When engineering overhead contact lines for mass transit and main line railways, we combine the calculations of our Sicat® Master IT tool with our extensive systems know-how.

Features
- Increasing efficiency and reducing sources of errors thanks to standardized and automated work processes
- Improved design quality
- Reduced time expenditure for project engineering
- Flexible adaptation to local conditions and technical requirements
- 3D data model for processing of level and height information

Dialog and report languages
By default, German and English are available for dialog languages in the program surface as well as for report languages. Further dialog languages are possible.
Process integration

Sicat Master supports the most important phases of engineering processes for mass transit and main line railways.

Preliminary project engineering makes it possible to produce documents that are needed for preparation the bid.

When it comes to actual engineering of the overhead contact line, the combination of our IT tools and the know-how of our engineers ensure a consistently high level of engineering quality. The planning documents necessary for material procurement and for the structural measures are also drawn up in the process. Furthermore, this creates the basis for high installation quality and logistics support for maintenance.

Key features

Creation, editing and deleting of overhead contact line elements

Calculation of contact wire and catenary wire height in catenary dips

Automatic pole numbering and aligning of labeling acc. to track

Copy and paste on base of track layout

Manual and automatic determination of material quantities

Calculation of track curve at any optional position in transition bend

Check and adaption of longitudinal span lengths (wind deflection) and contact line sagger

Drag and drop function for overhead contact line elements retaining track assignment

Automatic dimensioning of pole distances and alignment of subsidiary lines acc. to track
Program structure

The planning and engineering of overhead contact line projects is explained by the program structure of Sicat Master.

All data, such as general data relating to materials and type of construction, customer data or project planning data, are stored in central databases and can be updated with the aid of master data editors.

### Project management

- Customer data
- Project
- Calling of modules
- Managing of database

### Project engineering

**Process data module**
- Material data
- Environmental data
- Operating conditions

**Track layout module**
- Creation of new track layouts
- Import of existing track layouts

**Catenary design module**
- Mast positioning
- Drawing of catenary systems
- Creation, editing and deletion of overhead contact line projects

### Outputs

- Graphical outputs
- Pole and catenary lists
- Materials lists
- Data exchange

### Connected programs of the Sicat software product family

- **Sicat Dynamic**
  Dynamic simulation of interaction between pantograph and overhead contact line
- **Sicat Candrop PRO**
  Cantilever and catenary calculation
- **Sicat Matlog**
  Component selection and material logistic

### Project management

The project management is the central part of the program. This overall part serves for recording general project data, managing customer data, organizing database access and calling the project engineering modules.

High flexibility with work at international projects is achieved by a multi server operation extended across locations with data synchronization via SQL server replications.

Project management in multi server operation extended across locations
Process data module

In the process data module, the standard constructions are managed and project specific default values for project engineering and data processing are stored.

By default, overhead contact line types that are conform with the interoperability requirements like Sicat HA and Sicat SA as well as standard contact line types of the German DB AG like Re250 and Re330 with their characteristics are provided. In addition, customer specific new overhead contact line types can be created via comfortable editing functions. The system is adaptive and widens automatically with every new type of overhead contact line.

During project engineering, the selected standard overhead contact line type and the process data are referenced to calculate the design of the required overhead contact line system.
Track layout module

The track layout data—a three-dimensional description of the track pattern—are important starting data for the engineering of overhead contact lines. The track layout description plays a crucial role in the quality of project engineering and the system to be designed.

**Entering of track layout data via**

- Entering acc. to Gauß-Krüger coordinates by means of
  - structured text files
  - graphical dialog boxes
  - data migration of geo information system of the DB AG (DB-GIS)
- Importing existing track layouts from dxf files, e.g. also from customer systems
- Reading from transport planning software (ProVI, Nova)

An extensive library of points with standard point designs facilitates entry of data. In addition, the import of track elements from dxf background images with coordinates and location parameters is possible.

**Internal data organization in track layout module**

The track path describes a track layout across several track axis, track nodes and points, which establish the relationship to the run of a catenary.

Adjacent view: Main track path (track path 1) and Diverted track path (track path 2)
Catenary design module

On basis of the track layout data and the process data, the overhead contact line system is planned in the catenary design module. A large number of functions and diverse forms of display support the engineer in this process:

- Pole positionierung
- Drawing of catenaries
- Functions for creating, editing and deleting of overhead contact line elements
  - Catenary
  - Attachment points
  - Poles
  - Cantilevers, multiple track cantilevers
  - Tunnel supports
  - Cross spans and yokes
  - Switches, insulators, connectors, section insulators
  - Traction power lines
- Calculation and check of run of catenaries in dips
- Insertion of section insulations and tension assemblies from an extensive library
- Functions for automatic dimensioning and labeling
- Check of wind deflection
- Rule-based automatic and manual determination of material quantities
- Comfortable, track layout based copy and paste function of complex groups of overhead contact line objects

Calculation algorithms, such as the algorithms for longitudinal span length optimization and for the definition of reusable catenary installation blocks, ensure efficient project planning and engineering. Furthermore, they permit the analysis of the static loads on poles together with their built-on parts.
Display possibilities

- Flexible, symbolic view of overhead contact line elements (symbol size, customer specific adaption of symbols)
- Descaled view for visual check of wind deflection
- View of cross sections
  - Visualization for each pole position
  - Calculation of fixation height and dimensioning
  - Visualization of structure gauges and standard sections
- Longitudinal profiles
  - Graphical view of catenary dip
  - Graphical view of vertical run of feeder and reinforcement lines
- 3D view of complete overhead contact line system
  - 3D simulation of train runs
  - Visualization of line sag and line decay process via hammock
- Visualization of background images of territory in plan view and cross section
  - dwg / dxf CAD files
  - Georeferenced ECW files
Outputs

For the output of data, diverse options are available:

Output formats

Graphical outputs
Layout plans, cross sections and longitudinal profiles of catenary dips can be imported into CAD programs as dwg or dxf files.

Pole and catenary lists
Lists like pole lists, catenary lists and quantity data are used for project logistics and can also serve as the basis for maintenance work.

Material lists
Results of the automatic and manual selection of Siemens parts for further processing.

Data exchange
to other project engineering tools

Interfaces to other IT tools complete the integration into the project engineering process:

Sicat Dynamic
Based on the catenary and environmental parameters from Sicat Master and also additional pantograph parameters, Sicat Dynamic simulates the dynamic interaction between pantograph and contact line with the help of a special mathematical model.

Sicat Candrop
Sicat Candrop uses the track geometry and pole locations imported from Sicat Master to calculate production lists for cantilever and dropper manufacture.

Sicat Matlog
Sicat Matlog provides support in the component selection and in material logistics and, thanks to its interface to Sicat Master, is always up-to-date with the latest state of the project engineering process.

3D view incl. simulation of train run

Extract of a material list generated in Sicat Master

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