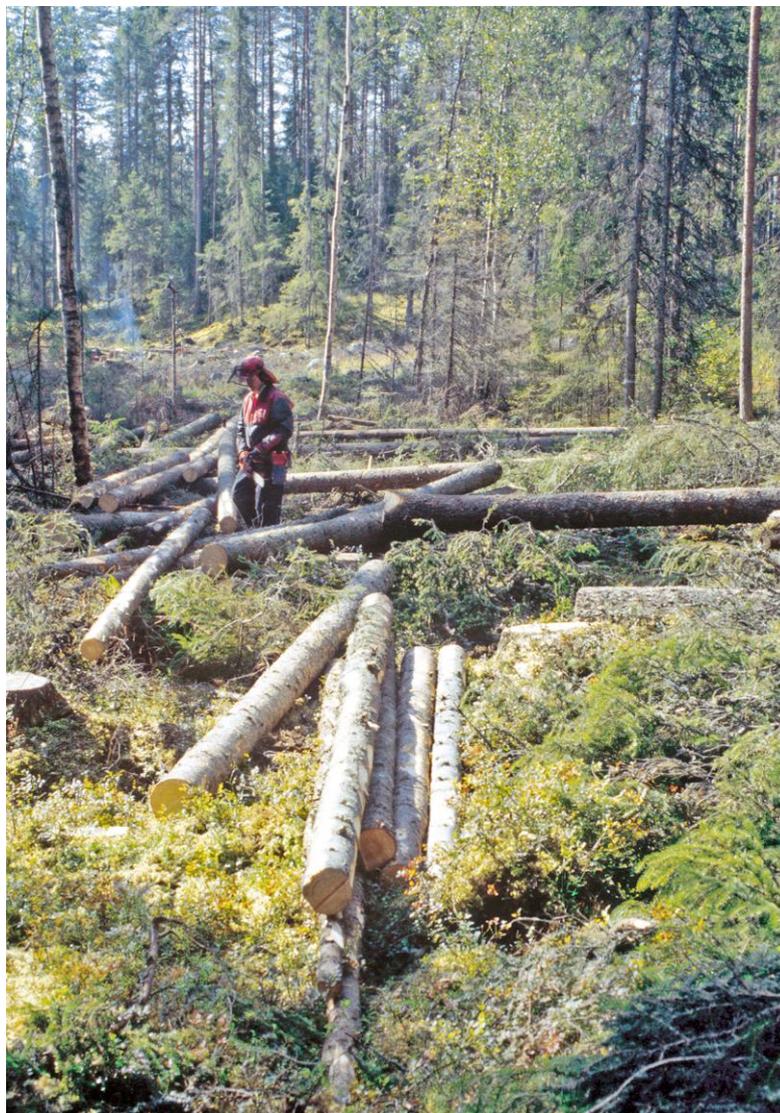




# Safe Use of Chainsaw and its Maintenance



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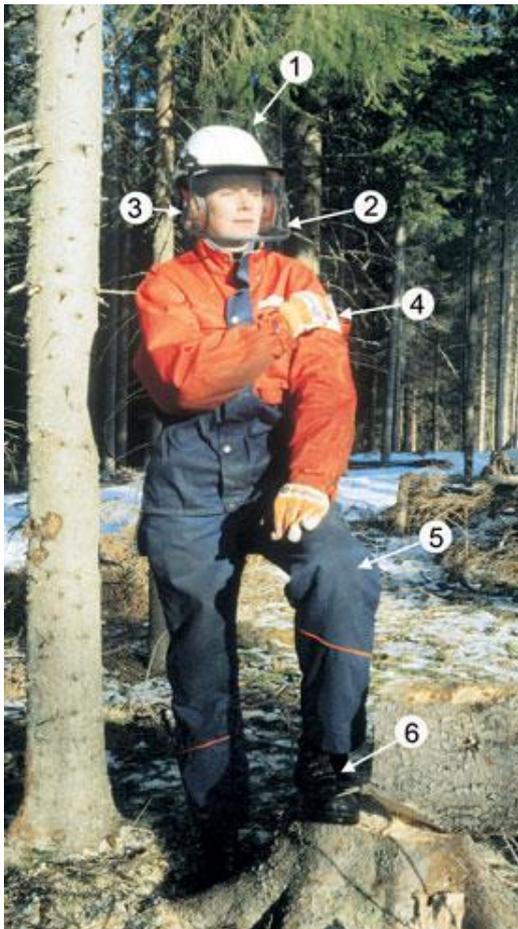
## Safety Rules

Tree felling is the most dangerous operation among forestry work, and the risk rate for fatal accidents is very high if something goes wrong.

