



# Bind Analysis & Cut Sequence

For Trainee Saw Operators and Saw Operators

April 2017

# Course Overview

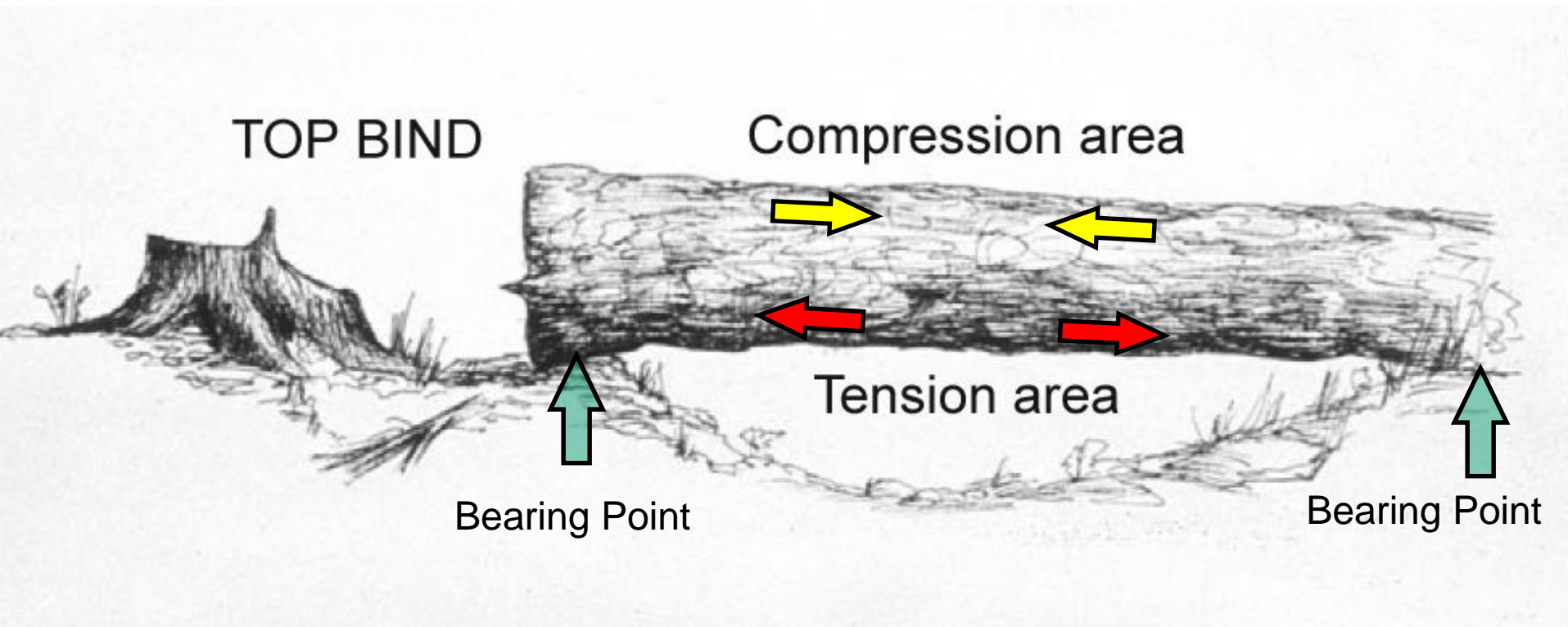
- Types of Binds
- Types of Cuts
- General Considerations
- Hazard Tree Scenario

