



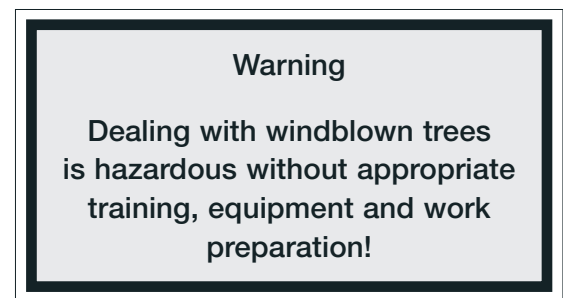
Dealing with windblown trees

Do you also give any thought to your safety and your health when dealing with windblown trees? This brochure is intended for people who have to deal with windblown trees. Our aim is to

- Make you aware of the particular dangers involved in dealing with wind-blown trees
- Encourage you to think about your own capabilities and limitations
- Inform you about safety rules and measures

We have intentionally dispensed with descriptions of working and cutting techniques. These are best learnt in practical courses. Every windblown-tree situation is different and requires an individual approach. Only when taught by a qualified instructor will you learn how to assess a specific situation correctly and how to apply the safest working and cutting techniques.

This brochure is no substitute for minimum basic training nor can it be considered to be a comprehensive training document. It is no substitute for practical, on-the-job training.



Suva
Swiss National Accident Insurance Fund
Occupational safety
P.O. Box, 6002 Lucerne
Tel. 041 419 51 11
Fax 041 419 59 17 (for orders)
Internet: www.suva.ch

Dealing with windblown trees

Forestry Section

Illustrations: Lucas Zbinden-Mathieu, Lobsigen

Reproduction permitted if source is quoted.
English edition - February 2003

Number: 44070.e

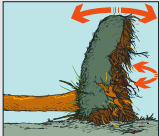


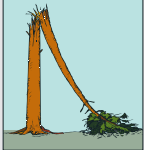

1 Dealing with windblown trees: A job involving particular hazards!



There are many complex hazards in storm-affected forests with thrown, uprooted, broken, heavily leaning and hung-up trees or parts of trees:

- Impassable and obstructed roads and routes, reduced accessibility and visibility
- Incalculable tension and forces both in individual trees as well as in jammed stems and root plates
- Unstable trees, parts of trees, root plates and stones that can suddenly topple, tip over, fall or roll away without any visible reason even days, weeks or months after a storm.

Dealing with windblown trees involves particular hazards.
A look at the accident statistics reveals the following main points:

Activity	Hazards
Severing trees from their root plates	<ul style="list-style-type: none"> ■ Being crushed by a toppling, turning or rolling root plate ■ Being struck by a stem kicking sideways ■ Getting caught by a splitting stem ■ Getting trapped and crushed between stems 
Felling heavily leaning trees	<ul style="list-style-type: none"> ■ Getting struck by a splitting stem ■ Getting struck by a falling part of the stem 
Bringing down hung-up trees or parts of the crown	<ul style="list-style-type: none"> ■ Getting struck by a tree or root plate that move unexpectedly ■ Getting struck by part of the crown that breaks off and falls 
Bringing down a tree with a broken crown touching the ground	<ul style="list-style-type: none"> ■ Getting struck by the stem or part of the crown that breaks off and falls 
Felling the remains of a tree without a crown	<ul style="list-style-type: none"> ■ Getting struck by remains of trees that bounce up or kick sideways or backwards when they hit the ground 

The risk of accidents is substantially reduced if windblown trees are dealt with using the appropriate machines and aids – for example with harvesters and vehicles equipped with grapple cranes.

4 Are you equipped for an emergency?

An undesirable incident – an accident, an insect bite, an acute attack of illness – can affect anyone. Undesirable consequences can often be avoided by taking swift and appropriate action. Therefore:

Never work alone!

Be prepared to call help:

- Complete an emergency card (Suva order number 88042)
 - Note down important telephone numbers
 - Determine the co-ordinates of the nearest usable road to the work area
 - Determine the meeting point for rescuers
- Have your mobile phone and radio ready

Before starting work, check that:

- You carry a pocket first-aid set
- Your first-aid kit is at the work area
- Your alarm system (mobile phone, Rega emergency radio) is ready and reception has been tested
- You have your updated emergency aid card with you
- First-aid measures are known

In the event of an emergency:

- Keep calm!
- Get a clear picture of what has happened
 - What has happened exactly?
 - Injured persons, material damage?
- Assess
 - Danger to rescuers (e.g. from falling branches or parts of the crown, toppling root plates, falling rocks)?
- Take action
 - Protect yourself
 - Get any accident victims out of the danger area
 - Assess the condition of accident victims
- Apply first aid (life-preserving, on-the-spot measures)
- Call for help (emergency call)



We need help. Land here!

We need no help.

