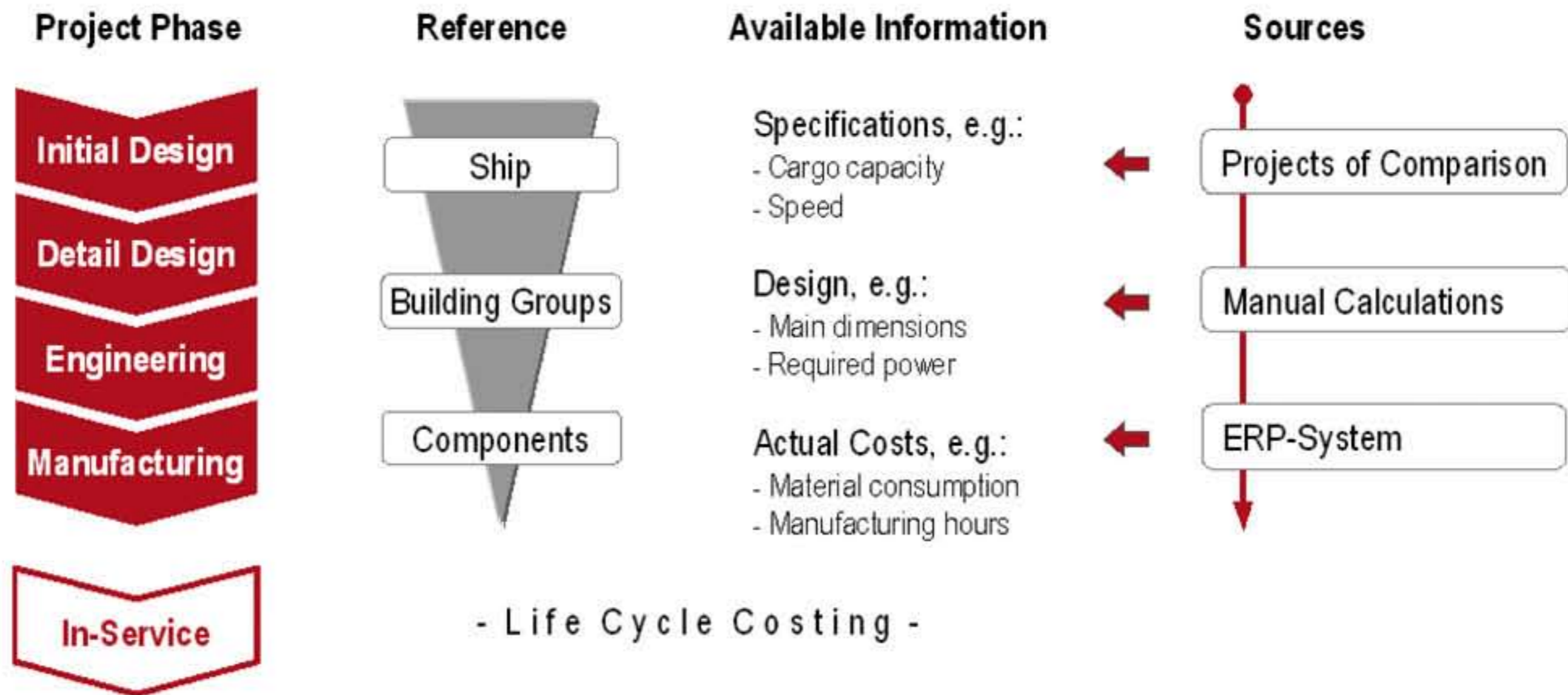


Cost Management in Shipbuilding and Naval Engineering

**Software System costfact:
Planning, Analysing and Controlling
Product Cost in the Maritime Industry**

costfact is the key to comprehensive cost management

The major part of the ship's cost is defined before the beginning of production. Therefore, planning and controlling of costs should start with design and engineering. The software system "costfact" supports cost management throughout all project phases, beginning with the early phases of design and engineering, to the calculation accompanying the production and finally, to the analysis of already concluded projects. Cost planning and control can be carried out at various analysis levels based on the information available.



The cost planning, both top down and bottom up, is carried out within the group system. The tree view enables the user to navigate quickly between the different levels and allows a cost planning at each of these levels.

