



This Best Practice Guide is
being reviewed.

The future of Best Practice
Guides will be decided
during 2015.

Best practice guidelines for Working with Helicopters

Vision, knowledge, performance



He Mihi

Nga pakiaka ki te Rawhiti.

Roots to the East.

Nga pakiaka ki te Raki.

Roots to the North.

Nga pakiaka ki te Uru.

Roots to the West.

Nga pakiaka ki te Tonga.

Roots to the South.

Nau mai, Haere mai

We greet you and welcome you.

ki te Wāonui o Tane

To the forest world of Tane.

Whaia te huarahi,

Pursue the path,

o te Aka Matua,

of the climbing vine,

i runga, I te poutama

on the stairway,

o te mātauranga.

of learning.

Kia rongo ai koe

So that you will feel,

te mahana o te rangimārie.

the inner warmth of peace.

Ka kaha ai koe,

Then you will be able,

ki te tū whakaiti,

to stand humbler,

ki te tū whakahī.

Yet stand proud.

Kia Kaha, kia manawānui

Be strong, be steadfast.

Tena koutou katoa.

First edition October 2000

Revised edition January 2005

This Best Practice Guideline is to be used as a guide to certain helicopter procedures and techniques. It does not supersede legislation in any jurisdiction or the recommendations of equipment manufacturers.

FITEC believes that the information in the guideline is accurate and reliable; however, FITEC notes that conditions vary greatly from one geographical area to another; that a greater variety of equipment and techniques are currently in use; and other (or additional) measures may be appropriate in a given situation.

Other Best Practice Guidelines included in the series:

- Cable Logging
- Chainsaw Use
- Fire Fighting and Controlled Burnoffs
- Ground-based Logging
- Land Preparation
- Loading
- Maintenance inspections of Yarder Towers
- Manual Log-making
- Mechanised Harvesting and Processing
- Mobile Plant
- Personal Protective Equipment
- Road and Landing Construction
- Silvicultural Pruning
- Transport
- Tree Felling
- Tree Planting

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**Best Practice Guidelines
for
Working with Helicopters**

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Introduction

Purpose of these guidelines

The Best Practice Guidelines for Working with Helicopters have been designed by FITEC to improve worker safety and productivity. They combine industry training standards and best practice information to provide a valuable reference manual for people working with helicopters.

These guidelines should be read in conjunction with the Approved Code of Practice for Safety and Health in Forest Operations. In particular, these guidelines provide direct support for Part 3 – Section 5 (Helicopters) of the code. The guidelines may also be subject to some requirements of the Approved Code of Practice for Helicopter Logging.

How to use these guidelines

These guidelines have been arranged in two main sections:

- **Helicopter basics** provides information on helicopter operations and hazards
- **Helicopter procedures** describes specific operational procedures common to the range of helicopter operations.

The **Glossary of terms** gives the meaning of terms used throughout these guidelines.

Acknowledgements

FITEC acknowledges the assistance of the Occupational Safety and Health Service, Liro Forestry Solutions, and numerous forest industry trainers, forestry contractors, and forest company staff in the development of these Best Practice Guidelines

About best practice training material

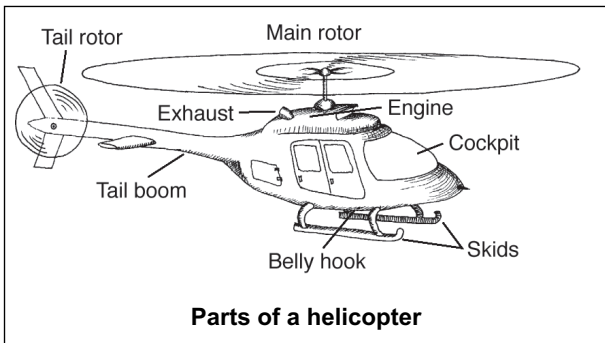
FITEC has developed the material in this publication. It has been reviewed by representatives of the forest industry. At the time of publication, FITEC considers the practices and approaches in this publication to exceed accepted industry standards with regard to production and business management. In addition, the practices recommended in the publication exceed all the New Zealand regulatory standards, in particular those related to health and safety, environmental management, and human resources / employment.

This material is reviewed and reprinted regularly by FITEC.

Helicopter basics



Helicopter spraying



Parts of a helicopter



Types of operations

Helicopters are used for many forest operations. These include:

- Forest health assessments
- Forest inventory
- Logging
- Fire fighting
- Spraying
- Surveying
- Transport of people, rigging, loads
- Controlled burning
- Rescue missions
- Wild animal control

Helicopter features

The main feature of a helicopter is the main rotor, which acts as a rotary wing.

