



High profitability by
PROFILING TECHNOLOGY



Oberkirch at the border of the Black Forest is our home. Here are our entrepreneurial roots and from here we develop our products and services daily further.



EXPERIENCE TRADITION RELIABILITY

Leading in technology, economically convincing: Being the largest European manufacturer of sawmill equipment, we are the industrial partner no. 1

In more than 170 years of company history we changed from a family handcraft business to a technological leader in the wood-working industry. This is not surprising at all as the timber industry is deeply linked with our area. We commit to a high quality level „made in Germany“ and keep a close partnership with our customers worldwide. Precision and diligence from process planning till commissioning characterize both, our service as well as production.

We offer solutions for the woodworking industry. Depending on the sawmill concept, the available space on site or the focus of the business, we supply saw lines that meet the individual requirements and possibilities of our customers. After having analyzed the precise needs we give you advice for designing your operation with regards to maximum efficiency and profitability.

Only high quality lumber can be sold at best prices. LINCK lines are therefore planned, designed and manufactured with perfect sawmill machines whose robust construction guarantees a troublefree long-lasting operation even under hardest conditions. Whether you work at -20°C or $+40^{\circ}\text{C}$, LINCK machines always provide constant high accuracy and best surface quality.

Technologies:

- Profiling technology
- Reducer technology
- Edging technology
- Log yards
- Round log feeding systems

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TRENDSETTING EFFICIENT VALUE ADDING

The LINCK profiling technology is the most efficient process for producing lumber.

By introducing the profiling technology in 1979 we succeeded in developing an innovation which revolutionized the sawmill industry and significantly contributed to the industrialization of the timber industry.

What started with a patent has developed into a unique success story to which we can look back with the experience of more than 140 profiling lines supplied to date. As we have set and will still set the pace for consistently further developing this technology, we daily invest in good ideas for making saw lines more flexible and efficient.

Profiling lines produce center products and sideboards in one single pass: fully automatic and monitored by one operator only from its ergonomic central control panel. Our high precision saw lines produce high-quality lumber with narrow dimension tolerances being in sought after the market.

We also take care of the growing demand for high-quality by-products such as pulp and fine chips for pellet production. Our variable cutting tools provide numerous possibilities for a fast retrofitting of your saw line so that you can always meet the changing market conditions.

**LINCK profiling lines
convince in every respect:**

- High cutting volumes by well-engineered technologies
- High availability by particularly sturdy and solid design
- Modular design offers the possibility for any combination
- Versatile saw line control by LINCK-owned technology
- High in-house manufacturing and know-how
 - Optimum linking of mechanics, controls and software
 - Log-related cutting patterns
 - Control and manufacturing according to any parameters such as dimension, quality and added value





PLANT CONTROL

To make optimal use of our high performance saw lines, we develop and program our own control and automation concepts raising the capability of our profiling lines to a new productivity level.



The well-established LINCK team consisting of experienced project engineers for machine design, electronic controls and software programming takes care that not only the saw lines but also the electric and electronic controls meet the customers' requirements.

Perfectly developed for market and customer requirements, our electrical plant controls convince by a multitude of application possibilities and high-quality workmanship. Only high-performance and high-quality components of well-respected suppliers are used and dimensioned for a reliable operation with sufficient spare capacity. So that your saw line operates safely and of course with high availability.

Basis for achieving maximum recovery is the use of 3D-scanners. The software takes the measuring results for calculating thousands of options in fractions of a second and decides for the optimum cutting pattern. So that you can make use of all possibilities your saw line is offering you at any time.

Entrance scanning



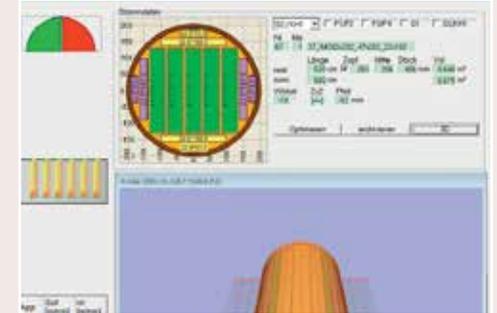
- Scanning of round logs
- Calculation of rotating angle
- Verification whether the log suits the predetermined cutting pattern
- Determination of added-value sideboards (saw line with sideboard optimization)
- Definition of cutting pattern (saw line with full optimization)

Control panel



- Intuitive operating concept
- Ergonomical workplace
- Short training period
- Plain text error message for fast and uncomplicated troubleshooting
- Access for remote maintenance

User interface



- Clear structuring for fast overview
- Extensive statistical data
- All important data at a glance
- In the corresponding national language

Cant scanning



- Measuring of all surfaces
- Reoptimization of sideboards
- Comparison and control with entrance scanning

