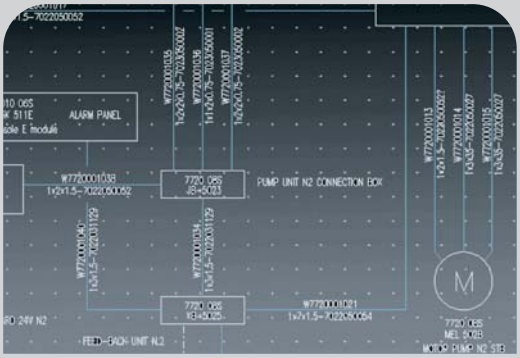
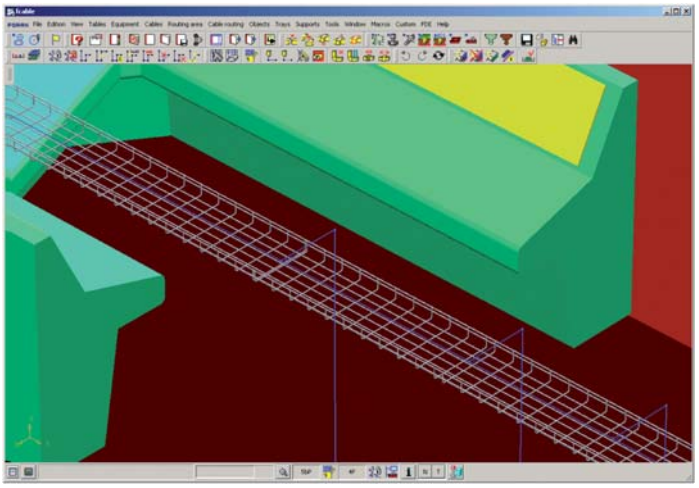
FORAN