# Types of Binds

- Top bind
- Bottom bind
- Side bind
- End bind
- Compound binds



# Top Bind



**Top cut and finish from bottom – add pie cut if needed**

# Top Bind



**Top cut and finish from bottom**

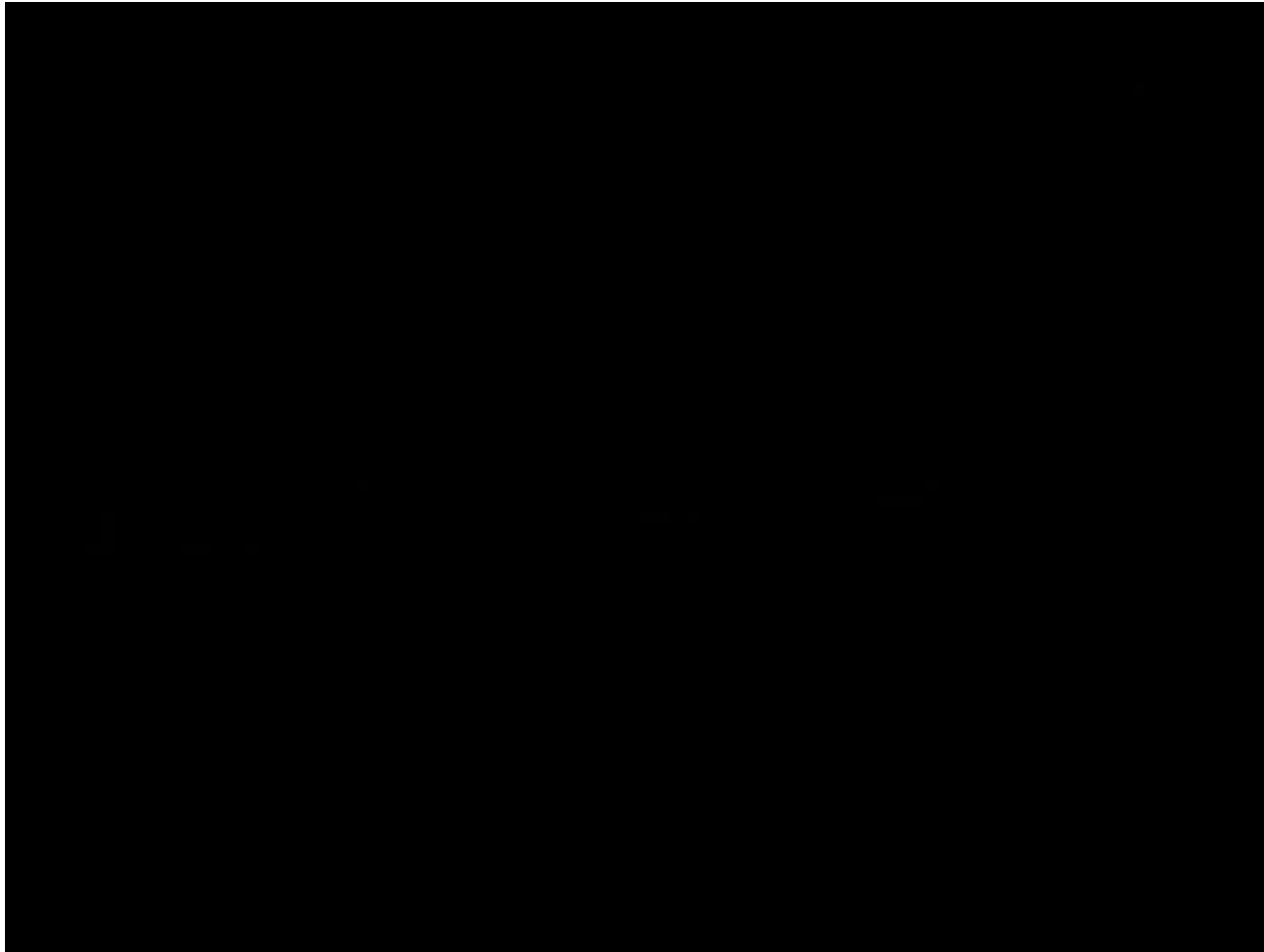
# Top Bind



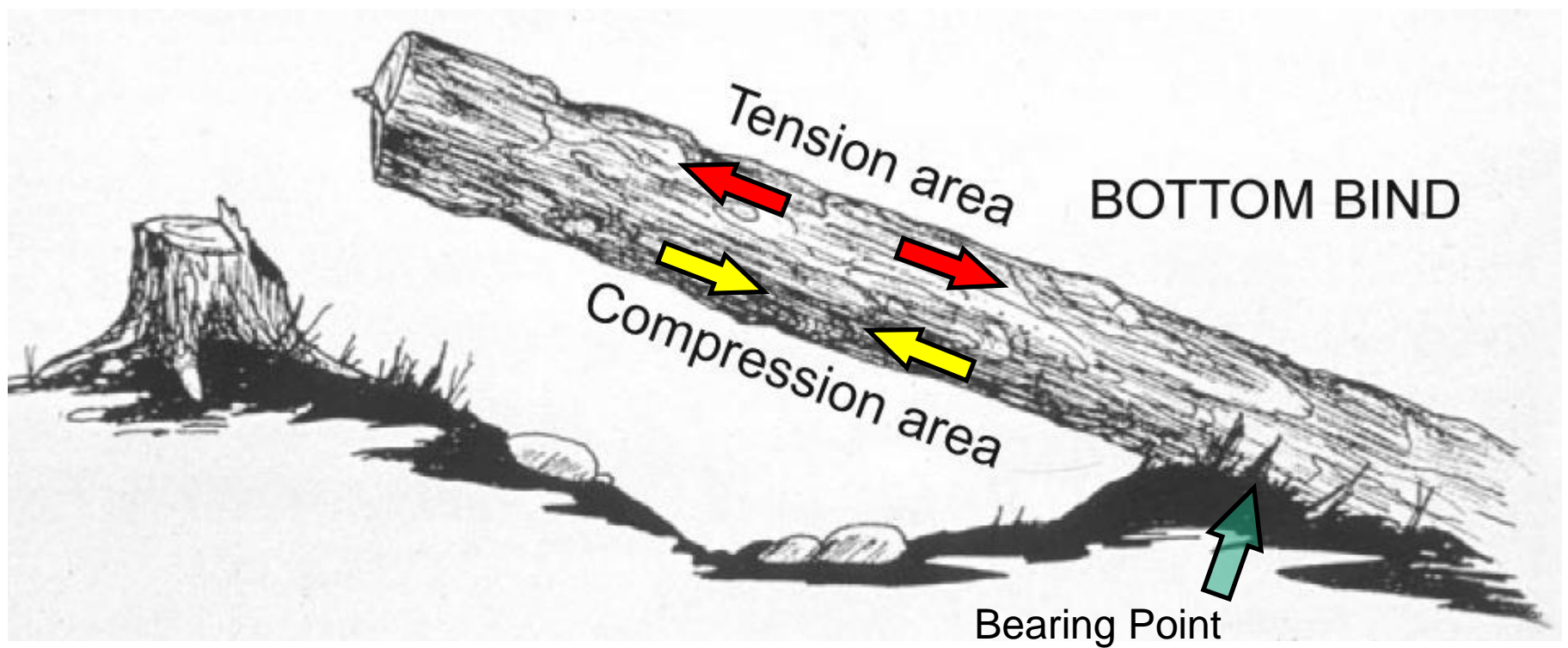
**Cut from Top and Wedge**

# Top Bind

(Wildland Fire Chain Saws, S-212 Video,  
National Wildfire Coordinating Group)



