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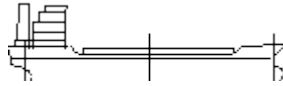
CASTOR

For Windows

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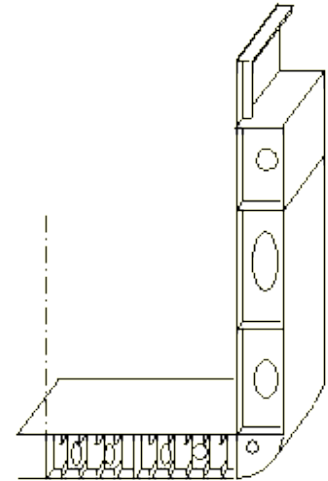
Computer Aided ship's STructural design prOceduRe

Short overview



CASTOR for Windows is an aid for ships structural design using clearly defined survey able procedures. Already starting at the first design stage one can create reliable results.

A model of the structure, simply and quick generated, is the base for all examinations like calculation of steel weight, centres of gravity en costs. One can create a model of the ship's structure in the early design stage within a short time using a minimum input.

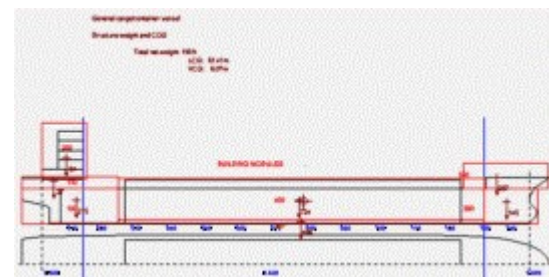
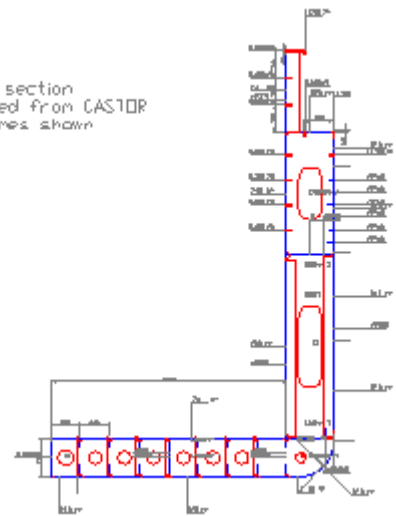


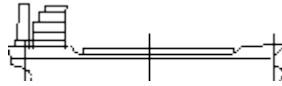
CASTOR contains the first serious method to make forecasts of the steel weight in the first design state based on a structure model.

Results from CASTOR:

- Major scantlings calculated according class rules; based on parameter studies for instance to find the best spacing
- Cross sections
Detailed modelling of parts possible
Supported by a dxf drawing export
Longitudinal bending criteria check including buckling of longitudinal
- Structure Weight, including surfaces and centre of gravity sorted for structure modules, plates (shell separated), profiles and so on.
- Activity based costing with cost parameters like length of flame cutting and welding, working hours and –costs as well as detailed material costs given per activity group, structure module and total for the midship body.
- Open interfaces in text format to make all CASTOR data available to other design or engineering procedures

midship section
exported from CASTOR
all frames shown

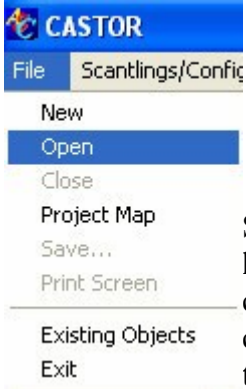




Using CASTOR

Minimum input required:

- ☞ Specifications, main dimensions
- ☞ Outline - general arrangement
- ☞ Special requirements



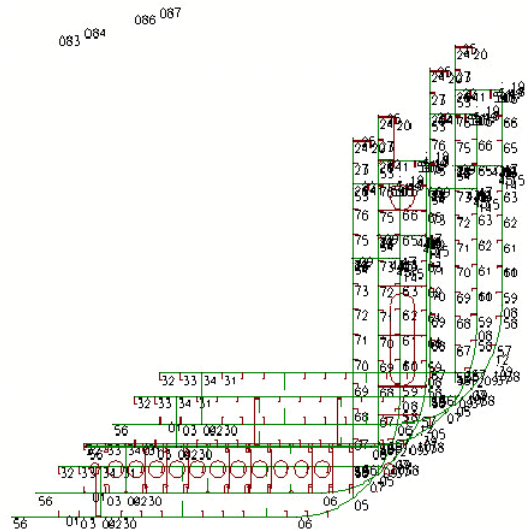
Start working on a new object a structure concept has to be defined and the major scantlings will be calculated according to general rules of a certain class authority. Additional procedures are available to support several special problems.

To continuing the structural design procedure, a model containing the structure parts of amidships cross section has to be generated.



All cross sections of this model can be shown and edited to the user's convenience.

