Impact Factor: 9.9 ISSN-L: 2544-980X

Plastic Bag Libraries for Automation of Electrical Engineering Departments Rubius Electric Suite

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Annotation: Rubius library package for automation of electrical engineering departments is described Electric Suite, including the Rubius library Electric Suite: 0.4-10 kV power transmission lines, designed for the design of 0.4-10 kV power transmission lines, and the library - ku Rubius Electric Suite: MZ, designed for designing lightning protection systems. Describes the basic principles of working with libraries, the benefits of using them.

Keywords: Rubius Electric Suite, Power transmission line, MZ, power line, lightning protection system, AutoCAD, COMPASS, output documentation.

Due to the annually increasing competition among design companies, more and more attention is being paid to improving the efficiency of the design process, in particular , reducing material and time costs at all stages of design and improving the quality of the projects themselves. The most common and in an effective way The use of CAD systems is essential for automating the activities of design organizations .

Some time ago, to solve this problem, the SKB " Rubius " (OOO " Rubius ") of Tomsk University of Systems management and radio electronics (TUSUR) created a software line for the automation of electrical engineering departments – Rubius Electric Suite (hereinafter referred to as RES).

IN this material presented two software product:

1. RES: 0.4–10 kV power transmission lines – intended for the design of 0.4–10 kV overheadpower transmission lines;
2. RES: MZ - For design systems lightning protection.

When developing these software products, the technical assignment for programmers was set by professional designers, with many years of experience in designing power transmission lines. Thus, the programs were not created as a “marketing product ” with a lot of “useless features”, but as a tool for effective practical application in the implementation of real projects. At the same time , the products have a wide range of unique capabilities, not implemented in any program presented on the market.

A distinctive feature of the RES software package is that that it was originally intended to work with plan localities, and not with geological profile. In addition, The uniqueness of the complex lies in the fact that that the mathematical core does not depend on the graphics platform used – this allows the software to work equally effectively on the AutoCAD platform, so, for example, and on the KOMPAS platform, and in the future. Maybe, the port will also be carried out to other popular graphics platforms.

Every from programs complex RES Can conditionally divided into next levels

Intellectual drafting And design tools for work on the plan.

Allows you to create overhead lines or place lightning rods on a plan using non-standard primitives, and fully functional dynamic objects (such as as "VL route" "support", "rod lightning rod" , etc.). Each object is assigned its inherent properties and "intelligent" behavior and editing. Convenient tools for interactive adjustments directly on the plan are implemented (the user can quickly change the

[1] Fergana branch of TATU named after Muhammad al-Khorazmi, assistant

overhead line route, move the support, etc.), at the same time is being carried out automatic recalculation of the information associated with this object. Convenience of editing is also ensured by the ability to copy objects, undo / redo user actions, and each type of object is located in a separate layer.

In order for the design of drawings to comply with corporate standards and be as informative as possible for the designer, The programs provide for many settings, allowing you to customize the design of a drawing in just a few clicks of the mouse To desired view (ask styles objects, tune displayed information, set fonts and color), at the same time all dynamic blocks will change their display according to the set settings. All these listed features make RES indispensable drawing tool, which will please any designer.

It is worth noting another useful implemented feature - if a project is transferred to a department, in which RES software is not installed, then the drawing will be displayed correctly , however, its editing will be blocked. This allows projects to be transferred to the customer without additional processing and cleaning of the drawing and to protect the designer's original work.

Automation calculations.

When using calculation modules of programs RES part of the necessary information is automatically taken directly from the plan, which allows to significantly reduce the time for data entry. In addition, in this In this case, there is no need to update the input calculation data each time after modifying the drawing. The calculation results can be exported to word programs, Excel , AutoCAD and KOMPAS. Carefully thought out comfortable interface each windows speaks O volume, What these programs made "designers for designers."

Generating a kit day off documentation.

