

LOCOPIAS

Grain/Bulk module

As an aid to assess the stability of a vessel loaded with bulk or grain in bulk, LOCOPIAS can be equipped with a dedicated grain/bulk loading module.

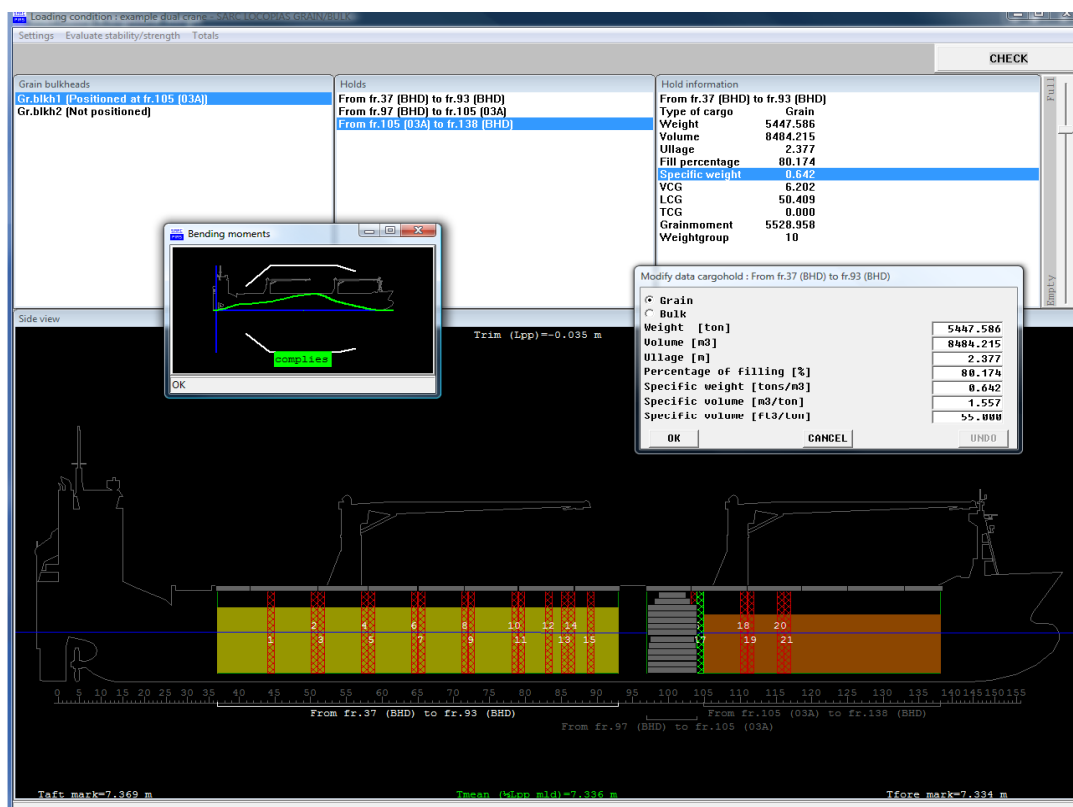
This module performs the following functions:

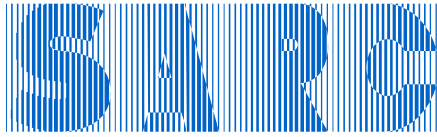
- Selection and positioning of moveable grain bulkheads, or tweendeck panels;
- Selection of grain holds, and filling of those holds by volume, weight, ullage or percentage;
- After the filling of the holds, the LCG, VCG and heeling moments (in case of grain) of the cargo is determined automatically;
- Verification of compliance against the relevant grain stability criteria;
- At any desired moment, stability or strength particulars can be evaluated and verified against the relevant criteria.