Main functions of costfact's basic module:

- Consistent and clear cost planning and cost controlling at each level of the group system
- Cost estimations for new projects based on existing calculations
- Incorporation of technical parameters for cost prognoses and project comparisons
- Risk analysis to calculate the extent to which costs could deviate from the forecast
- Setting cost targets and controlling of target cost attainment
- Cost information consolidation from various software systems
- Administration of different group systems and automatic transfer of calculations between such calculation structures
- Calculation accompanying the production process including comparisons of planned and actual costs
- Cost structure analysis and cost driver analysis
- Calculation of the cost of changes after project start
- Cost benchmarking, even between different types of ships
- Automatically created cost history that documents all single cost inputs and cost changes
- Export of calculations to MS Excel, CSV-files etc.
- And more!

costfact provides a uniform system base for calculation projects and the linkage to external systems

Edit Costs

2300
PROPULSION UNITS

Suggest project hourly rate for manufacturing hours

Advice: Click on history to open full size

ID	Name	Quan...	Unit	Mat. Cost/Unit	Man. Cost/Unit	Mat. Cost	Manuf. Cost	Product Cost	Item	HG
2301	Propulsion Diesel Engi...	1	pc	5.633.980	0	5.633.980	0	5.633.980	Object Material	4
2302	Vibration Damper	1	k.A.	192.500	19.010	192.500	19.010	211.510	Object Material	2
2303	Foundation Bolt	1	pc	24.200	0	24.200	0	24.200	Object Material	4
2304	Coupling Pin	1	k.A.	5.500	2.100	5.500	2.100	7.600	Object Material	5
2305	Additional Costs	1	n.s.	1.120.999	0	1.120.999	0	1.120.999	Additional Costs	3
2306	Stock Material	1	n.s.	12.000	0	12.000	0	12.000	Stock Material	2
2307	Alignment	40	h	0	60	0	2.400	2.400	Manufacturing	1

Manual cost input

Group system

Calculated costs

Project 2010-02

Program Settings View Edit Target Cost Export Specification

Search

	Mat. Cost (plan)	Manuf. Cost (plan)	Product Cost ...
2010-02 RoRo 2800	21.660.990	8.717.681	30.378.671
0000 GENERAL GUIDANCE AND ADMINISTRATION	1.573.817	578.978	2.152.795
1000 HULL STRUCTURE, GENERAL	3.828.906	4.864.406	8.693.312
2000 PROPULSION PLANT, GENERAL	7.760.471	628.449	8.388.920
2010 GENERAL ARRANGEMENT - PROP. DRAWI			
2020 MACHINERY PLANT CENTRAL CONTROL S	459.292	102.939	562.231
2030 FUNCTIONAL DESCRIPTION			
2200 ENERGY GENERATING SYSTEM (NON-NUCL			
2300 PROPULSION UNITS	7.301.179	525.510	7.826.689
2310 PROPULSION STEAM TURBINES	180.000	320.000	500.000
2320 PROPULSION STEAM ENGINES			
2330 PROPULSION INTERNAL COMBUSTION			
2340 PROPULSION GAS TURBINES	132.000	182.000	314.000
2350 ELECTRIC PROPULSION			
2301 Propulsion Diesel Engines	5.633.980		5.633.980
2302 Vibration Damper	192.500	19.010	211.510
2303 Foundation Bolt	24.200		24.200
2304 Coupling Pin	5.500	2.100	7.600
2305 Additional Costs	1.120.999		1.120.999
2306 Stock Material	12.000		12.000
2307 Alignment		2.400	2.400
2400 TRANSMISSION AND PROPULSOR SYSTEM			
2500 PROPULSION SUPPORT SYS. (EXCEPT FUE			
2600 PROPULSION SUPPORT SYSTEMS (FUEL AI			
3000 ELECTRIC PLANT, GENERAL	1.662.908	105.120	1.768.028
4000 COMMAND AND SURVEILLANCE, GENERAL	3.901.776		3.901.776
5000 AUXILIARY SYSTEMS, GENERAL	2.048.422	1.200	2.049.622
6000 OUTFIT AND FURNISHINGS, GENERAL	253.800	178.600	432.400
7000 ARMAMENT, GENERAL			
8000 INTEGRATION/ENGINEERING (SHIPBUILDER RI	630.890	380.928	1.011.818
9000 SHIP ASSEMBLY AND SUPPORT SERVICES		1.980.000	1.980.000

View Group System

Only groups with cost > 0

Only groups according type: Cargo

Only groups according No.: 0000

Cost Structure Analysis

All items

Selected building groups

Change proposals: incl.

