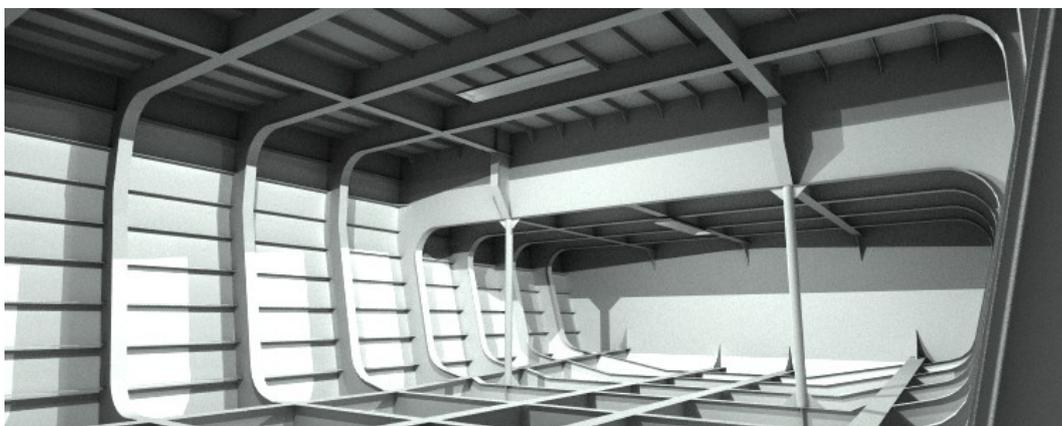


# Ship Wizard

**USER MANUAL v0.0.0.3 alpha**

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## **Requirements**

PC running Rhinoceros 3d v5 under Windows

## **Installation**

Open an empty file in Rhino. Drag and drop ShipWizard.rhp into the Rhino window. Import toolbar ShipWizard.rui to Rhino. Test if everything is working correctly.

## **Feedback and comments**

If you have any feedback please report it at [mklimek.info](http://mklimek.info) website, [food4rhino.com](http://food4rhino.com) comment section or Rhino discourse in the plugin section. Also check regularly for new versions.

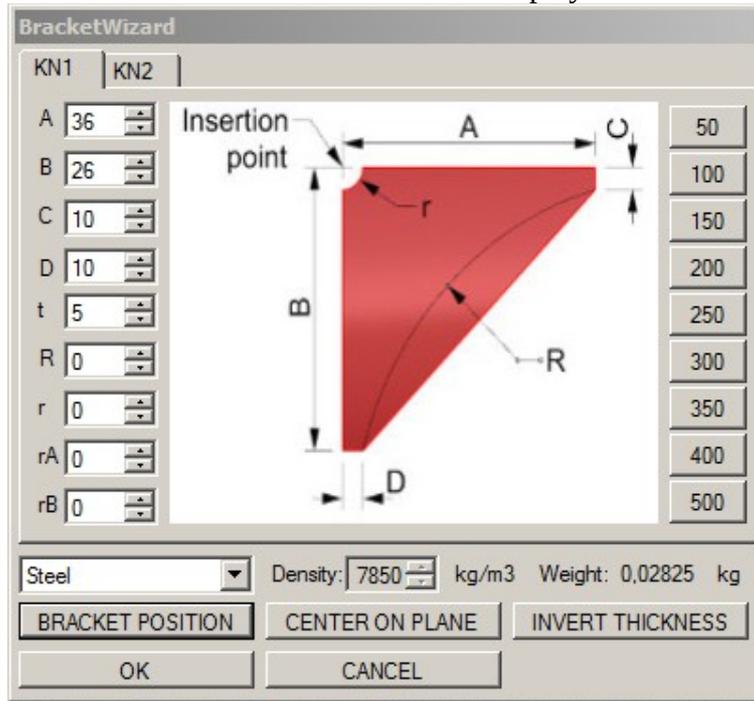
## **Usage**

Copies of all files should be saved before using this plugin to prevent data loss. After clicking the function icon a form will be displayed. Alternatively one can type one of the following commands:

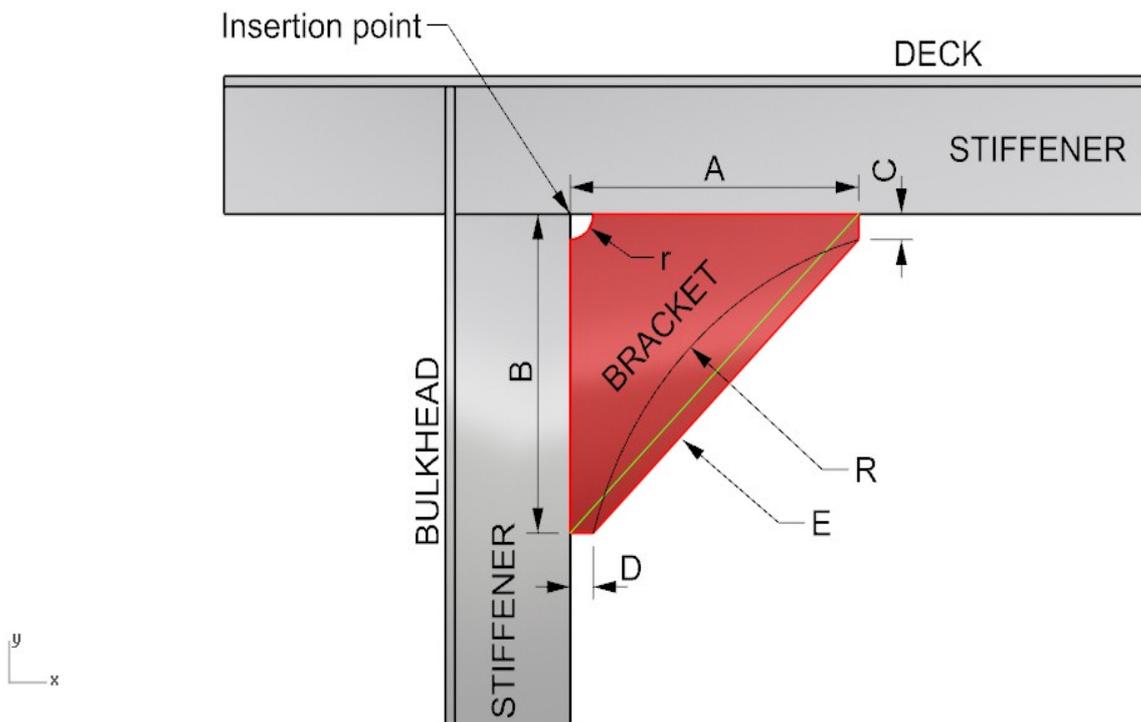
BracketWizard  
StiffenerWizard

# BracketWizard

After calling the command BracketWizard form is displayed.



First step is to indicate the bracket placement position by showing lines for two edges A and B. To do it press **“Bracket position”** button and draw lines for arm A and arm B of the bracket. Direction of the line should generally be from insertion point outwards. The angle between arms does not have to be equal to 90deg but angles > 180deg are not possible. Please note that it is not necessary to draw the full length of the arm or start from insertion point - only direction must be given. Lines drawn do not have to cross each other – intersection point will be found by the plugin. The fourth point will be constrained to the plane of the first three points. **Tip:** it is useful to use a correct length of the arm - it will be used as default in the form.



Next step is to choose bracket type (only type KN1 is currently implemented) by switching the tabs . All dimensions can be adjusted in the form with live update on the screen.

Scallops can be inserted by defining **r** value. If **r=0** there will be no scallops at all. If **r<=10** there will be chamfer instead of the scallops. **rA** and **rB** control scallops in other corners in a similar manner.

Free edge can be modeled as an arc if radius in field **R** is provided. Min radius is calculated and if the radius provided is smaller a straight edge will be used. Subsequently **R** field will be set to 0. To return to straight edge form an arc set **R** field to 0.

