

Handmanual Rigging App

Introduction

In this document, the manual of the rigging app is shown. Before a crane can lift an object, there needs to be flow chart followed according to the DNV standard. This step plan checks the rigging equipment and the crane. See flow chart beneath, according to the DNV standard the skew load factor is a standard factor. The app calculates this skew load factor in more detail.

After all the checks are done, the app will automatically generate a rapport with all the checks in it.

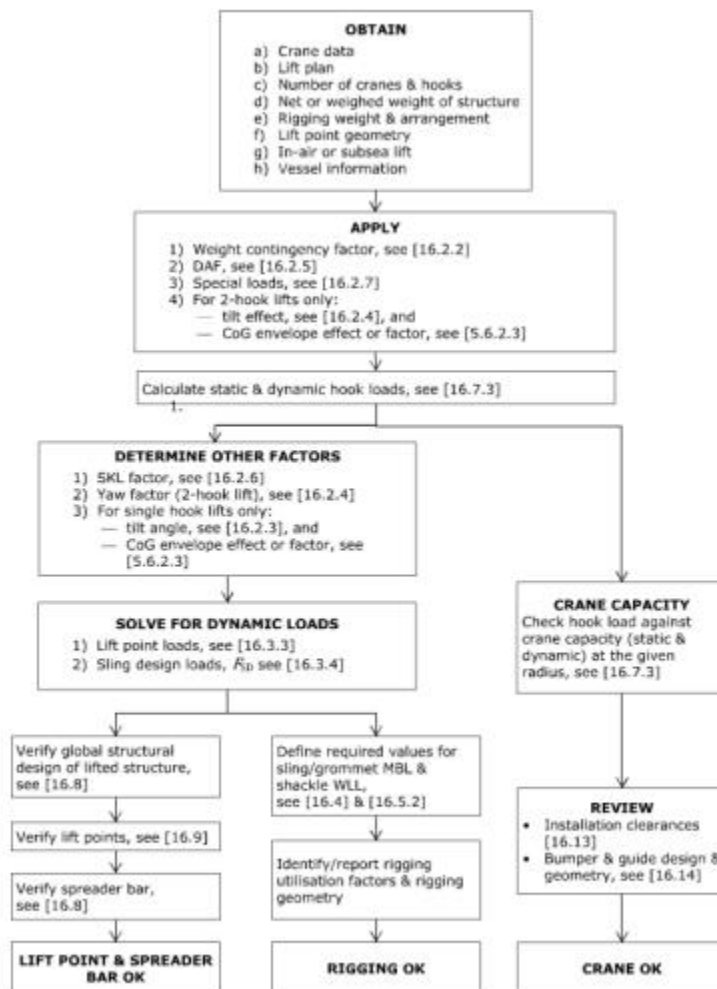
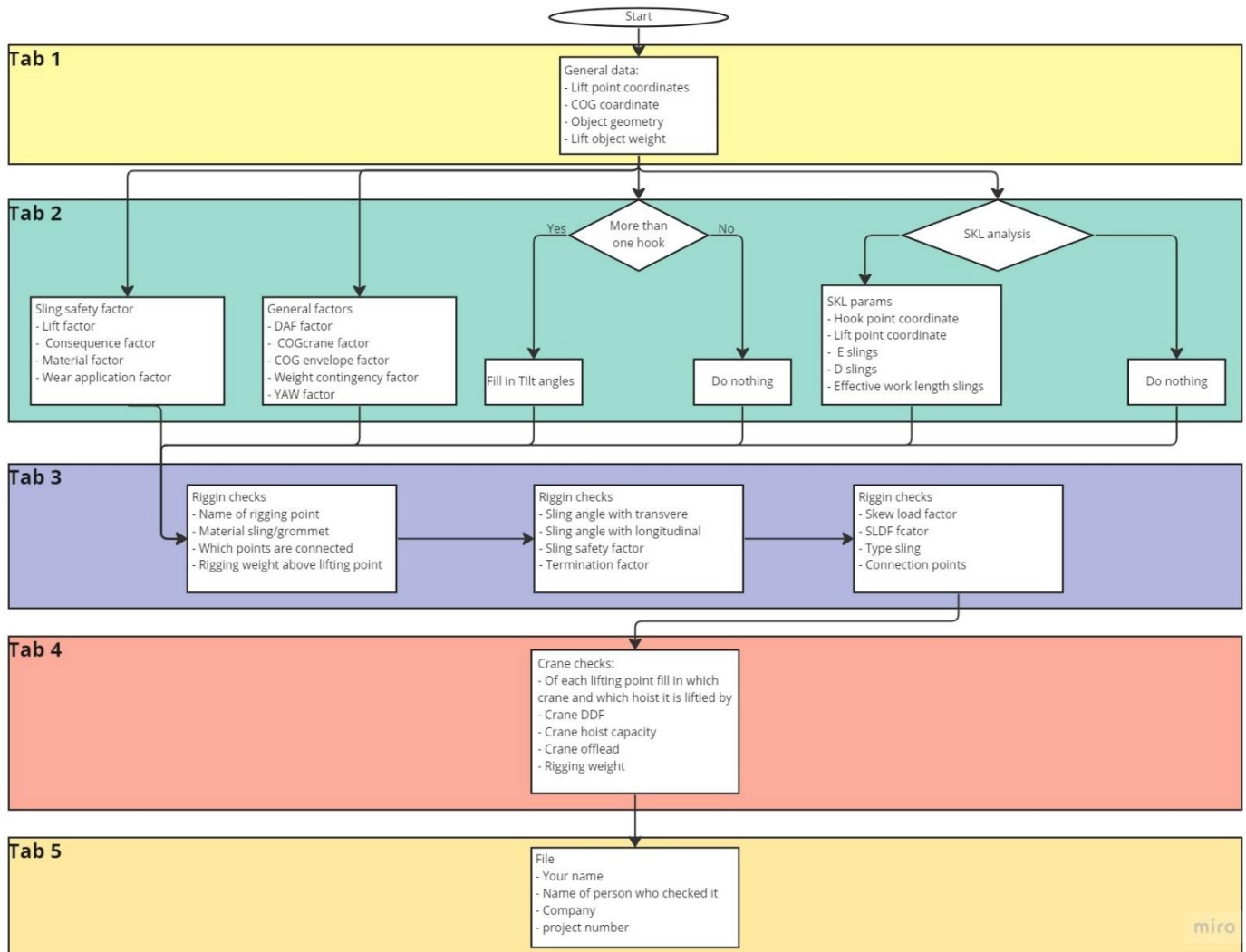