CP in process

CP offered

CP accepted

CP turned down

Selected objects:

Object Material

Stock Material

Manufacturing

Engineering

Additional Costs

Cost Driver Analysis

Cost limit: 0% cumulated

Base: Product Cost

Cost Import

2000
PROPULSION PLANT, GENERAL

Container 2800 0 €

Reference Filter

Key Data: from: 15.300 up to: 31.400

Power [kw] Filter off Filter on

Reference	Product Cost	Key Data
Container 2400	6.510.000 €	29.430
Container 2700	6.900.900 €	31.400
Container 4300	4.765.810 €	20.595
Cruiser 1100	5.142.070 €	20.595
Gas Tanker 1400	4.908.910 €	22.399
Gas Tanker 1000	4.000.300 €	27.153
Gas Tanker 1100	5.249.870 €	25.430
Gas Tanker 1300	5.349.900 €	23.595
Gas Tanker 2700	4.336.600 €	16.873
PCV 900	3.270.000 €	15.300
RoPax 1900	5.670.000 €	27.412

Hourly rate manufacturing

Replace the hourly rate of the project of comparison by the actual hourly rate

Apply actual project hourly rate to all objects with unit 'h'

Transfer all values unmodified

Cost Import Cancel

Cost import from previous projects

Cost update by cost factors

Cost Factor

2000
PROPULSION PLANT, GENERAL

Global Cost Factors

All Items MTC: 0% MFC: 0%

Differentiated Cost Factors

Object Material MTC: 10% MFC: 0%

Stock Material MTC: 20% MFC: 0%

Manufacturing MTC: 0% MFC: -15%

Engineering MTC: 0% MFC: 0%

Additional Cost MTC: 0% MFC: 0%

MTC: Material Cost, MFC: Manufacturing Cost

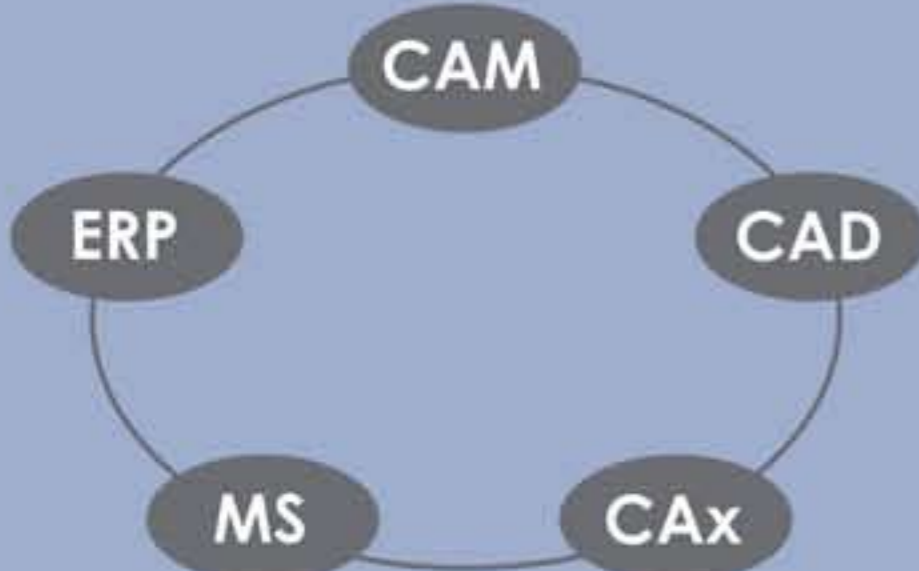
Round Results: No rounding Round up to Cent Round up to Euro

Annotation (optional): Manufacturing new welding system

Execute Cancel

Unite of actual costs and technical data

Automatic documentation of all planning steps



Cost History

14.07.2011: Material cost modified by 10%, Manufacturing cost modified by -17% (Project: RoRo 2800 (User: MHa))
Annotation: Manufacturing new welding system

14.07.2011: Import from project Gas Tanker 2700 to project RoRo 2800 (User: MHa)

19.04.2009: Costs modified manually (Project: Gas Tanker 2700, User: MHa)

Close

Three steps of cost planning with costfact:

Step 1:

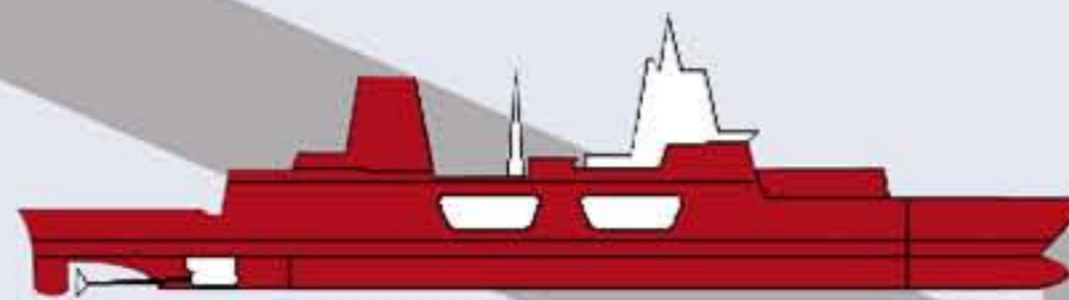
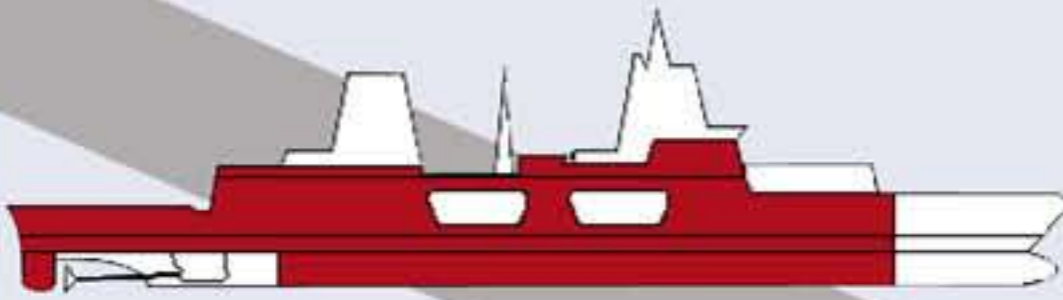
A template calculation or an existing project with accordant similarities is used as a starting point of the new ship's cost planning.

Step 2:

The cost items that differ from the model are derived from existing projects by importing main groups and groups. These values can be modified by factors or by manual input.

Step 3:

The residual calculation objects are calculated manually.



