

Forecaster – the modelling processes of a simulation

ATLAS Technology

May 2010



**FUTURE
FORESTS
RESEARCH**

Leadership in forest and environmental management, innovation and research

SCION 
Next generation biomaterials

Sequence of Processes

- Modelling of stems
- Modelling of branches
- Growth
- Modelling of Sweep and Forking
- Modelling of Wood Properties
- Felling and Bucking

Models' User-settable Properties

- Model-specific
- Set on model via FunctionSet
- Can override by setting on Site
- Can override by setting on Crop

Branch Modelling

- *BLOSSIM, Generic and None* models
- Models in whole years
- Shoots
 - ◆ Length
 - ◆ Cluster count
- Clusters
 - ◆ Position
 - ◆ Branch count

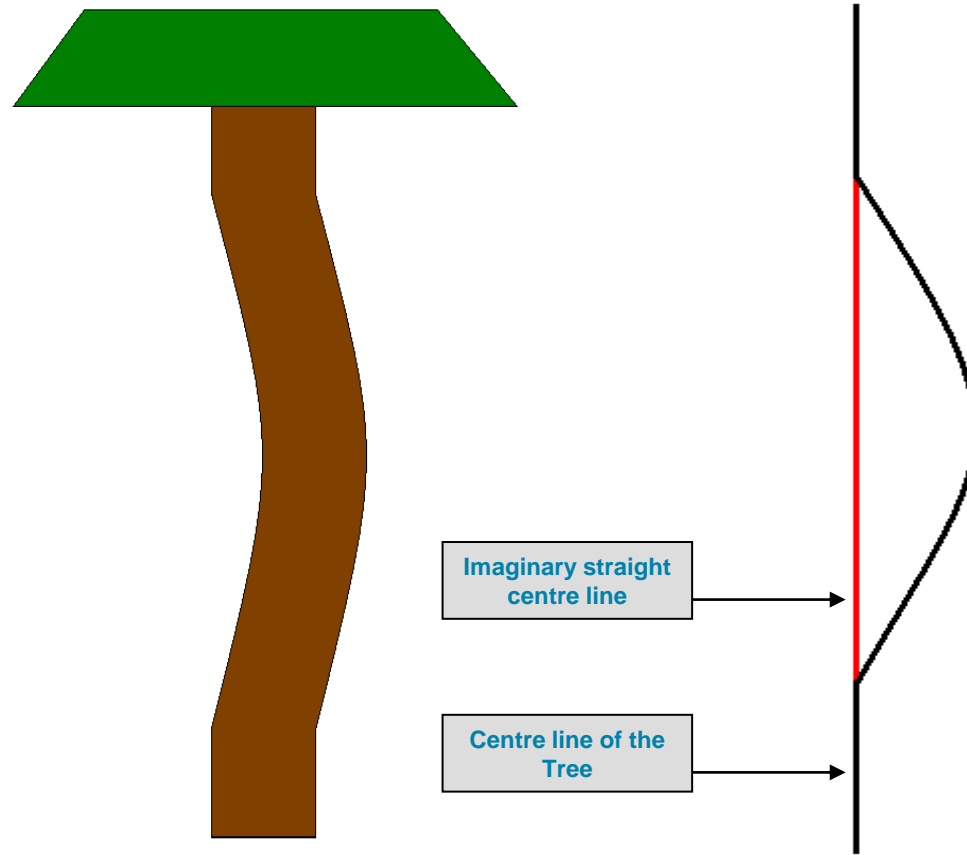
Branch Modelling – Branch Attributes

- Age
- Diameter
- Angle
- Azimuth
- Position
- Vitality
- Prune Age

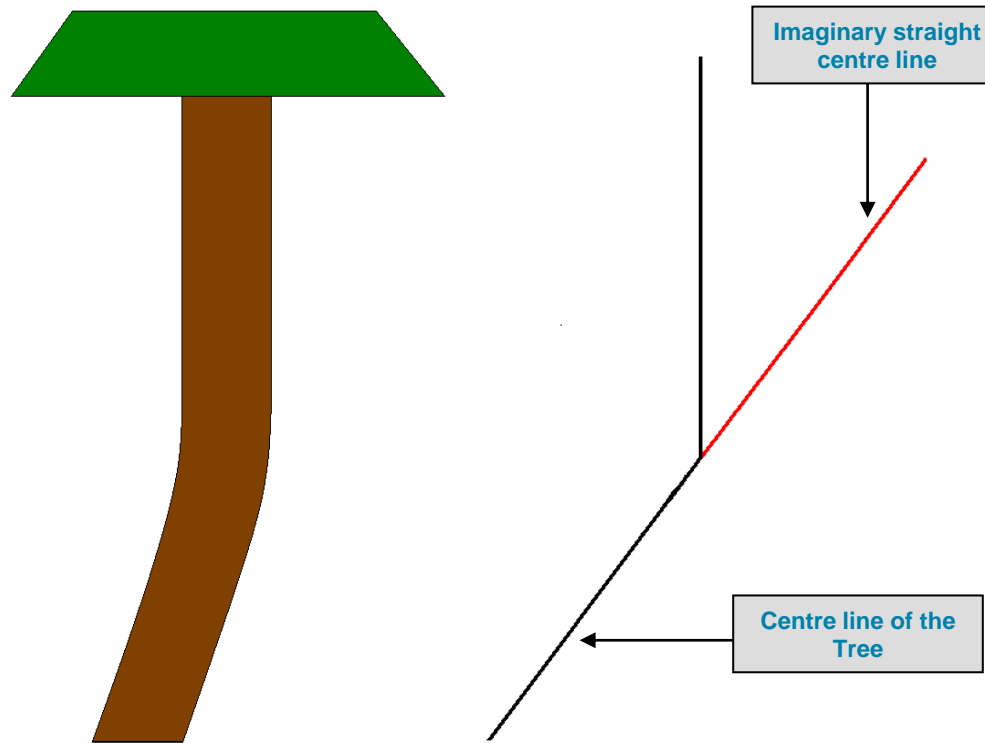
Sweep Modelling

- *Generic* model
- User-settable Properties:
 - ◆ Stem - number of sweep regions (probability)
 - ◆ Region - shape type (probability)
 - ◆ Region - length (distribution)
 - ◆ Region - maximum deviation (distribution)

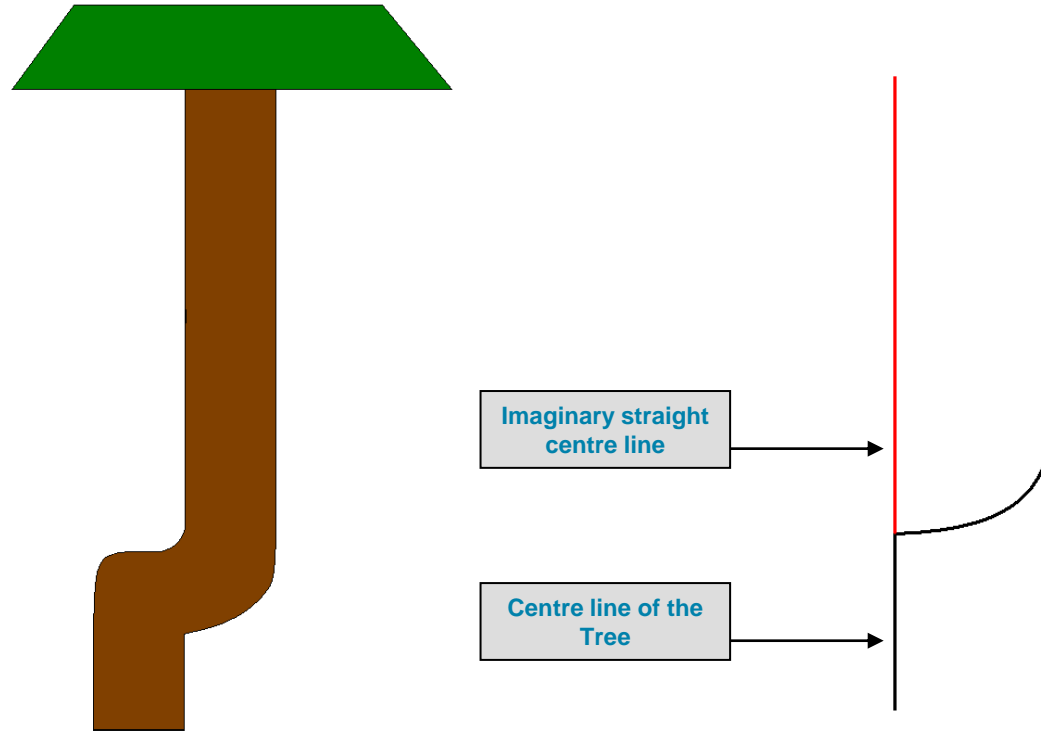
Normal Sweep – “S”



