# Rhino Beam Tools - User Manual

## Introduction

*Rhino Beam Tools* is a plugin for Rhino 3D, designed to draw mechanical Beams and Nodes in context, then export them in a Beam calculation software. Currenttly, *RhinoBeamTools* is only compatible with ©Steel<sup>1</sup> (Editor: ®Bureau Veritas).

## **Plugin installation**

## Overview

The plugin installer can be downloaded at: https://www.tomkod.com/product/rhino-beam-tools/ A free trial is included, and yearly licenses can be purchased on the aforementioned page. *Rhino Beam Tools* works for Rhino 5<sup> $^{2}$ </sup>, Rhino 6<sup> $^{3}$ </sup>, and Rhino7<sup>4</sup>.

## Yak

Our plugins are also compatible with <u>Yak</u>, Rhino's new package manager <sup>5)</sup>, which is basically an application store for Rhino. You just need to call Rhino's command **\_PackageManager**:

Last

upuate: 2021/02/09 start:plugins:rhinobeamtools:rbt-usermanual https://wiki.tomkod.com/doku.php?id=start:plugins:rhinobeamtools:rbt-usermanual&rev=1612862737 10:25 Package Manager × Online Installed tomkod AttributeAnalysis Name: v2.0.4-beta **AttributeAnalysis** Downloads: AttributeAnalysis is a tool designed to give you Author: Matthieu Arnold (TomKod) a fast Analysis of your rh... Installed: 2.0.4-beta ~ Version: v1.0.5-rc DrawUserTexts Date published: Jundi 14 décembre 2020 This plugin for Rhino6 brings several life changing https://www.tomkod.com/ tools for your 2D drawi... Url: product/attribute-analysis/ Description: v1.0.3-beta LightweightSurvey AttributeAnalysis is a tool designed to give you a This plugin for Rhino allows your technicians to fast Analysis of your rhino model attributes. Select conduct a vessel os full su... an attribute: all your objects will be colorized automatically and a color key table will be displayed. You will also be able to select objects by v1.1.0 attributes. MarineWeightSchedule The Marine Weight Schedule plugin for Rhino6 can generate a bill of masses ... v1.1.2 RhinoBeamTools Rhino Beam Tools is a rhino plugin built as a bridge Install between Rhino and spec... Uninstall ✓ Include pre-releases

You can also install from the repository with the following command line:

"D:\Program Files\Rhino 6\System\Yak.exe" install 'PluginName'

If you add this in a batch file (\*.bat) at windows startup, it is probably the best way to keep all your plugins up-to-date 😉



## License activation

https://wiki.tomkod.com/

Close

Help

#### Prerequisites

The free evaluation can be used once per computer, and requires network access to www.license.tomkod.com The license activation requires network access to www.tomkod.com

Please check your firewall in case of failure.

#### Activation form

The activation window automatically shows up when the plugin is loading and a valid license or trial is not registered. If you want to see, change or remove your license while the plugin is already loaded, you can use the Rhino commands **PluginName\_License**.

Activation status is always visible on the upper right corner of the form, if the icon is green your plugin will be enabled:

$\checkmark$

#### Trial Tab

This first tab is dedicated to the trial requests. Your trial status is displayed, and the button is disabled if a trial is not available for your computer (Your trial has already been activated, or the server is unreachable)

TomKod license activation - Tal	ble 3.x	?	×
Tom Kod >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	Plugin Status Enabled - license is valid	0	
Free Trial License Commercial Lice Computer ID:	ense Details		
Reque	est Free evaluation (*)	ł	
Status: Accepted (End dat		1	

#### **Commercial Tab**

This tab's two main buttons let you Check-out (Activate) or Check-in (Desactivate) your license from

our license server.

TomKod licens	e activation - Table	: 3.x		?	>
FomKod oftwares for use		Plugin Status Enabled - licens	e is valid	Ø	
Free Trial License	Commercial Licens	e Details			
Email	and an order	com.			1
Product key					ļ
Activ	rate (Check-Out)	- 3	Desactivate (C	heck-in)	
Status: Dis	abled				
Enable floa	ating licenses ( Affe	cts every TomKo	d plugins )		
Use a license ce	artificate				
	anti-in mathead for all	fline activation u	sing a certifica	te file	
Alter This can a	void network activa	tion issues, but th	e license won	't be floating.	

When the checkbox "Enable floating licenses" is checked, every TomKod's plugin will try to deactivate the license automatically when closing (Making it available for another of your computers)

Finally, a license certificate (\*.TkLic) can be selected at the bottom of this tab. It allows to activate a license offline, but the license won't be floating anymore. If you need one, contact us at https://www.tomkod.com/contact/

#### Toolbar

The toolbars for Rhino are always included in your plugins installation directory, or can be downloaded here.

