CPC 2.0

Stability & Longitudinal Strength Software

CPC 2.0 is HMC's class approved ship loading and cargo planning computer. CPC 2.0 combines all obligatory stability and strength parameters with an efficient and user friendly interface. Key aspect in the development of CPC 2.0 was to decrease the expert knowledge needed to operate the program. This was done by completely redesigning the program and focusing on optimization of the user-interface and visual feedback provided by the algorithms.

Experience based engineering

CPC 2.0 is based on CPC1.9, which was installed on over 1500 ships worldwide since its first delivery in 1980. At that time it was one of the first ship loading computers available for a wide range of ships. This long term experience resulted in the development of CPC 2.0. The focus was on increasing the user friendliness and improving the graphical feedback of the program. Another major improvement is the multi screen functionality which enables the user to view their own set of screens to assess whatever combination of information providing screens might be relevant at that moment.

CPC 2.0: a cost efficient solution

HMC has always envisioned to provide software that exceeds expectations. Fully compliant with all IMO rules and regulations for IT products in the maritime industry, and against a competitive price. The program has been divided into several modules, enabling you to only pay for what you need.

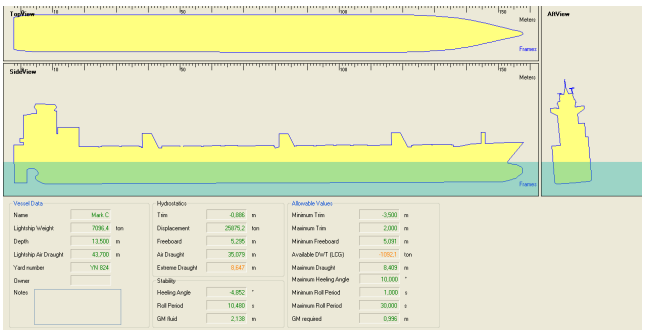

Figure 1 - CPC 2.0 vessel overview

Type and ship specific approval

CPC 2.0 offers ship specific approval under a variety of classification societies, such as Lloyd's Register, Germanischer Lloyd, Bureau Veritas and the DNV. A general type approval of CPC 2.0 is currently pending with Lloyd's Register.

CPC 2.0 features

The core version of CPC 2.0 contains:

- Server based class approved cargo planning and ship stability software
- Grain & bulk cargo input (or tanker configuration)
- Ballast water & consumables tank input
- Observed draft input and correction
- Stability & longitudinal strength calculations
- Draft, trim & list calculations
- Stability check according to IMO regulations
- Graphical representation of:
  - Weight distribution
  - Actual and maximum shear force
  - Actual and maximum bending moment
  - Actual and maximum torsion moment
  - Ship specific intact stability & Weather criteria according to IMO regulations
  - Tank content configuration
  - Trim, list & draught
  - Input of break bulk and project cargo
  - Bulkhead placement

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CPC 2.0

Standard features

Grain & bulk cargo input

Bulk cargoes can be entered using pre-defined hold configurations, limited by the movable bulkheads.

By selecting a hold one can input weight, volume or filling percentage. Stowage factors may be changed and it is possible to change the filling of the hold in a slide bar. One can fill or empty the hold using easy to use dedicated buttons.

If grain is selected the stability will be calculated according to the ruling requirements, a print can also be made to hand out to authorities.

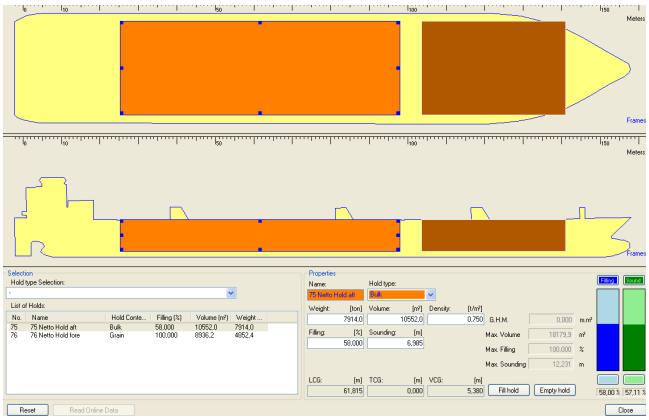

Figure 2 - Grain input screenshot

Ballast water and consumables tank input

Ballast water and consumable tanks can be selected individually or in groups by clicking the tanks in the ship overview or in a list, which can be sorted on types of tanks.

