Marine Weight Schedule - User Manual

Introduction

Marine Weight Schedule is a plugin for Rhino 3D designed to generate - from a vessel's 3D model - a bill of masses/inertias, as well as a Bill Of Materials. It take in account points, curves, surfaces, solids and blocks, and use the parameters from the layers names to apply the unitary/lineic/surfacic/volumic masses, with a margin percentage applied.

A command is also provided to generate an hydrostatic report at a given height interval (based on Rhino hydrostatics features)

Both reports will be generated as excel files (.xlsx) based on a customizable template, but microsoft excel doesn't need to be installed on the computer.

Plugin installation

Overview

The plugin installer can be downloaded at: https://www.tomkod.com/product/marine-weight-schedule/ A free trial is included, and yearly licenses can be purchased on the aforementioned page. *Marine Weight Schedule* works for Rhino 6¹⁾ and Rhino7²⁾.

Yak

Our plugins are also compatible with <u>Yak</u>, Rhino's new package manager³⁾, which is basically an application store for Rhino. You just need to call Rhino's command **PackageManager**:

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 (a) (b) (c) (c)	AttributeAnalysis v2.0.4-beta AttributeAnalysis is a tool designed to give you a fast Analysis of your rh v1.0.5-rc DrawUserTexts v1.0.5-rc This plugin for Rhino6 brings several life changing tools for your 2D drawi v1.0.3-beta LightweightSurvey v1.0.3-beta This plugin for Rhino allows your technicians to conduct a vessel \$ s full su v1.1.0 MarineWeightSchedule v1.1.0 The Marine Weight Schedule plugin for Rhino6 can generate a bill of masses v1.1.0	Urk Description: AttributeAnalysis fast Analysis of an attribute: all automatically ar	AttributeAnalysis 3 Matthieu Arnold (TomKod) 2.0.4-beta lundi 14 décembre 2020 https://www.tomkod.com/ product/attribute-analysis/ is is a tool designed to give you a your rhino model attributes. Select your objects will be colorized nd a color key table will be vill also be able to select objects by
e Inclu	RhinoBeamTools v1.1.2 Rhino Beam Tools is a rhino plugin built as a bridge between Rhino and spec de pre-releases		Install Uninstall
			Close Help
You	can also install from the repository with the	e following co	mmand line:
"D:	\Program Files\Rhino 6\System\Ya	k.exe" ins	tall 'PluginName
-	u add this in a batch file (*.bat) at windows all your plugins up-to-date 😉	s startup, it is	probably the best wa

Downloading PluginName(X.X.X)... Downloaded PluginName(X.X.X) Installing PluginName(X.X.X)... Successfully installed PluginName(X.X.X) C:\>

License activation

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:

Plugin Status	
Enabled - license is valid	\sim

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	- Table 3.x	?	×
Fom Kod > Softwares for users, by users	Plugin Status Enabled - ficense is valid	Ø)
Free Trial License Commercial	License Details		
Computer ID:	Referred.		
R	equest Free evaluation (*)		
	equest Free evaluation (*) I date: 21/12/2020)		

Commercial Tab

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

our license server.

TomKod license	e activation - Table	e 3.x		? ×
FomKod Softwares for user		Plugin Status Enabled - lic	ense is valid	
Free Trial License	Commercial Licens	e Details		
Email	1	e.com		
Product key				
Activ	ate (Check-Out)		Desactivate (C	heck-in)
Status: Dis	abled			
Enable floa	ating licenses (Affe	cts every Tor	nKod plugins)	
Use a license ce	etificate			
	native method for o void network activa			

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.



Features and commands

MWS_About

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

5/12

About .		>
MarineWeightSchedule - v1.1.0.0		-
Commercial Name: Marine Weigth Schedule T.x Update Status: Marine Weigth Schedule 1:x: Your current version (1.1.0.0) is a Editor: TomKod Copyright: Copyright ©Ship-ST 2020	in early release candidate. Latest stable version: 1.	0.9
License status Commercial license: Enabled - Successfully activated. 0 out of 1 activations re Trial status: Ended Computer ID: TomKodDevComputerUniqueID	enaining	
CHANGELOG: V1.1.0 (21 dec. 2020) Added: Keywords for ywk package		
9 available commands		
HydrostaticReport MWS_License MWS_About ProjectWeightReport GBlock_GeltLint Oblock_Select GBlock_SelectWeitMissingData GBlock_ReadData GBlock_ReadData		
	Copy Alt Save As	-

MWS_License

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

See license_activation.

ProjectWeightReport

Computes the whole model masses, <u>as well as a Bill Of Materials</u>⁴⁾ and generates an excel report.