Figure 16-1 Lift calculation flowchart

Flowchart

In this chapter the flowchart of the app is given, in the flowchart is shown in which steps needs to be followed to, all the parameters are put in different boxes. Each box represents a Tab, the frontend of the app consist of 5 tabs, in the next chapter every tab is explained in more detail.



Tab 1: General

Lift pointsss ^

Number of lifting points
1

Lift points

	Lift point	x (m)	y (m)	z (m)
1	A	0	0	0
2	B	0	0	0
3	C	0	0	0
4	D	0	0	0

COG x ([m])
0

COG y ([m])
0

COG z ([m])
0

Object geometry ^

Object lengte (m)
0

Object width (m)
0

Object height (m)
0

Object and rigging weight ^

LW: Weight lifted object (t)
100

Figuur 1: Screen shot tab 1

First fill in the coordinates of the lifting points correctly(red box), then fill in the number of lifting points used(bleu box). The minimal lifting point is equal to one and the max is equal to 4. Then fill in the COG point, object geometry and the weight of the lifted object.

The z-coordinates of both the lifting points and the COG are always positive, z=0 on the bottom of the lifting object.

Tab 2: Factors

General factors

Weight of object ⓘ
Weighted weight

COG shift crane ⓘ
Single hook on single vessel

Dynamic amplification factor ⓘ
Offshore

YAW effect factor ⓘ
Single hook on single vessel

COG envelope ⓘ
Use of COG envelope

Are the hooks above the x-axes different as below?
☐

Are the hooks left from the y-axes different from the right?
☐

See paragraph DNV: 16.2.2

First fill in all droboxes in the red box, for a more detailed explanation of the factor, go with the cursor on the ⓘ symbol (see green circle). The app shows a popup of the chapter where the factor is explained in more detail in the DNV standards.

When there are more than two hooks used, fill in the blue box. First check the boxes for which hooks are different, it is also possible that all the lifting points have different hooks, if this is the case check both boxes on.

When the boxes are checked on, the app shows the picture below:

Are the hooks above the x-axes different as below?
☒

Are the hooks left from the y-axes different from the right?
☒

Which tilt angle (deg) ⓘ
0

Which pitch angle (deg) ⓘ
0


See paragraph 16.2.4.3, (One vessel: 3deg, Two vessels: 5deg)


Go with the cursor on the ⓘ symbol (see green circle). The app shows a popup of the chapter where the factor is explained in more detail and what the usual tilt degrees are.


Sling safety factor


[See dnv 16.4.4](#)


Sling 1.


Lift factor calculated? (default=1.3) 





The consequence factor (default=1.3) 



Material factor 


Steel with 3.1/3.2 Certificate 

Wear and applicaton factor 

Steel with 3.1/3.2 Certificate 

^

▼



+ Voeg nieuwe rij toe

First fill in the red box. When to add another sling safety factor push on the button “voeg nieuwe rij toe”, see blue box. When this button is pushed another box will be shown that is the same as in the picture above. Here you can fill in other sling safety factors.

Is a four point sling, whis statical undert...



