

ASPECTS ON THE EFFICIENCY OF MOBILE TEAM INTERVENTIONS ON ELECTRICAL ENERGY DISTRIBUTION EQUIPMENT TOWARDS DOMESTIC AND INDUSTRIAL CONSUMERS

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Abstract: *The paper aims at presenting how to coordinate intervention teams in the event of failure regimes in electric power distribution installations to domestic and industrial low voltage consumers. The work was theoretically and practically supported by an application implemented within the Faculty of Engineering and coordinated by the author.*

Key words: application interface, electrical system, dispatcher, mobile team, operational control gear.

1. INTRODUCTIONS

The aim of the laboratory is to highlight the opportunity of implementing the coordination applications by the local energy dispatchers and the interventions of the operating personnel in the electric power distribution installations to the domestic and industrial consumers.

It is well-known that the occurrence of fault or failure regimes in electrical power distribution installations requires rapid and efficient intervention to eliminate these fault regimes. For this purpose, within the National Energy System, disposed management stages are provided, spread over several levels (central, zonal, local). These operating steps are coordinated in hierarchical order by: the central dispatcher, the local dispatcher, the local dispatcher.

The paper relates to low-voltage power distribution systems, coordinated directly by local energy dispatchers, and takes into account both the importance of dispatching coordination of these categories of electrical installations and the importance of mobile teams interventions for identifying in - a relatively small time of faulty equipment and their isolation / elimination. In this sense, it is possible to develop applications that can be accessed through a common web browser and wide use such as Internet Explorer, Mozilla Firefox, Google Chrome.

The interface between the mobile intervention teams is assured, with the help of junction terminals, and identifies on an orthophotographic map (related to the area served by the mobile team), the electrical installation / electrical equipment in which the incident occurred .

Figure 1 illustrates schematically the dispatched management architecture of interventions to identify and eliminate defect schemes in a power distribution installation to household and industrial consumers.



Fig.1. Representation schematically the dispatched management architecture of interventions

The interaction between the dispatched area and the mobile intervention team involves the announcement and recording of the fault in an operational register, the announcement of the mobile team, operations to measure operating parameters, establishing abnormal operations and proposing remedial measures, structured as follows:

- **the dispatched area** providing the operative command / coordinate stage by the local energy dispatcher who records in an operational register the date and time of occurrence of the incident as well as the name of the operative personnel who took over the message and is about to start the intervention procedure on the field;
- **the mobile team** that is part of the operative servicing personnel of the distribution electrical installations and which takes over the message from the dispatcher and starts the procedure for identifying and insulating / eliminating the defect in the electrical installations. To this end, mobile team members are equipped with mobile stations connected via a common web browser and broad usage such as Internet Explorer, Mozilla Firefox, Google Chrome, to a central server located in the control room;
- **the intervention area** in which the mobile team equipped with specific apparatus and instruments (measuring devices, toolbox, etc.) identifies the defect, assesses the state of the art and the possibilities for its isolation / removal, to return as soon as possible to a normal operation of the electrical installation.

Dispatch centers are invested with attributes of the management authority through dispatcher (decision-maker, command order and competence, direct command) on the installations with documents called "Investment Order with the attributes of the driving authority through dispatcher" [1-2].

Each equipment in the transmission and distribution grids, as well as each SES power plant, is obligatory in the decision-making authority of a Dispatch Center [2].

2. DESCRIPTION OF THE WAY IN WHICH FIELD OPERATIONS ARE CARRIED OUT BY MOBILE TEAMS

In the framework of the National Energy System, the operation of the electrical installations is carried out by specialized units having authority over all participants in the electricity market, for the purpose of coordinated management of electrical installations and equipment for electricity transmission and distribution that require an order unit [3]. Starting from this point, the work was related to a narrow segment of the operation of electrical installations, namely to the distribution of electricity to household and industrial consumers. The power distribution system is a vital component of the functioning of the National Energy System as a whole, which is why the operability of the interventions on the electrical installations is justified in the event of a defect or failure regime.