The tail rotor provides directional control for the helicopter. In many cases, the tail rotor will be unguarded.

On most helicopters the exhaust is vented out of the back of the helicopter. The exhaust may be either above or below the boom. In the latter case, there is a significant hazard associated with burns from the exhaust.

Training and supervision

The Approved Code of Practice for Safety and Health in Forest Operations requires that before **any** workers begin working with helicopters, the employer must place them under the close supervision of a competent person. That person must continue to supervise the workers until they are sure they can work safely and are not likely to harm themselves or anyone else.

Extra attention must be given to the training and supervision of new or inexperienced workers, because most serious injuries occur to workers with less than 6 months' experience.

Because helicopter operations can be very hazardous to the ground crew, workers must be:

- Highly trained and skilled
- Able to work and react in a calm and efficient manner
- Able to communicate in a manner that is clear, easy to follow and understand
- Physically fit and subject to regular health checks.

Knowledge of hazards

As part of the supervision and training programme, workers need to be **shown** the hazards they will face on the job, and the controls required to avoid being harmed by those hazards.

There must be on-site documentation of the hazards present and the control measures, and evidence to show that the workers have been made aware of them.

The two main hazard categories are **Health Hazards** and **Operational Hazards**.

Health hazards

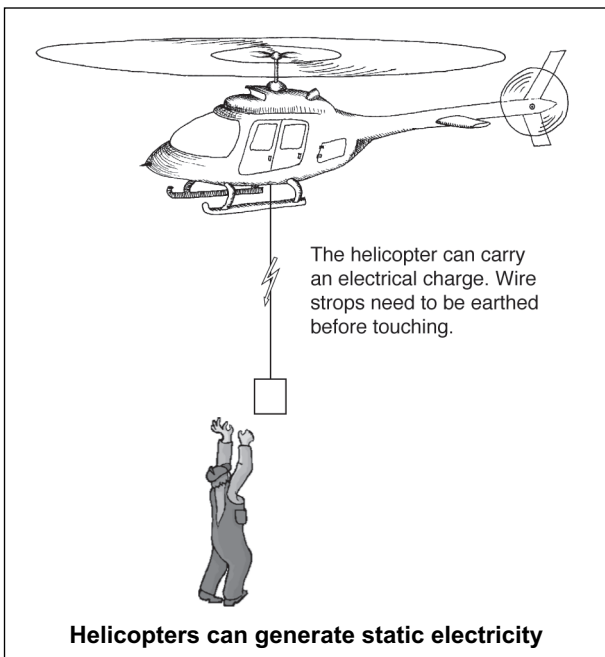
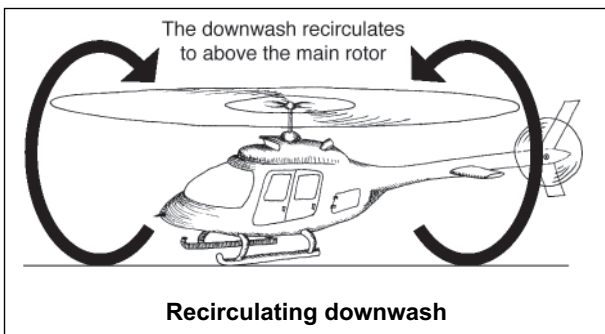
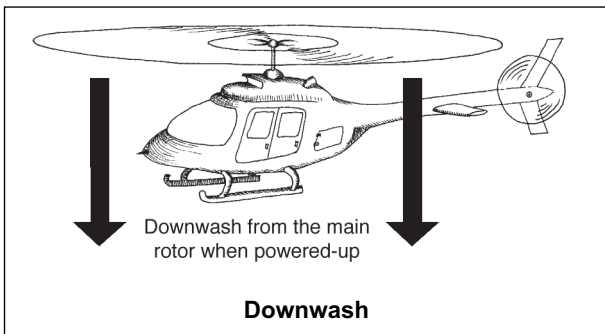
Working with helicopters can be a physically and mentally demanding job. To maintain peak performance and prevent accidents through fatigue, workers must take special care of themselves. Points to be aware of include physical fitness, diet, water intake, personal hygiene, sleep and non-work activities.