# Bottom Bind



**Underbuck – Then top cut – Be ready for lots of movement**



# Bottom Bind



**Cut at Bearing Point, when possible**

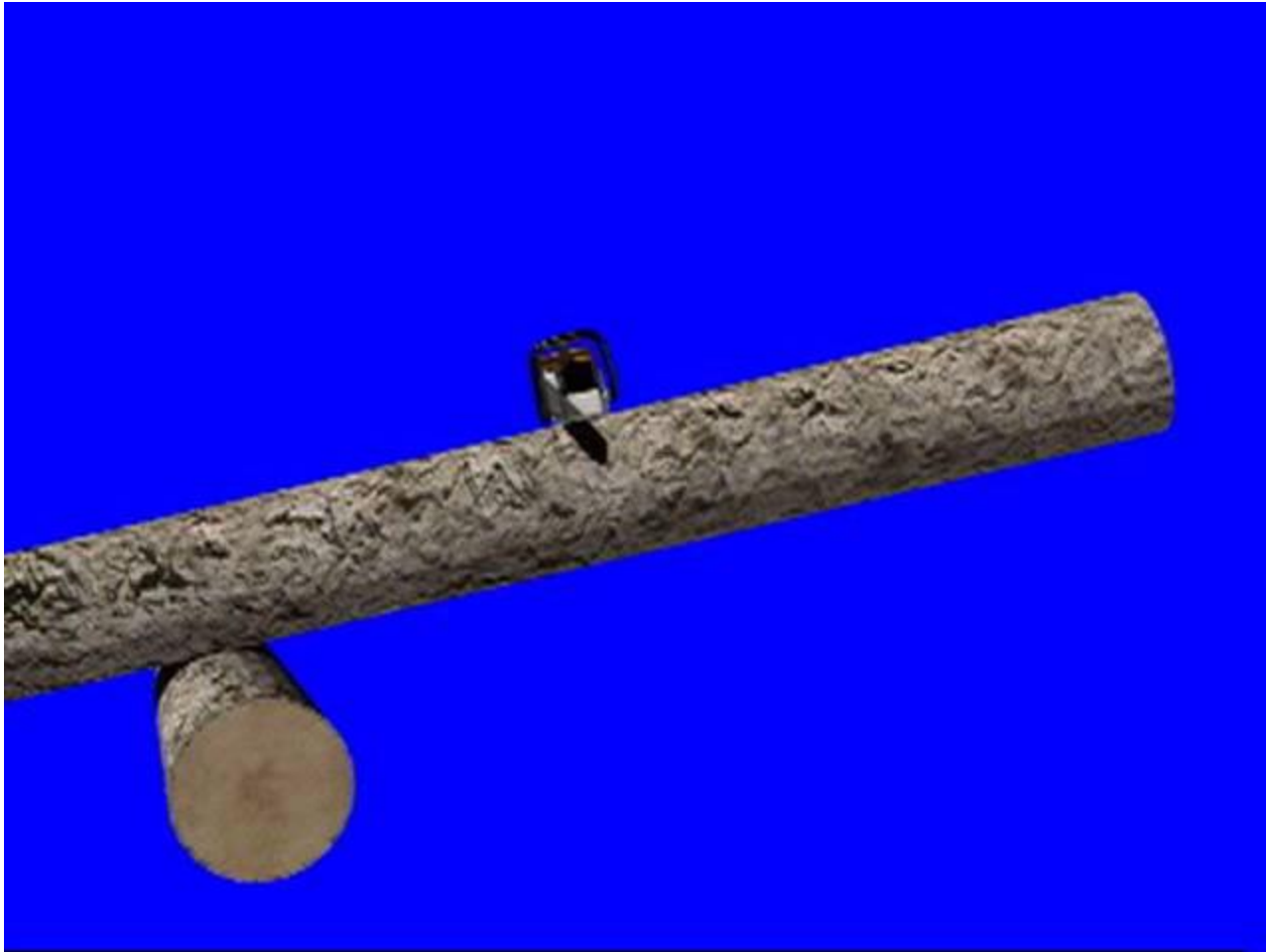
# Bottom Bind



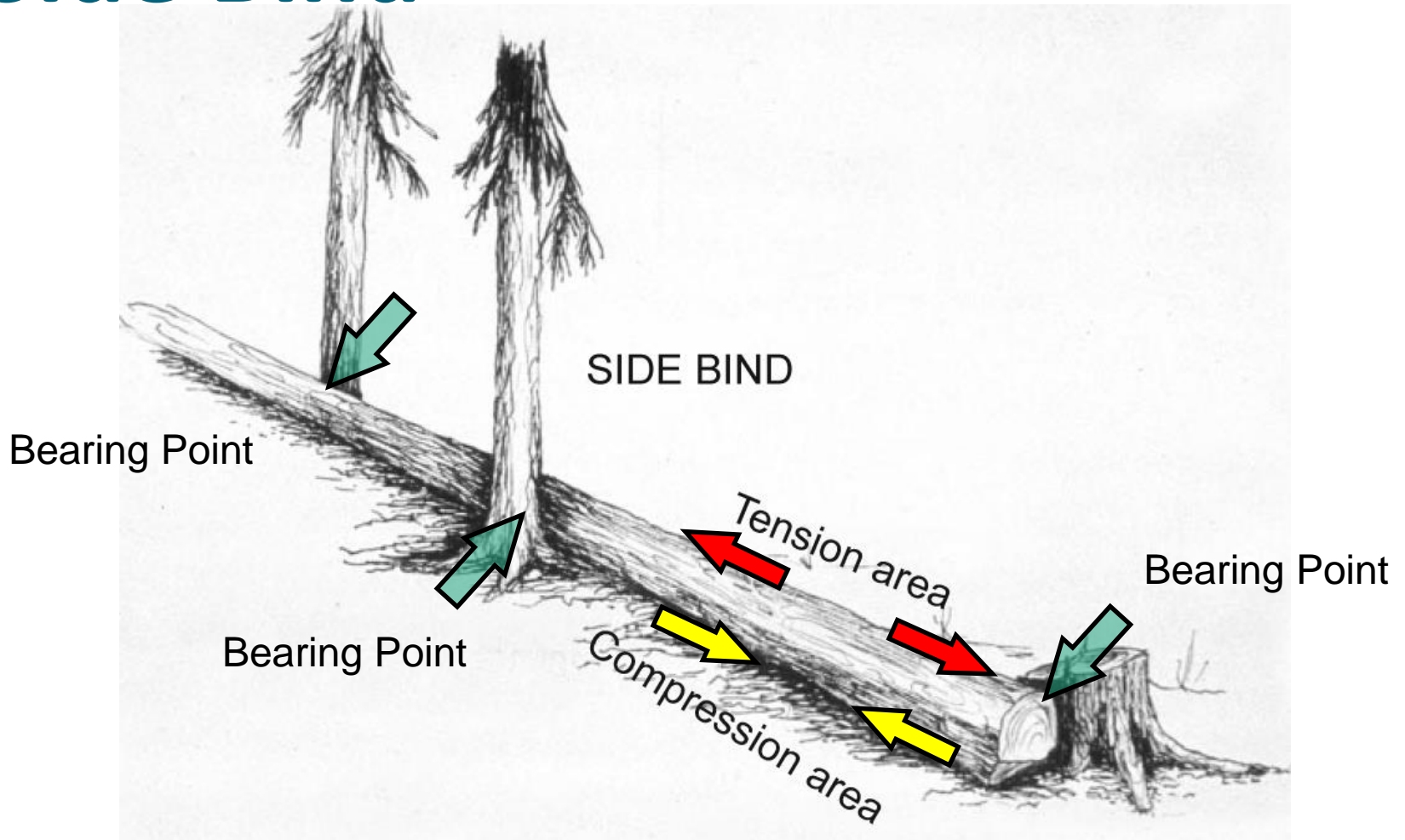
**Watch kerf as it opens during release cut**

# Bottom Bind

(Wildland Fire Chain Saws, S-212 Video,  
