

USING BIM TECHNOLOGIES WHEN DESIGNING A ROAD PART

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ABSTRACT

The article examines the main capabilities of Credo and AutoDesk software products used for developing road projects. In addition, their advantages and disadvantages were noted.

Keywords: *BIM technology, AutoDesk, intelligent transportation systems, automobile road, software, modeling, innovative technology, GIS platform*

BIM innovative technology is the information modeling of buildings and structures, the implementation of high-quality and thorough control of all performed operations at each stage of the object's life cycle.

BIM technologies (Building Information Modeling, information modeling of a construction object) are used to achieve a wide range of tasks, starting with detailed visualization of building interiors and exteriors based on images and concluding with automated control of construction equipment [1].

In this case, the possibility of applying BIM technology in the development of a new highway project within the framework of course design is being considered. At the same time, the following tasks were set:

- modeling in the Credo, AutoDesk software complex with the creation of a digital relief model;
- importing the model into the Credo software package to perform analysis and select route variants;
- obtaining drawings, statements, and visualizing objects with a digital project model;
- assessment of the effectiveness of the design process using GIS and CAD tools.

At the research stage, the digital survey of the area using electronic recorders proved insufficient, so paper cartographic material was taken as the basis. Connection to the coordinate grid was performed and the tablet was stitched at a scale of 1:10000. Data were exported to two Credo and AutoDesk software packages to compare the possibilities of reducing the time for designing a section of the highway. The work was carried out simultaneously in the Credo and AutoDesk software systems, which allowed for the use of variant design at all stages of project work. The visualization of the designed section of the highway using working drawings has been completed.

The creation of a 3D model of artificial structures and a bus stop was carried out in AutoDesk AutoCad Civil 3D.

The application of AutoDesk software products, a complex of programs: Credo_Topograph, Credo_Transform, Credo_Roads - for comprehensive design of surfaces and construction sites, allowed for the optimization of the automobile road design process. The possibility of exporting project results to automated construction equipment control systems and geodetic equipment registers has been obtained. Using BIM technologies at the road design and construction stage allows for obtaining data on work volumes and their estimated cost. Throughout the entire service life of the highway, adjustments can be made to the 3D model of the designed section during construction work and seasonal road surveys.

Thus, using BIM technologies based on AutoCAD Civil 3D and Credo offers the following advantages [2, 3]:

- using Credo software for digitizing topographic plans and working with cartographic materials;
 - using Credo_Roads for creating CDM and variant road design;
 - linking digital and analytical models in AutoDesk AutoCad Civil 3D;
 - reduction in the design and modeling time of the highway, the possibility of working with the project for a long time in the future;
 - the ability to create multi-variant project solutions based on digital models, perform training tasks, and build from the created digital spatial 3D models;
 - the use of CAD and GIS reduces the risk of gross and systematic errors;
- the application of BIM technologies allows for the adjustment of the digital model of the designed road section at all stages: from the creation of the CDP to assessing the effectiveness of the design, construction, and road operation processes.

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