Health hazards

Hazard	Control
Early starts	<ul style="list-style-type: none">• Replace sleep lost because of early starts. If you get up earlier go to bed earlier.
Alcohol abuse	<ul style="list-style-type: none">• Avoid drinking alcohol at least 24 hours before carrying out any hard physical work.
Poor nutrition	<ul style="list-style-type: none">• Start each day with a high carbohydrate breakfast like porridge, cereal, toast, bananas, pasta, or potatoes.• Eat high protein foods like lean meat, chicken, eggs, milk and cheese at night.• Eat at the start of a break and rest to allow digestion.• Always eat a high carbohydrate snack straight after work.
Exposure to sun	<ul style="list-style-type: none">• Wear sun block.• Wear light coloured shirts on hot days.• Wear a safety helmet (it must be fitted with a chinstrap).
Drugs	<ul style="list-style-type: none">• Avoid all non-prescription drugs as they seriously affect both your mental and physical ability to work.• Inform the boss if you are on any medication that may affect your work. Stay home if necessary.• If you are on long term medication for a serious health complaint inform the boss or crew of your condition in case you are involved in an emergency at work.
Lack of rest/sleep	<ul style="list-style-type: none">• Build short frequent rest breaks into your work routine.• Take at least two evenly spaced 30-minute rest breaks during the working day.
Early over-exertion/sprains and strains	<ul style="list-style-type: none">• Start each day with a 10-15 minute warm up and a few stretches.• Start the day slowly to allow the muscles to warm up.• If starting a new job, allow time for the body to get used to it before working flat out.• Do some stretches at the end of the day.• Take particular care when starting back at work after the holidays.
Hypothermia/chills	<ul style="list-style-type: none">• Polypropylene clothing (thermal underwear) is excellent for cold, wet weather (but is not suitable for fire fighting operations).• If necessary also wear warm hats, rainwear or chaps.

Health hazards (cont...)

Hazard	Control
Hypothermia/chills (cont...)	<ul style="list-style-type: none">• Put a hat and warm clothes on when you stop for a break• Bring spare dry clothing even on fine days. The weather can turn bad very quickly.
Poor hygiene	<ul style="list-style-type: none">• Clean and dress any cuts or scratches received on the job as soon as possible, and keep them covered.• Make sure the first aid kit is kept fully stocked.• Carry water and soap on the job to wash hands before smokos.• Bath or shower every night.• Eat a balanced diet to keep your body healthy.• Wear clean clothes against the skin every day.
Dehydration/heat exhaustion	<ul style="list-style-type: none">• Regularly drink fluids at a rate of 0.5 litres per hour, and up to 1 litre per hour in hot conditions.• Drink before you feel thirsty.• Do not drink fluids, like soft drinks and cordials, that have more than 8% carbohydrate content.• Drink high carbohydrate drinks after work to replace energy levels.• Drink plenty of water at night to recharge the body.• Drink a couple of glasses of water before leaving for work.
Ineffective personal protective	<ul style="list-style-type: none">• Do not perform tasks if protective equipment is ineffective.• Clean dirty hi-vis garments and oil-soaked protective legwear.• Replace any soiled, worn, damaged or expired protective equipment.• Routinely check the condition of your protective equipment.



Operational hazards

The greatest hazards associated with helicopters are the spinning rotor blades, the exhaust, and the downwash.

Spinning helicopter rotor blades can be difficult to see and may vary in their height above the ground. In addition, they create a strong rotor downwash, produce high noise levels, and can generate static electricity.

When on or near the ground, the downwash can recirculate back down through the main rotor. Loose objects must be secured on the ground to prevent them travelling through the rotor and causing damage.

The downwash is capable of knocking a person over. It can also dislodge dead or live vegetation and objects, which may pose a threat either to people on the ground or to the helicopter itself.

Helicopter rotor blades can generate static electricity. In moist air conditions, electricity can build up. This will be discharged when the helicopter earths or attachments come into contact with the ground. This is not a hazard to those on the helicopter, unless a passenger steps down from a hovering helicopter. The greatest threat is to workers grabbing wire rope (winch rope or strops) hanging beneath an unearthed helicopter. Allowing the wire rope to touch the ground before handling it can eliminate the risk of electric shock. This allows the charge in the helicopter to be earthed.