For this cross section a longitudinal criteria check including buckling will be performed. Buckling criteria are calculated after reduction for corrosion on longitudinal loaded plate panels. To meet all criteria, may be one has to improve the structure of the topsides step by step.



Nr	Title	Thick/Prof.	Typ	Fr.	P+S	p1	p2	b/:
95	COAM.STAY	HP370		121	219	02	24	22
96	Web stiffener lgt96	HP180		131	217	02	61	73
97	PILLAR		kg/m	121	217	00	34	26
98	Web stiffener lgt98	HP180		131	217	02	62	74
99	Web stiffener lgt99	HP180		131	217	02	64	76
100	Web stiffener lgt**	HP180		131	217	02	66	78
101	U. DECKBEAM			121	216	02	50	22
102	T. DECKBEAM			121	216	02	47	28
103	LW. STIFF LONG.BULKH			121	216	02	54	55
104	UP. STIFF LONG.BULKH			121	216	02	53	42

CASTOR for modelling the ship structures during the design includes costing and weight calculations you profit by saving weight and costs



The model can be used as an interface to follow up procedures in design and engineering, so that you can match CASTOR in your design environment.

Example for integrated interfaces:

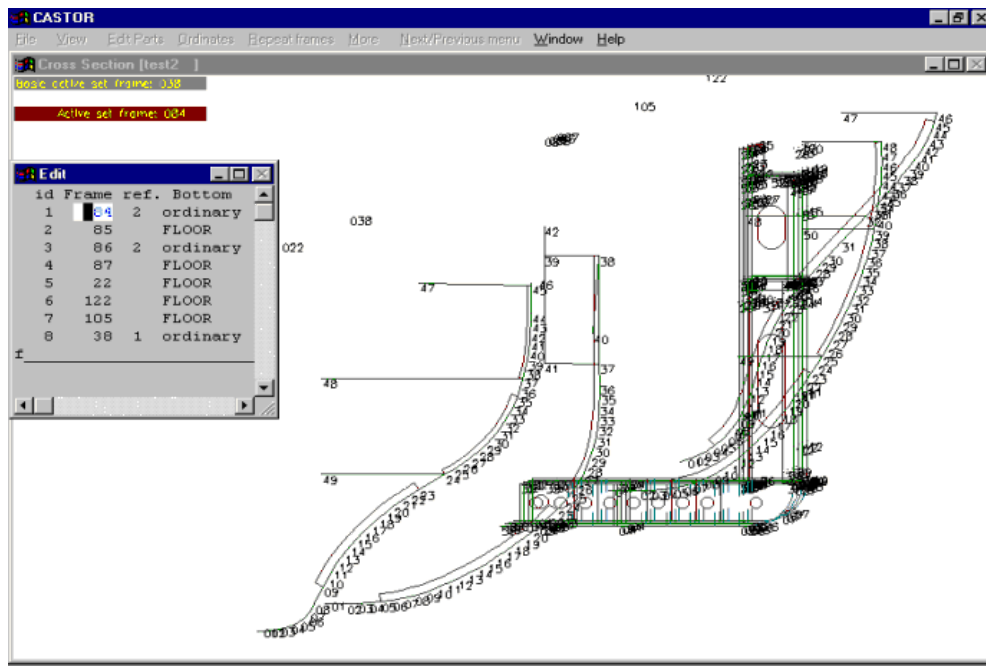
Import of a general arrangement background using DXF files

Export of cross sections using DXF files

Interface to use GL inland water way rules

Import of PIAS/FAIRWAY hull form for cross sections as shown on the next figure.

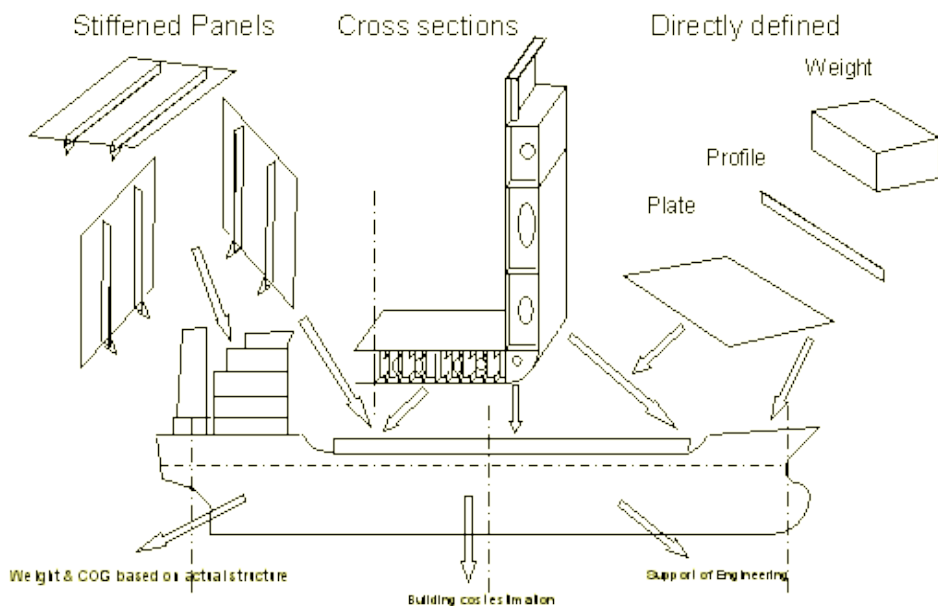
Frames are imported as shown and defined as hull and internal structure has to be added.



