**Table of content**

### 1. Basic terms
- 1.1 Overview of 3D menus
- 1.2 Overview of 2D plane menus
- 1.2.1 The three-button mouse
- 1.2.2 The mouse with wheel
- 1.2.3 The cursor (basic settings)
- 1.3 Activating
- 1.4 Difference between point and cursor position

### 2. Basic elements
- 2.1 Node
- 2.2 Line
- 2.3 Axis
- 2.4 Surface
- 2.5 Beam
- 2.6 Auxiliary element
- 2.7 Rotation element
- 2.8 Export solid
- 2.9 Container
- 2.10 Architecture
- 2.11 Catalog
- 2.12 Variant
- 2.13 Files
- 2.14 Element module
- 2.15 Roof parts
- 2.16 Roof Pro
- 2.17 Stairs
- 2.18 Spline

### 3. Windows menu
- 3.1 File
- 3.2 Edit
- 3.3 Extra
- 3.4 Help

### 4. Status row
- 4.1 User
- 4.2 HVA
- 4.3 Material
- 4.4 Units

If the cursor is located on top of a menu point and a question mark is attached to the cursor, instant help graphics are available. Click "shift + ?" to visualize the graphics. The functions can be selected by selecting the appropriate graphics. This option is only available if the User "Help" function in the status row is active.
5. **Right menu**
5.1 Undo/Redo
5.2 Activate attribute
5.3 Add
5.4 Delete
5.5.1 Copy
5.5.2 Copy, Rotate
5.5.3 Copy, Symmetry
5.5.4 Copy, Rotate + move
5.6 Move
5.7 Join
5.8 Separate
5.9 Stretch
5.10 Modify
5.11 Cut
5.12.1 Auxiliary lines in 3D
5.12.2 Auxiliary lines in a 2D Plane
5.13 Export (Shop drawing, List, Files, etc.)

6. **Left menu**
6.1 2D-Plane
6.2 Per = Perspective (define perspective views)
6.3 Axo = Axonometric view
6.4 V1 - V4 = Views (save and open views)
6.5 X,Y,Z,A (define view parallel to the axes)
6.6 Dynamic rotation und zoom
6.7 Hidden lines (generate hidden line view)
6.8 Open-GL (generate shaded mode)
6.9 Lasso = Lasso points
6.10 M1 - M8 / M-Auto (save and open view modes)
6.11 Zoom (increase/decrease size of views on screen)
6.12 Vision (modify vision settings for element attributes)
6.13 Settings (modify user settings)
6.14 Measure (measure angle, length, area, volume, weight, etc.)
1. Basic terms

1.1.1 Overview of 3D menus

After starting the program, the menu containing auxiliary functions will be displayed on the left and the editing functions on the right side of the monitor. The auxiliary functions are available at anytime. All functions are accessible with the mouse. A comment line at the bottom left of the monitor indicates what to do next.
1.1.2 Overview of 2D plane menus

Screen after opening a 2D plane:

After opening a 2D plane ("2D-Plane" in menu), the menus are adjusted to a different configuration based on the requirements for working in a 2D plane. (see above). By selecting "3D" in the left menu, it is possible to return to the 3D menus. Most functions are identical in the two modes.

1. **User:** User type (sets menu layout)
2. **HVA:** Back/Front/Axis: controls how elements are added in reference to a plane
3. **Material:** Display material or modify material list by clicking with (L) (see 4.3)
4. **Units:** Current lengths and angle units with (L) modifiable (see 4.4)
1.2.1 The three-button mouse

The cursor is driven by the mouse. In this manual, the three mouse buttons are named with (L) for left button, (M) for middle button and (R) for right button. The current meanings of each mouse button are displayed in the comment row.

**Cursor in right menu:**

In the right menu, the cursor has a rectangular shape.

**LEFT BUTTON (L)**

- = Select menu

Example: Menu "Copy" (see 5.5.1)

**RIGHT BUTTON (R)**

- = Return

The right mouse button can be used to go back one level in the active menu.

**Cursor in graphic window:**

In the graphic window, the cursor is represented with crosshairs. The settings can be changed between 2D or 3D crosshairs.

**Mouse button functions:**

- see chapters 1.3 and 1.4

Note: By pressing the "Ctrl" key and clicking the mouse button (L) simultaneously, the middle mouse button functions can be executed on a two-button mouse.
1.2.2 The mouse with wheel

If your mouse has a wheel, besides replacing all the functions that the middle mouse button is used for, more functions are possible. Examples are zooming, rotating, and panning. Be sure, however, that the system configuration for the mouse wheel is set to be the middle mouse button.

Zoom:
When no other keys are pressed, you can zoom with the mouse wheel. The cursor position is the center of where the screen will zoom. You can also zoom by pressing the "+" and "-" keys.

Pan (vertical)
Press the Shift key simultaneously in order to pan up and down with the mouse wheel. The same can be done by using only the arrow keys.

Pan (horizontal)
Press the Ctrl key simultaneously in order to pan left and right with the mouse wheel. The same can be done using only the arrow keys.

Rotate (vertical)
Press the Alt key simultaneously in order to rotate vertically with the mouse wheel. The same can be done using the Shift and arrow keys.

Rotate (horizontal)
Press the Ctrl key and Alt key simultaneously in order to rotate horizontally with the mouse wheel or with the arrow keys. The same can be done using the Shift and arrow keys.

Assigning the mouse button functions:
(configuration path: Windows Start -- > Settings -- > Control panel -- > Mouse )

!! Make sure that the middle button is defined as "middle button" !!
1.2.3 The cursor (basic settings)

The cursor (crosshairs) is a very important tool in cadwork to model or modify elements. Therefore several cursor settings can be made.

Path for basic cursor settings:
(See 1.3.-2 for crosshair settings)

```
Settings ➔ Options ➔ Adapt... ➔ Cursor menu...
```

The cursor is represented with 3D crosshairs. The X axis is displayed in red, the Y axis blue, and the Z axis green.

The crosshairs display a plane when specific functions are executed. The plane changes color to match that of the axis which it is perpendicular to. (Example: Copy -> Symmetry)

An arrow indicates the direction of rotation.

The cursor is a very important tool in cadwork to model or modify elements. Therefore several cursor settings can be made.

The menu button is enclosed by a white frame when the cursor hovers over it.

The menu button turns white when the cursor hovers over it.

The position of the cursor is visible when hovering over the menu buttons.

The cursor is represented with 2D crosshairs as in cadwork 2D.

The cursor is represented with 3D crosshairs. The X axis is displayed in red, the Y axis blue, and the Z axis green.

If this box is checked, the Z axis is faded in.

The crosshairs display a plane when specific functions are executed. The plane changes color to match that of the axis which it is perpendicular to. (Example: Copy -> Symmetry)

An arrow indicates the direction of rotation.
1.3 Activating

Terms:

Active point: The first point that is activated with the mouse button (L) becomes the "active point". The active point is the reference point when executing the "MOVE", "COPY", etc. functions. The active point is represented with a small square.

Active edge (active segment) The first edge that is activated with the mouse button (L) becomes the "active edge". The active point is placed at the nearest edge end. Active points and active edges are reference elements for different editing functions.

Mouse buttons: The (L)eft mouse button:
- Activates an element or a group. Either Points or edges of elements can be activated.
- By clicking on the same point twice, the program activates the next element with the same point.
- Disactivates all elements by clicking in a zone without elements.

The (M)iddle mouse button:
- Disactivates an already active element. Disactivating is also possible with the lasso function. By activating an element with (M), the glide function is initiated.

The (R)ight mouse button:
- Activates additional elements when an element or elements are already active. Activating is also possible with the lasso function.
- If an element is not active, the element information is displayed

Disactivate: By clicking in a zone without elements, all active elements will be disactivated.

Activate lasso: By holding down a mouse button and moving the cursor simultaneously, a rectangle is drawn on the screen. This is defined as a "lasso". Elements or element points (depending on the settings) found within this rectangle become active. (see 6.9)
1.3 Activating (continued)

Search radius of the cursor:
Cadwork locates the nearest point within approximately a 1 mm radius and snaps the cursor to this point.

Activating with a line:
By pressing "Shift" + "Ctrl" as well as the mouse buttons (L), (M) or (R), a line is drawn that can be used to activate or deactivate any elements that intersect with it.

Activating with a free lasso:
By pressing "Ctrl" + "Alt", a free lasso (polygon) can be generated. (L), (M) and (R) retain their functions as described in chapter 1.3 above.

1.4 Difference between point and cursor position
(in a 2D plane or in the X, Y, Z views)

(L)eft mouse button:
The points nearest to the position of the cursor when the button is clicked become active.

(M)iddle mouse button:
The points are placed at the exact position of the cursor when the button is clicked.

(R)ight mouse button:
Right = "Return" (i.e.: cancel a function)
Right = "Return" after entering a value or confirming to accept the default value for a Y/N question.
Right = "Modify" by activating an element with the right mouse button
Right = "Activate" an additional element
2. Basic elements

2.1 Nodes

Nodes, like axes, are elements that have no surface or volume. They can be used to define/describe connectors which are linked to a 2D catalog element (i.e.: hanger) and can be exported as a connector list. Nodes could also be the reference points for wire models that can then be exported for structural analysis, or simply as reference points for adding specific beams along its two axis points. When starting a new 3D file, one node is located at the origin (in the standard "init.3d").

A node can be added in 3D according to the global coordinate system. The software asks for these coordinates systematically in the comment row.
When working in a 2D plane, nodes can simply be added with the cursor. By using (L), nodes will be placed on a point (i.e., corner of an element) and by using (M), nodes will be placed at the cursor's current position.
3D Basic Elements

13

(continued)

Database description

A description that can be defined by the user. It can be assigned to a node (i.e.: Connectors).
The file "connector.db needs to be stored in the folder .../Settings/3D/connector.

# Text rows with a number sign '#' are comments and remarks.
# Max length for each text row is 70 signs.
# Each record can contain no more then 38 text rows.
# A record has to start like this: $NUMBERxxxx. This is the number of the
# data record. This number allows the link between the connector node
# in cadwork 3d and the data record (xxxx).
# The 2nd row needs to start like this: $NAMEabcd. This is the name of the
# data record (abcd). This name allows the user to understand and recognize
# the data records.
$234567890123456789012345678901234567890123456789012345678901234567890

2D element reference

During the export into cadwork 2d connector nodes will be replaced with reference
objets from the catalog. The number of the reference objects corresponds to the
number of the connector node. For example this could be a hanger top view.
Reference objects (2d catalog elements) need to be stored in:
.../cadwork.cat/catalog_2d/node_3d/.
The file name has to be as follows: "number". (eg.4567.2dc).

