

# TRAILER CONSULTATION

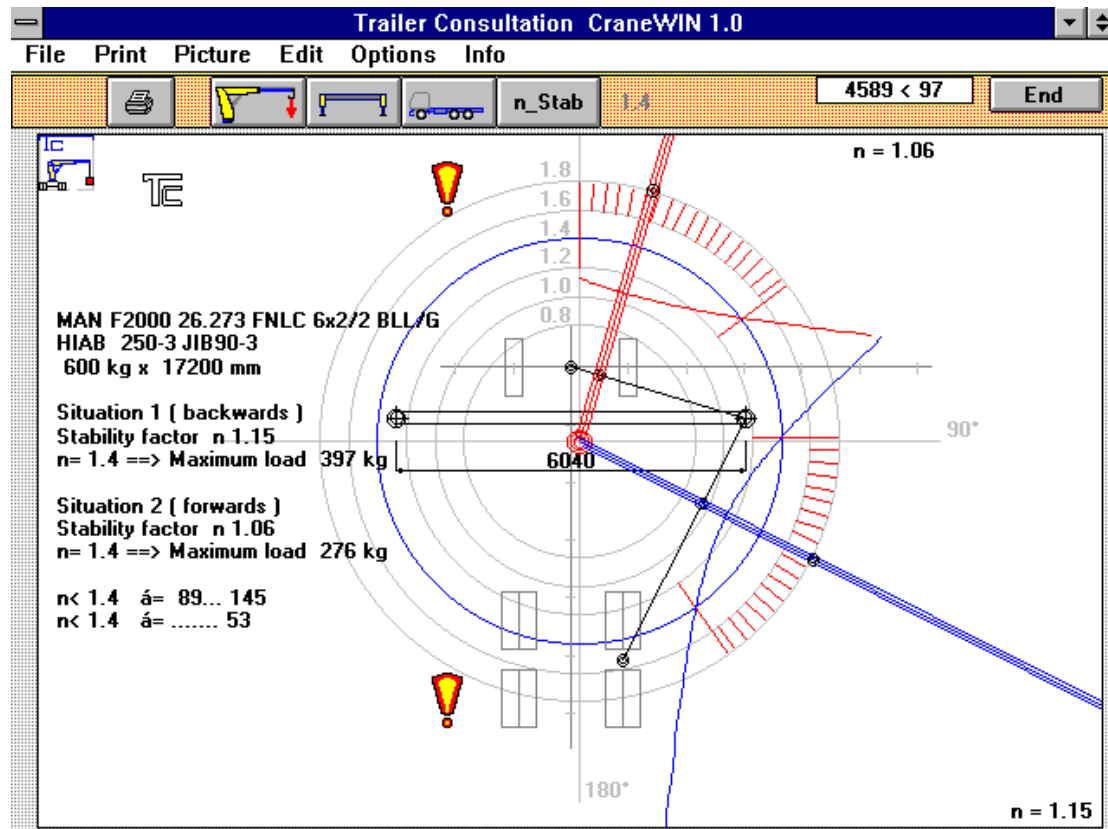
Kauppatori 2  
FIN - 67100 Kokkola FINLAND  
www.trailerwin.com

Tel +358 - 6 - 831 9905

Fax +358 - 6 - 831 1008

E-mail: info@trailerwin.com

## CraneWIN Manual



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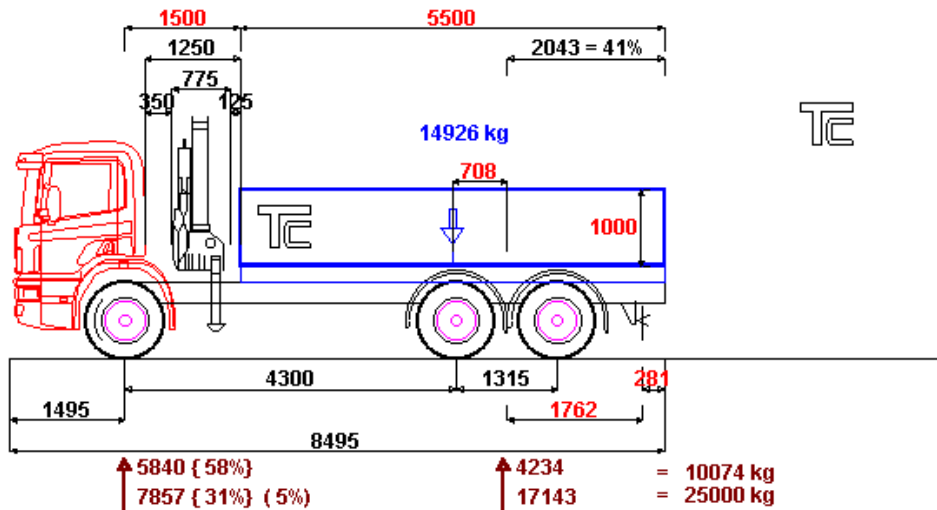
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# CRANE STABILITY CALCULATING PROGRAM "CraneWIN"

## CraneWIN : Starting the program

### Using with TrailerWIN Program

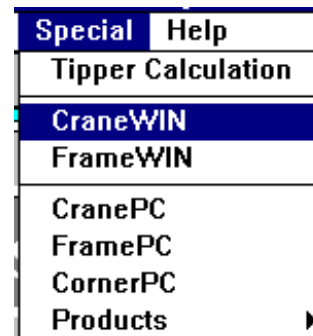
Stability calculating program is designed to be used with the **TrailerWIN**-program.



Vehicle measuring, the weight calculation, the crane choosing and the crane mounting in the vehicle is done first by using the "**TrailerWIN**"-program. When the choices have been made will the "**TrailerWIN**"-program automatically make a file CRANE.DAT, which contains the crane data of this measurement.

By choosing Special and CraneWIN from the TrailerWIN menu You can go to stability calculating program.

When you start the "**CraneWIN**", the program will read all the crane data from the CRANE.DAT file and it will do the crane stability calculations by using this data.



### STAGES OF CALCULATION

1. Start the "TrailerWIN"-program
2. Choose the truck make, the model and the crane.  
Complete the measurements and get the printout to the paper.

*The crane data will be saved in the last stages of calculation as CRANE.DAT file. This will happen automatically, without informing the user.*

3. Start the CraneWIN by choosing Special and CraneWIN from the TrailerWIN menu..
4. The program will get all the calculating values from the CRANE.DAT file made earlier. So the calculating values are from the "TrailerWIN"-calculation that you made.
5. The program shows first the calculating values one by one. You can change the files, if you wish. In case the chosen crane file doesn't contain all the information that the stability calculation needs, then you can give the missing information at this point.

