SAFE WORK PRACTICES FOR Helicopter Operations in the Forest Industry





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Workers' Compensation Board of B.C.

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About the WCB

The Workers' Compensation Board is an independent provincial statutory agency governed by a Board of Directors. It is funded by insurance premiums paid by registered employers and by investment returns. In administering the *Workers Compensation Act*, the WCB remains separate and distinct from government; however, it is accountable to the public through government in its role of protecting and maintaining the overall well-being of the workers' compensation system.

The WCB was born out of a compromise between BC's workers and employers in 1917 where workers gave up the right to sue their employers or fellow workers for injuries on the job in return for a no-fault insurance program fully paid for by employers. The WCB is committed to a safe and healthy workplace, and to providing return-to-work rehabilitation and legislated compensation benefits to workers injured as a result of their employment.

WCB Prevention Information Line

The WCB Prevention Information Line can answer your questions about workplace health and safety, worker and employer responsibilities, and reporting a workplace accident or incident. The Prevention Information Line accepts anonymous calls.

Phone 604 276-3100 in the Lower Mainland, or call 1 888 621-7233 (621-SAFE) toll-free in British Columbia.

To report after-hours and weekend accidents and emergencies, call 604 273-7711 in the Lower Mainland, or call 1 866 922-4357 (WCB-HELP) toll-free in British Columbia.

About HRSDC – Labour Program

Human Resources Skills Development Canada-Labour Program enforces the Canada Labour Code Part II and the associated Canada Occupational Health and Safety Regulations. This legislation applies to federally regulated undertakings, which includes heli-logging operations, specifically the Ground Crew employees who construct, attach, and detach loads to the helicopters.

The purpose of the Canada Labour Code Part II is to prevent accidents and injury to health arising out of, linked with, or occurring in the course of employment. HRSDC-Labour Program Health and Safety Officers enforce the Code by conducting workplace inspections, responding to employee complaints, and investigating serious workplace hazardous occurrences.

In British Columbia, the HRSDC-Labour Program can be reached at 1-800-668-5155 during regular business hours, and outside of these hours for emergencies. Fatalities and serious accidents involving federally regulated Ground Crew employees must be reported to HRSDC-Labour Program within 24 hours.

About Transport Canada – Civil Aviation

Transport Canada Civil Aviation enforces the Aeronautics Act and associated Canadian Aviation Regulations, as well as the Aviation Occupational Safety and Health Regulations related to the Canada Labour Code Part II. These regulations govern the operation, certification, and maintenance of aircraft.

In British Columbia, TC-Civil Aviation can be reached at (604) 666-0155, and after hours at (604) 612-4944. Fatalities and serious accidents involving flight crew in operations must be reported to TC-Civil Aviation within 24 hours.

In addition, these incidents must also be reported to the Transportation Safety Board at (604) 666-5826 as soon as possible.

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This booklet offers guidelines in planning and developing safe work procedures in forest industry helicopter operations. These guidelines are not intended to address every health and safety issue related to heli-logging. They are an amalgamation of existing federal and provincial Regulations, and of good industry practices developed through years of experience. These guidelines are designed to apply to most situations. Since parameters may vary considerably from one operation to another, individual operators remain responsible for tailoring their policies, training and procedures to the experience and aptitude of their employees, the equipment operated, and the prevailing geographical and climatic conditions.

Occupational health and safety in the helilogging industry is regulated by both federal and provincial agencies. Employees in heli-logging undertakings will normally fall under federal jurisdiction. Employees involved in operating aircraft are regulated by Transport Canada. Employees engaged in other tasks in a federally regulated heli-logging undertaking are regulated by HRSDC-Labour Program. In British Columbia, the Workers' Compensation Board is the provincial agency that regulates the health and safety of workers in the forestry industry. Workers involved in ground work supporting heli-logging operations, but who work for firms that are not primarily dedicated to heli-logging, may be provincially regulated in certain circumstances.

Helicopter logging is a system for the removal, by helicopter, of felled and bucked logs from areas where some or all of the trees have been felled. Since helicopter logging is a fastmoving operation with numerous events happening simultaneously or in rapid sequence, knowledgeable workers, good planning, and effective co-ordination of all activities are required to ensure both the safety and health of all involved, and an efficient operation.

Special Hazards

The use of helicopters in the logging industry creates special hazards, including the following:

- Rotor wash can cause saplings, decaying trees, and loose debris from tree-tops to fall, and can create dusty conditions that reduce visibility for both the ground workers and the pilot.
- The noise from the engines can make communication between ground workers difficult.
- Material being carried by the helicopter may fall to the ground if not properly secured. This material may endanger people under the flight path, or get caught-up in the trees and become a hazard for fallers and other ground workers who may access this area in the future.
- Heli-logging may occur while fallers are still active in the area. This increases the hazard both for the fallers, who may be exposed to the noise and rotor wash of the helicopter, and for the helicopter ground crew (specifically riggers), who may encroach on the fallers' required safety zone.