Particulars can be entered through numerically editing weight, volume, density or filling and sounding percentages. To quickly fill or empty a tank, a slide bar, “fill tank” and “empty tank” button is available. Free surface moment and maximum capacity of the tank are displayed as well.

Actual tank data can also be imported through the online tank module. More information can be found in the optional features list starting at page 6.

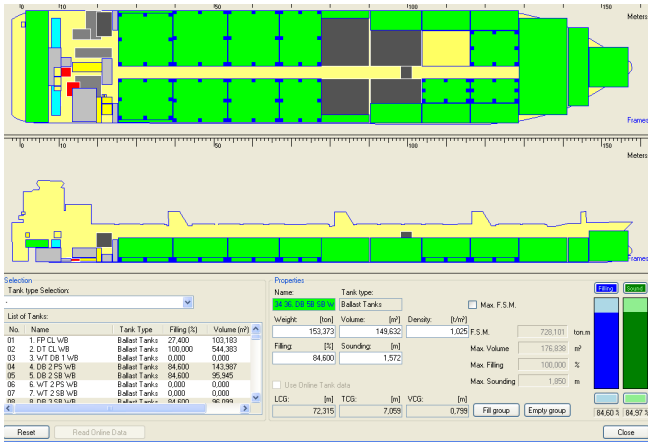

Figure 3 - Tanks screenshot

Observed draft input and correction

Drafts calculated by CPC 2.0 can have minor discrepancies with the actual draft of a ship. CPC 2.0 enables a chief mate or surveyor to manually correct the draft to up to 5% of the calculated draft.

It is also possible to link draft measurement systems to CPC 2.0 to automatically correct and monitor draft. More information about this option can be found in the options list.

Break bulk and project cargo input

Project cargo is easily added by creating new cargo items and editing its XYZ position, dimensions, volume, free surface moment, weight, and values for LCG, TCG, VCG and density.

It is also possible to save cargo space items to quickly select often used items, for instance break bulk or project cargo items that are commonly transported.

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Standard features

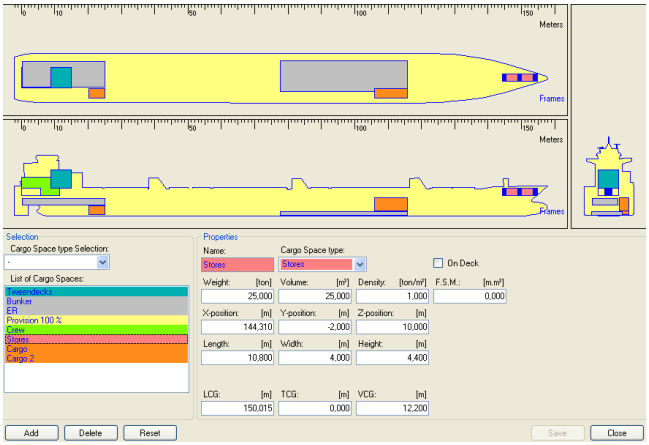

Figure 4 - Cargo spaces screenshot

Stability & longitudinal strength calculations

The standard CPC 2.0 features stability and strength calculations which are presented in a clear overview. This 'basic conditions' screen features stability data including heeling angle, KMt, KG and GM values in both actual and required values and free surface moment correction values.
Strength data presents maximum shear force, torsion and bending moment, weather criteria and visibility data (blind spot length) is also presented . At last, grain data provides a grain heeling moment and heeling angle.

Draft, trim & list calculations

Measures for trim, list and draught at aft, mid ship and forward positions as well as freeboard and maximum draught values are also presented in the 'basic conditions' screen. Air draught indicates the total height from the ship's waterline. The ship's centres of gravity, displacement and remaining available deadweight are also given.

Stability check according to IMO regulations

The basic conditions screen provides an overview of all relevant IMO requirements and assesses the ship's current stability data accordingly. Results are presented in such a way that the user can scan the overview for deviations at a glance.

Ship specific intact stability & weather criteria according to IMO regulations

Besides a check on the intact stability, weather criteria are also tested through IMO guidelines. Roll period, wind area and wind heeling angle are calculated and presented.