6. *On the screen there will be a picture of the vehicle with the crane. The picture is on a scale. In the picture the crane is on two critical positions. The calculation has been made by using these positions.  
From the stability factors  $n$  the other one is calculated to the back or to diagonally backwards and the other one is calculated to front or to diagonally forwards.*  
  
*The requirements of the stability factor depend on the situation and on the country. The common requirement is that  $n$  should be at least 1,4.  $n \geq 1,4$ .*
7. *The printout gives the picture on a scale and also the calculating values and the moment calculating weights and the moment arms, so the calculation is easy to check and explain.*
8. *By choosing CHANGES, you can change the measures and the weights in crane calculation.*

### **Start the CraneWIN from Windows icon.**

You can also start the **CraneWIN** from the **Windows Program Manager** by choosing the **CraneWIN**-icon.



Also in this case the program first reads and shows the data from the previous TrailerWIN-calculation.

If You wanted to use some other calculation, You can choose from the Menu - FILE some other truck and crane combination (read File functions). You can also start by changing the data of that previous measuring.

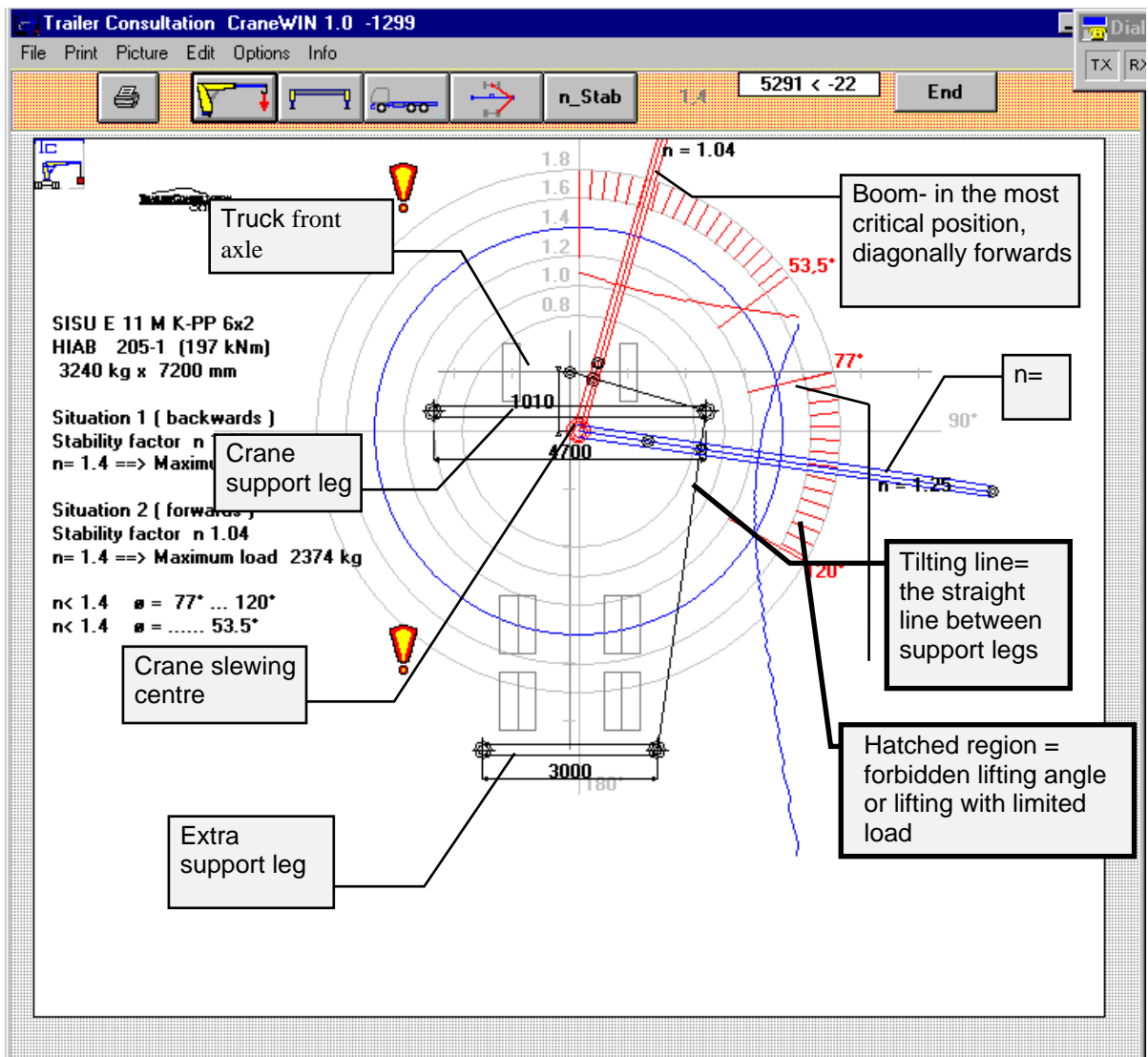
# The screen

## Circle diagram

The program gives a circle diagram: Stability factor  $n$  with different crane turning angles. A straight line from the centre of the circle to the direction in which the crane is turned. The stability factor to that direction.  $\alpha=0^\circ$  straight forwards,  $\alpha=90^\circ$  straight angle to side,  $\alpha=180^\circ$  straight backwards.

The stability factors are different sized circles. The centre of the circles is the cranes slewing centre. The circle with the biggest radius stands for the stability factor  $n=1.8$  and the smaller for: 1.6, 1.4, 1.2, 1.0, 0.8. The chosen critical stability factor will show at screen in different colour than the others. The figure is above the diagram at the toolbox.

In the picture there are two stability factors as  $n$ -curves. One for each tilting line.



This example curve shows, for example that  $\alpha = 180^\circ$  straight backwards;  $n$ -factor is 0,87. Straight to side,  $\alpha = 90^\circ$ ;  $n$ -factor is 1,3.

The most critical direction is diagonally forwards, about  $\alpha = 60^\circ$ ,  $n$ -factor is 0.94 .

The text on screen shows us that the  $n$ -factor is smaller than 1,4 when  $\alpha$ -is between  $22^\circ \dots$ and...  $94^\circ$  and when  $\alpha$ -is between  $132^\circ \dots$ and...  $180^\circ$ .

If n-factor is smaller than 1,4 the program calculates also the decreased load when the n-factor is 1,4.

