

LOCOPIAS' inland waterway functionality

Summary

LOCOPIAS has been designed for all types of ships and any sailing area. Since European inland waterway vessels have to meet specific requirements, LOCOPIAS has been provided with specific facilities to that end. With LOCOPIAS the position, stability, damage stability and longitudinal strength can be tested on board against the requirements laid down in ADN (2015) prior to the voyage. LOCOPIAS is approved by Lloyds Register, IVW, Bureau Veritas and DNV.GL. Also in the event of EBIS inspections, the relevant questions of the questionnaires (which refer to ISGINTT) can be answered with YES with a complete and approved version of LOCOPIAS on board. Finally, LOCOPIAS entirely meets the recommendations for that matter in the Research report of WSV regarding the Waldhof (summary).

LOCOPIAS has been developed on the basis of PIAS, a program developed by SARC with which stability calculations have been made over the past 35 years. The input of the ship's model in PIAS can directly be used for LOCOPIAS. NB: for the majority of tankers that fly the Dutch flag, and for many other tankers, our PIAS software is used for the stability booklets.

LOCOPIAS provides the following advantages:

- In the main screen of LOCOPIAS you can see the draft, trim and heel of the ship at first glance and, depending on the chosen package, whether the entered loading condition meets the criteria for intact stability, damage stability and longitudinal strength.
- For the input of the tank fillings, LOCOPIAS disposes of an orderly graphical screen in which tank fillings and specific gravity can be given per tank or for several tanks at the same time. The position of the ship is continuously recalculated during the processing of the tank fillings in this screen (fill, empty and pump), and can be tested against the set criteria at any moment.
- LOCOPIAS makes all calculations on the basis of 3D models of the ship and the tanks, thus providing more accuracy compared to reading of pre-calculated tank tables.
- For any loading the position of the ship is determined exactly by means of the real shape of the submerged body.
- The (negative) effect of the displacement of liquids in tanks on the stability is determined exactly, as a result of which large over-corrections (the 'free surface moment' FSM) have become a thing of the past. These over-corrections are largest in the event of almost full or almost empty tanks.
- At damage calculations, LOCOPIAS takes the outflow of the original contents of a damaged tank into account. For the consequences of becoming damaged for a full tank completely differ from those of an empty tank. Calculations based on pre-calculated tables don't do this normally.
- In the event of an unintended real damage, the position of the ship at that damage can be assessed.
- The larger accuracy mostly results in more favorable results (possibly higher draft) than can be achieved with manual calculations or less complex software.

Extensions are available which further facilitate working with LOCOPIAS, such as the elaboration of a draft measurement, interface with a tank gauging system and substance characteristics.

Damage stability module

This module calculates whether the compulsory damage cases comply with the applicable damage stability criteria. The final stage as well as the intermediate stages and unequal intermediate stages of flooding are tested.

In the unlikely event of a real damage, the position of the ship at that damage can be assessed.

The LOCOPIAS damage stability module is remarkable for:

Optimization of damage cases

When the distance between openings in final stages of flooding is smaller than the required safety distance, the connected compartment is automatically added to the standard damage case.

Liquid displacement calculations

The (negative) effect of the displacement of liquids in tanks on the stability is determined exactly. The real displacement of centers of gravity is calculated for any angle of heel, as a result of which large over-corrections, as they may occur at the calculation with the 'free surface moment' (FSM), have become a thing of the past. These over-corrections may be considerable in the event of almost full or almost empty tanks.

Outflow of damaged tanks

LOCOPIAS takes the outflow of the original contents of a damaged tank into account. For the consequences of becoming damaged for a full tank completely differ from those of an empty tank.

Grounded vessel module

The module calculates the stability of the ship when it has run aground. The user gives a number of parameters, after which the program calculates whether the ship has run aground.

Subsequently, the grounding force at the bottom of the ship is determined. At the calculation and testing against the criteria of the heel, trim, (damage) stability and strength, this grounding force is taken into account.

The effect of the grounding force is taken into account as point load on the ship.

Draft survey module

The purpose of this module is the determination of the displacement of the ship by means of the measurement of freeboards and/or drafts. In order to determine the displacement as exactly as possible, LOCOPIAS does not calculate with a mean waterline, whereas the real sagging is taken into account.

This module is intended to be capable of calculating the following:

- Determining the difference between the current loading condition and the actual draft of the ship.
- Determining the difference in weight from before till after loading.

The image below is the output of this module. Here you can see that the ship has loaded 377 tons. On the second image you can see the input screen. In a standard way the draft marks are used, it is also possible, however, that the freeboard is imported at a random position.

Container module

For container ships, LOCOPIAS can be equipped with the container module, which enables placement of

containers as vessel cargo. The location, unloading port, height and weight of the container are directly visible on screen.

The container module has various options:

- Fit for all types of containers (20', 30', 40', 45', 48', 52' or any other length, breadth and height).
- Output of container loading plans per bay or per layer.
- Being capable of calculating the strength and stability at any moment.
- The program reports when the stack load is exceeded.
- Containers cannot be placed when there are insufficient containers under this position.
- When the containers rise above the den, this is automatically taken into account in the windage area.

Air draft module

The air draft of the vessel is indicated in the main screen.

Points can also be switched on or off in the main screen. On the basis of the points that are switched on the air draft is determined for the current trim of the ship. In this manner it is possible, for example, to switch off the point 'wheelhouse high', and to switch on 'wheelhouse low' so that the minimum air draft is shown.

Tank sounding module

After reading the tanks, the result is directly visible in the weight items list. In the module "Tanks", of the program "LOCOPIAS", it is possible to read data of (external) tank gauging systems. This interface simplifies the work process, prevents mistakes by typing errors and saves time. By using the really measured centers of gravity and volumes (corrected according to ASTM tables) of liquids in tanks, the loading condition defined in LOCOPIAS corresponds with the real loading of the ship.

The interface is now available for the following systems:

- C.E. van 't Hof - Nxt und Nxt Reizen
- Bitsoft - MIDAS Binnenmaat
- Berg Maritieme Meetsystemen
- Sygo B.V.