Owners, employers, prime contractors, supervisors, and workers all have specific responsibilities for safety. See Workers Compensation Act Part 3 Division 3 for more information.

Trees felled into standing timber creating a hazard for the next phase.

References:
WorkSafeBC Occupational Health and Safety Regulation
Workers Compensation Act BC
BCFSC Steep Slope Logging Resource Package

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Mechanical Falling and Hand Falling

Working Together for Better Results

A Guide to Maintaining Safe and Productive Worksites

BC **Forest Safety**

Created by
the Falling Technical Advisory Committee (FTAC) 2016

Definitions

Brushing
The striking of a standing tree by a tree being felled if the strike is a direct blow or a glancing blow of sufficient force to cause one or more branches to break at or near the stem of the standing tree. (OHSR 26.23 (1)).

Combination Falling
Sites where more than one falling method is used. An example is a block where hand falling takes place in conjunction with mechanical falling by a feller buncher.

No Go or No Work Zone
Areas identified on maps that are forbidden for certain machines or workers. These could be sensitive areas, areas under powerlines or riparian zones. These Zones may or may not be flagged in the field.

Phase Congestion
A situation where different phases – falling, road construction, harvesting, blasting, etc. -- become bunched up, putting workers at higher risk of an upset condition or incident.

Positive Control
Indicates that the fall direction of the tree must be controlled at all times. Positive control can be maintained by a feller buncher as long as the tree's diameter and height isn't too great. A hand faller assisted by a feller buncher can also maintain positive control.

Qualified
"... means being knowledgeable of the work, the hazards involved and the means to control the hazards, by reason of education, training, experience or a combination thereof." (OHSR 1.1).

Split Line
A narrow zone between mechanically and hand felled areas. A minimum of a tree length of timber is removed, creating a buffer between the proposed mechanical falling and hand falling areas. Remember that a minumum of two tree lengths must be maintained at all times when both phases are working at the same time.

Stacking
Placing workers above each other on steep slopes. Stacking contributes to unsafe working conditions when runaway trees run down slopes toward other workers. It is a practice that must be avoided.

Steep Slopes

(3) If the manufacturer's maximum slope operating stability limit for logging equipment is not known, the equipment must be operated within the following limits:

(a) a rubber tired skidder must not be operated on a slope which exceeds 35%;

(b) a crawler tractor, feller buncher, excavator and other similar equipment must not be operated on a slope which exceeds 40%;

(c) any other forestry equipment specifically designed for use on a steep slope must not be operated on a slope which exceeds 50%.

(OHSR 26.16 (3)).

Mechanical Falling and Hand Falling – Working Together for Better Results

BC's logging industry operates in areas with highly variable terrain. A single cutblock can have flat and steep ground, wet and dry areas, large and smaller diameter trees. In order to maximize productivity and safety in these variable blocks, companies use more than one method to fall timber.

Mechanical falling equipment, like feller bunchers, are highly efficient on moderately sloped, drier ground where trees are not oversized. Because operators sit inside a steel cab while working, they are well protected and have a reduced risk of injury.

Often hand fallers are used when logging more difficult terrain. They do not have the protection of a steel cab, so must have a very good safety program, safe work procedures, and high work standards to stay safe.

Combining mechanical falling and hand falling maximizes productivity and improves safety, but can also create challenges.

- Planning and scheduling activities take more time when coordinating multiple groups.
- One phase can create hazards for the other phase.

This InfoFlip helps address some of the challenges when working on a combined falling site, and provides recommendations for safer and more productive work sites.

1 Preparation and Planning - The Supervisor

In order to have a safe and productive worksite where both hand falling and mechanical falling will take place, the supervisor plays a critical role. The supervisor is responsible for the site and the workers, so must identify all reasonably foreseeable hazards, and find ways to deal with them.

Walk the block, identify hazards, document

Before bringing in crews, the supervisor needs to know where hazards exist or can arise. This assessment should include, but is not limited to, the following steps:

- Note and record locations of block features that may require hand falling, or other special treatment, for example:
  - Steep slopes
  - Wet areas
  - Rock bluffs
  - Machine free zones
  - Oversized trees
  - Danger trees
- Identify areas where positive control falling, or machine assist will be required, e.g. powerlines, property lines.
  Note: Training, safe work procedures and documentation are required when working near powerlines.
- Determine if combination falling will occur, and how the phases can create hazards for each other. Evaluate the possibility for brushing, runaway timber, stacking of workers, and how these can be avoided.