Safety

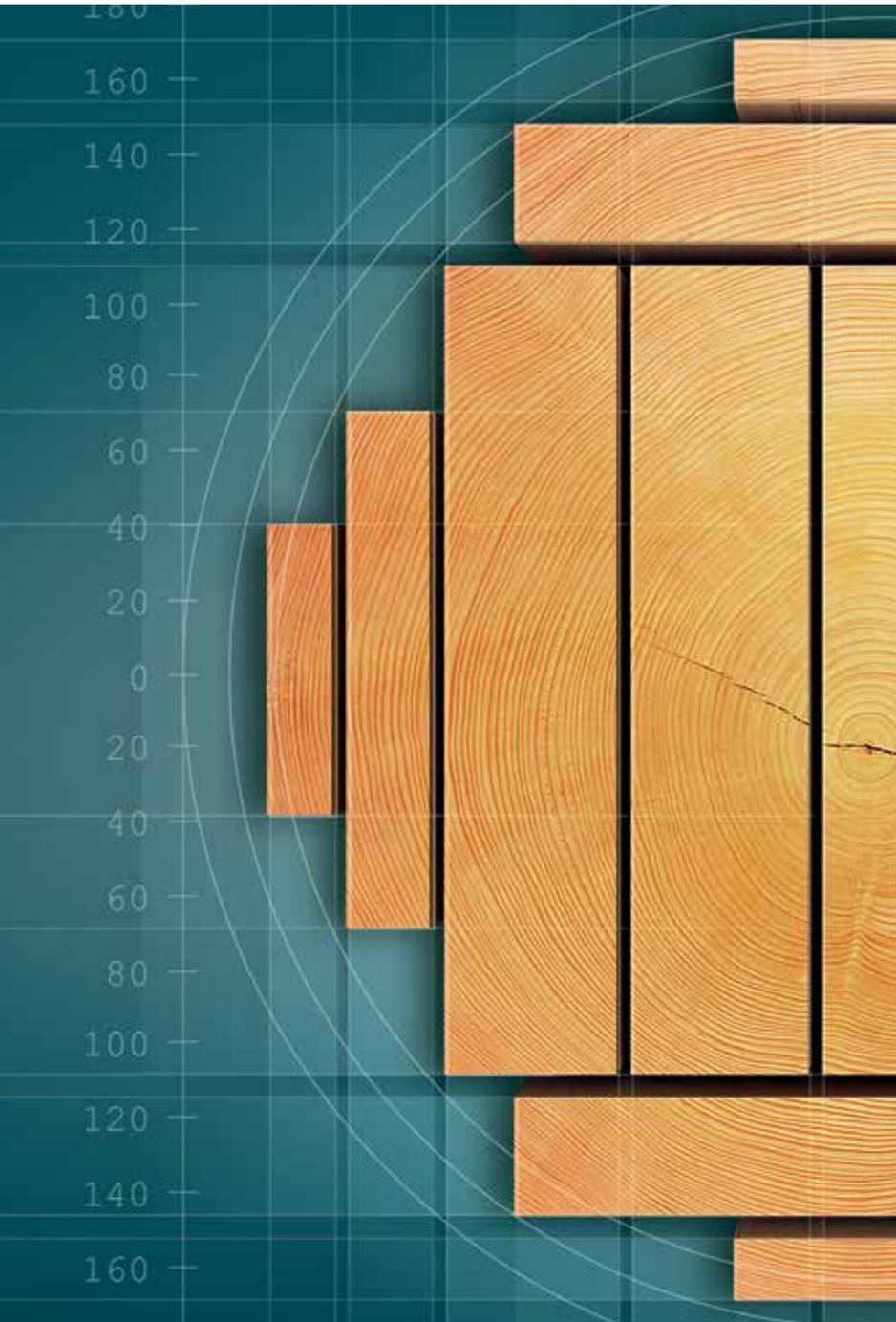


- Individual safety concept meeting the corresponding regulations
- Certified methodology

Switch and control plants



- In-house switch cabinet manufacture
- 100% test in our laboratory prior to supply



OPTIMIZATION

Wood is a precious natural product which we treat with respect. Against this background we looked for and found technical solutions for processing logs to get the most valuable products from each log.

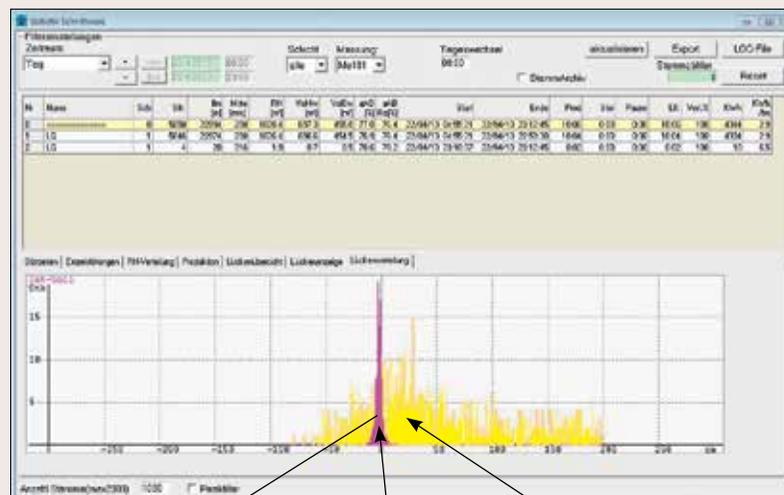
Always striving for perfection, we configure each plant and component in a way that optimum recovery is guaranteed with each log quality. This added value is a feature of every LINCK plant.

Log gap optimization

The even distance between logs in front of the first chipper canter plays an important role in the production process. In case the log gap is too small, the plant switches over to stop-and-go operation leading to an unnecessary high mechanical load.

A too large gap between the logs reduces the cutting volume resulting in uneconomical non-productive periods. Our software confronts this problem. Log gaps are of course also set by mechanical components such as conveying equipment, feed rollers etc.

The gap is automatically adjusted to guarantee a smooth and continuous production flow.



Optimum gap

Log gap distribution optimized

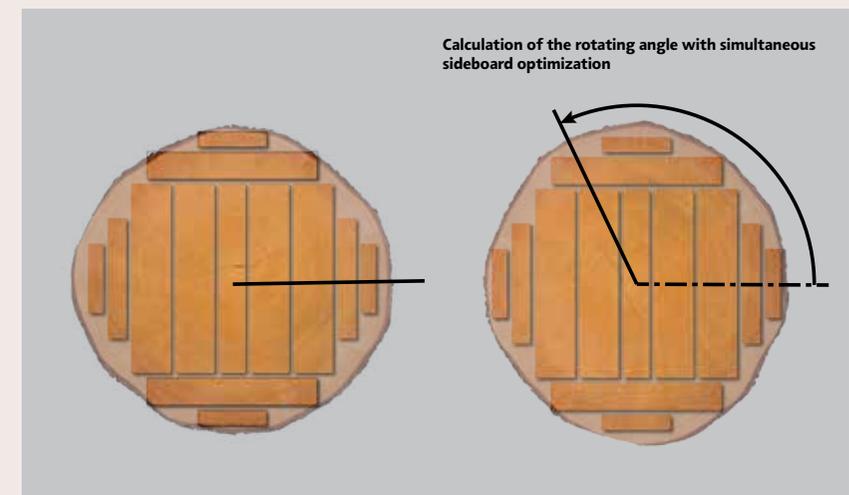
Log gap distribution standard

Log rotation

No log is like any other, deviations in shape, i.e. ovality and curve, make each log unique. In order to achieve maximum recovery, the cutting pattern, however, has to be specifically placed into the log.

A model is therefore generated based on the data from the 3D-scanner which is then turned around the cutting pattern until it has reached its optimum position. At the same time it is possible to collect the sideboard dimensions with the highest added value or even to set up the whole cutting pattern from the stored board dimensions.

An angle is determined around which the log has to be rotated. This high-precision rotation is then carried out in the chipper canter infeed system. All calculation algorithms are optimized for high throughput and proceed during normal passage without reducing capacity.



Log position during scanning

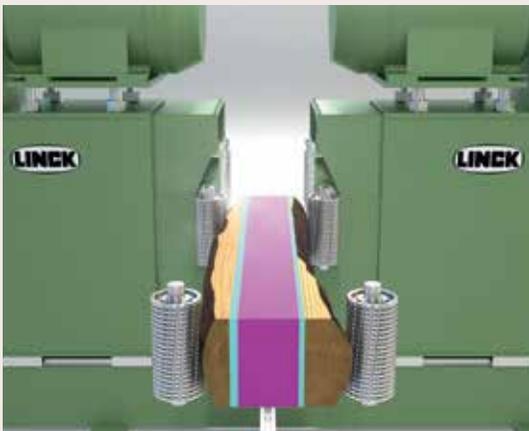
Optimum log position for maximum recovery

Diagonal alignment

Considerable recovery increase with little effort is achieved by diagonally aligning the two-sided cant prior to its second pass through the chipper canter.

A split centering of curved cants in front of the secondary chipper canter may result in a relatively small four-sided cant. A diagonal alignment of the cant however can consider the log curvature and the volume increase by taper in order to increase recovery.

Based on the 3D-data it is possible to determine the optimum position of the four-sided cant in the two-sided one and to calculate the roller positions in the infeed system in front of the secondary chipper canter. Lateral positioning of the roller pairs is carried out by means of hydraulic servo cylinders without reducing throughput.