The LOCOPIAS grain module can be applied for vessels with:

- Single holds or multiple holds;
- Relocatable grain bulkheads;
- Relocatable tween decks;
- Combinations of relocatable bulkheads and tween decks

For grain loading the stowage and stability parameters are in accordance with the IMO *International Code for the Safe Carriage of Grain in Bulk (International Grain Code)*





LOCOPAS Container module

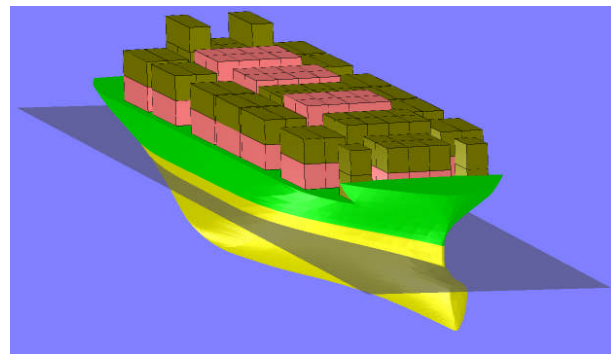
For container vessels LOCOPAS can be equipped with a dedicated container module

This module is essential for vessels with a significant container capacity. It allows for the interactive positioning of containers of any size, and contains numerous loading options, amongst which electronic data exchange.

Some highlights of this module are:

- The module is founded upon a 3-D representation of container distribution. It allows the user to show any desired combination of rows, bays and tiers, and to work in a sequence and orientation selected by the user;
- Suitable for all kinds of containers. The module has no restrictions at all with regard to the container type (20', 30', 40', 45', 48', 52' or every other length, with random breadth and height of each container) or loading combination. (refrigerated containers are also supported);
- Drawings and lists of container loading details, either sorted by bay, row or tier;
- At any desired moment, stability or strength particulars can be evaluated and verified against the relevant criteria

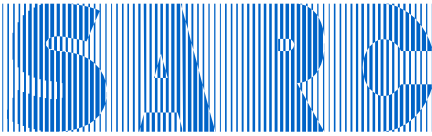
- Alarm on exceeding maximum stackload;
- Only consistent container loading is accepted. For instance, containers can only be placed where/if the slots underneath are also occupied;
- Database management functions for import and export of container data and loading conditions;
- Integrates seamlessly with LOCOPAS *line of sight* module;
- Container cargo positioned above deck is automatically included in the calculation of the windcontour of the vessel.



The screenshot displays the LOCOPAS software interface for container loading. The top menu bar includes options like 'New 1 Load 1 Discharge 1 Edt 1 Settings Options Input Output Stab/Strength BAPLIE 3D View'. The main window is divided into several sections:

- Active function:** 'New 1 : define and load 1 new container'.
- Container information:**
 - Port loading: AMS
 - Port shifting: AMS
 - Pt discharge: ANT
 - Containerno: 02863jnm
 - Ulnro: 0
 - Weight: 5,000
 - Type: 20 feet
 - Kind: N
 - Ulnh: 45
 - Ulnl: 9'6"
 - Ulnr: no
- Weight UNnoPrt disch. Containerno:**

5,000	0	ANT	643[22]
5,000	0	ANT	2u73809j
5,000	0	ANT	39h3jz
5,000	0	ANT	u420936y42
5,000	0	ANT	1993hskdp
5,000	0	ANT	02863jnm
5,000	0	ANT	10003kkk
5,000	0	ANT	
- VCG Calculation:**
 - Allowable: 9.314
 - Actual: 8.264
 - Surplus: 1.050
- Deck Layout Views:**
 - ACTIVE BAY: 07**: Shows a grid of container slots with dimensions (e.g., 5.0, 7.0) and a G-Mark of 1.766 m.
 - ACTIVE ROW: 04**: Shows a side view of the deck with container positions and dimensions (e.g., 31, 29, 27, 25, 23, 21, 17, 15, 13, 11, 07, 05, 03, 01).
 - ACTIVE TIER: 04**: Shows a top-down view of the container stack with dimensions (e.g., 20.0, 30.0) and a T-Force mark of 6.275 m.



LOCOPIAS

General cargo module

Dedicated LOCOPIAS module for loading and distribution of general cargo.

The general cargo module is intended for project cargo. The weight and centres of gravity of the general cargo are incorporated in the loading condition, and thus included in the calculation of stability, strength etc. This module is an add-on for LOCOPIAS and is applicable for ships with general cargo capability.