Permanent control of target cost achievement and deviation from plan

Target Costs

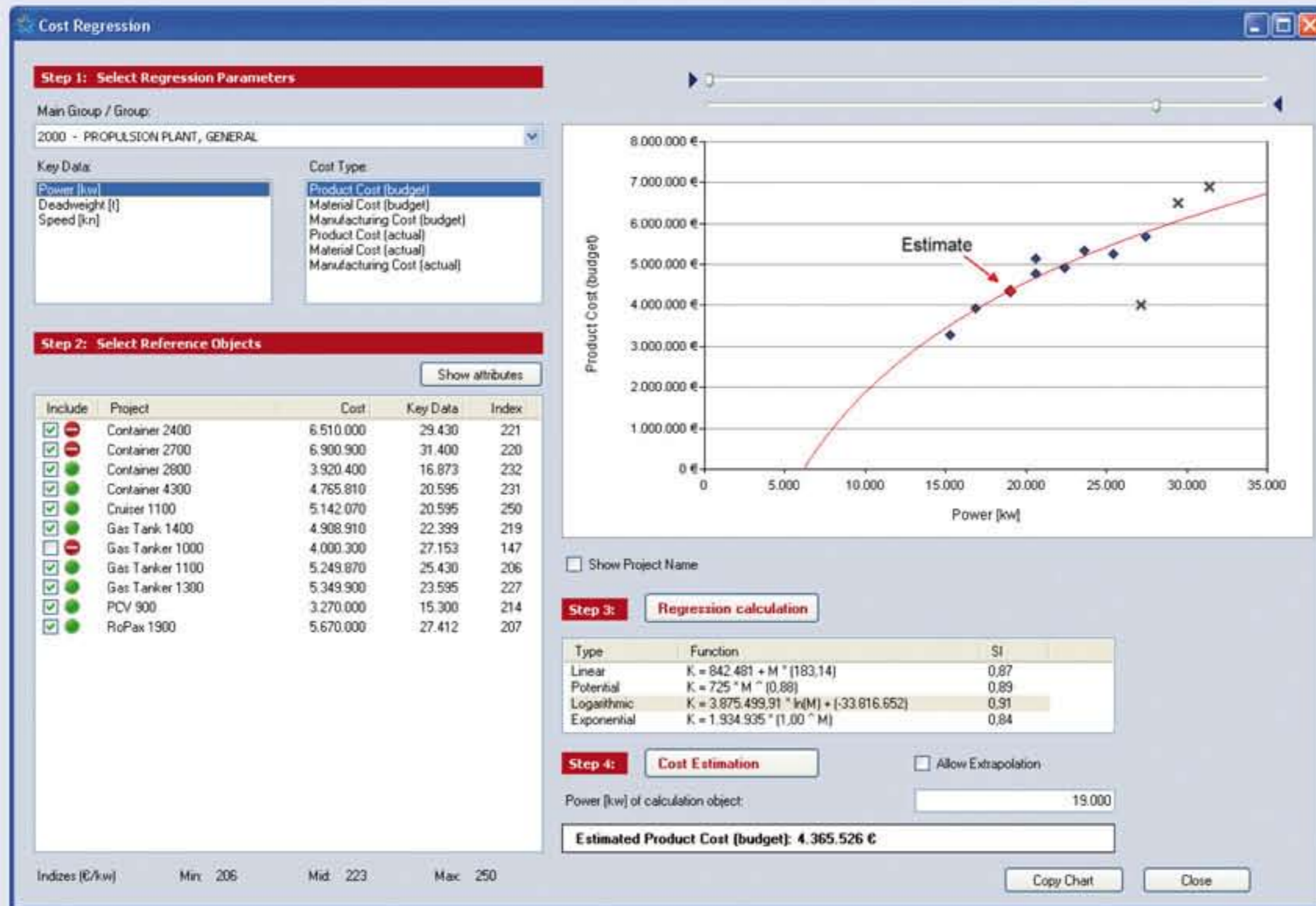
2011-01
Gas Tanker 1300

Cost comparison
 Target - Plan
 Target - Actual
 Plan - Actual
 Hide value columns

	Target Cost	TC [%]	Planned Cost	Actual Cost	POC [%]	Cost Forecast		TC-Delta I	TC-Delta II
Sum of main groups	38.000.300	100%	41.098.897	50.931.116		68.755.937	-100%	+100% (8%)	
0000 INTEGRATION / ENGINEERING	1.900.015	5%	1.615.833	3.089.312	20%	15.446.560	-100%	+100% (-15%)	
1000 HULL STRUCTURE	4.180.033	11%	5.633.000	8.789.177	100%	8.789.177	-100%	+100% (35%)	
2000 OPERATION SUPPORT	1.140.009	3%	1.778.885	2.089.619	44%	4.749.134	-100%	+100% (56%)	
3000 SHIFLOAD EQUIPMENT	1.900.015	5%	1.687.340	1.526.018	80%	1.907.523	-100%	+100% (-11%)	
4000 OUTFIT AND FURNISHINGS	2.280.018	6%	2.917.429	2.798.896	90%	3.109.884	-100%	+100% (28%)	
5000 CONSERVATION / PAINTING	1.520.012	4%	1.746.350	1.856.819	100%	1.856.819	-100%	+100% (15%)	
6000 PROPULSION PLANT	3.040.024	8%	3.721.070	3.588.116	95%	3.776.984	-100%	+100% (22%)	
7000 AUXILIARY SYSTEMS	760.006	2%	1.235.740	1.285.008	100%	1.285.008	-100%	+100% (63%)	
8000 SHIP ASSEMBLY AND SUPPORT SERVICES	3.420.027	9%	1.947.700	2.593.416	85%	3.989.871	-100%	+100% (-43%)	
9000 ELECTRIC PLANT	4.560.036	12%	4.456.800	4.772.356	90%	5.302.618	-100%	+100% (-2%)	

Module "Regression Analysis"