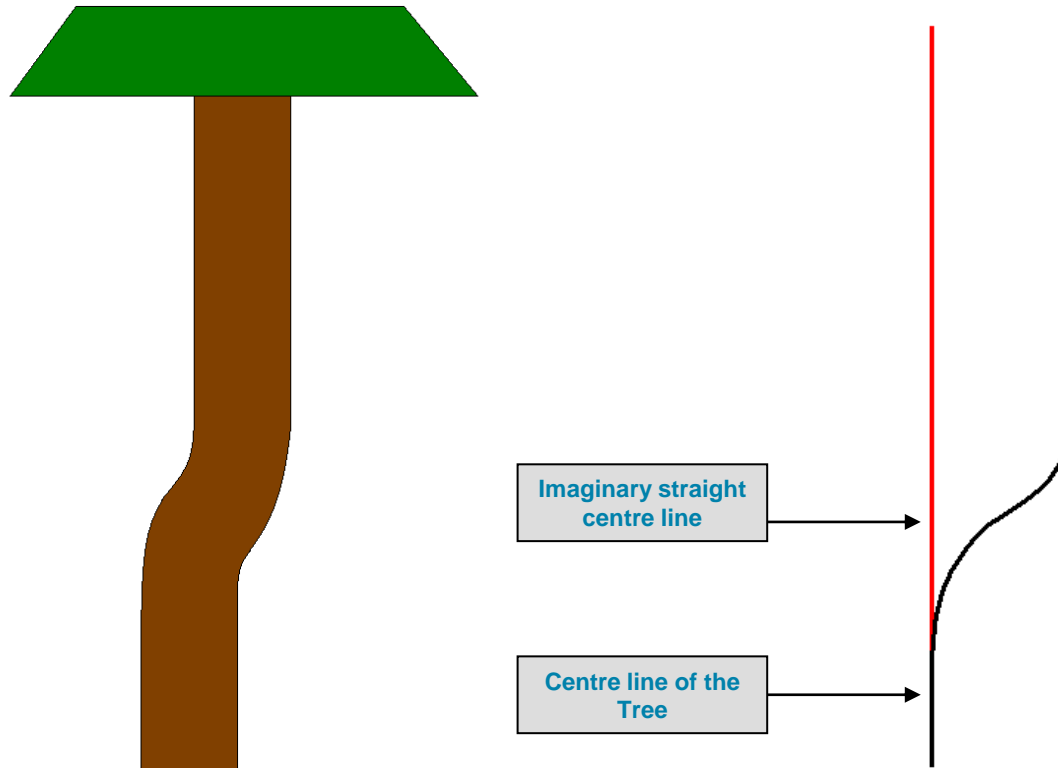
Bend – “B”