6 Windblown forest areas: The correct approach

The following principles must be observed in particular when dealing with windblown trees:

- Start work generally in the trees' direction of fall and from the side.
- Only do as much work as is necessary in the damaged area:
 - first eliminate dangers from above (fell unstable, heavily leaning and hung-up trees)
 - then clear lying trees and
 - finally fell the remains of trees without crowns
- Pull out and haul away trees on a continuous basis using a vehicle equipped with a grapple crane, a winch or a cable crane.
- Debranch trees in a safe place:
 - at an ergonomically appropriate workplace (posture)
 - using machines wherever possible



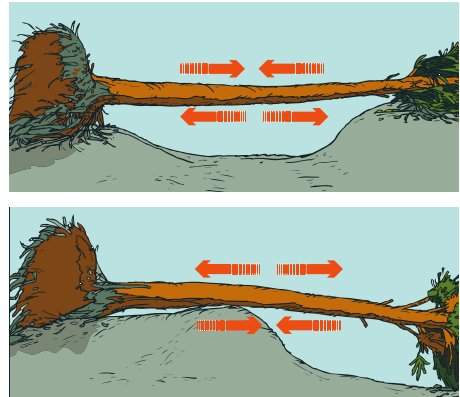
7 Before every cut: Reassess the situation

Ask yourself the following questions before every cut:

- 1 How will the stump, the stem react?



- 2 Where are the areas of compression and tension?



- 3 Is the degree of tension slight, moderate or severe?



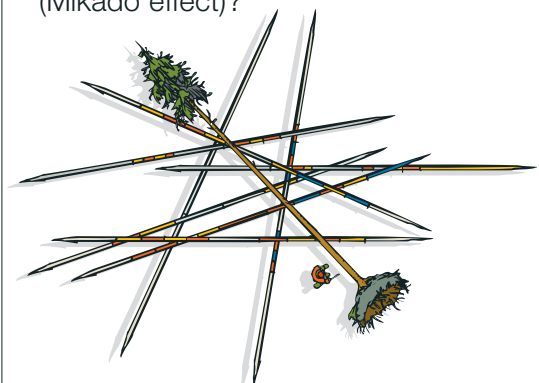
- 4 Which cutting technique should I adopt?



- 5 Where will I be standing after I have made the final cut? Where is it safe to stand?



- 6 Am I creating new hazards with the final cut? Is there any likelihood of other trees starting to move (Mikado effect)?



8 Tension: Beware of the hazards – your life could be at risk!

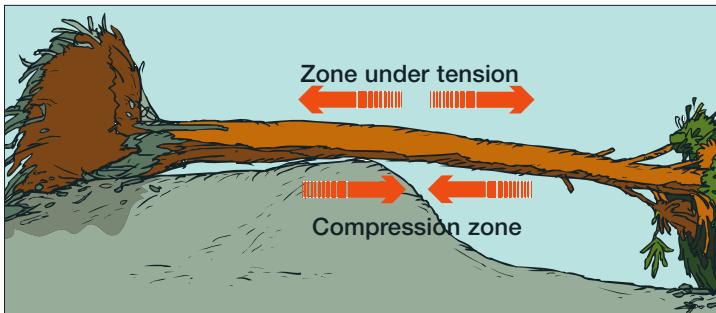
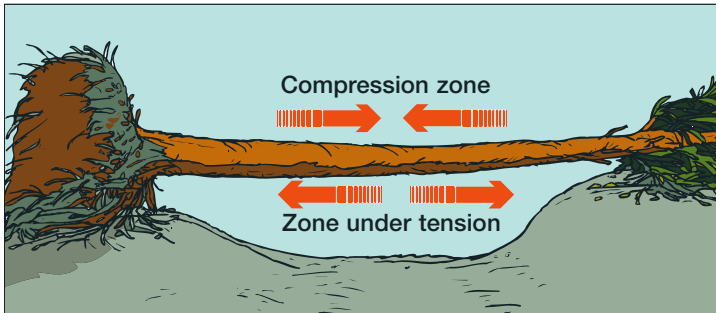
Trees under tension are extremely hazardous:

When a cut is made, a tree under tension can suddenly

- kick sideways or upwards
- split

If this happens, the chainsaw operator can be struck, thrown to one side, crushed or jammed between adjacent stems.