2.2  Line

Lines, just like nodes, are elements that have no surface or volume. The only modifications that can be
made are changing their color or changing them to an axis. Lines are used as borders for imported surfaces
from DXF files because they require much less memory than axes.

Add

\[ Line \quad A+L \quad \text{Add a line} \]

\[ Color \quad \text{Select the color} \]

Modifying a line

\[ \text{Modify 1} \]

Global size

Change global size with a factor

Color

Change color

Marking...

Select whether the line defines a marking

Line to connector axis

Modify to a connector axis

Line to bolt axis

Modify to a bolt axis

Line to normal axis

Modify to a normal axis

Line to round axis

Modify to a round axis

Line to rectangular axis

Modify to a rectangular axis

Line to eave line

Modify to an eave axis

No marking

Line marking

Brdmth marking

see chapter: machine interface
2.3 Axis

Axes, like nodes, have no surface or volume. Axes are always fixated to two nodes that define axis start and axis end. If one of these nodes is moved, so does the axis. Both nodes can be activated with a mouse click. Axes of type "Bolt", "Round" and "Square" can be exported to lists and can always be stretched along their axis direction.

Example:
2.3 Axis (Modify)

Modifying an Axis

Modify color
Select new material from material list
Select texture (independent from material)
Name of element that will, for example, appear in the parts list
Group
Subgroup

Other attributes...

User1 to User10 can be defined by the user. Attributes such as building phases, delivery info, etc. can be added here.

Position no. ...

Production list
Parts list
Assembly list

Extended settings

Output shop drawing
Axis will be output to the shop drawing
DPP without dim.
Axis will be output without dimension
Output DPP wall
Axis will be output to the wall shop drawing
Output DPP group
Axis will be output to the group shop drawing
Chief element
Axis become chief element = Axis defines the coordinate system for the shop drawing
Output Weinmann
Axis will be output to the Weinmann multifunction bridge
Output log mach.
Axis will be output to log machines
Output Randek
Axis will be output to Randek framing station
Output log macro
Axis will be output to log macro

Marking...

No marking
Axis is defined as a line marking
Line marking
Axis is defined as a line marking
Brdmth marking
Axis is defined as a birdmouth marking

Element module

Properties Ctrl E
See manual "Element module"

Division zone...
Wall situation
Delete collision info
Layers by geometry
Layers by machine
Horizontal wall cut
Vertical wall cut
Delete wall cut
2.3 Axis (Modify) (continued)

Options

- Global size
- Attributes display...
- Axis to connector axis
- Axis to bolt axis
- Axis to normal axis
- Axis to round axis
- Axis to rectangular axis
- Axis to eave line
- Axis to line

Modifying an eave line

Modify 1

- Color
- Name
- Group
- Sub group
- Other attributes ...
- Comment
- EDP code
- User1
- User10
- Position no. ...
- Extended settings
- Roof slope
- Eave direction
- Element module
- Options ...
- Global size
- Attributes display...
- Eave line to connector axis
- Eave line to bolt axis
- Eave line to normal axis
- Eave line to round axis
- Eave line to rect. axis
- Eave line to line
- Database description

Name of element that will, for example, appear in the parts list

Modify position number

See "modifying an axis", extended settings

Modify roof slope to another value

Change the eave direction

See description "axis"
2.3 Axis (Modify) (continued)

**Modifying a bolt**

<table>
<thead>
<tr>
<th>Modify 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color</strong></td>
</tr>
<tr>
<td><strong>Material</strong></td>
</tr>
<tr>
<td><strong>Texture</strong></td>
</tr>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td><strong>Group</strong></td>
</tr>
<tr>
<td><strong>Subgroup</strong></td>
</tr>
<tr>
<td><strong>Other attributes ...</strong></td>
</tr>
<tr>
<td><strong>Comment</strong></td>
</tr>
<tr>
<td><strong>EDP code</strong></td>
</tr>
<tr>
<td><strong>User1</strong></td>
</tr>
<tr>
<td><strong>User10</strong></td>
</tr>
<tr>
<td><strong>Position no. ...</strong></td>
</tr>
<tr>
<td><strong>Extended settings</strong></td>
</tr>
<tr>
<td><strong>Bolt diameter</strong></td>
</tr>
<tr>
<td><strong>Drilling tolerance</strong></td>
</tr>
<tr>
<td><strong>Over-length</strong></td>
</tr>
<tr>
<td><strong>Round length</strong></td>
</tr>
<tr>
<td><strong>Element module</strong></td>
</tr>
<tr>
<td><strong>Options ...</strong></td>
</tr>
</tbody>
</table>

- **Name of element that will, for example, appear in the parts list**
- **Modify position number**
- **See "modifying an axis", extended settings**
- **Change bolt diameter**
- **Change the drilling tolerance**
- **Over-length**
- **Round the clamping length and over-length to a standard value**
- **See element module properties for axes**
- **Global size**
- **Attributes display...**
- **Bolt axis to connector axis**
- **Bolt axis to normal axis**
- **Bolt axis to round axis**
- **Bolt axis to rect. axis**
- **Bolt axis to eave line**
- **Bolt axis to line**
- **Database description**

*See description "axis"*
2.4 Surface

Add a surface in a 2D plane

- Surface contour: Enter color, name, and outline
- Surface circle: Enter: surface of circle
  - Center + point: Center of circle and point on circle (see example)
  - Center + diam.: Center of circle and circle diameter
- Surface wall: Click to define the wall axis points and enter the wall width (see example)
- Line + depth: The line depth is entered and the surface contour is drawn. The surface is then modeled as a volume with its corresponding depth in 3D.

P-2D Surface circle

- Angle segment of circle in degrees (here 30)
- Pt. 1 (Center)

P-2D Surface wall

- Pt. 1
- Pt. 2
- Pt. 3
- Pt. 4
- Pt. 5
- Wall width
2.4 Surface (Modify)

Modifizieren 1  Modify surface

- Next position (PL)  Switch to next position
- Color
- Material
- Texture
- Name  Name of element that will, for example, appear in the parts list
- Group
- Subgroup
- Other attributes ...

- Comment
- EDP code
- User1
- User10

- Position no. ...  Modify position number
- Process type
- Extended Settings  See "modifying an axis", extended settings
- Surface to beam/panel/aux.el
- Surfaces to volume  Change surfaces to a volume
- Local axis...
  - Manual  Adjust length axis manually
  - Along roof slope  Adjust length axis perpendicular to eave line

- Planing ...
  - Touching surface
  - Opposite surface
  - Neighbor surface
  - Planing depth  Define a location and depth of surface that needs to be planed. (i.e.: if rafters need to be planed only where visible, the visible surface can be modified with "Planing ...")
  - Planing depth (if value=0, will not be planed)

- Bitmap/image ...
  - Bitmap (tif,jpg) automatic
  - Bitmap (tif,jpg) manual
  - Orthophoto
  - Mirror bitmap
  - Delete bitmap

- Element module
- Options ...
  - See description of "Axis"
2.4 Surface (continued)

Stretch 7  |  Stretch a surface
---|---
Active point  |  Stretch one of the surface's points
Lasso points  |  Stretch all points within lasso

To a point
Along X
Along Y
Along Z
Along act. edge
Along edge
Along 2p
Along vector

Along active edge in the direction on the active point (an edge has to be active in order to use this function --> dashed line)

Extend
The surface is stretched along the active edge in the direction of the active point

To a point
Value  Positive value = stretch, negative value = shorten

Procedure for stretching with lasso to a point:
Select surface at desired active point --> Stretch 7 --> Lasso points --> Define lasso with mouse button (L) --> To a point

Procedure for extending to a point:
Select surface at desired active point --> Stretch 7 --> Extend --> To a point --> Click on point with mouse button (L)

2.5 Beam

Beams are defined with a constant section and a length
The various sections are selected from the menu. Possible sections are:

<table>
<thead>
<tr>
<th>Square</th>
<th>Rectangular</th>
<th>Circular</th>
<th>Panel profiles</th>
<th>Various section profiles</th>
<th>Steel profiles (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Square Beam" /></td>
<td><img src="image2.png" alt="Rectangular Beam" /></td>
<td><img src="image3.png" alt="Circular Beam" /></td>
<td><img src="image4.png" alt="Panel Profiles" /></td>
<td><img src="image5.png" alt="Various Section Profiles" /></td>
<td><img src="image6.png" alt="Steel Profiles (Standard)" /></td>
</tr>
</tbody>
</table>
2.5 Beam (continued)

For square, rectangular, and circular sections, three offcut types exist.

Begining                  End

 Beam with plumb offcuts
 Beam with perpendicular offcuts
 Beam with horizontal offcuts

The offcuts can be defined separately for the start and end of a beam.

Beams are differentiated from other elements by their standardized local axis system. This local axis system enables cadwork to recalculate length-, width- and height-information after modifying such elements, which is essential in order to generate different lists, produce processing data and generate shop drawings.

When adding beams in a 2D plane, the HVA button defines in which plane an element is added. The element can be added flush to the back of the plane by selecting "H", flush to the front of the plane by selecting "V", and length-axis centered on the plane by selecting "A".

All beams can be added in 3D mode. If they are added according to two points, the perpendicular axis is automatically oriented horizontally.

Beams can only be added if "User" in the Status row is set to "Timber/Steel".

Add beam in 3D

Add          Beam (element with a length-axis)

 Beam selected from a custom standard list
 Square
 Square section

 Axis 2 points

 Height axis points upward

 Possible sections (see page 21)
 Select color
 Select name from list

 Front view 3 points

 The first two points define the direction of the length axis and the third point defines the width axis. Front view = view of length and height.

 Top view 3 points

 The first two points define the direction of the length axis and the third point defines the width axis. Front view = view of length and width.

 Button: (L) The "L" button jumps directly to this menu. The last used values can be reused or new values can be entered.

See "Beam" -> "Square", difference: both section measurements must be entered.
2.5 Beam (continued)

Circular Enter circular sections, see "Square"
Steel Section The standard steel sections can be selected from a list. (see example 2.5-4)
=> Select generation options (axis points, front view, top view)
=> Select color and name
=> Click to define the two axis points

Profile catalog Add a new beam from the profile catalog. This catalog is customizable.