All values presented in the 'basic conditions' screen are easily monitored and evaluated due to their colour scheme. Values in accordance with IMO guidelines and the ship's stability booklet are presented in green whereas problematic values are presented in orange and non-according values are presented in red, providing a clear overview of the ship's stability at a glance. This colour scheme can also be adjusted by the captain of the vessel.

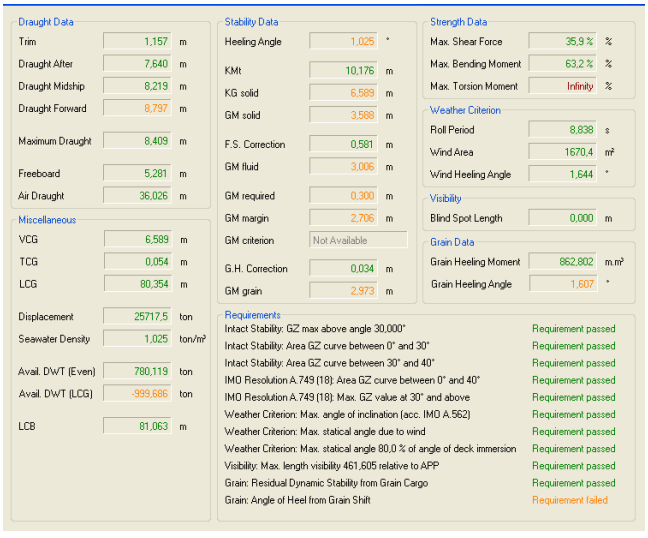

Figure 5 - Basic conditions screenshot

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Standard features

Besides the 'basic conditions' summary of the ship's stability and strength, more detailed information can be viewed through separate windows providing graphical information regarding:

Weight distribution

The Weight Distribution graph presents how the cargo and the tank weights are distributed, including the light ships weight distribution. The total weight on a strip is split up in partials relating back to its origin (tank, cargo, container or RoRo weight).
This overview allows the user to find peak values easily.

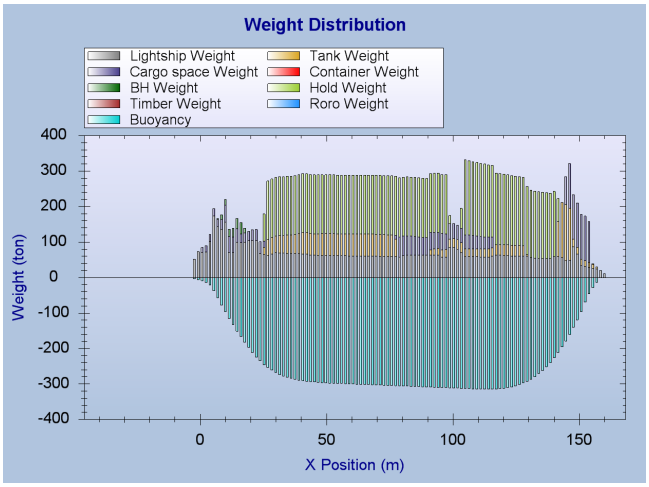

Figure 6 - Weight distribution screenshot

Longitudinal shear force

CPC 2.0 graphically presents both actual and maximum values for the ship's shear force in a clear graph. The user can easily check for peaks and adjust loads accordingly

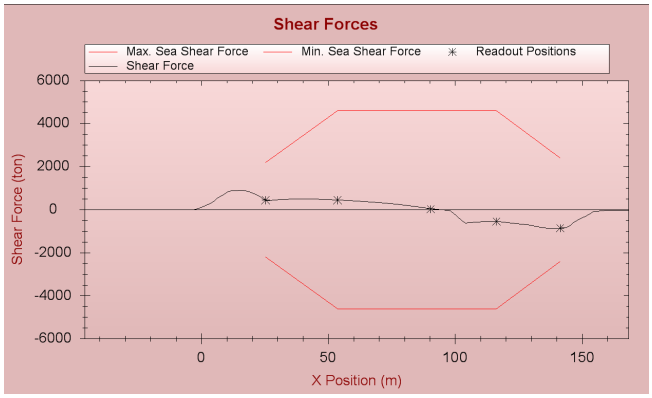

Figure 7 - Shear force graph screenshot

Longitudinal bending moment

By integrating the shear force values over the ship's length the bending moment is calculated. This bending moment is graphically presented and assessed against calculated maximum values. The user can easily check the longitudinal position of the exceeding bending moment.