For this purpose, the interventions in the electrical installations must be carried out on the basis of some applications, which allow the following operations to be accessed by the mobile team of the toolbars and functionalities [4]:

- the determination of the surfaces directly in the orthophotographic map of the locality served by the operational management step and the mobile team,
- positioning within the orthophotographic map based on ip location,
- quick realization of video tutorials directly within the application,
- disconnect the user from the application,
- automatic navigation to the map frame that includes the selected item.

In support of understanding the principle of functioning of such an application, the paper summarizes the architecture of the software system which was the subject of a case study within a Laboratory for Diagnostics of Electrical Equipment, belonging to the Faculty of Engineering. Figure 2 shows through a software application the way of identifying and delimiting on the orthographic map of the locality that incorporates both the dispatched area and the location where the fault regime occurred. [4]



Fig. 2. Orthographic map incorporating the dispatched area and the location where the fault regime occurred

Figure 3 is the main interface of such an application, from which it can be identified on the orthographic map (blue markers), the dispatched area and the location where the fault regime occurred [4].

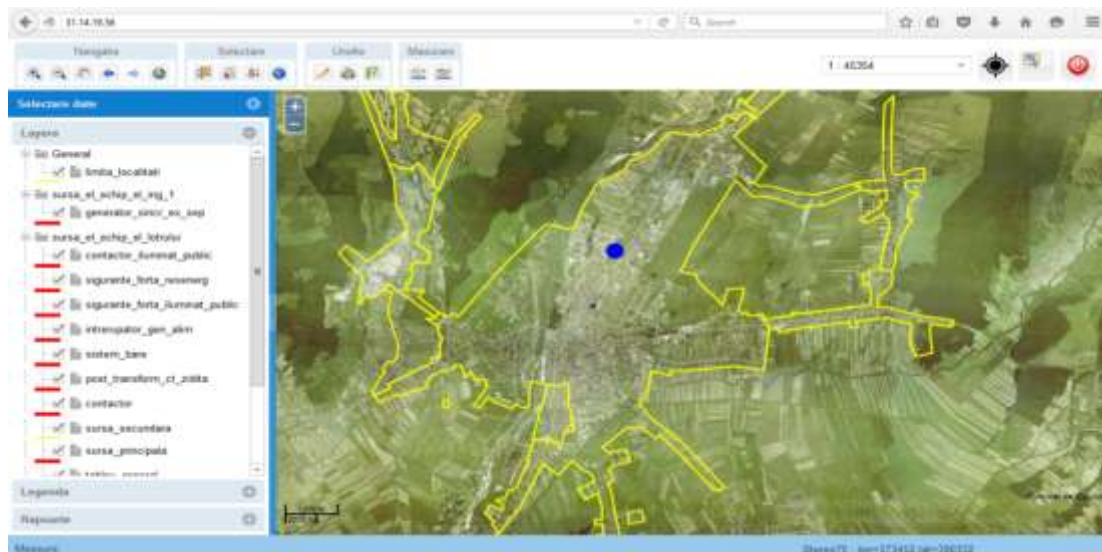


Fig. 3. The main interface of the software application

3. CONCLUSIONS

The efficiency of the interventions in the electrical distribution installations under the management of a board operator within the National Energy System can be achieved by:

- reducing intervention times by quickly identifying the area in which the defect occurred and the movement directed towards it;
- implementing in the application software a procedure for the intervention and recognition of all types of defects that may occur accidentally and the successive stages of their verification and isolation / elimination;
- training operative personnel in the configuration of the mobile team, how to use and manage the software application;
- the periodic training of the operative personnel in the mobile team configuration with regard to the configuration of the electrical power distribution installations and the defect or failure modes that may occur at any given time;
- permanent updating of the orthographic map of the locality in which the electrical installations under the jurisdiction of the operating step are located and in the operation of the mobile intervention team.

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