Newsletter on PIAS and LOCOPIAS functionality extensions

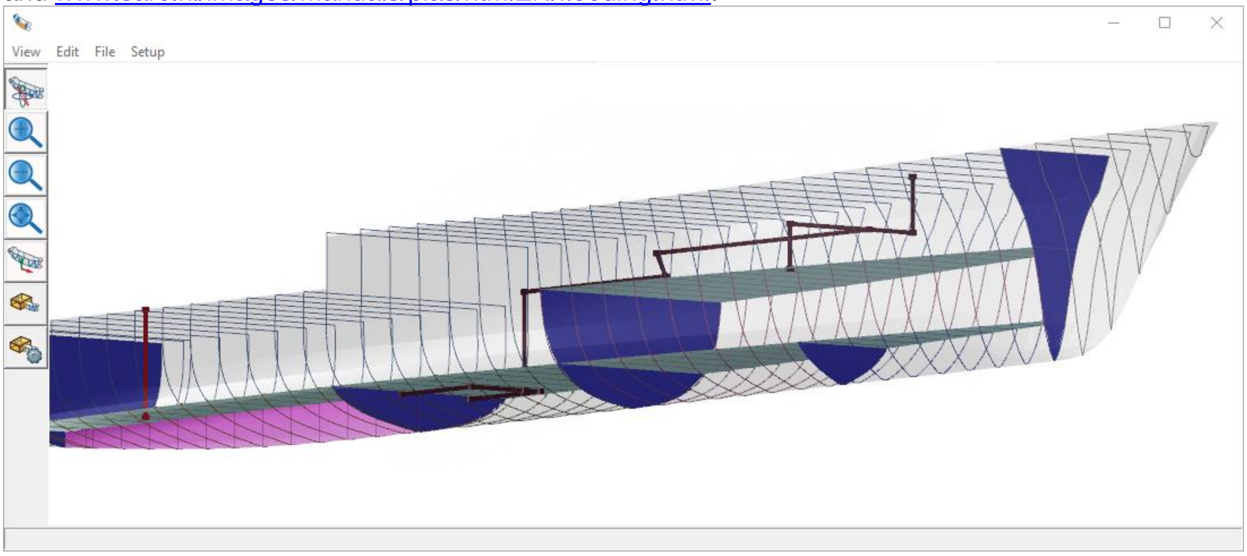
As released between July 2021 and December 2022

Introduction

This newsletter summarizes some major enhancements of (LOCO)PIAS since the previous overview from July 2021. Individual release notes are also published on the website and in LinkedIn group SARC BV around the moment of release, however, an additional comprehensive collection from time to time is considered to be appropriate for archiving purposes. Another source of PIAS news is the SARC users' day. We will share more information on this soon.

This year our development team will again work on numerous smaller and larger tasks. Significant enhancements will be:

- For many years, PIAS has a mechanism for compartment connections and critical points, what can be used when modelling complex stages of flooding. Although this works well, as such, it has never been designed for massive application. However, gradually the users of PIAS , as well as classification societies, are demanding so many of such 'complex stages', that their elaboration has become quite laborious. In order to meet this demand, a few years ago we decided to develop a brand new subsystem which offers a much more structured and automated. The basis for this new system is the shape and connectivity of the actual pipe lines and ducts from the ship. As first step, some time ago the GUI for the geometric modelling of a piping system, including its connections to tanks and compartments, has been finalized at found a place in Layout. By the summer of 2023 we expect to be able to lease a version of PIAS where this system is use in all damage stability modules, for the generation of intermediate (complex) stages of flooding, as well as integrated time domain computations of the fluid flow through piping networks. A sneak preview can already be obtained through the manual chapters www.sarc.nl/images/manuals/pias/htmlEN/layout_piping.html and www.sarc.nl/images/manuals/pias/htmlEN/flooding.html.



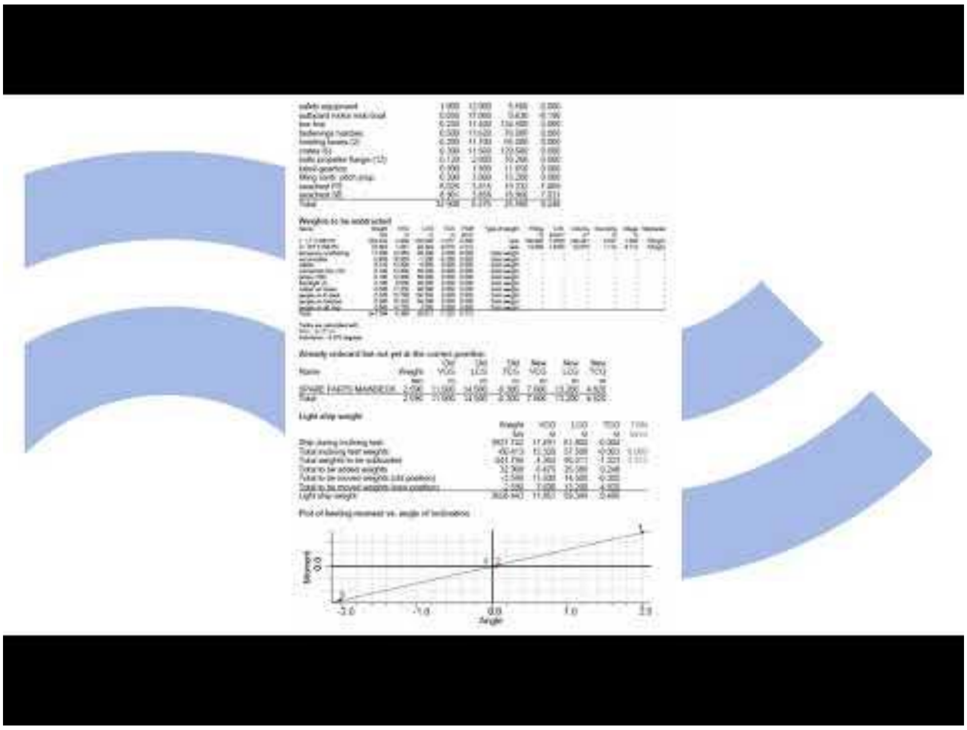
- A set of menus to define container-specific ship data — such as casting locations and bay/row/tier positions — which will allow PIAS users to also use the new container module. After all, while the container module was designed for LOCOPIAS, it can still be a valuable tool in the ship design stage as well.
- Steadily increasing the number of places where multithreading is applied. Unfortunately, there exists no magic bullet which can provide full multithreading for an entire application, on the contrary, that has to be programmed and tuned at each individual part of a program. So, this is a continuous effort, which we are eager to make, in order to keep PIAS on the maximum level of computational force.
- Container lashing in LOCOPIAS, scheduled to be released in the first quarter of 2023 Based on an interface with DNV Stowlash.

- From the beginning of 2023, SARC will participate in a EU Horizon project called ‘SEUS – Smart European Shipbuilding’, on the development of an integrated platform for a combined solution incorporating CAE, CAD, CAM, and PDM software, see https://www.cadmatic.com/en/marine/seus/ . We look forward on collaborating with these distinguished international partners.

Initial PIAS training

Being experts in the field of many aspects covered by our software, SARC shares its knowledge by means of courses or training. Initially, we want to help the novice user to get started in PIAS. in these exercises the essentials of working with PIAS are taught by defining a vessel and execute (damage) stability and strength calculations. The training with its exercises and explanatory videos should be sufficient for anyone with a naval engineering background.

We want to share the course for free with anyone who is interested. Feel free to send us an email at sarc@sarc.nl or call us at +31 85 040 9040 for more information.



PIAS software protection, implementation of Universal Firm Code
The PIAS software protection is arranged by means of the Codemeter protection suite provided by Wibu Systems. So far this protection was available in 2 options. As a physical hardware lock (CmStick) and a software based license (CmAct). Both license containers are created using a different so called firmcode for each variant, which separates the creation process of the license containers.

