channels

These are channels using a frequency that is bounced off a repeater station that is usually located on high ground and gives coverage over a greater area than is possible with simplex transmission. The signal is transmitted from the radio to the repeater and then re-transmitted to the receiving set.

Transmissions by duplex can have a range over several hundred kilometres.



Channel Selection

Channel selection is very important, as everyone on the fireground must be able to communicate clearly and easily. Everyone using a radio must be aware of what channel to operate on for the job that they are doing.

If you are instructed to take a radio, make sure you:

- **Know what channel** you are to operate on and who else is on the channel
- **Know what your call-sign** is
- **Know your radio** - its limitations and abilities.

Note: Keep the antenna vertical as this maximises signal transfer.

Servicing and Maintenance

Care of Radios

Radios are a vital piece of safety equipment - your safety and the safety of others may depend on it.

- radios are an expensive item and easily damaged
- protect all radios from physical abuse
- take care not to drop or bump them
- protect the set from water damage
- do not use the antenna as a handle
- ensure that the push to talk button (PTT) is not accidentally depressed especially when the radio is carried in your pocket. This will jam communications for other users as well as rapidly flattening the battery.

Battery Care

The battery is vital to radio operation and should always be maintained in perfect working order.

- keep rechargeable batteries regularly charged as they lose a little charge each day and may be below operational output when needed
- replace rechargeable batteries when they are repeatedly failing to hold a charge for less than a few days – they have a finite life
- charge batteries in accordance with the manufacturer's instructions
- when the radio is fitted with dry cell batteries, carry a spare set of batteries.

Radio Inspection

You must check radios regularly to ensure that they are working properly and that the batteries are in a full state of charge.

- note any faults and action them as soon as possible
- check the aerial to make sure it's connected properly and that it's not damaged (any damage to the aerial will reduce the receiving/transmission capabilities of the radio)
- check and test the microphone/speaker to make sure it is connected properly and not damaged
- check that the battery is fully charged and that you have spares
- report faults and ensure crew safety. A defective radio can put a crew in an unsafe position.



Safety Note

When receiving handover of a radio from another firefighter:

- visually check its condition
- obtain the associated call sign
- perform a radio transmission check
- obtain spare batteries.

Section 3: Radio Procedures

Radio voice procedure is a skill that is developed with use. Used correctly it helps you get the message through efficiently and effectively.

Call Signs

Allocating call signs

Call signs should be allocated to crews working on a fire ground at the start of a work assignment and recorded by the Incident Control Point (ICP).

- this will ensure that call signs will be correctly allocated and duplications will be avoided
- any change of call signs must be communicated and approved by the headquarters communications officer.

The use of call signs is essential for operations involving multiple crews or organizations on a fireground.

- using a person's name can be confusing, particularly if there's more than one person with the same name
- it's preferable to use the person's or crew's **position** on the fire ground, as this will not alter as crew changes occur -

e.g. *"Base Pump, Base pump, this is Crew One, Water off, -- Over"*

When calling another operator, always give their call sign first.

- the operator will recognize the call sign and this will alert the operator to an incoming call -

e.g. *"Makara Command, this is Crew One, returning to Staging Area, --- Over"*

Using the phrase **"this is"** between the contact and caller's call sign separates the caller and the destination called and gives the receiver time to listen for the message.

- if the call signs are run together it may cause confusion, particularly on a noisy fire ground -

e.g. *"Crew One, Crew Two, move left"* could be mistaken for an instruction for both crews to move.

The correct message should leave no doubt as to whom the message is for and who sent it -

e.g. *"Crew one, **this is** Crew two--- move left, ---Over."*

Establishing Communications

Strength and Readability Reports

Two sets of terms are used to describe to the caller or contact how well their transmission is heard – **Strength** and **Readability**.

These are used to confirm whether the radio signal is strong and understandable.

When you are establishing communication you should check for these two key signals.

Strength

- loud
- weak
- very weak
- fading.

Readability

- clear
- readable
- unreadable
- distorted
- with interference.

Some examples of strength and readability reports are:

- loud and clear
- nothing heard
- loud but distorted
- weak but readable
- weak barely readable.

Phonetic Alphabet

The phonetic alphabet can be used when poor radio reception occurs and when you have to spell any name to make sure the right information is given and received.

e.g. *Cust Road* or *was it Trust Road*.

