# FINE-ELEC: An Integrated Computer Environment for Electrical Installation Projects
*(by 4M Support department)*

FINE-ELEC is an Integrated Environment for Designing and Calculating Building and Industrial Electrical Installations. FINE-ELEC makes all the required calculations of any Electrical Installation directly from the drawings, generating automatically all the study results: Calculation sheets, technical reports, a complete series of the final drawings of any Electrical Installation, updated with the calculation results, the bill of required materials etc. It should be mentioned that FINE-ELEC does not substitute the knowledge and experience of the Electrical Engineer, it just relieve him from routine tasks or complex, procedures, which can be automated. The timesaving achieved by the smart automation of certain procedures can be used for enhanced designing: The user has obviously more time at his disposal to conduct tests with alternative design scenarios, in order to achieve the optimum result in any case. FINE-ELEC consists of two big components, the CAD Component and the Calculations Component which are described in the following sections.

## 1. The CAD Component

FINE-ELEC CAD Component has the ability to think, suggest, design and recognize any Electricity network or installation, sending the relative data to the Calculations Component and produces in a completely automatic way all the project drawings in their final form. More specifically the program creates automatically:

- The linear panel diagrams for all the panels of the Installation
- The installation distribution diagram (block diagram)
- The ground plans fully updated with the calculation results (dimensions of cables, numeration of appliances etc)
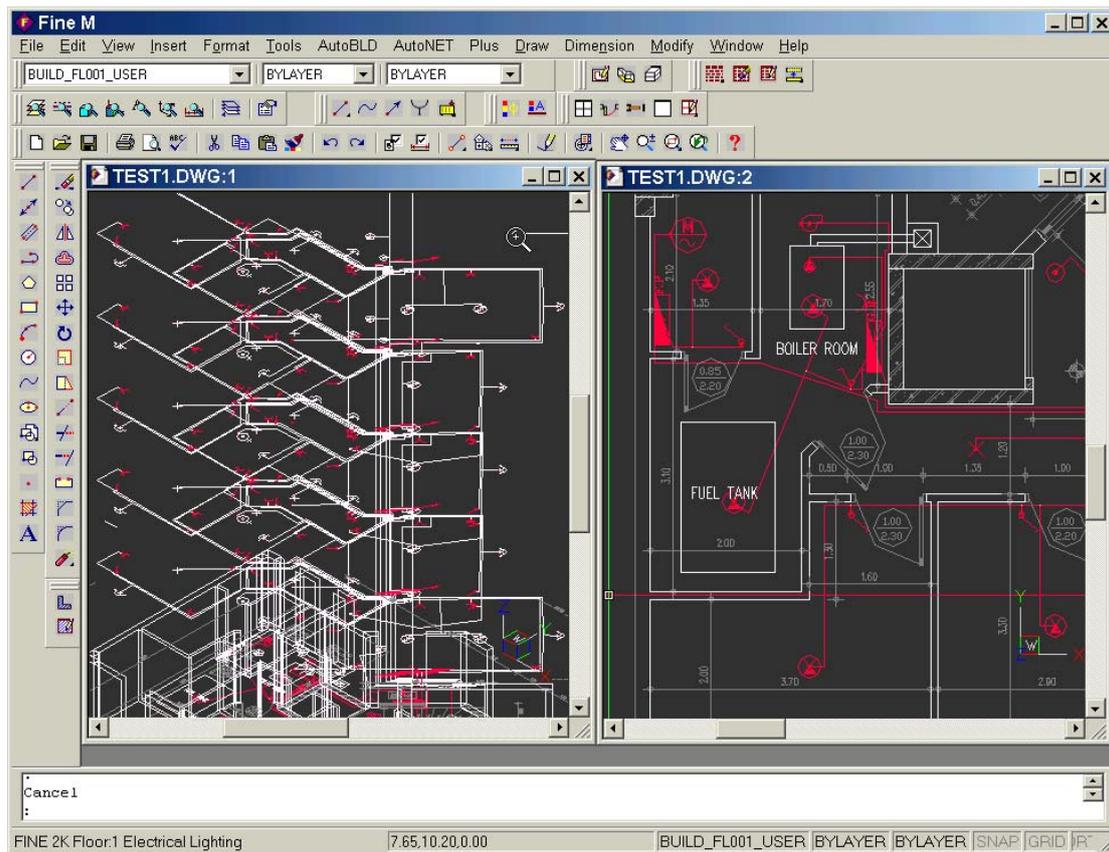
The drawing procedure consists of two phases, a) the location of the receptors (or appliances) taken from the program libraries and b) the routing of the cable drawing. Both procedures are done in an easy, rather automatic way. For instance, using the rooting commands "Cable Parallel to Wall " (or "Parallel to Points ") and "Jacks Connection" etc., the cables and their connections are designed almost automatically. Then the program recognizes and numbers the junctions and transfers the data exactly as the calculating subsystem demands. The next two points-abilities result in combination with the calculation subsystem:

- Automatic Symbols: The ground plan drawings are automatically enriched with the results values (cables dimensioning, enumeration etc.), and also with the necessary symbols (e.g, connection nodes, arrows etc)
- Automatic Creation of Drawings: The linear panel diagrams and the installation distribution diagram are created automatically

It should be mentioned that all symbols and line libraries are of DWG type, so they are open to the user and easy modifiable.


## 2. The Calculations Component

FINE-ELEC Calculations Component makes the analytical calculations of any Electrical installation part (cables, protection devices etc) using the most updated methodological background and the most acknowledged international and European standards (HD 384 provided by CENELEC). All network parameters such as ambient temperature, cable installation method and means etc, are taken into account. The user can select specific calculation rules for any part of the installation (calculation of protection devices either by the current or by the cable). The calculation sheet shows

all intermediate calculation results (e.g. permissible current in each line) on a real time basis, so the user has a very good image of the whole installation and can easily intervene on any stage of its study.
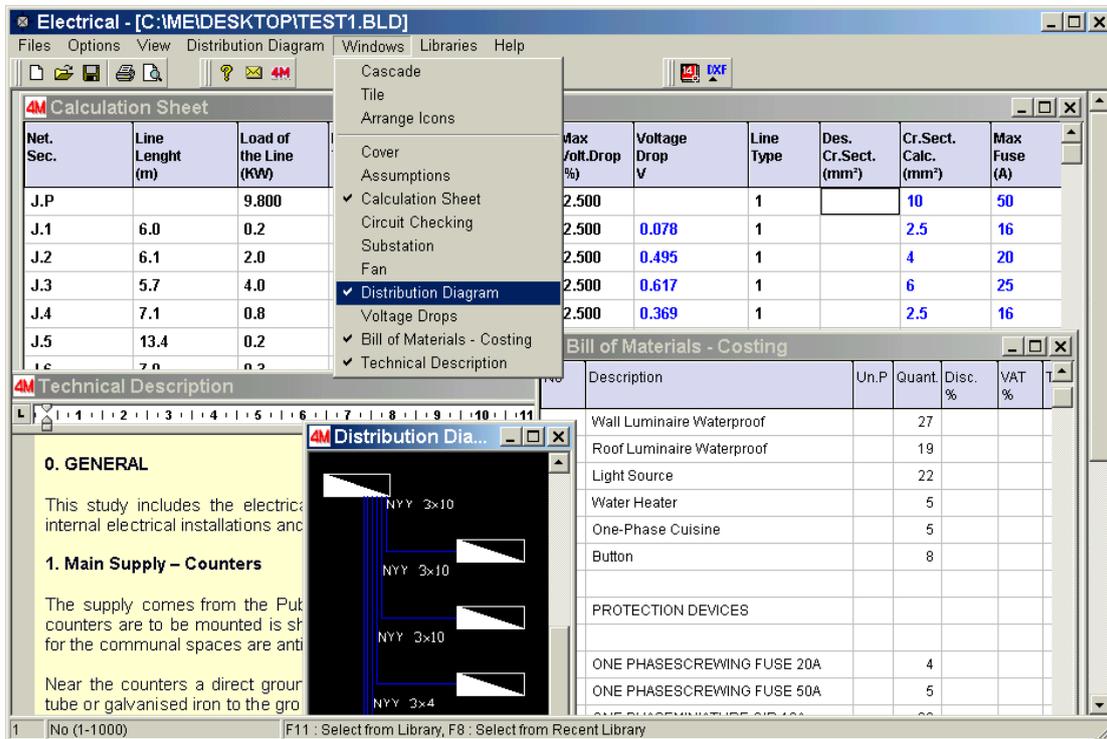