The best way to avoid risks is to take action with preventative measures:

- Education and knowledge about safe working methods.
- Employers' responsibility such as; Never work alone, education of the workers, safety clothes for the employees, updated chainsaw with functioning safety equipment, employees' insurance.
- A minimum training should be carried out.

## Personal Safety Equipment



Working with chainsaw must not be done without helmet (1) incl. visor (2) and hearing protecting (3), protective trousers with saw protection (5), boots with saw protection steel toe-cap and non-slip sole (6) and a personal first-aid kit incorporating a large wound dressing in a easily accessible pocket (4). It is recommended to wear gloves and a good visible jacket.

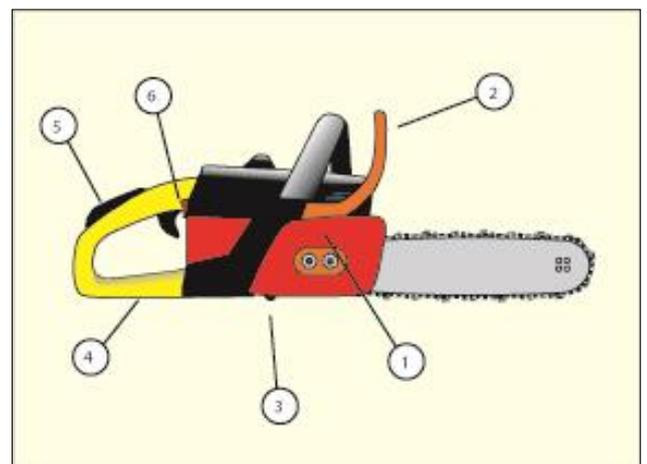
The equipment should be approved and produced in accordance with current safety directives (eg. CE).

## Machine's Safety Equipment

The chainsaw safety equipment must be in good condition. Such as: Chain brake (1) and front hand guard (2), throttle lock (5), chain catcher (3), right hand guard (4), stop switch (6), and vibration damping system, muffler, cutting equipment.

## Maintenance of the Chainsaw

For detailed information and instruction use the operator's manual belonging to the specific saw. Always follow the producers' manual for safety instructions and interval procedures, both for general and specific maintenance.



### *After 8 hours Work (Daily maintenance)*

- Check the machine's safety equipment function
- Clean the air filter. Replace if necessary.
- Test the stop switch to ensure that it works.
- Check for fuel leakage.
- Check that the bar and chain are getting sufficient oil
- Check throttle lock and throttle control.
- Clean the chain brake and check that it operates safely
- Check the lubrication hole in the bar, to be sure it is not clogged. Clean the bar groove
- The bar should be turned daily for more even wear.
- Clean the air intake on the starter and the fins on the flywheel.
- Check that nuts and screws are tight

### *After 40 hours Work (Weekly maintenance)*

- Check that the vibration damping elements are not damaged.
- Lubricate the clutch drum bearing.
- Check the clutch drum for damages.
- File off any burrs from the edges of the bar.
- Clean the spark plug. Check that the electrode gap is 0.5 mm. Shift the spark plug after 60-100 hours use.
- Clean the cooling fins on the cylinder.
- Clean or replace the spark arrestor mesh in the muffler
- File back the raker lip to the recommended height with the raker gauge.
- Clean the carburettor compartment.
- Turn the bar.
- Check the bar tip sprocket.
- Check the rim sprocket (replaceable)/spur sprocket (the chain sprocket is welded on the drum)

## **Approvals and Declarations**

Always wear personal safety equipment and chainsaws approved and produced in accordance with applicable directives, and fulfils the European Standard (EN) for the product. In Europe marked with the symbol CE (European Community's Directive) and the corresponding EN number. The symbols should be placed on the equipment and machine.