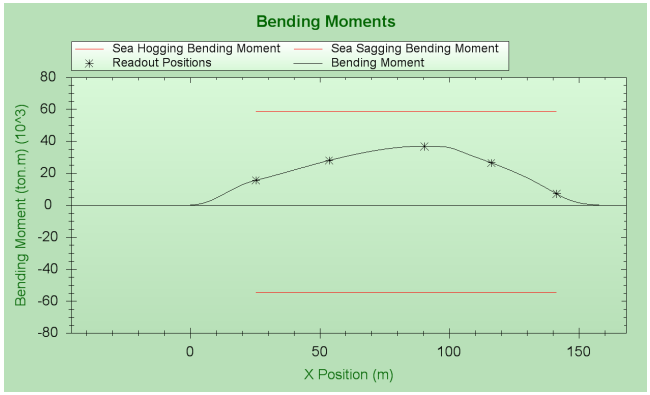

Figure 8 - Bending moment graph screenshot

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Standard features

Longitudinal torsion moment

For every strip in the length of the ship the torsion moment is calculated and shown in the torsion moment graph.

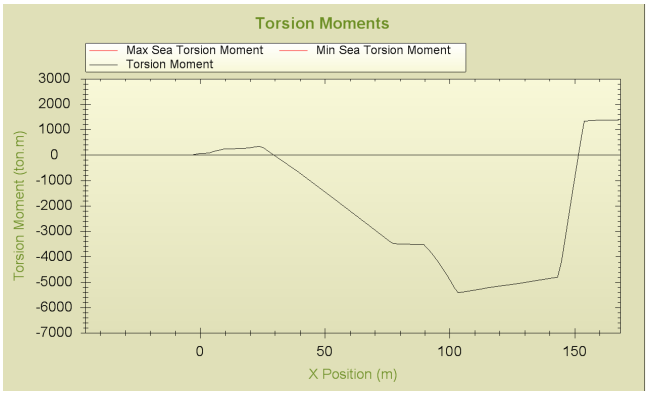

Figure 9 - Torsion moment graph screenshot

GZ-curves display

The GZ-curve displays the actual righting lever for different heeling angles. This information is used for compliance with intact stability and weather condition requirements. Both are assessed through IMO regulations and graphically represented.

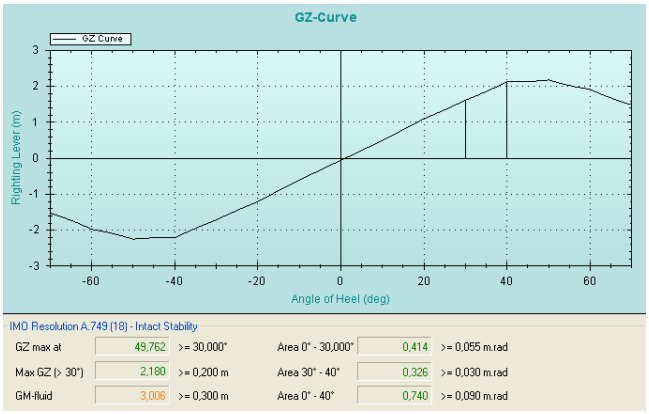

Figure 10 - Intact stability graph screenshot

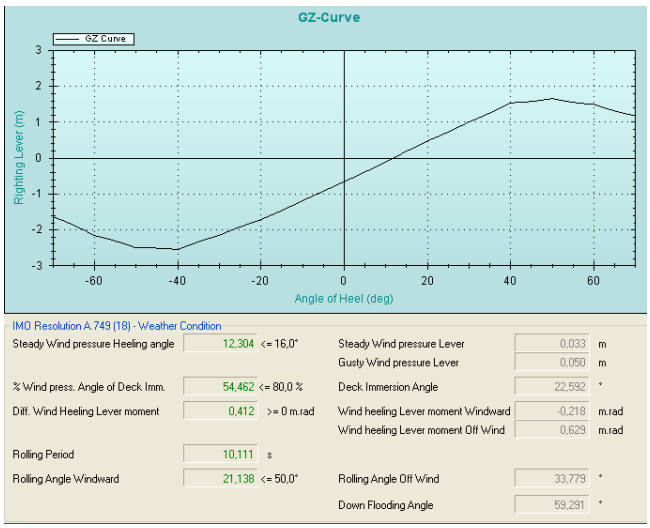

Figure 11 - Weather condition graph screenshot

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Optional features

Besides the standard features discussed in previous pages, HMC also offers specialized optional features to adapt the program to your liking.