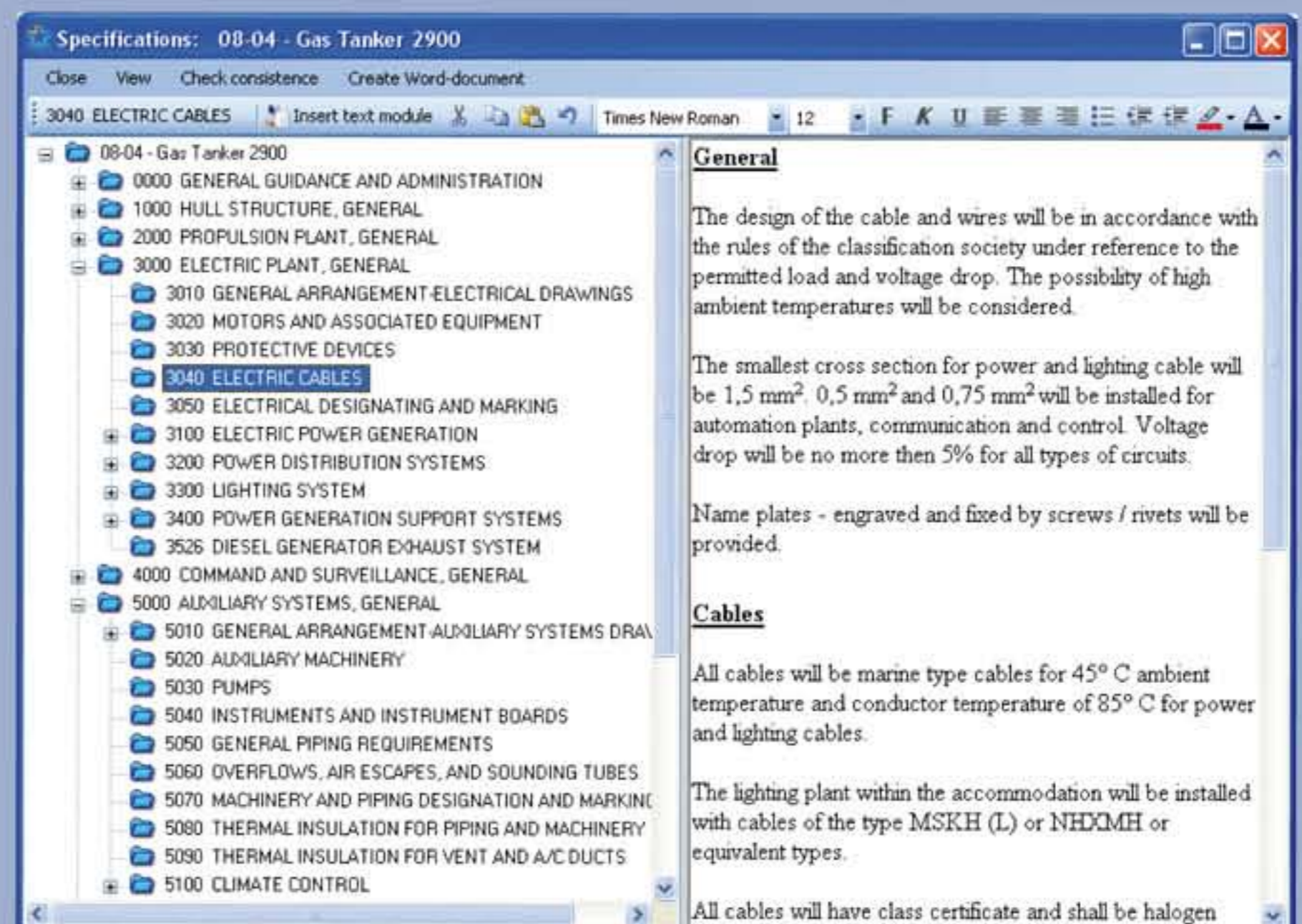
The regression analysis is used especially in early project phases for cost estimations when detailed information about the components to be used is not yet available. Using this module, the cost of main groups and subordinate groups can be forecasted via the statistical analysis of costs and technical attributes from corresponding calculation objects in previous projects. The regression module can also be used to generate cost indexes for quick cost predicting.



Module "Specification"