Some highlights of this module are:

- Cargo can be placed on any position in the vessel;
- Cargo holds and compartments used for storage are visible in all views of the vessel;
- Project cargo positioned above deck is automatically included in the calculation of the windcontour of the vessel;
- Project cargo of any dimension can be defined (LxBxH);
- Cargo can be rotated;
- A list of all cargo or a graphical cargo stowage plan on any desired horizontal section can be printed;
- At any desired moment, stability or strength particulars can be evaluated and verified against the relevant criteria;



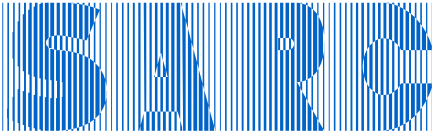
The screenshot displays the 'Grafical general cargo loading module' interface. It features several panels and data tables:

- Active function:** Move 1 : move general cargo on board of the ship
- General cargo information table:**

Group	MEN
Load port	MEN
Shift port	FB
Disch.port	FB
Name	Dry chlorate silos
Weight	25.000
Length	20.700
Breadth	5.800
Height	5.800
VCG	2.900
LCG	10.350
TCG	0.000
Length in ship	102.683
Breadth in ship	-4.052
Height in ship	14.500
Angle in ship	0.0
- Table of Cargo Data:**

Name	Weight	Group	Port of load	Port of disc
Pushing boat	250.000	MEN	F-B	
- Edit general cargo data:**

Name	Dry chlorate silos
Weight	25.000
Length	20.700
Breadth	5.800
Height	5.800
VCG	2.900
LCG	10.350
TCG	0.000
Group	Mentie
Load port	Mentie
Shift port	Mentie
Disch.port	FB Deck
Length in ship	102.683
Breadth in ship	-4.052
Height in ship	14.500
Angle in ship	0.0
- ACTIVE REAR VIEW:** 113.033 0 0, Angle=-1.628 degrees, G*M=1.296 m
- Trim=-0.118 m**
- Stowage Plan:** Shows various cargo holds and modules like 'Kiln shell', 'Eco module', 'Staker', 'Condensator', 'Side wall upper', and 'Dry chlorate silos'.
- Bending moments:** A graph showing a curve labeled 'Complies'.
- TOP VIEW:** -90 -90, Taft mark=-5.410 m, Tmean=-5.319 m
- Footer:** Groups : Tweendeck Tanktop Ports of load: Amsterdam Rotterdam Antwerp FB Deck FB Tank top FB Tweendeck Mentie Kotka



LOCOPIAS cranes module

For geared vessels

The cranes module is intended for the loading of cargo with one or two (coupled) cranes. The weight and centers of gravity of the cranes and their loads are incorporated in the loading condition and loading scenarios can be created and stored.

Some highlights of this module are:

- Support dual crane operations, also with coupled cranes;
- Supports tank counterballasting, either by filling ballast tanks with seawater, or by pumping between two tanks.
- Instant verification of heel, trim, stability or longitudinal strength.
- Supports crawler cranes.
- Records all simulated actions (for re-assessment or replay);
- Including the effects of heeling and trim on the exact location of the hanging loads;



LOCOPIAS CRANE MODULE

Cargo Quay Rigging Configurations Check

Crane 1
Crane 2

Select cargo: Train

slew/top/slew

rotate cargo

Running length: 17.118

Interval [deg]: 1, 5, 10
Interval [m]: 0.1, 0.5, 1.0

Outreach [m]: Horizontal 18.631, Transverse 18.665

Seagoing position

crane load [t]: 12.000
slewing angle: 40.671
topping angle: 30.968

Position Cranetop [m]: Longitudinal 62.373, Transverse 26.214, Vertical 43.580

Tank:11 LT 3 WB PS

Select ballast tank

1	FP	WB	CL	
2	DT	WB	CL	
3	DB	1	WB	CL
4	LT	1	WB	PS
5	LT	1	WB	SB
6	DB	2	WB	CL
7	LT	2	WB	PS
8	LT	2	WB	SB
10	DB	3	WB	CL
11	LT	3	WB	PS
12	LT	3	WB	SB
13	AH	4	WB	PS
14	AH	4	WB	SB
19	DB	5	WB	PS
20	DB	5	WB	SB
21	WT	5	WB	PS
22	WT	5	WB	SB

Select tank to pump from/to: 1 FP WB CL

Empty Full

pull

Topview

Trim=-1.011 m

190.1

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

Taft mark=5.637 m Tmean=5.110 m Tfore mark=4.616 m

Cross section

Angle=3.436 degrees

G' M=1.569 m

Activity log

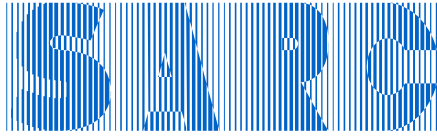
Log

Print

Reset

1) 14 AH 4 WB SB: 172.563 t to 0.000 t
2) 12 LT 3 WB SB: 234.719 t to 0.000 t

OK



LOCOPIAS line of sight add-on

For all vessels, but in particular for vessels with possible deck loads (containers, general cargo).