CPC 2.0 optional features

The following list of optional modules are available:

- BAPLIE & Automatic container booking system
- IMDG-code compliance
- RoRo module
- Ice accretion
- Damage stability calculation (added weight)
- Online tanks
- Online draught
- Container booking system
- Dangerous cargo segregation
- Bulkhead placement
- Under keel clearance
- Propeller immersion calculation
- Import - export module
- SafeTow

BAPLIE & Automatic container booking system

CPC 2.0 also allows for data entry through importing BAPLIE standardized container lay-out files. After moderation by CPC 2.0, these files can also be exported in BAPLIE format again. This allows the user to exchange container data quickly and efficiently with terminals, headquarters and the ship and also reduces chances on human error.

IMDG-code compliance

A module for compliance to the International Maritime Dangerous Goods Code (IMDG-code) is also available for those container vessels repeatedly transporting dangerous goods. The module keeps track of the position of containers with dangerous goods and forbids such a container to be positioned somewhere where it is not allowed to.

RoRo module

A specialized module for RoRo ships is available, enabling deckhands to manually enter rolling and driving cargo on multiple decks simultaneously. This module is specialized for RoRo ships. And enables a common RoRo type vessel to efficiently load within 1-2 hours and increases the on-board safety in the mean time. A direct online connection to the office for data exchange is possible and in case of an emergency, the captain has immediate access to the real time stability status. This increases the amount and accuracy of the information available at all times.

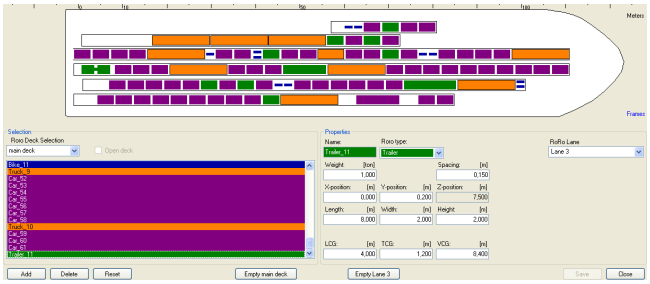

Figure 12 - RoRo module screenshot

Ice accretion

Ice accretion seriously affects the stability and safety of a ship sailing through icy weather.
Stability calculations for ships in icy weather areas should compensate for the accretion of ice on the ship's outer body and deck cargo.
This is done by the optional ice accretion module in compliance with IMO regulations for ship stability in icy weather.

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CPC 2.0

Optional features

Damage stability calculation
To calculate stability in the case of an event, damage stability calculations define several damage cases in which each case defines several damaged compartments. After input of the damage case CPC 2.0 performs a calculation according to the added weight method.

The damage stability module enables the user to quickly assess the stability situation in case one or more tanks are ruptured. Besides actual damage control, the module also allows the user to calculate 'what if' situations, explaining what happens to the vessel's stability in case buoyancy is lost. The module also allows for post-hoc analysis to evaluate events and emergencies.

Online tanks
Instead of manually entering tank data, HMC offers to link your existing tank sensors to its stability software, automatically updating tank sounding in CPC 2.0. The online tanks module decreases the margin for error and increases efficiency on the bridge.

Online draught
Instead of manually correcting on actual draught readouts, HMC offers to link draught sensors to its stability software making draught correction an automated process. The online draught module decreases the margin for error and increases efficiency on the bridge.

Container booking system
For ships with a dedicated container stacking lay-out, CPC 2.0 offers a container booking system module. This module predefines all possible container positions and uses these to input container cargo efficiently.

Containers can be entered per tier, bay or stack. It is also possible to add standardized containers for repetitive use.

Containers can be marked according to their Port Of Destiny (POD) and Port Of Loading (POL). This allows the captain to reduce the amount of unneeded container movements and therefore saves time. The total weight and height of each stack are calculated automatically.