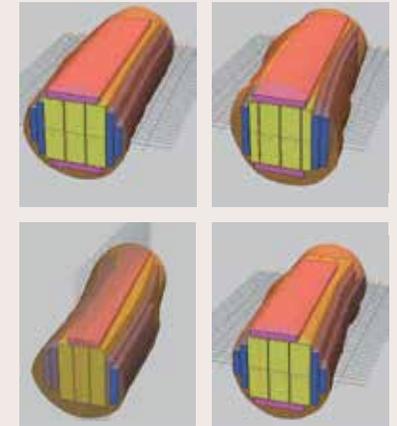


Pink: Four-sided cant width with split taper centering
Turquoise: Effect of the diagonal alignment

Sideboard optimization

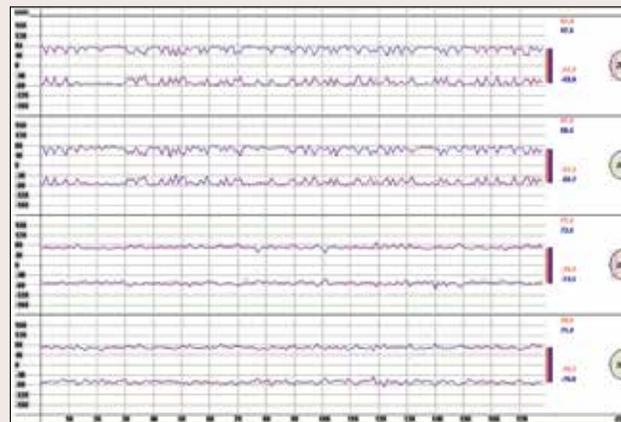
The optimizing program uses the 3D-data from the entrance scanner for determining the optimum sideboard thickness, width and position. The permitted dimensions are taken from a table edited by the operator which also includes values. Additional data such as permitted percentage of wane and cutting lengths are also used for determining dimensions. Value optimized sideboards are the result. The sideboards on the left- and right-hand side can of course differ in dimension, location and in number.

The data from the entrance scanner already supply precise results. More precise data is supplied by the second scanning system measuring the surfaces of the four-sided cant. In addition to calculating the sideboards, the results of the entrance scanner are verified.

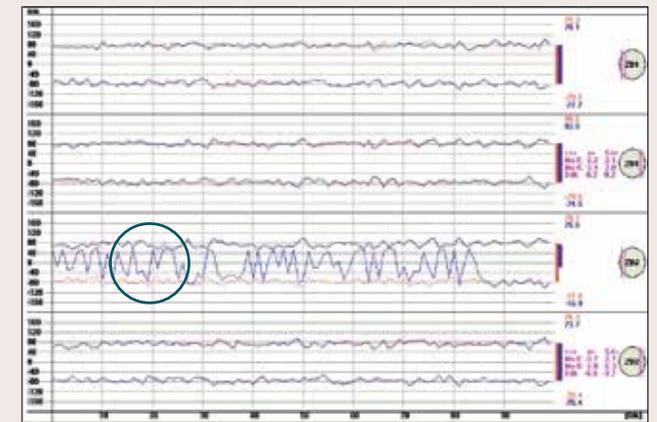


Stk	Stärke [mm]	Breite [mm]	Stärke [mm]	Breite [mm]	Nr. 1	Nr. 2	abst. [mm]	max. [mm]	Lst 1 [mm]	Plt 1 [mm]	Lst 2 [mm]	Plt 2 [mm]
1	20.0	82.0	19.0	90.0	7	7	276	300	218			
2	20.0	164.0	19.0	170.0	7	7	250	300	218			
3	23.5	82.0	22.0	90.0	7	7	276	300	218			
4	23.5	164.0	22.0	170.0	7	7	250	300	218			
5	23.5	126.0	22.0	130.0	6	6	292	300	218			
6	32.0	130.0	32.0	130.0	15	15	276	275	300			
7	32.0	198.0	32.0	198.0	15	15	250	275	300	1200		
8	49.0	164.0	47.0	164.0	3	3	132	275	1300	300	1600	
9	49.0	130.0	47.0	125.0	3	3	132	275	1300	300	1400	

Example for a table with sideboard assortments. The basic structure is set project-related; the plant operator can adapt the contents to market conditions at any time.



The online diagnostic system compares data from the entrance scanner with the ones from the cant scanner. The illustration shows standard deviations.



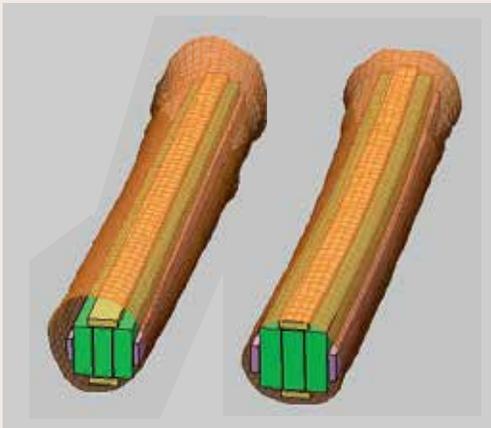
A message is sent to the operator in case a measuring point shows significant deviations.

Curve sawing

A considerable recovery increase can be achieved by curve resawing.

The log on the left in the graphical display is processed with split taper centering; the log on the right shows the considerably higher recovery when being sawn along its curvature.

Curve sawing is active, i.e. sawing is not done along the curvature of the log, but along a freely defined run that may contain straight and curved parts.



Additional recovery by utilization of curvature, ovality and taper

Work steps

- 3D-scanning
- Cutting pattern definition
- Automatic log rotation in the infeed system of the primary chipper canter
- Production of a two-sided cant (straight sawing)
- 90° turning of the two-sided cant
- Curve resawing in the secondary chipper canter. The chipper canter itself is fixed; the curvature is followed by feeding systems leading to short setting times by not having to move heavy masses.
- Re-optimization of all sideboards based on the 3D-scanning of the four-sided cant
- After additional 90° turning: Profiling of primary sideboards (straight)
- Sawing and separating of primary sideboards
- Turning and curve profiling of secondary sideboards. The profiling units are fixed; curvature is followed by the feeding units.
- Curve splitting of main products and sawing of secondary sideboards in a separate machine group
- Separation of sideboards

Full optimization

The supreme discipline of the LINCK profiling technology: Instead of using predetermined cutting patterns, each log is processed according to its individually calculated cutting pattern.

You enter the board dimensions, the plant is doing the rest: Logs can be fed unsorted and in any order.

Main product and sideboard dimensions are stored in editable tables with the corresponding value and are the basis for calculation. Using additional scanning systems makes it possible to consider even heart- and sapwood as well as position of heart and knots.

Result: Highest added value guaranteed.



THE CLASSICAL

Chipping - Turning - Chipping

More than 30 years after its introduction on the market, this basic configuration has been and still is the most economical method for producing lumber. It is therefore subject to continuous development and adaptation to market requirements. After having passed two chipper canter, the log has been transferred into a four-sided cant from which sideboards are profiled, sawn and separated in an additional machine group. While sideboards are being transported to the sorting plant, the four-sided cant is fed to the following machine group after having been turned by 90°. Here again sideboards are produced and separated. The center cant is simultaneously split into various products.