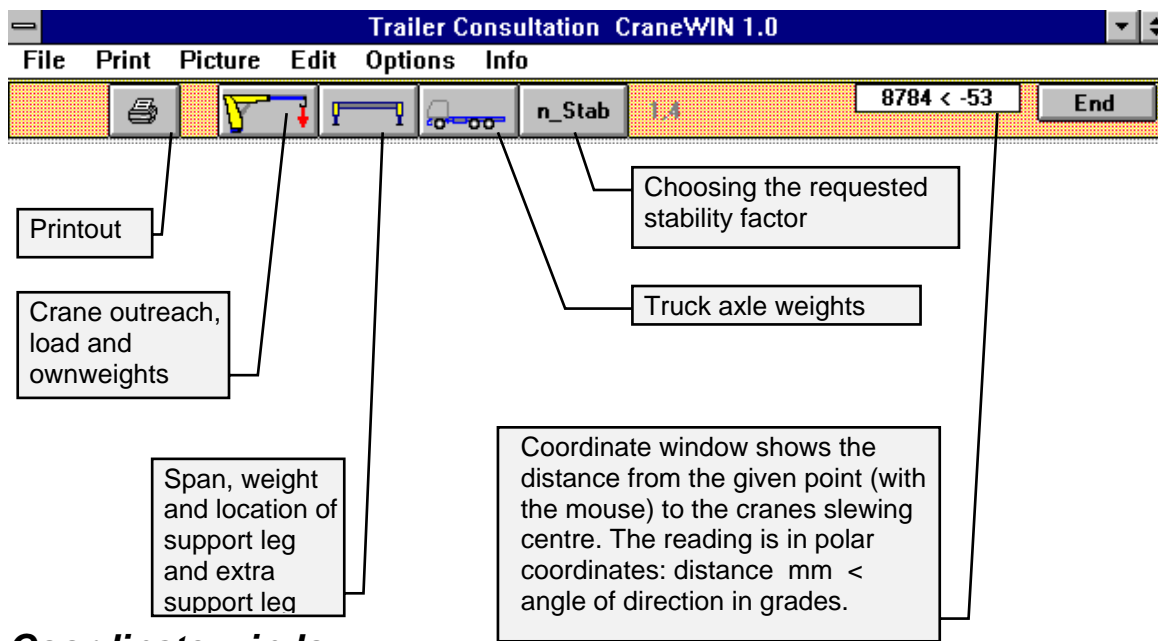
## The calculation

The picture of the truck with the crane will come into the screen. The picture is on a scale. The crane is on two critical positions. The calculation has been made for these two most important positions. The calculation method is a varyfied standard.

Stability factors n1, n2 are calculated to most critical positions. The other one to backwards or to diagonally backwards and the other one to forwards or to diagonally forwards.

Demands for the stability factors depend on each situation and each country. In most cases n should be at least 1.4.  $n \geq 1.4$ .

## Toolbox



### Coordinate-window

Coordinate window shows the distance from the given point (with the mouse) to the cranes slewing centre. The reading is in polar coordinates: Distance mm < angle of direction in grades. You can for example study the weight points distance from the tilting line.

## File functions

### Menu: File

File	Print	Picture	Edit	Options	Inf
<b>Open</b>					
Open CraneWIN Calculation					
Open TrailerWIN Calculation					
Save As CraneWIN Calculation					
End	Ctrl+X				

## **Open file**

Open the data files of the calculations previously made with TrailerWIN. (Previous calculation with a crane). By choosing this function You will return to the calculation, You entered automatically when You started the program.

## **Open CraneWIN calculation**

Open a calculation made and edited with CraneWIN.

## **Open TrailerWIN calculation**

Open a weight calculation made with TrailerWIN. The calculations that had crane, can be used in CraneWIN stability program.

## **Save CraneWIN calculation**

Save a calculation for possible later use. The first part and the extension part of the file name can be given freely.

## **End**

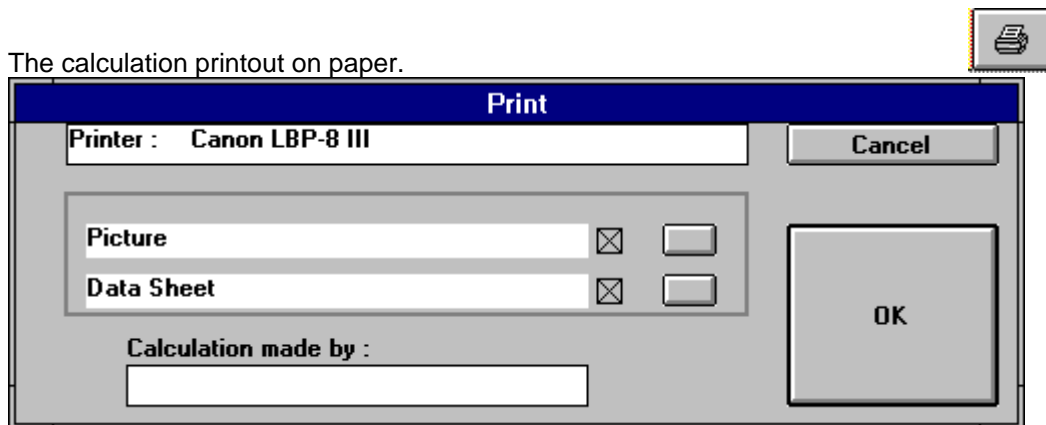
Ending the program. In case You started the CraneWIN from the TrailerWIN, You will return to TrailerWIN.

---

## **Menu: Print**

### **Print**

The calculation printout on paper.

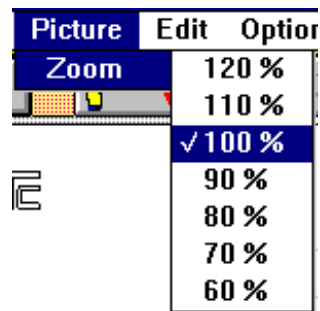


With small buttons You can choose to print only the picture or only the text page.

If both squares are marked with **X**, then the OK button will printout the picture and the textpage.

The program does not give printout if You do not type something to "Calculation made by": square.