The phonetic alphabet is:

LETTER	PHONETIC ALPHABET	PRONUNCIATION
A	ALPHA	AL-fah
B	BRAVO	BRAH-vo
C	CHARLIE	CHAR-lee
D	DELTA	DELL-tah
E	ECHO	ECK-oh
F	FOXTROT	FOX-trot
G	GOLF	GOLF
H	HOTEL	HO-tell
I	INDIA	IN-dee-ah
J	JULIET	JEW-lee-ett
K	KILO	KEY-low
L	LIMA	LEE-ma
M	MIKE	MIKE
N	NOVEMBER	no-VEM-bah
O	OSCAR	OSS-car
P	PAPA	PAH-pah
Q	QUEBEC	KWEE-beck
R	ROMEO	ROW-me-oh
S	SIERRA	see-AIR-ra
T	TANGO	TANG-go
U	UNIFORM	YOU-nee-form
V	VICTOR	VIK-tah
W	WHISKEY	WISS-key
X	X-RAY	ECKS-ray
Y	YANKEE	YANG-key
Z	ZULU	ZOO-loo

Pronunciation of Numbers

As with the alphabet, numbers can become confusing when transmitted over the radio.

Before using or saying numbers over a radio, you should always start with

- the standard phrase “figures”, then say
- the numbers.

Using the word “figures” warns the recipient that some numbers are coming.

NUMBER	PRONUNCIATION
0	ZEE-row
1	WUN
2	TOO
3	Thuh-REE
4	FOR-were
5	FIFE
6	SIX
7	SEV-ven
8	ATE
9	NINE-ah
10	WUN-ZEE-row
11	WUN-WUN
12	WUN-TOO
13	WUN-thuh-REE
20	TOO-ZEE-row
25	TOO-FIFE
30	thuh-REE-ZEE-row
100	WUN-HUN-dread
150	WUN-FIFE-ZEE-row
. [dot]	Day-see-mal

Rules-For-Numbers

Numbers

Numbers are sent **digit by digit** except: 100's and 1000's.

For example:

“There are “figures” 45 (FOR-were -FIFE) staff to be fed.”

“We have figures 268 (TOO- SIX- ATE) sandbags.”

“There are figures 5000 (fife thousand) sandbags available.”

Numbers

Numbers are sent **digit by digit** except: 100's and 1000's.

For example:

“There are “figures” 45 (FOR-were -FIFE) staff to be fed.”

“We have figures 268 (TOO- SIX- ATE) sandbags.”

“There are figures 5000 (fife thousand) sandbags available.”

Times

Times are handled a little differently. They are broken into two groups of two numbers.

For example:

“The time is figures 1500 hrs.” (fifteen hundred hours)

“The time is figures 1130 hrs.” (eleven thirty hours)

'K" Code Messages

For people who have fire service radios in their vehicles communicate is done via 'K' code messages

	K0	not available
	K1	proceeding to incident
	K2	in attendance at incident
	K3	on RT outside normal turnout area
	K4	on RT inside normal turnout area
	K5	on RT available at incident
	K6	on telepager
	K7	at normal station
	K8	at residence (on phone)
	K9	off RT - state location
	KE	unable to proceed (state reason-spoken as 'Kay echo').
Support Services	K11	(state service required, and if necessary, the reason)
	K11-1	police required – confidential
Appliance Movement	K22	is your appliance available for a further call?
	K22-1	appliance available to respond to a further call
	K22-2	have you any appliances that can be released?
	K25	proceed to, and stand-by at (location)
	K25-1	appliance standing by awaiting instructions at (location)
	K26	appliance will be engaged at incident for (time)
	K26-1	appliance still engaged, no additional developments
	K28	appliance is to return to station (only to be used by mobilising centre)
	K28-1	return other or specific responding appliances.
Radio Procedures	K31	request permission to go off RT (fires and stand-bys)
	K32	on radio test - how do you receive?
	K33(1-5)	radio test received satisfactorily (readability 1 to 5)
	K34	repeat your message
	K35	verify address of call
	K35-1	request map reference
	K36	contact communication centre by telephone
	K38	associate this officer to incident (state incident address)
	K39	re-transmit your current status (MSU or verbal).

Incident Ground Command	K41	fatality (indicate number with suffix)
	K42	<i>(this code is not in use)</i>
	K43	all available manpower fully utilised
	K44	command or control point established (OIC and location)
	K45	command responsibility change (state name)
Stop Message	K46-1	stop message - false alarm - good intent
	K46-2	stop message - false alarm - accidental
	K46-3	stop message - false alarm - defective apparatus
	K46-4	stop message - false alarm - malicious
	K46-5	stop message - alarm agent in attendance
	K46-6	stop message - nothing showing on indicator panel
	K47	stop message - message unchanged from informative
	K48	stop message - details to follow.
Trial Evacuation	K51	trial evacuation to be carried out at(state location)
	K52	(location) was a 111 call received from the premises
	K53	(location) evacuation successful.
Arrival Messages	K55	first appliance in attendance - special service incident
	K66	first appliance in attendance - non property fire
	K77	first appliance in attendance - nothing showing investigating further
	K88	first appliance in attendance - property fire apparently small
	K99	first appliance in attendance - property fire well involved.