After adding a beam it is possible to change its position with the mouse wheel.
The element can also be adjusted using shortcuts:
"S"=symmetry  "O"=rotate 90 deg  "W"=along an angle (enter value in deg)  "K"=along edge

2.5 Beam (Modify)

Modify 1 Modify the beam

Next position (PL) The element with the next highest position number is selected
Color Change the color
Material Modify the material

Texture

Name
Group
Subgroup
Other attributes See description "Other attributes" in 2.3 Bolts
Position no. ... See description "Position no. ..." in 2.3 Bolts
Process type
2.5 Beam (Modify) (continued)

The process type defines how a beam will be exported to a 2D plan. By selecting from the various name types, the element will be exported according to the settings for that type. There are pre-set types (i.e.: Purlin) as well as custom types under User 1 to User 5.

- None
- Purlin
- Stud
- Rafter
- Jack rafter
- Hip/valley
- Log
- Truss
- Panel
- Tread
- User 1
- User 2
- User 3
- User 4
- User 5

Process quality

With “Process quality” it is possible to define all processes as such that wood quality is not diminished (splinter free options). This information is available and transferred when interfacing with a machine. This allows the designer to insure quality in manufacturing.

- Brdmth
- Hip brdmth
- Lap
- Ridge lap
- Simple scarf
- Shoulder
- Drilling
- Profile
- Slot
- Sheathing cut
- Scarf joint
2.5 Beam (Modify) (continued)

- **Front slot**
- **V-cut**
- **Inside DT dato**
- **Outside DT dato**
- **All splinter free**
- **All lower quality**
- **Planing all**

### Extended settings

- **Output shop drawing** Export element to the piece by piece drawings: DPP automatic
- **DPP without dim.** Export element to the piece by piece drawing: DPP manual
- **Output DPP wall** Export element to the piece by piece drawing: DPP Wall
- **Output DPP group** Export element into the piece by piece drawing: DPP Group
- **Chief element**

  The chief-element is the element that is used as a reference when exporting elements to the "DPP Group". All three views as well as the position in 2D are defined by using the axis system of the chief-element as a reference.

- **Output Weinmann** Export element to Weinmann multifunction bridge
- **Output log mach.** Export element to log machine
- **Output Randek** Export element to Randek framing station
- **Output log macro** Export element as log macro

### Dimensions

- **Real width**
- **Real height**
- **Real length**

**Beam rough dimensions...**

- **Over-width**
- **Over-height**
- **Over-length**
- **Delete over-values**
- **Round width**

If the element dimensions differ from the finished dimensions (i.e.: wood beam is planed), it is possible to adjust these over-dimensions here.

When a part list is exported, the elements often have similar lengths or x-sections that vary just slightly but still have the same position number. This function allows these values to be rounded by a specific amount. In the parts list one is then able to compare real length to list length (the rounded value). Same for real width/list width and real height/list height.
2.5 Beam (Modify) (continued)

- **Round height**
- **Round length**

- **X-section correction...**
  - **Pos. suppl. height**
  - **Neg. suppl. height**
  - **Pos. suppl. width**
  - **Neg. suppl. width**

- **Ref. side (M) Config**
  - **Positive height axis**
  - **Negative height axis**
  - **Positive width axis**
  - **Negative width axis**

**Rotate length axis**
- **W**
  - **90 deg**
  - **180 deg**
  - **270 deg**
  - **Value**
  - **Adjust 2 points**

**Rotate perp. axis**
- **Ctrl+W**
  - **90 deg**
  - **180 deg**
  - **270 deg**
  - **Value**
  - **Adjust 2 points**

**End-type ...**

It is possible that by rotating and copying an element, its length axis no longer corresponds with the actual axis of the beam. This can be adjusted with a specific angle or by selecting 2 points.

It is possible that by rotating and copying an element, its perpendicular axis no longer corresponds with the actual axis of the beam. This can be adjusted with a specific angle or by selecting 2 points.

End-types are not modeled manually, but rather selected from a pre-defined end-type list. They cannot be activated. The mortise on the connecting piece that corresponds with the tenon is recognized automatically. The process of selecting and modifying such end-types is explained clearly in the software menus and is therefore not explained any further here.
2.5 Beam (Modify) (continued)

- None
- Tenon 1
- Tenon 2
- Tenon 3
- Tenon 4
- Lengthening
- Front Slot
- Dovetail Dato
- Dovetail General
- GMI w/o Counterpart
- GMI fix w/o Counterpart
- GMI with Counterpart
- GMI fix with Counterpart

Element module

- Properties Ctrl+E
- Division zone ...
- Wall situation
- Delete collisions info
- Layers by geometry
- Layers by machine
- Horizontal wall cut ...
- Vertical wall cut ...
- Delete wall cut

Options ...

- Global size
- Attributes display...

Change to global size of an element with a specific factor

See 2.3 Axis
2.5 Beam (Modify) (continued)

- Beam to panel: Convert a beam to a panel. Reason: List export is different.
- Beam to auxiliary element: Convert a beam to an auxiliary element. Reason: Auxiliary elements are not exported to lists.
- Beam to surface: Convert beam to individual surfaces
- Angle Smooth-Shading: Angle values of 5, 10, 20, 30 and custom values are possible.

2.5 Beam (Stretch)

Stretch one or more beams

- Active point: When stretching a beam with only the active point along the axis all joinery and cuts disappear.
- Lasso points: All points within the lasso are stretched the same as the active point. If more than one element is selected, the first active axis is the stretch axis.
- Along length: Stretch along length axis (red axis)
- Along width: Stretch along width axis (blue axis)
- Along height: Stretch along height axis (green axis)
- To a point: Positive value = stretch, negative value = shorten
- Adjust lasso: Active beams are stretched or shortened along their axes.

Value=12" cut in geometry disappears

Value=12"
2.5 Beam (Stretch) (continued)

Procedure (stretch with lasso adjust)
Activate element (reference point = active point) --> activate the remaining elements --> Stretch Lasso adjust

Stretching with "Lasso adjust" stretches the element with the active point to a desired point. The other elements are also stretched along their axes until the desired point and the length axes create an angle of 90°.

2.5 Panel

The user can save standard panels in a library in which all the panel attributes are contained.

Add
Panel
Standard panel
2.5 Panel (continued)

- Rectangular
  - Axis 2 points
  - Top view 3 points
  - Front view 3 points
- Contour ...
  - Top view
  - Front view
  - X-section view
- Modify 1
  - Modify panel (same as "Modify beam")
- Stretch 7
  - Stretch one or more panels (same as "Stretch beam")

2.6 Auxiliary element

Auxiliary volumes are elements that are especially useful for complex sections and shapes. The contour is generally constructed in a 2D plane with the use of auxiliary lines. The name "auxiliary element" gives the element the characteristic of not being assigned a production/parts number as beams are. Although when creating auxiliary elements, a local axis system (length, width, height) is generated just like for beams, these axes are hidden. The first two selected points when making the contour define the length axis and the thickness value defines the height of the element.

- Add
  - Auxiliary el. P
  - Add an auxiliary element in 3D
  - Color
  - Define the color
  - Name
  - Define name
  - Thickness
  - Enter the thickness value with keyboard
    --> Construct a closed polygon
2.6 Auxiliary element (continued)

Rotation elements are volume elements with a rotational symmetry. They have an arbitrary, straight, or circular section. Creating such elements is similar to creating an auxiliary element. The section contour is defined in a 2D plane followed by the definition of the rotation axis.

2.7 Rotation element (only possible in a 2D plane)

Add a rotation element in a 2D plane

- **Rotation element**: The contour to be rotated is defined on one side of the desired rotation axis. An existing surface is chosen as the surface to be rotated.
- **New contour line**: Define color
- **Exist. surface**: Define name
2.7 Rotation element (continued)

only possible in a 2D plane

[Images showing 3D rotation elements]

Modify 1

Color  Change color
Material  Select new material from material list
Texture  Select texture (independent from material)
Name  Select new name
Group  Select new group
Sub group  Select new sub group
Other attributes

Comment
EDP-Code
User1
User10

Other attributes such as internal IT-system numbers or text
User1 to User10 can be defined by the user. Attributes such as building phases, delivery info, etc. can be added here.
2. Rotation element (continued) only possible in a 2D plane

- Real thickness
- Auxiliary element to beam
- Auxiliary element to panel
- Auxiliary element to surfaces

Element module
- Properties Ctrl+E
- Division zone ...
- Wall situation
- Delete collisions info
- Layers by geometry
- Layers by machine
- Horizontal wall cut ...
- Vertical wall cut ...
- Delete wall cut

Optionen ...
- Globale size
- Attributes display...
- Angle Smooth-Shading

Change global size with factor
see chapter 2.3: axis

To smooth edges on curved parts. 5, 10, 20, 30 deg or variable angle possible

The element module is described in the Element Module Manual.

Modify 1 --> Beam

1. Point length axis
Point of perpendicular axis

2. Point length axis
2.8 Export solid

Using the export solid is described in the Export Solid Manual.

2.9 Container

Using the container is described in the container Manual.

2.10 Architecture

Architecture elements
- Wall
- Opening
- Floor
- Roof
- Wall envelopes
- Opening volumes RO (windows, doors, etc.)
- Floor envelopes
- Roof envelopes

2.11 Catalog

Catalog elements (self-made or from hardware supplier)
- Standard catalog
- User catalog
- Current dir.

A catalog element can be added in 3D or in a 2D plane.
2.12 Variant

A variant is a parametric catalog element. Cadwork offers various variants in the standard catalog. Using variants is described in the Variant Manual.