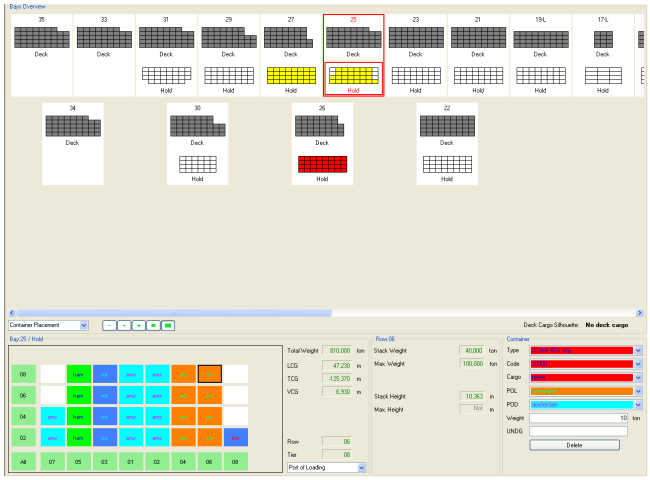

Figure 13 - Container bay screenshot

Bulkhead placement
Multi purpose ships with moveable bulkheads can easily configure their hold lay-out according to the actual bulkhead placement using CPC 2.0's Bulkhead placement module. This module allows the user to place a fixed number of bulkheads at predefined locations. After placing the bulkheads, the possible hold positions will be viewed automatically to decrease the margin for error.

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Optional features

Under keel clearance

The under keel clearance module automatically provides information on the keel clearance dependent on the vessel's current draught and trim.

This has proven to be very useful for ships sailing in shallow waters and semi-submersibles during loading and sailing operations.

The UKC module allows the user to import tide tables of a specific port or river to calculate the under keel clearance. If the UKC module is combined with the online draught sensor module, the user is automatically provided with realtime underkeel clearance, instead of UKC with the planned draught according to CPC 2.0.

Propeller immersion calculation

The propeller immersion calculation module calculates whether the propeller is fully immersed in different loading conditions. A non-fully immersed propeller reduces engine efficiency dramatically and could cause cavitation which in turn could cause damage to the propeller. This should be avoided at all times. Using this simple module, this problem should no longer have to occur.

This module can also be combined with online draughts to monitor propeller immersion continuously by automatically updating draught directly from draught sensors.

Import - export module

To enable planning communication between the onshore operations department and the vessel HMC developed an import / export function for CPC 2.0. This module enables the user to export a small data file from the database and send it over the e-mail to the vessel, who can import that data file again to see the planned loading conditions and the associated stability values.

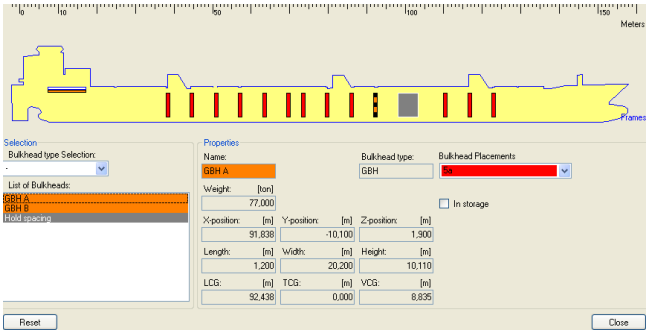

Figure 14 - Bulkhead placement screenshot

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CPC 2.0

Additional information

The power of combining modules

All modules can be used independently of one another. However, unique advantages can be obtained by combining modules. An example is the combination of the under keel clearance or the propeller immersion calculation module and the online draught module. These combinations increase the accuracy of both modules and make the calculations real-time by providing draught sensor data to perform the under keel clearance and propeller immersion calculations on. More information about the possibilities of combining modules can be obtained by contacting our office.

Printing

CPC allows the user to print a summary of all relevant stability and strength data for harbour authorities. A dedicated window allows the user to select or unselect items to print.

Training

HMC offers inexperienced users training in the safe use of CPC 2.0 ship loading computer. CPC 2.0 training may be given at our office in Almere or on-board.

Class approved hardware

Besides the core software package, HMC offers class approved hardware and a delivery and installation service.

Vessel & office versions

Besides ship loading computers for on-board purposes, HMC offers office versions for cargo planning and operational management purposes. Via the Import - export optional module data can easily be transferred from the onshore office database to the offshore vessel database.

Guarantee & service

CPC is delivered with a one-year guarantee. Additionally Service Contracts can be arranged for vessel's and office versions of CPC. Subject details once a year on board servicing of CPC and the provision of the latest CPC versions is included.

For more information, additional brochures or screenshots, please contact HMC via info@hmc.nl.

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