Integrated Shipbuilding CAD/CAM/CAE System



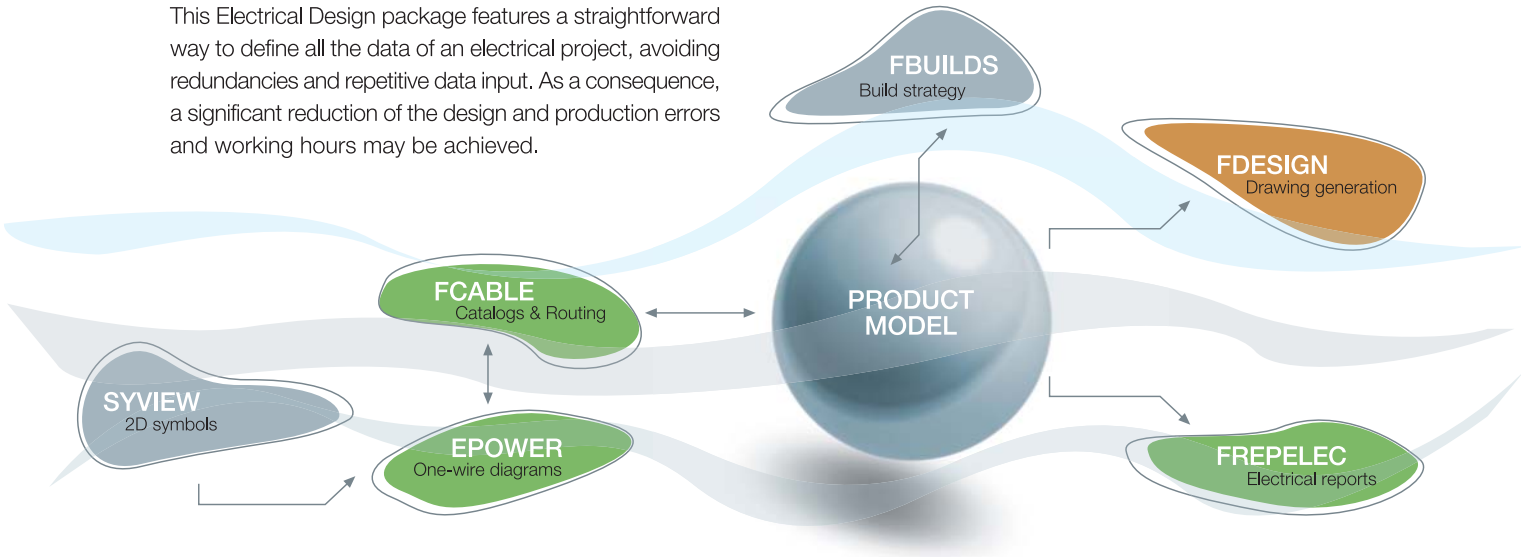
ELECTRICAL

FORAN provides advanced functions to manage all the relevant aspects in design and production of electrical systems on ships. In particular, it includes facilities to create different types of electrical diagrams, model electrical equipment, create 2D or 3D equipment and cableways layouts, calculate cable sizes, route cables, define cable terminations, manage instrumentation and control signals, administrate the electrical materials database, generate different types of reports and drawings, and manage the electrical elements lifecycle.



Fully supported by the **FORAN** database and the **FORAN** 2D and 3D graphic capabilities, the Electrical Design package of **FORAN** provides an efficient connection between the electrical department and the other disciplines in the design office.

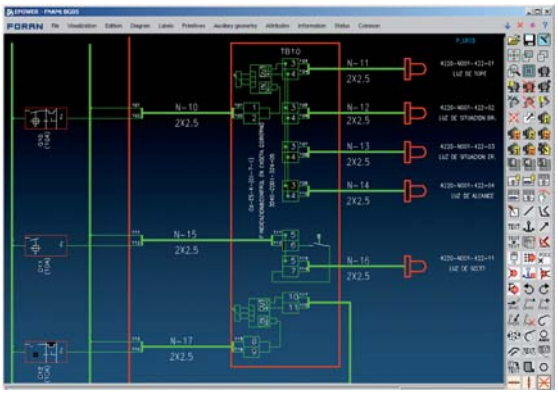
This Electrical Design package features a straightforward way to define all the data of an electrical project, avoiding redundancies and repetitive data input. As a consequence, a significant reduction of the design and production errors and working hours may be achieved.



EPOWER

Electrical diagrams

EPOWER constitutes an intuitive graphic support for the definition of electrical elements. All cables and electrical equipment pieces placed on the diagram are automatically registered in the **FORAN** database and are ready to be reused in the rest of the applications.



On-line, block, wiring and lighting diagrams are some examples of the types of documents that can be created.

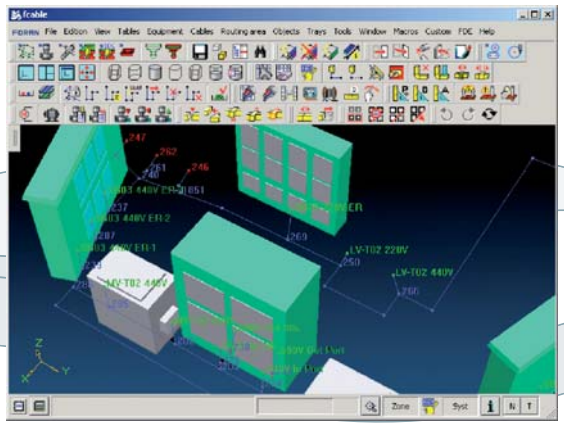
Some key features of **EPOWER** are:

- Information integrity. Any element can be placed in more than one diagram, being still considered a single database entity
- Automatic calculation of the cable size by different criteria
- On-line edition of all data of the elements in the diagram
- Specific functions to handle equipment and fitting symbols, as well as cable line drawing
- Automatic and configurable labelling of all the elements in the diagram
- Automatic generation of configurable graphic lists
- Integration of pipe fittings with electrical connections

FCABLE

FCABLE provides functions for the definition of the electrical standards libraries (equipment classes and components, cables catalogues, standard materials, etc.) and the electrical elements of the project (electrical equipment and cables). These functions are supported by advanced dialogs and input data forms.