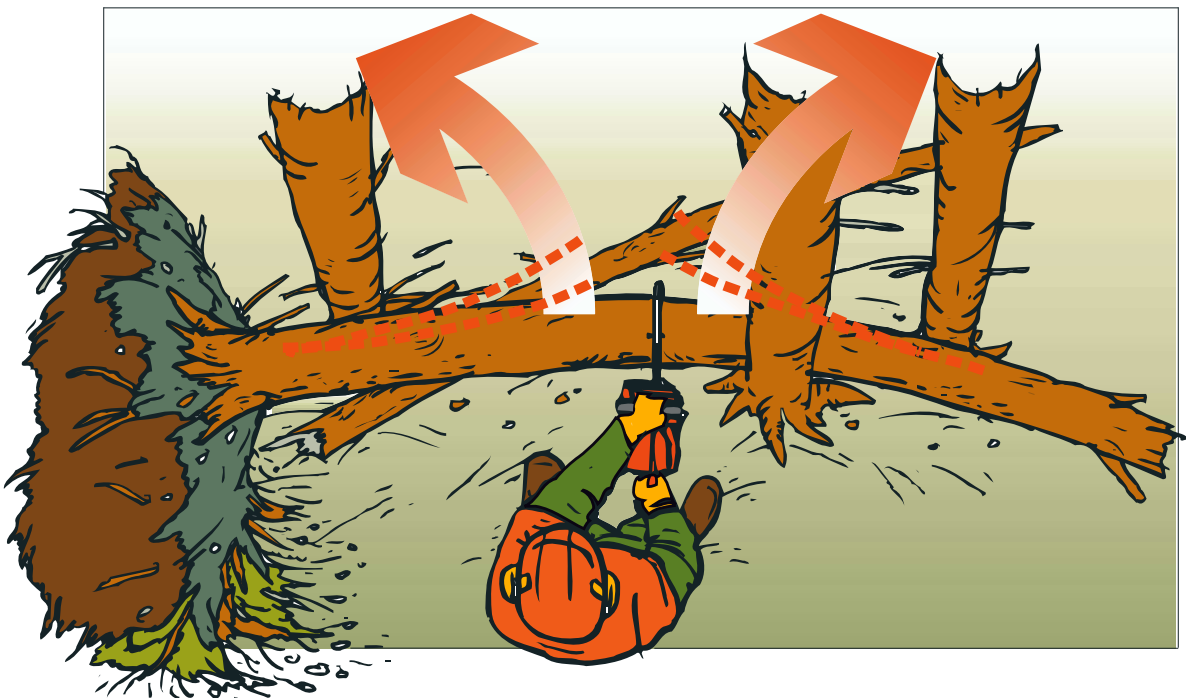




Recommended procedure:

- Thoroughly assess the working situation, the stump, the stems.
 - Where are there any areas under compression and tension?
 - Choose the safest working method and the safest cutting technique.
- Stand on the «safe» side.
- Take up a safe working stance.
- Make your saw cuts carefully and attentively.
- Watch how the cut and the stem react.
- Use a stem press in difficult cases.

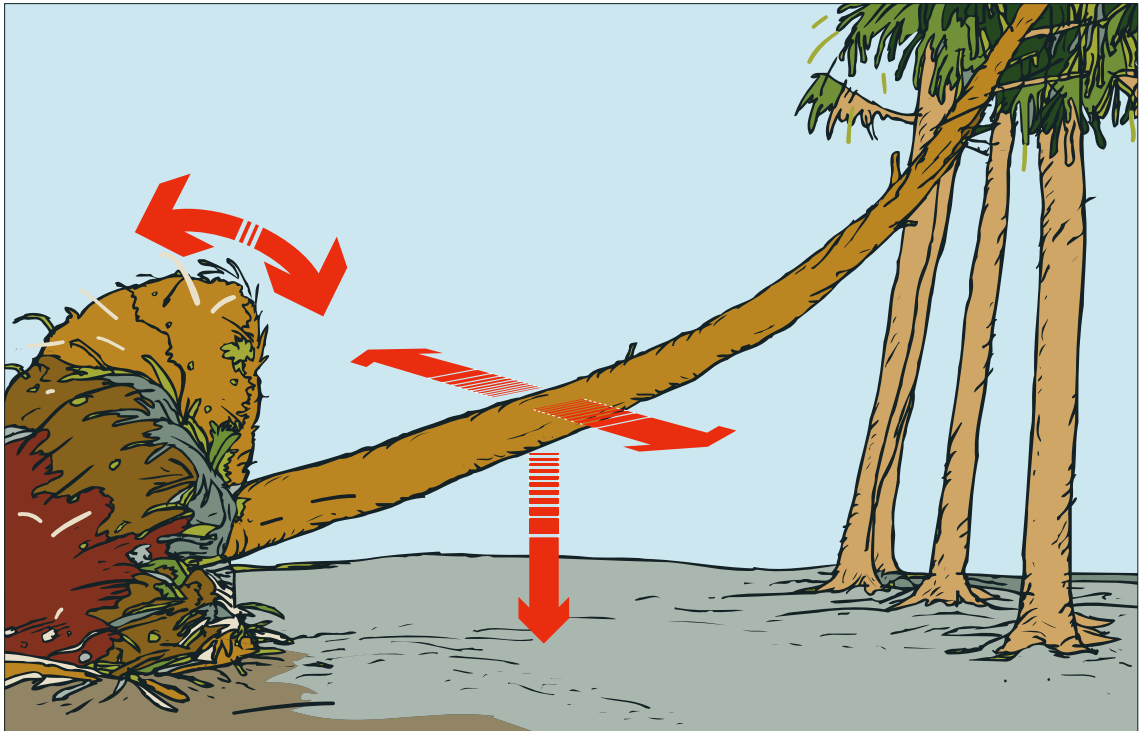
An authorised instructor is the best person to teach you which cutting technique is safest in what situation.