2.13 Files

Import a cadwork or other file types

- 3d-file (*.3d) Import an external cadwork 3D file. This can also be done by using the clipboard
- Surface file (*.3ds) Import a *.3ds file. This is a surface file that cannot contain any volumes
- Roof Pro file (*.3dc) Import a file from the external Roof Pro program
- ACIS file (*.sat) Import a 3D solid file from ACIS based applications (e.g. Autodesk products)
- HLI file (*.hli) Import a 3D file from MB-Group applications (i.e. ARCON)
- RStab file (*.stp) Import a 3D file from the structural analysis program R-Stab
- STEP file (*.stp) Import a 3D file from applications that can export STEP files
- DTH file (*.stp) Import a 3D file from applications that can export DTH files
- VI2000 file (*.ifc) Import a 3D file from the estimating software VI2000
- IFC file (*.ifc) Import a 3D file from applications such as Archicad, Nemetchek, etc.
- CATIA_V5 file (*.part) Import a 3D file from the CAD program CATIA
- RSTAB-COM
2.14 Element module

The element module is clearly described in the Element Module Manual.
2.15 Roof parts

Add

- **Roof parts**: Automatic 3D modeling help for roof parts
  - **Eaves (cullis edge)**: Definition of color, beginning and end points, as well as the roof pitch. Each eave line defines a plane in space that is cut and intersected to form the roof shape. Note that a roof pitch in x/12 can be entered as $'x'$.
  - **Roof definition**: Automatic roof surface generation
    - **Manual mode**: Only the planes defined by the active eave lines are intersected and cut. At each cut line a 3D auxiliary line is created.
    - **Automatic mode**: All the planes defined by the eave lines are intersected and cut. The roof surfaces are automatically created with the chosen color.
  - **Hip rafter**: The edge that intersects the left and right roof surface of a hip has to be clicked on. (In order to define "left" and "right", the direction of view is always from the ridge down to the eave). The rafter height of each side must be entered in order for the software to calculate the minimum hip rafter height.
    - **Edge = Axis**: The hip line lies exactly on the center of the width of the hip rafter.
    - **Move edge**: The hip line is automatically moved accordingly if the left and right roof surfaces have a different pitch.
    - **Select move edge**: The hip line can be moved a specific distance from the center.
  - **Valley rafter**: Same as hip rafter
    - **Valley = Axis**: (see. example)
    - **Move valley**
    - **Select move valley**
  - **Rafters**: Only possible on inclined surfaces
    - **Interval rafters**: Rafters are distributed evenly according to a specific pre-defined rafter spacing.
      - **Plumb cut**
      - **Square cut**
        - Eaves cut plumb
different rafter spacings.

Click on the start and end points of the eave line and then click on the start and end points of an interval zone. The points are projected perpendicular to the eave line and the rafters are evenly divided over this distance according to the rafter spacing. It is then possible to define other interval zones with different rafter spacings.
2.15 Roof parts (continued)

- **Rafters**
  - Only possible for inclined surfaces => choose section
  - Rafters are distributed evenly along a specified interval zone according to the number of rafters
  - Plumb cut
  - Square cut

Click on the start and end points of the eave line and then click on start and end points of an interval zone.

- **Joists**
  - Only possible for horizontal surfaces => choose section
  - Interval joists
  - Quantity of joists

Define spacing, color, and two points of a reference edge (defines the direction of the joists).

Define quantity, color, and two points of a reference edge. Offset of first joist on the left and last joist on the right (see example).

- **Studs**
  - Only possible for vertical surfaces => choose section
  - Interval studs
  - Quantity of studs

Define spacing, color, and two points of a reference edge. The third point defines the direction of the wall width.

Define quantity, color, and two points of a reference edge. Offset of first stud on the left and last stud on the right. The third point defines the direction of the wall width (see example).

- **Coupled purlin**

Define the sections for the outer and inner fields. Enter name, color, and coupled length for both fields.

- Coupled length = 0 => the purlins will be cut exactly in the center of the bent (see example).
- Coupled length < 0 => the purlins are placed flush between the bents (see example).

- **Eaves (cullis edge)**

Notes:
- Direction of eave edge always counter clockwise
- Eave edge with roof slope

- **Roof definition**

Automatically generated roof surfaces

Note that a roof pitch in x/12 can be entered as 'x'.
2.15 Roof parts (continued)

- **Hip rafter**
  - Move edge
  - Shared edge of roof surfaces
  - Hip is generated with an overlength so that the joinery can be easily constructed.

- **Valley rafter**
  - Edge = Axis
  - Surfaces common edge
  - Valley is generated with an overlength so that the joinery can be easily constructed.

- **Rafters**
  - Interval rafters
  - Quantity of joists = 9

- **Studs**
  - Interval studs

- **Joists**
  - Quantity of joists
  - Interval left and right = 0
  - Quantity of joists = 9

The rafters are automatically joined as a group. They can be activated and modified individually by clicking on “Separate.”

The studs are automatically joined as a group. They can be activated and modified individually by clicking on “Separate.”

The joists are automatically joined as a group. They can be activated and modified individually by clicking on “Separate.”
2.15 Roof parts (continued)

Coupled purlin  Coupled length > 0

The first purlin will always be placed where the active point is
(Question: First purlin below axis [Y/N]? => here "N")

The bottom is always where the active line of the surface is.

Coupled purlin  Coupled length = 0

The first purlin will always be placed where the active point is
(Question: First purlin below axis [Y/N]? => here "N")

The bottom is always where the active line of the surface is.

Coupled purlin  Coupled length < 0

The bottom is always where the active line of the surface is. 
(Question: First purlin below axis [Y/N]? => here "N")
2.16 Roof pro

Add Roof pro ...

Automatic roof modeling module (special licence required)

- Roof layer
- Roof design
- Add
- Delete
- Copy
- Move "5"
- Stretch
- Modify
- Cut
- Export
- Preferences ...

This very efficient and automatic roof modeling module is described in another manual. Please look there for more information.

2.17 Stairs

Add Stairs ...

- New staircase
- Modify stairs

This very efficient and automatic stair modeling module is described in another manual. Please look there for more information. (special licence required)

2.18 Spline

Add Spline

Create bent and twisted elements

With the spline function it is possible to model elements that have bidirectionally bent and twisted. It is also possible to model elements that have changing cross-sections. The basis for such splines are surfaces. First, model a surface that has the corresponding cross-section of the final element. Copy this surface or create a new surface at different points. It is important to note that if the cross-section of the spline element changes, the same number of points are on each surface.
2.18 Spline (continued) see Spline Manual

Select "Spline" in the "Add" menu. Be sure to not be in a 2D plane. A spline can only be added in 3D. Then, activate the individual surfaces and end the command with the right mouse button. The more surfaces that are selected the more detailed the final element. Always click on the same corner.

Example of a twisted element:

Original surface copied and rotated six times. Number of divisions = 5, surfaces triangulated and converted to a volume. Modified to a beam, axes rotated manually, and material defined.

Example of a changing cross-section:

Original surface copied four times and each surface stretched individually. Number of divisions = 5 surfaces triangulated and converted to a volume. Modified to a beam, axes rotated manually, and material defined.

Example of a bi-directionally bent beam:

Original surface copied with "Rotate and move". Number of divisions = 5, surfaces triangulated and converted to a volume. Modified to a beam and material defined.
3. Windows Menu

3.1 File

Save Ctrl+S
Save as ...

Save the file
Save the file in a location with a specific name (see Windows functions)

Backup

Creates a backup copy with the current name + date and time

Standard file (Init)

Creates a standard file (Init)

Save as Version 15.0

Saves the file as the previous cadwork version
3.1 File (continued)

- **Settings ...** Save all current settings in the file into the userprofile
  - **Save**
  - **Load**
  - **Delete**
    - o Current folder
    - o Userprofile

- **Export ZIP-file** Creates a ZIP file with selectable linked files

- **Import ...** Import an external file
  - **3d-file (*.3d)** Import an external cadwork 3D file. This can also be done by using the clipboard.
  - **Surface file (*.3ds)** Import a *.3ds file. This is a surface file that cannot contain any volumes.
  - **Roof Pro file (*.3dc)** Import a file from the external Roof Pro program.
  - **ACIS file (*.sat)** Import a 3D solid file from ACIS based applications (e.g. Autodesk products)
  - **HLI file (*.hli)** Import a 3D file from MB-Group applications (i.e.: ARCON)
  - **RStab file (*.stp)** Import a 3D STP- file from the structural analysis program R-Stab
  - **STEP file (*.stp)** Import a 3D file from applications that can export STEP files
  - **DTH file (*.stp)** Import a 3D file from applications that can export DTH files
  - **VI 2000 file (*.ifc)** Import a 3D file from the estimating software VI2000
  - **IFC file (*.ifc)** Import a 3D file from applications such as Archicad, Nemetschek, Revit etc.
  - **CATIA_V5 file (*.part)** Import a 3D file from the CAD program CATIA
  - **RSTAB-COM** Import a native file from the structural analysis program R-Stab
3.1 File (continued)

- Export ...
  - -> 3D file (*.3d) 3D file: all elements or only the active ones
  - -> IGES file (*.igs) Export the wire model
  - -> DXF file (*.dxf) Export a 3D DXF file
  - -> ACIS file (*.sat) Export a 3D SAT file, i.e.: for Autocad
  - -> STEP file (*.stp) Export a STEP file
  - -> DTH file (*.stp) Export a DTH file
  - -> IFC file (*.ifc) Export an IFC file, i.e.: for Archicad, Nemetschek, Revit
  - -> VRML file (*.wrl) Export a VRML file, i.e.: for 3D-Studio-Max
  - -> Tornado (*.viz) Export to the Tornado viewer
  - -> Wave front (*.obj) Export a Wave front file
  - -> Atlantis (*.atl) Export to the rendering software Artlantis
  - -> 3D Viewer (*.ivx) Export in the cadwork-Viewer and Lexoviewer

Print Ctrl+P

Exit

Do you want to save the file before quitting?
[Yes] [No] [Cancel]

3.2 Edit

- Undo Ctrl+Z
- Restore Ctrl+Y
- Cut Ctrl+X
- Copy Ctrl+C
- Paste Ctrl+V

Same as general windows functions
3.3 Extra

Join more than one element to a group
Seperate the active group. Multiple joined groups can be seperated entirely by clicking on (M).

Attributes can be matched with other elements.

Procedure:
One or more elements are activated. The "Match" function is selected and the various desired attributes to be matched can be chosen from the list. All the elements that should then have those attributes can be selected. By clicking on "Apply", the attributes are matched.

Any attributes that are in grey text cannot be matched because they are not currently defined for the selected element(s).

With the letter "J", all invisible elements can be made to appear. This can also be done with "Ctrl+J". The only difference is that Ctrl+J makes it possible to only make specific elements appear by checking the boxes.
### 3.3 Extra (continued)

**Project data**

- Delete processes Ctrl+D
- Check for element duplicates
- Check connector axis Ctrl+K
- Collision check Check that there aren't any interferences between elements
- Check position numbers
- Check rough volume
- Set tenon direction
- Element module details...

The element module is described in the Element Module Manual. Please look there for a more detailed description.