Walkthrough

For each layer⁵, the command will retrieve the *Mass*, *Margin* and *Vertical offset* values from the layer name⁶, then:

- For each rhino object, the actual mass and gravity center will be computed, using the layer values. The layer's *Mass* will be used differently, depending on the object's type: ponctual mass for Points, lineic mass for curves, surfacic mass for surfaces⁷⁾, and volumic mass for closed polysurfaces.
- 2. At the same time, the Bill-of-Materials will be created internally.
- 3. An excel report will be created.



Model preparation

The fondamental idea of this plugin is to match data from the model's objects and their layer. For this reason, each layer should contain only one specific material. *For example:*

- The layer **Deck1:SectionB:Nuts** could contain only points, and the layer's (mass) information would be used as a ponctual mass for each nut.
- The layer **Deck1:SectionB:plates** could contain only surfaces, and the layer's *(mass)* information would be used as a surfacic mass for each plate.

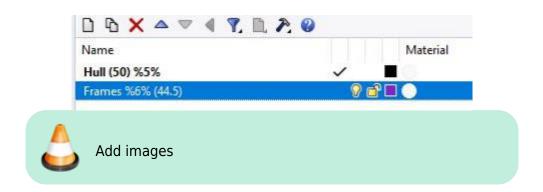
Layers naming convention

The document's layers should follow the following naming convention:

```
LayerName (Mass) %Margin% |VerticalOffset|
```

where:

- Mass will be the ponctual/lineic/surfacic/volumic mass
- Margin (optional) will be the percentage to add to the object's mass.
- VerticalOffset (optional) will be the the vertical offset to apply to the layer's masses



Particular case for Stiffeners

A specific naming convention has been added to properly count the stiffeners in the Bill-of-Materials, to consider the scenarii explained below.

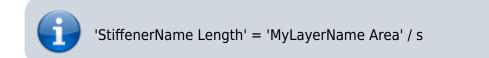
Those particular cases only impact how materials will be counted in the Bill-of-Material tab. <u>The weight report results</u> won't be impacted.

• Implicit stiffeners

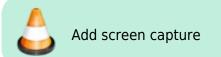
There are some cases where you don't want/need to create an actual geometry for your structure stiffeners, for example when you are at the early stage of your project. *Implicit stiffeners* let you count the required stiffener lengths relative to the layer's metal sheet's areas.

LAYERNAME:	MyLayerName	(Mass)	%Margin%	VerticalOffset	[StiffenerName
s=value]					

In the Bill-of-Material, this would create two outputs: an area for the surfaces in "*MyLayerName*", and a length for their stiffeners.



For example:



• Stiffeners defined as curves in the model

Two kind of curves-defined stiffeners can be used:

• Folded plates

LAYERNAME: W:120×6 BF60

This will be counted as one surface, Thickness 6, width=120+60. Thus the result in the Bill-ofmaterials will be:



'Th.6 plate Area' = length x (120+60)

• Profile with flat plate

```
W:120x6 F:80x8
```

This will count as one surface, Thickness 6, width=120, plus one profile 80×8

In this case, the command will output an area for the plate, and a length for the profile:

'Th.6 plate Area' = length x 120

'80×8 profile length ' =length

• Stiffeners defined as surfaces in the model

In some cases, you might want to represent your stiffeners as a 3D surface in the model, but count them as lineic outputs in the Bill-of-Materials because they are technically profiles.

LAYERNAME: F:80×8

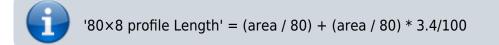
This would output:



As for the weight estimate, the layer's optional %Tolerance% will be considered:

```
LAYERNAME: F:80x8 |34.1| (87.2) %3.4%
```

This would output:



Particular case for Blocks



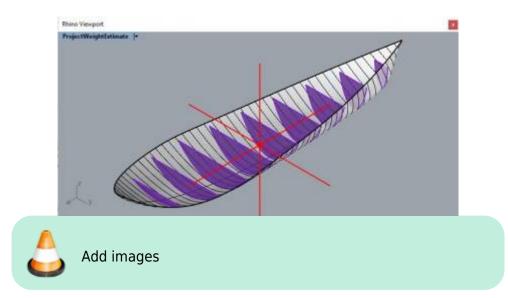
Output

An excel report is generated:

9/12

ast update on 11/10/201				Weight Es	e : xxx s timate-rev0 ent :			
Refere	Reference _ DemoDVP.3dm Masses inertias			VIIIII				
ltem	Mass (kg)	Xg (mm)	Yg (mm)	Zg (mm)	lxx (kg.mm²)	lyy (kg.mm²)	lzz (kg.mm²)	XIIXIIAIAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
olumic Masses	0	0	0	0	0	0	0	
urfacic Masses	11041866	343895	0	-34890	3.1504E+16	4,4484E+17	4,6281E+17	
ineic Masses	0	0	0	0	0	0	0	
onctual Masses	0	0	0	0	0	0	0	
		1.1.0X02.02000						
otal	11041866	343895	0	-34890	3,1504E+16	4,4484E+17	4,6281E+17	
]	lx= ly= lz=		New Inertia 616 935 700 72 052 930 000 80 160 090 000			

A custom ViewPort is created with the gravity center displayed:



Options

No option available.