Apart from the basic calculation results (dimension of cables and protection devices) a series of results are produces:

- Automatic calculation of the voltage drop in sections, branches and in the most mailing branch.
- Automatic phases allocation (optimization algorithm)
- Analytical panel calculations (degree of protection, short circuit controls etc).
- General substation calculation.
- Bill of materials, cost estimation, bids etc with freedom of editing and possibility to select auxiliary materials.
- technical descriptions (for high-intensity and weak currents) produces by a Technical Report Manager.
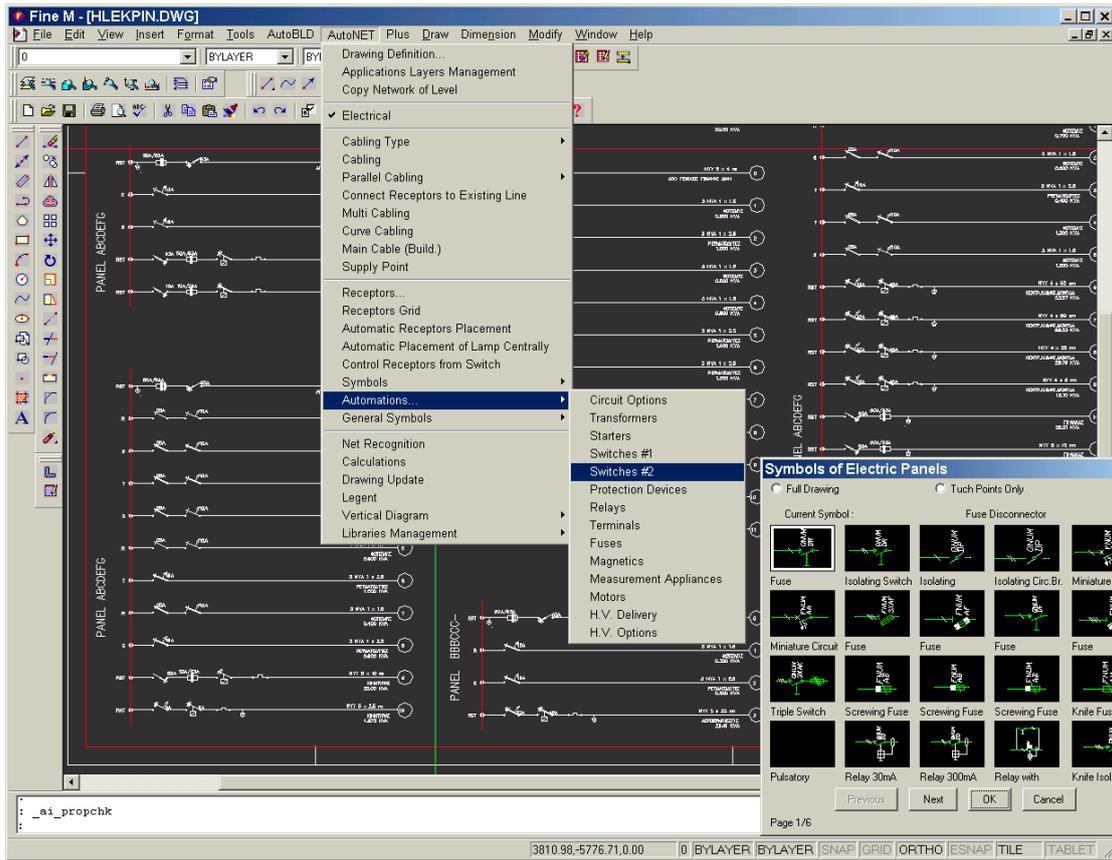
From a functional point of view, the package follows the standards established by Windows. FINE-ELEC embeds a high performance Calculating Core (spreadsheet type), where the user can interfere freely in the independent parametres and observe in real time the results of his selections, as the system is self-updated on every modification. In general, FINE-ELEC has all the advantages and advanced characteristics of the FINE-Suite environment.