**Wall edge 90/(M) Backup**

**Wall edge alpha/(M) Backup**

**Wall end/(M) Backup**

**Wall crossing/(M) Backup**

**Wall dividing joint/(M) Backup**

**T-joint/(M) Backup**

**In-line joint/(M) Backup**

**Opening/(M) Backup**

**Floor end/(M) Backup**

**Floor joint/(M) Backup**

**Floor opening/(M) Backup**

**Floor dividing joint/(M) Backup**

**Nesting**

- Settings Nesting settings
3.3 Extra (continued)

- Moving distance 1
- Moving distance 2
- Hor.measure along rough vol.
- Ver.measure along rough vol.
- Max.length rough vol.ser.

- Regenerate
- Move
- New rough volume
- Modify name
- Stretch
- Delete
- Activate assigned el.
- Delete all

**External program**

- (L) up../(M) Drive
- U:api
- IFC
- Rundholz
- CVS
- Inventor Export
- cut_extra

**Viewer Mode @**

Switches to viewer mode

The viewer mode offers the possibility to visualize elements with all of their processes including cuts, drillings, etc. The elements can be exploded according to criteria such as their group. This mode is only a visualization tool and cannot be used for modeling or modifying elements.

For architectural elevations, openings can be cut into walls. Walls and floors can be temporarily welded so that it is possible to obtain a "real" view.

cadwork offers interfacing with other programs. These interfaces can be provided as a service from cadwork or created through external programmers.
### 3.4 Help

**Customizable shortcuts for the function keys**

Cadwork makes it possible to easily save shortcuts to most commands in its software. The twelve function keys alone and in combination with "Alt" "Shift" and "CTRL" are customizable. These shortcuts can be saved, printed, and also transferred to another workstation.

**Keyboard shortcuts**

Many keys are set for various commands and guarantee efficient use of the software with both hands.

**Manual**

Direct access to current manuals. All manuals are saved as PDF files and can be printed if necessary. Use the Adobe search function (CTRL-F) to quickly find a topic.

**Release notes**

Access to release notes and User-meeting documents (e.g. News V16). All files are saved in PDF format and can be printed if necessary. Use the Adobe search function (CTRL-F) to quickly find a topic.
### 3.4 Help (continued)

- **Exercises**
  - Access to exercises and tutorials. Please contact your support office for more exercises or specific learning material.

- **NetViewer**
  - **TeamViewer**
  - Start Internet remote support. We use two different tools: Netviewer and Teamviewer. An individual connection number allows us to access your computer. Note that we cannot access your computer without your permission.

- **Cadwork Support**
  - **Cadwork Setup**
  - **Check updates**
  - Access cadwork start. For more info see cadwork installation V16.

- **Info ...**
  - Info displays the version numbers, revisions, date etc. It also displays all cadwork directories.

### 4.1 User

- **User General:** Civil engineering, road construction
- **User Timber/Steel:** For timber and steel construction. Note that functions are different for both users.

- **Beginner**
  - Simple menus: Only basic menus and functions available.

- **Test**
  - Untested functions and features as well as discontinued functions available.

- **Help**
  - Displays help bubbles and help pictures.
4.2 HVA

Application:
(H) ' Create element relative to 2d plane to the back
(V) ' Create element relative to 2d plane to the front
(A) ' Create Element centered in axis relative to 2d plane
The general setting can be overwritten using the keyboard shortcuts (H), (V), or (A) before the first point is defined. The element can also be placed with a defined distance from the 2d plane using (V) and a value after the first point is defined. A positive value moves the element forward; a negative element moves it backwards (into the screen).

4.3 Material

New you can define the "Material-Color "default definition in the Material window. You can define materials individually for ten element types using all 256 colors. Choose an element type first then drag the desired material in the color field while pushing the left mouse button. Note that the option "Show only materials in use" deletes all unused material data.

All material data such as Name, Weight, Texture, Color, Transparency, Mechanical properties etc. can be entered in the material window. All materials can be merged into material groups. Material data can be imported from other programs.

Caution: The option "Show only materials in use" deletes all unused material data.
5. Right menu

5.1 Undo/Redo

Undo Copy  All operations can be undone and re-done. This feature is only stored for as long as
Redo Copy  the file is open. The undo/redo information will be lost if you quit and save the file.

5.2 Activate attribute

Activate attribute  

Element type  Activate only certain element types.

Node …  Activate only certain node types.

- Nodes normal  See chapter 2.1 Nodes

- Nodes connect.

+ All

- All

Axis …  Activate only certain axis types.

- Normal axes

- Square axes

- Circular axes

- Eave axes

- Bolt axes

- Connector axes

+ All

- All

Color  Activate only certain colors.

Material  Activate only certain materials.

Texture  Activate only certain textures.

Name  Activate only certain names.

Group  Activate only certain groups.

Subgroup  Activate only certain sub groups.

Position no. …  Activate only elements with specific numbers (PL-#; TL-#: AL-#).

- Production list  Production-list numbers (different geometry and processes).

- Parts list  Parts-list numbers (different rough geometry).

- Assembly list  Assembly list number (special layout number system for log homes and SIP's)

- EDP-code  Activate only elements with specific EDP-codes.
The user can define EDP codes. An EDP code is typically used for bar codes systems and can be exported to shop drawings or lists. It can contain up to 30 numbers, signs and symbols.

What is a process type?

We use different process type so we can define the way a component will be exported in the single piece shop drawing (DPP). For example for a purlin we may only need a face and a top view and for a valley rafter we also need a view from the back as well as a view from the bottom. These settings can be setup by the user (see export single piece shop drawing).

Process types can also be handy for pricing.

---

See chapter: 2.5 Beam
5.2 Activate attribute (continued)

- Sheathing cut
- Scarf joint
- Front slot
- V-cut
- Inside DT dado
- Outside DT dado
- All splinter free
- All lower quality
- Planing all

Extended settings
- Output shop drawing
- DPP without dim.
- Output DPP wall
- Output DPP group
- Chief element
- Output Weinmann
- Output log mach.
- Output Randek
- Output log macro

Comment
- Previous
  - All
- All
  - planed
  - 4-side champfer
  - same as nuts

Wall situation
- Previous
  - All
- All
  - AW1-AW1#3
  - AW1-AW3#2

Comments can be freely defined by the user.

Wall situation definitions are necessary for the element module. For more info see the Element module manual.
5.2 Activate attribute (continued)

End-type

- Tenon 1
- Tenon 2
- Tenon 3
- Tenon 4
- Lengthening
- Front slot
- Dovetail dado
- Dovetail gen.
- GMI fix
- GMI fix w. counterp.
- GMI
- GMI w. counterpart

Machine data

Activate all elements that already have machine data.

Dimensions ...

- X-section
- Real height
- Real width
- Real length
- List height
- List width
- List length

Dimensions axes ...

- Bolt axes
- Square axes
- Circular axes

Marking elements ...

- [ ] Axes
- [ ] Lines
- all

Other attributes

Endtypes can only be defined for beam type elements. See chapter 2.5 Beam for more information about endtypes.

Activate elements by dimensions. You can choose between real dimensions and list dimensions. List dimensions also consider their rounding values (over-height / over-width / over-length) as well as rounding values.

Axes or lines can be used as 'markers'. You can also activate elements with certain marking elements.
5.2 Activate attribute (continued)

- Comment
- EDP code
- User1
- User10
- Defective volumes ...
  - Acis Model not allowed
  - Special problem (M) Config
  - Local axis
  - Model description
  - End-types
  - Acis data
  - Dimension of volumes
  - Facets size

Volumes from older CADwork versions or from other CAD systems can possibly be defective or have an invalid ACIS body.

- Element module ...
  - Collision info
  - Rough volumes
  - Without layer allocation

Define minimal size of volume to still be "valid".

Define minimal size of facet (surface) to still be "valid".

- Activate wall envelopes (walls, floors, ceilings, openings).
- Activate elements without layer definition. See Manual 'Element routine'.

5.3 Add

Add — See chapter 2: Basic elements

5.4 Delete

Delete 8 — Delete active elements. Alternative you can use the delete button on your keyboard.

With UNDO DELETE you can restore deleted elements as long as no other operations have been made. See chapter 5.1: Undo/redo.

5.5 Copy

The function "Copy" is the reproduction of an element in space. The duplicated elements simultaneously receive a new position in space, defined by the user in relation to the original elements (active elements).

Under "Settings" -> "Options" - "copy" can be set if the function copy "multiple" is to be executed, whether the copies are to be automatically connected and that the copies are to be automatically activated.

The copy function can be executed multiple times. Add a value for the "number of copies." before you choose the type of copy. Also see Shortcuts.
Activate element- choose the copy function. The activation by clicking on the element defines a reference point (active point) which is the starting point of the copy. The second point (corresponding to the command until the point) defines the destination point of the copy. If the activation is done by lasso, the destination point will be defined first, and the starting point (or active point) is defined last.

The element is copied from its active point along the global X axis towards the desired location. Only movement along X is possible, the other 2 directions are blocked for the moment. It is then possible to use projected points situated in an aligned plan perpendicular to X to the desired destination point. The choice of a copy by its value doesn't require any more defining of points (neither active points nor destination points). Supplementary options are made possible by the shortcut keys.

Same as X axis but along Y

Same as X axis but along Z
5.5 Copy (continued)

Along axis 2 points
- To a point
- Value

Same as X-axis but in random direction defined by two points

Along edge
- To a point
- Value

Same as X-axis but along active edge (dashed line) or define an edge of any 3d element

Along vector
- To a point
- Value

The piece can be activated independently by lasso or by a point. The choice to copy by a vector requires in all cases to indicate two points forming the vector and thus the distance and direction of the translation.

Divide

The element is copied between its active point and the final point X amount of times. This X number must be typed in. This number can also be modified if need be. Note that this function is handy for joist layouts, rafter layouts etc.
The element will be turned around a rotation axis. The rotation axis is defined either by mouse clicking or by keyboard. The same is true for the angle of rotation. The positive or negative sense of rotation is automatically indicated through a helpful rotation cursor.

The element is copied along a symmetric plane which can be defined in various ways.
5.5 Copy (continued)

The element is rotated and moved by a certain value at the same time.
Enter value of translation if prompted.

This option can be chosen before the steps mentioned above.
All the options are equally available as shortcut keys.

5.6 Move

The "move" function allows you to change the position of an active element existing in a 3D space. The move function can practically be used just like in the "Copy" menu. For this reason, no further explanation is provided, but can be found in chapter 5.5 "Copy".

