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.

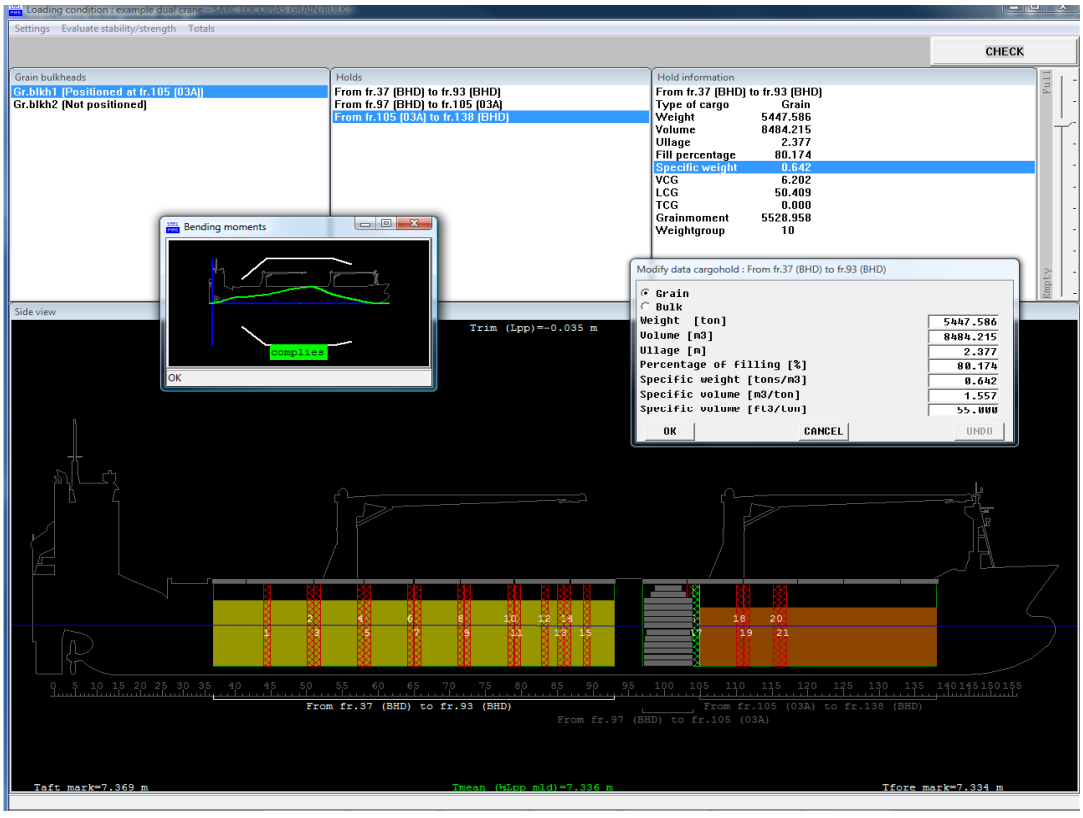
This module performs the following functions:

- 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.

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)*

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



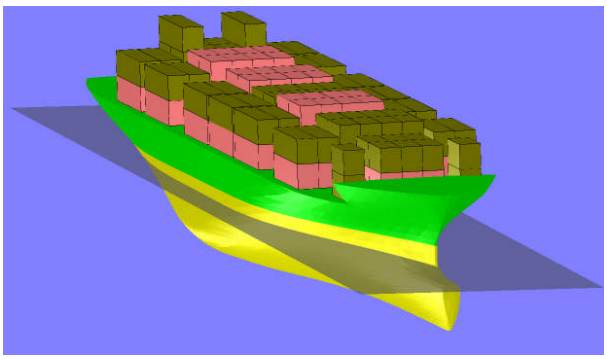
LOCOPIAS
Container module

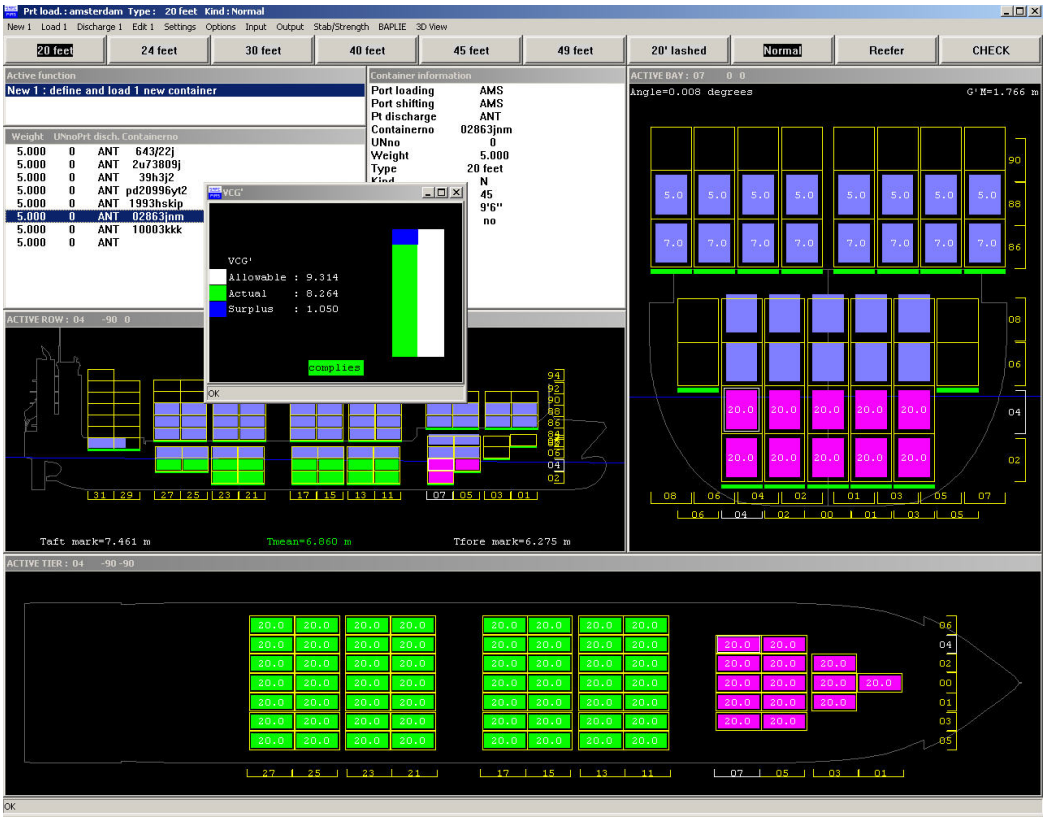
For container vessels LOCOPIAS can be equipped with a dedicated container module

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 LOCOPIAS *line of sight* module;
- Container cargo positioned above deck is automatically included in the calculation of the windcontour of the vessel.





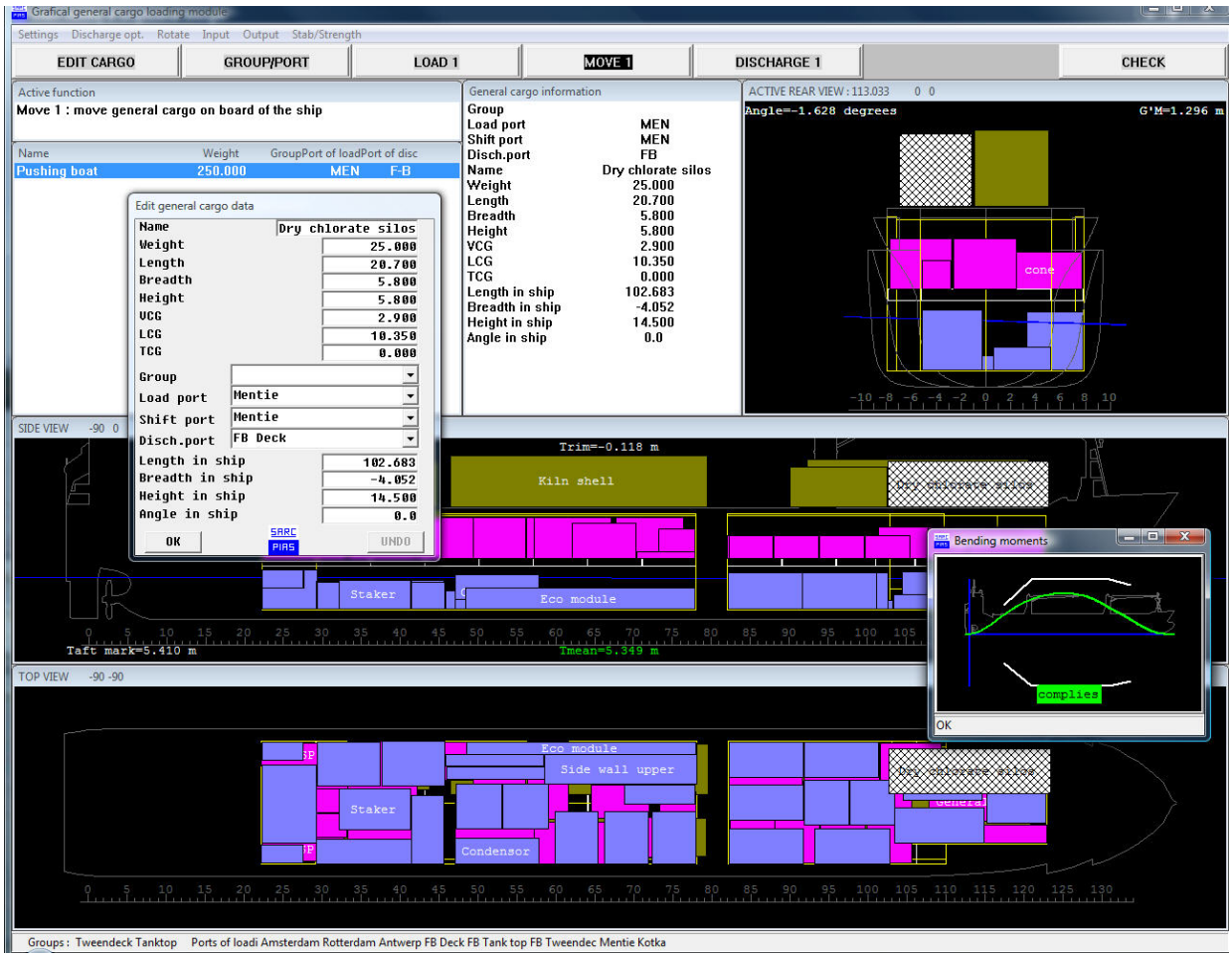
LOCOPIAS
General cargo module

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;

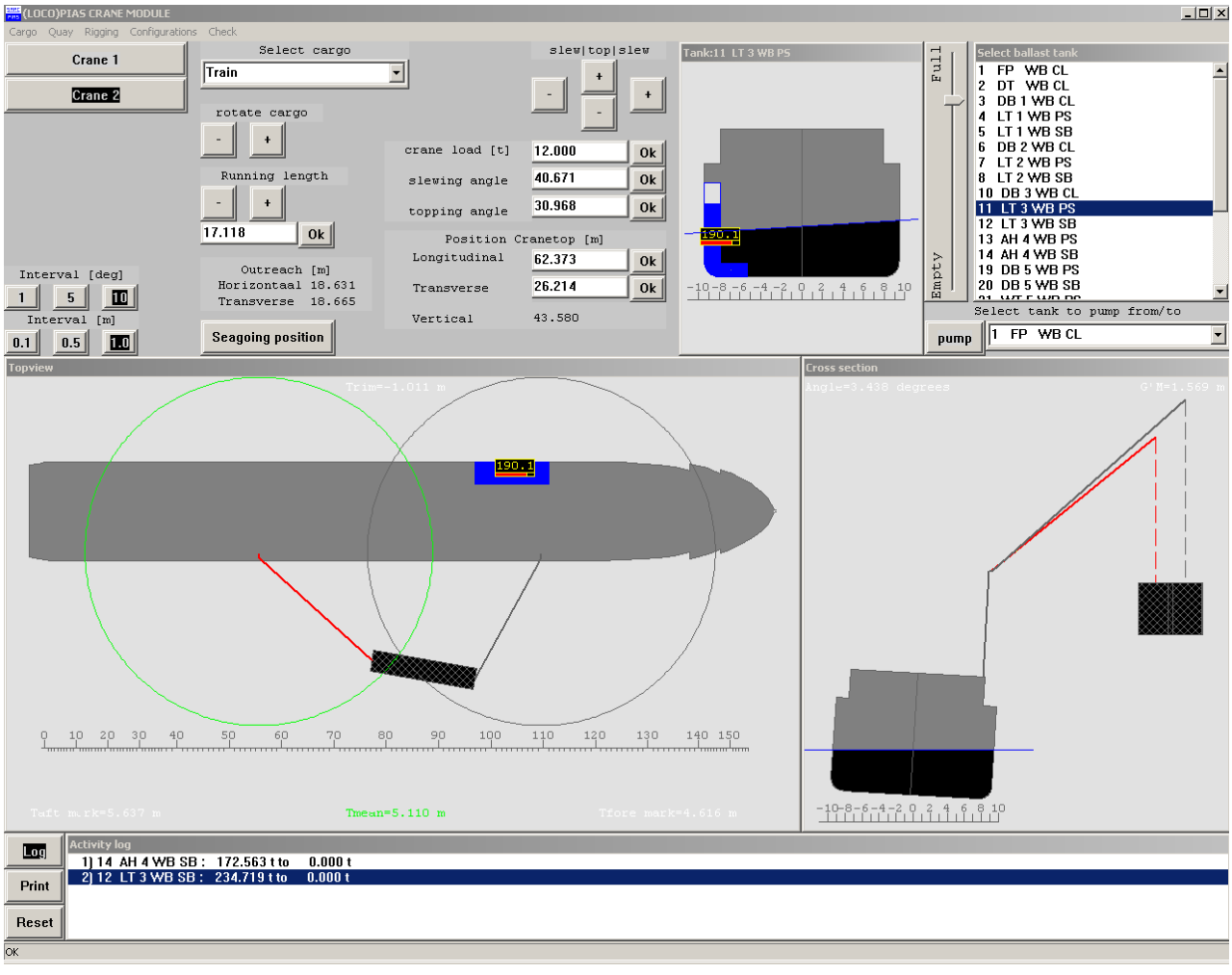


LOCOPIAS cranes module

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.
- Suppports 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;

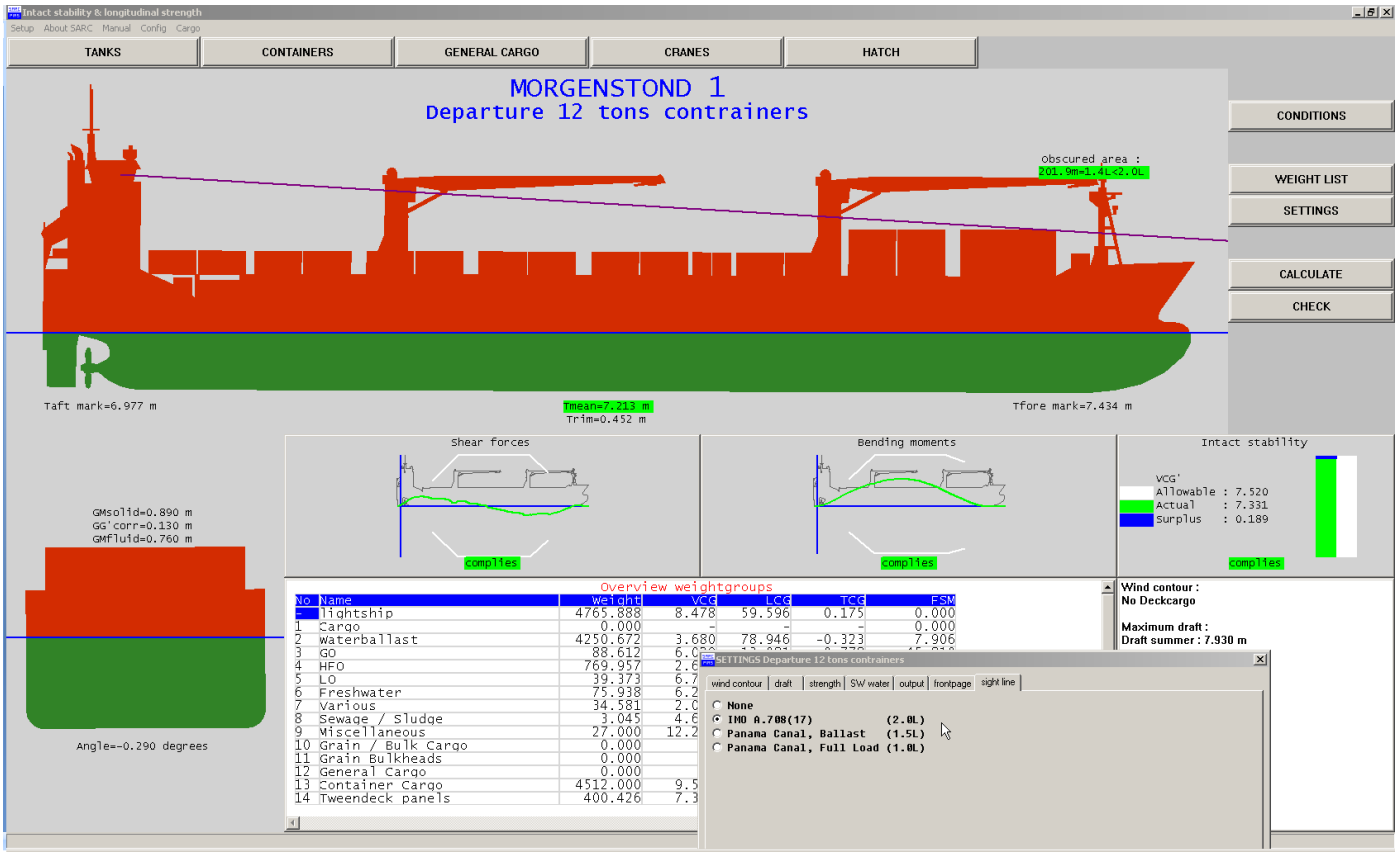


LOCOPIAS
line of sight add-on

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.

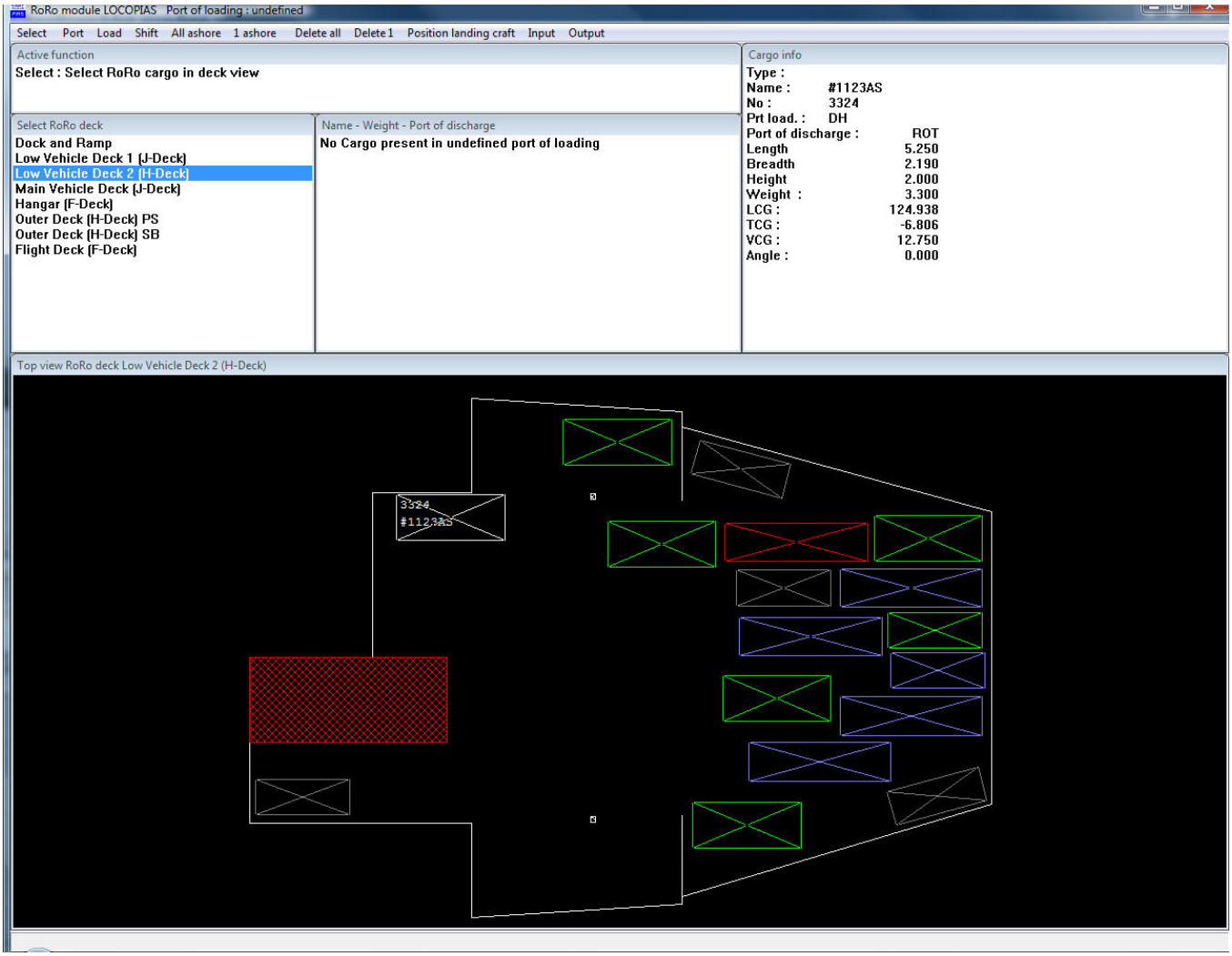


LOCOPIAS
The RoRo module

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 occuring 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

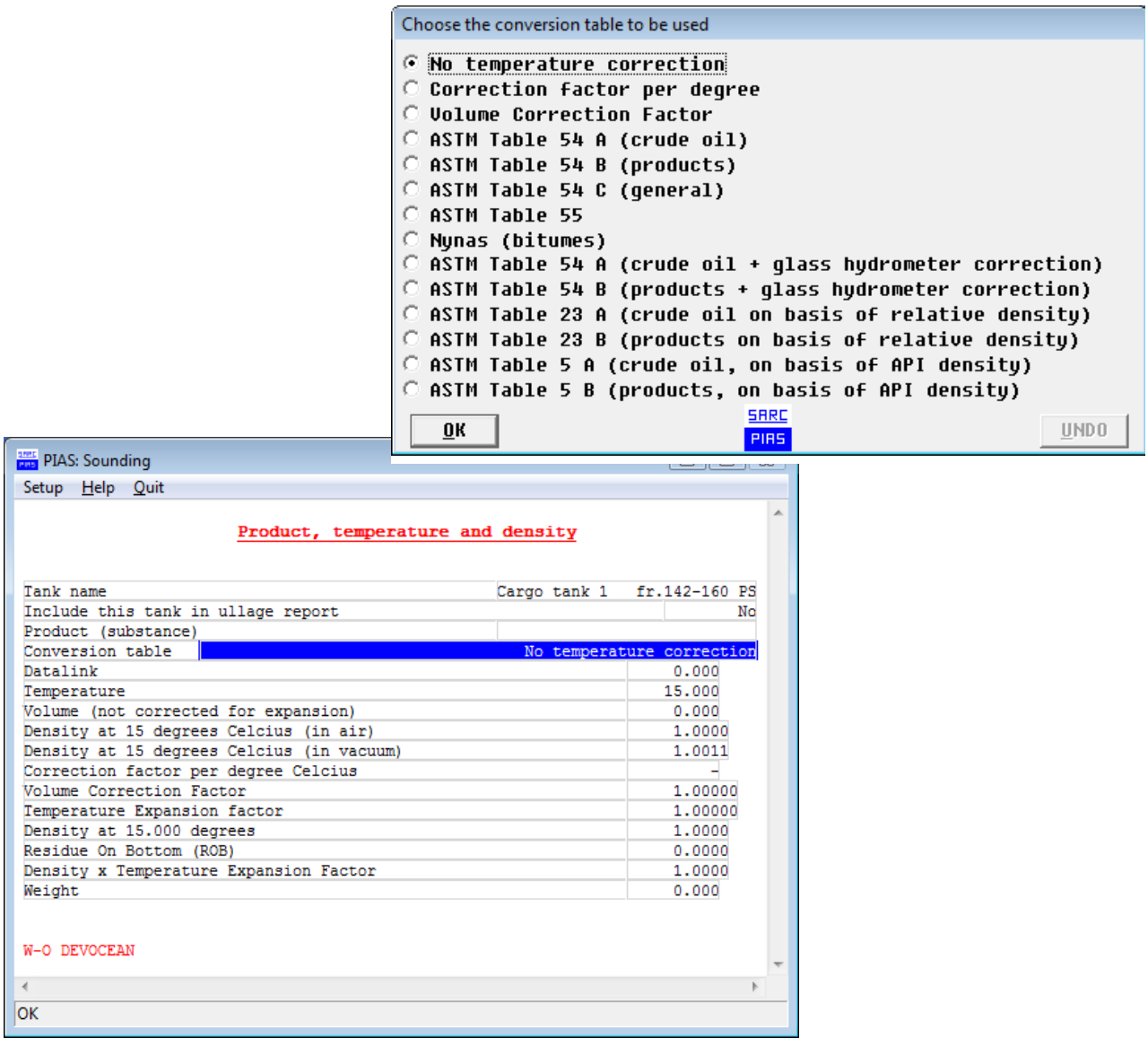


LOCOPIAS
Tanksounding

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 :

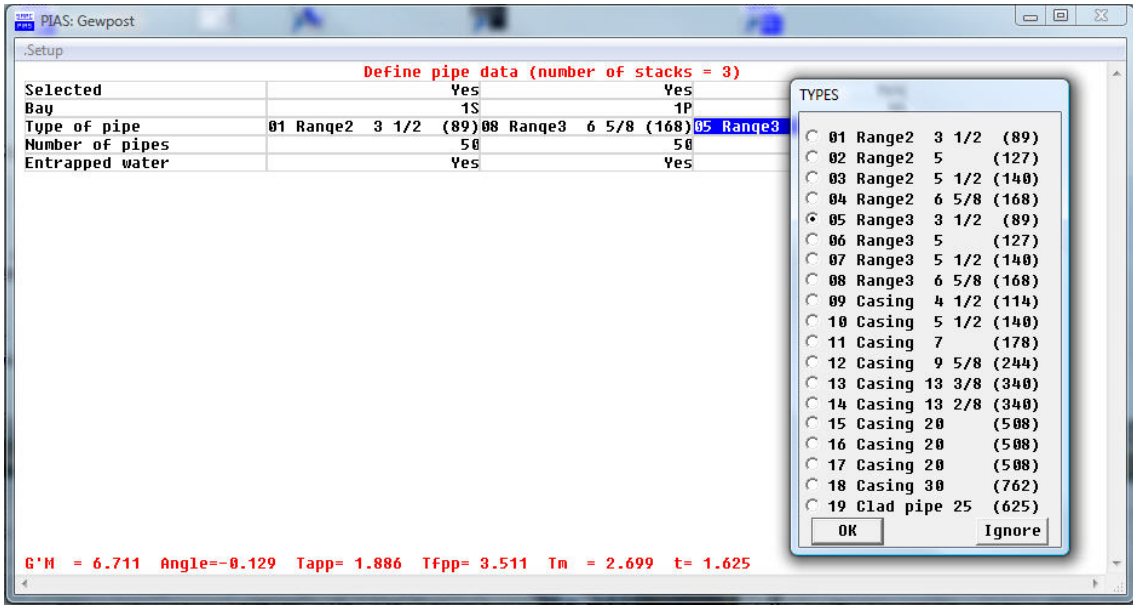
- The user can enter sounding, league, pressure, volume, weight, percentage of filling or temperature. The software determines all corresponding properties instantaneously.
- The tank geometry (rather than a pre-calculated table) is used to calculate the volume for each tank for the actual trim and heel. 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.



LOCOPIAS
pipe stack module

For ships with open deck pipe storage apacity

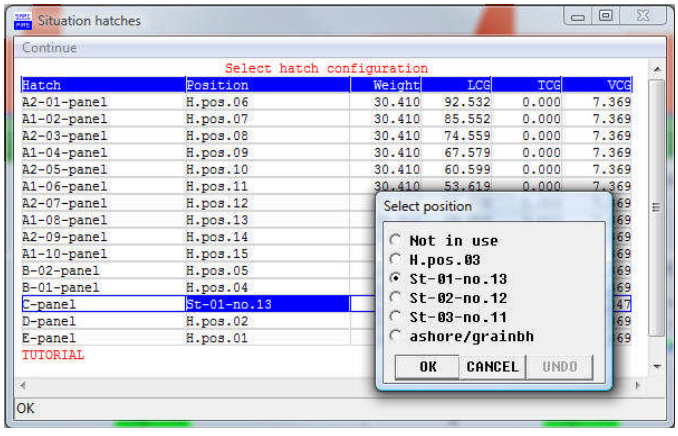
The pipe module is intended for vessels with open pipes as deck cargo. (f.e. offshore supply vessels). This module determines the weight of the combined pipe cargo, as well as the trapped water. The resulting weights and centers of gravity are incorporated in the loading condition.



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.



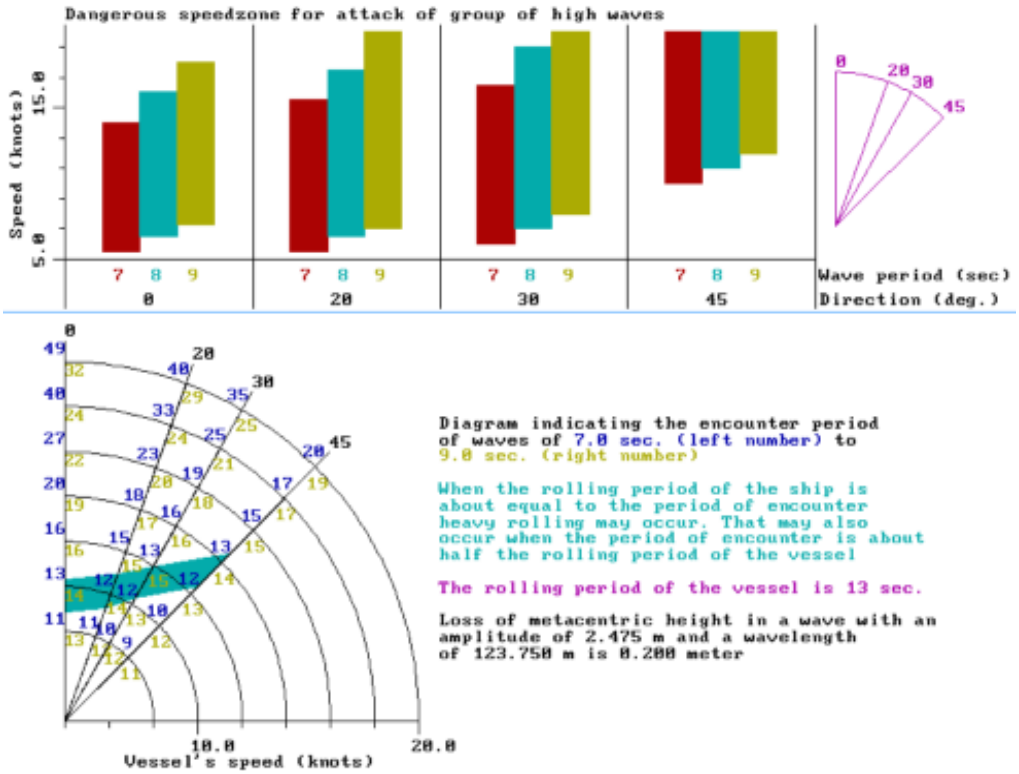
LOCOPIAS
Assessment of quartering and following seas

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

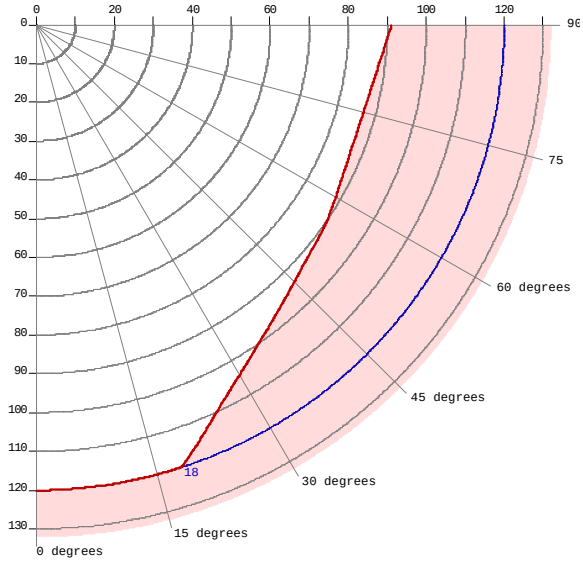
Diagram indicating the maximum allowable anchor chain forces during anchor-handling, according NMD 2007

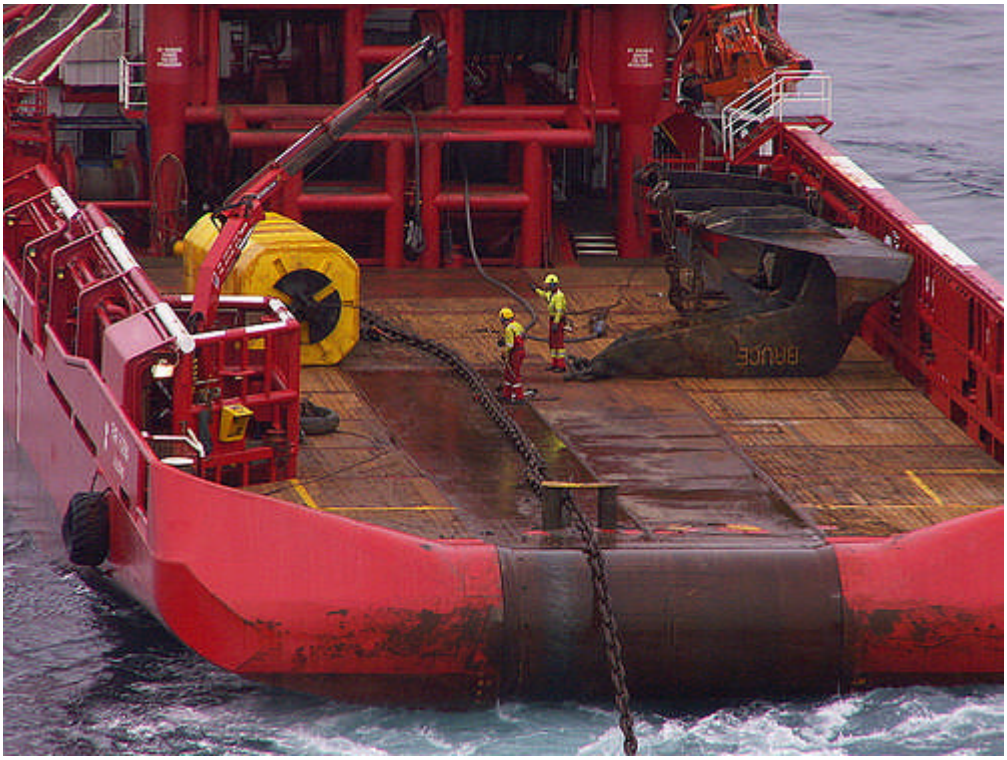
In June 2007 the Norwegian Maritime Directorate (NMD) released the Guidelines for immediate measures on supply ships and tugs that are used for anchor handling, where additional stability criteria for vessels engaged in anchor-handling are presented. Under effect of the anchor chain force, the heeling 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-inerface. 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		
Observed drafts [m]	Aft	Mid	Fore	Aft	Mid	Fore
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