

Ewa ZARZEKA-RACZKOWSKA, Jakub KRUPA

Lublin University of Technology

Faculty of Civil Engineering and Architecture

Department of Solid Mechanics

Nadbystrzycka Street 40, 20-618 Lublin, Poland

phone/fax: +48 81 538 43 84 / +48 81 538 41 73

e-mail: e.zarzeka-raczkowska@pollub.pl

3D MODEL OF ENGINEERING OBJECT AS INTEGRAL PART OF TECHNICAL DOCUMENTATION

Keywords: *3D modelling, visualisation, rendering, AutoCAD, 3DS Max, Revit.*

Legal and technical documents are two basic types of requirements in the engineering practice. The technical documentation is a set of calculations and projects on the basis of which the buildings and other infrastructure are carried out. The drawing part of technical projects is commonly created using CAD software, and it can be made in both paper and electronic form. Nowadays, technical capabilities allow to supplement the required current technical documentation form with visualization of the designed objects or their selected parts.

The use of 3D modelling, visualization and rendering *computer applications gives an additional possibility to check the correctness of created engineering projects, to verify of the collisions occurrence as well as to conduct detailed analysis of daylight and to prepare advanced visualisations and animations.*

The subject of the work is the example of visualisation of a designed football pitch together with the access road and presenting the main benefits of its implementation. The paper presents the most important functions and features of the computer programmes of this type, like AutoCad 2014 AutoCAD Civil 3D, 3DS Max Design, which were used during the process of designing and visualization of a sports facility.

The starting point was creating a 3D model of the area basing on the map for designing purposes. The contour lines and the characteristic points after the proper conversion were turned into the foundation on the basis of which it was possible to begin the process of creating the existing area (Fig.1.a).

The location of the main road and the pitch were put on the model of the field terrain and then the terrace line was set out. After setting all the parameters of the carriageway both in the plan and the longitudinal section, the corridor of the main road and the pitch area together with the bank for the grandstand were modelled (Fig.1.b).

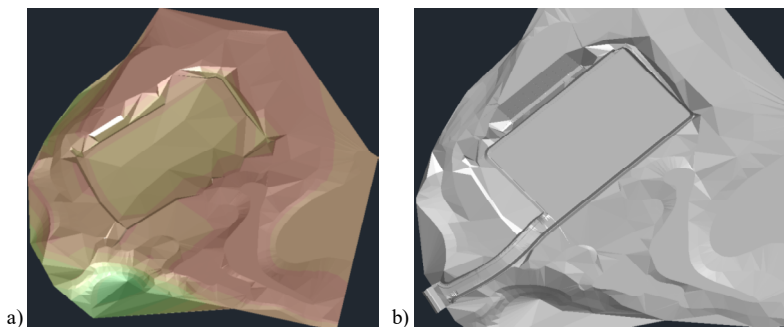


Fig.1. The existing area: a) before the earthworks, b) after the earthworks

3D models of the pitch, adjacent structures and other elements to give the scene real look were created.

Another process was texture application on the objects. The materials were specified, the parameters of light dispersion and reflection, the type of lighting, smoothing and many other settings were adopted meant to give the modelled objects the look as close to the real as possible (Fig. 2).

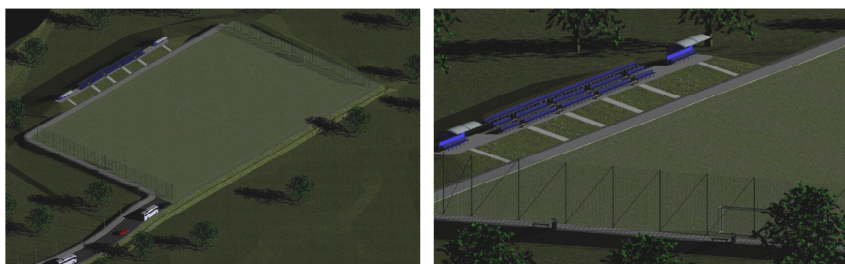


Fig. 2. The final effect of the visualisation process of the football pitch

References:

- [1] Czepiel J., AutoCAD. Ćwiczenia praktyczne 3D, Gliwice, Wydawnictwo Politechniki Śląskiej, 2011.
- [2] Górska R., Computer aided modeling to solve certain design problems „Journal Biuletyn of Polish Society for Geometry and engineering graphics, 2001, vol. 12 pp. 18 –21.
- [3] Jaskulski A., AutoCAD 2013/LT2013/WS+. Kurs projektowania parametrycznego i nieparametrycznego 2D i 3D, Wyd. Nauk. PWN 2013.