A Combined Method Digital Topographic Plans of Creation for Engineering Structures Geodetic Surveying of Using PHOTOMOD

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Currently, for the construction purposes, expansion and reconstruction of electrical small stations (EP) and electric power lines (EL) at the designing stage specialists prepare complex reports on engineering surveys of these objects. In accordance with the standard technical documentation (STD) concerning the construction standards, in the engineering surveying works for construction of EP and EL comprises there are the following stages: engineering geodetic surveying, engineering-geological, engineering hydro-meteorological and engineering and environmental surveying.

Engineering-geodetic surveying for the construction of the above objects should provide surveying data about the land features and existing structures, the areas entities (in digital, graphic, photographic and other forms). This information is required for a comprehensive assessment of natural and technogenie construction site conditions the design studreasoning, the structures maintenance, as well as the creation and maintenance of the state cadastre, the territory management, and real estate transactions. Engineering geodetic surveying results in topographic plans (in digital, graphic, photographic and other forms), profiles and other geodetic documents and data.

In the Novosibirsk branch of LLC «Geoproectiziscanie», as in any other organization engineering industry, one of the main documents of geodetic surveying is a topographic plan with a scale (1: 500 to 1: 5000) in AutoCAD format.

This topographic map (figure) must meet the standard requirements.

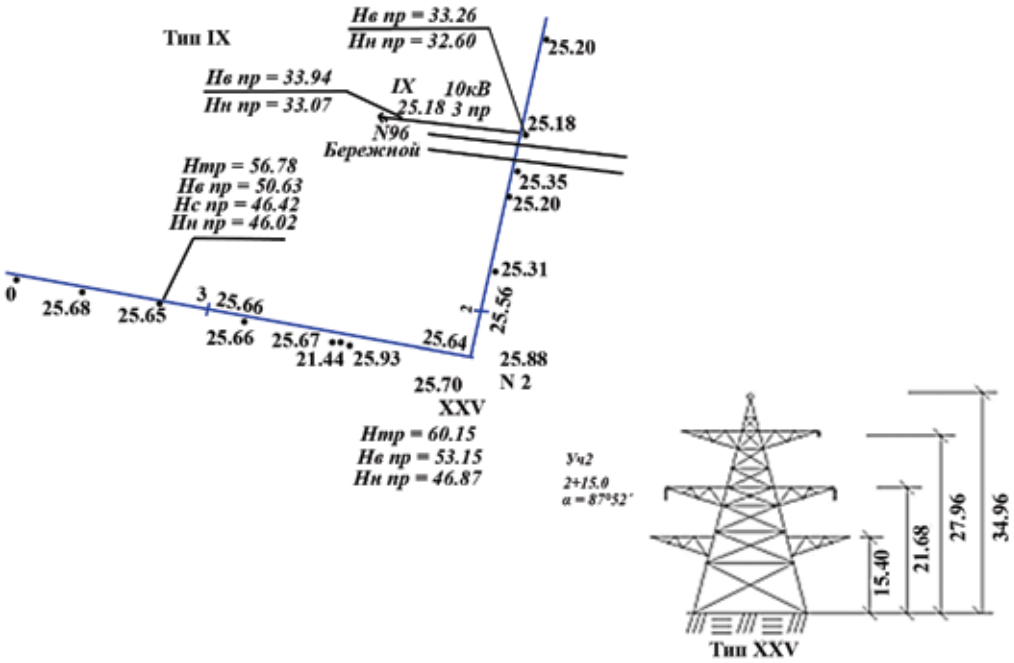

Figure 1. A part of a topographic plan of scale 1 : 2000 with picture support

Survey data are sent to designers who are faced with a particular problem associated with the visualization. In same cases, at the design stage it is necessary visual the objects to present such as explication, bearings, cables, garlands, and also plots of crossing routes with artificial and natural barriers for visual understanding. There appears to examine these objects at a site resulting in additional time and costs.

The complexity of the features displayed on

digital topographic plans increases when there is a large number of ground and underground communications for various purposes. As a result in such situations, some authors recommend to make large scale executive survey, bat complex objects have to be accompanied by photographs and to use laser scanners in surveying. Terrestrial laser survey has same advantages and disadvantages.

We propose a combined method of digital topographic plans creation, in which the information of topographic plan has to be supplemented by of the objects three-dimensional models. Three-dimensional models (3D model, three-dimensional videoscan) are the new types of digital geospatial data, that are three-dimensional analogues of real terrain objects.

Application of the combined technique of digital topographic plans will allow the user to obtain additional information in the form of three-dimensional videoscans of same separate parts or same objects. The three-dimensional video scene not only improve the perception and increase the information content of a digital topographic plan, but allow you to perform the measurements. This minimizes field trips. Research on practical application of three-dimensional video scenes in literature reflected poorly.

In connection with the above information, the digital topographic plan technology consists of the following steps:

– the creation of digital topographic plans known in accordance with technological scheme;

– the establishment of schemes of the lots requiring, measuring three-dimensional video scene;

– gathering of information for the DEM and the DMO on the basis of aerial photographs, satellite imagery of high resolution, and also on data received with small non-metric digital cameras for further creation of three-dimensional videoscan of selected areas;

– creating terrain objects and models, three-dimensional video scenes 3D GIS;

– creation of a digital topographic plan, added by the three-dimensional video scenes.

The necessary conditions have been determined under which the digital topographic plans with a combined method will be received.

When creating the DEM and DMO by means of photogrammetric technologies for the in future use in 3D GIS there occurs the task of complex coordination of three-dimensional models created of the site on DFS, at the information level and three-dimensional models of the territory, the construction of which is in the internal structures of 3D GIS based on the input spatial data export.

Based on this research and testing the proposed technology: DPW PHOTOMOD (Racurs, Moscow); and the program of GIS MAP 2011 GIS Panorama (KB Panorama, Moscow) have been selected.

While developing the technology a number of problems have been revealed that are solved in the Siberian State Academy of Geodesy (SSGA).