You just have to drag/drop the file "Tomkod.rui" to a rhino window to install them.

## Generalities

#### Definitions

#### Nodes

Nodes are custom points with translations and rotation constraints defined on x, y & z axis. Every node in the model is identified by a unique number.

#### Beams

Beams are oriented lines located between two nodes <sup>6)</sup>. They are represented as an arrow, and have an optionnal angle option. Every beam in the model is identified by a unique number.

#### Sets

A set is a group of beams. It is mainly used to easily select beams together.

## Interface

#### Panel

*Rhino Beam Tools* comes with a user panel to interact with your Beams, Nodes and Sets. The panel display is refreshed in real time. If you select a beam or a node in the model, the panel is automatically enabled and the appropriate tab is opened. The *Display* tab offers quick access tro display settings.

Nodes Beams Sets Display	Nodes Beams Sets Display	Nodes Beams Sets Display	Nodes Beams Sets Display
Nodes Beams Sets Display Selected Nodes list: 60, 50 DOFs Trans. /y - free Trans. /y - free Rot. /y - various Rot. /y - various Rot. /z - various Rot. /z - various C Fixed O Free Spring O Forced Spring O Forced	Nodes     Beams     Sets     Display       Selected Beams list: 23     Definition       First Node     61       Second Node     50         Angle       90.00     \$       Value:     90       Z Local Vector:     0;-9;18         Reverse Beams	Nodes Beams Sets Display Sets of Beams Test1 Test2 Create Set Rename Set Add beams to Set Remove Beams from Set Remove Set	Nodes     Beams     Sets     Display       Beams display <ul> <li>Enable oriented preview</li> <li>Enable local axes display</li> </ul> Nodes display        Enable local axes display           Nodes display <ul> <li>Enable annotations</li> <li>Show Nodes Labels</li> <li>Show node constraints</li> </ul> <ul> <li>Text height</li> <li>11.000</li> <li> </li> <li>Annotation colors;</li> <li>Fixed nodes</li> <li>Translation-fixed nodes</li> <li>Free nodes</li> </ul>
	Keverse beams	Remove Beams from Set	Fixed nodes Rotation-fixed nodes Translation-fixed nodes

#### Annotations

*Rhino Beam Tools* offer the possibility to display annotations in the model with the every node's settings:



The content, size, offset and color of these annotations can be edited in the RhinoBeamTools' panel's *Display* tab. *Constraints* can be "Fixed", "Free", "TranslationFixed", "RotationFixed", or Custom.

Custom constraints are displayed like this: x, y & z values for translation (t), then x, y & z values for rotation (r).

The values can be 0=fixed , 1=free, 2=spring, 3=forced.



In the example above, the node #87 is rotation-Free, with translation-fixed on x, translation-spring on y, and translation-free on z

### **Display settings**

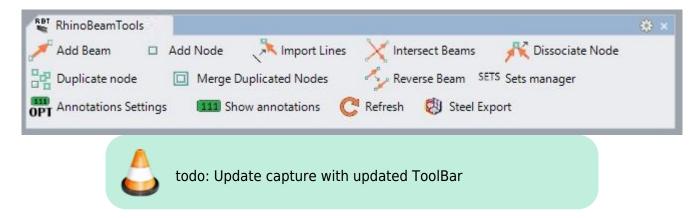


The display settings can be edited from RhinoBeamTools' panel's *Display* tab. These settings are immediately applied when their values is changed, and are saved in the plugin.

	Name	Description				
Beams	Enable oriented preview	Shows or hides 3D H - shaped beams to make it easier to understand the beams orientation.	Nodes	Beams		Display
Enable local local x, y		Shows or hides the beams' local x, y & z axis, taking in account the beams' angle values.	🗹 Ena		nted prev I axes dis	
	Enable annotations	Shows or hides the nodes annotations.	Node	s display		
	Show nodes labels	If enabled, the nodes annotations content will include the nodes' labels. (IDs)	<ul> <li>Enable annotations</li> <li>Show Nodes Labels</li> <li>Show node constraints</li> </ul>			100-002
Nodes	Show nodes constraints	If enabled, the nodes annotations content will include the nodes' constraints.	Text o	eight 1 ffset -	16	• •
display settings	Text height	Sets the nodes annotations' display height. If too small this option might be ignored.	Fixed			
	Text offset	Sets the nodes annotations' display offset. The offset if oriented in the screen vertical direction.	Free n	odes	ed node:	s
	Annotation colors	Clicking on these buttons opens a dialog form to set custom display colors for particular node constraints.	Other	nodes		

#### Toolbar

A toolbar is included in Tomkod's toolbar group, with buttons available for most commands:



## Commands

## **RBT\_About**

This command can be used only from the command line prompt. It displays the plugin's current revision and license status.