A recent development from Wibu systems is the Codemeter Universal firmcode, shortly called UFC. (for more info, see https://www.wibu.com/magazine/keynote-articles/article/detail/universal-firm-code.html).
Using the universal firmcode, means one (1) single firmcode can now be used to create both CmAct and Cmstick licenses.
For Wibu systems, the UFC is the road to the future. Therefore, SARC has implemented the use of the UFC in its PIAS software to benefit from the latest developments and best security.
The UFC also introduces a third new variant of license containers. This is the Cloud container, or Cmcloud.
This cloud-based license variant can be made available through the internet, instantly available on request, no shipping (costs) involved, and the cloud container can be 'recycled', in contrast to the CmAct license container.
Furthermore, the cloud container can be programmed directly by the software vendor (SARC), without the need of exchanging license request file and the license update file with SARC.

Videos on recent developments by SARC
SARC has developed a *constraint management* feature for PIAS' Layout module. Constraint management is an important step in automating a part of the design process, while leaving the designer firmly in the captain's seat. https://www.youtube.com/watch?v=H-X21szjs0Q

Reduce fuel consumption by adjusting ballast water ballast on board. It is certainly possible as long as you use the right tools. With this module of LOCOPIAS, you implement the results from resistance calculations made for your ship and the software then searches for the most optimal trim within your loading condition. https://www.youtube.com/watch?v=62pRpk7ei8A

The SARC EDI-IMDG Validator can operate without any predefined ship geometry and is based on a schematic bay plan. This bay plan is derived from an Electronic Data Interchange file (EDI/Baplie). The tool can read a load from an EDI/Baplie message and checks the compliance of the load with the latest IMDG amendment. https://www.youtube.com/watch?v=6ifHOzjQhMk

SARC and CADMATIC achieved the following for bulkheads and decks:

- A two-way 3D data exchange between PIAS and CADMATIC Hull
- A 3D data synchronization mechanism between PIAS and CADMATIC Hull
- Communicate design changes with synchronized Logbook entries
- User-friendly settings and features to facilitate communication between the systems

https://www.youtube.com/watch?v=pSLt9hiSN6w

July 27, 2021

Adjustment of the application of least squares computation in module Incltest

In the program for reporting an inclination test, a VCG is determined per measurement, so that all small hydrostatic differences that may arise between the measurements are fully taken into account. Such may for example be differences in KM — because PIAS determines rather accurately for each heel the hull intersection with the waterline, and the associated KM — or in displacement. The latter may occur when using tanks as inclining test weights.

After determining the VCGs, the overall VCG of the empty vessel can be determined with the method of least squares. This gave some differences with the conventional determination of the VCG, calculated with a GM that was directly based on all moments and measured angles. However, this conventional scheme can only be used with fixed inclination test weights, where there is no difference in draft and trim during the inclination test. For PIAS' Incltest that is not sufficiently versatile, because users have required the option of using ballast water as inclining test weight. Yet, in order to have PIAS' results mimic the conventional least squares results as much as possible, we have changed parameters as fed to the least squares computation, so that the resulting VCG is more in accordance with a conventional calculation. Remaining differences are an expression of PIAS' higher accuracy because of the usage of the actual waterline for each measurement (instead of conventional averaging).

INCLINING TEST REPORT
M.v. Exempli Gratia

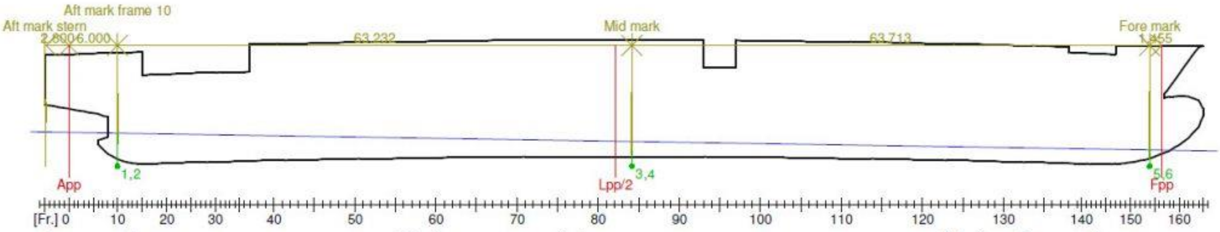
27 Jul 2021 12:52:07

Zero measurement

NO inclining test weights were aboard during draft or freeboard measurement.

Measured drafts and/or freeboards

Name	Length	Breadth	Ref. point from base	Measured type	Measured value	Draft from base
	m	m	m		m	m
Aftmark, Aft mark frame 10 <PS>	6.000	-0.269	-0.015	Draft	3.910	3.895
Aftmark, Aft mark frame 10 <SB>	6.000	0.275	-0.015	Draft	3.890	3.875
Mid mark, Mid mark <PS>	69.232	-9.450	-0.015	Draft	1.910	1.895
Mid mark, Mid mark <SB>	69.232	9.450	-0.015	Draft	1.890	1.875
Fore mark, Fore mark <PS>	132.945	-1.433	-0.015	Draft	2.010	1.995
Fore mark, Fore mark <SB>	132.945	1.418	-0.015	Draft	1.990	1.975



Legend
—Perpendiculars
—Water line
—Mark lines

Reference points
—1 Aftmark, Aft mark frame 10 <PS>
—2 Aftmark, Aft mark frame 10 <SB>
—3 Mid mark, Mid mark <PS>
—4 Mid mark, Mid mark <SB>
—5 Fore mark, Fore mark <PS>
—6 Fore mark, Fore mark <SB>

Main dimensions

Length perpendiculars	134.400m
Hull length	142.545m
Moulded breadth	18.900m
Moulded depth	10.950m

August 10, 2021

Appendage points visible again in PIAS

Vessels are always equipped with an appendage in PIAS. At the starting point 'Start appendage' appears on the right. The appendage points are shown in grey and cannot be changed. Nor can points be deleted or inserted. It is only meant to confirm the location of the appendage points.

Coordinates of frame on frame location 1.500 , frame no. 3.000

Half breadth	Height	Property
0.000	1.312	
0.052	1.312	Knuckle
1.142	1.631	Knuckle
1.142	1.964	Knuckle
1.828	1.981	
2.561	2.001	
3.101	2.028	
3.746	2.092	Knuckle
4.093	2.302	
4.368	2.469	
4.558	2.615	
4.681	2.727	
4.769	2.839	
4.830	2.955	
4.851	3.030	
4.857	3.152	Knuckle
4.854	3.903	Start appendage
2.200	3.903	Knuckle
2.200	6.800	Knuckle
0.000	6.800	

More info at:

https://www.sarc.nl/images/manuals/pias/htmlEN/hulldef.html#hulldef_input_coordinates_manual

September 7, 2021

Strip theory has been added in Motions

Earlier this year we announced that we had added a new module to PIAS: Motions. With this module the seakeeping behavior of a monohull vessel can be analyzed. While at launch only a simple empirical model was available, we are happy to announce that the module has been extended with a strip theory based method.
This method is capable of computing the transfer functions for all six ship motions (surge, sway, heave, roll, pitch and yaw), and will be able to calculate the motion, velocity and acceleration of any point on the vessel. The operation of the software has been explained in the manual.

The strip theory is the fastest way to obtain a first reliable impression of all six ship motions. It gives an answer in a few minutes, depending on the number of headings, wave frequencies and the amount of frames specified in the PIAS model.