9 Bringing down hung-up trees

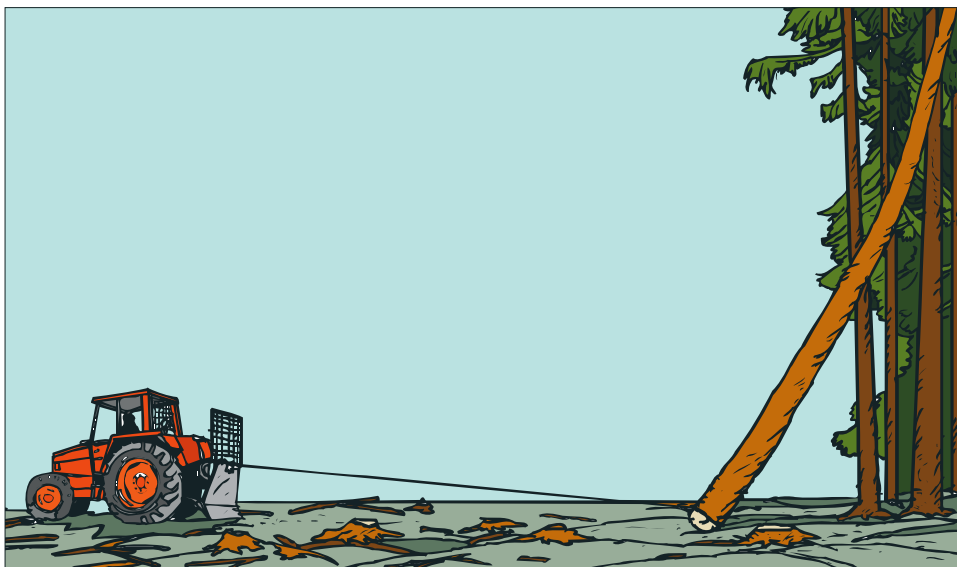
Points you must consider:

- What will happen when a hung-up tree falls down?
 - Will the whole tree fall with its crown?
 - Will parts of the crown or branches fall separately?
 - How will the supporting tree react?
- After the final cut
 - How will the root plate react?
 - How will the hung-up tree react?

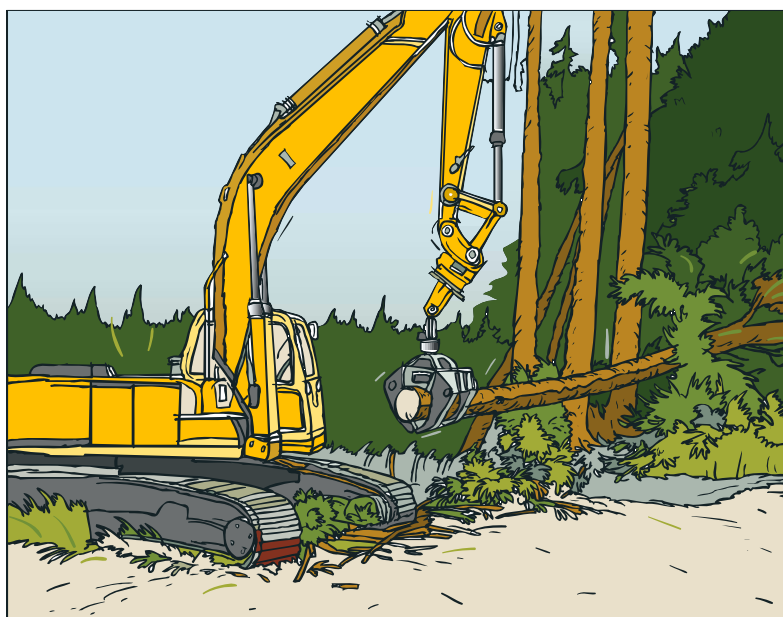


Recommended procedure with the usual equipment:

- Assess the tree and its surrounding area, particularly
 - the area in tension and under compression
 - the crown
- Choose the safest working method (cutting technique, working aids)
- Sever the stem from the root plate
- Pull down the tree using a winch or a cable crane
 - Only from a safe distance
 - With due care for hazardous areas such as the bight of a cable, tensioned and moving cables