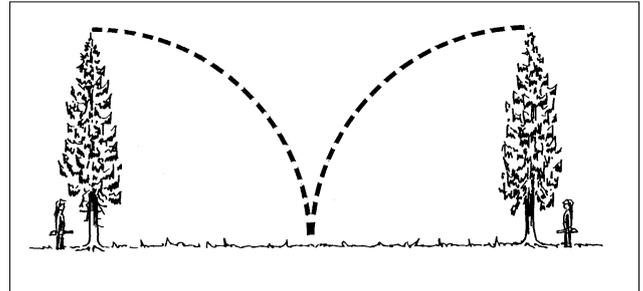
## **Planning the Work before Starting Up**

- Use the information from Forest Management Plan (FMP).
- Mark none-cutting areas as environmental spots etc.
- The FMP's map has important information.
- Mark entrance/exit tracks for forwarding

- Be aware of the slope when planning the tracks.
- Marking colour for different symbols must be clarified (eg. red for main tracks that is much in use, blue for narrow tracks, orange for trees and environmental aspects left standing)
- Mark the entrance to the working area with warning sign.

### Before Starting Up

- Check the user's personal and the machinery safety equipment.
- Safety distance between the workers. This distance must never be less than 2 tree-lengths. Make sure that no-one else is within this risk zone during felling.



### Safe starting Procedure with Chainsaw

Two different starting positions can be used for safe starting of chainsaw.



**Chainsaw on the ground:**

Place the chainsaw on firm ground. Place the right foot toe through the rear handle, grip your left hand around the front handle and pull out the start cord with your right hand.

**Between the legs:**

Place the rear part between the legs and hold it steady with your legs. Wrap your left fingers and thumbs around the handle and pull the start line with your right hand.

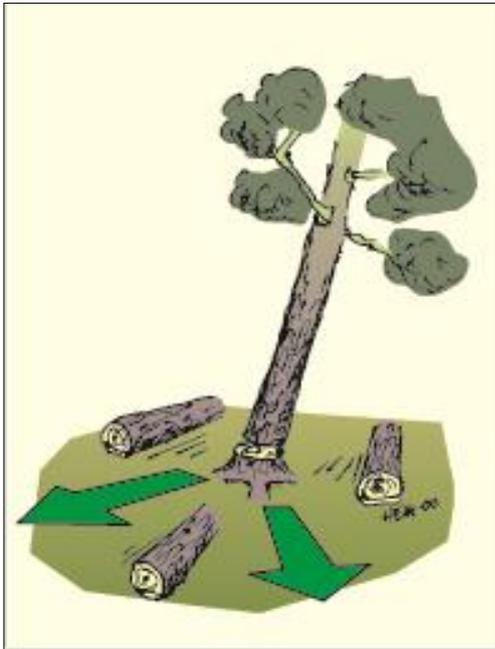


### Felling

The purpose with these methods is to avoid accidents and prevent negative health injuries both in short and long term.

#### Overview

To prepare a safe felling you must make an overview over the situation, and get an understanding of impacts on the felling result: How is the terrain, the lean of the tree, bend, wind direction, arrangement of branches and weight of snow.

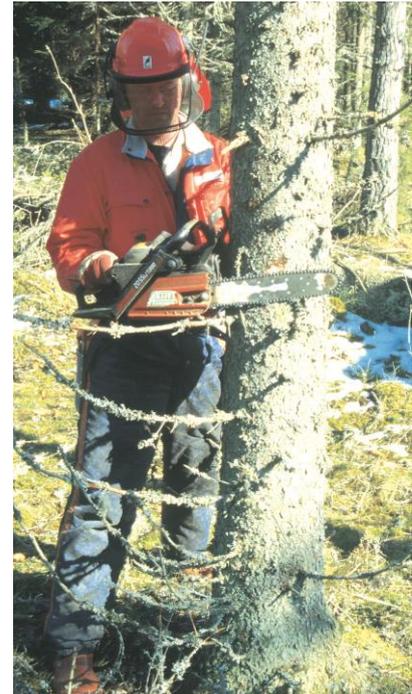


### *Retreat Preparation*

Prepare your retreat before clearing the trunk and felling procedures. Remove any undergrowth from the base of the tree and check the area for obstacles (stones, branches, holes, etc.) so that you have a clear path of retreat when the tree starts to fall. Your path of retreat should be diagonally backwards from the intended felling direction.