Conduct a steep slope assessment

- Unless a steep slope assessment has been completed by a qualified person, a feller buncher cannot be operated on slopes exceeding 40%. (OHSR 26.16).
- Develop a site specific steep slope plan. Remember that as slope increases, a machine's ability to handle large wood decreases. Pre-identify areas where hand falling may be required.
- Review the BC Forest Safety Council's Steep Slope Logging Resource Package for more information.

Place all key information on maps and communicate

Hand fallers and feller buncher operators need to know where challenging ground conditions are present. Provide each worker with a map of the areas where their work will take place, and where they should not be operating. Ensure they understand the map. In addition, critical **No Work** or **No Go Zones** for feller buncher operators should be identified on the map, and potentially in the field as well.

Supervisors from both phases must communicate regularly to ensure safe, productive operations.

1 Preparation and Planning - The Supervisor

2 Block Falling Plan

Any time the logging plan includes hand falling, a Qualified Falling Supervisor should create, or be involved with the creation of, the block falling plan.

The falling plan includes a range of topics that cover off safe work within the block. It includes emergency response, first aid, hazard identification - evaluation - control, and more. (See Falling Supervisor InfoFlip for details.) In addition the falling plan addresses how to take a block apart, such as the methods and timing for logging different areas. For areas that will include both mechanical and hand falling, there are additional items to consider:

- Areas that can't be safely mechanically felled must be identified for hand falling **prior** to any work on the block.
- Knowledgeable Harvesting and Falling Supervisors must **jointly** evaluate each block for the safest approach to falling. Feller bunchers will open up some blocks, and hand fallers will open up other blocks.
- Supervisors must work together to ensure the first phase does not create hazards such as excessive ground debris, hang-ups and danger trees for the next phase.
- Hazards from phase congestion and runaway logs must be prevented.
- Supervisors must ensure active work zones are clearly identified, and workers are at least two tree lengths apart at all times. (OHSR 26.24, 26.27, 26.29, 26.29.4). Gating and communication protocols must be followed. Note: Some mechanical harvesting equipment requires more than two tree lengths between workers (as defined by the manufacturer).
- Hazards created or identified by one phase must be promptly shared with other phases.
- Hand fallers require qualified assistance readily available. (OHSR 26.28). A feller buncher can provide qualified assistance as long as the machine can reach the hand faller within 10 minutes of being summoned. In this situation a feller buncher operator can do 20 minute man checks with hand fallers. *Note - a hand faller is the preferred choice for providing qualified assistance.
- Supervisors must provide feller buncher operators and hand fallers with other falling criteria that will maintain safety and productivity for other phases.

2 Block Falling Plan

3 Defining Mechanical and Hand Falling Areas

A critical task on a combined falling site is identifying hand falling and mechanical falling zones. The Falling Supervisor and the Harvesting supervisor must **pre-identify** where hand fallers and where feller bunchers will work.

Map and field marking

- Field maps must show where different falling methods will be applied, and include specific No Work Zones for machines. Safe Work Areas must be identified. (OHSR 26.14.1 & 2).
- Depending on the field site and the company policies, changes in falling methods may also be ribboned in the field to help feller buncher operators and hand fallers determine their boundaries.
- If hand fallers work in an area where feller bunchers are expected at a later time, access trails should be marked on the map and can be ribboned ahead of time so they are kept clear of logs and debris.

The zone where different falling techniques come together

The zone on each combined block where activities change from mechanical falling to hand falling must be carefully managed. Hazards created by one phase, like brushed timber, processor debris, and felled logs can make work for the next phase less safe and less efficient. Harvesting and Falling Supervisors must work together and stay alert to changing conditions to manage these interface zones effectively. Whenever someone wants to deviate from the plan, supervisors from both phases must be involved.

When hand fallers create a split line

Hand fallers can create a split line: a narrow zone between mechanically and hand felled areas. In this scenario hand fallers remove at least a tree length of timber, creating a buffer between proposed mechanical falling and hand falling areas. Hand fallers working above the split line aren't exposed to hazards that may arise from mechanical falling, and the feller buncher has flexibility to tip trees into the cleared area.