Examples for extended possibilities:

- Installation of a horizontal split saw for producing quarter timber
- Installation of a second resaw for processing large diameter logs
- Line concepts for vertical grain cut

KEY DATA

Feed speed	up to 180 m/min
Operating mode	processing of sorted/unsorted logs
Log length	from 2,40 m on
Small end diameter	from 10 cm on
Optimizing possibilities	<ul style="list-style-type: none"> ■ automatic log rotation ■ diagonal alignment of two-sided cants ■ sideboard optimization
Number of sideboards	max. 8 (special design up to 10)
Log feeding	either large or small end first: logs can be fed with small or large end first

The basis for many other options



1 3D-scanner
Round log scanning



2 Chipper canter VM45
Opening of two log faces,
production of two-sided
cants and chips



3 Cant turner DV 70-2
90° turning of two-sided
cants

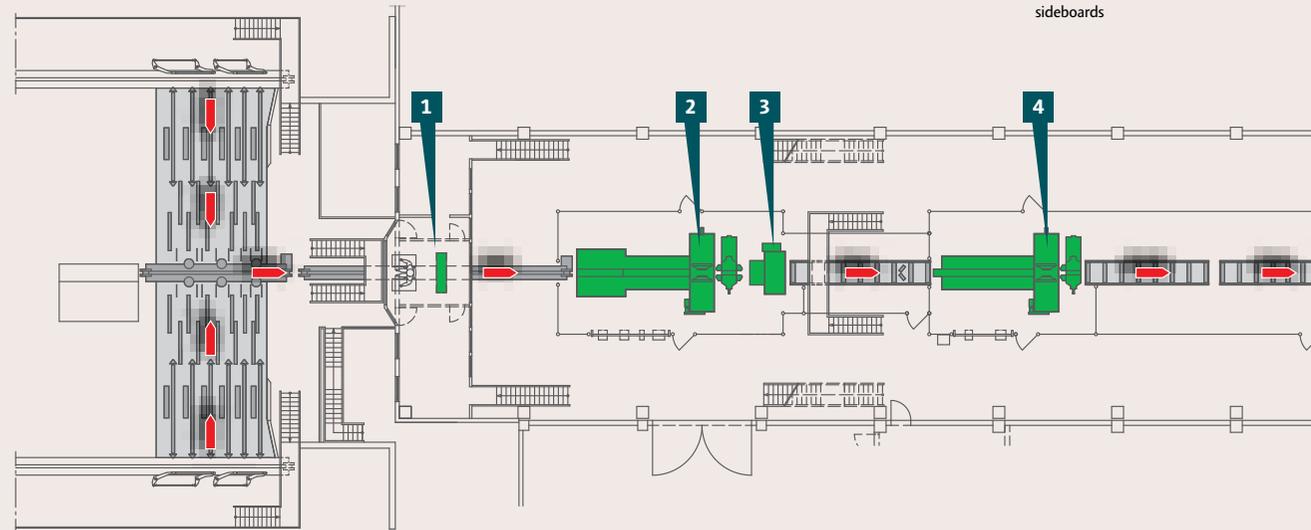


4 Chipper canter VM45
Opening of two faces,
production of four-sided
cants and chips



5 6 Profiler unit VPF 340
Profiling of two sideboards

7 Saw unit CSMK 285-A1/B1
Resawing of two-sided
cants, production of
four-sided cants and
sideboards





8 Separating conveyor SEA
Sideboard separation



9 Cant turner DV 70-2
90° turning of four-sided cants



10 11 Profiler unit VPF 340
Profiling of two sideboards

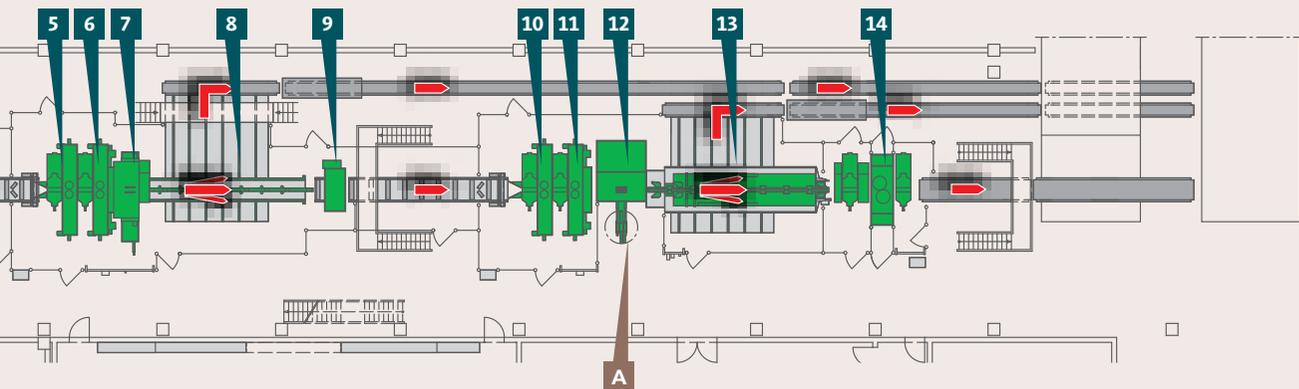


13 Separating conveyor SEV
Sideboard separation

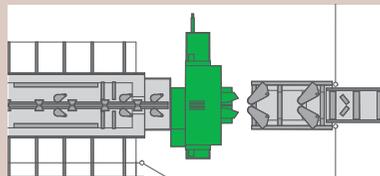


14 Horizontal split saw HKM 360-A2
Horizontal splitting of main products

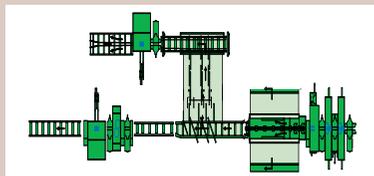
12 Double arbor circular saw MKS
Resawing of four-sided cants, production of boards, planks and sideboards



Option



A Saw for producing quarter timbers
More flexibility with a circular resaw CSMK: Instead of the MKS with fixed saw sleeve, the CSMK can be equipped with up to 6 adjustable tool axes which makes it possible to achieve 7 variable products.



Resaws
Two resaws placed parallel to each other allow a high throughput even with large diameter logs.



CURVE SAWING

For more lumber

The two-sided cant is fed through the secondary chipper canter and the following machines along its curvature.

The data from the 3D-scanner are used for precisely calculating the curvature which can include straight or curved sections. It is possible to consider and continuously develop all technically and mechanically possible solutions.

Curve sawing however does not make sense for certain products such as e.g. large cross section main products. In this case, either the optimizing program or the operator can independently decide whether a diagonal or a center alignment of the two-sided cant will be of advantage.

The portrayed saw line is designed for processing unsorted logs. This means that the optimum cutting pattern is chosen for each individual log from an inventory.

KEY DATA

Feed speed	up to 180 m/min
Operating mode	processing of sorted/unsorted logs
Log length	from 2,40 m on
Small end diameter	from 10 cm on
Large end diameter	up to 50 cm
Optimizing possibilities	<ul style="list-style-type: none"> ■ automatic log rotation ■ diagonal alignment of two-sided cants ■ sideboard optimization ■ curve resawing
Number of sideboards	max. 6 (special design up to 10)
Log feeding	either large or small end first

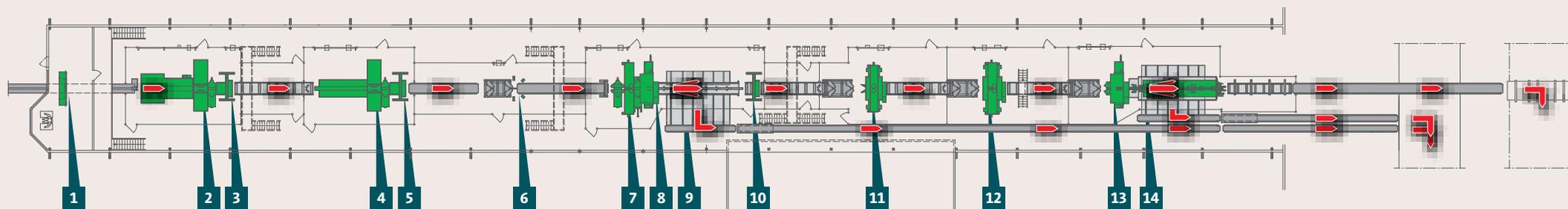


Four-sided cant with four profiled sideboards just before separation: Sideboards are transported to the sorting plant; the four-sided cant is split into main products.