IMO regulations stipulate criteria for line of sight are stipulated. In order to assess whether a vessel complies with these rules, LOCOPIAS is equipped with a dedicated add-on, with the following features:

- Integrated with other LOCOPIAS modules for general cargo and containers;
- Effects of fixed obstructions, such as cranes or constructions on deck, are accounted for;
- Including the effect of trim;
- Also with criteria for line of sight in Panama Canal.



Intact stability & longitudinal strength

Setup About SARC Manual Config Cargo

TANKS CONTAINERS GENERAL CARGO CRANES HATCH

MORGENSTOND 1
Departure 12 tons containers

Obscured area : 201,9m=1,4L=0,0L

Taft mark=6.977 m Tmeas=7.213 m Tfore mark=7.434 m
Trim=0.452 m

GMSol1d=0.890 m
GG'corr=0.130 m
GMFluid=0.760 m

Angle=-0.290 degrees

Shear forces Bending moments Intact stability

complies complies complies

VCG*
Allowable : 7.520
Actual : 7.331
Surplus : 0.189

complies

Wind contour:
No Deckcargo
Maximum draft:
Draft summer : 7.930 m

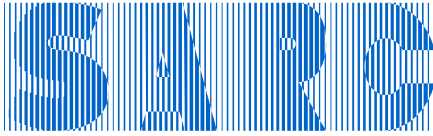
Overview weightgroups

No	Name	Wt	YCG	XCG	TCG	FSM
lightship		4765.888	8.478	59.596	0.175	0.000
1	Cargo	0.000	-	-	-	0.000
2	waterballast	4250.672	3.680	78.946	-0.323	7.906
3	GO	88.612	6.0	-	-	-
4	HFO	769.957	2.6	-	-	-
5	LO	39.373	6.7	-	-	-
6	Freshwater	75.938	6.2	-	-	-
7	Various	34.581	2.0	-	-	-
8	Sewage / Sludge	3.045	4.6	-	-	-
9	Miscellaneous	27.000	12.2	-	-	-
10	Grain / Bulk Cargo	0.000	-	-	-	-
11	Grain Bulkheads	0.000	-	-	-	-
12	General Cargo	0.000	-	-	-	-
13	Container Cargo	4512.000	9.5	-	-	-
14	Tweendeck panels	400.426	7.3	-	-	-

SETTINGS Departure 12 tons containers

wind contour | draft | strength | SW water | output | frontpage | sight line

None
 IMO A.708(17) (2.0L)
 Panama Canal, Ballast (1.5L)
 Panama Canal, Full Load (1.0L)



LOCOPIAS

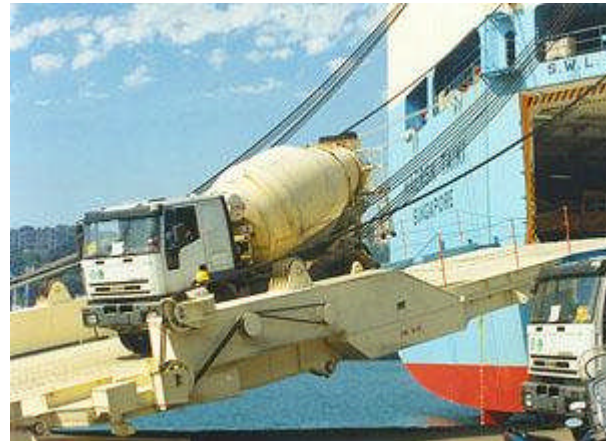
The RoRo module

For ships with RoRo capacity

The RoRo module is intended for rolling cargo. RoRo cargo can be positioned on all defined RoRo decks. The weight and centres of gravity of the RoRo cargo are incorporated in the loading condition. RoRo cargo stowage plans and loading lists can be printed. This module is an add-on for Locopias and is applicable for vessels with RoRo capacity.