To minimize these hazards the work must be planned to ensure the following:

Flight paths

- Loads shall not be flown over persons.
- Loads shall not be flown over roadways unless traffic is controlled.
- Loads shall not be flown over areas to be felled in the next 6 months, unless it is not reasonably practicable to avoid.
- Helicopters below 152 metres (500 ft) shall not fly within 91 metres (300 ft) horizontal distance from active fallers.
- Helicopters shall not fly close enough to active fallers to create hazardous rotor wash.

Distances from fallers

- On flat terrain, ground crews shall not come within two tree lengths of active fallers.
- On sloped terrain where logs may slide or roll onto them, ground crews shall not work below active fallers.

Walking paths

Fallers will often build paths of fallen trees leading from near the heli-pad they are dropped off at, to the area they are falling. These paths allow fallers and woodland crews to more safely access their work areas, and also allow first aid attendants to more quickly respond to and evacuate injured workers. As the fallers' work progresses and new heli-pads are built, the paths are no longer used. However, these paths contribute to the safety of the operation, and if practicable should not be logged while still in use.

2. Responsibilities for Safe Helicopter Operations

Principal Contractor's or Owner's Responsibility

For heli-logging operations involving both federal and provincially regulated employees, a principal contractor, or, if there is no principal contractor, the owner, must ensure that:

- The WCB is notified at least two weeks before starting operations
- The occupational safety and health programs and activities of two or more contractors are co-ordinated
- The required first aid services and equipment are available

Employer's Responsibility

Every employer must ensure the adequate direction and instruction of workers in the safe performance of their duties. Before operations begin, the employer must meet with the supervisors and, if possible, the crews to review the planned operations and discuss, clarify, and agree on:

- Safe work procedures to be used around helicopters
- First aid services and equipment required



Planning and Training



- Means for emergency transportation and evacuation
- Methods and equipment to be used to communicate between crews and between pilots and crews
- Written procedures to be implemented for eliminating or controlling danger trees, unbucked logs, and other worksite hazards
- Safe means for getting into and leaving worksites
- Who is responsible for the various operations and activities
- Procedures to be followed or the actions to be taken under adverse conditions of weather, wind, and terrain
- Person-check procedures to check the continuing well-being of workers

Helicopter Operations in the Forest Industry

In addition, the employer in helicopter operations must ensure that:

- All dangers to workers are identified and brought to the attention of the workers
- Dangers are eliminated, where practicable, and where it is not practicable, ensure that the dangers are controlled or the workers are protected
- Work procedures are adequately planned to prevent injury
- Written work procedures are prepared and available
- All workers and supervisors are provided with adequate pre-job instruction and training
- Workers' instruction and training are documented
- Workers are able to demonstrate their ability to safely perform their job
- A worker on-site is assigned the responsibility for supervising and co-ordinating airlift operations
- Accidents and incidents are investigated
- Machinery and equipment are operated only by workers who are qualified and authorized by the employer or supervisor
- Personal protective clothing and equipment are available and used
- Ground traffic is adequately controlled by flag persons, or other effective means, when it conflicts with flight paths
- Work areas are arranged to minimize hazards from mobile equipment and unstable material

Supervisor's Responsibility

Supervisors are responsible for the proper instruction of workers under their direction and control, and for ensuring that work is performed without undue risk. The supervisor must:

- Plan in detail the work to be done and determine the procedures or techniques to be used
- Review the written work procedures with the crew on a regular basis
- Correct unsafe work practices or habits through instruction or retraining
- Inform all workers when the work area will be beneath a previous flight path and that debris could be in the treetops
- Inform new crew, at crew changeover, of any hazards or changes in site conditions
- Inspect work areas to locate and mark danger trees or any other danger in the work area and then have the hazards removed or controlled





- Ensure that airlifted loads are of such a weight and configuration that they can be lifted safely without creating a hazard to workers
- Authorize and co-ordinate crew placement
- Communicate crew placement and any changes of crew placement to the pilot
- Ensure that new workers are adequately instructed and trained before they begin work
- Ensure that workers are not allowed to work when impaired by alcohol, drugs, or any other substances

Worker's Responsibility

The worker must:

- Understand and follow established safe work procedures
- Notify the supervisor of any jobsite hazards, improper work procedures, incidents, or accidents
- NOT work when impaired by fatigue, illness, medication, alcohol, or other substances
- Notify the supervisor of any changes to the planned work location
- Use safe means for getting into and leaving the worksite
- Wear, and maintain in good condition, the required personal protective clothing and equipment
- Report all injuries to the first aid attendant and to the supervisor

3. Planning

It is extremely important that the logging plan is discussed with the ground crew before it is implemented. Where the trees are already felled, the ground crew must, in conjunction with the flight crew, survey the ground and develop an effective plan.