Operational hazards

Hazard	Control
Spinning rotor blades	<ul style="list-style-type: none">• Approach or leave a helicopter only when instructed by the pilot.• Approach or leave from the front or the side. Never the back.• If on a slope, approach or leave only from the downhill side.• Do not approach a helicopter if the rotors are running down or starting up.• Approach or leave in a slight crouch to increase rotor clearance.• If it is unsafe to walk away from the helicopter, remain crouched beside the machine until it has left.
Inexperienced people (inexperienced people tend to rush when working with helicopters)	<ul style="list-style-type: none">• Inexperienced people must be in the charge of a competent person.• Slow down.• Listen and follow all instructions given to you.
Noise	<ul style="list-style-type: none">• Wear approved hearing protection (Grade 4 or better).
Dust / loose material	<ul style="list-style-type: none">• Wear appropriate eye protection. If blinded by swirling dust or grit, stop, crouch down, and wait until conditions improve.• Wear a hard hat, it must be fitted with a chin-strap.• Do not wear loose or unfastened clothing.• Where possible, remove loose items from around the helipad.• Get clear of the downwash zone before a hovering helicopter powers up to lift a cargo slung beneath.• Check for overhead hazards, such as sailers or wires, before instructing a helicopter to approach.
Static electricity	<ul style="list-style-type: none">• Let the helicopter or hanging strop earth itself by touching the ground before you touch the machine or strop.
Heat	<ul style="list-style-type: none">• Keep clear of the motor exhaust by avoiding the prohibited zone at the rear of the helicopter.
Refuelling	<ul style="list-style-type: none">• The pilot is responsible for all refuelling procedures and his/her instructions should be followed.• Do not smoke in the vicinity of fuel.

Personal protective equipment requirements

When working with helicopters, ground crew are required to wear the following personal protective equipment:

- Approved safety footwear
- High visibility garment
- High visibility hard hat **with a chin strap**
- Face shield or eye protector where dust and flying debris may be present, unless the wearing of such protection causes a greater hazard
- Hearing protection (at least Grade 4)

It is recommended that the ground crew also have

- Clothing that provides suitable protection against the weather
- Adequate hand protection.

Communication

Good communication between the pilot and the ground crew is vital for carrying out helicopter operations in a safe and efficient manner.

Before helicopter operations begin, the supervisor and ground crew must meet with the pilot to establish:

- Plans and procedures to be used
- Ground-to-helicopter communication systems
- Corrective measures required to minimise risks of injury to workers
- Limitations and capabilities of the helicopter
- Guidelines for the safe use of equipment associated with the helicopter operation.

Communication between the pilot and ground crew should be established by implementing the following minimum requirements:

- Establish an effective system of visual communication signals between the pilot and the ground crew (noise may prevent verbal communication)
- Provide two-way radio communication equipment. This is essential for helicopter operations
- Establish exact voice commands to avoid any possibility of misunderstanding: all communication should be pertinent and brief
- Include helicopter identification in any command given to direct flight movement
- The worker who is in radio contact with the pilot should wear a distinctive high-visibility vest or jacket
- Clearly mark the location of cables and all known hazards in the way of anticipated flight paths on the plans, and make the pilot aware of them.

Confirm the visual and verbal signals before starting the operation.

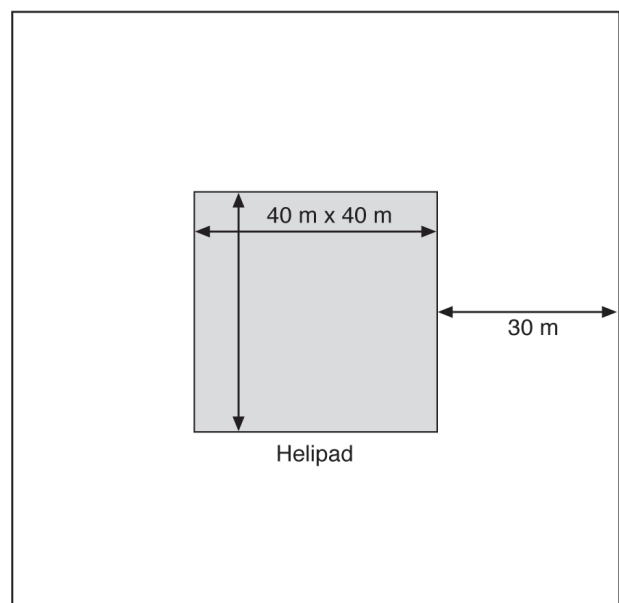
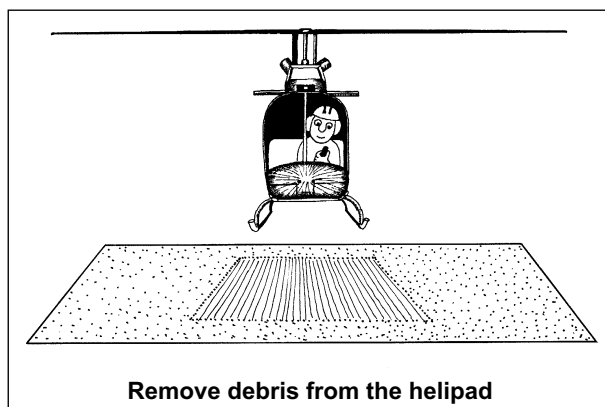
Helicopter procedures