Short setting times and therefore small log gaps are possible by aligning the log and not the heavier machines according to curvature. There is no difference in log gap between curve and straight sawing.

Full recovery



1 3D-scanner
Round log scanning



2 Chipper canter VM 45
Opening of two log faces,
production of two-sided
cants and chips



3 Cant turner DV 70
90° turning of two-sided
cants



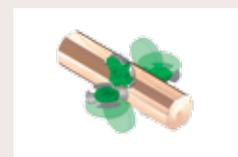
4 Chipper canter VM 45
Opening of two faces, pro-
duction of four-sided
cants and chips



5 Cant turner DV 70
90° turning of four-sided
cants



6 Cant scanner
Sideboard reoptimization



7 Profiler unit VPM 450
Profiling of two sideboards



8 Saw unit CSMK 285-A1/B1
Resawing of two-sided cants,
production of four-sided
cants and sideboards



9 Separating conveyor SEB
Sideboard separation



10 Sideboard separation
90° turning of four-sided
cants



11 Profiler unit VPM 450
Profiling of two sideboards



12 Profiler unit VPM 450
Profiling of two sideboards



13 Saw unit CSMK 285-A3/B3
Resawing of four-sided
cants, production of boards,
planks and sideboards



14 Separating conveyor SEV
Sideboard separation

PROFILING WITH MERRY-GO-ROUND SYSTEM

For smaller processing capacities

This type of sawline allows using the profiling technology profitably even for smaller processing capacities that means sideboards can already be profiled on the two-sided cant in the breakdown machine.

After having produced a two-sided cant in the chipper canter, up to two sideboards are profiled with two profiler units VPM 450/N on both sides of the cant. These sideboards must not necessarily be produced parallel to the cant support; to achieve a higher recovery, it is also possible to produce the boards diagonally. This is achieved by tiltable tool units in the profiling units.

The following saw unit saws off and separates the sideboards from the two-sided cant which is then returned to the chipper canter by means of a merry-go-round system for producing a four-sided cant. This cant can either be produced with straight or curve sawing.

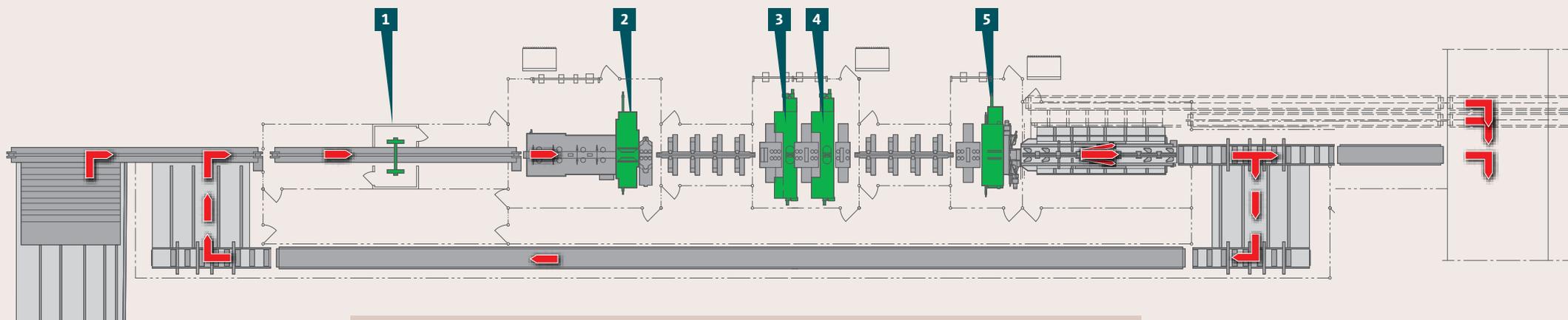
Up to four sideboards can again be produced with the two profiling units VPM 450/N which are then sawn off and separated by the following saw unit.

KEY DATA

Operating mode	processing of unsorted logs
Log length	from 2,40 m on
Small end diameter	15 cm - 50 cm
Optimizing possibilities	<ul style="list-style-type: none"> ■ automatic log rotation ■ diagonal alignment of two-sided cants ■ curve resawing ■ sideboard optimization
Number of sideboards	max. 8
Log feeding	either large or small end first



Sawline for processing 100.000 m³ of round logs



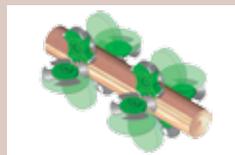
First pass



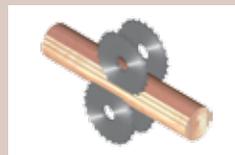
1 3D-scanner
Round log scanning



2 Chipper canter VM 45
Opening of two log faces,
production of two-sided
cants and chips



3 4 Profiler unit VPM 450/N
Profiling of two sideboards



5 Saw unit CSMK 285-A2/B2
Resawing of two-sided cants,
production of four-sided
cants and sideboards

Second pass



1 3D-scanner
Cant scanning



2 Chipper canter VM 45
Resawing of two-sided cants,
production of four-sided
cants and chips



3 4 Profiler unit VPM 450/N
Profiling of two sideboards



5 Saw unit CSMK 285-A2/B2
Resawing of four-sided cants,
production of four-sided
cants and sideboards

IDEAL FOR SHORT LOGS

Specialized for producing packaging material

Even logs of inferior quality, e.g. heavily crooked logs, can be handled economically in case they are processed in short lengths. This sawline completely operates with machines for processing 1,20-2,50 m long logs. Guide rollers are arranged directly in front and behind the tools to always guarantee a reliable guiding of the log during operation.

After having passed the two chipper canters, a total of up to four sideboards can be produced, separated and directly fed to two stacking plants. A split saw is used for splitting the four-sided cant into two products which are then distributed to two rip saws. The board packages are then directly transferred as a whole to two stacking plants. Alternatively the boards can also be transferred to sorting plants.