To define thickness you need to change **t** value. Thickness offset can be adjusted with “**Center bracket**” to put bracket center on the bracket plane or “**Invert thickness**” to change thickness offset side.

*Hint:* Thickness **t** input may be red if :

$$\text{Free edge length} > t * 60$$

where free edge length is defined as:

- shorter length between lines C and D (E on Fig.1) for C and D > 20;
  - longer length between lines C and D (green line on Fig.1) for C or D < 20
- This is provided as a hint and does not guarantee parameters fulfill this formula.

On the right side of the form user can find buttons with predefined brackets. Following parameters are used:

Button text	Bracket arm length A, B	Weld step length C, D	Scallops radius r
50	50	10	Chamfer 10/45°
100	100	10	Chamfer 10/45°
150	150	10	Chamfer 10/45°
200	200	10	20
250	250	20	20
300	300	20	20
350	350	20	20
400	400	20	20

Thickness is variable and depend on free edge length (green line on Fig.1) but can be overrode at any time.

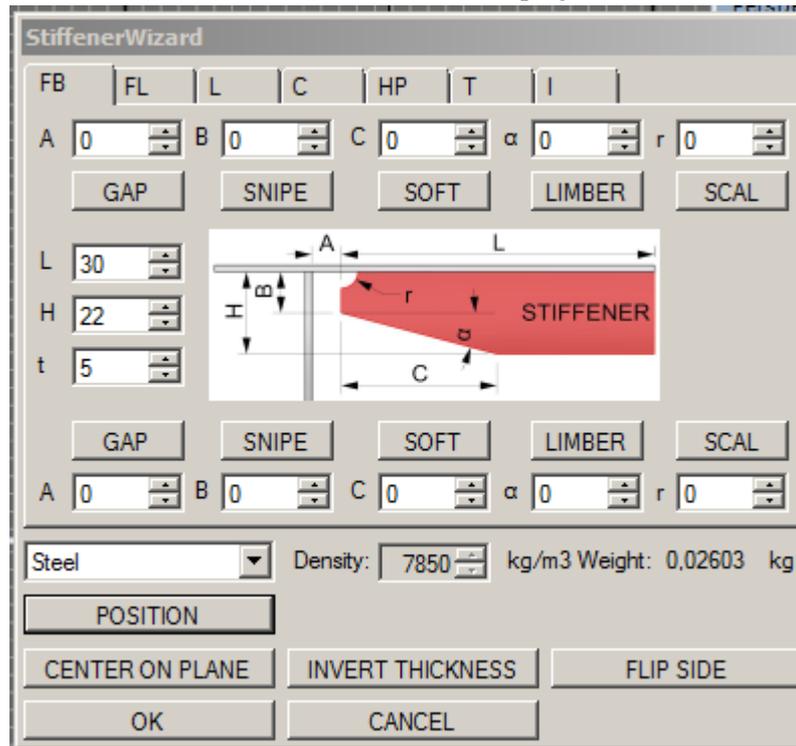
The form provide weight estimate for the bracket. User can choose material from the dropbox and density will be shown on the right side of it. Weight is recalculated automatically. Please note that it is an estimate and may be incorrect. User should calculate final weight independently after the bracket is created.

Press OK button to close the form and add the bracket to Rhino document or cancel to leave and delete the bracket.

Check if the object is created as intended (e.g. if dimensions are correct) as well as if the weight is correct. Check for the data corruption in the file.

## StiffenerWizard

After calling the command StiffenerWizard form is displayed.



First step is to indicate the stiffener placement position by showing lines for two edges L and H. To do it press “**Stiffener position**” button and provide three points – two for direction L and one for height and orientation of the stiffener.

It is possible to change length and height later. Generally the stiffener should be drawn from object to object as gap can be added as endcut.

The type of the stiffener can be changed by switching tabs (currently only FB is implemented). Length of the stiffener can be changed by adjusting the **L** value, **H** value adjust the height and **t** adjusts the thickness. Thickness offset can be adjusted with “**Center on plane**” to put stiffener center on the stiffener plane or “**Invert thickness**” to change thickness offset side. It is possible to flip the FB in regard to the primary edge by clicking “**Flip**” button.