The (5) button "Move" is used similarly to the (6) button "Copy".

The (4) button (Rotation) goes directly in the menu: "Move" = > "Rotation" = > "Angle by 2 points"/ "Value of the angle". The rotation axis is in this case always the active edge. You can also define another rotation axis using the shortcuts (A): New axis; (X): X axis; (Y): Y axis; (Z): Z axis. With (W) you can change the rotation direction and with (R) you can flip between the main directions X/Y/Z.

5.7 Join

Often, it is necessary to activate different elements at the same time. In this case, it is advised to create a new "block". The "join selection" facilitates the work. It allows you to join all the active elements in one single block. Therefore, by activating an element belonging to this group, all the other elements in the group become activated as well.

To return to these individual elements, we can re-separate the selection. A good solution consists of temporarily separating the selections, in other words deactivate the "join selection" function. This function can be obtained by clicking the middle button on the mouse (M) over the "Join selection" function.

"Join selection": white ' Join selection mode is activated
"Join selection": red ' Join selection mode is deactivated
5.7 Join (continued)

With the help of the "Separate selection" function, located in the right hand menu we can separate the selection again (see chapter 5.8 "Separate selection").

By simultaneously pressing <SHIFT> + <->, the selection is deactivated and the element with the active point remains activated.

An element can belong to a number of selections; consequently it is possible to reunite a number of selections into one. We are now referring to a piling up of selections or multi-layered selections.

5.8 Separate

To return to the previous state of the elements of a selection before the "Join selection" function, you have to use the "Separate selection" function. Each element can now be activated individually again (see chapter 5.7 "Join selection"). If an element belongs to many selections, these can all be separated, by clicking the middle mouse button (M) over the function "Separate selection". If an element belongs to many selections on various levels (layer, partition, house, etc...), the function: 'Separate' with the right mouse button (R) unloads the selection level by level. The function: 'Separate' with the middle mouse button (M) allows you to break all the selections and all the levels at once.

5.9 Stretch

The stretching possibilities are different for each type of element. They're explained individually for each type in chapter 2, basic elements.

5.10 Modify

The modifying possibilities are different for each type of element. They're explained individually for each type in chapter 2, basic elements.

5.11 Cut

The majority of basic elements can be cut (except the axis and the lines). The procedure is always the same: activate with an active point and choose the cut function. The position of the active point allows you to identify which part of the piece is removed. The cut-slice option doesn't require an active point, without any of the parts being eliminated. The majority of assemblies are made with the cut function except the extremity types (tenon, dove tail, lengthenings) which go through the "modify" function (we modify the simple extremity of the piece by an extremity type from the list above).
5.11 Cut (continued)

Cut Hard/soft is using a Boolean function. It calculates the difference between two overlapping volumes and cuts the overlapping material away from the 'soft' part.

Procedure: Activate element that defines form ('hard' element). Define element that needs to be cut ('soft' element). Right click to confirm. Note that you can cut multiple elements in one step.

Same procedure as above but reversed. Activate first the element that needs to be cut out ('soft' element).

Cutting a contour. Procedure: activate element -> choose the "cut contour" function and define a polygon with a closed perimeter. This function can be used in 3D or in a 2D plane. The cut is always done perpendicularly to the polygon chosen (which forms a plane starting from 3 points). Note that the easiest way to cut a contour is through the use of auxiliary lines in a 2D working plane. You can also define a contour 'pocket' (with defined depth) using the shortcut <H>.

Cut plane means that you cut off an element with a straight plane. This plane can be defined in multiple ways such as for example using 3 points, 2 edges or you simply choose a standard plane (X/Y/Z). See 2D planes. The part with the active point will remain and the offcut will disappear. You can inverse that using the middle button instead.
5.11 Cut (continued)

- **Cut plane (in two)**
  Same as 'CUT plane' but the offcut remains. The part with the active point remains active.

- **Cut polyline**
  This function is only available in a 2d working plane. The cut needs to be defined using multiple polygon points.

- **Cut polyline (in two)**
  Same as 'CUT polyline' but the offcut remains. Also only available in a 2d working plane.

- **Cut 2 pl. concave**
  This function creates a double concave cut (or curved-in). The 2 cuts must be identified (see function: 'Cut with plane').

Plane \_\_\_ X
Plane \_\_\_ Y
Plane \_\_\_ Z
Plane \_\_ edge
Plane 3 points
Plane 2 edges
Plane edge + point
Plane trace
5.11 Cut (continued)

- **Half Lap / (M) Config**
- **Simple scarf / (M) Config**
- **Scarf (straight) / (M) Config**
- **Scarf (diagonal) / (M) Config**
- **Scarf (with wedge) / (M) Config**
- **Diagonal cut / (M) Config**

See end-types chapter. 2.5 beam
3D Cut

5.11 Cut (continued)

This function differs from the longitudinal assembly functions by the fact that it also cuts the elements in two ways. Only one single element needs to be activated at the start of the function.
5.11 Cut (continued)

- Heel sh./(M)Config V+S
- Double sh./(M)Config V+S
- Others ...
- BrdMth
5.11 Cut (continued)

The distances correspond to the ones described in the previous function 'Cut-Loghome-Joists' and won't be explained again in this section.

Cut wall envelopes by sector and housed.
5.11 Cut (continued)

- Lap
- Beam end profiles
- Without profile
- Concave profile
- Convex profile
- Complex profile

Cut half laps in wall logs.
5.11 Cut (continued)

- **Rounded profile**
- **Convex-concave profile**
- **Multiple cuts**
- **Solder D**
- **Options ...**
  - **Global-cut** Create a cut through a complete model.
  - **Global-cut --> 2dc** Create a cut through a complete object and save it in 2dc format.
  - **Intersection** Isolate the common part of two colliding models.
  - **Corr. facets Ctrl+F** Identify and correct the erroneous facets.
  - **Collision check Ctrl+K** Analyze the collisions between volumes (Attention: this can last a few minutes depending on the quantity of information)
  - **Delete process Ctrl+D** Erase one or more cuts or processes. The process is displayed white, can be selected with the white mouse button and need to be confirmed with the right mouse button.
5.12.1 Auxiliary lines in 3D

Auxiliary lines work the same way in all cadwork modules. Note that it is hard to see auxiliary line intersections in 3D.

- Inters. 2 str proj: Auxiliary point at the intersection of 2 lines projected in the plane. The projection plane passes by the point of "origin".s.
- Inters. 2 straights: Auxiliary point at the intersection of 2 lines or edges in 3D. The intersection point can only be found if the two lines actually touch.
- Inters. plane + pt: Auxiliary point where the line (or edge) crosses a defined plane.
- Inters. act el - plane: Auxiliary point at the intersection of all the edges of an active element with a defined plane.
- Point by ratio: Auxiliary point based on the distance ratio between 2 points.
- Midpoint M: Auxiliary point centered between 2 points.
- Divide: Auxiliary point on any division between 2 points.
- Straight 2 points: Auxiliary line between 2 points.
- Straight paral + dist.: Auxiliary line parallel to an edge or a projected segment with a chosen distance.
- Straight paral + pt: Auxiliary line parallel to an edge or a projected segment with a chosen point.
- Straight x+pt X: Auxiliary line parallel to the x axis and by a point.
- Straight y+pt Y: Auxiliary line parallel to the y axis and by a point.
- Straight z+pt Z: Auxiliary line parallel to the z axis and by a point.
- Straight _|_ plane + pt: Construction line perpendicular to a plane (defined by 2 edges or 3 points) and passing by a point.
- Straight on edge: Auxiliary line on a "clicked" edge.
- Delete points: Delete the designated points.
- Delete straights: Delete the designated lines.
- Delete all: Delete all the auxiliary lines together.

5.12.2 Auxiliary lines in 2D

Auxiliary lines work the same way in all cadwork modules.

5.13 Export (Shop drawing, List, Files, etc.)

Export

- Catalog: Export active element to catalog (library).
- Profile catalog: Export active profile element to profile catalog.
- Std beam Shift+S: Beam or panels elements have a variety of properties and attributes. Existing elements with all definitions made can be exported as standard elements. The user can choose what attributes should be redefined if the "standard-element" is inserted in 3D. If the check box is not checked the saved attributes will be used. If it's checked, it will prompt the user to define it upon insertion.
5.13 Export others

- **Std panel** Shift+P

- **Std connector axis** Shift+C

- **Shading (\*.shai)**
  - Shading
  - Animation (\*.shac)
  - Export a walking path for cadwork movie maker

- **Settings ...**
  - Lines, axes
  - Diam. lines, axes
  - Number of segments
  - Spot 1
  - Spot 2
  - Spot 3

- **Smooth def.**
  - Select element
  - Delete
5.13 Export lists (continued)

Lists
- Production list
  - Calculate
  - List module
  - Calculation config...

Project data...

Options
- Delete Pos. no.
- Move Pos. no.
- Compress Pos. no.
- Continuous positioning
- Manual positioning
5.13 Export lists (continued)

The parts list differs from the production list by the fact that the analysis of pieces is based on a very basic; raw geometry without cuts or processes. The list can, however, take into consideration the over measures and rounding values. The other functions are identical.

The optimization can be made in 3D or in the list module. If it’s done in 3D, the information from the optimized beams is available and visible in 3D. If done in the list module the result is only available as a list. A mix of optimized and non optimized pieces is thus possible. For more information about the optimization consult the list in the manual.

Assembly list number (special layout number system for log homes and SIP’s). The system works with different rows and within that row it is using an index for the part position. For example:

Row 1
Part 1.1, 1.2, 1.3 etc.
Row 2
Part 2.1, 2.2, 2.3, 2.4 etc.
5.13 Export lists (continued) / Export machine

- **End-type list**
  - Tenon 1
  - Tenon 2
  - Tenon 3
  - Tenon 4
  - Lengthening
  - Front slot
  - Dovetail dado
  - Dovetail
d  - Dovetail gen.
  - GMI
  - GMI with counterp.

- **Node list**
  - Number database
  - Attribute no.
  - Position no.

- **Machine Ctrl+Q**
  - BTL export ...
    - BTL 10.2
    - BTL 10.1
    - BTL 10.0
    - BTL 6.0
    - BTL 5.0
    - BTL 1.0

- **Hundegger ...**
  - Hundegger P8/P10  "old" Hundegger Joinery machines
  - Hundegger K1    First Hundegger K series Joinery machines
  - Hundegger K2    Hundegger K2 series Joinery machines
  - Hundegger K2+/K3 K2+=5 axis machine: K3=3 position wagon system
  - Hundegger Speedcut Hundegger SC series cutting machines

For process time and price estimates a list with endtypes can be created.