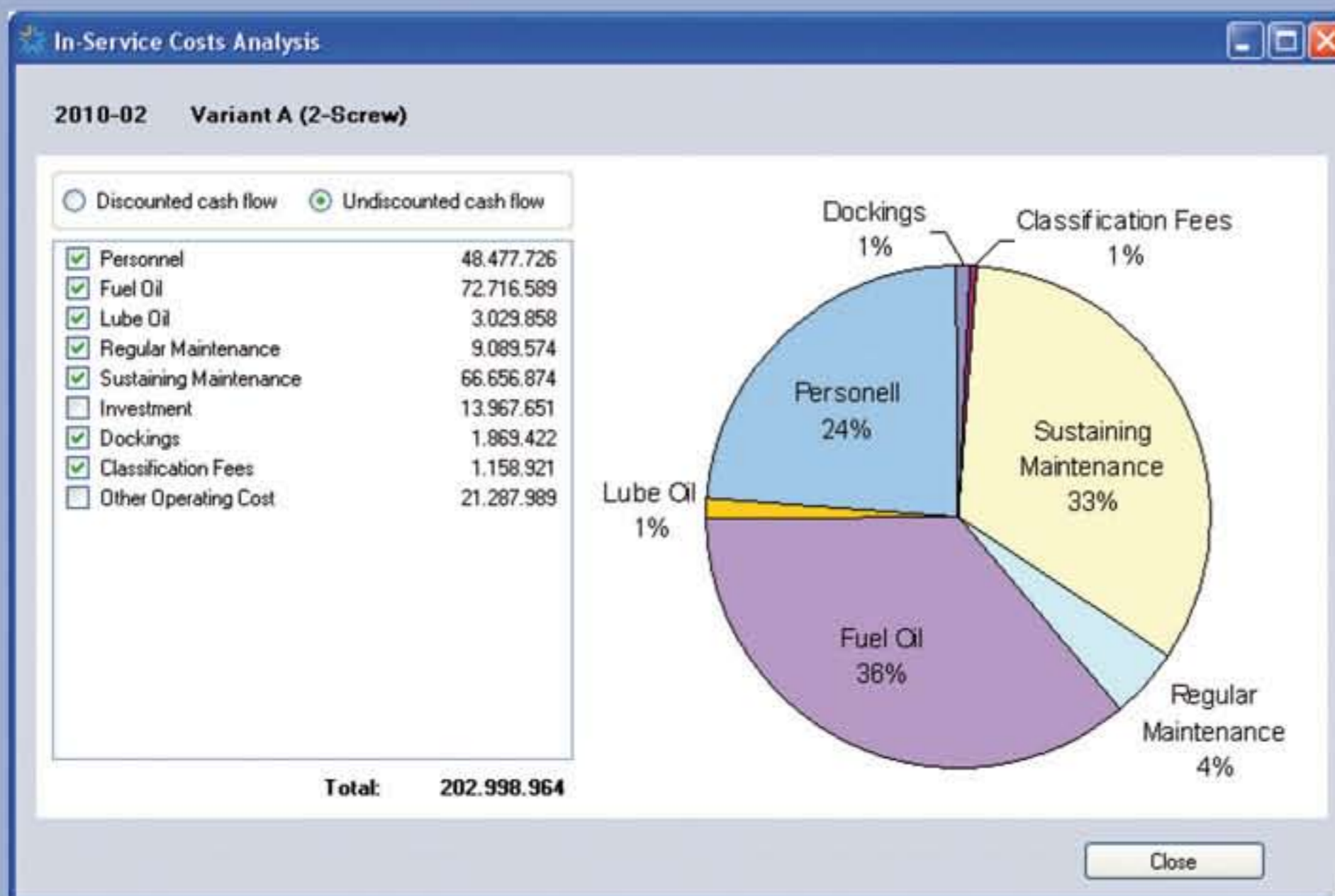
This module supports design and engineering that corresponds exactly to the specification. It provides the following benefits:

- Structured and simplified specification creation
- Generating and using text modules
- Automated import of specifications from Word documents including assigning the different text sections to the respective groups
- Automatic consistency checks for specifications and calculations by identifying costs for which no specifications have been defined and vice versa
- Outputting specifications as text documents



Module "Life Cycle Costing"

Life Cycle Costing includes the cost of the whole in-service phase. costfact calculates the project's life cycle cost in terms of actual cash values and annuities and enables comparisons of alternatives. These analyses are not only useful for the ship operator, but for the manufacturer as well, for example, when the ship builder can demonstrate to the buyer that the choice of a technical alternative can lead to a higher purchase price, but simultaneously to savings during operation that exceed the initial additional costs.