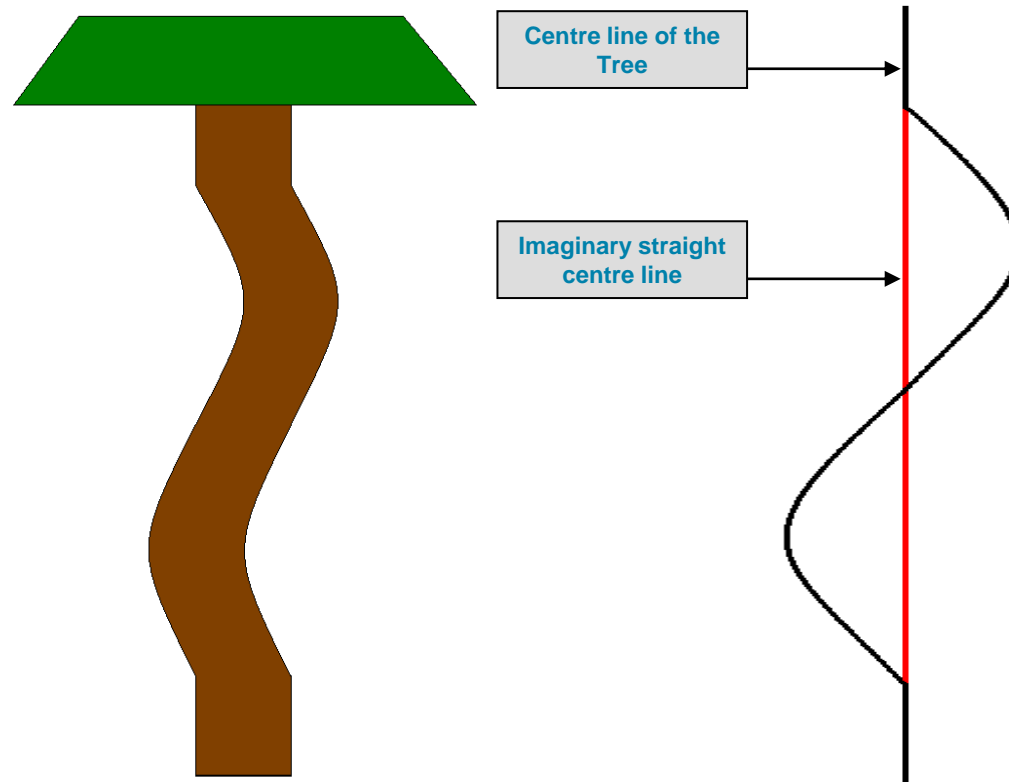
Hockey Stick – “HS”



Leader Replacement – “LR”



Wobble – “W”



Forking Modelling

- *Generic and None* models
- Only single level of forking
- Stem's un-forked volume preserved
- User-settable Properties:
 - ◆ Stem is forked (probability)
 - ◆ Number of leaders (probability)
 - ◆ Fork height (distribution)

Density Modelling

- *NZMeanWoodDensity*, *WQIBasicDensity* and *None* models
- User-settable Properties:
 - ◆ Stand-average outerwood breast-height density
 - ◆ Age at measurement of stand density
- Minimum density log product constraint