## FB - Creating flat bars

Variety of endcuts is possible by changing the parameters. Changing parameters in the top of the form change one end of the stiffener and changing the one on the bottom change the other end, so endcuts do not have to be identical.

Scallops can be inserted by defining  $r$  value. If  $r=0$  there will be no scallops at all. If  $r \leq 10$  there will be chamfer instead of the scallops. Pressing LIMBER button will switch from scallops to a limber hole located 50mm from the stiffener end.

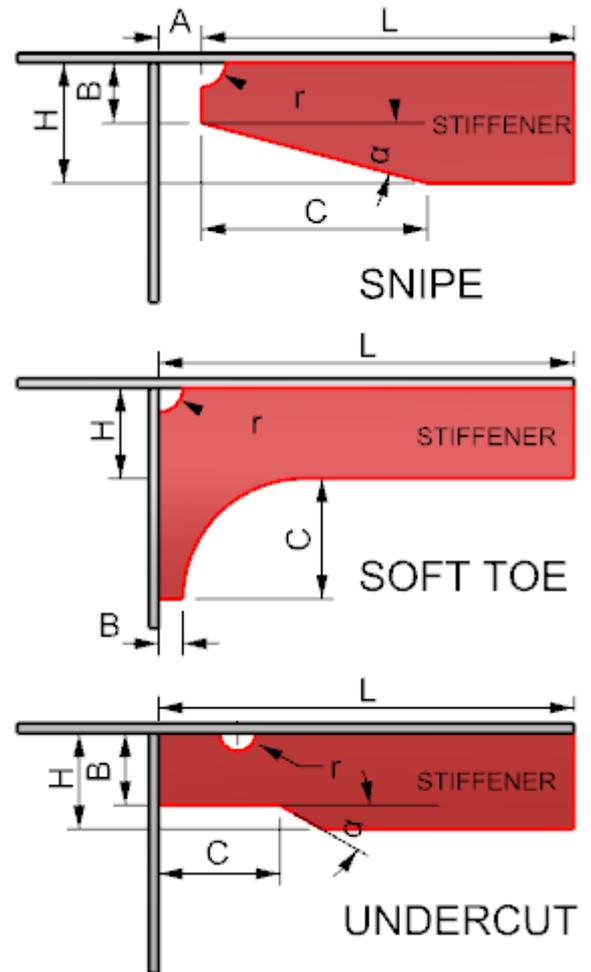
SOFT button creates soft toe endcut. The radius is controlled with  $C$  parameter and weld step is controlled with  $B$  parameter.

SNIFE button creates sniped endcut. Weld step is controlled with  $B$  parameter and snipe length is controlled either with  $C$  parameter as length input or  $\alpha$  for angle input.

UCUT button is available after clicking snipe button. It creates an endcut suitable for placing FB under angles, Tees etc.  $B$  parameter controls the internal height of the angle,  $C$  controls the flange length,  $\alpha$  controls the transition angle where 0 mean perpendicular.

GAP button provides a 20mm gap endcut. Clicking it twice reset endcut to none.

*Tip: It is possible to add scallops or limber hole to all other endcuts. It is currently impossible to use limber hole and scallops at one endcut.*



Clicking buttons provide predefined endcut with following parameters:

Button text	Parameters
GAP	$A = 20$
SNIFE	$A = 20, B = 20, \alpha = 30$
UCUT	$B = H - 5, C = H$
SOFT	$B = 20, C = H$
SCAL	$R = 10$ for $H < 75$ , $r = 20$ for $H > 75$

The form provide weight estimate for the stiffener. User can choose material from the dropdown and density will be shown on the right side of it. Weight is recalculated automatically. Please note that it is an estimate and may be incorrect. User should calculate final weight independently after the bracket is created.

Press OK button to close the form and add the bracket to Rhino document or cancel to leave and delete the bracket.

Check if the object is created as intended (e.g. if dimensions are correct) as well as if the weight is correct. Check for the data corruption in the file.