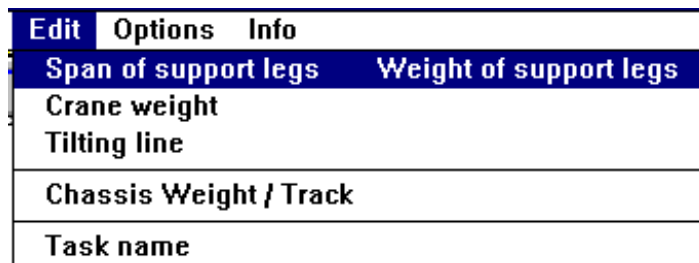
## Menu: The picture



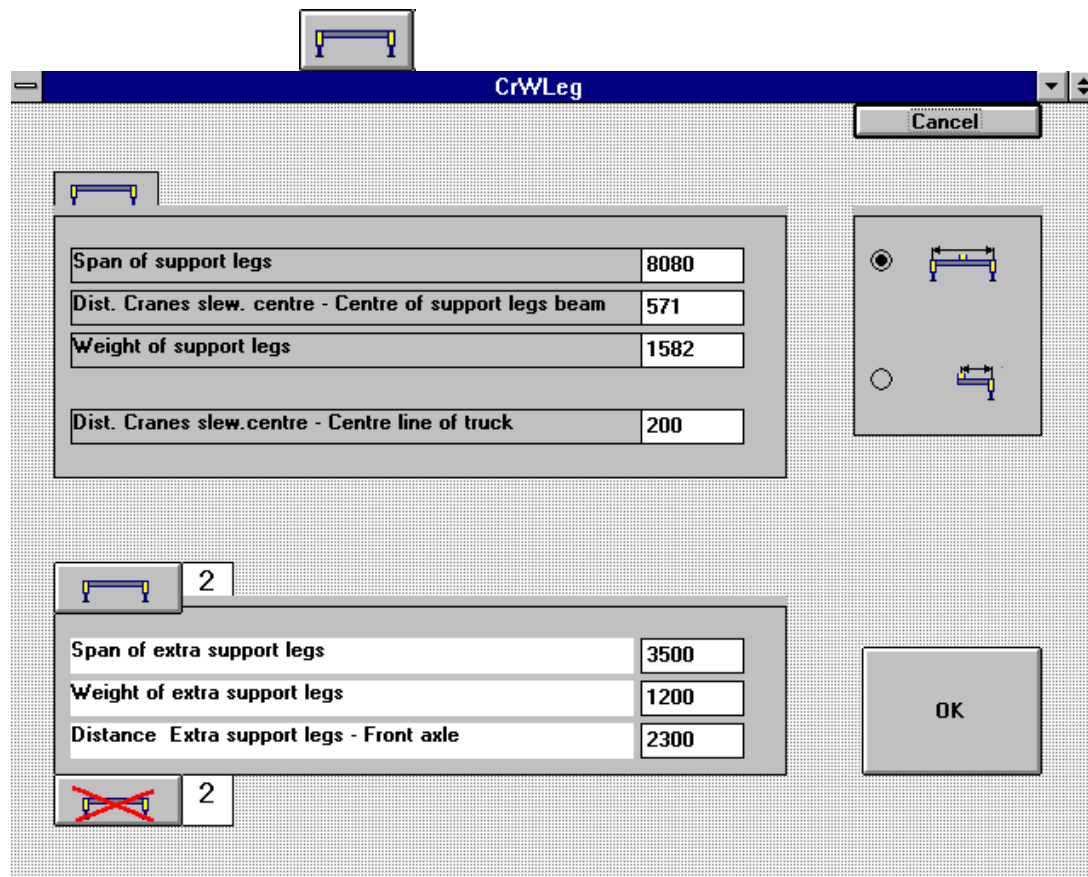
### Zoom

Zooming the picture if necessary.

## Menu: Edit



### *Span of support legs, weight of support legs*







The upper frame shows the span, the weight, and location of the crane support legs. The side distance (right or left) does not matter. The calculation is always made to the most critical side. From the right side buttons You can choose, if the crane has only one support leg on the other side, as some very small cranes have.

The lower frame is for the extra support leg data. You can remove the extra support leg with the button under the box.

### The weight of the crane



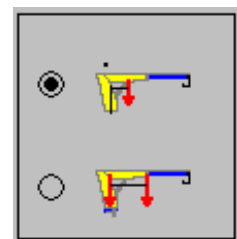
Task name / Stabilizing moment	
Task name	<input type="text"/>
Customer	<input type="text"/>
Truck	MERCEDES-BENZ 3538K 8x6/4
Calculation	HIAB 550-6 (498 kNm)
<b>Loading Moment</b>	
Lifting capacity kg	2900
Outreach mm	15100
M1 = 438 kNm	
Crane weight kg	8058
Dist. Cranes slew. centre - COG of crane at max outreach mm	3240
M2 = 261 kNm	
M1 + M2 = 699 kNm	

Allowed load and the outreach can be edited from here.

The crane ownweight is given in different ways depending on the crane make

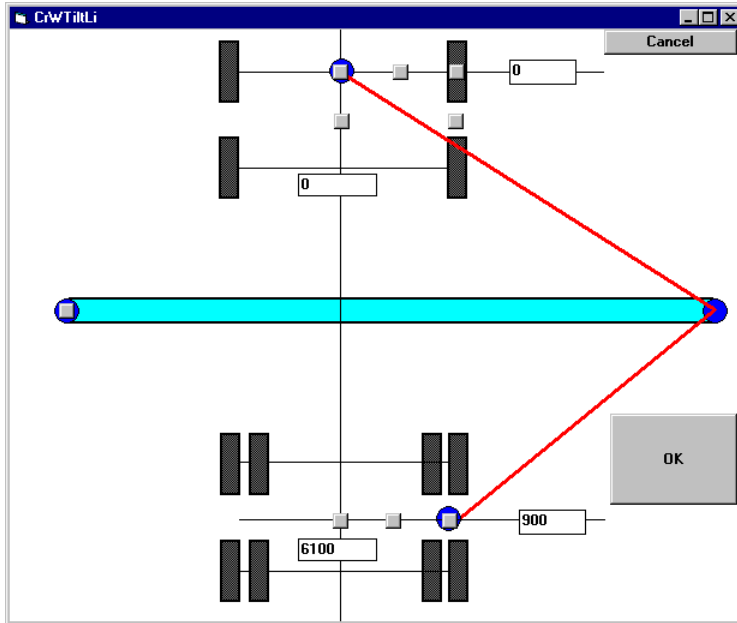
- The total crane weight as one figure. Then the weight point gives the weight point of the crane when the boom is at the maximum outreach. The upper button
- The base of the cranes weight and the boom weight separately. The weight point means then the boom weight point at the maximum outreach. The lower button.



If You change the outreach while making the calculation, take notice that the program does not change the crane weight point figure or the boom weight point figure from the original.

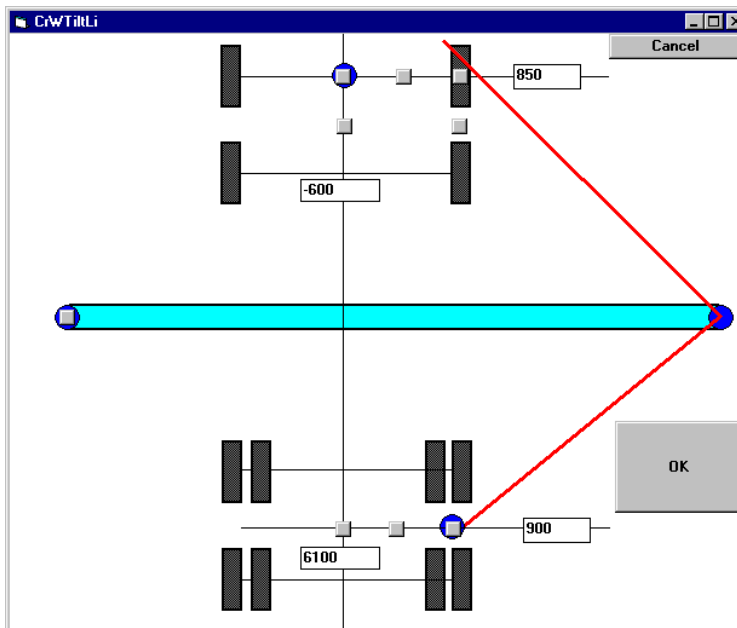
## The tilting line

Menu Edit – tilting line



You can choose the location of the support point by using the buttons in the picture (above). There are five options, if truck has two front axles, otherwise three options. Changing the support point location can also be done by typing the wanted coordinates (X,Y) into the screen. The support point default and the zero point is then the centre point of the first axle. You can change the location of the tilting line by changing the front axle support point.