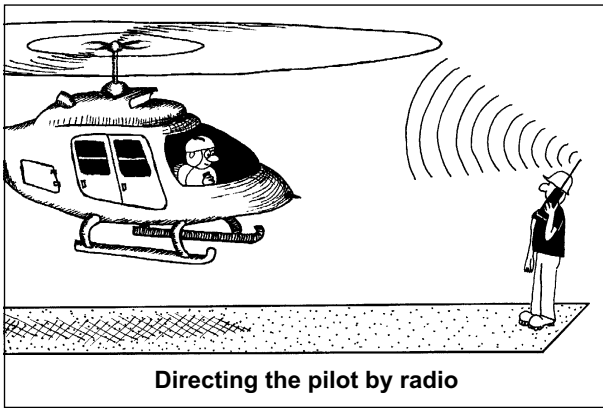
Preparing for helicopter operations

- There should be a person in charge who will be responsible for all ground operations.
- In planning the layout of a work site, the following minimum information must be considered:
 - Location of work areas for the various elements of the operation
 - Location of emergency landing areas
 - Location of helipads
 - Location of separate service and refuelling areas
 - Location of any travelled roadways
 - Location of any potential hazards such as power lines or tall trees.
- Workers must be informed of the plan of operations.
- Workers must be aware of the helicopter flight path to and from the helipad.
- Flight paths and operational areas must be kept clear of equipment, or personnel other than flight personnel necessary to assist in landing and take-off.
- Workers must not be placed in an area where there are overhead hazards.

Preparing the helipad

- Set up the helipad so takeoffs and landings are into the wind.
- The size of the helipad will be dependent on the type of helicopter. For most, an area of 40 x 40 m is adequate.
- Ensure the approach and departure ends of the helipad are clear of obstacles (any object greater than 15 m tall that is within 30 m of the helipad).
- An elevated site is desirable.
- Remove any loose debris such as wood, cans, and plastic from the helipad. Flying debris from downwash can do damage to both the helicopter and personnel on the ground.
- To minimise the hazard of blowing sand and dust, the helipad should be hosed down if practicable.





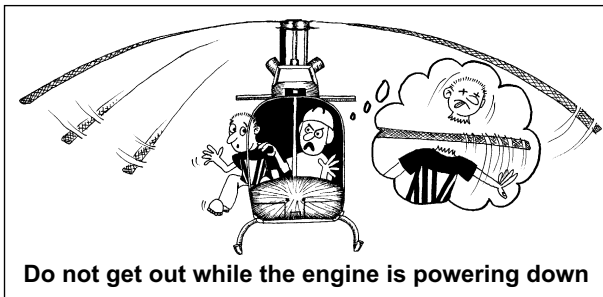
Take-off and landing

Ground crew

- When directing the pilot by radio, remember that he or she may be too busy to acknowledge your call.

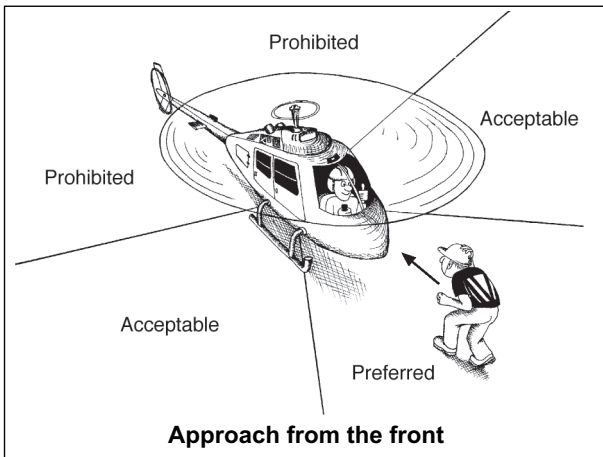


- When directing the pilot for landing, stand at the edge of helipad with your back to the wind with arms raised.
- Other ground crew should face away from the helicopter during take-off and landing to reduce the risk of dust blinding them.