National Wildfire Coordinating Group)



# Side Bind



**Safely relieve bind on compression side**

# Side Bind

- Cut at the point of compression if possible
- This is an example of what not to do...

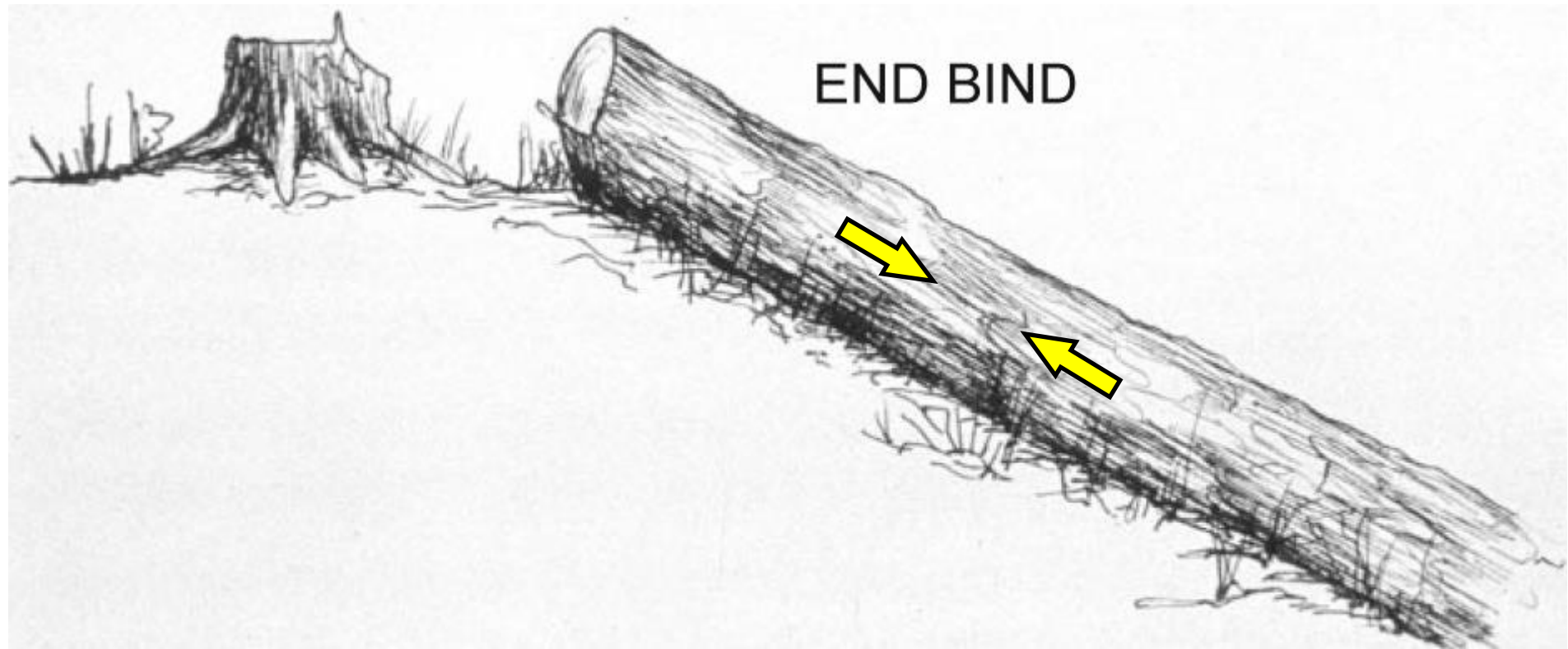


# Side Bind

(Wildland Fire Chain Saws, S-212 Video, National Wildfire Coordinating Group)