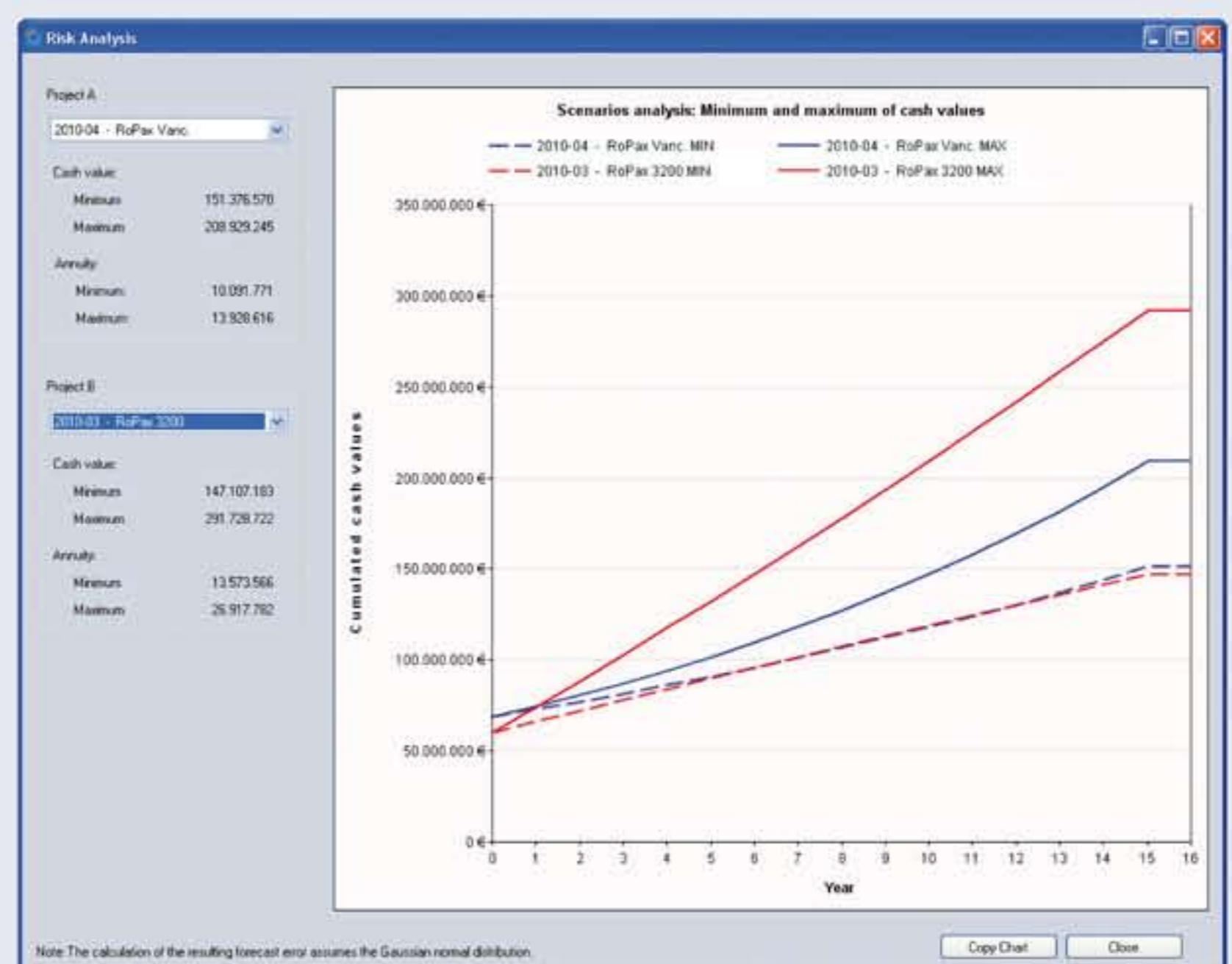


costfact's module "Life Cycle Costing" enables:

- Comparison of projects and project alternatives
- Analysis of the in-service costs to identify the main cost drivers and to get indications of the cost causing technical parameters
- Identifying the optimum service life of a project and the point in time, at which a project profitability change may take place

Life Cycle Costing requires prognoses that inevitably contain uncertainties. costfact incorporates this uncertainty by several functions:

- **Risk analysis:** costfact calculates best and worst case scenarios for the life cycle costs. The calculation is based on an assumed error in estimating the input parameters differentiated according to the type and payment time point as well as the statistical error compensation effect.
- **Sensitivity analysis of input parameters:** By this analysis, the quantitative effect of variance in the predicted values on the cash value of a project is calculated.
- **Sensitivity analysis of projects:** The sensitivity analysis of compared projects calculates the critical value of an input parameter that would cause a change in advantageousness of the projects.



Based on these analyses, questions can be answered such as, "what increase in the expected price of fuel will cause a profitability change in two compared projects?"