In addition, **FCABLE** provides a fully interactive 3D environment, with specific functions for placing electrical equipment pieces, define 3D cable paths, model cableways and route cables. The common **FORAN** functions for database read, visualization, interrogation, clash detection, penetration analysis, etc. are also available in **FCABLE**.



Electrical standard libraries

The definition of the electrical standards and elements includes, among others, the following topics:

- Basic data tables (cable segregations, nominal cross-sections, tray standard sizes, cable materials, etc.)
- Cable catalogues, organized in cable specs and cable nominal sizes. Available data include cable composition, core size, overall diameter and other mechanical and electrical characteristics associated to each nominal cross section
- Classes and components of electrical equipment, fittings and instruments
- Cable segregations and cable routing rules

Electrical equipment 3D layout

Equipment pieces can be placed in the 3D model of the ship simply by selecting the proper database item (or defining it “on the fly”), and selecting graphically a 3D position. This position can be referred to the project surfaces (decks, frame system, etc.), or to any other 3D entity in the 3D scene.

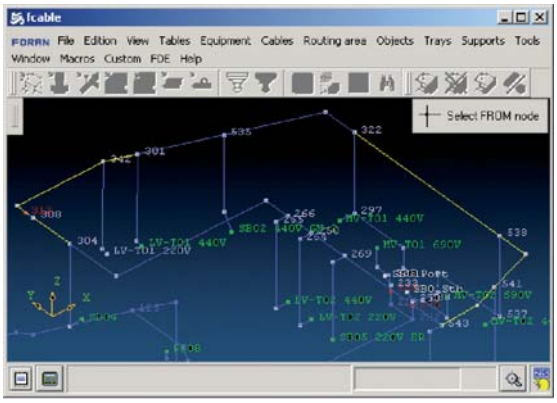
Cable definition

Cables are defined by choosing the ‘from’ and ‘to’ equipment items, then selecting a cable spec and section from the cables catalogue and then entering a cable number. Many other attributes are available to complete the definition.

Users may also control the progress of the cables throughout their life in the project, considering different levels of maturity that restrict some actions on them.

Cable routing

The cable routing is based on “routing paths”, or sequences of 3D points (nodes) connected by straight segments. End equipment, penetrations, branches, changes of direction can determine the position of a node.



Every segment of a routing path is assigned a set of routing conditions controlling the cable population in that segment, i.e., allowed cable segregations, minimum spacing between segregations, maximum transverse area, etc. Nodes representing penetrations can be assigned also rules for controlling the cable population in the penetration: penetration fitting, allowed area, number and type of watertight blocks, etc.

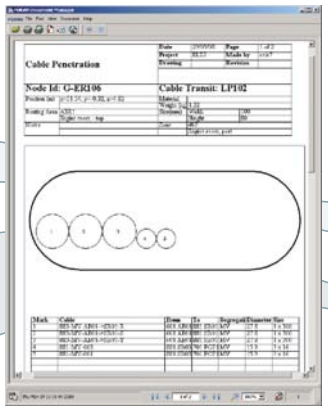
Cables can be routed either in automatic, semiautomatic or manual modes. The automatic mode evaluates the shortest path that fulfils the routing conditions and the existing cable population. The semiautomatic mode allows marking some points as “mandatory” or “forbidden”. Once a cable is routed, its weight, length, centre of gravity and the cable tray population are automatically updated.