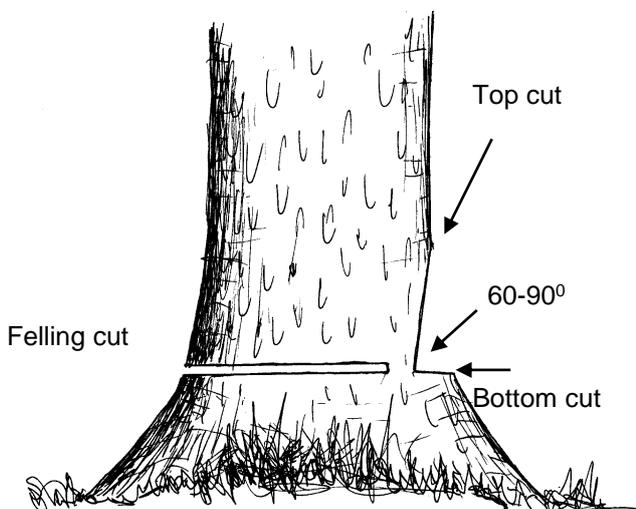
### *Clearing the Trunk*

Remove any branches on the trunk. To do this it is best to work from the top down and keep the trunk between you and the chainsaw bar. Never delimb above shoulder height.



### *Directional Cut*

Begin with the top cut. Stand to the right of the trunk and cut on the pull stroke. Next make the bottom cut so that it finishes exactly at the lower end of the top cut.



cut.

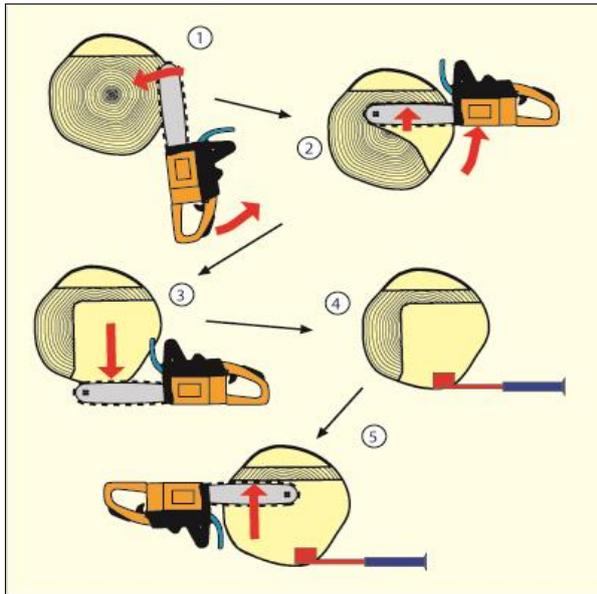
The directional cuts breadth should be approx.  $\frac{2}{3}$  of the trunk's diameter in breast height and the angle between the top cut and bottom cut should be between  $60-90^\circ$ .

The line where the two cuts meet is called the directional cut line. This line should be perfectly horizontal.

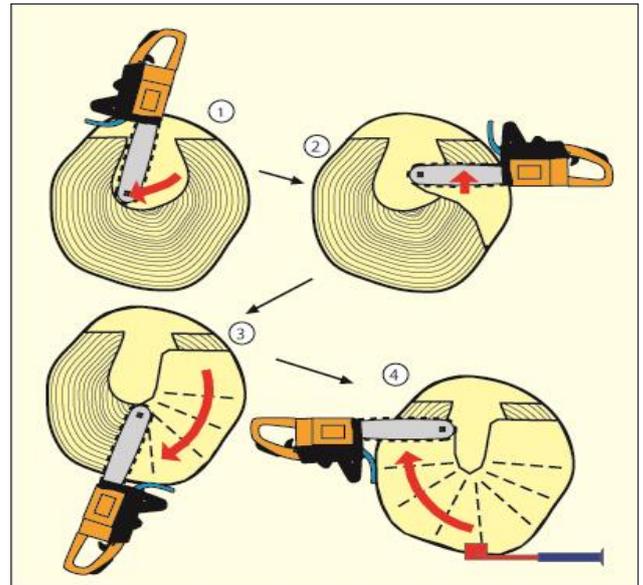
### *Felling Cut*

The felling cut is made perfectly horizontal behind the directional cut and normally in the same heights as the directional cut. The distance between the directional cut and the felling cut is at least 1/10 of the trunk diameter in breast height. This uncut section is called the felling hinge and is extremely important. The hinge controls the direction of the tree fall.

Observe that it is extremely important not to do any cuttings on any side of the hinge. This will reduce the hinges' stabilizing effect.



Felling cut on tree diameter less than one bar length.



Felling cut on tree diameter more than one bar length.

### **Bench**

Always look for possibilities to fell a tree on a “bench”.

Either on another trunk or on a natural platform on the ground.

The purpose is to give good working height and make it easier to move/roll the trunks.