Node list in text format with automatic numbering and X/Y/Z coordinates.

Node list in text format with numbering, only X/Y/Z coordinates.

Node list in text format with the production number as well as X/Y/Z coordinates.

The BTL interface is a standard interface initialized by cadwork and developed in collaboration with SEMA. The BTL format is along its way to becoming the standard means of exchanging CAD files to CNC machines in the wood construction industry. For more info see: www.design2machine.com.com

"old" Hundegger Joinery machines

First Hundegger K series Joinery machines

Hundegger K2 series Joinery machines

K2+=5 axis machine: K3=3 position wagon system

Hundegger SC series cutting machines
5.13 Export Machine (continued)

- **Hundegger PBA**
  - Hundegger PBA (Gantry type machine)
  - Hundegger PBA using the new BVX file format
  - Hundegger SPM
  - SPM=Speed-Panel-Machine (panel saw)

- **Weinmann**
  - Weinmann MFB+FS
    - Multi function bridge and Framing station
  - Weinmann Single-piece
  - Weinmann WBZ
    - Weinmann-Joinery machines

- **Krüsi**
  - Krüsimatik BTL 10.2 Format
    - Krüsimatik joinery machine using BTL 10. Old machines using ATG and KRU
  - Krüsimatik BTL 10.1 Format

- **Schmidler**
  - Schmidler BTL 10.2 Format
    - Schmidler joinery machine using BTL 10. Old machines using ATG or BTL.
  - Schmidler BTL 10.1 Format

- **Uniteam**
  - Uniteam Ultra
    - Uniteam Ultra joinery machine; made in Italy. Various models using BTL 1.0 to BTL 10.2 format; depending on model and age.
  - Uniteam Ultra BTL 10.2
  - Uniteam Ultra BTL 10.1
  - Uniteam Ultra BTL 10.0
  - Uniteam Ultra BTL 5.0
  - Uniteam Extra
    - Uniteam Extra joinery machine; made in Italy. Various models using BTL 1.0 to BTL 10.2 format; depending on model and age.
    - Uniteam Extra BTL 10.2
    - Uniteam Extra BTL 10.1
    - Uniteam Extra BTL 10.0

- **Essetre**
  - Essetre joinery machine; made in Italy. Various models using BTL 1.0 to BTL 10.2 format; depending on model and age.
  - Essetre BTL 10.2
  - Essetre BTL 10.1
  - Essetre BTL 10.0

- **Kuka**
  - Kuka is a robot used in modern timber production facilities. Various models and systems using BTL 10 to BTL 10.2 format; depending on model and age.
5.13 Export Export Machine (continued)

Bautech ... Bautech is a framing machine for wall, roof and floor panels. Various models and systems using proprietary Bautech formats.


3D Export Machine

- Delete process data
- Process options
- Vega
  - Calculation/(M)Config
  - Individual control
  - Check processes
  - Export
  - Delete process data
  - Process options
  - Lap-->Blocking groove
  - End lap-->Ridge lap
  - Marking as brdmth (M)
  - Double marking/(M)Config
  - Process code
  - Process name
  - Parts in contact
  - Process test
  - Help elements
5.13 Export Machine (continued)

Lignocam is a general CAM-solution for all kinds of CNC machines in the wood industry. Lignocam is using the BTL interface.

- Lignocam BTL 10.2 format
- Lignocam BTL 10.1 format
- Lignocam BTL 10.0 format
- Lignocam BTL 6.0 format

Licam
- Calculation
- Individual control
- Check processes
- Export
- Delete process data
- Process options

Old CAM-System from 1994 developed for the Lignamatic joinery machine. No updates and services available. Operating system OS2.

Technowood
- Calculation
- Individual control
- Check processes
- Export
- Delete process data
- Process options

CAM-System and single beam processor software by Technowood. Used for all Technowood 'Appenzellerholz' Solid wood wall machines.

 CMS
- Calculation
- Individual control
- Check processes
- Export
- Delete process data
- Process options
### 5.13 Export machine (continued)

- **Others ...**
  - Universell: BTL 1.0
  - Depauw: Miter saw; mostly used for Gangnail systems
  - Randek: Miter saw
  - Sapex: Miter saw
  - NC-Hops: Panel processing machine
  - DXF for Machine: Universal format for various machines
  - IGES for Machine: Universal format for various machines

- **Hardcopy**
  - Hardcopy in file
  - Image (*.tif, *.jpg) \( \text{Shift} + \text{T} \)

- **Files ...**
  - -> 3D (*.3d): Cadwork 3d file
  - -> IGES (*.igs): Export 3d wire frame
  - -> DXF file (*.dxf): Export 3d DXF
  - -> ACIS (*.sat): Export 3d SAT. 3d solid model; used for Autodesk products and others
  - -> STEP (*.stp): Export STEP file
  - -> DTH (*.stp): Export DTH file
  - -> IFC (*.ifc): Export IFC. 3d solid model; used for Archicad, Nemecek and others
  - -> VRML (*.wrl): Export VRML file. Used for 3D-Studio-Max and others
  - -> Tornado (*.viz): Export Tornado-Viewer file
  - -> Wavefront (*.obj): Export in general visualization format
  - -> Artlantis (*.atl): Export to Artlantis rendering software
  - -> 3D Viewer (*.ivx): Export to cadwork-Viewer and Lexoviewer

- **Module ...**
  - Multiwall export
  - S&S-List (*.hlz)
6. Left menu

6.1 2D-Plane

In order to simplify the drafting process, one can go from a 3D to a 2D environment; this is what we name a 2D plane. We then progress as if we were working in 2D with the abstraction of a dimension (length, height or width depending on the position of the piece to be drawn). These planes as well as auxiliary lines can be saved under a name. The saved planes remain even after closing the saved file in 3D.

By clicking on the menu \textit{2DP} with the middle mouse button (M), we can directly access the saved planes.

By clicking on the menu \textit{2DP} with the right mouse button (R), we can directly access the saved planes but the view is inversed by 180°.

When we're in a work plane, a left click of the mouse (L) on the button \textit{2DP} with the middle button of the mouse will bring us to the saved planes menu. The defined plane can be saved by clicking on \textit{2DP} with the middle button of the mouse.
**6.1 2D-Plane (continued)**

- **Plane _|_ edge Alt+T**
  
  Previous plane
  
  New plane
  
  Save plane

- **Plane 3 points Alt+Q**
  
  Previous plane
  
  New plane
  
  Save plane

- **Plane 2 edges Alt+K**
  
  Previous plane
  
  New plane
  
  Save plane

- **Plane edge+point Alt+P**
  
  Previous plane
  
  New plane
  
  Save plane

- **Plane _|_2 Pt XY projected**
  
  Previous plane
  
  New plane
  
  Save plane

- **Plane active facet**

  This plane can only be chosen if a facet of the volume or surface has already been activated. The view direction can be inversed with the shortcut: "W".

- **Plane current view Alt+H**

  This function transforms the current view into a 2d plane. It works best for 2d views in 3d (eg. X/Y/Z view).

- **Saved planes Alt+G**

  Each plane can be saved (middle click on the 2D plane). In a saved working plane, the auxiliary lines are preserved as well. The saved planes are also preserved even after closing the file. These saved planes can be erased by moving the cursor on the name of the plane by pressing the DEL button.
6.2 Per = Perspective (define perspective views)

- **Per**: Central perspective using the current view
  - **Previous perspective**: Previous perspective
  - **Perspective 2 points**: Perspective view using two points (observer and viewed point)

- **Perspective value**: Perspective view using the coordinates of two points
- **Window xyz views**

- **Animation (.shac)**: Export walking path for cadwork movie maker
- **Angle of view**: The view angle can be chosen between 0° and 180°

6.3 A xo = Axonometric view

- **A xo**: Middle mouse button calculates the values of the current axonometric view
  - **Standard axo**: Standard axonometric view
  - **A xo 3 points**: Define axonometric view using 3 points (counterclockwise)
  - **A xo 2 points**: Define axonometric view using view direction (2 points)
6.3 Axo (continued)

Standard axo

6.4 V1 - V4 = Views (save and open views)

<table>
<thead>
<tr>
<th>V1</th>
<th>V3</th>
<th>Save and recall views (V=View)</th>
</tr>
</thead>
<tbody>
<tr>
<td>V2</td>
<td>V4</td>
<td>(L) recall saved view (V1-4)</td>
</tr>
</tbody>
</table>

(M) save current view under V 1-4

6.5 X,Y,Z,A (define view parallel to the axes)

<table>
<thead>
<tr>
<th>X</th>
<th>-Y</th>
<th>(L) View parallel to the standard axis (X, Y, Z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>A</td>
<td>(M) similar to (L) but rotated 180 deg</td>
</tr>
</tbody>
</table>

(R) View parallel to the standard axis (X, Y, Z) without changing actual zoom

A = Standard-Axonometric view

6.6 Dynamic rotation and zoom

5 C

Set rotation angle between 1, 5 or 30 deg,

C Turn dynamic rotation center on/off

Rotate arround Z-axis or horizontal axis using "SCHIFT" + "ARROWS" keys
6.6 Dynamic rotation and zoom (continued)

Dynamic rotation and zoom (must be activated in "Settings").
(L) Left mouse click => the object remains visible, and rotation or zoom is somewhat slow.
(M) Middle click the mouse => A replacement cube will be built around the construction to allow a quick zoom. All active elements will be shown in the cube.
(L) Left mouse click during the function => change from the rotation/zoom to PAN mode (move)
The rotation is also possible by combining the "Shift" and the "arrow" keys.
Hidden lines (generate hidden line view)

In hidden line mode, the construction elements can be represented by hidden lines. This can be very useful when dealing with unclear construction details. In hidden line mode, no element can be activated or modified. When calculating the hidden lines, only the axes found in the visible zone are taken into account. This is equally applicable to the listed attributes, for example, the position numbers. The transfer in cadwork 2D or the exporting of image files (*.tif) is equally possible with the help of <, > the clipboard or the EXPORT --> Image (*.tif).

Mouse functions:

(L) Calculate Hidden lines for all elements with at least one visible point in the current view. Elements that are outside the current view won't be calculated in hidden lines.

(M) Compute hidden lines for all visible elements.