KEY DATA

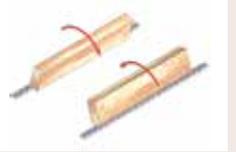
Feed speed	up to 100 m/min
Operating mode	processing of sorted logs
Log length	from 1,20 m on
Small end diameter	10 cm - 40 cm
Optimizing possibilities	■ none
Number of sideboards	max. 4
Log feeding	either large or small end first

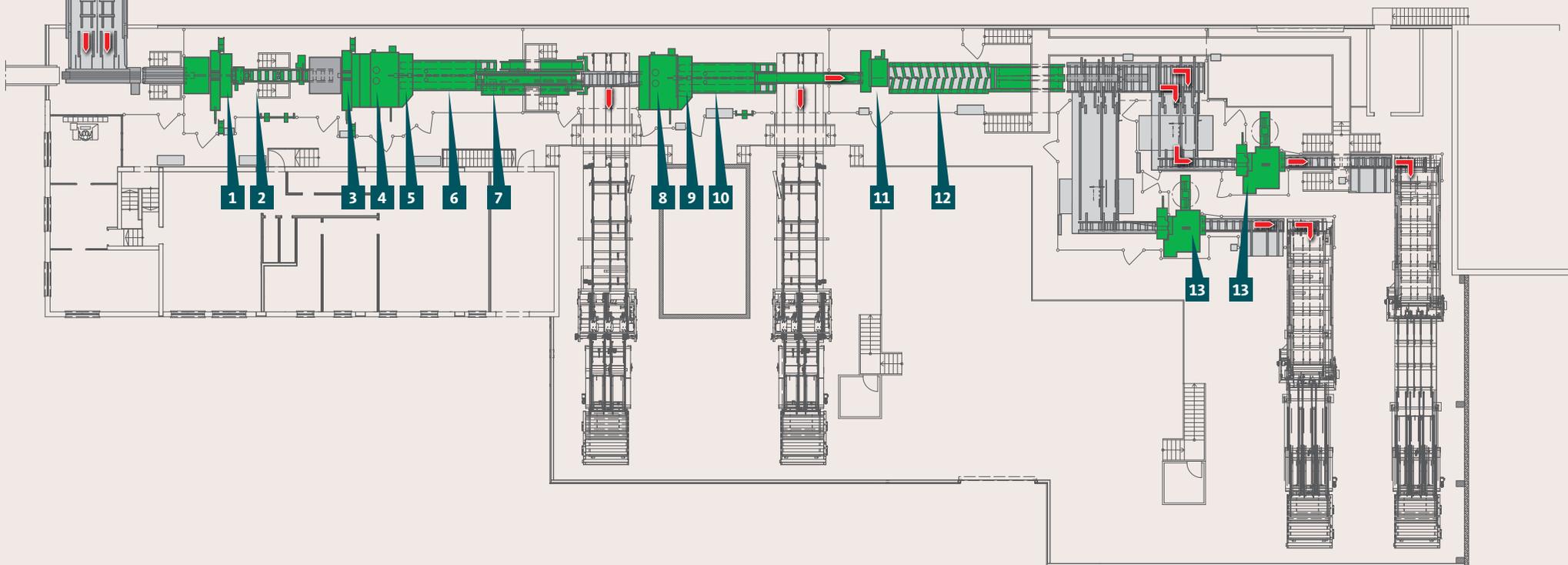


Logs with a length from 1,20 m on can be processed in this type of profiling line. Logs are fed with a length of 2,50 m and cut with a bucking saw in the middle. When producing 2,50 m long products, the bucking saw and the wedge separator will be moved out of working position.

The four-sided cants are distributed to two resaws and trimmed to final length in the cross transport. The trim saws can be adjusted for producing different lengths.

Efficient production from 1,20 m length on

- | | | | | | | |
|--|---|---|---|---|--|---|
|  |  |  |  |  |  |  |
| 1 Chipper canter VM 35
Opening of two log faces, production of two-sided cants and chips | 2 Cant turner DVS 35
90° turning of two-sided cants | 3 Chipper canter VM 35
Opening of two faces, production of four-sided cants and chips | 4 Profiler and saw unit VPS 35
Profiling and sawing of two sideboards | 5 Profiler and saw unit VPS 35
Profiling and sawing of two sideboards | 6 Separating conveyor SES 35
Sideboard separation | 7 Four-sided cant turner
90° turning of four-sided cants |
|  |  |  |  |  |  | |
| 8 Profiler and saw unit VPS 35
Profiling and sawing of two sideboards | 9 Profiler and saw unit VPS 35
Profiling and sawing of two sideboards | 10 Separating conveyor SES 35
Sideboard separation | 11 Circular split saw TS 35
Splitting of four-sided cants | 12 Four-sided cant turner
90° turning of four-sided cants | 13 Saw unit CSMK 225-A1
Resawing of four-sided cants, production of sideboards | |



FULL OPTIMIZATION

Automatic detection and evaluation of core- and sapwood

The value optimized cutting pattern is calculated after having measured the log. Dimensions and value are taken from a user-defined table where the value can be entered depending on the position in the log (area of heart or sap).

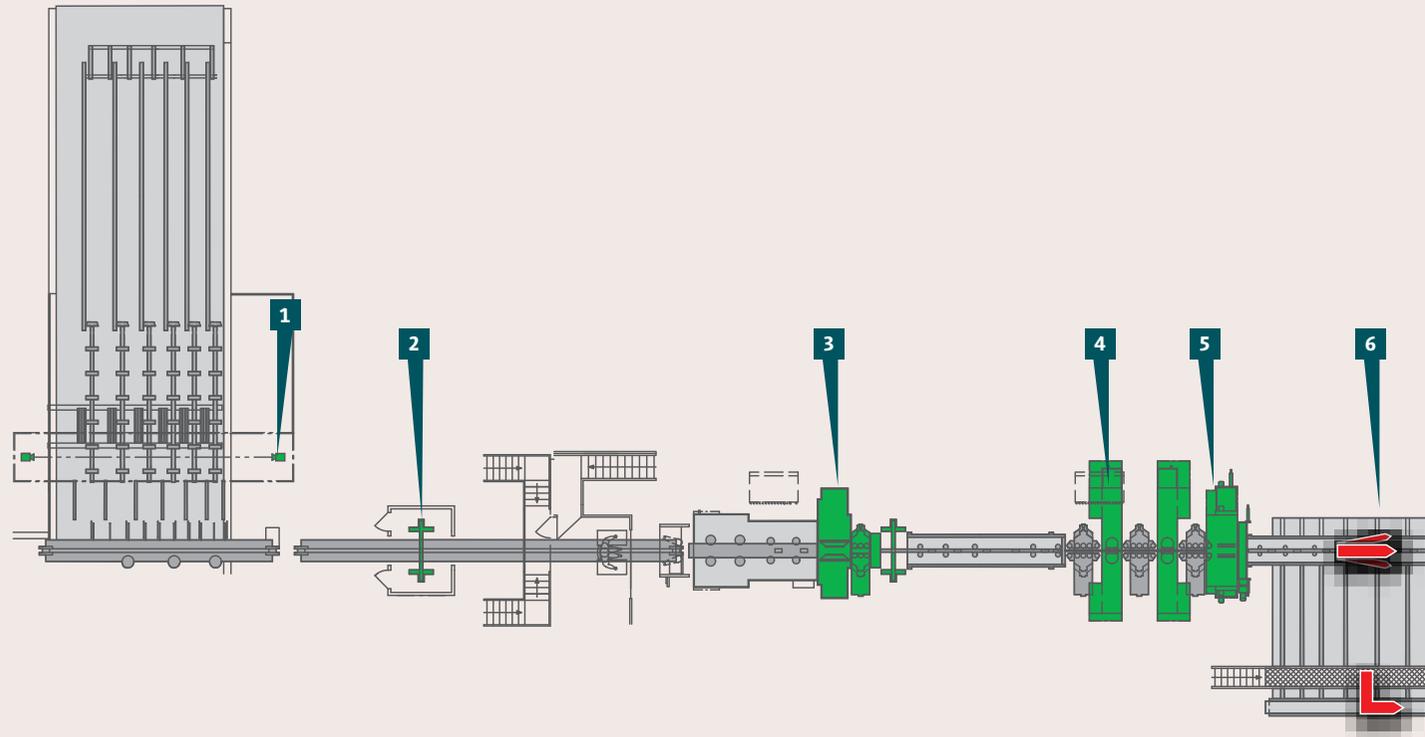
Already after the first chipper canter, a maximum of two sideboards can be profiled and sawn off on both, the right- and left-hand side of the cant. This is possible by the profiler unit VPM/N whose profiler heads can be shifted diagonally to the cant support. After having turned and processed the two-sided cant in the secondary chipper canter, the following machine group again profiles up to two sideboards per side, this time following the curve.