Log high ground first, if possible, because:

- This removes the threat of unstable logs and debris from above
- It provides an opportunity to evaluate potential hazards from a position of elevation
- Developing CLEAN high ground reduces the threat of dislodged material on the ground being moved by airborne logs and the possibility of material dropping onto workers



- It is easier and more efficient to move chokers downhill
- Gravity will assist in moving hooked turns off sidehills and down

Where possible, logging should be planned to minimize congestion of machinery and manpower. If settings are to be harvested by both conventional falling methods and single stem harvesting methods, whenever possible conventional falling should be conducted first to minimize logging debris (such as limbs and tops) from becoming a safety hazard for the conventional fallers.

Crew Meetings

Before commencing work in a new area, a safety meeting must be held with the ground crew, supervisor, pilot, and fallers if they are working in the area. Attendance and the minutes of the meeting must be recorded. The meeting should address, but not be limited to, the following issues:

- Site plan showing locations of key activities
- Type of logging (selective, block, grapple, choker, cedar block flying)
- Identified hazards (debris in trees, steep terrain, power lines, prevailing winds)
- Method of communication with helicopter
- · Lift capacity of the helicopter
- Reporting requirements for injuries or identified hazards
- Procedures for evacuating injured workers, aborting loads, and adverse weather





A site plan should show locations of:

- Areas and sequences to be felled and logged
- Flight paths
- SAFE ZONES and drop zones
- Helicopter refuelling and service areas
- Travelled roadways
- Heli-pads, emergency landing areas, and first aid supplies

Clear communication between the flight crew and ground crew is vital to safety and must be ensured as follows:

- Radio communication shall be provided and used between the flight crew and ground crews before initiating helicopter logging operations.
- The "all clear" signal given to the flight crew by the ground crew must be confirmed, and include helicopter identification.
- If fallers are working in the area, radio communication must be provided between the fallers and the ground crew.
- First aid attendants must be provided with radio communication.

In addition to two-way radio communication, flight crews and ground crew must be able to communicate with hand signals. Refer to Appendix II for an example of hand signals that may be used.

Principal contractors or owners of operations that will create hazardous conditions to users of navigable air must file or register suitable notice to NAV Canada before operations start. NAV Canada will issue a NOTAM (Notice to Airmen). It is suggested that the radio frequency

Preplanned Flight Paths

the operation is using be reported for inclusion on the NOTAM. NOTAM information can be obtained from the local flight service station at the nearest airport (or by telephone at 1-866-992-7433). The positions of logging guylines, skylines, blasting operations, or similar obstructions that may be in place for only a short period of time are best obtained by contacting the logging companies in the area. Helicopters often pick up and drop off passengers while the rotors are still turning. In addition, the pilot's range of vision is often significantly reduced by the helicopter design. It is therefore very important that persons who work around helicopters know how to minimize these hazards as follows:

Boarding and Deplaning

Approach Method (Normally used on flat ground)

• Stay clear of the helicopter and within the pilot's range of vision.



- Wait for a signal from the pilot to approach.
- Walk in a crouched position when approaching or leaving the helicopter as the blade tips may come within 1.5 m (5 ft.) of the ground.
- Never approach or leave the helicopter from the rear or go near the tail rotor.
- Never approach or depart uphill from the helicopter.
- Do not go under the tail boom to get from one side to the other. Walk only around the front of the helicopter.



Wait Method (Often used with sidehill helipads)

- Crouch down at the side of the helipad within the pilot's range of vision.
- Wait for the helicopter to settle and the pilot's signal before climbing onto the helipad.
- When deplaning, crouch down at the side of the helipad and give the all-clear signal to the pilot and wait until the helicopter has lifted off and cleared the pad.

Wait Method on Sidehill



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Additional Precautions

- Use chin straps for hard hats.
- Do not smoke near the helicopter.
- Carry tools and equipment horizontally at or below waist level (never upright or over the shoulder).
- Secure tools and equipment before takeoff.
- Follow the pilot's instructions regarding seating and storage of cargo.
- Inform the pilot of the nature of all cargo.
- Do not carry flammable or explosive materials in the passenger compartment.
- Wear hearing protection or radio communication headsets when in the helicopter.
- Close doors gently and latch. Be sure that nothing is hanging out.
- Wear properly adjusted seat belts and do not

Safe Storage of Cargo

remove them until instructed by the pilot.

- Never throw anything out of helicopters when in flight.
- Exit to the low side and remain within the pilot's range of vision.
- Carry all loose cargo out of the landing area.