Some highlights of this module are:

- Collision checking with other (positioned) cargo, deck outline and other defined deck obstructions;
- Integrated (user maintainable) database for storage of frequent occurring cargo items. Records all intended actions (for re-assessment or replay);
- Cargo can be rotated;
- Check of available deck height and maximum deckload.
- Output of stowage plan and lists of RoRo cargo



RoRo module LOCOPIAS Port of loading : undefined

Select Port Load Shift All ashore 1 ashore Delete all Delete1 Position landing craft Input Output

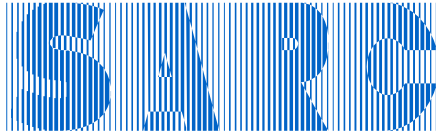
Active function
Select : Select RoRo cargo in deck view

Select RoRo deck	Name - Weight - Port of discharge
Dock and Ramp	No Cargo present in undefined port of loading
Low Vehicle Deck 1 (J-Deck)	
Low Vehicle Deck 2 (H-Deck)	
Main Vehicle Deck (J-Deck)	
Hangar (F-Deck)	
Outer Deck (H-Deck) PS	
Outer Deck (H-Deck) SB	
Flight Deck (F-Deck)	

Cargo info

Type :	#1123AS
Name :	
No :	3324
Prt load. :	DH
Port of discharge :	ROT
Length :	5.250
Breadth :	2.190
Height :	2.000
Weight :	3.300
LCG :	124.938
TCG :	-6.806
VCG :	12.750
Angle :	0.000

Top view RoRo deck Low Vehicle Deck 2 (H-Deck)



LOCOPIAS Tank sounding

Calculation of actual tank contents including effects of list and trim

To be able to determine an accurate determination of the volume and weight of the tank content, LOCOPIAS can be equipped with a special tank reading module. This module has the following characteristics :

- The user can enter sounding, league, pressure, volume, weight, percentage of filling or temperature. The software determines all corresponding properties instantaneously.
- The tank geometry (rather than a pre-calculated table) is used to calculate the volume for each tank for the actual trim and heel. There is no need for additional correction tables.
- Interfaces for many tank measurement systems are available, so at each moment an exact overview of liquid content can be available, without further data entry.
- For vessels which carry petroleum products, a variety of temperature-volume correction tables is available: 54A, 54B, 54C, 55. Corrections can also be set manually. Moreover, a change in tank volume (caused by the deflection of steel under temperature fluctuations) is compensated for.
- Each collection of tank weights can serve as a basis for new loading conditions.

The image shows two windows from the LOCOPIAS software. The top window is a dialog box titled "Choose the conversion table to be used" with a list of radio button options. The bottom window is the main application window titled "PIAS: Sounding" with a menu bar (Setup, Help, Quit) and a data entry table.

Choose the conversion table to be used

- No temperature correction
- Correction factor per degree
- Volume Correction Factor
- ASTM Table 54 A (crude oil)
- ASTM Table 54 B (products)
- ASTM Table 54 C (general)
- ASTM Table 55
- Nynas (bitumes)
- ASTM Table 54 A (crude oil + glass hydrometer correction)
- ASTM Table 54 B (products + glass hydrometer correction)
- ASTM Table 23 A (crude oil on basis of relative density)
- ASTM Table 23 B (products on basis of relative density)
- ASTM Table 5 A (crude oil, on basis of API density)
- ASTM Table 5 B (products, on basis of API density)

Buttons: OK, SARC, PIAS, UNDO

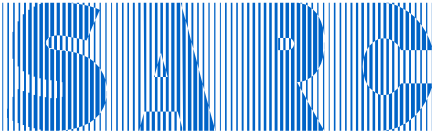
PIAS: Sounding
Setup Help Quit

Product, temperature and density

Tank name	Cargo tank 1	fr.142-160 PS
Include this tank in ullage report		No
Product (substance)		
Conversion table	No temperature correction	
Datalink		0.000
Temperature		15.000
Volume (not corrected for expansion)		0.000
Density at 15 degrees Celcius (in air)		1.0000
Density at 15 degrees Celcius (in vacuum)		1.0011
Correction factor per degree Celcius		-
Volume Correction Factor		1.00000
Temperature Expansion factor		1.00000
Density at 15.000 degrees		1.0000
Residue On Bottom (ROB)		0.0000
Density x Temperature Expansion Factor		1.0000
Weight		0.000