Result works designer seems to be exactly V view set day off documentation. This one from the most painstaking And labor-intensive stages, Where are often hidden errors. However with programs rulers RES, generation day off documentation will turn into V pleasant And simple procedure, being performed from one click mouse. After all, one of the strongest points of this software is the flexibility and convenience of generating various forms. output documentation. All documents are generated completely automatically, only on basis contained on drawing object information. Supported conclusion necessary documentation V programs Word, Excel, AutoCAD , COMPASS, at the same time The received document can be edited at your discretion if necessary user. Editable document templates allow you to customize your own font styles, layer names, display styles of supports, etc., according to GOST and internal standards organizations.

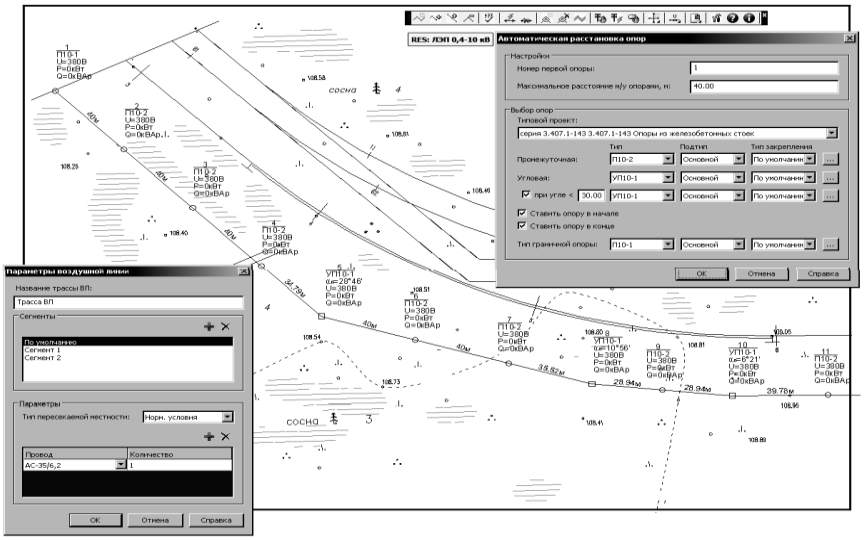
Control errors at execution project.

In the process of "manual" design and calculations, it is quite easy to make a mistake. RES package programs have a built-in ability to control the correctness of user actions throughout the design cycle. Each of the program objects ("support", "retraction", etc.) is in its own way "intellectual" - it takes into account its position relative to other objects, controls errors in the drawing directly at the drawing and calculation stages.

Since programs automate much of the designer's work, then most errors are simply impossible to make. Acceleration is achieved through automation of routine mechanical work, leaving the creative component, koto- paradise and determines the quality of the entire project.

Next let's consider every from modules RES more details.

RES: Power transmission line 0.4–10 kV



Pic. 1. General view libraries Rubius Electric Suite : Power transmission line 0.4–10 kV

The design is carried out according to a plan and does not require preliminary placement of supports along the profile, which is relevant when implementing projects in the 0.4 and 6(10) kV range. The designer can specify for each section of the overhead power line route (drawn as a polyline) certain types of cables and the type of adjacent terrain (swamp, clearing, etc.).

Semi-automatic (user himself) is supported places supports on the line) and automatic support placement modes. Each support can be conveniently moved and edited .

Equipment is attached to the supports, which is later taken into account in the automatic generation of all output documents. Subtypes of supports have been introduced, which allows to typify frequently used sets of equipment and fittings at support. Automatic calculation of wire length is performed.

Supported construction long-term And short term bends lands under transmission line supports with calculation of the resulting area, and, if necessary, editing of their position and geometry by the user.

Convenient intersection construction module: dimensions are automatically recalculated and are compared with the standard values (if there is a discrepancy, they are highlighted in red). The number of intersections in one flight is not limited.

Types supported day off documentation on basis customizable templates:

a) specification on a sheet;

b) custom-made specification;

c) exercise on compilation estimate; d) assignment for land allocation;

d) display of all intersections on the plan and on a separate drawing;

e) list of supports.

Supported mode creations total set documents By several drawings that is Very important factor, So How allows to the designer work (generate documentation) not with separate drawings, and with the project generally.