Passengers

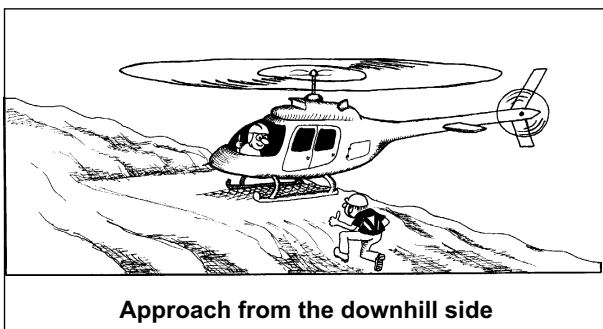
- Those in the helicopter must remain seated, with seatbelts fastened until instructed by the pilot to disembark. This will usually be after the main rotor has powered down or stopped rotating.



Entering the helicopter

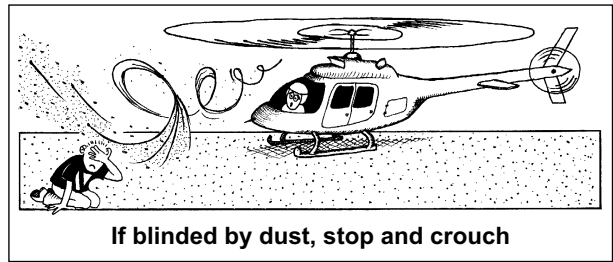
- (1) Establish contact with the pilot. Position yourself where he can see you. Maintain visual contact with the pilot (wear goggles if dust is a hazard).
- (2) After being signalled by the pilot, approach the helicopter in the preferred direction (i.e., from 10 to 2 o'clock) if possible. Walk, do not run. Enter the helicopter one person at a time.

DO NOT approach from behind the helicopter because of the risk of being struck by the tail rotor, or being burnt by exhaust. In addition, the pilot cannot see you.

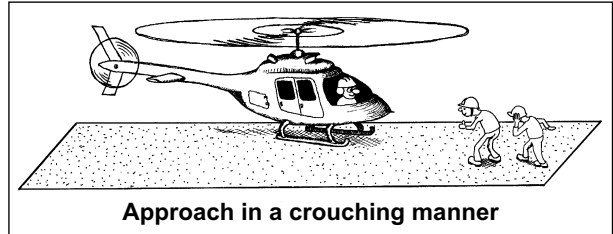


- (3) If the helicopter is on a slope, approach from the downhill side.

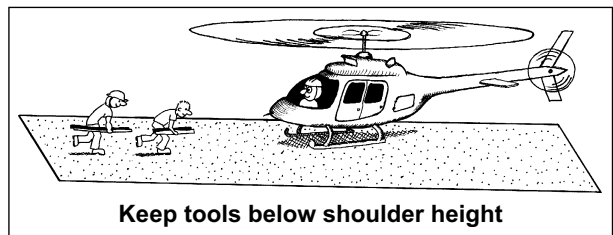
- (4) If blinded by swirling dust or grit, **STOP**, crouch low and wait for assistance.



- (5) Approach the helicopter in a crouching manner for extra rotor clearance. **NEVER** reach up to grab clothing or other articles that have blown away.



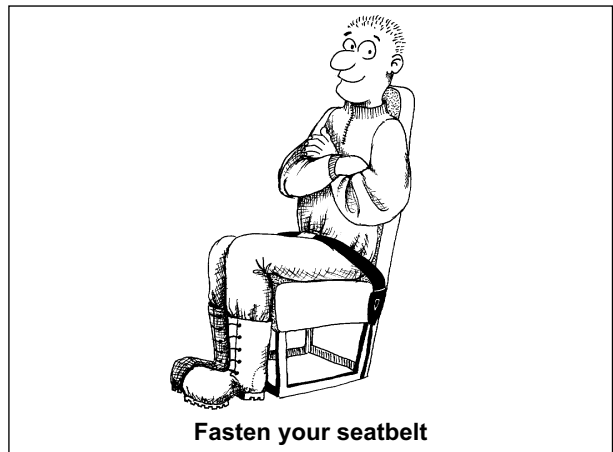
- (6) Carry any tools horizontally below waist level. **NEVER** upright or on your shoulder.