About			3
RhinoBeamToolsRH6 - v1.0.6.0			^
Commercial Name: Rhino Beam Tools 1.x Update Status: Rhino Beam Tools 1.x: Your current version (1.0.6./ Editor: TomKod Copyright: Copyright ©Ship-ST 2020	0) is an early release candio	date. Latest stable v	ersion: 1.0.6
License status: License status unknown (Not implemented yet.) Computer ID:			
CHANGELOG:			
>			
/1.0.6 (14-10-2020)			
Fixed: When a model contains Rhino Beams or nodes, any item se	elected would bring to from	nt the RBT_Panel	
15 available commands:			
TK SetLicenseMode			
RBI About			
RBT_AddBeam			
RBT_About RBT_AddBeam RBT_AddNode RBT_DiscosiateMode			

## **RBT\_License**

This command can be used only from the command line prompt. It displays the plugin's activation form.

See license\_activation.

## **RBT\_AddNode**

Add Node This command adds a node to the model.

#### Walkthrough

- 1. Pick a location
- 2. The node is created without constraints (Free)
- 3. === Options ===

#### No option available.

#### **RBT\_AddBeam**

Add Beam This command adds a beam to the model.

#### Walkthrough

- 1. Pick two nodes
- 2. The beam is created from the first node to the second node.

#### Preselection

Preselection is allowed, but the nodes order will be random. If more than two nodes where preselected, the beam will randomly be created between two nodes.

#### Options

No option available.

### **RBT\_DissociateNode**

Mode This command allows to separate two beams with a common node by duplicating the node.

#### Walkthrough

- 1. Select the beam that should be dissociated (The one that will be linked to a new node)
- 2. Select which node should be dissociated: *StartNode* or *EndNode*
- 3. Choose if the node constraints should be duplicated <sup>7</sup>). If *No* is selected, the new node will be unconstrained (Free).
- 4. Pick the new node location

#### Preselection

Preselection is allowed if only one beam is preselected

#### Options

- *StartNode* or *EndNode*
- Duplicate the node constraints

## **RBT\_ImportLines**

Import Lines This command can convert lines and curves into beams and nodes.

#### Walkthrough

- 1. Select the line and curves that should be imported
- 2. Choose if the original lines should be removed
- 3. For each non linear curve, a segment count option is shown to split the curve in several lines. The current view is zoomed in and the current curve is highlighted.
- Every beams and nodes are created, duplicated nodes are removed and intersecting beams are splitted.

	¥
Command:	÷
Add Beam 🛛 Add Node 💸 Import Lines 🔀 Intersect Beams 🥂 Disso	-
Merge Duplicated Nodes	tings 💶 Show annotations 🕐 Refresh »
Perspective	<ul> <li>Bea O Prop O Ren U Layers Help</li> <li>Nodes Beams Sets</li> </ul>
Z Y Perspective Dessus Face Droite +	No Selected Nodes  DOFs  Trans. /x -  Trans. /z -  Rot. /x - Rot. /y - Rot. /y - Rot. /z -  Fixed Spring  Free Forced  Free Forced
✓ End ☑ Near □ Point ☑ Mid □ Cen □ Int □ Perp ☑ Tan □ Quad □ Knot □ Vertex □ P	Project Disable
	tho Planar Osnap SmartTrack Gumball Record Histon Filter 1

#### Preselection

Preselection is allowed.

#### Options

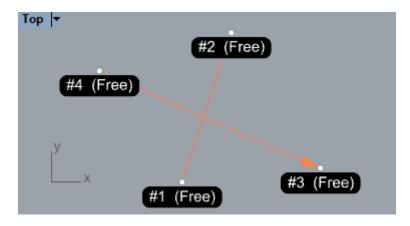
• *Delete original lines* : Select wether or not the original curves should be removed from the model upon completion.

## **RBT\_IntersectBeams**

Intersect Beams This commands check the whole model and adds node at beams intersections.

#### Walkthrough

Launch the command and that's it!



#### Options

No option available.

## **RBT\_MergeDuplicateNodes**

Merge Duplicated Nodes This command merge node with the same location.

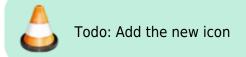
#### Walkthrough

- 1. Set the tolerance (Default 0.001)
- 2. Every duplicated nodes are merged in the model

#### Options

• *Tolerance* : in model unit, maximum distance to consider two nodes duplicated.

## **RBT\_Export**



Exports your beams, nodes and sets to  $\[mathbb{C}\]$  Steel<sup>8)</sup> or RDM7.

#### Walkthrough

- 1. Launch the command
- 2. Select a file path and extension to export the model to ©Steel3 (\*.*stw*\*), ©Steel4 (\*.*steel*\*), or RDM6-7 (\*.*por*\*)
- 3. The file is created, then RBT attempts to open it with windows default program for this extension.