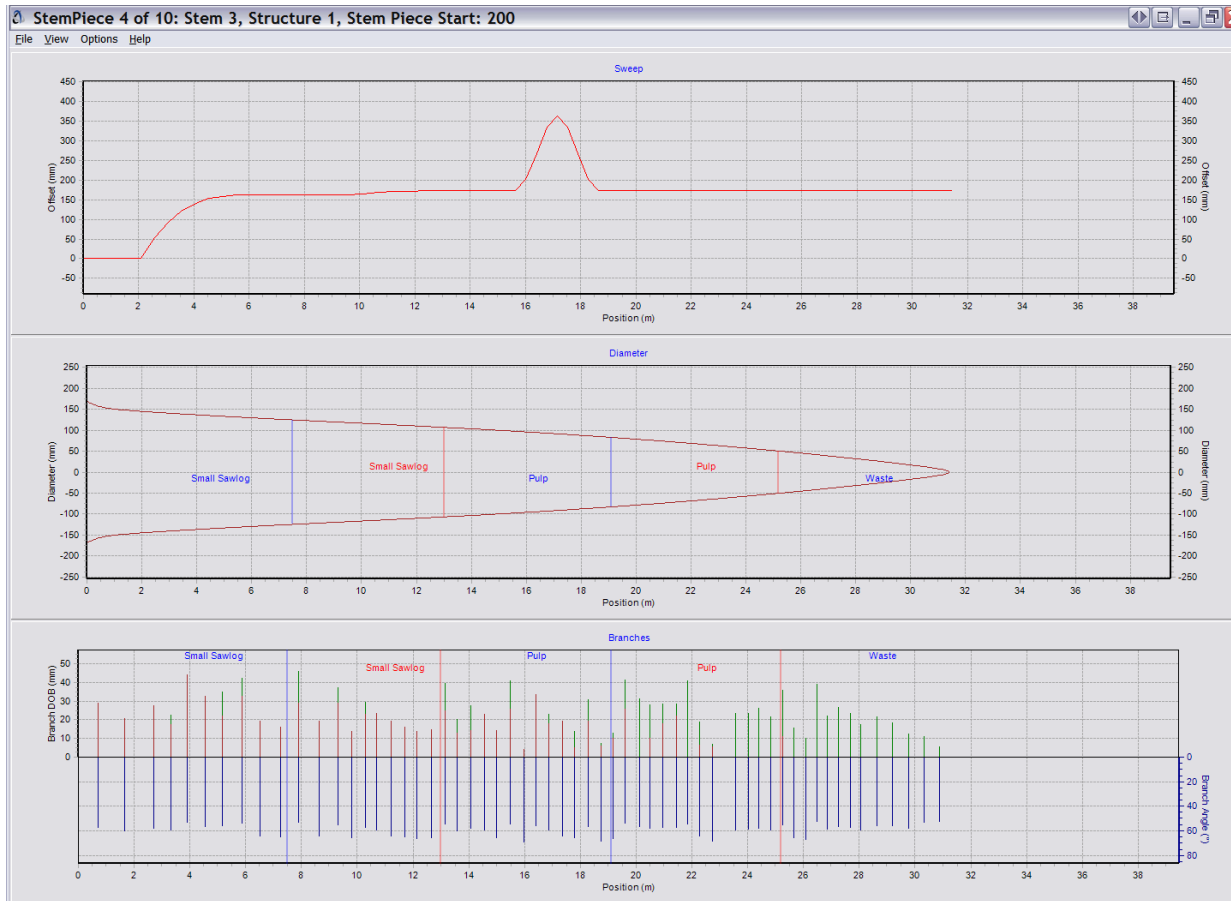
Stiffness Modelling

- *WQI Acoustic Velocity* and *None* Models
- WQI model user-settable Properties:
 - ◆ Stand-average velocity and/or density
 - ◆ Velocity measurements from multiple instruments
- Minimum acoustic velocity log product constraint