W-O DEVOCEAN

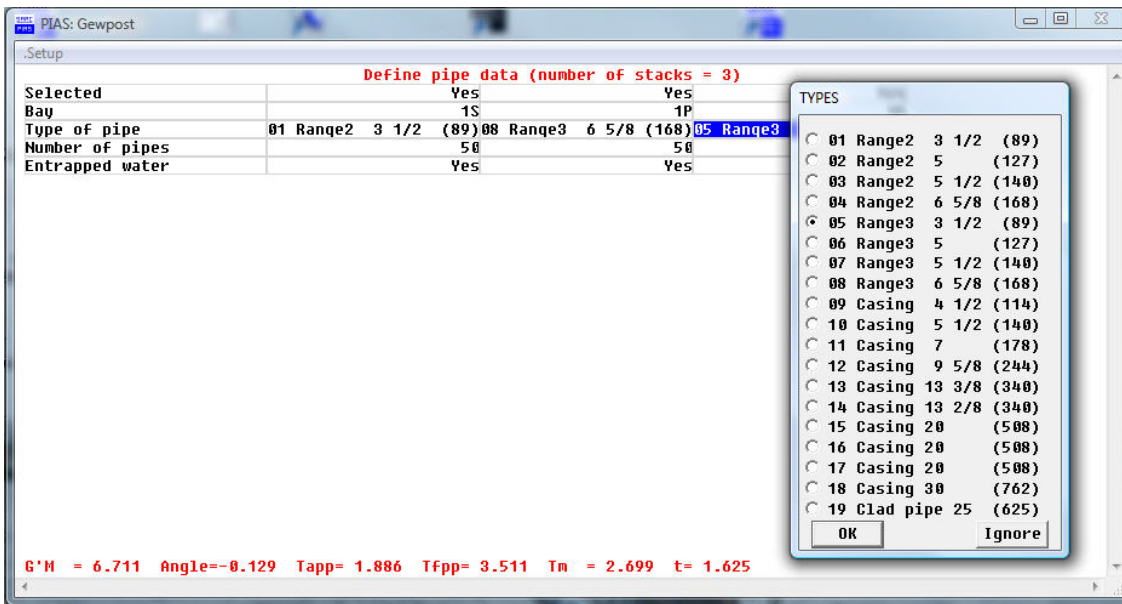
OK



LOCOPIAS pipe stack module

For ships with open deck pipe storage capacity

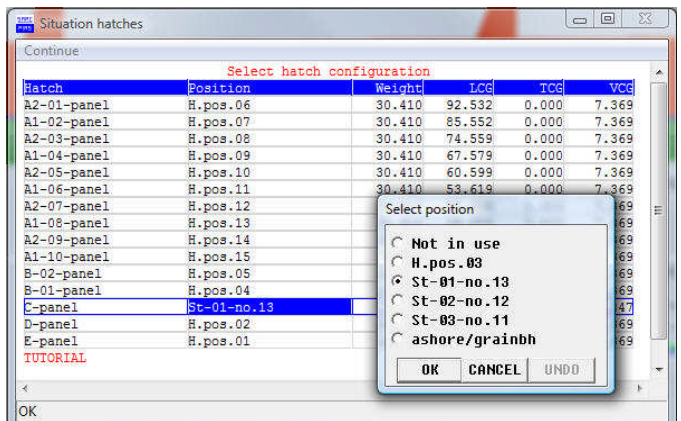
The pipe module is intended for vessels with open pipes as deck cargo. (f.e. offshore supply vessels). This module determines the weight of the combined pipe cargo, as well as the trapped water. The resulting weights and centers of gravity are incorporated in the loading condition.

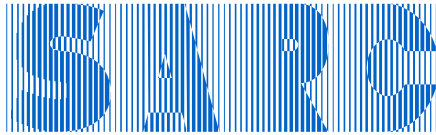


LOCOPIAS Hatch module

For ships with tween deck hatch

The module keeps track of the use of those hatches, while their weights and centers of gravity are incorporated in the loading condition. hatch module is intended for vessels with multiple tweendeck hatches, which may possibly also be used as (parts of) grain bulkheads.