Note: active phases must always be at least two tree lengths apart.

When feller bunchers open up the split line

Feller bunchers can open up the split line between mechanical and hand falling activities. They will carefully take down timber, without brushing remaining trees. Processed branches and tops will be kept out of the hand faller's area and logs will be safely placed outside the faller's quarter. All efforts must be made to minimize any type of disturbance to the ground or trees in the hand faller's zone.

Proper training and supervision of feller buncher operators working in the vicinity of the split line is critical.

3 Defining Mechanical and Hand Falling Areas

4 Mechanical Falling - Dos and Don’ts

No additional hazards *“Mechanical falling activities must be conducted in a manner that does not create any additional hazard for workers conducting subsequent work activities.”* **OHSR 26.29.5**

DO

- ✔ communicate regularly with fallers and other equipment operators. Identify hazards on maps and provide this information to your supervisor and to other phases promptly.
- ✔ walk your section of the block before beginning work.
- ✔ have a plan, and know where you are on your map at all times. Go for a walk to check falling corners or ribbons if needed -- particularly when approaching areas of hand falling or No Work Zones.
- ✔ lay timber into open areas where trees won’t interfere with a hand faller’s work area.
- ✔ pre-identify danger trees and oversized trees that must be hand-felled. Where practical, leave a ring of green trees around them to provide hand fallers with cover or push trees. Always fall timber away from these areas to prevent brushing and limit ground debris.
- ✔ ensure your machine has the appropriate sized head for the timber you are working in.
- ✔ where practical and safe, log areas prior to hand falling activities to remove ground debris and improve escape trail options for fallers. (Carefully consider how this approach could disturb rooting systems of standing trees.)
- ✔ be certain you can finish what you’ve started. Be cautious tackling oversized trees and when working on steep or rocky slopes. (OHSR 26.29.2).

DON’T

- ✘ tip trees into standing timber where hand fallers will be working (i.e. don’t brush), leaving broken tops and branches in the canopy.
- ✘ leave excessive ground debris where hand falling will take place. It makes egress difficult, and increases risk.
- ✘ leave logs in the hand faller’s quarter. When trees are felled onto logs, the tree can swing or slide, and the ground debris can also move unpredictably.
- ✘ focus on setting up the hoe-chucker more than you focus on keeping hand fallers safe.
- ✘ expect logging will take place before fallers come in. Logging can’t fix a mess.

4 Mechanical Falling - Dos and Don’ts

5 Hand Falling - Dos and Don’ts

When hand fallers are scheduled to fall an area prior to mechanical falling in the block, there are dos and don’ts the hand fallers can apply to improve efficiencies and safety for themselves and for feller buncher operators in the next phase.

DO

- ✔ ensure identified trails are clear for feller bunchers.
- ✔ plan, communicate and stay alert to ensure workers are not stacked above each other, and to minimize the danger of runaway trees.
- ✔ safely remove dangerous trees near the boundary of the mechanical falling area to improve safety of the next phase.
- ✔ communicate regularly with feller buncher operators and other hand fallers. Identify hazards on maps, and ensure the next phase receives the information promptly.
- ✔ provide feedback to other phases -- for both good and poor work practices.

DON’T

- ✘ brush trees. Avoiding brushing makes worksites safer for hand fallers and feller buncher operators. “When a tree is being felled, the tree must not brush standing trees if it can be avoided.” (OHSR 26.24 (5.1)).
- ✘ tip trees into timbered areas that will be mechanically felled. Lack of access slows down feller bunchers, and reduces productivity. Large timber can also create a sliding hazard for machines.
- ✘ overestimate a feller buncher’s ability to work on rocky areas, steep slopes or in oversized timber. If hand fallers expect a feller buncher to remove remaining trees but it cannot, the hand fallers may have inadvertently created more hazards for themselves.

5 Hand Falling - Dos and Don’ts

6 Communication

When hand fallers are working alongside, or in sequence with feller buncher operators, communication is essential to maintaining a safe, productive workplace.

Supervisors working together

Falling and harvest supervisors must collaborate on combined falling sites. Planning should take place with both supervisors present in order to ensure work is coordinated, and all phases are kept safe and productive.