The bench will reduce the need for picking branches (the branches fall to the ground between the trunks)



## Breaking Bar

It is recommended to use a breaking bar or a felling wedge to secure a safe and controlled tree fall. To prevent prospective back problems it is of importance to lift the breaking bar with straight back.

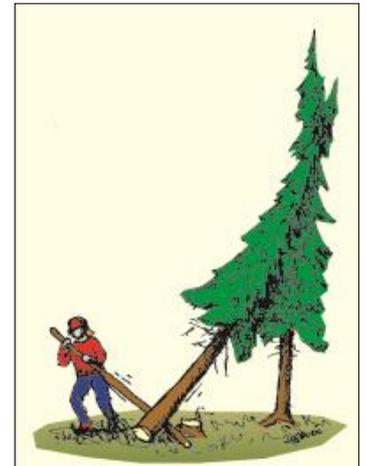
## Freeing “Trapped” Trees

It is very dangerous to free a badly fallen “hanging” or “trapped” tree. The risk for fatal accidents is high.

Use a tractor mounted winch to pull down the tree (safest), or a hand hold trunk to move the root backwards.

Never walk under such a badly fallen tree, and never cut the standing tree.

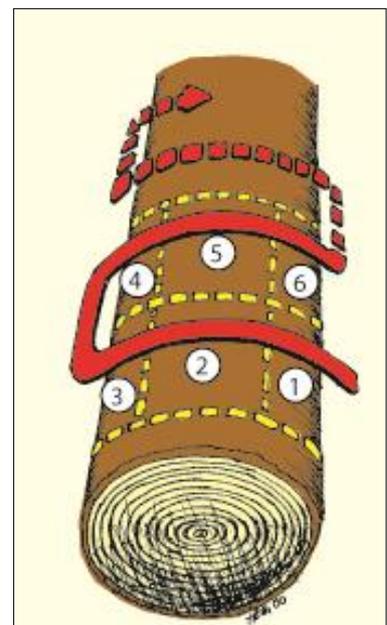
Mark with marking tape if you must leave the area.



## Delimiting

The 6-zone system is the most efficient method for delimiting branches. It takes care of the workers safety as well as efficient method. Moving the feet are done with the trunk between the leg and the bar, and kick backs are reduced.

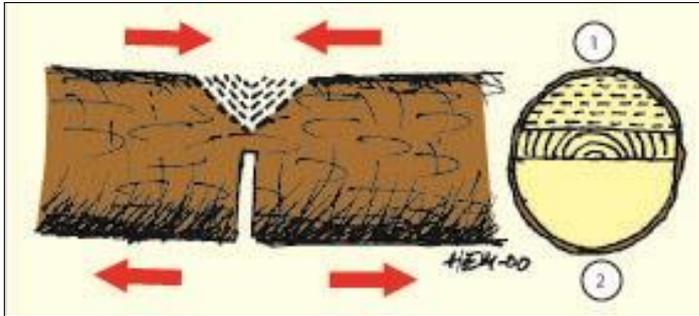
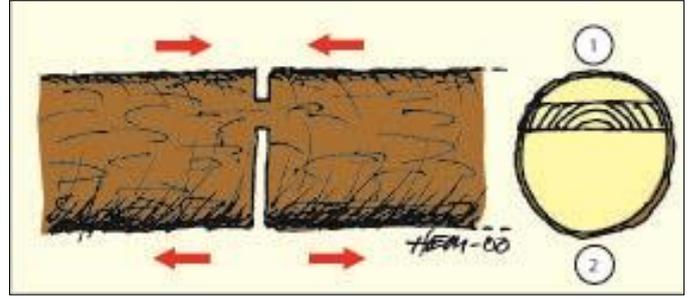
To manage the system it is necessary to get the trunk up from the ground (use of bench). The saw is moving from zone 1 to 6 before moving the feet, and then start on again. For every second 6-zone, the branches underneath are cut.



### Cutting Trunk with Tension

Never cut straight through a trunk that is in tension. In general; Position yourself so you will be clear of the trunk when the tension is released.

Trunks with small tension: 1) Make a small cut on the pressure side. 2) Make the longest cut on the stretch side.



Trunks with high tension:

1) Make several small cuts on the pressure side, up to half of trunk diameter. 2) Make a cut on the stretch side.

### Fuel and Oil

Be particular aware of to follow the operator's manual for mixing fuel and two-stroke oil and chain oil.

### Chainsaw Operator's Manual

The operator's manual gives important information connected to each specific chainsaw. And every chainsaw should be delivered with manual.

In any emergency Situation dial:

