

# EFC-400LF – Low Frequency

## Power Transmission Lines and Terminal Stations

Electric and Magnetic Field - Calculation according to VDE 0848

'EFC-400LF' is a Windows™ - program, which has been developed for calculation purposes of electric and magnetic fields caused by energy distribution facilities. The general usage extends from checking critical values of electromagnetic compatibility and prevention of health hazards to collection of data for field catasters. EFC-400LF can calculate field distributions of:

- ❑ Power Transmission Lines
- ❑ Power Stations / Substations
- ❑ Terminal Stations
- ❑ Earth Cable
- ❑ Cat Wires of Tram and Railway
- ❑ Urban Railway and Subway
- ❑ Ship and Aeroplane Supply

Further important features of EFC-400LF are high speed calculation and a comfortable user interface. Predefined elements like towers, switch gears, transformers, etc. enable a very efficient construction of geometry based on topographic information.

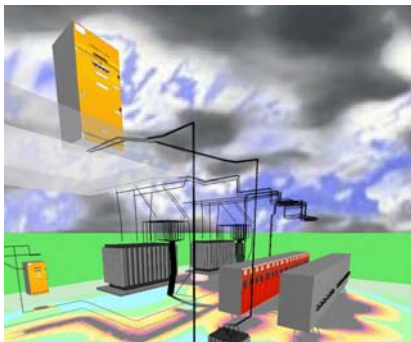


Fig.: magnetic field of terminal stations

In order to construct power transmission lines, it is possible to select towers and system configurations from libraries. In case of modifying the construction, such as movement of towers, EFC-400LF calculates new configurations of conductors automatically.

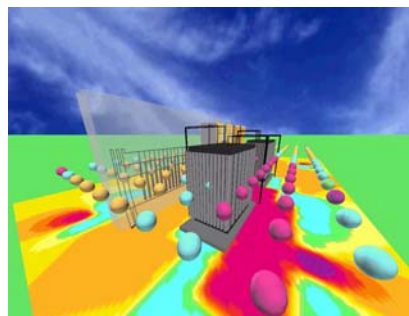


Fig.: measurement data in power stations

Field sources with different frequencies (0 - 500 Hz), such as railway or urban railway, can be considered. Comparison with measurement data

is possible, while the data can be interpolated.

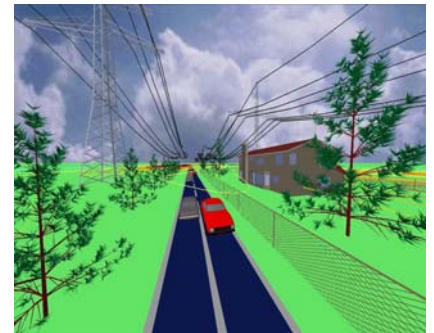


Fig.: influence of vegetation and houses

The amount of simultaneous calculation points is restricted only by hard disk capacity and the high calculation speed offers a workstation-like performance. EFC-400LF supplies export filters for DXF- and ASCII-files, for further processing of data with software for presentation, statistics, CAD or GIS.

# Calculation Electric and Magnetic Field

## Power Transmission Lines - according to VDE 0848

### Technical Data: Magnetic Field Calculation

- 3D-calculation of Biot-Savart-Equation
- calculation of RMS value, peak and components
- time dependent field components
- automatic calculation of ground wire currents
- height at midspan by classification of segments
- frequency range 0 to 500 Hz

### Geometric Objects

- max. 50000 conductors
- max. 100 transmission or railway lines
- max. 1000 towers
- max. 100 isolated towers
- max. 1000 buildings
- max. 1000 blocks

### Calculation Modes

- max. 32000 x 32000 points
- calculation along a straight 3D-line
- calculation on an area in space
- profile series in z-direction
- dynamic interpolation of data points
- check on Kirchhoff-law

### Object Manipulation

- good survey and easy input of geometry data
- shift, rotation, insertion etc. of geometry data
- reusable blocks of conductors
- polylines, coils etc. of conductors
- loading of towers and railway profiles from library

### Data Presentation

- X, Y, Z-axis plots
- 2D-Isoline plots
- 3D-surface plots
- representation of conductors
- statistics, histograms
- average value, L05, L50, L95-value
- zoom function
- proportional view

### Performance

- max. 1.000.000 points/sec (Pentium™, 1 GHz)
- runtime version for external calculation

- 32-bit runtime version
- batch job available
- integrated data compression
- user interface configuration
- user defined colors
- support of 16, 256 and true color graphics

### Electric Field Calculation

- up to 32000 charge segments
- ground influence
- Gauss-Jordan or sparse-matrix inversion
- calculation of tower and building influence

### Power Transmission Lines Support

- tower library
- user defined towers
- automatic segmentation of towers
- replacement of towers in transmission lines
- change tower types of transmission lines
- system or phase voltage
- Al/St/Cu wire input
- phase optimization
- temperature adjustment

### Data Interface

- ground profiles loadable
- import of experimental data
- map-import as DXF, PCX and JPEG
- DXF-export of Isolines, hatch pattern, solids
- ASCII-export (EXCEL™-readable format)
- export of 4D - colored areas (Stanford Graphics™)
- export/import of dBase™ and Paradox™ files
- creation of database reports and protocols
- bitmap, WMF, JPG, html and CD export

### Integrated Tools

- Editor, Calculator
- Paint-Tool
- DXF-object filter

### Hardware Requirements

- 64 MB RAM, HD 600 MB free
- WIN 95/98 / WIN NT / Win 2000 / Win XP™