TABLE OF MOTION OUTPUT
DTC schip

11 Jan 2023 14:33:20

Point of Interest:

Name	Abbr.	Length	Breadth	Heigth
Center of gravity	C.o.G.	173.772	0.000	19.842

Speed: 0.000 knots
Wave heading: 0.000 degrees

Frequencies		RAOs											
Wave freq.	Enc. freq.	Surge		Sway		Heave		Roll		Pitch		Yaw	
		Ampl	Phase	Ampl	Phase	Ampl	Phase	Ampl	Phase	Ampl	Phase	Ampl	Phase
rad/s	rad/s	-	rad	-	rad	-	rad	-	rad	-	rad	-	rad
0.200	0.200	0.985	1.582	0.000	3.080	0.945	-0.007	0.000	3.136	0.004	1.612	0.000	1.873
0.300	0.300	0.867	1.620	0.000	-0.188	0.730	-0.035	0.000	2.965	0.008	1.682	0.000	2.117
0.400	0.400	0.529	1.705	0.000	-2.693	0.260	-0.289	0.000	0.470	0.009	1.760	0.000	1.572
0.500	0.500	0.060	2.323	0.000	0.000	0.217	-3.034	0.000	3.064	0.002	2.027	0.000	2.796
0.600	0.600	0.135	-1.480	0.000	1.615	0.102	2.903	0.000	-1.594	0.003	-1.645	0.000	-1.546
0.700	0.700	0.035	0.563	0.000	3.053	0.084	-0.457	0.000	-0.211	0.001	0.474	0.000	1.364
0.800	0.800	0.022	2.949	0.000	-0.431	0.028	1.873	0.000	2.582	0.001	2.458	0.000	-2.075
0.900	0.900	0.012	-0.305	0.000	2.435	0.022	-1.680	0.000	-0.817	0.000	-0.889	0.000	0.895
1.000	1.000	0.008	2.974	0.000	-0.923	0.012	1.650	0.000	2.163	0.000	2.422	0.000	-2.445

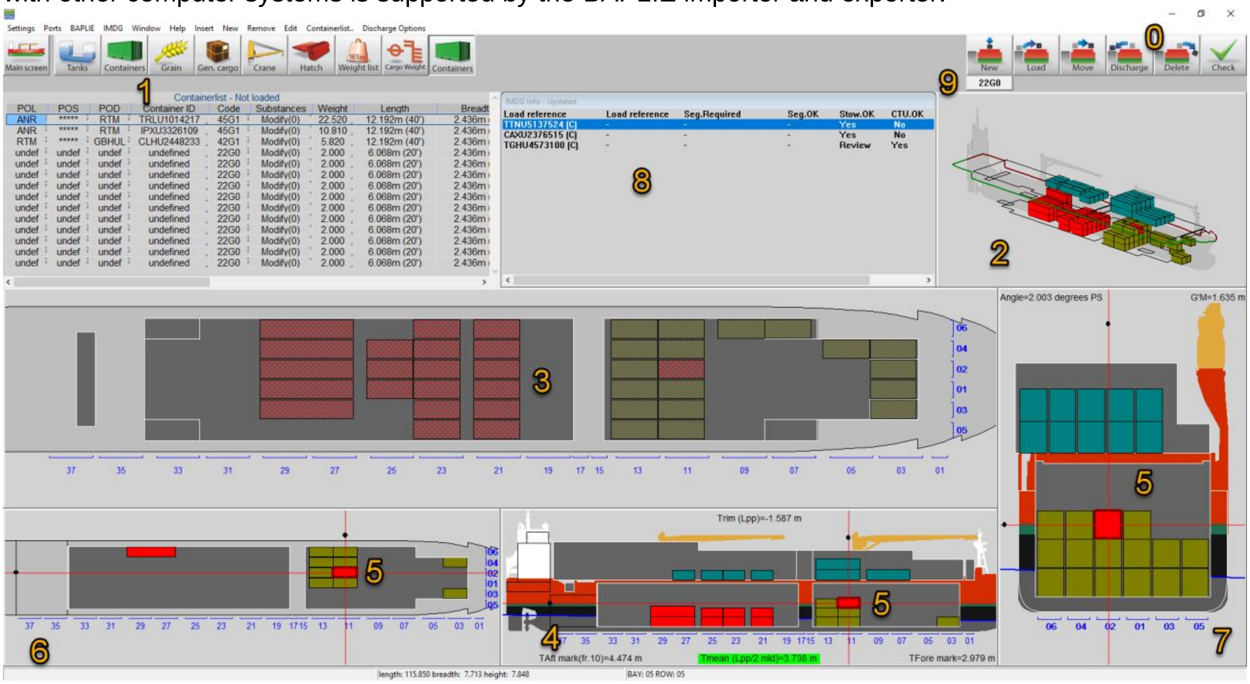
September 20, 2021

Redesign of the Container module

LOCOPIAS has always been equipped with a dedicated container GUI with support for a wide range of standard container types. However, corresponding container slot positions needed to be pre-defined for all container types, which was quite a task to do. Recently, a completely redesigned and rewritten container module was released, equipped with enhanced logic for the positioning of containers of varying sizes. This new module requires only a minimal amount of predefined data, while still supporting all ISO container types, even those not foreseen in the design stage of the ship.

The redesign of this LOCOPIAS module also offered the opportunity to extend the vessel's geometric data set with IMDG-related items, such as the locations of living quarters and ventilation inlets. In collaboration with the Hazcheck database this allows for an automated verification of a container load against the IMDG code, including checks on individual container placement and separations between multiple containers.

LOCOPIAS can be installed as a shipborne software program, where relevant connected to the tank gauging system. In addition, LOCOPIAS copies are allowed to be used in shore offices as well, with the ability to transfer loading conditions, including IMDG particulars, to and from the ship. Data exchange with other computer systems is supported by the BAPLIE importer and exporter.



Example of new container module

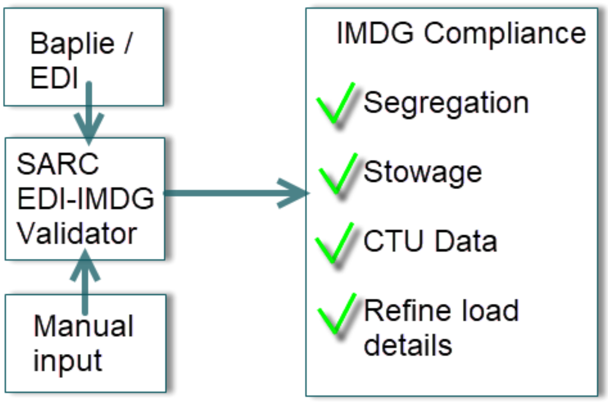
0. Loading/ Discharging functions.
1. List of containers to be loaded.
2. 3D View.
3. Top View: all functions happen in this window.
4. Side View.
5. Navigation Lines.
6. Top View : used for navigation.
7. Cross Section View : used for navigation.
8. IMDG window: shows IMDG compliance and/or exceptions.
9. Container type button : the selected one is on the button.

The operation of the software is explained [in the manual] as usual.

October 5, 2021

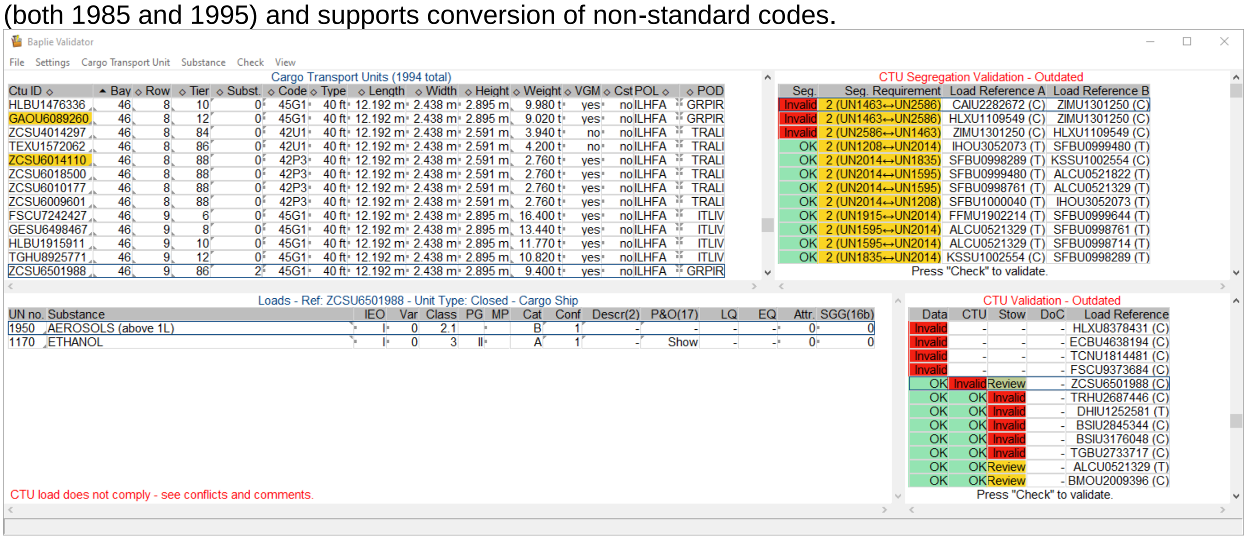
SARC launches EDI-IMDG validation tool for shipping dangerous goods by sea

SARC, Netherlands-based developer of maritime software solutions, has released an EDI-IMDG validation tool for shipping dangerous goods by sea. The SARC EDI-IMDG Validator can operate without any predefined ship geometry and is based on a schematic bay plan. This bay plan is derived from an Electronic Data Interchange file (EDI/Baplie). The tool is meant for ship owners, shipping lines, crew and port authorities and can assist in attaining a higher standard of safety at lower effort.



If a vessel sails with dangerous cargo, international rules require the load to be verified for compliance with the latest IMDG code (International Maritime Dangerous Goods). Each transported substance needs to be checked for conflicts with all other transported substances and the position of its Cargo Transport Unit (CTU) on the vessel needs to be validated.
The tool can read a load from an EDI/Baplie message and checks the compliance of the load with the latest IMDG amendment. It is also possible to check a manually entered load. Once a load is imported, the operator can refine details of the load that were not available in the imported data, for example if a substance is in limited or excepted quantity. The tool performs segregation checks between all CTU's, verifies stowage comments and labels for each individual CTU and validates the CTU data.

The number of combinations to be checked increases quadratic with each additional substance in the load. A manual check of a complete load is therefore often very time-consuming and in practice a check will often be performed on a sample check basis. The EDI-IMDG Validator takes the bulk of this work out of your hands and does a complete check of all combinations and points you directly to the possible segregation conflicts or stowage issues for further review. The tool supports ISO 6436 container codes (both 1985 and 1995) and supports conversion of non-standard codes.



In summary, the EDI-IMDG Validator allows for a more thorough and more efficient check of a vessel's load, thus increasing the safety of the vessel, its crew and reducing the risk of environmental pollution. If you are interested in a demonstration, or require further information, please visit our website (www.sarc.nl) or contact SARC directly (sarc@sarc.nl). A free trial of the tool is available on request.
Leaflet: https://www.sarc.nl/wp-content/uploads/2021/10/SARC-EDI-IMDG-VALIDATOR-LEAFLET.pdf

December 14, 2021

Change of address

After 15 years at the Brinklaan, SARC moved this month to a new office space, where we have enough possibilities to grow and to give courses for larger groups. Those who are curious are more than welcome at the address below:

Landstraat 5
1404 JD Bussum
Netherlands

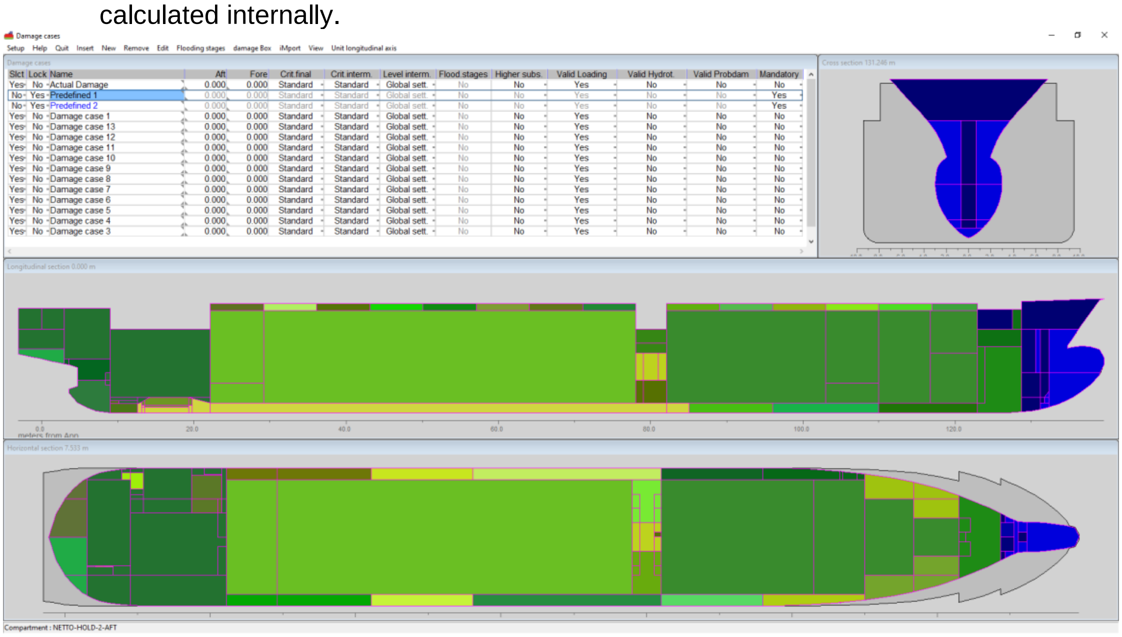
December 21, 2021

New damage case definition

The damage case definition has been updated to accommodate users' desires (as ventilated over the past years) and support future enhanced functionality.

Features of the new damage case definition:

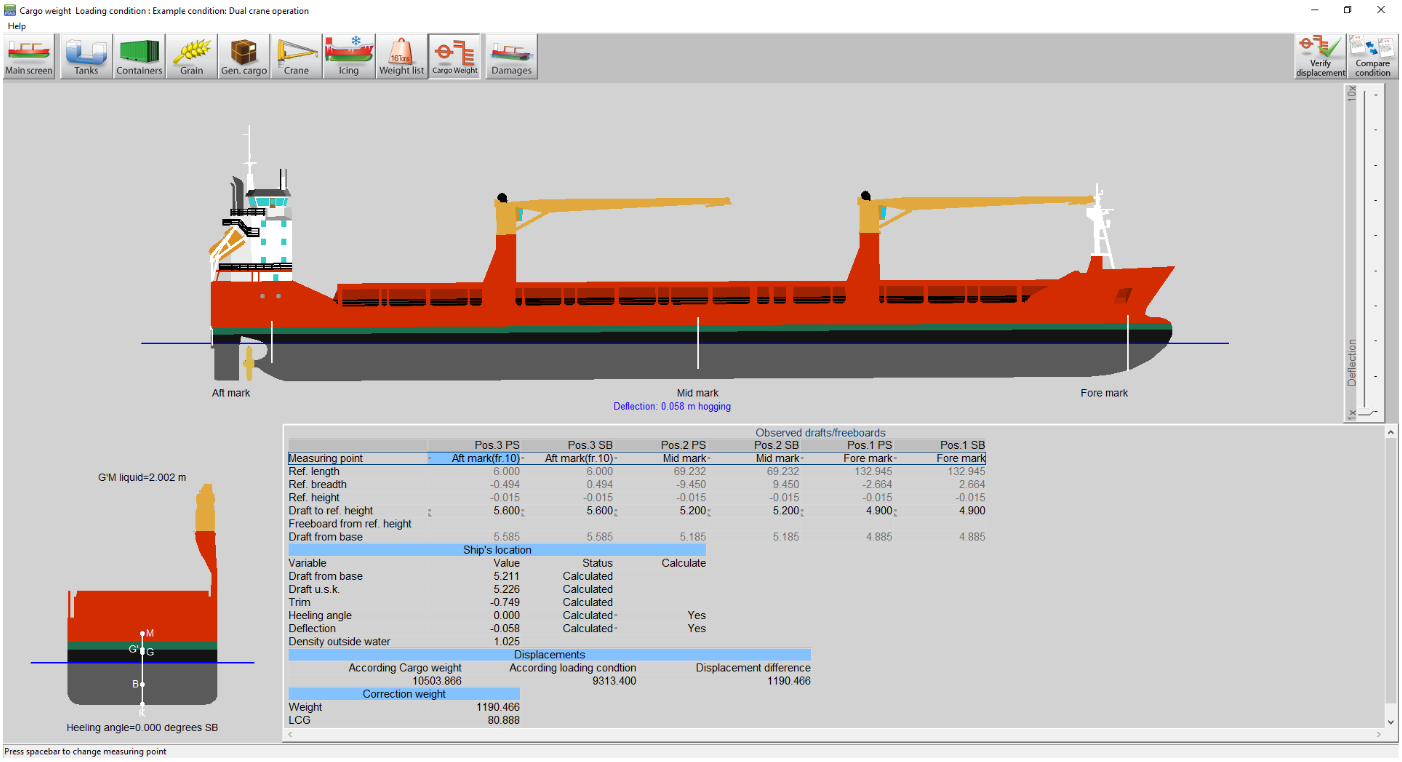
- All damage cases from all modules are in a sinlge list, each damage case can be calculated in any damage stability related module.
- Per damage case you can specify for which module it is intended, possibly for all three (Loading, Hydrotables, Probdam). You can set which damage cases you want to see in the list.
- The complex intermediate stages are now stored within their particular damage case, you can create multiple damage cases with the same damaged compartments, but with different (or no) complex intermediate stages.
- The number of damage cases, the number of damaged compartments per damage case and the number of complex intermediate stages is unlimited.
- Damage cases can be locked.
- Per damage case you can select different sets of damage stability criteria for the final and intermediate stages (e.g. separate criteria for inland waterway and for seagoing operation).
- Per damage case you can make a different choice for the liquid level during the intermediate stages (equal/unequal everywhere).
- Per damage case you can set whether the higher sub-damages are to be calculated (hence also in Loading and Hydrotables), these are no longer generated as complex intermediate stages but calculated internally.



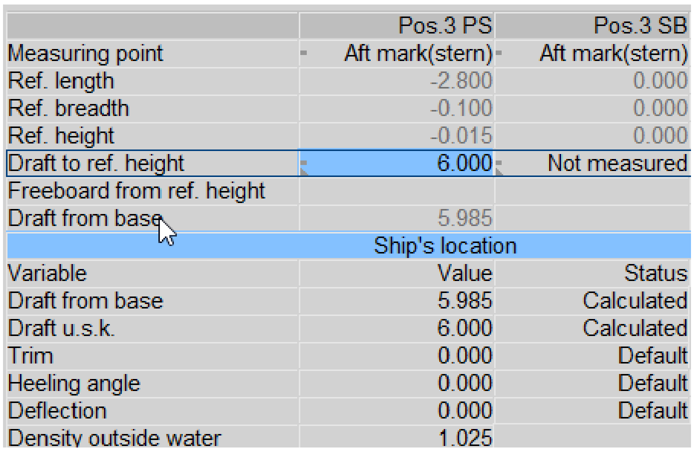
February 22, 2022

Upgraded Cargo Weight module

In March 2021, we already provided the news that the Cargo Weight module had been renewed. (https://www.sarc.nl/cargo-weight-module-renewed/) Afterwards, customers still had some questions, so we took another critical look at the program and made some extra adjustments.



- Additional fields are shown for draft and freeboard. Calculated (or initial) values will all be displayed on screen with a remark on their status: “Calculated” or “Default”.
- One completed draft/freeboard is enough to perform a calculation, more will of course provide a more detailed calculation. The deflection is only calculated if draughts or freeboards are specified over the entire length of the ship.



	Pos.3 PS	Pos.3 SB
Measuring point	Aft mark(stern)	Aft mark(stern)
Ref. length	-2.800	0.000
Ref. breadth	-0.100	0.000
Ref. height	-0.015	0.000
Draft to ref. height	6.000	Not measured
Freeboard from ref. height		
Draft from base	5.985	
Ship's location		
Variable	Value	Status
Draft from base	5.985	Calculated
Draft u.s.k.	6.000	Calculated
Trim	0.000	Default
Heeling angle	0.000	Default
Deflection	0.000	Default
Density outside water	1.025	

On the screen, more information is displayed about the measuring points and the location of the vessel.

This module is available for the on-board loading computer software LOCOPIAS as well as for the naval architectural calculations software PIAS.

March 1, 2022
Hulldef data check

In the past, you could only leave Hulldef if there were no more errors in the input. Now you can always leave the module, but you will still get a popup with possible definition errors. This popup is also available in the module itself, see the 'Check' option in the menu bar and will only show up if there is an error.

When starting any other module, the same check will be made on the input data and the user will only be able to continue with the module concerned once all errors in the model in Hulldef have been corrected.

April 6, 2022
Smaller additions to PIAS in prior months

In addition to the larger development projects, there are occasionally smaller functions that we adjust in the software to make it easier or faster to work with. Some of these that have taken place in recent months are listed below.

From the very beginning, the hull shape data (cross-sectional shapes) were stored in a file with the extension .hyd. Now, after 38 years of service, this file has been replaced with an extended file type, with extension .frames. The .hyd file can still be read but instead a .frames file will be written. The old .hyd file is then automatically renamed to .hyd.pre_2021 for backup purposes.

In the .hyd file the ship's cross-sectional shapes were stored as closed B-spline curves, with the appendages included. The .frames file contains the model twice: once as a model with only the input frame coordinates as B-spline curves (so without appendages) and additionally as a model with dense and closed polyline curves. The polylines are always derived from the B-spline curves and the specified appendages, and are used for the hydrostatic and stability calculations. The advantage of this redundant storage is that the originally entered frame coordinates are better preserved, because they are no longer modified by repeated adding & removing of appendages, and that the polylines that are used for the calculation are immediately available and do not have to be derived from the B-spline repeatedly.

In Hulldef, cutting/pasting of list of coordinates of frame has become easier. Also, you can apply the 'knuckle' shortcut (Alt + K) to multiple cells at once.

In Probdam, with the SPS code selected, the user is now given the option to choose either SOLAS 2009 or 2020 as regulatory basis.

In the table of wind heeling moments the maximum on the number of rows has gone. So larger, and hence more accurate, tables can be computed now.

As soon as you have the latest version of PIAS from https://cloud.sarc.nl/, you can use the above additions.

April 26, 2022
Faster graphics in (LOCO)PIAS
PIAS and LOCOPIAS rely more and more on powerful interactive 3D graphics. The amount of data transferred between the program and the video card can occasionally be so high that for some computer types the interaction became to feel a bit sluggish. Although that does not hamper the use of the software, after hours of work this gives a bit of an uneasy experience. By exploiting a hardware facility of Windows' graphic system, the refresh speed of the monitor has increased enormously. This makes the (LOCO-)PIAS experience much smoother, especially in the GUI's of Loading, Layout and Hulldef, but also when scrolling through large numerical tables.

May 24, 2022

PIAS Motions: the strip theory method has been expanded with additional roll damping

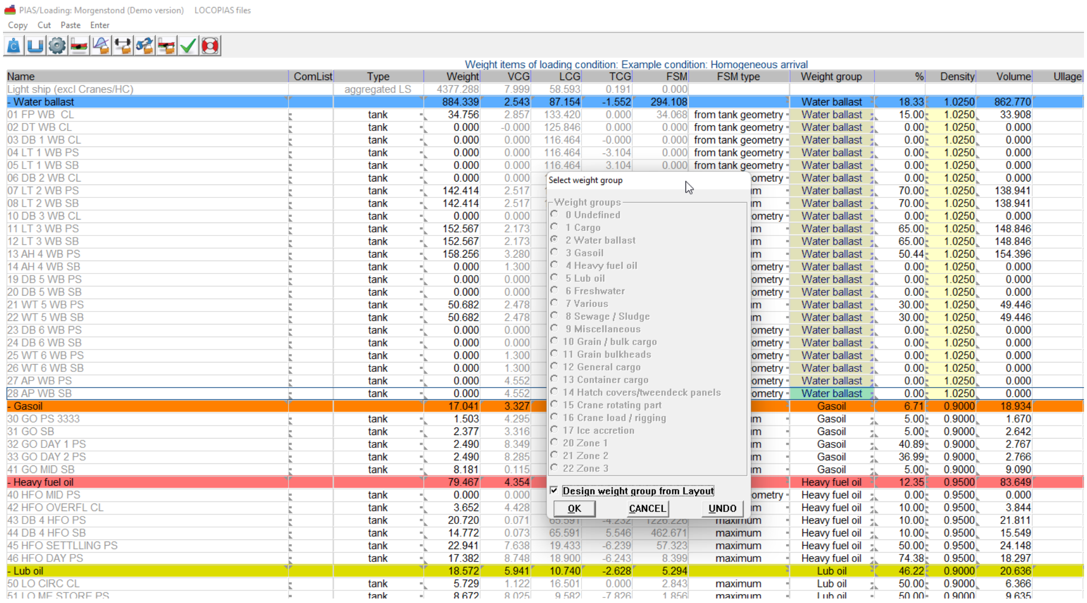
The strip theory method of PIAS’ Motions has been expanded with the option to include additional roll damping. The implementation is based on *el Moctar, B. O., Schellin, T. E., & Söding, H. (2021). Numerical Methods for Seakeeping Problems, Springer International Publishing*. Strip theory is based on the potential theory, which does not account for frictional resistance, which may cause the damping to be underestimated, notably for the roll motion. By including additional roll damping through the input of a damping ratio, the roll motions can be estimated more accurately.

The damping ratio is a physical quantity, which can be measured through a free roll decay or forced roll test.

August 2, 2022

Changed tank properties in Layout are automatically used in Loading

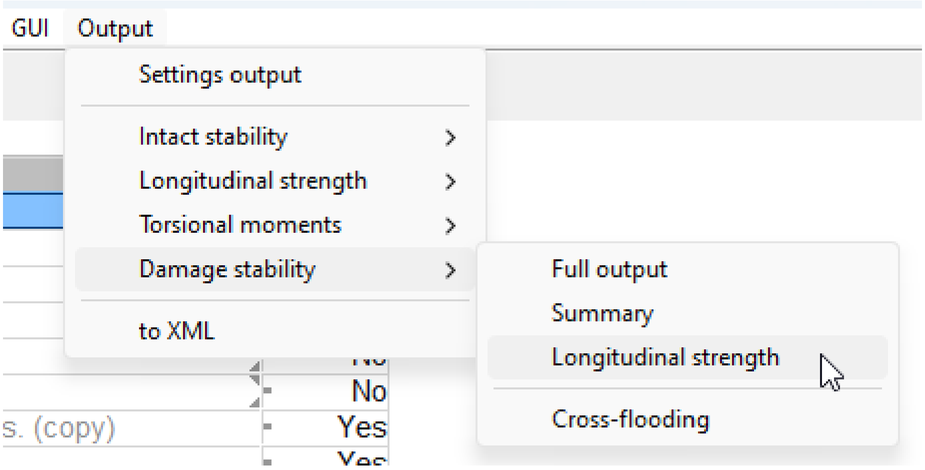
During the design process, compartment geometry or tank properties are frequently changed in order to optimize the performance of the design. Changes in tank geometry (and hence in volume etc.) are always processed in subsequent modules (In Loading immediately if ‘direct calculation of tank data’ has been switched on, see https://www.sarc.nl/images/manuals/pias/htmlEN/config.html#config_compartments). However, for some tank particulars their transfer to Loading is **optional**, such as the design density, for which the designer might want changes to be also transferred to Loading, or might want that changes are not transferred because other, loading condition specific, values have already been assigned. For this dilemma, elder PIAS had an option to import all Layout tank particulars into Loading, however, that was a bit crude because it did not offer the possibility to import some of the particulars and omit other.
Now, by default, in a new loading condition the density and weight group of all weight items are connected to Layout, so any change in Layout will directly be processed in Loading. This connection is depicted by the yellow color of the cells. When the user types a value in such a cell, the connection is broken, and that value is now specific for this loading condition. In this fashion, the user has a tool to control the connection of density and weight group between Loading and Layout, up to the level of the individual weight item. A supporting option to establish this connection for all weight items of all loading conditions is available under *Loading conditions -> Manage -> Design data from Layout.*



October 31, 2022

Longitudinal strength calculations in damaged condition

In the menu with the overview of loading conditions, under the 'Output / Damage stability' option, there is a new additional option 'Longitudinal strength' :



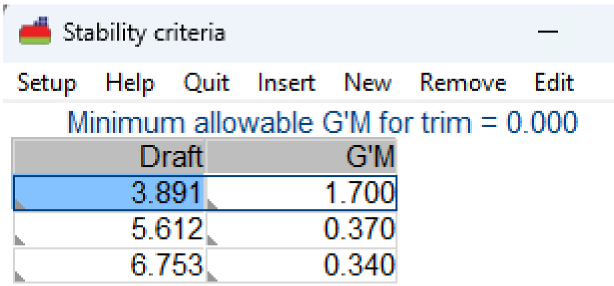
If this option is selected, longitudinal strength calculations are made for all selected loading conditions for damage stability (2nd column in this menu) and for all selected damage cases for the final stage of flooding in damaged condition.
The weight of incoming water is temporarily added to the loading condition and a longitudinal strength calculation is further made for that condition in the normal way.

This extension option is now available. The options for deterministic damage stability and longitudinal strength must be present.

November 3, 2022

Specifying minimum allowable G'M in a stability criteria verification overview

At the stability criteria it is possible to enter a table of minimum allowable G'M, for example calculated with the probabilistic damage stability :



In the summary of the stability criteria in Loading, this minimum allowable G'M was printed as a maximum allowable VCG'. From now on, it is printed as a minimum G'M, see the example below.

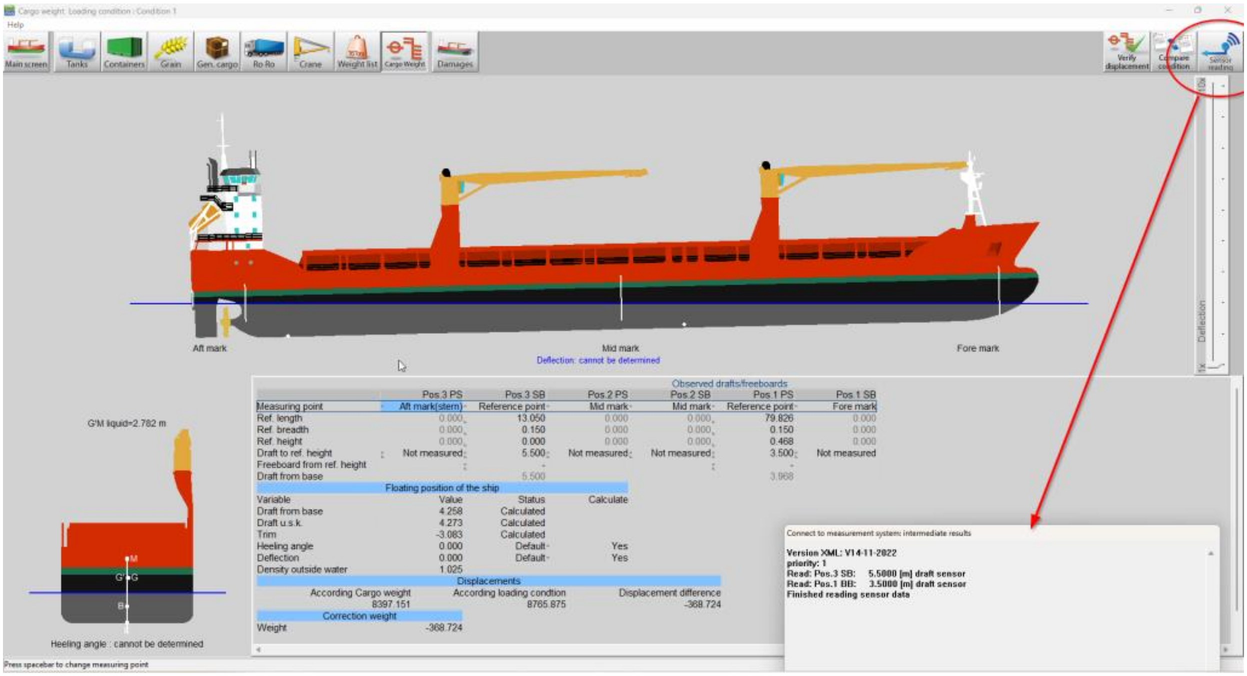
Calculated to PS	Criterion	Value
Minimum metacentric height G'M	*0.150*	*1.551 meter*
Maximum GZ at 30 degrees or more	*0.200*	*1.727 meter*
Top of the GZ curve at least at	*25.000*	*51.524 degrees PS*
Area under the GZ curve up to 30 degrees	*0.055*	*0.243 mrad*
Area under the GZ curve up to 40 degrees	*0.090*	*0.466 mrad*
Area under the GZ curve between 30 and 40 degrees	*0.030*	*0.223 mrad*
Maximum angle of inclination acc. to IMO's A.562 weathercriterion	*50.000*	*26.055 degrees PS*
Maximum statical angle due to wind	*16.000*	*1.895 degrees PS*
Maximum statical angle 80% of angle of deck immersion	*23.608*	*1.895 degrees PS*
Prob.Damage Calc.(PS&SB)	***0.389***	***1.551 meter***

The description of this criterion is manual input and it is possible that a 'maximum VCG' is mentioned. In that case the user has to update the description.

November 15, 2022

Cargo weight module extended with draft sensor reading

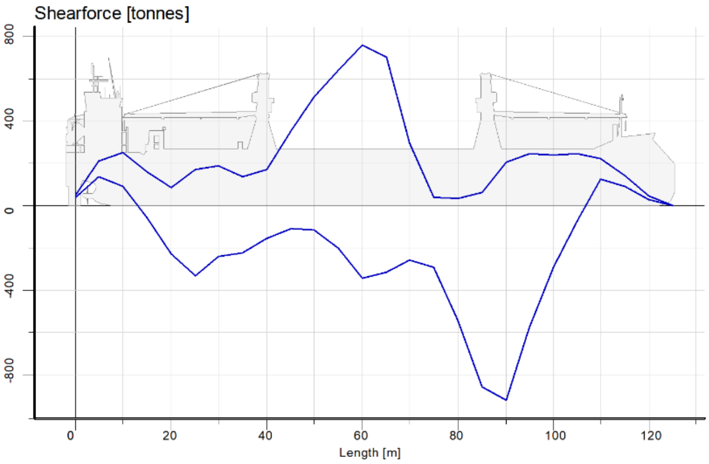
On user request, the module "Cargo Weight" in LOCOPIAS Draft survey – SARC is extended with functionality to read the (draft)sensors.
If a vessel is equipped with draft sensors, the measured values and the predefined sensor positions can be read and copied to the correct position in the draft/freeboard menu.
After the sensor reading the values are used to calculate ships position, displacement, and correction weights.



December 22, 2022

Envelope curve longitudinal strength

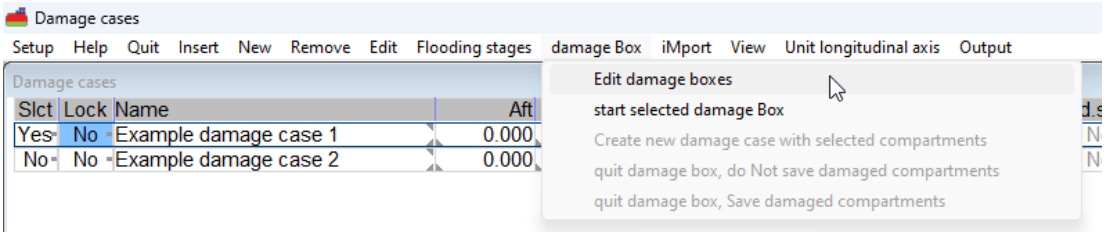
With this option, the envelope upper and lower limits are calculated of the occurring shear forces and moments based on the curves of the selected loading conditions. This envelope curve can be used to determine how strong the ship should be at certain longitudinal positions. Thus, it is really a design tool.

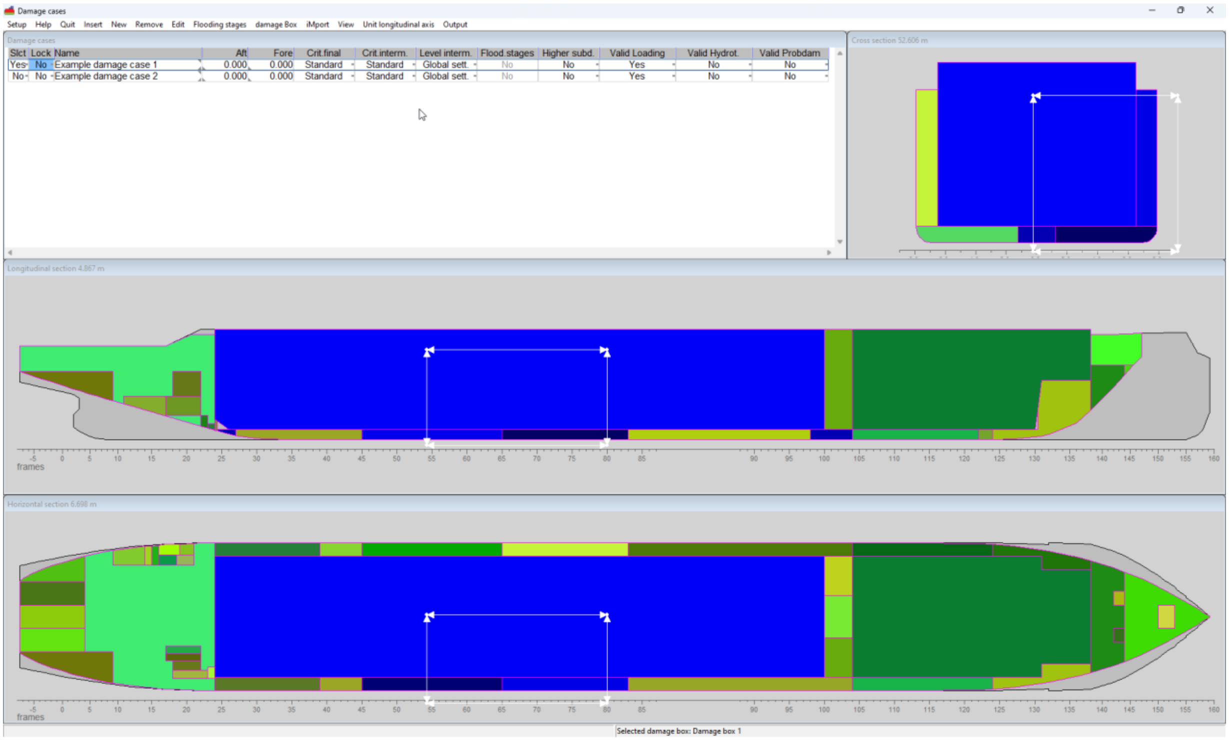


December 26, 2022

Definition of multiple damage boxes

For damage cases PIAS has a tool called damage box, where interactively a rectangle can be dragged, which makes the contained compartments flooded. This is a quick and consistent tool for declaring a large number of compartments flooded simultaneously. Now there is the possibility to define multiple damage boxes that can be quickly switched.





December 29, 2022

Ice belt

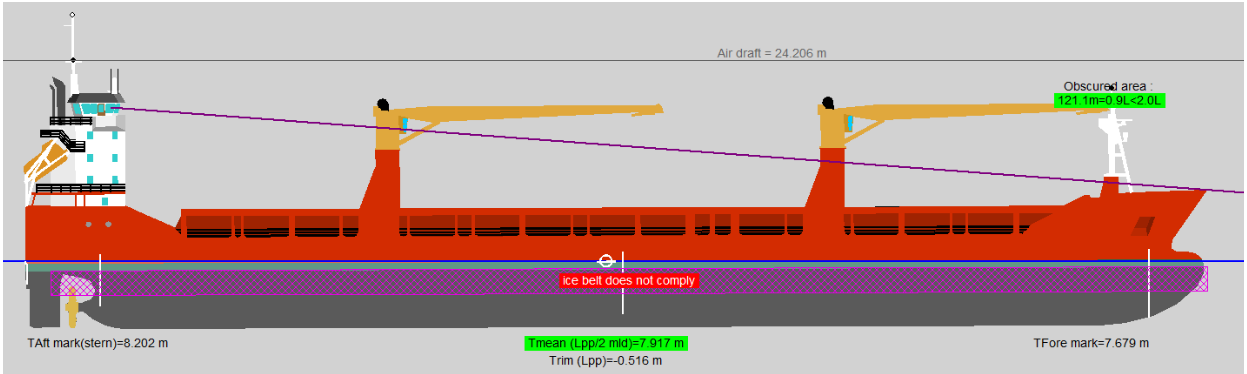
At draft marks the user can define minimum and maximum drafts for sailing in ice. This defines a so-called 'ice belt', which is graphically drawn and also checked. The user can turn the ice belt on and off in the settings of a loading condition.

Definition in Hulldef:

Draft marks and allowable maximum and minimum drafts

Name	Type of mark	Check	Tmin	Tmax	T ps/sb mea
Aft mark	draft mark	no check	-	-	Yes
Mid mark	draft mark	no check	-	-	Yes
Fore mark	draft mark	no check	-	-	Yes
min fore	draft info	Tmin local	4.000	-	Yes
Aft	ice mark	Tmax local/Tmin local	4.000	7.000	Yes
Mid	ice mark	Tmax local/Tmin local	4.000	7.000	Yes
Fore	ice mark	Tmax local/Tmin local	4.000	7.000	Yes

GUI :

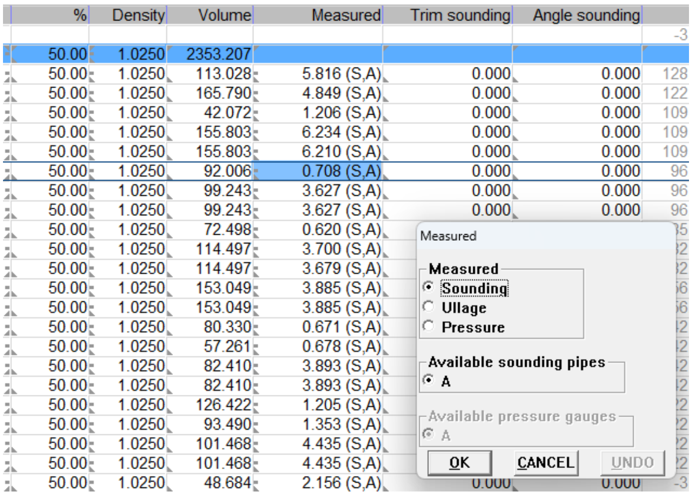


December 30, 2022

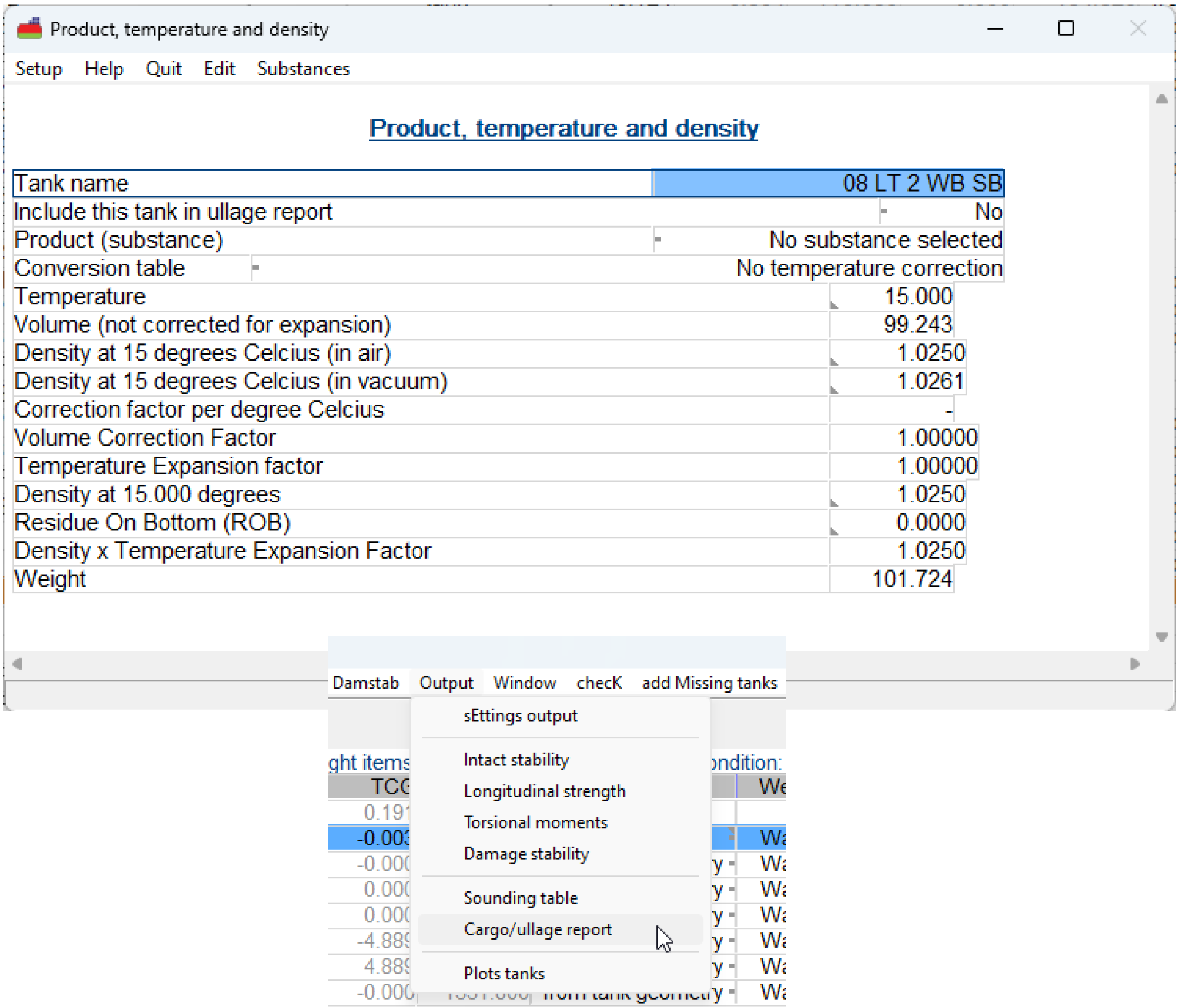
Integration sounding in Loading

For many years, PIAS has a module Sounding, which computes tank capacities and corresponding COG for an arbitrary list/trim combination, if applicable also with temperature correction to account for expansion of tank structure or cargo. The latter also with support for standards, e.g. ASTM tables for liquid hydrocarbons. These results can be utilized in a cargo/ullage report or be exported to a loading condition.

This feature is now integrated in Loading. With sounding functionality, the sounding pipes also get the option to calculate with trim and angle. Furthermore, interfaces with tank sensors are available.



%	Density	Volume	Measured	Trim sounding	Angle sounding	
						-3
50.00	1.0250	2353.207				
50.00	1.0250	113.028	5.816 (S,A)	0.000	0.000	128
50.00	1.0250	165.790	4.849 (S,A)	0.000	0.000	122
50.00	1.0250	42.072	1.206 (S,A)	0.000	0.000	109
50.00	1.0250	155.803	6.234 (S,A)	0.000	0.000	109
50.00	1.0250	155.803	6.210 (S,A)	0.000	0.000	109
50.00	1.0250	92.006	0.708 (S,A)	0.000	0.000	96
50.00	1.0250	99.243	3.627 (S,A)	0.000	0.000	96
50.00	1.0250	99.243	3.627 (S,A)	0.000	0.000	96
50.00	1.0250	72.498	0.620 (S,A)			35
50.00	1.0250	114.497	3.700 (S,A)			32
50.00	1.0250	114.497	3.679 (S,A)			32
50.00	1.0250	153.049	3.885 (S,A)			36
50.00	1.0250	153.049	3.885 (S,A)			36
50.00	1.0250	80.330	0.671 (S,A)			32
50.00	1.0250	57.261	0.678 (S,A)			32
50.00	1.0250	82.410	3.893 (S,A)			32
50.00	1.0250	82.410	3.893 (S,A)			32
50.00	1.0250	126.422	1.205 (S,A)			32
50.00	1.0250	93.490	1.353 (S,A)			32
50.00	1.0250	101.468	4.435 (S,A)			32
50.00	1.0250	101.468	4.435 (S,A)			32
50.00	1.0250	48.684	2.156 (S,A)	0.000	0.000	-3



Tank name	08 LT 2 WB SB
Include this tank in ullage report	No
Product (substance)	No substance selected
Conversion table	No temperature correction
Temperature	15.000
Volume (not corrected for expansion)	99.243
Density at 15 degrees Celcius (in air)	1.0250
Density at 15 degrees Celcius (in vacuum)	1.0261
Correction factor per degree Celcius	-
Volume Correction Factor	1.00000
Temperature Expansion factor	1.00000
Density at 15.000 degrees	1.0250
Residue On Bottom (ROB)	0.0000
Density x Temperature Expansion Factor	1.0250
Weight	101.724