#### Scripted mode

No Scripted Mode

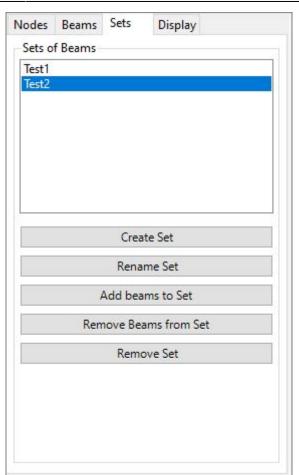
#### Options

No option available.

## **RBT\_SetManager**

This command<sup>9)</sup> is a direct link to the *Rhino Beam Tools* panel's *Sets* tab

- 1. Launch the command
- 2. RhinoBeamTools' panel<sup>10)</sup> will be opened, with the *Sets* tab selected.



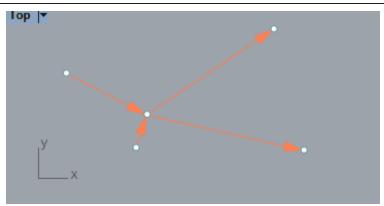
#### Options

No option available.

## **RBT\_ReverseBeam**

Reverse Beam This command reverses the beam's first and second node.

- 1. Select the beams
- 2. The beams nodes are swapped. The arrow orientation are refreshed as well as the node infos.



#### Preselection

Preselection is allowed, every selected beams will be reversed.

#### Options

No option available.

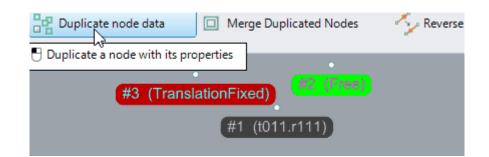
#### Alternative

A *"Reverse beam"* button is available on the panel's Beams tab. It does the same thing but does not allow to reverse several beams at the same time.

## **RBT\_DuplicateNodeData**

Duplicate node data This command copies a node's constraints to another.

- 1. Pick the original node to duplicate its constraints
- 2. Pick one or several nodes that need to be changed
- 3. The selected nodes are updated with the original node's constraints



#### Preselection

Preselection is enabled if one and anly one node is preselected.

#### Options

No option available.

## **RBT\_ShowAnnotations**

111 Show annotations

#### Walkthrough

- 1. Launch the command.
- 2. If annotations were visible, they are hidden, if they were hidden they will be shown

OPT Annotations Settings	1111 Show annotations 🛛 📿 Refresh
	#2 (RotationFixed)
	#4 (t011.r111
(#1 (Free)	#3 (TranslationFixed)

#### Options

No option available.

## **RBT\_DisplaySettings**



This command<sup>11)</sup> is a direct link to the panel's *Display* tab

### Walkthrough

- 1. Launch the command
- 2. RhinoBeamTools' panel<sup>12)</sup> will be opened, with the *Display* tab selected.

Nodes	Beams	Sets	Display	
Beam	s display			
En:	able orien	ted prev	view	
🗹 Ena	able local	axes dis	play	
Node	s display			
En En	able anno	tations		
She	ow Node	s Labels		
She	ow node	constrai	nts	
Text h	eight 11	.000	1000	
Text o	ffset -1	6		
Annot	ation color	<u>'5:</u>		
Fixed	nodes			
Rotati	on-fixed	nodes		
Transl	ation-fixe	ed node	5	
Free n	iodes			
				-

## **RBT\_ImportSteel4File**

This command is a beta prototype. It might have unwanted behaviours and we will decline any responsability if it causes damages to your model. TomKod may or may not publish a proper version at a later date.

Attempts to import a Steel (\*.steel) project beams' and nodes' in your Rhino models.

- 1. Launch the command
- 2. Select the file to import
- 3. Nodes are imported with their contraints
- 4. Beams are imported

## **RBT\_Refresh**

C Refresh

This command forces a display update:

- Overlapped nodes are merged
- Beam errors are detected
- Beam positions are fixed
- Rhino views are redrawn

Normally you don't need to use this command.

#### Options

No option available.

```
1)
v3 or v4
2)
Rhino 5.12 or later
3)
Rhino 6.15 or later
4)
Tested up to Rhino 7.1
5)
Rhino 6 or later only, with graphic user interface for Rhino7 only
6)
More specifically, two node definition numbers
7)
default value = true
8)
®Bureau Veritas' beam calculation software
9) 11)
Formerly named RBT_AnnotationsSettings
10) 12)
```

```
See interface
```

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Permanent link: https://wiki.tomkod.com/doku.php?id=start:plugins:rhinobeamtools:rbt-usermanual&rev=1612862737

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