This process achieves maximum recovery with a shorter overall length compared with sawlines producing sideboards after the second chipper canter only.

KEY DATA

Feed speed	up to 180 m/min
Operating mode	processing of unsorted logs
Log length	from 2,40 m on
Small end diameter	15 cm - 50 cm
Optimizing possibilities	<ul style="list-style-type: none"> ■ automatic log rotation ■ diagonal cant alignment ■ curve resawing ■ sideboard optimization ■ full optimization
Number of sideboards	max. 8
Log feeding	large end first

Everything possible for maximum proceeds



1 Scanner
Scanning of the front ends



2 3D-scanner
Round log scanning



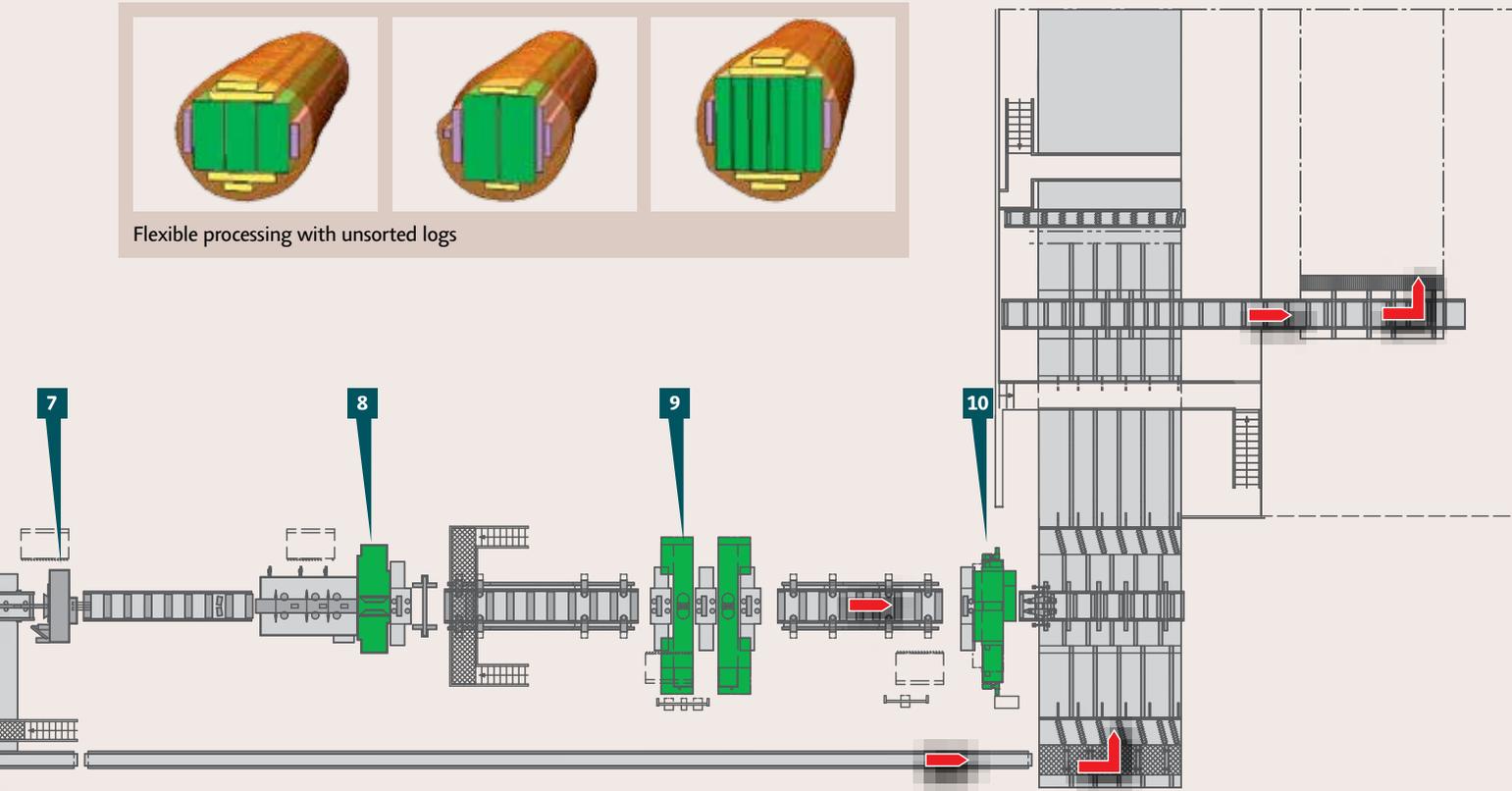
3 Chipper canter VM 45
Opening of two log faces, production of two-sided cants and chips



4 2x Profiler unit VPM 450/N
Profiling of two sideboards diagonal to the cant support



5 Saw unit CSMK 375-A2/B2
Log resawing, production of two-sided cants and sideboards



6 Separating conveyor SEA
Sideboard separation



7 Cant turner DV 56-1
90° cant turning



8 Chipper canter VM 45
Resawing of two-sided cants,
production of four-sided
cants and chips



9 2x Profiler unit VPM 450/5
Profiling of two sideboards



10 Saw unit CSMK 325-A3/B3
Resawing of four-sided cants,
production of boards, planks
and sideboards



REDUCER LINE WITH SECONDARY PROFILING

Value optimized processing even with misshaped logs

Up to four sideboards are separated after the first chipper canter. They are then optimized in the board edger plant where a split saw can produce several products. Following the second chipper canter, working along the curve, sideboards can also be separated from the four-sided cant for a second board edger plant where a vertical grain cut is possible.

The U-type arrangement of the profiling line is now reversing the feeding direction of the logs. After having been fed through the chipper canter and sideboard saws small end first, they are now transported through the curve sawing secondary profiling machines large end first. Two profiler units and a double arbor circular saw with fixed saw sleeves are installed. The double arbor circular saw splits the main products and saws off the sideboards in one working process. A horizontal split saw is installed for producing quarter timber.