## Support legs on the front of the truck



If you want to have support legs on the front of the truck, in this case do not use support legs there in TrailerWIN. Instead of this, edit the support point on the front axle, for example as in this example:

Now you have support point 850 mm side from the center line of the truck, if means  $2 \times 850 = 1700$  mm wide legs on the front. The place of the legs is now 600 mm front of the front axle (-600).

## The chassis weight, track width



Truck axle weights can be changed from here.  
The truck weights do not contain the crane, support legs, driver, extra support legs or the load.  
The chassis weights Bodywork weight and other extra equipment weights are calculated.  
The track width affects on the location of the tilting line.

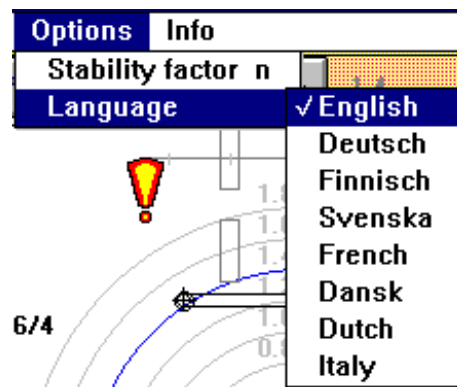
## The task name

Task name	<input type="text"/>
Customer	<input type="text"/>
Truck	MERCEDES-BENZ 3538K 8x6/4
Calculation	HIAB 550-6 (498 kNm)

Customer information etc. This information will be on the printout and will help to find the previously saved calculations.

---

## Menu: Options



## Stability factor $n$



Stability factor default in program is  $n = 1.4$ .  
Changing the factor will affect on the error messages and on possible limiting of the lifting positions on the picture.

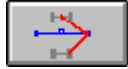
## The language

Language options for the program and the printout. Language options in use will be discussed personally with customers. More languages can be added if ordered. Languages available at the moment: English, German, Finnish, Swedish, French, Danish, Dutch, Italian.

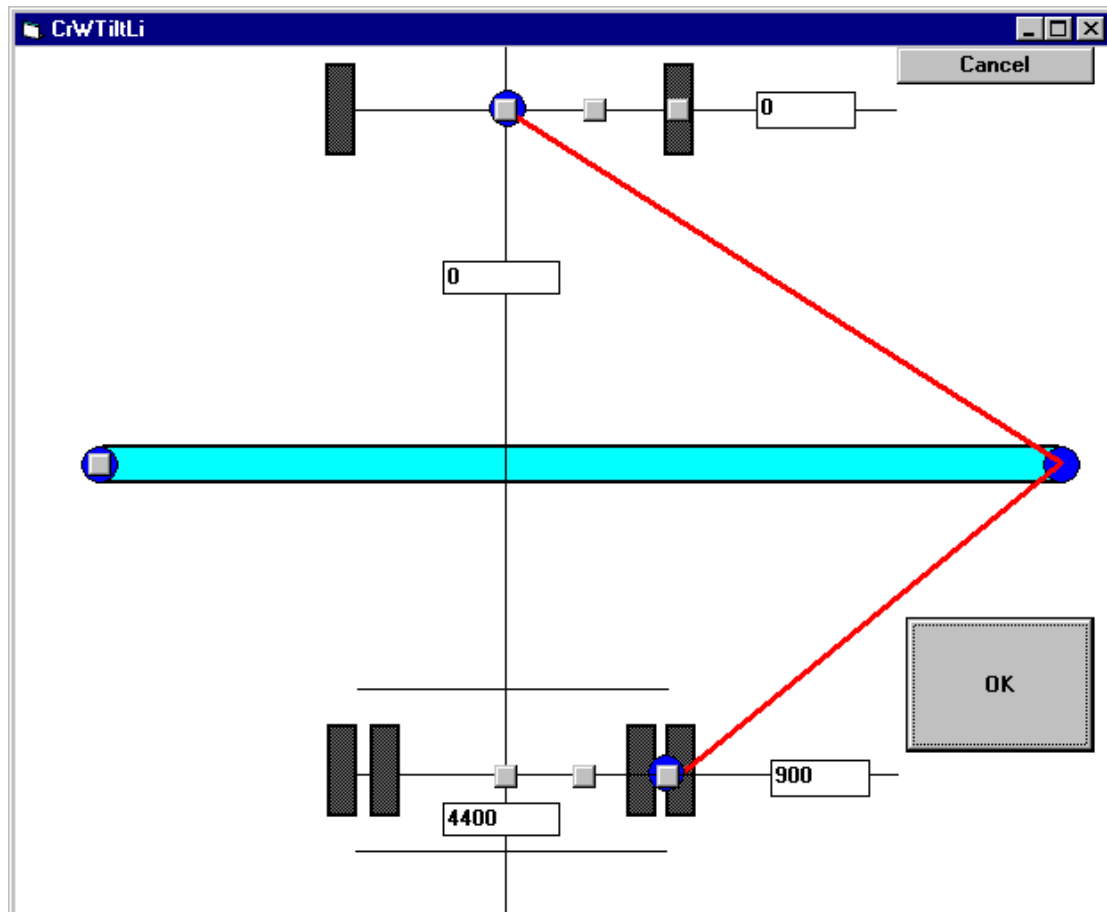
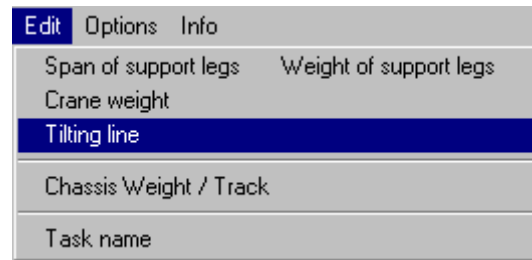
# Renewings CraneWIN 0399

## The tilting line

Button for changing the tiltingline



You can also use Menu: **Edit - Tilting line**



It is also possible change the tilting line on the rear axle.

If you have extra support legs or the crane is rear mounted , the tilting line does not at all go to the rear axle.