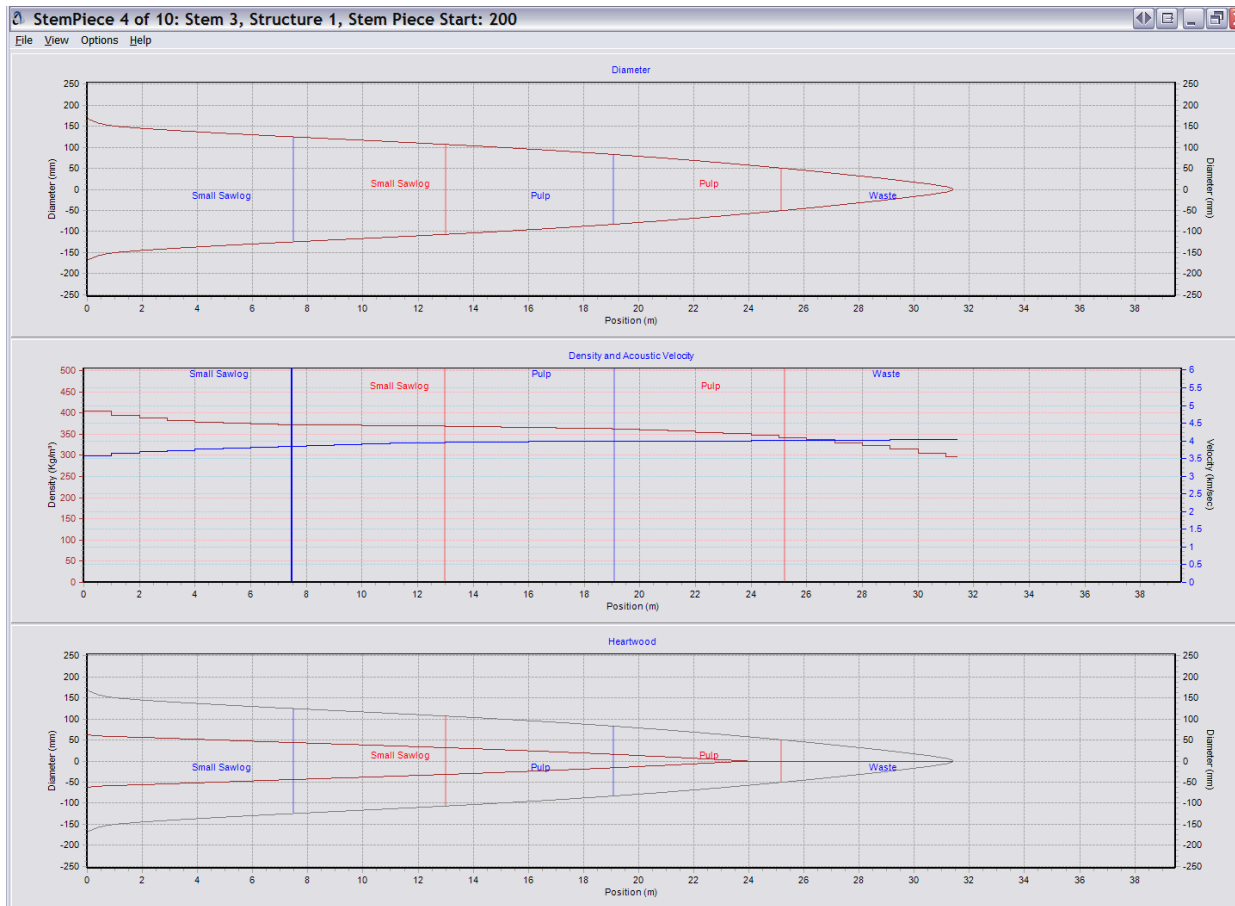
Heartwood Modelling

- *FFR2008*, *FFRWQI2009* and *None* Models
- *FFRWQI2009* includes between-tree variation
- Log reporting on:
 - ◆ Heartwood volume – % and actual
 - ◆ Heartwood diam. – large end, small end, and max.
- Maximum heartwood diam. log product constraint