Comfortable settlement modules programs perform calculation according to PUE-7:

a) mechanical calculation of wire and sag arrows in various modes;

b) calculation of the wire cross-section based on the continuous permissible current, current of the protective device, economic current density, by voltage loss and single-phase short-circuit current ;

c) calculation of grounding of supports relative to reinforced concrete, metal and artificial foundations ;

d) calculation of voltage losses over the entire length of the overhead power line, and in its individual sections , depending on the parameters of the wires and the load in the nodes (supports) of the 0.4 kV electrical network .

The RES: 0.4–10 kV Power Lines program comes with a well-structured editable reference book, which allows you to conveniently and uniformly edit and create your own standard projects , equipment, fittings, wires, terrain types, types of fastenings. In this way in this way, It is possible to reflect the design features in any organization without having to contact the developers.

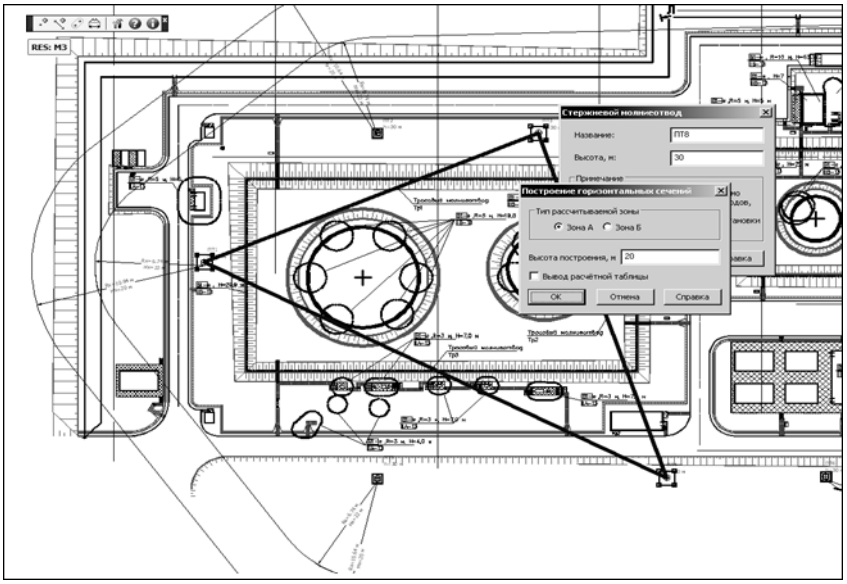
Taking into account feedback from developers was established, that the application of software complex RES: Power transmission line 0.4–10 kV gives savings time at design of power transmission lines by almost 3 times. The freed up time can be spent on improving the quality project, increase in design volumes, performed in the department, or optimization of expended resources .

Another very useful program, which features a simple and user-friendly interface, Not requires special training, at this providing overwhelming part of the necessary calculations according to the methods of RD 34.21.122-87 and SO 153-34.21.122-2003. In order to perform the calculations, It only takes a few user actions of the effectiveness of the implementation and use of this software was carried out. As a result of which it was established, what application RES: MZ gives saving time when completing a project more than 2 times.

I want to emphasize that software security RES: Power transmission line 0.4–10 kV And RES: M3 - This unity graphs, calculations And day off documentation V within the framework total project, not individual drawings.

At the moment, there are already several dozen users of the RES line of programs, in that including neighboring countries (Kazakhstan and Uzbekistan), among them: OJSC "MRSK Volga", OOO "Teploenergo -Comfort", JSC "Tatneft", JSC "Zapsib - electrical engineering", JSC "Atomenergoremont", TOO "Karaganda "Zharyk", State Unitary Enterprise « O'zGEOTEXLITI », TOO "Kaztechnology" And etc.

Rubius Electric Suite: MZ



Pic.2. General view libraries Rubius Electric Suite: MZ

Usage products rulers RES allows: standardize process preparations drawings, kart, plans; reduce deadlines developments for check decrease routine operations;

increase performance labor, increase developed volumes; raise quality performed projects.

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