LOCOPIAS

Assessment of quartering and following seas

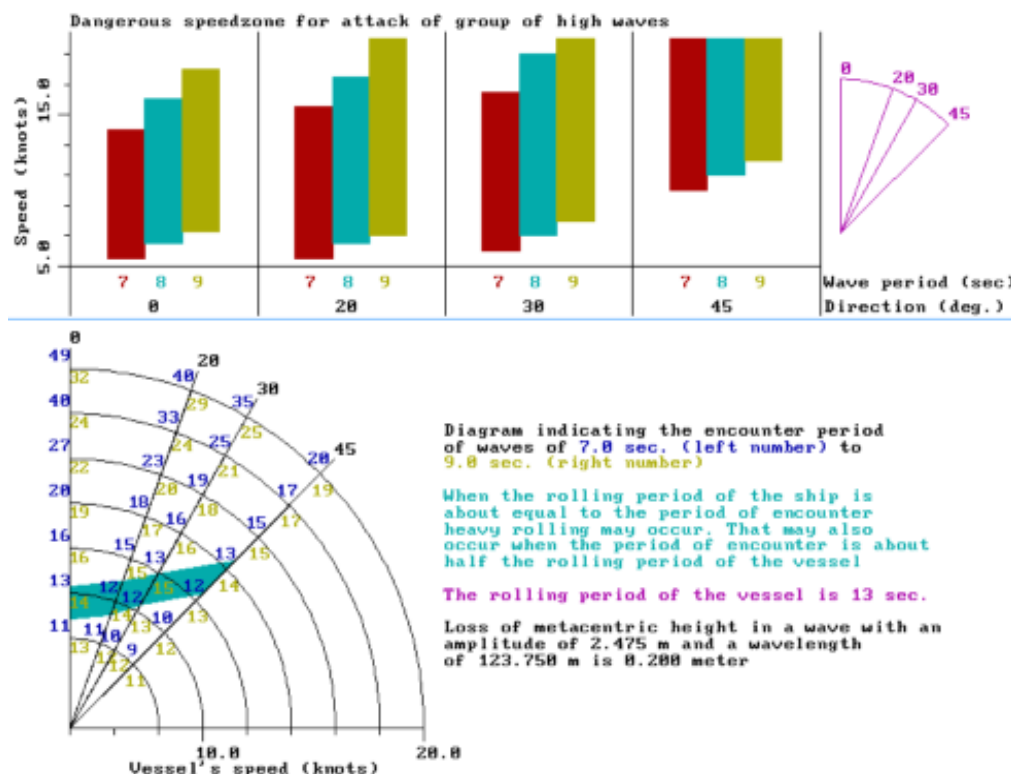
High quartering and following seas may inflict immediate danger to a vessel.

Those dangers can be categorized as follows:

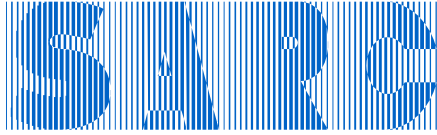
- Surfriding: when the speed of the vessel approximates the speed of the waves, the vessel will be accelerated by those waves, thus reducing the rudder function. This effects may cause broaching;
- Loss of stability on a wave crest: for a vessel with V-shaped cross sections the waterline breadths at the vessels ends is reduced in the wave troughs, which reduces G'M, and may even lead to negative G'M values;
- Synchronal rolling or resonance;
- Asynchronal rolling or resonance.
- In order to be able to assess those dangers, LOCOPIAS can be equipped with a specialistic function, which is based on the method of IMO paper SLF 39/3/3. This LOCOPIAS function presents a graph, which indicates all possible dangers instantaneously. It contains three elements:

- A bar chart, indicating the dangerous speed zone for surf riding;
- A polar diagram, which indicates dangerous resonance zones for different courses and speeds. In this diagram the areas with possible synchronous or asynchronous resonance (resulting from the actual loading condition) are indicated in red;
- An indication of the loss of stability, by showing the loss of metacentric height on a wave crest with a height of 2% of the length between perpendiculars.

Locopias produces a graph, of which an example is presented below, which can help the crew to determine a possible change of course or speed.



Seastate diagram



LOCOPIAS

Maximum allowable anchor chain forces

Diagram indicating the maximum allowable anchor chain forces during anchor-handling, according NMD 2007

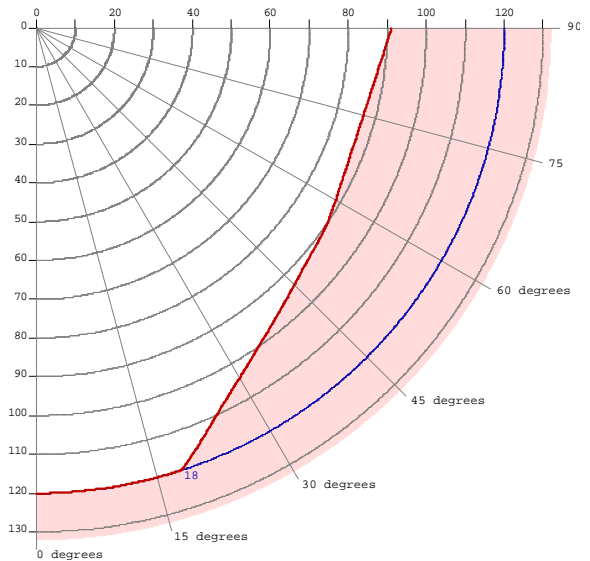
In June 2007 the Norwegian Maritime Directorate (NMD) released the Guidelines for immediate measures on supply ships and tugs that are used for anchor handling, where additional stability criteria for vessels engaged in anchor-handling are presented. Under effect of the anchor chain force, the heeling angle is limited to:

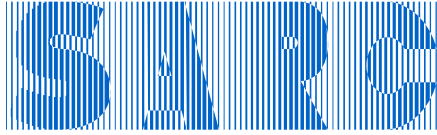
- The angle equivalent to a GZ-value equal to 50 % of GZ-max.
- That which results in water aft on working deck when the deck is calculated as flat.
- 15 degrees.

Where the heeling moment must be calculated as the total effect of the horizontal and vertical transverse components of force in the wire or the chain.

In order to assess the compliance of a particular loading with these criteria, for each loading condition a polar diagram can be plotted, as an extension to the

calculation of intact stability, which contains the maximum allowable anchor chain force, as function of the anchor chain angle.





LOCOPIAS Draft survey

Calculation of loaded or discharged cargo weight

This module can be used on every cargo vessel. It calculates the weight of the loaded or discharged cargo after the input of the drafts or freeboards before and after the cargo handling. It takes into account the differences of ballast water and consumables.

At the right the output of this module is shown. In this case the weight of the loaded containers is 3086.703 tons.

Below is the main screen of the user-interface. Standard the draft marks are used, but you can also define a reference point yourself.

Draft survey report

16-08-2010 14:36

	Initial			Final		
	Aft	Mid	Fore	Aft	Mid	Fore
Observed drafts [m]						
Starboard	2.900	2.800	2.750	5.570	5.500	5.470
Portside	2.900	2.800	2.750	5.570	5.500	5.470
Mean	2.900	2.800	2.750	5.570	5.500	5.470
Hydrostatics						
Draft mean of means [m]	2.793			5.491		
Trim on Lpp [m]	-0.148			-0.098		
Angle [degrees]	0.000			0.000		
Deflection [m]	-0.021			-0.017		
Specific weight water [ton/m3]	1.025			1.025		
Actual displacement [ton]	4000.179			8377.359		
Deductables [ton]						
Ballast water	677.769			1968.246		
HFO	479.459			479.459		
Fuel Oil	70.450			70.450		
Fresh Water	52.831			52.831		
Miscellaneous	36.634			36.634		
Cargo	0.000			0.000		
Tweendeck hatches	207.239			207.239		
Grain bulkheads	66.000			66.000		
Crew / prov / stores	15.000			15.000		
Other	0.000			0.000		
Total deductables	1605.380			2895.858		
NET Displacement [ton]	2394.798			5481.501		
Empty ship	2380.041			2380.041		
Constant/cargo on board [ton]	14.757			3101.460		
Total loaded [ton]				3086.703		