- Unless approved by Transport Canada-Civil Aviation in the Air Operators Ops Manual, only the pilot and/or co-pilot may remain in the helicopter during hot refuelling.
- If fuel is mechanically (as opposed to manually) pumped, an emergency shut-off button shall be in the immediate area, and only dispensing nozzles equipped with automatic shut-off "deadman" valves shall be used.
- No smoking or spark producing activity shall be permitted within 15.2 metres (50 feet) of fuel storage tanks or refuelling operations.
- The helicopter shall be electrically bonded to the bulk fuel tank or vehicle.
- At least one 20BC minimum rated portable fire extinguisher shall be in the immediate area.

7. Heli-pads

- Sufficient heli-pads should be constructed so that ground workers need not walk more than 20 minutes to their work location.
- Pads shall have sufficient clearance for the main and tail rotors, and loose material that may become hazardous in rotor wash must be removed.
- Pads shall be marked with high-visibility paint to direct the pilot's landing approach, and shall be distinguishable from each other.
- Pads shall be large enough to accommodate the helicopters that will use it, and at least 0.6m (2') wider than the helicopter skid width to assist passenger access/egress.
- Pads shall be constructed of substantial lumber held together by spikes, and capable of supporting the weight of the helicopter and passengers.
- Pads shall be level and effectively secured to the ground.



Helipad on Sidehill

8. Woodland Crews

Riggers

- Riggers shall wear high visibility hard hats (preferably with chin straps), high visibility vests, caulked boots, gloves, and hearing protection. In addition, eye protection may be required.
- Before commencing work in the area, be aware of any hazards (such as unstable trees, logs, root wads, rocks) and the effect that rotor wash will have on these hazards.
- Ensure logs are stable before climbing on them to set chokers.
- Choke logs at butt ends if possible, with enough end so logs do not slip out.
- Always watch the hook when the helicopter is approaching.
- Connect the appropriate number of chokers to the hook, ensuring the helicopter and rigging are not overloaded.
- MOVE TO A SAFE LOCATION.
- Advise the pilot of the particulars of the load (such as the number of pieces, approximate weight).
- Signal by radio for the pilot to lift the load, and receive confirmation of the pilot's intent.
- Watch the load depart, and notify the pilot of any problems requiring load to be aborted.

Rigging

- Slings, chokers, hooks, and long lines shall be inspected at least daily, and either marked with their safe working load or otherwise identified so that the rigger knows the safe working load.
- Slings and chokers shall be no longer than 1/3 the length of the helicopter long line, and shall be of a type that does not allow them to rebound into the helicopter rotors.

Hoisting Rigging





- Chasers shall wear high visibility hard hats (preferably with chin straps), high visibility vests, caulked boots, gloves, and hearing protection. In addition, eye protection may be required.
- Chasers shall coil chokers, and watch loads being flown into log landings, from a designated SAFE ZONE.
- The designated SAFE ZONE shall be at least 1.5 log lengths away from the grounding point of incoming log turns, and clearly visible to both the helicopter pilot and loader operator.
- Chasers shall monitor the radio for the pilot's concerns (such as change in helicopter approach or wind direction, visibility, landing size, and configuration).
- Turns should be approached from upper side on sloped landings when removing chokers.
- If the turn is unstable, the chaser shall ask the loader operator to reposition the turn for safe choker removal.

- Chasers shall inspect chokers and slings after each use and shall remove from service as required damaged and worn rigging.
- Chasers shall establish eye contact with the loader operator, and receive permission, before moving into the log loading area.



- The loader operator must be clear of incoming turns, and must wait until the helicopter has left before entering the log landing area.
- Always be aware of the position of all chasers and other landing personnel before moving the loader.
- Ensure that there is a 0.6 metre (two-foot) clearance between counterweights, wheels or

tracks and log decks, rocks, stumps, ditches, or other equipment.

- Use extreme caution when backing up, and ensure back-up alarms are functioning
- Check equipment daily to ensure it is in safe working condition, and report any problems to the supervisor immediately.

- Pilots must be Air Operator qualified for carriage of external loads and remote electric hook operation.
- A risk assessment and safety briefing with the ground crew and pilot to discuss known safety hazards (e.g., snags, rigging, branches, dead tops) and the required personal protective equipment must be conducted before performing longline cargo transport.
- Only persons essential to the aerial work operations are permitted in the helicopter while conducting longline operations.
- In addition to radio communication, the ground crew and pilot should establish hand signals to raise, lower, release load, and keep the remote hook level before commencing work.
- Loading areas shall be cleared of debris that could fly up and strike personnel or the helicopter.
- Hover hook-ups shall only be performed by personnel trained in these procedures. Otherwise, hook-ups shall be performed while the helicopter is shut down.
- Cargo loads shall be secure, centred, and as symmetrical as possible.
- Once the load is ready, and prior to commencing external load operation, the pilot should check the manual and electric release of the cargo hook, and the electric release of the remote hook.