# End Bind



**Weight of log causes compressive forces - use wedges**

# End Bind

(Wildland Fire Chain Saws, S-212 Video,  
National Wildfire Coordinating Group)





# End Bind



**Weight of log causes compressive forces - use wedges**

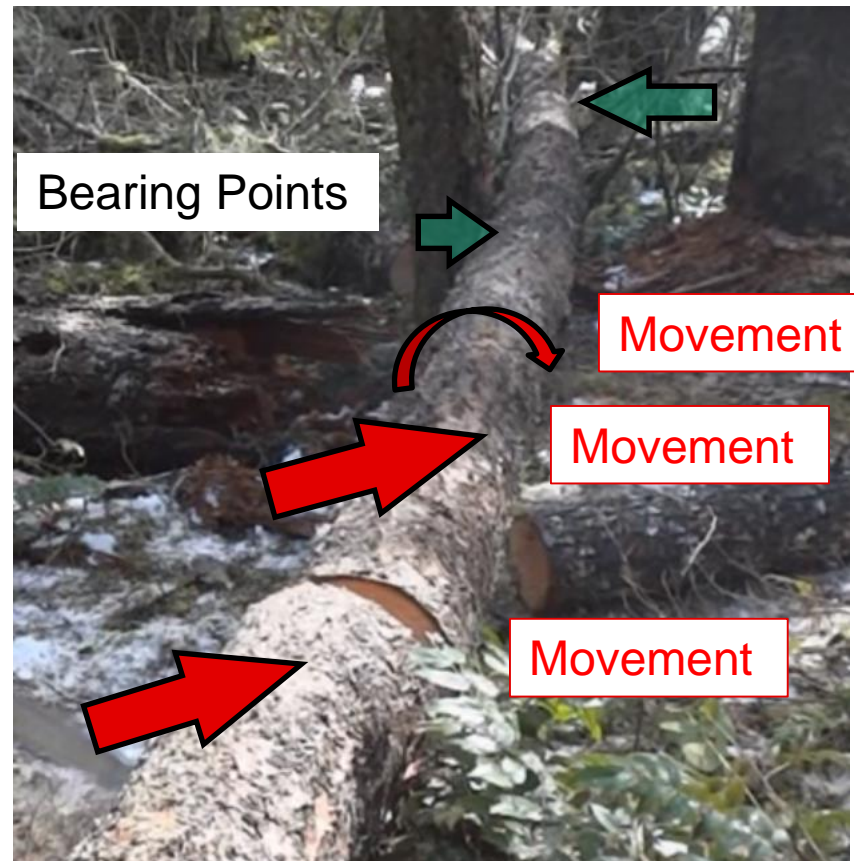
# Compound Binds

- Compound binds are a combination of two or more binds
- Binds can move and change during the cutting process
  - Cutting the log reduces weight in sections and changes bind
  - Moving bearing points changes binds
- Side binds usually transition to top or bottom bind as the side bind is relieved
  - Side bind forces add bearing points to the log
  - As side bind is relieved, bearing points change
- Compound binds also include twisting or torsional binds
- Constantly assess log thru the cutting sequence for changes in the binds and the kerf

# Compound Binds



Side Bind transitions to more bottom bind  
Changes in bearing points  
Torsional bind due to holding wood



# Binds Review

- Top bind
- Bottom bind
- Side bind
- End bind
- Compound binds

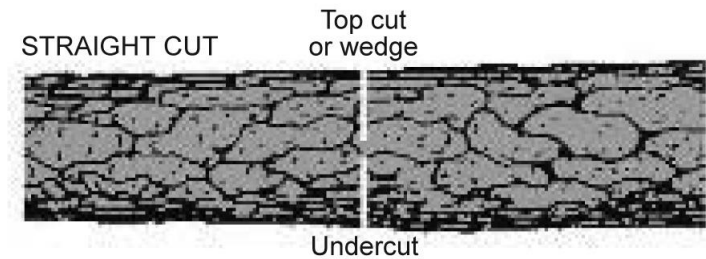


**Cut Compression First!**

# Types of Cuts

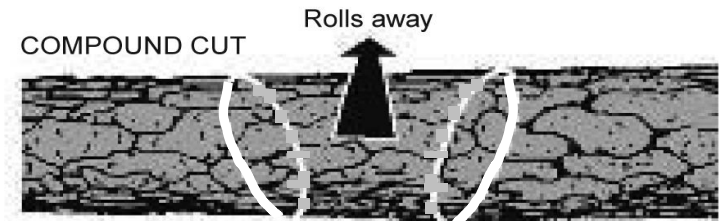
## Straight Cuts

- Continuous top or bottom bind
- Small logs, low bind conditions
- Can be angled to allow clearance



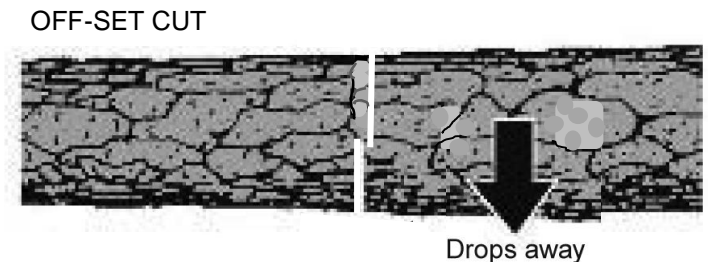
## Compound Cuts

- Large logs, hillside logs with end bind



## Off-set Cut

- Continuous top or bottom bind
- Straight Cut with offset to fixed end
- Best protection for crosscut saw
- Allows for control of release