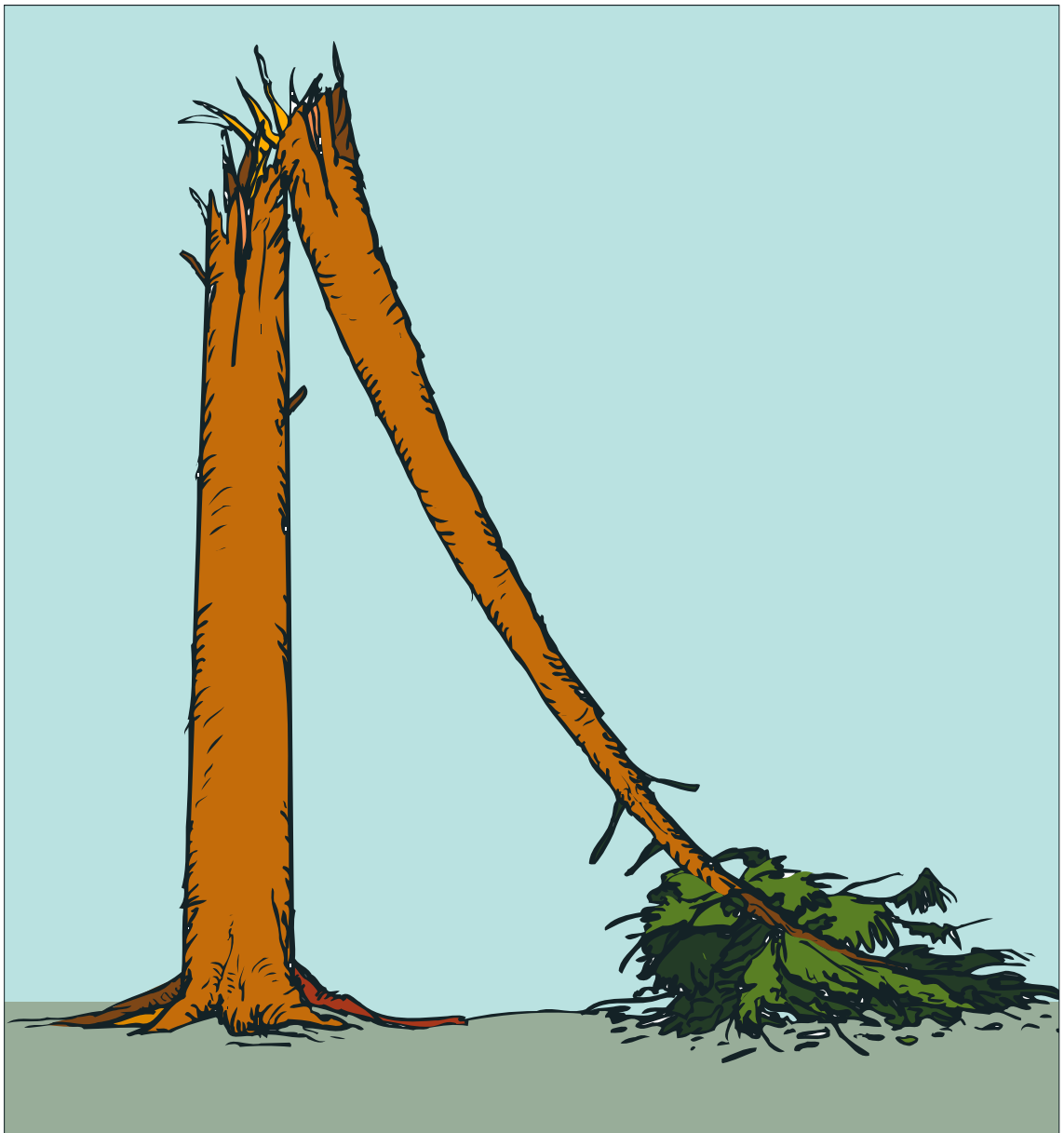
Hung-up trees can be brought down swiftly and safely using the appropriate equipment.