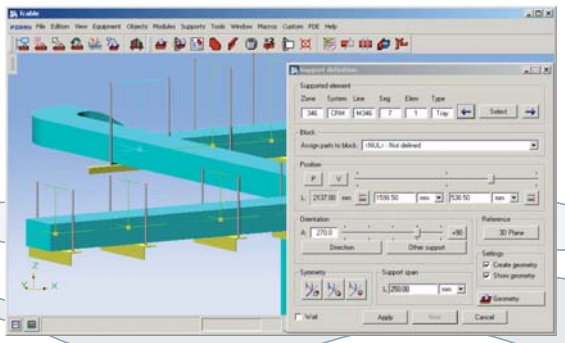
Cable tray modelling

Cable trays may be modelled automatically according to the cable tray pattern assigned to each segment or polygonal of the nodal network. Functions for inserting manually standard fittings, such as tees, branches, etc., are also available. Cable penetrations or transits are automatically modelled based on the information given to the penetration nodes.

The on-line interference checking is available in the process, and may be used to avoid mounting errors.

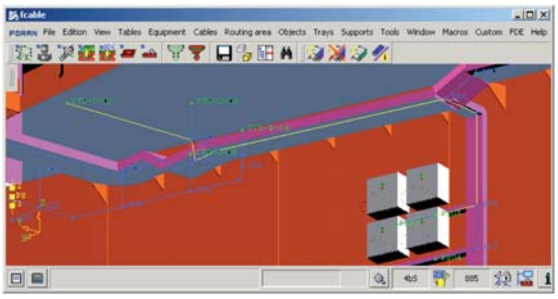
FCABLE is able to generate different types of drawings, including automatic cable route pull sheets and cable trays iso sketches.





Cable terminations

FCABLE provides a powerful cable connection window, in which the conductors, jackets and screens of a cable can be assigned to the terminal points of the end equipments. **FCABLE** controls the consistency of the process and creates automatic connection sketches. It is also possible to define jumpers or links among terminals.



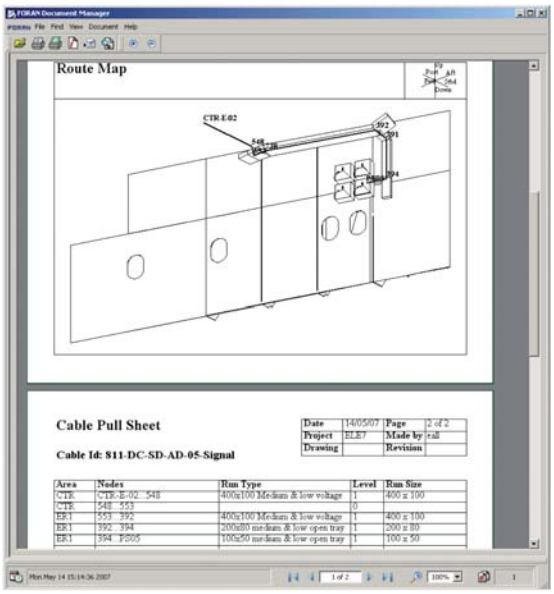
I/O signals

FCABLE includes a full set of functions for managing the instrumentation and control signals of the project. I/O signals are defined by entering some data like the signal type (analogue, digital or serial line), the I/O card type, the range of measurements, alarm data, etc., and then defining the end instrument (field element), the sequence of intermediate process stations and the cable conductors the signal propagates through. Different types of I/O lists may be also generated.

Electrical reports

As part of the electrical package, **FORAN** offers a complete report generator that includes both predefined and configurable reports. Reports can be exported to a wide range of standard formats.

It is possible to create, among others, cable reports, equipment reports, routing cable spec reports, I/O signal loop sketches and cable connection sketches.



FBUILDS

FORAN offers a solution to set up the build strategy, i.e. to organize a **FORAN** project according to the fabrication and assembly processes that take place at the shipyard. The build strategy is defined by arranging a hierarchical tree that describes the breakdown structure of the ship. The full product model is organized into a hierarchy of interim products (IP), being possible to set up general alternative build strategies.

FBUILDS provides advanced interactive functions for IP creation and parts assignment (cut & paste, drag & drop, sorting, searching), the possibility to classify the IP using configurable attributes for each type, and the definition of the assembly sequence. Drawings and part lists of IP are created in **FDESIGN**.

FDESIGN

Drawings are generated in FDESIGN module, as it is described in a separated Brochure.

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