The CASTOR-model can be completed by three different types of parts:

- ☉ Parts on cross sections
- ☉ Stiffened plate panels
- ☉ Direct input of parameters.

Normally only additional structures defined as panels and girders has to be added to complete the model of the whole ship structure.



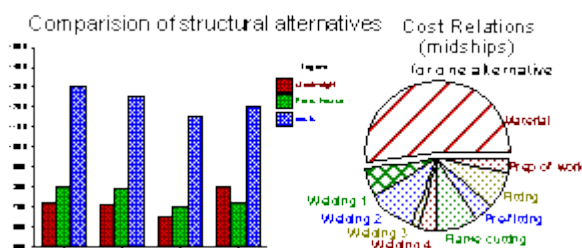


As mentioned before CASTOR offers you a very exact forecast of structure weights depending on the correctness of the model. But using CASTOR will result in more than just a weight:

Activity Based Costing is used for structure part related costs per group of activities. You have the opportunity to make parameter studies, to find minimum weight, hours and costs.

Already in an early stage one creates insight on the influence of design parameters on the weight and costs by variation of the ships structure.

Early decisions about improvements of the design are much easier than in a too late stage and could be based on facts found from the structure model. There is a better control of design parameters; which can result in quality, a minimum structure weight and/or costs. It is an important advantage to know the differences in weight and costs between several possible structure alternatives.



Also knowledge about the share of a group of parts in weight, or activities in costing, may help more to make better decisions than the use of “the rule of thumb”!

After finding a minimized structure weight by parameter variation take into account the following:

Later changing caused i.e. by approval or decisions while engineering in general will result in increasing the weight but never a in a lesser weight! Of course this increase will happen unresolved also if CASTOR is not used!

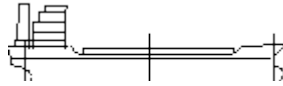
Using CASTOR frequently during the whole design period after changing the structure you get a good control about a possible increasing of the structure weight. It is recommended to try to predict the final weight in an early stage. For this task you can use your history about how the weight is growing!

Also take into account that the CASTOR determined weight gives you the opportunity to know the difference between the approximated weight found from the model and the structure weight “as built”; **this difference is your money** that you have spent in excess of your first plan based on the model! Next you should find out how to save this money.

Normally shipbuilders do not even know that the structure weight can grow uncontrolled between 5 and 20 % caused by measures during design and engineering!

Read also the corresponding [hints](#) of the user guide if you want to compare the structure weight found by CASTOR with the rest weight got from experience based methods!





Investments in CASTOR are neglect able in comparison with your profit.

Do you know how much better you must be than the concurrent? CASTOR is also a competitive intelligence tool which you can use to simulate building costs of other yards or even your future plant to proof your investment!

How do you can profit by the advantages of CASTOR ?

The application of CASTOR shows that much of your time during used for the design can be saved, but in practice this advantage will be seldom used to deduct the costs for the design. One can use this time better to investigate more structure variants for possibilities to reduce weight and costs!

Herewith some examples:

1. Using CASTOR you are able to improve the accuracy of your calculated structure weight of a vessel. For example for a steel weight of 1500t and a cost price coefficient of € 1,80/kg) there is a profit on the cost price of € 27.300,-- for each percent more accurate weight!
2. A publication shows that a certain shipyard has saved 4% of the weight of an inland waterway tank vessel. These savings are the result of using CASTOR making systematic calculations of alternative structures! The steel weight is about 1000t and by means of a simple calculation you will find a reduction of the costs of about € 73.000,--. By the way for this vessel also structure variants are investigated, related to minimum costs, which gives you still much more profit than the mentioned reduction by saving only steel but it isn't published .
3. Experience in investigation of structure variants shows that you can save at least 10 % of the costs for the midship structure if you minimize the costs using CASTOR in stead of applying a conventional approach with a structure concept found by the rule of thumb. This means a reduction of €180.000, -- of the cost price for a simple midship structure of 1000t!
4. Even for another minimum cost design, CASTOR may help to find alternative structures, which brings you an appreciable profit.

Based on above-mentioned examples a cost conscious company shall not doubt to use CASTOR.

CASTOR is an indispensable tool in the international struggle for competition!