- After hooking the load, MOVE CLEAR OF THE HELICOPTER AND LOAD, signal the pilot "all clear" to lift the load, receive confirmation, and watch for falling debris and other hazards.
- Never stand under or near a load, or between a load and a fixed object. Always have a pre-determined escape route,
- If there is an aircraft emergency during a hover hook-up, the pilot should try and move away from ground worker, and the ground worker should move away from the helicopter using the escape route, or fall flat next to the load to gain as much protection as possible.
- Landing area for the cargo should be clearly marked for the pilot with a bright object such as flagging tape or paint. If the pilot cannot locate the landing area, direct the pilot to it, then move away.
- If the load must be handled while receiving (e.g., placing a repeater, unloading a net), only personnel trained in these procedures shall perform this work. Otherwise, all other personnel shall stay at least 15meters (50 ft) clear of the landing area until the pilot has released the remote electric hook.
- Always have at least one pre-determined escape route.



Conditions for establishing a water drop area:

- The drop zone and the area where logs are stored and processed must be constructed, arranged, maintained, and operated so that workers can work in the clear of airlifted logs, machines, and equipment.
- The flight paths should allow the helicopter to fly through the "log delivery area." This area must be kept clear of workers and equipment.
- Logs should always be placed and not dropped.
- The boomed logs must not be towed under active flight paths.
- The area must have a means for showing wind direction.
- The emergency landing area, service area, first aid facilities, and firefighting equipment must be readily accessible to the helicopter and ground crews.

As part of operating procedures at a water drop area, boom crews must:

- Stay alert to the location of the helicopter
- Not turn their backs to the incoming log turns or load hooks
- Carefully watch the movement of logs and wait until all logs surface before going in to retrieve chokers
- Move free chokers to clear areas before making up return bundles of chokers
- Use power equipment, if necessary, to free fouled chokers
- Wear flotation devices, hearing protection, and head protection in water drop areas
- Have access to life buoys with heaving lines in work areas such as choker floats and processing floats

Selective logging with helicopters is the removal of wood products from within standing timber or from areas that are immediately adjacent to standing timber. The wood removed by this method includes:

- · Selectively felled trees
- Danger trees
- Logs of a desired species or grade which have been felled or which are windfall timber
- Pilings and poles
- Shake blocks

This system of logging can be extremely dangerous and can result in severe injury to workers. Intensive planning and stringent inspection of the worksite are required before rotor wash is introduced to the area and wood material is flown out.

The practices and procedures outlined in the previous section on helicopter logging also apply to this type of operation. Additional guidelines are provided to assist in planning selective logging operations and the precautions that must be observed.

Falling Activity

Because trees will be felled in standing timber, there are two particular hazards that fallers must be on the alert for:

• Excessive brushing of residual trees may result in broken and hung-up limbs and tops.

These must be removed before further work is done in proximity to these dangers. Hung-up trees must also be removed before further work is done.

 Trees being felled may kick back off the stump and either the felled tree or standing trees may break and come back toward the faller.

Felled trees must be bucked to a length and weight that will allow the helicopter to lift the load clear of adjacent trees. The practice of excessively brushing standing timber during the yarding phase is prohibited.

The faller, as well as the supervisor, must identify dangers in areas where the hooker will go. These dangers, in addition to the danger trees marked by the supervisor for falling, must be removed by the faller or reported to the supervisor. After falling and prior to yarding by helicopter, the supervisor must inspect the area to make certain that it will be safe for the hooker and the aircraft.

Trees that are not found to be windfirm – which includes saplings over 6 m (20 ft.), trees that are damaged, trees that are victims of root rot, bug kill, or fire kill, or trees with other noticeable defects – must be removed or effectively controlled. A qualified worker must assess residual trees that are to be left standing for operational or environmental reasons before airlift operations begin.



Hazards Induced by Rotor Wash

The forest canopy can obscure the rigger from the pilot, making it necessary to have direct radio communication in order to:

- "Talk in" the hook
- Signal the pilot to fly the turn when in the clear

A second worker acting as a spotter may also be required. There must be effective communication between the two ground workers and the pilot. Use of a flashlight or strobe light by the ground workers, in addition to radio communication, may be helpful to the pilot. As loads are lifted through the canopy, limbs or tops could be broken off and fall to the ground or remain hung up. The hooker must keep in the clear as the load is flown and carefully examine the area afterwards for overhead hazards. If hazards are found, they must be addressed before work begins in that area.

Overhead Hazards



General Operation

Cedar salvage operations involve moving sling loads of cedar blocks or cants by helicopter from various pickup points and flying them over designated flight paths to a predetermined landing area. Ground crews may be scattered over a large area.