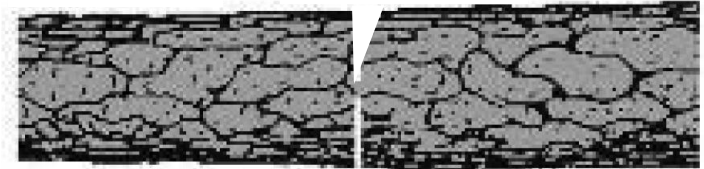


# Types of Cuts

## Pie Cut

- Use with all binds
- Use to allow for travel and control
- Useful with Chainsaw
- Rarely used with crosscut saw
- Can also be just a series cuts with the tip of the bar

PIE CUT

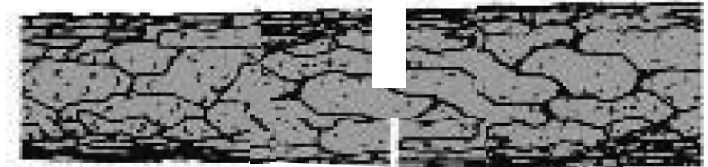


Release Cut

## Double Cut

- Severe side bind, large rotten logs
- Logs with torsion, shattered log
- Clean out with Pulaski if needed
- Can be used to relieve side bind for crosscut saw

DOUBLE CUT



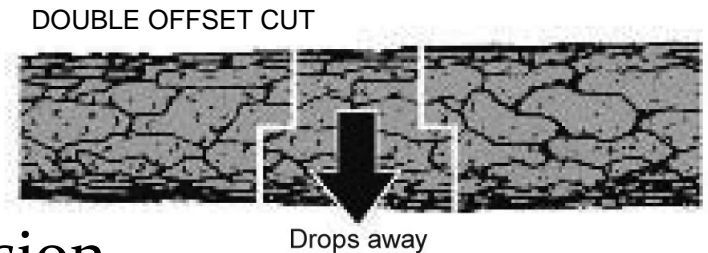
Clean out between  
the two cuts

Release Cut

# Types of Cuts

## Double Off-set Cuts (Crosscut saw)

- Continuous top or bottom bind
- Best protection for crosscut saw
- Allows section to drop out
- Cut compression cuts first, then tension cuts



# Straight Cut

- **Sequence:**
  - **Offside Cut:** Remove material on offside of log, when there is ample retaining holding wood
  - **Compression Cut:** Cut compression side as early as possible and add pie-shaped cut if needed to allow log to move and relieve bind – Don't go over  $\frac{1}{3}$  of the diameter
  - **Bucking Side Cut:** Useful to remove additional holding wood on the side of the release cut for large logs (similar to offside cut). Cut from Compression to Tension.
  - **Tension (Release) Cut:** Remove holding wood cutting only on the tension side. Use wedge as back up for unexpected change in bind and for end bind.

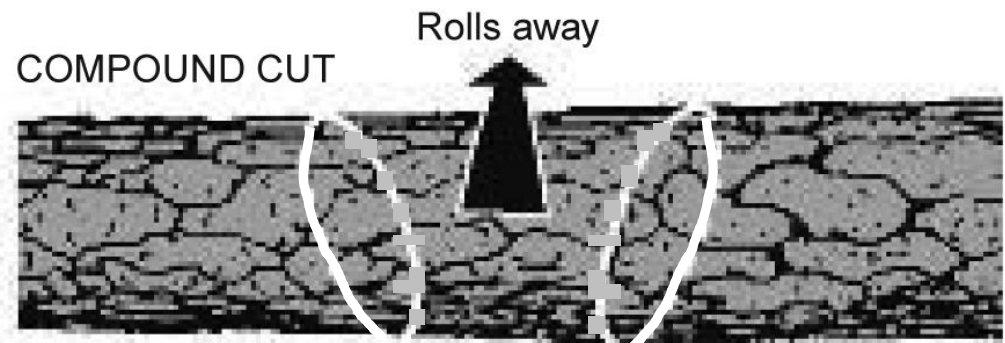


# Straight Cut

- **Offside Cut and Bucking Side Cut:**
  - Not common with Crosscut sawing, but can be used to get more material removed when double bucking
  - Can reduce amount of holding wood to finish when single bucking, especially useful when sawyers are at different heights
  - Very common with chainsaw use to reduce the length of the bar in the log during the release cut

# Compound Cut

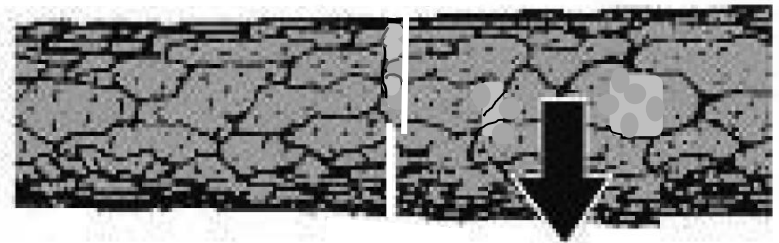
- Face the direction to roll out section and make a “V” with arms
- Two angled cuts allow for clearance to roll out section
- Slight compound angle – Top angle opens outward and is tilted, to be wider on the top than bottom of log
- Straight cut through and back up with wedges when cutting
- Shoot for 5° angles



# Off-set Cut

- Allows controlled release of cut section
- **Compression:** Cut compression side
- **Tension Cut:**
  - Off-set top kerf approximately  $\frac{1}{2}$ " from bottom kerf
  - Ensure the offset is made correctly to allow the cut piece to drop and the kerfs overlap, to sever the holding wood
- Increasing the width of the offset, up to 6", can lock the cut piece to control twist or torsion