KEY DATA

Feed speed	up to 130 m/min
Operating mode	processing of unsorted logs (presorting via three sorting decks)
Log length	from 2,40 m
Small end diameter	15 cm - 50 cm
Optimizing possibilities	<ul style="list-style-type: none"> ■ automatic log rotation ■ diagonal cant alignment ■ curve resawing ■ sideboard optimization
Number of sideboards	max. 6 unedged (primary machines) max. 4 profiled (secondary machines)
Log feeding	small end first

Reducing in the primary, profiling in the secondary machine group



1 3D-scanner
Round log scanning



2 Chipper canter VM 50
Opening of two log faces,
production of two-sided
cants and chips



4 Separating conveyor SEA
Sideboard separation

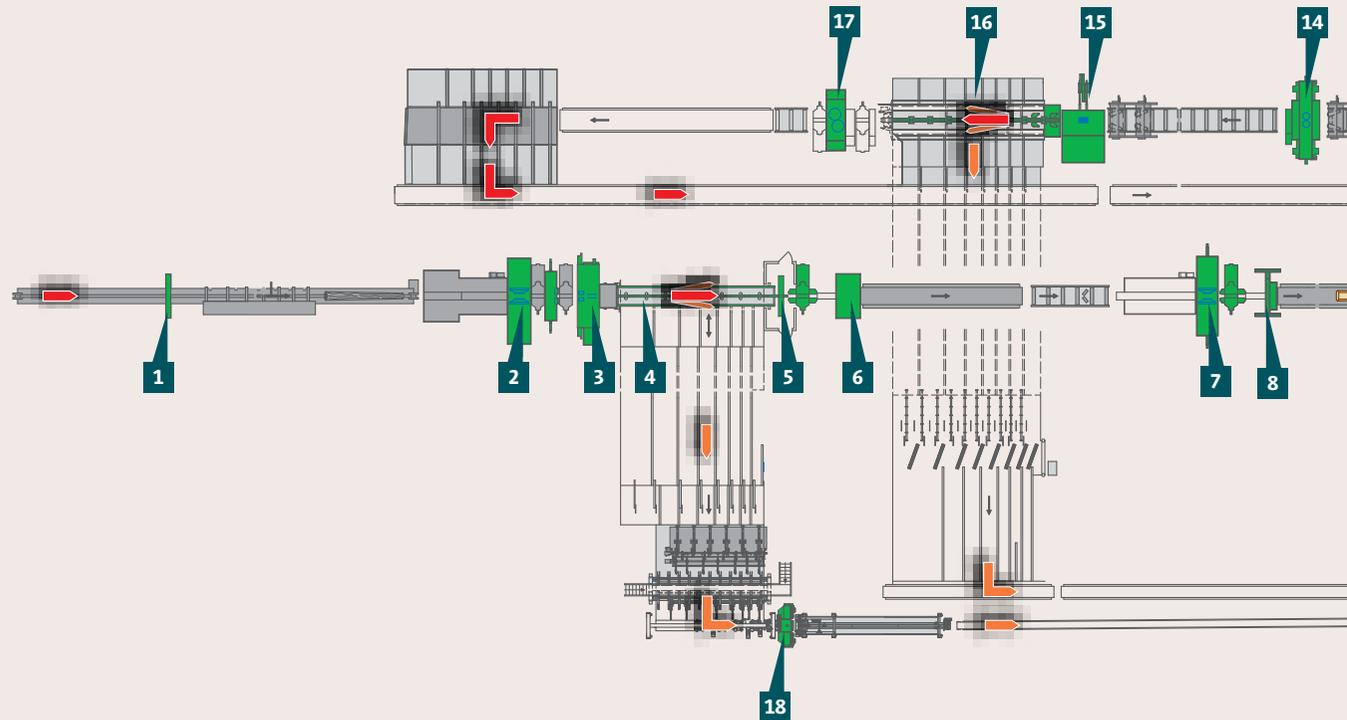


5 Two-sided cant scanner
Sideboard re-optimization



6 Cant turner DV 90
90° cant turning

3 Saw unit CSMK 375-A1/B1
Resawing of two-sided cants,
production of two-sided
cants and sideboards





7 Chipper canter VM 50
Sawing of two-sided cants, production of four-sided cants and chips



8 Cant turner DV 70
90° cant turning



9 Saw unit CSMK 375-A2/B2
Resawing of four-sided cants, production of four-sided cants and sideboards



10 Separating conveyor SEB
Sideboard separation



11 Cant turner DV 70
90° cant turning



12 Four-sided cant scanner
Sideboard re-optimization



13 Profiler unit VPF 340
Profiling of two sideboards



14 Profiler unit VPF 340
Profiling of two sideboards



15 Double arbor circular saw MKS
Resawing of four-sided cants, production of boards, planks and sideboards



16 Separating conveyor SEV
Sideboard separation



17 Horizontal split saw HKM 360-A1
Horizontal splitting of main products



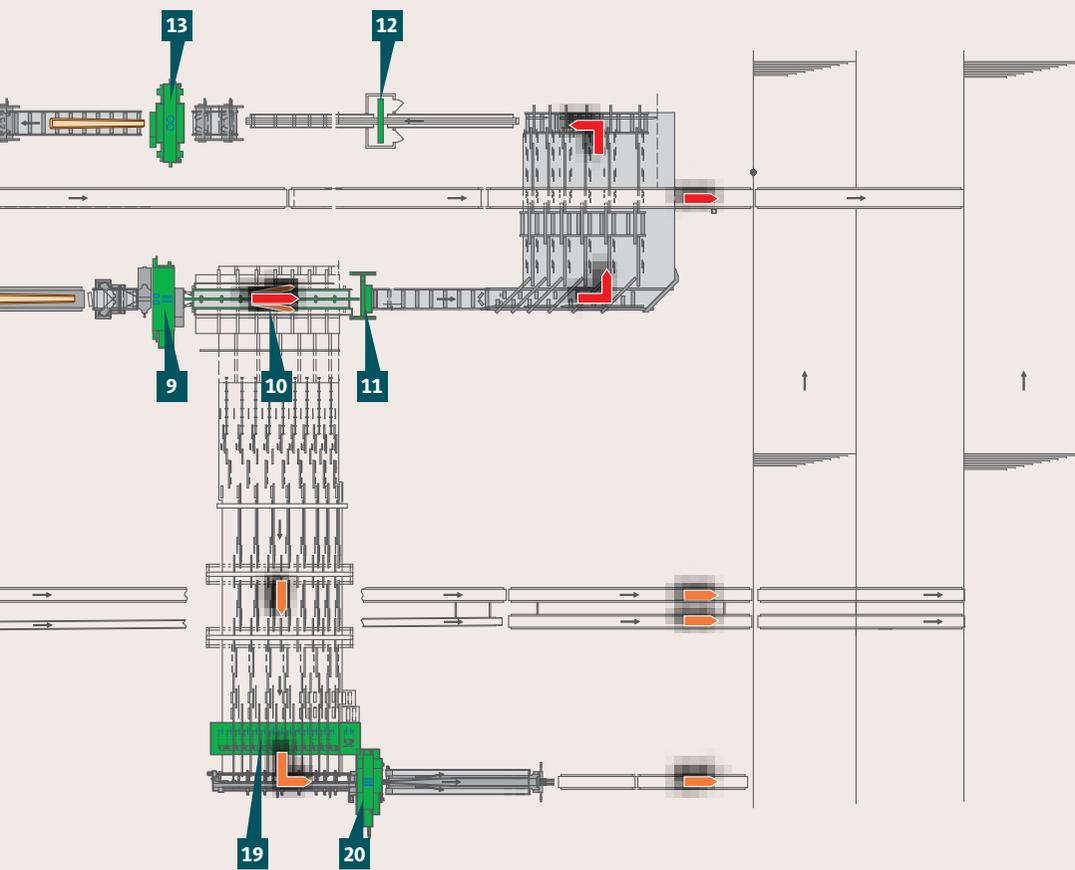
18 Board edger
Edging of sideboards



19 Trim saw
Trimming of sideboards to length



20 Board edger CSM 80-A3/B3
Edging of sideboards





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