## Own company text on the end of the text printout page

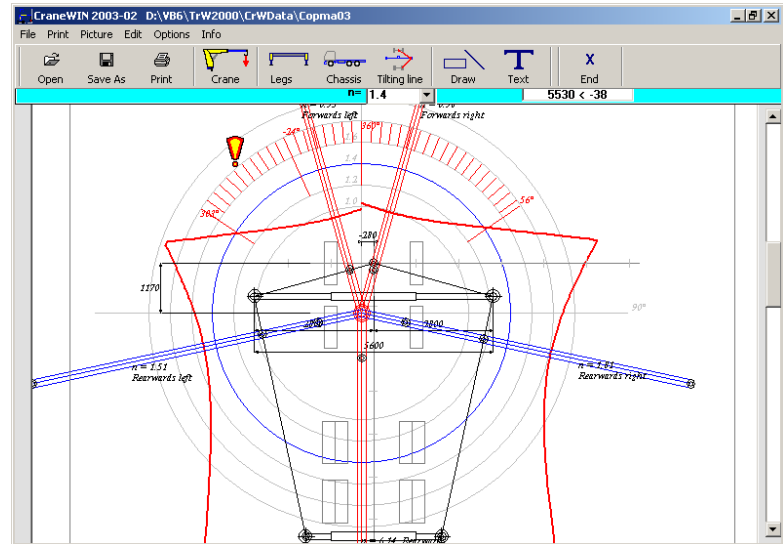
You can give your own company text on 3-last text rows of every printout paper

This textfile is called **FRTCR.WDS** .and it must be located in **C:\TRAILERW** .

You edit or make this ASCII-Textfile for example by using Windows Notepad.

## How to take CraneWIN Stability calculation into Word Document or into E-mail message.

If use this direct to E-mail message, the message format can not be "Plain text"



1. Click MENU : **Picture – Picture onto Clipboard**  
Now you have the picture on Windows Clipboard.

2. Open Word Document or E-mail message

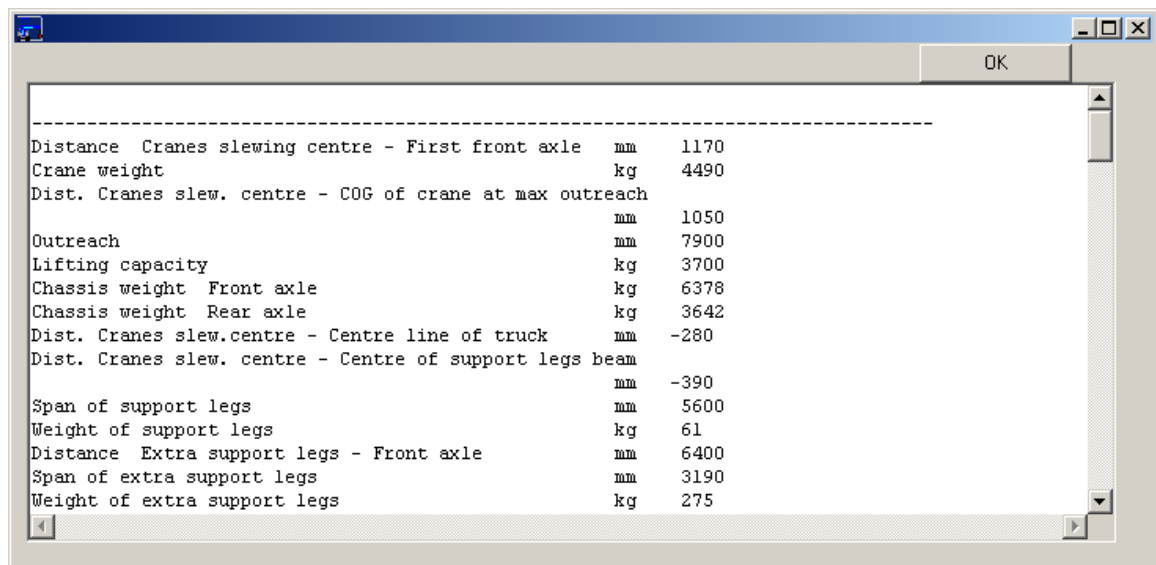
In Word:

3. Click MENU: **Edit – Paste**  
You will get the picture on the Word document.

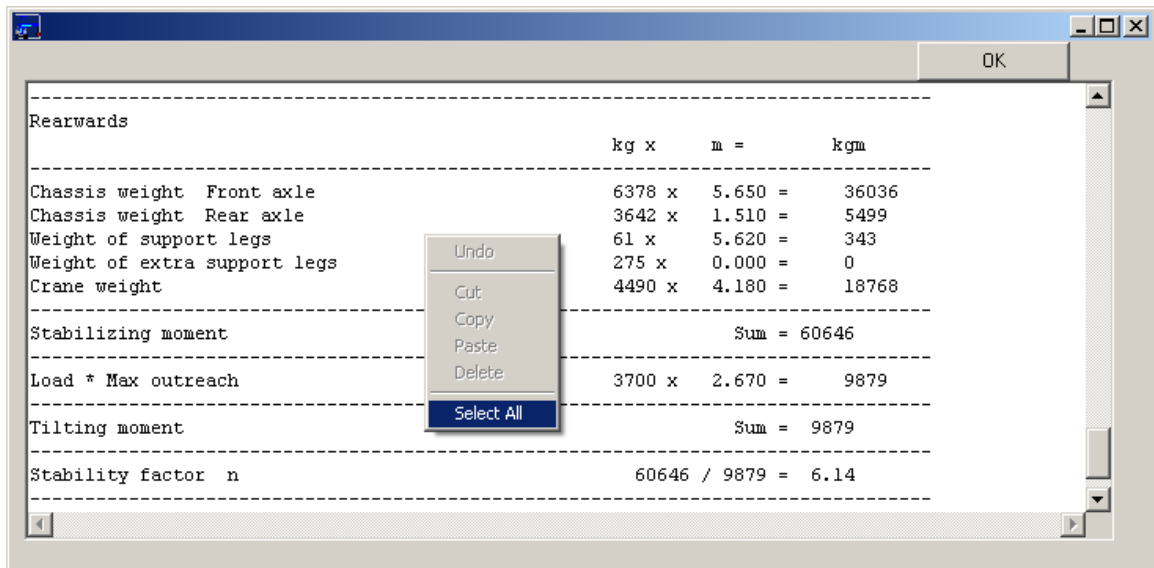
4. Go back to CraneWIN, do not close Word document

In CraneWIN:

5. Click MENU: **Picture - Text**  
You will see following screen:



6. Click with **Right Mouse button** on this text screen, and click **Select all**



7. When all text is blue, Click again with **Right Mouse button** and select **Copy**.  
Now you have the text on Windows Clipboard.
8. Go again to Word Document
9. Set the cursor with mouse on this place on the Word text, where you want to have the new Text. If needed make new row with pushing Enter on keyboard.