10 Bringing down a tree with a broken crown touching the ground

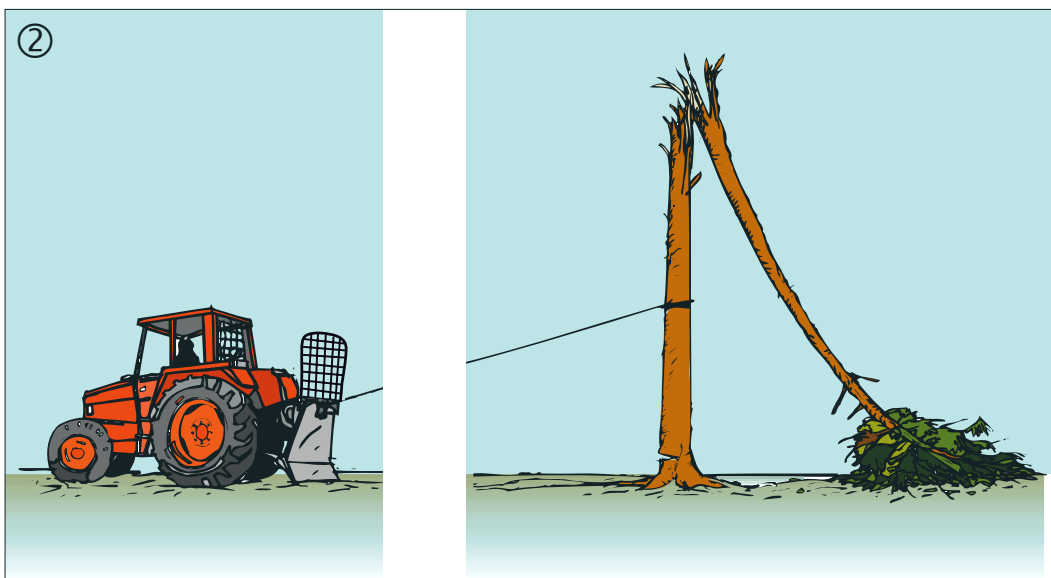
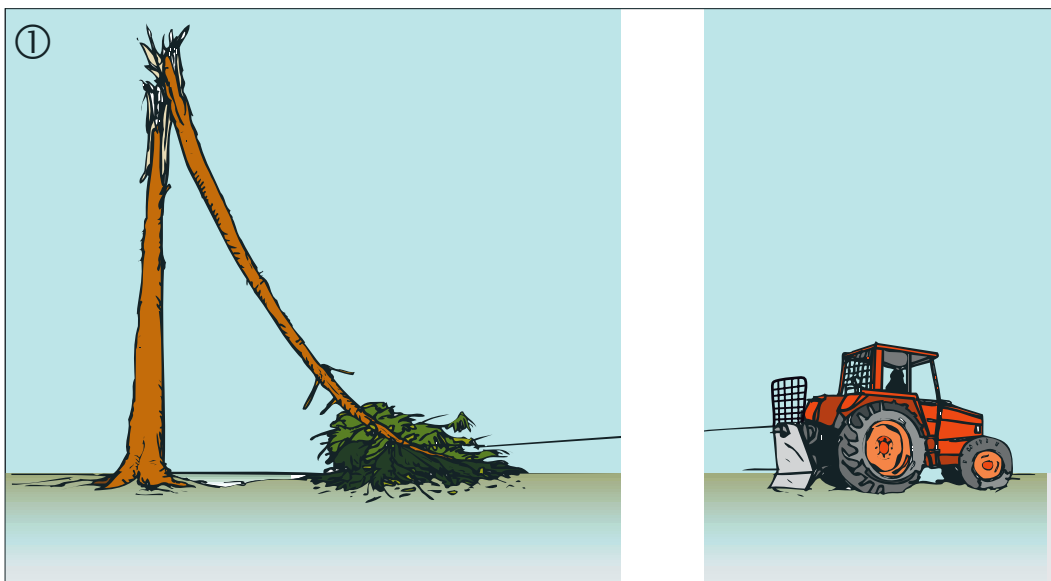
Points you must consider:

- What will happen when bringing down a tree with a broken crown?
 - Will the tree fall to the ground with its crown?
 - How will the tree stump react?



Recommended procedure with the usual equipment:

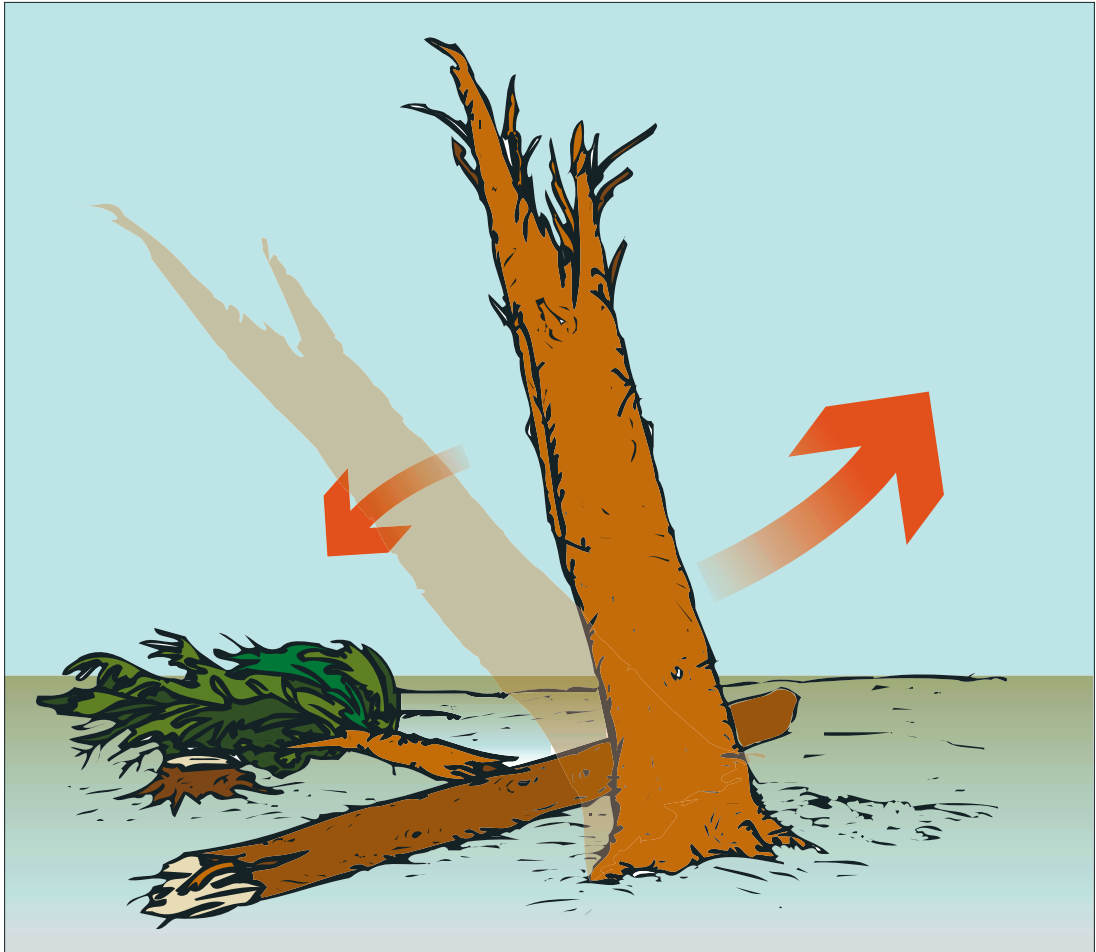
- Thoroughly assess the tree and the point of breakage in particular
- Choose the safest working method
 - First pull down the crown with a winch①
 - Fell the remaining part of the tree
 - If firmly connected at the point of breakage
 - Fell the tree sideways
 - Cut the tree in the direction of compression if it is the only way and bring the tree down using a winch②