Planning

Good planning is essential to a safe operation. It is desirable to have the various crews working in the same general area. This makes it easier to:

- Maintain close supervision
- Provide emergency transportation and first aid
- Control hazards

Site Layout

Before the cedar salvage operation is started, make a thorough survey of the area. A site layout plan should be drawn up based on the following:

- Location of the pickup areas
- Flight paths arranged so that the helicopter is kept well clear of potential flight hazards such as power lines, danger trees, and residual trees
- A drop-off site that may include provision for emergency evacuation and first aid
- Location of fuelling areas and maintenance shops
- Location of required helipads
- · Location of any travelled roadways
- Alternative landing areas

Shake block crews must not be located downhill where they are endangered by activities such as falling or bucking carried out above them. Falling, cutting, and trimming activities must not be carried out in an area where blocks are being flown out.

Worksites in gullies or in the vicinity of trees or rock outcroppings on steep hillsides must be carefully assessed to ensure that rotor washinduced hazards are removed and that there is sufficient rotor clearance.

Planning Fly-out Areas



Common Dangers

All dangers to a ground crew must be identified and eliminated or controlled before the helicopter arrives to fly out the blocks.

• Loose logs, chunks of wood, rocks, and similar debris on the sidehills are common dangers to the ground crew. Anything suspect above the

worksite should be examined before any work is started, and again after any heavy rainfall.

- Any trees that are a hazard to workers must be removed. The hazards are increased by rotor wash, which can dislodge loose limbs, tops, danger trees, widowmakers, and excessive snow buildup in standing timber. It is necessary that all overhead hazards be identified and eliminated.
- Pilots must know the exact location of ground crews to avoid flying suspended loads over them.
- Ground crews must be alert to the movement of helicopters and the specific dangers they may cause.
- Chain saw and helicopter noise can prevent buckers and hookers from hearing any movement of hazardous overhead material. The escape routes for bucking and helicopter hooking operations must be selected to avoid going below unstable material.

Crew Meetings

It is essential that the helicopter pilot meet with the other workers involved in the cedar salvage operations to determine the procedures for flying out blocks. Such procedures should include:

- Emergency procedures
- Sequence of block flying
- · Flight paths and alternative flight paths
- Obstructions to flight paths
- Instruction by the pilot on the limitations of the helicopter
- Location of ground crews
- Good radio communication
- A system for visual communication signals to be used in event of radio failure
- Block flying and block landing procedures
- Abort procedures

Pickup Operation

Making Up Loads

- Plan ahead to avoid working below any pile that could fall over.
- Select the spot that will allow a level, stable pile to be built. This may require placing some cribbing underneath.

Building Stable Piles



- Do not make up loads within reach of danger trees, loose limbs or tops, or behind buckedoff rootwads.
- Do not mix different block lengths in the same sling load.
- Ensure that tree limbs or surplus slings are not choked in with the blocks.
- Synthetic fibre slings may be used for choking bundles of blocks.
- Make sure the load of blocks does not exceed the safe working load of the sling and is within the lifting capacity of the helicopter.

Pile Weight to Suit Helicopter Capacity



- Set the choker so that it will tighten as the load is lifted.
- Make up loads that permit unrestricted removal. The hooker's escape route must be clear of the flight path.

Receiving the Hook

- When possible, stand on the uphill side of the load to receive the hook.
- As the helicopter approaches, hold your arm out to indicate readiness to hook up.
- Maintain firm footing and wait for the hook.
- Allow the hook to contact the ground to dissipate static charge.
- Do not chase the hook or lunge off balance. Be aware that rotor wash can cause a loss of balance. The pilot should be able to put the hook within reach and at chest height.
- Watch the hook constantly and be prepared to move to safety if necessary.
- Be prepared to let go of the hook if it moves up or away.
- In open areas, the hooker can also be the radio man but in standing timber, two workers will be required — one to operate the radio and the other to hook up. Use of a

flashlight or strobe light by the hooker can be helpful to the pilot.

Hooking Sling

- Make sure the load is stable and the sling is centred on the load.
- Hold the sling by the splice to avoid catching the hand between the eye and the hook.
- Keep hands clear of the sling after hooking.

CAUTION: Hooking slings end to end is very dangerous because of the potential slingshot effect if the load is lost. With a short long-line, a suddenly released double sling could snap into the rotor.

Block Flying

 Move to a predetermined safe position that is at least 6 to 8 m (20 to 25 ft.) away. Access to this position must be clear of obstructions and overhead hazards.

Keeping Clear of Airlifted Loads



- Signal the pilot to lift.
- Stay in the clear on the high side, watching the load until the helicopter has left.
- While waiting for the next lift, check the next load.

Landing Area Operation

Determining the Block Landing Area

Conditions for choosing the landing area:

- The landing area should be as close as possible to the block cutting area.
- The flight paths should not pass over travelled roads. If this is not possible, traffic control must be implemented.
- The area must be large enough to accommodate the landing of blocks and, if required, the loading of blocks.
 - Traffic Control



Co-ordination of Activity in the Landing Area

- Restrict access to the landing area to authorized persons only. Post the area or provide traffic control if necessary.
- If slings are recovered "hot," make sure that the landing worker gets in the clear well in advance of the incoming load.

Loading a Truck



- When blocks are being landed directly onto flat decks, "B" trains, or barges, all workers must be well clear of the landing surface to prevent injury due to spilled blocks.
- Maintain the landing work areas clear of slings, debris, and similar tripping hazards.

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Keeping Clear of Loads



First Aid Requirements

- Provincially Regulated Employers: For 6-10 employees, at least one Level 1 First Aid Attendant with a Transportation Endorsement (total of 14 hour course), with a Level 1 Kit. For 11-30 employees, at least one Level 3 First Aid Attendant (70 hour course), with a Level 3 Kit. In both cases an Emergency Transport Vehicle (ETV) is also required.
- Federally Regulated Employers: At least one First Aid Attendant, with a Standard Level certificate, (two-day course), with a Type C First Aid Kit.
- The First Aid Attendants shall have radio communication, ready access to First Aid kits, and not be assigned duties that will prevent the prompt rendering of first aid.
- Employees shall immediately report injuries and accidents to his employer

Emergency Evacuation

- Before beginning work at a site, written procedures shall be established describing the means of summoning an ambulance, and quickly transporting an ill or injured worker to a medical treatment facility.
- All employees must be informed of the above procedures, and adequately trained in their duties.
- If evacuation is by helicopter, ensure:
 - Effective communication between worksite, Pilot and hospital
 - Spine board will fit in the helicopter
 - Pilot knows GPS co-ordinates and radio frequencies of worksite and hospital
 - Air splints are not used (as they will expand with altitude)

Accident Investigation and Reporting

Fatalities and Permanent Injuries must be reported immediately as follows:

WCB: 1(888) 621-7233, or 1(866) 922-4357 (After Hours) For provincially regulated employees (i.e., Fallers, Loader Operators, and Logging Truck Drivers, etc.)

HRSDC-Labour Program: 1(800) 688-5155 For federally regulated helicopter Ground Crew employees (i.e., Mechanics, Refuellers, Riggers, and Chasers, etc.)

Transport Canada - Civil Aviation: (604) 666-0155, or (604) 612-4944 For federally regulated helicopter Flight Crew employees.

Temporary Disabling Injuries (except those requiring First Aid only) shall be investigated and reported in writing, within 14 days to a local office of the WCB, HRSDC-Labour Program, or Transport Canada - Civil Aviation, as required.

(Note: consult the appropriate Regulations for a full list of incidents that must be investigated and reported to the Authority Having Jurisdiction.)

Occupational First Aid

First aid procedures keep the injured person breathing and the bleeding controlled until medical help arrives.

When necessary, remove yourself and the injured person from any further threat of injury. Change the person's position only if necessary in order to administer survival techniques. Keep the injured person warm. Move the injured person only if necessary.

The Essentials of Occupational First Aid

- After making sure that there is no danger to yourself or further danger to the patient, determine level of consciousness.
- Make sure that breathing is present and adequate. If breathing is absent, administer mouth-to-mouth resuscitation with a pocket mask.
- Check for pulse. If no pulse can be detected, begin CPR at once and continue until medical assistance is obtained or until the pulse returns.
- Check to see whether bleeding is present. If so, apply pressure over the wound to stop the blood flow. Apply a pressure dressing.
- Get help as soon as possible.

Appendix I: Glossary of Terms Used in Forest Industry Helicopter Operations

Abort	Discontinuing a turn (lift) due to excessive load weight or mechanical difficulties.
Back up (turn)	A turn to which the helicopter can be directed in the event of abort or difficulties with the first turn.
Belly hook	A helicopter's load hook directly attached to its frame.
Bonus	Two logs in one choker.
Cycle (time)	The length of time a helicopter will log (fly) before returning to its service area.
Drop zone	The area (wet or dry) where the helicopter delivers logs from the logging site.
Escape route	A path, clear of obstructions and overhead hazards, used by hookers (and buckers) to move to a predetermined safe position.
Flight path	A helicopter's path of operation while flying between the logging area and drop zone.
Hooker (Rigger)	A worker who directs the helicopter pilot to the load site and hooks up the load to the helicopter load hook.
Hot loading	The practice of landing sling loads of shake blocks directly to truck trailer decks.
Hot refuelling	The refuelling of a helicopter while the engine is still running.
Hot sling recovery	The practice of recovering slings from an active load landing area.
Load hook	That part of a helicopter's load rigging which is connected to the lower end of the long-line.
Logging the treeline	Helicopter removal of logs right up to the treeline.
Long butting	Cutting a cull piece off the stump end of a log.