If there is a skew load factor, check on this box. The app will show then these input areas:

x position hook[m]
 y position hook[m]
 z position hook[m]

Lift points

	x[m]	y[m]	z[m]
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0

Table slings

	[N/mm ²] E	[mm] D	[mm] L
1	210000	10	0
2	210000	10	0
3	210000	10	0
4	210000	10	0

Calc skew load factor

Skew load factor 1 (-)	Skew load factor 2 (-)
<input type="text" value="1"/>	<input type="text" value="1"/>
Skew load factor 3 (-)	Skew load factor 4 (-)
<input type="text" value="1"/>	<input type="text" value="1"/>
Min pitch angle (deg)	Max pitch angle (deg)
<input type="text"/>	<input type="text"/>
Min roll angle (deg)	Max roll angle (deg)
<input type="text"/>	<input type="text"/>

First fill in all boxes in the red box. The E-modulus, the core diameter(D) and the Effective work length(L) are given from the supplier, when there are multiple slings used and attached to each other with shackles these values needs to be calculated with the hand.

When all params are filled in correctly, press on the “Calc skew load factor” button, when pressed the analysis for the skew load factor starts, this can take a while.

When the analysis is finished the results will be shown in the green box.

Do not change the values in the green box.

Tab 3

Rigging general

Rigging

1.

Rigging point
Name of this point

Material of sling/grommet
Steel

Points connected
A

Rigging weight above lifting point (t)
0

Sling angle with vertical transverse (deg)
0

Sling angle with vertical longitudinal_angle (deg)
0

Sling safety factor
SSF1

Terminationfactor @
Hand splices on wire ropes

Skew load factor
Statically determinate

Which skew load factor is it?
1

SLFD factor
2-part sling passing over, round or through shackle, trunion, padeye or crane hook, other than at a t...

Data sling/grommet

ID number	Type	SWL	D	Amount of parts
1	Type id number	sling	1	1

Connecting points

Which side	Connected to	Diameter (mm)	SWL (t)
1	Upper	Hook	1
2	Lower	Hook	1

+ Voeg nieuwe rij toe

Skew load factor
Statically indeterminate matched pair of slings, analyse

Which skew load factor is it?
1

Fill in all boxes, the red box is the sling safety factor, that is based on the factors that are filled in in tab 2. The dropdown contains all the different sling safety factor.

The green box is the skew load factor, when the left box is equal to "Statically indeterminate matched pair of slings, analyse" then the right box needs to be filled in, which skew load factor it is from the four, different skew load factors that is determined in tab 2.

Data sling/grommet

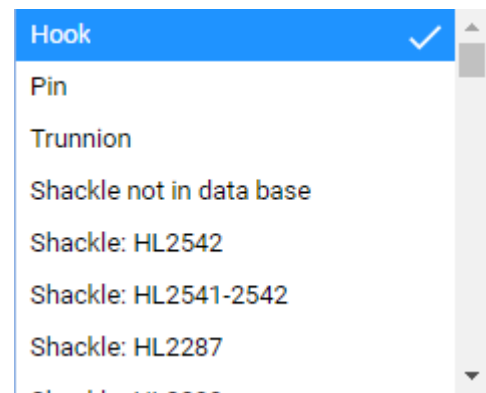
	ID number ▼	Type ▼	SWL ▼	D ▼	Amount of parts ▼
1	Type id number	sling ▼	1	1	1

Connecting points

	Which side ▼	Connected to ▼	Diameter (mm) ▼	SWL (t) ▼
1	Upper	Hook ▼	1	1
2	Lower	Hook ▼	1	1

If the id number of the used sling/grommet is in the data base you can fill in the ID number. If the id number is not in the data base, the app will automatically notice that it is not in the database and the Type, SWL, D needs to be filled in. The amount of parts always needs to be filled in.

On the right picture is the dropdown menu seen, of the connected to box. If the options Hook, Pin, trunnion and Shackle not in data base the diameter and SWL needs to be put in manually. If the shackle is in the data base search it in the textbox.



Tab 4

Lifted info



Lifting table

	Lift point	Which crane	Which hoist
1	A	Crane 1	Aux hoist
2	B	Crane 1	Aux hoist
3	C	Crane 1	Aux hoist
4	D	Crane 1	Aux hoist

Data crane 1



Data crane 2



Fill for each lifting point in, which crane it is lifted by and which hoist.

Name crane

Boka lift 1

Vessel dynamic design factor ([-])

1

Data crane data

	Which hoist	Capacity	Offlead	Rigging weight
1	Main hoist	100	0	0
2	Aux hoist	100	0	0
3	Whip hoist	100	0	0

Fill the DDF and the capacity, offlead and the rigging weight. If there is another crane used fill in the same information of the crane in section data crane 2

Tab 5

What is your name?

Name of person that checked

Name of client

What is project number

Upload drawings



Download word file

In tab 5 fill in the parameters of the file. If there are no wrong messages you can click on the “download word file”, the rigging check word document will be downloaded, note this can take a while.

error messages

Hier komen de foutmeldingen