In Word:

10. Click MENU: **Edit – Paste**  
Now you have the text on Word Document:

```

-----
Distance Cranes slewing centre - First front axle mm 1170
Crane weight kg 4490
Dist. Cranes slew. centre - COG of crane at max outreach
mm 1050
Outreach mm 7900

```

The text looks maybe not good so.  
Select the text, and choose font: Courier new...  
with this font, all characters have the same width.

```

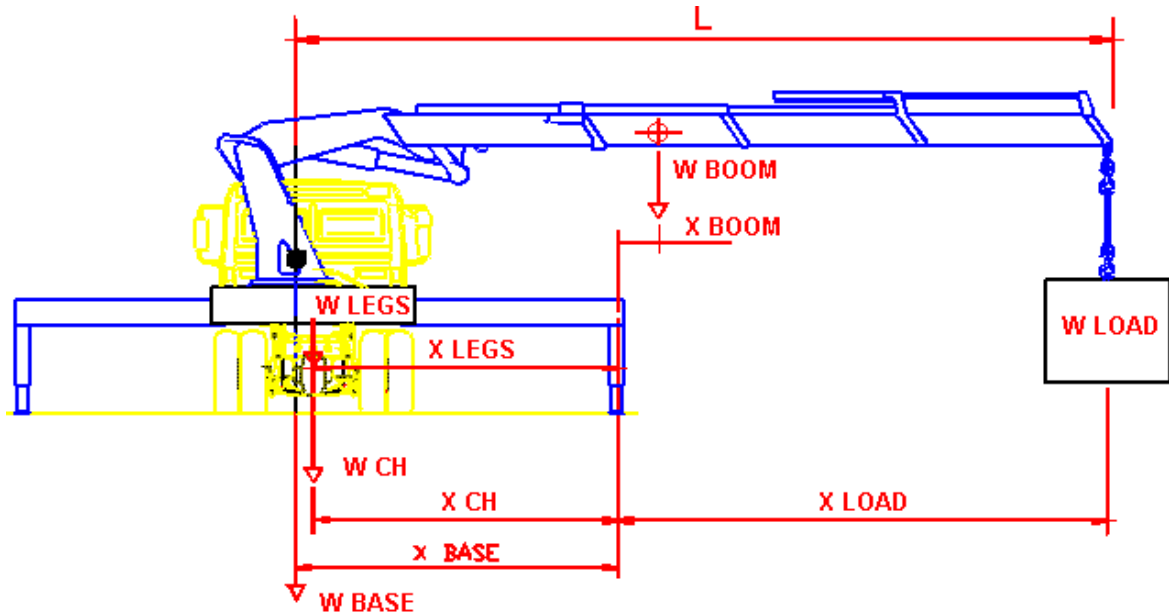
-----
Distance Cranes slewing centre - First front axle mm 1170
Crane weight kg 4490
Dist. Cranes slew. centre - COG of crane at max outreach
mm 1050
Outreach mm 7900
Lifting capacity kg 3700
Chassis weight Front axle kg 6378
Chassis weight Rear axle kg 3642
Dist. Cranes slew. centre - Centre line of truck mm -280
Dist. Cranes slew. centre - Centre of support legs beam
mm -390
Span of support legs mm 5600

```

Save the Word Document, and after that you can send it per E-mail as attachment file.

## Calculation principle

Principle formulas as follows:



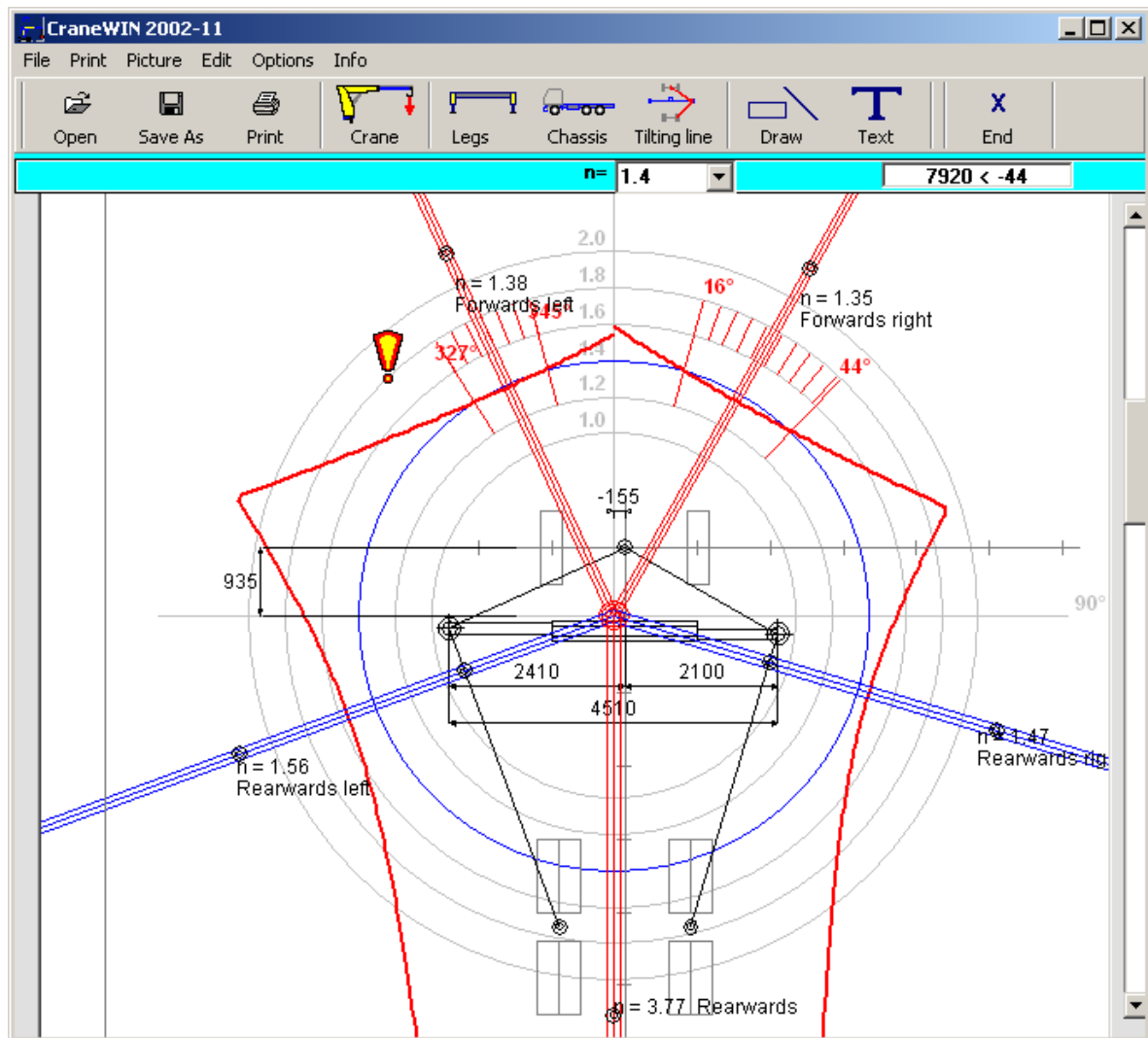
CRANES STABILITY CALCULATION (Measures from tilting line)

Chassis weight	Front axle	WchFront	x	xChFront	= xxx
Chassis weight	Rear axle	WchRear	x	xChRear	= xxx
Weight of support legs		WLegs	x	xLegs	= xxx
Weight of base		Wbase	x	xBase	= xxx
Stabilizing moment					Sum = xxxxx
Weight of boom		WBoom	x	xBoom	= xxx
Load * Max outreach		Wload	x	xLoad	= xxx
Tilting moment					Sum = xxxxx

Stability factor = n

n = Stabilizing moment / Tilting moment

Example 1 of CraneWIN screen picture (  $n=1.4$  ) :



$n = 1.4$  : Radius for the blue circle in stability diagram is now 1.4 .