StemPiece Viewer – Sweep and Branching



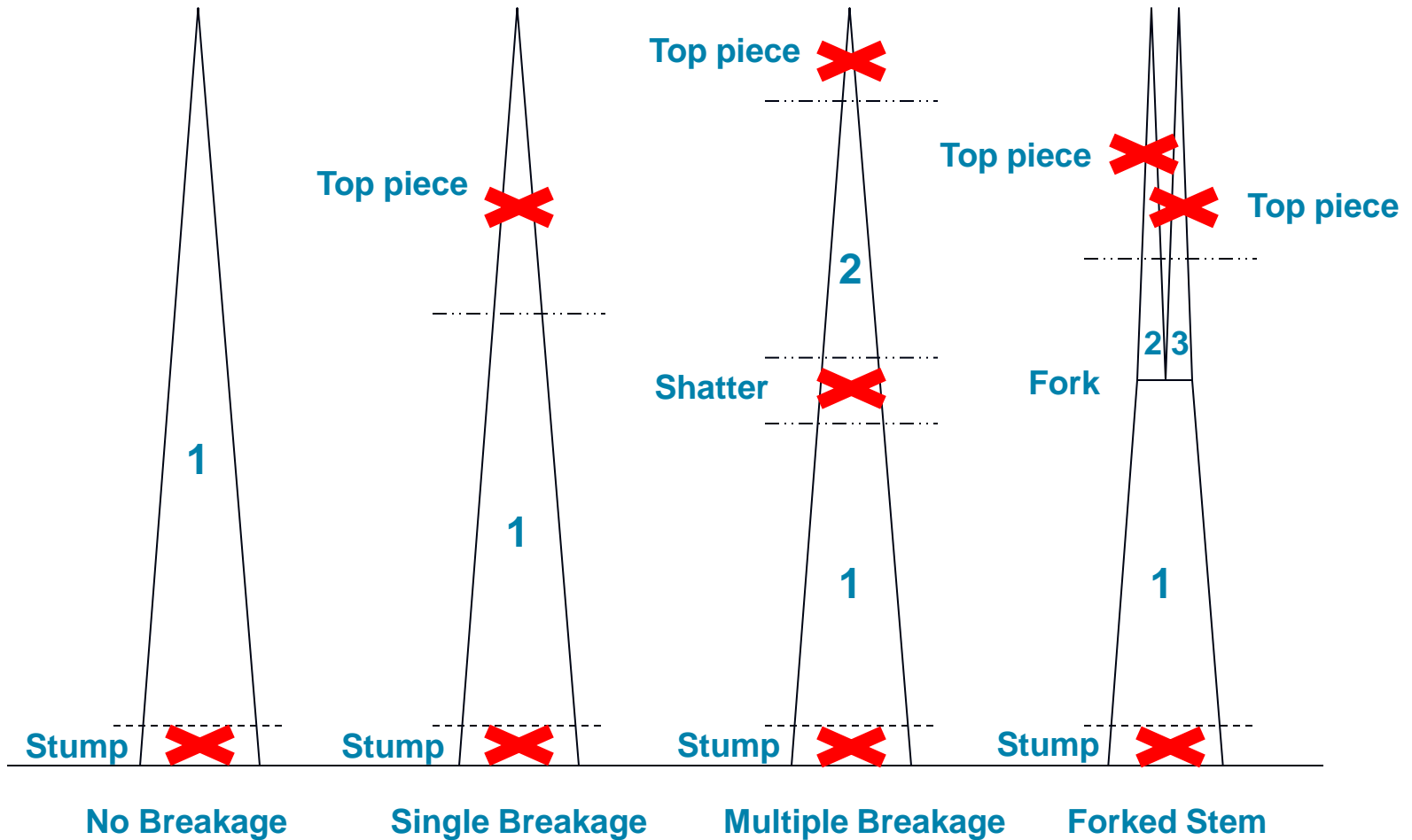
StemPiece Viewer – Wood Properties



Felling

- Stump – not extracted
- Breakage – tables for none, single and multiple
- Top piece (above break) – not extracted
- Extraction criteria – min. extractable piece size
- Produces *StemPieces* for bucking

Felling – extracted StemPieces



Bucking

- Priority List only (Optimal Value soon)
- Log product constraints:
 - ◆ Species
 - ◆ Size – diameters, length
 - ◆ Branching – size and angle, pruned, internodal
 - ◆ Shape – sweep, taper
 - ◆ Wood properties – density, stiffness, heartwood