- (7) Once you have reached the helicopter you will be instructed where to sit. Once seated fasten and adjust your seatbelt.

Exiting the helicopter

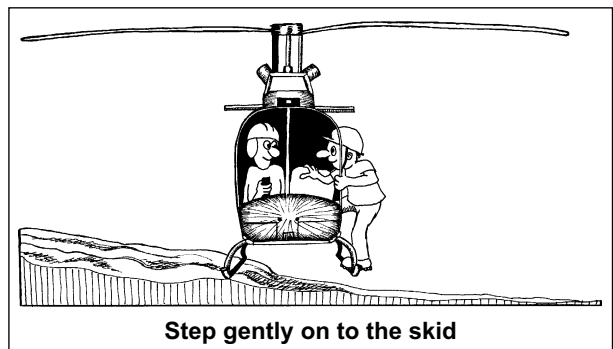
- (1) Similar rules to those of entry apply to exit.
- (2) Do not loosen the seatbelt until instructed to do so.
- (3) On exiting the helicopter, obey the pilot's instructions. Exit the helicopter one person at a time.
- (4) While moving, stay in the pilot's line of sight. Move away in the same direction as specified for helicopter entry.

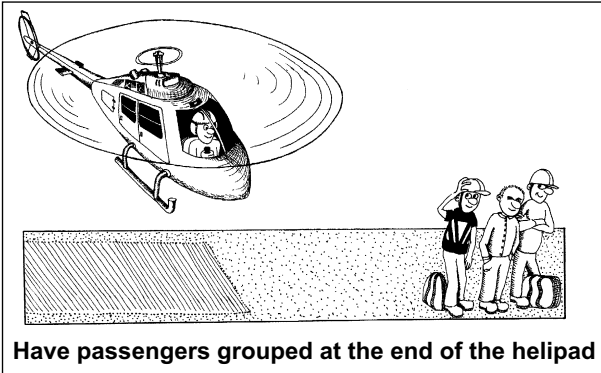


Entering or exiting a hovering helicopter

Entering or exiting a hovering helicopter requires extra care to reduce the chance of rocking the helicopter. If the movement is too extreme, the main rotor may hit the ground.

- If you are stepping into a hovering helicopter (e.g., one skid off the ground) transfer weight smoothly so as not to rock the helicopter.
- Only one person to enter or exit at a time.



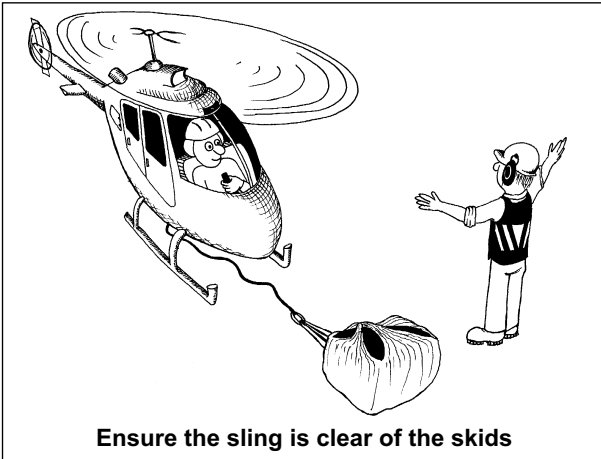


Loading operations

Transporting personnel

When transporting personnel, loading staff should ensure that:

- Passengers have been fully briefed about safety rules.
- They are grouped together and well back from the edge of the helipad.
- Each person looks after his or her own gear.



Slinging a load

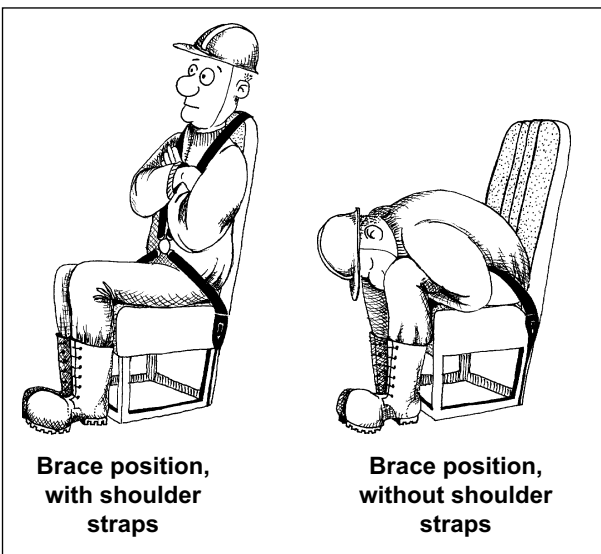
When slinging a load beneath a helicopter on the ground:

- Ensure the load is within safe loading limit for the particular helicopter (the pilot should define this).
- After hooking a cargo sling, move forward and to the side to signal the pilot.
- Ensure the sling is not across one of the helicopter skids.
- Never ride on the sling.