Standard Phrases

Standard phrases

Standard phrases are a standard way of speaking over a radio that is understood internationally.

They are easily pronounced words that have been assigned special meanings to speed up messages given over a radio network. These standard phrases must never be substituted for any word or phrase appearing in the text of a message.

There are some commonly used words and phrases in standard radio procedures that have specific meanings. Use them so as to avoid confusion and misunderstanding

Acknowledge	Let me know you have received and understood the message.
Affirmative	Yes, or permission granted.
Correction	Used where a message or part of a message is sent or received wrongly.
Go Ahead	Proceed with your message.
I say again	I am repeating the message.
Message Received	Message received and understood.
Negative	No, or permission is not granted.
Out	My transmission is ended and I do not expect a reply.
Over	My transmission is ended and I expect a reply.
Repeat	Repeat your message.
Say again	Repeat all or the following parts of your transmission.

Language, Etiquette and Emergencies

Appropriate Radio Procedures

When using a radio the appropriate procedures are:

Step	Action
1	Listen before calling
2	Plan what to say
3	Speak clearly
4	Identify who you are (know the call signs)
5	Repeat message if in doubt
6	Record important messages
7	Keep to the point (as brief as possible)
8	Take care of the equipment

Sending/Receiving a message	Examples
Calling	<i>Pump - this is Nozzle Operator</i>
Receiving	<i>Nozzle Operator - this is Pump</i>
Message	<i>Water off</i>
Acknowledge	<i>Water off</i>

Note: Stand at least 5m away from a running engine (pump) when using a radio telephone.

Emergency Message

This emergency message to clear the radio channel and/or gain the attention of other radio users in an emergency:

EMERGENCY - EMERGENCY – EMERGENCY

When a reply is received the caller must give their

- Identity
- Location
- Nature of emergency

Both the caller and receivers must stay in contact, as further information may be required.

All other radio users must listen, leave the channel free for the emergency message to be sent and acknowledged, and wait for any directions from incident management staff.

Inappropriate language Inappropriate language is not allowed when using a radio. This includes:

- swearing
- racist or sexist comments.

Any language that can be considered offensive could result you being charge with an offense under the Summary of Offences Act (1981).

Ensure that you always speak appropriately and professional when using a radio.

Speaking Protocols

Listen Listen before you speak or call as one channel may have many stations and you may cut someone else off.

Speak Speak clearly:

- normal voice
- don't shout
- give pauses.

Voice Procedure Voice procedure:

- rhythm
- speed
- volume
- pitch.

Think Think before you talk:

- work out what you are going to say
- divide your message up into sentences
- pause between sentences
- do not talk too long.

Recording your Messages

Message recording

This is an example of a communications log used to record the date, time and message of each transmission.

It is most commonly used in the Command vehicle or by the communications Unit at an incident. It is used for debriefing and also investigations of incidents.

Communications Log					
Time	From	To	Message	Sent	Op
00810	Crew 1	Crew 2	<i>Move recce party now</i>	Radio	pbo

Troubleshooting

- Is the radio switched on?
- Are you on the correct channel?
- How are you using the handheld radio?
 - hold handheld radios vertically when in use
 - hold the microphone close to your mouth and speak across it, not into it
 - remain stationary when transmitting
 - speak normally and clearly.
- Are the batteries fully charged?

Poor Reception

If reception is poor, move to another position, preferably higher or open ground and try again.

- Hills, trees or large buildings can block transmissions.
- Simplex transmissions require line of sight and may require another radio operator on higher ground to relay the message.

For difficult transmission areas, it may be necessary to set up a portable repeater station (duplex system) on high ground to cover the area of operation.

Relay Procedure

When one station cannot get through to another station, but you can hear both, you can let the sending station know that you can relay the message.

Tips:

1. Try to be away from anything, which may interfere with communicating clearly for example:
 - power lines
 - pumps
 - vehicles
 - other aerials/radios
 - cell phones.
2. Try to eliminate background noise (either noise or wind) by making sure you are standing with the back of the radio facing the noise or the wind.

Another way to help reduce the background noise is to shelter behind a tree, large rock or a vehicle as these all provides shelter to the radio and operator.

3. For best reception try to stay out of:
 - bluffs
 - valleys
 - blind spots
 - tunnels etc.