Customization

The excel file template can be modified in the plugin's install directory.



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HydrostaticReport

Computes an hydrostatic analysis at different heights and generates an excel report.

Walkthrough

The hull's surface or polysurface is selected as input. Once validated, Rhino's hydrostatic culculation is runned at various heights as defined in options, and an excel report is generated.

4	А	8	C	D	E	F	G	н	L I	J	к	L
1	.in							1		CASE : xxx		
1	MSW								Hyd	rostatique	-rev0	
-	~	-						1		Customer		
	Last up	date: 09/10/2	018 (18:40)									
			Reference :	HULL.3dm								
	Density:	1.025										
	TE (mm)	Hull Volume (m3)	Displaceme nt (Kg)	LCB (m)	TCB (m)	VCB (m)	Wet Surface (m ^a)	Lwl (m)	Bwl (m)	Floating Surface (m ²)	LCF (m)	TCF (m)
)	0	0	0	0	0	0	0	0	0	0	0	0
1	400	104,716	107333,9	6,6647E-09	4,4018E-15	0,211786	309,518	28,931	11,0001	300,97	2,6666E-09	-1,7745E-1
2	800	234,389	240248,725	-4,4117E-08	2,0758E-09	0,42879	368,815	32,3866	11,2	341,889	-1,6783E-08	2,6562E-0
3	1200	377,207	386637,175	-1,2697E-07	3,7393E-09	0.646117	422,516	35,3723	11,2	371,786	-4,1417E-08	5,4739E-0
1	1600	531,539	544827,475	-1,3983E-07	6.3871E-09	0,865704	476,361	38,3579	11.2	399,569	-2,5545E-08	9,1985E-0
5	2000	696,379	713788,475	-1,2904E-07	9.0957E-09	1,0873	527,381	40	11,2	421,618	3,5812E-10	1,2235E-08
5	2400	0	0	0	0	0	568,751	0	0	0	0	0
7												

Options

TEMin	Minimum height (mm)
TEmax	Maximum height (mm)
Delta	Distance between two tested height (mm)
Density	Water Density
AutoMinMax	Detect TEMin and TEmax values from geometry (Only available when a geometry is selected)

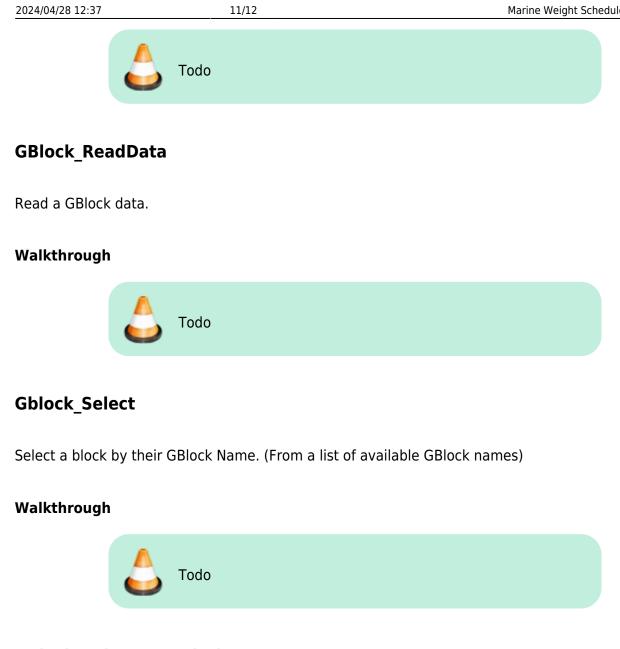
Customization

The excel file template can be edited in the plugin install directory.

GBlock_GetList

Lists every existing GBlock names and masses to the command line.

Walkthrough



GBlock_SelectNextMissingData

Select the next block in the document where gravity center and mass are undefined



GBlock SetData

Add gravity center and mass informations to a block. GBlocks are considered by the command ProjectWeightReport , which makes them extremely useful for your equipements.

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Walkthrough



1)

3)

4)

Rhino6.15 or later 2)

Tested up to Rhino 7.1

Rhino 6 or later only, with graphic user interface for Rhino7 only

v1.0.4 and later versions

5)

6)

The whole model or worksession will be used

Read "Model preparation" below

7)

To avoid errors, openened polysurfaces won't be allowed

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Last update: 2021/01/05 10:39