Attaching a load to a hovering helicopter

When attaching a load to a hovering helicopter:

- Ensure the load is within safe loading limit for the particular helicopter (the pilot should define this).
- If attaching logs, always hook on the top ones first to make breaking out easier.
- Always retreat from beneath the helicopter before signalling for the helicopter to power up.



Emergency procedures

During an emergency

- Follow the pilot's instructions.
- Do not distract the pilot.
- Check that any loose gear in the cabin is secured.
- Wear a helmet if provided.
- Remove eye glasses and put into your pocket (you might need them later).
- Assume brace position:
 - tighten seatbelt.
 - with shoulder straps, tighten and sit upright, knees together, arms folded across chest.
 - without shoulder straps, bend forward so chest is on your lap, head on knees, arms folded under thighs.

After an emergency landing

- Wait for instructions to exit, or until rotor stops turning.
- Assist others to evacuate well clear of the aircraft.
- Remove first aid kit and other emergency equipment after you have determined there is no threat of fire.
- Administer first aid if required.
- Set up camp to be as comfortable as possible.
- Make the site as conspicuous as possible from the air.
- Stay near the aircraft - don't wander away from the site.

When flying over water

- Listen carefully to the pilot's over-water pre-flight briefing.
- Know seatbelt fastening, tightening, and releasing procedures.
- Know the location and operation of doors and emergency exits.
- Know the location and operation of the emergency location transmitter (ELT).
- During an emergency:
 - obey the pilot's ditching instructions.
 - remove tie, loosen collar.
 - assume brace position when advised by the pilot.
 - wait for instructions to exit, or until rotor stops turning.
- After a ditching:
 - establish a reference position.
 - release seat belt.
 - inflate lifejacket and life raft when clear of helicopter.

Night operations

- Obstacles on the ground are far less visible to the pilot and ground crew during night operations. The ground crew must take extra care to ensure that the helipad and approach and departure paths for the helicopter are clear of obstacles.
- The surface conditions of the helipad are very difficult for the pilot to see. The presence of slopes or uneven ground will require precise communication between the pilot and ground crew.
- Do not shine lights at the helicopter - this will temporarily blind the pilot.

Transport of injured workers

Should a helicopter be required to evacuate an injured person, workers should be aware of the:

- Need to follow the instructions of the paramedic.
- Location of the emergency landing pad.
- Need to prepare the landing site for the helicopter.
- Procedures mentioned above, relating to operating around helicopters.

Glossary of terms

Belly hook	A helicopter's load hook directly attached to its frame
Downwash	The high velocity force of air directed down, and outwards from the rotor blades
Escape route	A path, clear of obstructions and overhead hazards, used by ground workers to move to a predetermined safe position
Flight path	A helicopter's path of operation while flying between the operations area and the drop zone
Helipad	A structure or area used specifically for helicopter landings
Log landing	A work area which includes the helicopter drop zone where logs are sorted and loaded
Load hook	That part of a helicopter's load rigging which is connected to the lower end of the long line
Loading zone	The area where the helicopter will land to load passengers and/or cargo. Separate from fuelling area.
Long line	A helicopter load line attached to the belly hook
Main rotor	The horizontally rotating rotor on the top of the helicopter body
Max load	A turn with a load approaching the helicopter's maximum lifting capacity
Remote hook	The cargo hook at the end of a long line which is released by the pilot
Rotor	A rotating wing (see <i>main</i> or <i>tail rotor</i>)
Rotor wash	The downward draft caused by a helicopter's main rotor blades
Skid	The support structure upon which the helicopter sits
Tail rotor	The vertically rotating rotor on the end of the tail boom

Poroporoaki

Wahaia te huarahi
o te mātauranga

*Pursue the path
of learning.*

Ka piki ake koe,
ka whānui atu nga pae.

*The higher you climb,
the wider the horizons.*

Rapuhia nga pae
i roto, I tōu nei ngakau.

*Seek also the horizons
within your self.*

E tipu, e awahi, e tū.

Grow, embrace, stand tall.

Vision, knowledge, performance