11 Felling the remains of a tree without a crown

Points you must consider:

- Any obstructions in the direction in which the remaining part of the tree is being felled?
- Reaction of the remaining part of the tree when it strikes the ground?
- Safe stance by the power-saw user?



Recommended procedure:

- Decide on and clear the escape route.
- Do not fell the remaining part of the tree over other stems or other obstructions if possible.
- Step back while the remaining part of the tree falls.
- If necessary: Use a stem press



Felling the remaining parts of trees with a harvester will prevent them from bouncing up and kicking back.



12 Felling heavily leaning trees

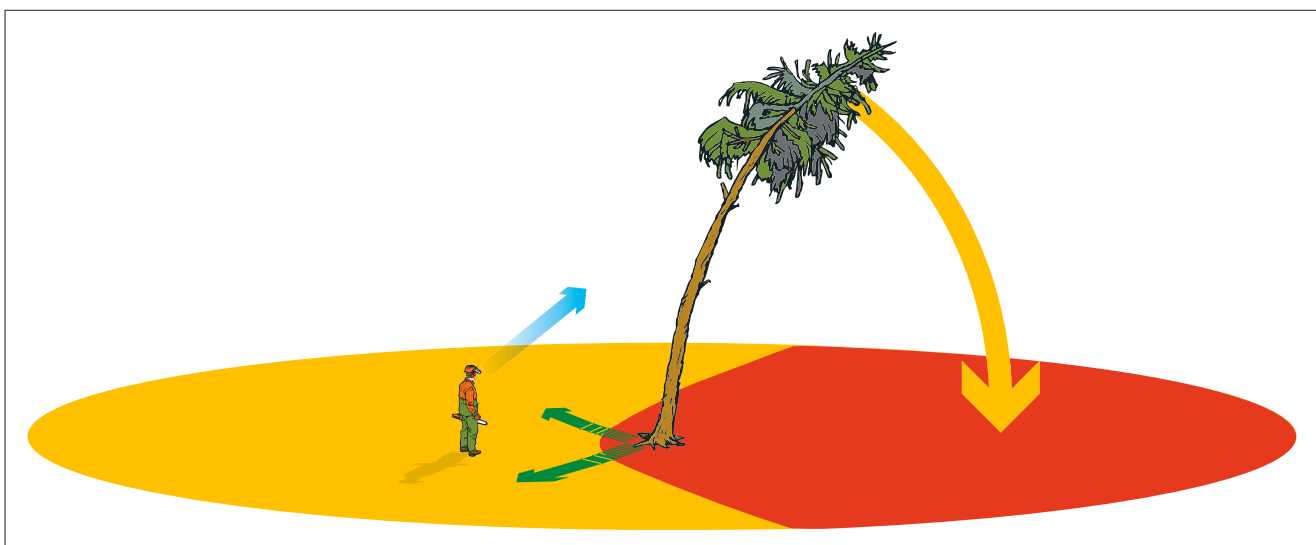
A point you must consider:

- How can the stem be prevented from splitting during felling?



Recommended procedure when felling with a chainsaw:

- Assess the tree and its surrounding area, in particular, the areas of compression and tension.
- Select the safest way to fell it.
- Consider whether a stem press should be used.
- Decide on and clear the escape route.