Pre-Work

Hand fallers and feller buncher operators must be briefed on the entire block plan, including all phases working on site, and safety details for each phase. The supervisor will go over challenging areas of the block, where special features like split lines have been placed, and the overall schedule for the different phases. The supervisor will also identify the plan for taking apart the block so that each phase knows its role, its timing, its limitations, and hazards that can arise. Workers and supervisors must regroup to communicate changes to plans, hazards and site conditions as needed.

Daily tailgates

Each day workers and supervisors on site should debrief to determine what has changed since the previous day, and to make plans for the control of any new hazards.

Changing location of workers can create new hazards, particularly when multiple phases are working simultaneously. Feller buncher operators and hand fallers must know where other phases are active on the block so they can avoid creating hazards like phase congestion, stacking, and runaway trees. (OHSR 26.14.1&2).

Each group must communicate hazards that they may have created in their daily work -- things like brushed timber or damaged trees. (WCA 116).

Regular radio contact

Hand fallers and feller buncher operators must communicate regularly with each other when working together on site. The two groups must ensure they stay at least two tree lengths apart. (OHSR 26.29.4(2)).

Sharing hazard reports

It is critical that hazard reports are shared, even when one phase has come and gone before the next arrives. Maps should identify hazards, and paper reports must be passed to the next phase to further explain hazards the new workers will encounter.

6 Communication

7 Machine Assist/Maintaining Positive Control

A company must have written safe work procedures acceptable to the Board, which address machine assist. OHSR 26.23(2)(g).

There are times when extra precautions are needed to guarantee that trees fall in a certain direction. This generally takes place around property lines, or in the vicinity of roads or powerlines. If a feller buncher operator cannot fall these trees safely while maintaining positive control, a hand faller will be brought in to work with the feller buncher.

Alternately, a hand faller may request machine assistance to manage a falling difficulty.

The practices for machine and hand faller working together are similar for situations where positive control must be maintained to guarantee the direction of fall, or where machine assist is needed for safety reasons. The following is a list of recommended steps:

1. Feller buncher operator and hand faller walk area and discuss plan for the area as well as falling of each tree that requires machine assist, and determine fall direction.
2. Good communication between hand faller and feller buncher operator must be maintained at all times.
3. Buncher operator or hand faller cleans out the area and determines escape routes.
4. Buncher operator gets machine into position behind tree to enable machine to push directly away from hazard (or boundary) whenever possible. (Hand faller must always remain a minimum of two tree lengths clear of the feller buncher when not machine assisting.)
5. Buncher operator calls hand faller back into area when ready. Hand faller is now in charge of the operation while the tree is being felled.
6. Hand faller ensures good escape trails are in place and lets the buncher operator know if he wants the machine head against the tree prior to placing the undercut.
7. Once the undercut and backcut are in, leaving sufficient holding wood for a strong hinge, and wedges are placed, the hand faller moves to a safe, visible location at least two tree lengths away and outside the swing radius of the machine, and tells the buncher operator to push the tree over.
8. Prior to re-entering the area, the hand faller must reassess the area for any new overhead hazards which may have been created.

Note: Training, safe work procedures and documentation are required when working near powerlines.

7 Machine Assist/Maintaining Positive Control

8 When to STOP Work

Phases working in close proximity introduce hazards to a worksite. It is critical that all workers know they must be comfortable with the work plan BEFORE they start work, and to stop work under certain circumstances. It is the worker's right to refuse unsafe work. The supervisors should reinforce these key principles where hand falling and mechanical falling are happening in close proximity.

Workers and supervisors MUST stop work when:

- ✘ work conditions are too hazardous to proceed safely.
- ✘ proceeding may create undue hazards for themselves or others.
- ✘ the falling plan is unclear.
- ✘ there is uncertainty about who is responsible for the site or the plan.
- ✘ phase congestion is creating hazards for other phases.
- ✘ workers are outside of their comfort zone.
- ✘ dangerous trees cannot be safely removed.
- ✘ workers are uncertain of another worker's location.
- ✘ communication with other phases has become patchy.
- ✘ any legal requirements cannot be met.

Note: There are many more situations when work must STOP to ensure worker safety. Know the Workers Compensation Act, OHS Regulation, and any legislation that applies to your work.

8 When to STOP Work