The red stability curve shows the stability calculated to different directions using the formulas shown on the previous page. The load in the calculation is the max allowed load, if you have not changed the load.

In the picture from direction  $16^\circ$  to direction  $44^\circ$  and from direction  $327^\circ$  to direction  $345^\circ$  the red curve (stabilation curve) is inside the blue circle ( $n=1.4$  circle). It means that to this directions the stability is less than 1.4.

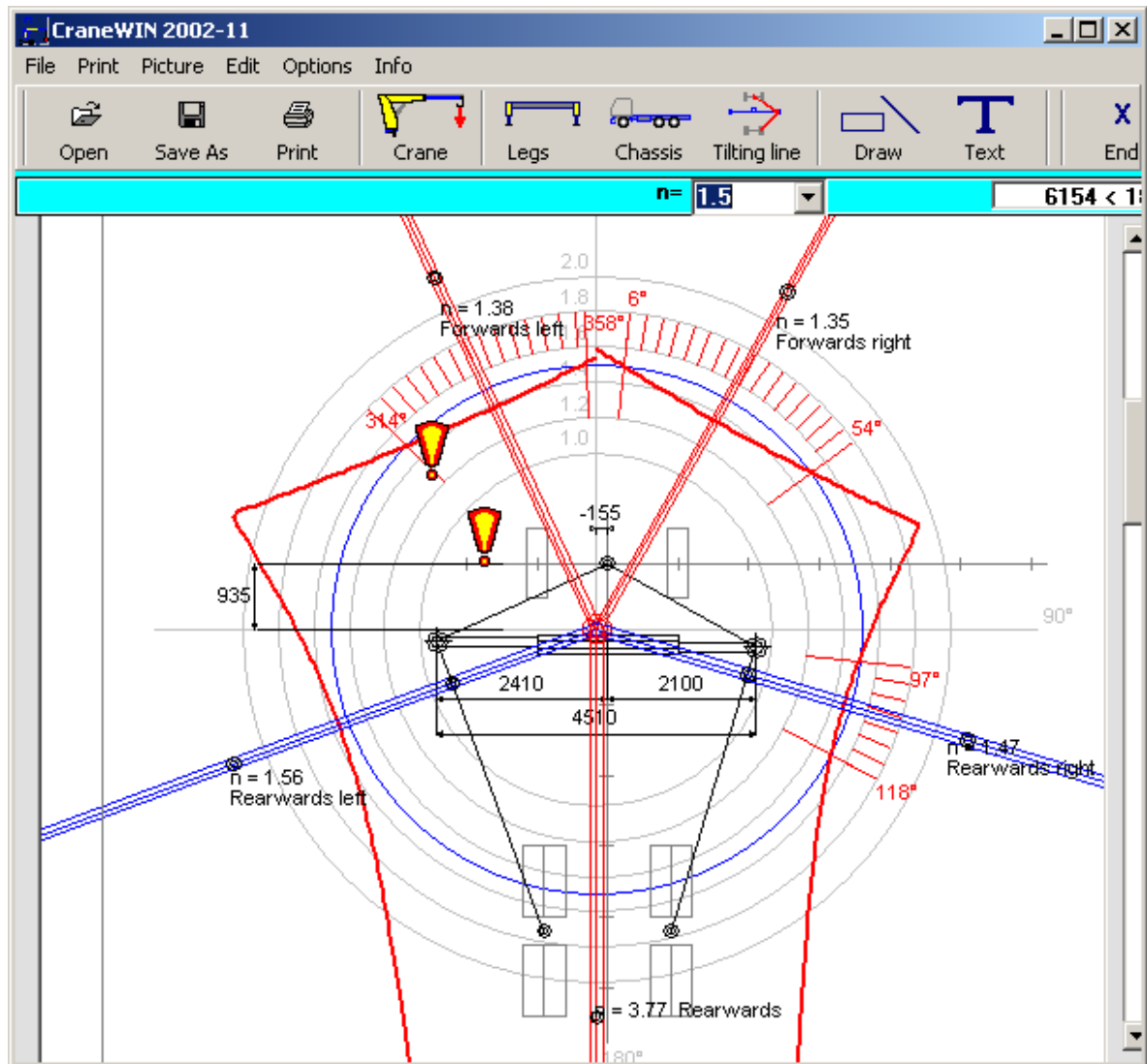
Therefore this direction area is marked with red lines.

On the next picture we choose different  $n$  value.



Example 1 of CraneWIN screen picture (  $n=1.5$  ) :

We have changed the wanted stability factor value  $n$  to  $n = 1.5$



$n = 1.5$  : Radius for the blue circle in stability diagram is now 1.5 .

The red stability curve shows the stability calculated to different directions using the formulas shown earlier. Also the red curve is the same as on the previous picture.

In this picture from direction 6° to direction 54° and from direction 314° to direction 358° and from direction 97° to direction 118° the red curve (stabilation curve) is inside the blue circle ( $n=1.5$  circle). It means that to this directions the stability is less than 1.5.

We want now bigger stabilation and therefore the red marked direction areas are now bigger than earlier.

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## Licence Agreement

You may use the **TRAILER CONSULTATION Computer Software** on one or more computers in one office or in one factory area.

You may use the TRAILER CONSULTATION Computer Software on a computer network when the network is working only in one office or in one factory area.

You may not make any changes or modifications to this or any of the TRAILER CONSULTATION Computer Software

You may not decompile, disassemble, or otherwise reverse engineer the TRAILER CONSULTATION Computer Software.

You may not rent or sell or lease or copy it to anyone.

**TRAILER CONSULTATION Computer Software includes following computer programs: TrailerWIN, CraneWIN, FrameWIN, CornerWIN, BusWIN and BrakeWIN.**

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## Warranty

This software is easy to use and it is very reliable.

If the user finds mistakes would it be nice to inform the maker of the program.

The possible faults are repaired as soon as possible and that is guaranteed (the faults are guaranteed to be repaired in at least one years time minimum) and possibly later on updating contracts.

***The maker, dealer, or agent of the software will not compensate possible faults on software and user's faults and the possible costs caused by them.***

***The maker, dealer, or agent of the software will not compensate possible costs caused by diskettes or any other data media (mechanical faults, virus, etc.)***