OFF-SET CUT



Drops away

# Off-set Cut

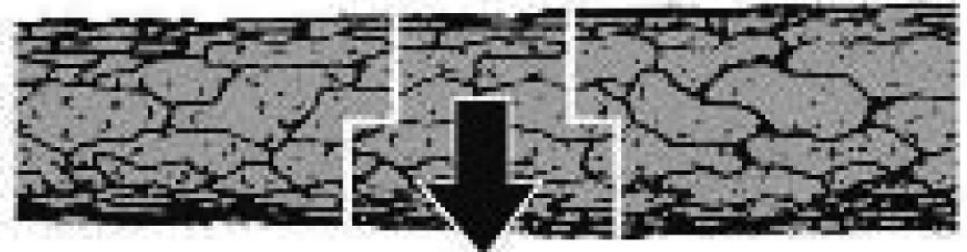
→ ←  $\frac{1}{8}$ " to  $\frac{1}{2}$ " Offset



# Double Off-set Cut

- Allows controlled release of cut section
- **Compression:** Cut compression side
- **Tension Cut:**
  - Off-set top kerf approximately  $\frac{1}{2}$ " from bottom kerf
  - Top kerf will be closer to center of trail relative to the bottom

OFFSET CUT

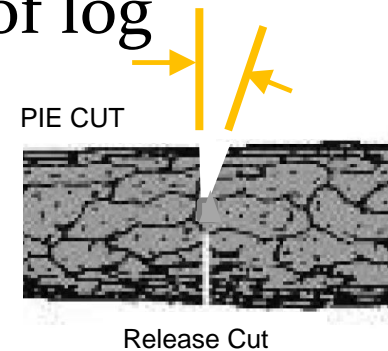


Drops away

# Pie Cut

- Useful with heavy bind, to remove material to allow log to move and to control the movement of the log
- Angle of pie cut only needs to match the expected angle the log needs to change, usually 10-30°
- Don't cut deeper than 1/3 of the diameter of log

Max angle of  
pie cut



Initial log  
centerline

log centerline  
after pie cut and  
release cut

# Double Cut

- Single buck from safe (compression) side to cut two parallel top kerfs, the width of a Pulaski
- When saw starts to bind, remove saw, using the adze of the Pulaski, remove wood fiber from between two kerfs
- Repeat until log severed, or bad wood is removed and normal cutting process can be used
- Can be used with compound binds when they are too complex to identify dominate binds

# Double Cut

- Can also be used to remove sections, where the wood is split within the log.
- Binds will change across the split sections, and cutting across the splits can bind the saw.
- Cut two parallel cuts, each one a little at time. Continue cutting back and forth and try to align saw to be parallel to the split.
- Use poll of ax to knock out cut sections.
- For chain saw, use tip of bar to minimize amount of bar in the wood, when cutting splintered wood.



# Plumb Cut

- Variation of the Straight Cut
- On steep slopes go above the back slope and make a plumb cut
- Used when log is angled and cut piece must drop

**Trail Tread**





**What types of cuts  
would you use?**









# Types of Cuts Review

- Straight Cuts
- Compound Cuts
- Off-set Cut
- Pie Cut
- Double Cut
- Double Off-set Cut

# Cutting Sequence

- Review Binds, Pivots, Supports, Bearing Points, etc.
- Determine safe areas to work
- Plan cuts to address the level of Complexity in the log or logs
- Don't be target focused – may need to start at end far from trail to safely mitigate hazards
- Use limbs or remaining mass of tree to help secure cut pieces, or remove as needed to reduce hazards
- **Focus on cutting sequence to remove the stored energy in the log in the most controlled manner**

# Plan for Release Cut

- How will the log move? What is the safe side?
- Is there room for the cut piece to release? Type of Cuts?
- Where will the cut piece travel?





# Cutting Compression Side First



# Wedge, Wedge, Wedge



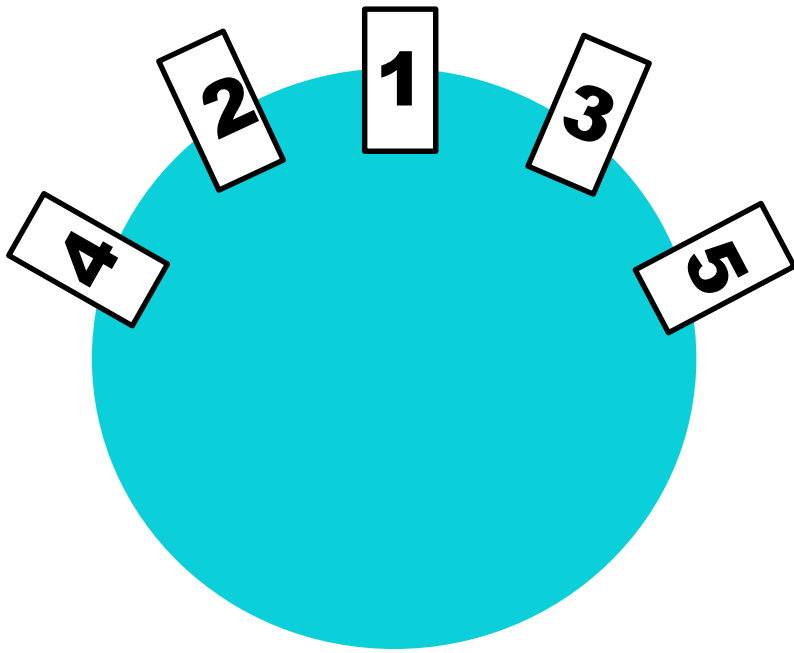
**Get a wedge in as soon as the saw is fully in the log**

# Carry Lots of Wedges



**Turn a top bind into a bottom bind with wedges**

# Wedge Placement



Examples have top compression – Axe used to prevent movement

# Cut Piece Track

- Make sure everyone has a safe working area
- Secure switchbacks for trail users, if needed
- Plan for use of added supports to guide or move after cut (rails or pivots)
- Clear path and add supports BEFORE cutting begins



# Hazard Awareness

- Overhead Survey
- Ground Survey – walk the length of the log
- Identify spring poles and brush, pivots and root wad
- Establish binds and bearing points
- Determine cutting sequence
- Determine how the binds will change thru cutting sequence
- Determine movement of cut pieces
- Establish Escape Routes and safe areas for crew
- Announce Plan and Review if things change from plan

# Course Review

- Types of Binds
- Types of Cuts
- Cutting Sequence
- General Considerations



# Hazard Tree Study

Warm Springs Indian Reservation

July 2012



# Scenario

- High winds caused two trees to uproot and fall across the PCT.
- On their way down, they collided with the crown of a third tree, just a few feet from the trail, causing its trunk to shatter vertically and the tree to lean over the trail.
- The third tree did not fall because its crown became entangled in the crowns of two trees on the other side of the trail.

# Proximity of Trees to Trail



Trail  
(facing north)

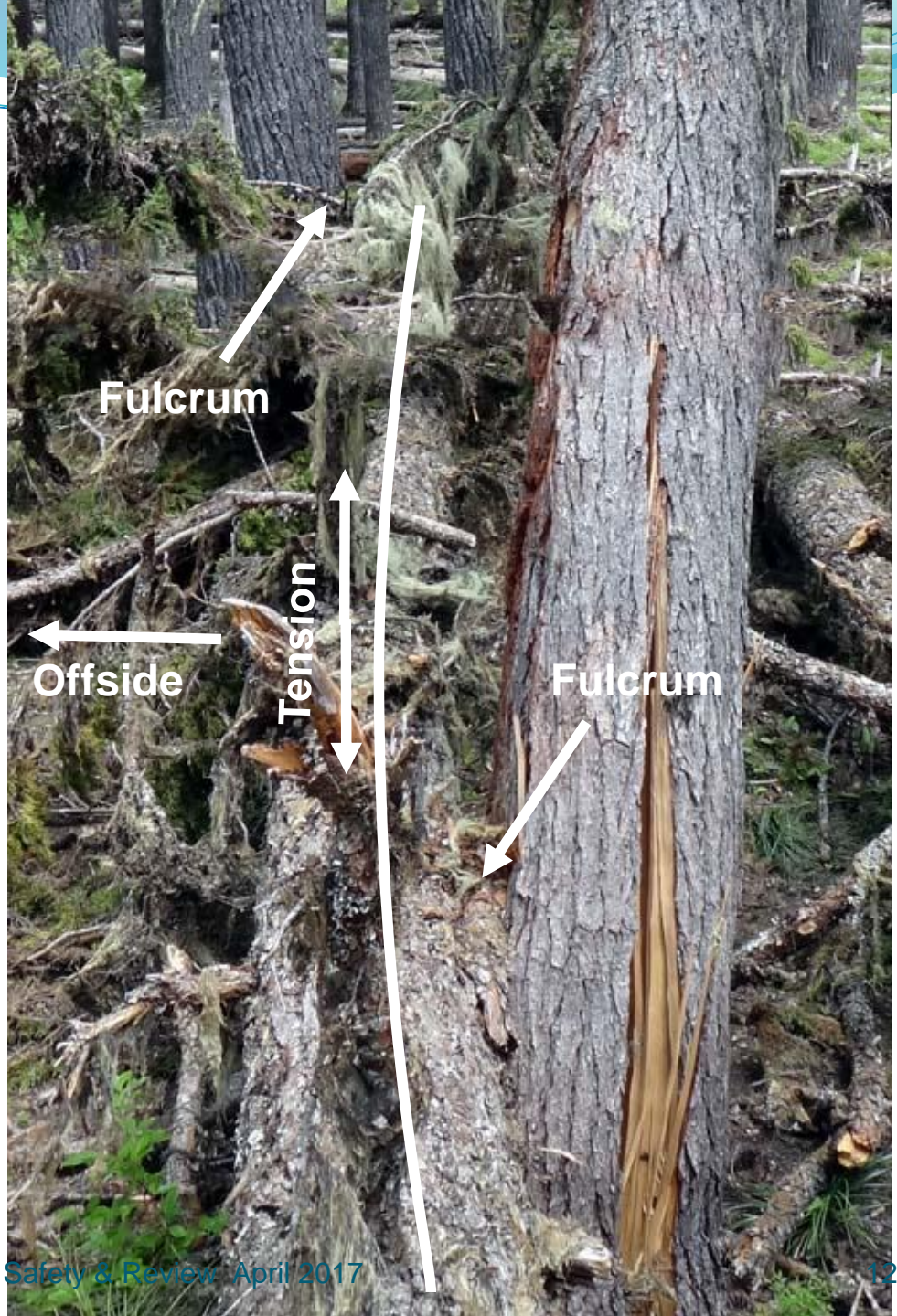
# Condition of Leaner



# Side Bind

- Because the northernmost blowdown was wedged between the leaner and a sound tree on the other side of the trail, it developed a severe side bind.
- This tree had approximately 6 feet of horizontal bend over a distance of 50 feet.

# Side Bind



# Go or No-Go?

- Using established Go/No-Go criteria, the initial volunteer saw crew decided this situation was beyond their capability.
- The crew clearly marked the hazard area and reported the situation to the USFS, the agency managing this section of the PCT.

# Marked Hazard Area



# Two Weeks Later...

- A second crew of volunteers plus a USFS recreation manager returned to site.
- Decision was made to temporarily reroute trail 15 feet west to avoid leaner.
- Area was cleaned up. Log with side bind severed (with 3 feet of springback). All logs bucked, opening temporary bypass.
- Long-term plan: return trail to original route after subsequent winter winds take down leaner.



# Reroute