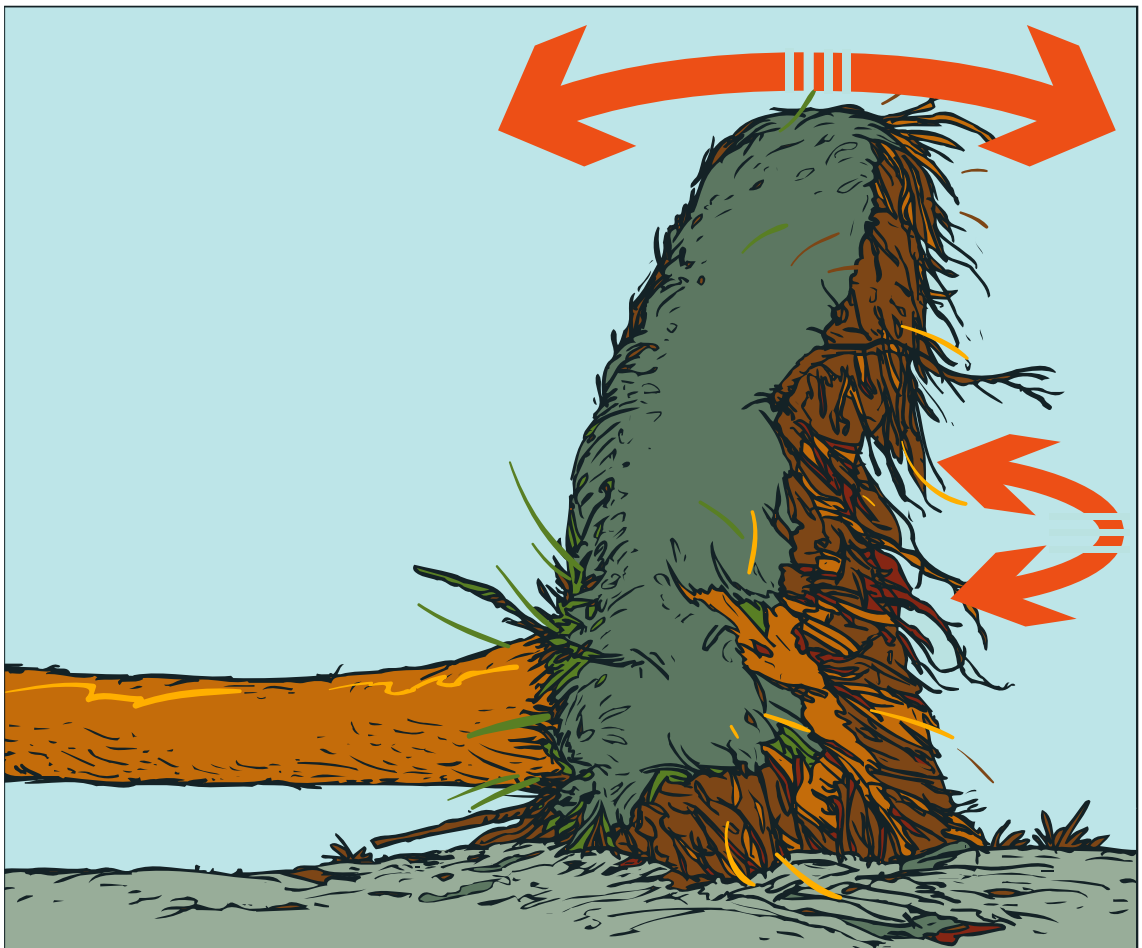
Where circumstances allow (small-diameter trees, terrain practicable) the use of fully mechanised tree-felling machines can prevent stems from splitting.



13 Severing trees from their root plates

Points you must consider:

- How will the root plate react during and after the final cut?
 - Will it topple forward or fall backwards?
 - Will it turn to one side?
 - Will it roll away: e.g. in the falling line, sideways, in the direction of a building, in the direction of a road located at a lower level?
- How will the stem react during and after the final cut?
 - Will it kick back: to one side, upwards?
 - Will it split?
- What else could happen? Is there any likelihood of a «mikado effect»?
 - Will other stems move?
 - Will other root plates move?



Recommended procedure:

The root plate will fall back into the ground:

- Where are areas under tension and compression?
- Assess the surrounding area: nobody must be allowed to stand behind the root plate!
- Stand on the «safe» side.
- Take up a safe working stance.
- Make the final cut and, at the same time, keep an eye on the cut, the stem and the root plate.



The root plate will probably fall forward or sideways:

- Where are areas under tension and compression?
- Stand on the «safe» side.
- Take up a safe working stance.
- Make the final cut at an adequate distance from the root plate and, at the same time, keep an eye on the cut and the root plate.
- Bring the root plate into a safe, final position if possible (pull it over or move it back from a safe distance).





**Advice Centre for
Accident Prevention
in Agriculture**