(R) Compute hidden lines in OPEN-GL mode. The advantage of the OPEN-GL mode is that the model can be rotated and the user can work within hidden lines. Export to Cadwork 2d is not possible. However a TIF or JPEG file can be created.

This window can also be recalled using the right mouse button.
6.8 Open-GL (generate rendered mode)

Open-GL-mode: The green button changes between wire frame mode and open GL mode. The open GL mode allows dynamic real time rendering with textures and transparency as well as other options such as dynamic hidden lines.

- **Wire model**: Wire model
- **Hidden line**: Hidden line
- **Render without cont.**: The model is rendered and the edges of the volumes are made invisible
- **Render contour black**: The model is rendered; its contour or edges are black
- **Render contour color**: The model is rendered and its edges are the same color as the volume
- **Render +Line (Combi.)**: The model is rendered and all lines and edges are visible
- **Display material texture**: Display material textures. Settings made in material window
- **Display bitmaps**: Display bitmaps (images on surfaces)
- **Smooth**: The facets of the curved shapes will either be smoothed or removed
- **Texture transparency**: Display texture transparency. Settings made in material window
- **Hardware acceleration**: Activate/deactivate hardware acceleration. (Deactivate only if video card problems appear)

In this configuration window, the lights and background colors can be defined. Small films can also easily be made. See manual 'Movie Maker'.
6.9 Lasso = Lasso points

- Lasso= white: to activate elements, you must completely enclose them => change to red by clicking on the button.
- Lasso= red: The lasso must at least enclose a point of the element for the whole element to be contained in the selection.

6.10 M1 - M8 / M-Auto (save and open view modes)

During the design process, it’s often necessary to momentarily hide certain elements. The construction is thus made clearer. The elements concerned must be selected and then made invisible (see MODE).

Selections of displayed and hidden elements can be saved in view modes M1-M8. The function works similar to the views V1-V4. The middle mouse button (M) saves the actual mode and the left mouse button (L) recalls the saved view.

New elements can be added after recalling a mode; like for example M2. In order to add the new elements to mode M2, the elements need to be activated and saved in M2 using the middle mouse button (M).

M Auto recalls the previously visible elements

Using the left mouse button and the shift key activates the mode MX. If the mode is active the M-button is pushed and all new added elements will be automatically saved in the M mode. Note that only one mode MX can be active at a time.

1. Activate elements to be hidden
3. Click mode M1 using the middle mouse button (M) in order to save the current view.
4. Activate and hide the dormer rafter
5. Save now visible elements under mode M2.

6. Recall:
   Use Vision and + Act. Elements or the shortcut .

7. Recall elements saved under M2 using the left mouse button (L).

8. Recall elements saved under M1 using the left mouse button (L).
6.11 Zoom (increase/decrease size of views on screen)

1. (L) Zoom all. Zoom on all visible elements
   (R) Zoom on all active elements

2. Z+ The "Z+" function with the left mouse click (L) allows you to define the zoom using a lasso. Left click to define the initial corner, stretch the rectangular lasso on the zone you wish to zoom on and release once the zone is defined. The "Z+" function with the right mouse click (R) created a factor 2 zoom. It is equally possible to use the "+" function by positioning the cursor on a point corresponding to the center of the new zoom. A factor 2 zoom is made by clicking.

3. Z- With a "click" on "z" and by moving the mouse to the right, the size of the post will decrease. Re-clicking with (R) ends the zoom, maintaining (L) allows you to slide the window. Click with (R) on "Z" creates a zoom (reduction) of 0.5 factor. This zoom of 50% is equally obtained by clicking on the < - > button.

4. Previous zoom. The last 4 zoom views are saved.
6.12 Vision (modify display settings for element attributes)
6.12 Vision (modify display settings for element attributes) (continued)

- Auxiliary el.
- Rotation elem.
- Cadwork elem.
- Export solid
- Container
- Global cut el.
- Element module type...
  - Wall
  - Roof
  - Floor
  - Opening

Color nodes/axes ...

1: cyan
2: blue
3: green
4: grey
5: red
6: brown
7: yellow
8: black
9: dark green
10: orange
11: violet
12: dark red

Number ...
Palette ...

Return

- Nodes
- Axes ...
  - Normal axes
  - Round axes
  - Rectangular axes
  - Eave axes
The end types can be visualized with symbols, names, or materialized geometry. For example, if the materialization function is activated, the tenon is visualized as a solid volume.
6.12 Vision (modify display settings for element attributes) (continued)

- Ref. side wall B: Display reference side for wall/floor/ceiling envelopes
- Ref. side Ctrl+B: Display reference side for beams
- Ref. surface panel Alt+B: Display reference side for panels

Options ...

- Element pts: Displays every point of an element using red points
- Auxiliary lines: Displays auxiliary lines
- Origin: Display origin
- Aux. origin: Display auxiliary origin
- Cutting surfaces (2DP): Display cutting surfaces of 2d plane (displays all elements that are cut by the 2d plane)
- Node no. database: Display internal database number
- Node no. attribute: Display internal database number (attributes)
- Axis no. database: Display internal database number (axis-#)
- Axes pts beam: Display axis points for beams (center points beam end)
- Local axes: Display local axis
- 1 active element:
- Several elements are active:
- Max. triang. edges: Hides the longest edge of a triangle. That way a triangulated volume, like for example a terrain model, looks more real.

Chief element = master element used for the export shop drawing-group. The local axis of a chief element defines the orientation of the other parts in the shop drawing. The chief elements are represented in dotted lines.

Chief elements can be defined as follows: Modify--> Additional settings --> Chief element.
**6.13 Settings (modify user settings)**

**Catalog**

Using the "N" button, it's possible to directly access a predefined personal catalog. In this catalog we find elements exported and saved by the user as well as cadwork catalog elements.

**3D catalog**

**User catalog ...**

**Current dir.**

**Variants ...**

Using the "Shift + N" button, it's possible to directly access a predefined variant catalog as well. Same as catalog.

**Variant cat. Shift+N**

- **Standard folder**
- **Choose folder ...**
- **Current folder**

**Unlock variant**

A variant can remain "Variant", meaning parametric or it can be exploded in single elements. (For more info, please refer to the variant manual).

**Timber ...**

- **End-types ...** See end types chapter 2.5
- **Shop drawing (DPP)** See manual shop drawing
- **Element module ...** See manual Element module
- **Log home ...** See manual Log Home

**Markings**

One element marks the element in contact. Marking criteria can be defined by geometrical situation as well as by attributes. Location and type of marking can also be setup. Note that some machines cannot process certain markings.

**Corner joint general**

**Joists ...**

**Rafters ...**

**Horizontal surface**

**Surface perp. to length axis (endgrain)**

**Vertical surface**

**Surface perp. to height axis (top view surface)**

**Surface non horizontal and non vertical**

**Surface perp. to width axis (front view surface)**
Actualize lists = only the attributes of pieces drawn in current 3D are posted: In an init file attributes lists such as names, groups, remarks, etc. are predefined. In order to find out what attributes are not currently used the lists can be actualized and not used entries will be hidden. Note that this operation can affect your computer's performance.

- Names
- Groups
- Subgroup
- Comments
- EDP code
- Beam X-section

Remarks:

- Menu red: only attributes used in the actual 3D model will be listed.
- Menu blue: personal attributes: 10 personal attributes can be listed as you desire. They can be customized in Settings-->Timber--> User attributes

Edit list. If the option to delete entries which are not being used is selected in an empty file, the list of names will be completely erased.

- Add
- Delete
- Modify
- Delete unused entries

Groups, Sub groups, Comments, EDP code, Material:

- Same as "Name"
- See materials window; here we can define new materials, erase them, regroup them, modify them, or attribute a texture to them, and even more...
**6.13 Settings (modify user settings) (continued)**

In addition to the basic attributes of the program, 10 "User" attributes (your personal attributes) are available. These attributes appear in blue in the different cadwork menus and are therefore easy to identify.

**Authorisation code**
See installation manual Version 16

**Open GL ...**
See settings OPEN GL in chapter 6.8

---

**User attributes ...**
- User 1: Same as "Name"
- User 2: Same as "Name"
- User 3: Same as "Name"
- User 4: Same as "Name"
- User 5: Same as "Name"
- User 6: Same as "Name"
- User 7: Same as "Name"
- User 8: Same as "Name"
- User 9: Same as "Name"
- User 10: Same as "Name"
6.13 Settings (modify user settings) (continued)

**Language**
- Francais
- Deutsch
- English
- Italiano
- Espagnol
- Tschechisch
- Finnisch
- Russisch
- Polnisch
- Rumänisch

**Options ...**

**Saving interval**
Define the interval for Auto-saving (in minutes)

**Security copy ...**

**Representation ...**

- Auxiliary lines color
- Points color
- Symbol nodes

**Adapt ... Alt+W**
- Cadwork frame
- Windows frame
- White background
- Windows fonts

Change background color (black or white)
6.13 Settings (modify user settings) (continued)

- Cadwork fonts
- Cursor menu ...
  - Frame
  - Filled
  - Cursor
  - Cursor 2D
  - Cursor 3D
  - Z axis
  - Symmetry plane
  - Rotation cursor
- Dyn. rotation
- Info activate
- Info direct
- Funktiones F1-F12
- Mouse wheel  Turn mouse wheel on/off
- User name  Enter User name
- Undo-steps  Number of possible undo steps
- Activate ...
  - Vol. + surfaces  Here we can define which elements can be activated or which elements must be ignored by selection.
  - Normal nodes
  - Connector nodes
  - Normal axes
  - Bolt axes
  - X-sect. axes
  - Activate group
  - Contact tolerance  Contact tolerance for bounding-box, defining parts in contact.
6.13 Settings (modify user settings) (continued)

- **Copy** ...
  - **Multiple** The function remains selected until the user decides otherwise.
  - **Join** The copies are automatically joined.
  - **Activate copies** The copies remain selected automatically.
- **Help video folder** ... Choose the folder containing the help videos.

**Test options...**

- **Message no.** Test options. Only for internal use.
- **Without backup**
- **Console**
- **Display intro**
- **Roof pro interface**

6.14 Measure

**Measure**

- **Direct distance 0** Direct distance between two points or edge
- **Projected distance**
- **Added distance**
- **Coordinates**
- **Angle 2 edges**
- **Angle 3 pts**
- **Angle line-plane**
Center of gravity with or without considering the material (optional). The values used for calculation are geometry and material data.