Long-line (pendant)	A helicopter load line attached to the belly hook.
Max turn	A turn of one or several logs with weight approaching the helicopter's maximum lifting capacity.
Pad (helipad)	A structure, or area, for the specific use of helicopter landing.
Pumpkin	A large (one log) solid turn.
Repo	The repositioning of a log to a new position, where it can be handled safely.
Ripper	A log that must be sawn (ripped) in half lengthwise to obtain an acceptable helicopter lift weight.
Rotor wash	The downward draft caused by a helicopter's main rotor blades.
Safety areas	Predetermined designated areas in log landings where ground workers are safe from mobile equipment and incoming airlifted loads.
Strip runner	Someone who sets chokers in conjunction with the hooker.
Talk in the hook	Directing the helicopter, by radio communication, to the load hook-up area; usually by use of "clock co-ordinate" system (for example, "I'm at your two o'clock low").
Treeline	The edge of the falling face; usually refers to the upper edge but can also be the sidelines.
Unit	American term for a setting (large logging area).
Vertical	A helipad built in standing timber which requires the helicopter to approach the pad vertically to land.
Widowmaker	A limb or rotten or broken top that can fall out of the tree.

Appendix II: Helicopter Hand Signals

These drawings are designed to show only the hand signals. When directing helicopter movement, workers are required to wear the appropriate personal protective equipment and clothing, including high-visibility vests.



MOVE DOWNWARD



Arms extended, palms down; arms sweeping down.

RELEASE SLING LOAD



Left arm held down away from body; right arm cuts across left arm in a slashing movement from above.

LOWER HOOK



Short sweeping, back-and-forth motion by one hand over top of hard hat.

RADIO FAILURE



Crossed forearms, facing helicopter.

CLEAR



Standing in clear, look to pilot, then wave.



Appendix III: Helicopters Commonly Used for Forest Industry Operations

Helicopter Operations in the Forest Industry

HRSDC – Labour Program

Vancouver (Regional Head Office)

125 East 10th Avenue Vancouver, B.C. V5T 1Z3 Phone: (800) 668-5155 Fax: (604) 666-3166

Kelowna 471 Queensway Avenue Kelowna, B.C. V1Y 6S5 Phone: (888) 336-4933 Fax: (250) 861-7783

Transport Canada – Civil Aviation

Vancouver (Regional Head Office)

620 - 800 Burrard Street Vancouver, B.C. V6Z 2J8 Phone: (604) 666-5657 Fax: (604) 666-0682

WCB Offices

Visit our web site at <www.worksafebc.com>

Abbotsford

2774 Trethewey Street V2T 3R1 Phone 604 276-3100 1 800 292-2219 Fax 604 556-2077

Burnaby 450 – 6450 Roberts Street V5G 4E1 Phone 604 276-3100 1 888 621-7233 Fax 604 232-5950

Coquitlam

104 – 3020 Lincoln Avenue V3B 6B4 Phone 604 276-3100 1 888 967-5377 Fax 604 232-1946

Courtenay 801 30th Street V9N 8G6 Phone 250 334-8765 1 800 663-7921 Fax 250 334-8757

Kamloops

321 Battle Street V2C 6P1 Phone 250 371-6003 1 800 663-3935 Fax 250 371-6031

Kelowna 110 – 2045 Enterprise Way V1Y 9T5 Phone 250 717-4313 1 888 922-4466 Fax 250 717-4380

Nanaimo 4980 Wills Road V9T 6C6 Phone 250 751-8040 1 800 663-7382 Fax 250 751-8046

Nelson

524 Kootenay Street V1L 6B4 Phone 250 352-2824 1 800 663-4962 Fax 250 352-1816

North Vancouver

400 – 224 Esplanade W. V7M 1A4 Phone 604 276-3100 1 888 875-6999 Fax 604 232-1558

Prince George

1066 Vancouver Street V2L 5M4 Phone 250 561-3700 1 800 663-6623 Fax 250 561-3710

Surrey

100 – 5500 152 Street V3S 5J9 Phone 604 276-3100 1 888 621-7233 Fax 604 232-7077

Terrace

4450 Lakelse Avenue V8G 1P2 Phone 250 615-6605 1 800 663-3871 Fax 250 615-6633

Victoria

4514 Chatterton Way V8X 5H2 Phone 250 881-3418 1 800 663-7593 Fax 250 881-3482

Head Office / Richmond

Prevention Information Line: Phone 604 276-3100 1 888 621-7233 (621-SAFE)

Administration: 6951 Westminster Highway Phone 604 273-2266

Mailing Address: PO Box 5350 Stn Terminal Vancouver BC V6B 5L5

After Hours Health & Safety Emergency 604 273-7711 1 866 922-4357 (WCB-HELP)

R11/04