

UDC 62-2, 72.021

## CONTEMPLATION IN USING 3D MODELING FOR PROJECTING OIL AND GAS EQUIPMENT

A.A.Ivanov, N.S.Anikeev

Ivano-Frankivsk National Technical University of Oil and Gas, Karpats'ka 15 str.,  
Ivano-Frankivsk, e-mail: [bivanovus@mail.ru](mailto:bivanovus@mail.ru)

Production of oil and gas expects two considerable and important chapters, namely: stating oil-gas equipment and production activity. For the correct stating is necessary to use a significant number of tech documents. One of the most important is schematic drawing. Schematic drawing includes such information as size, materials, moving trajectory of separate skids and location of equipment.

Nowadays 3D modeling becomes more popular which allows seeing model in real-time mode, viewing model in 3D space, also observing and assign animation of different equipment skids[1]. It can make projecting of oil-gas equipment much easier and better.

Also nowadays for the oil-gas equipment 3D graphics can play great role in economic solution because it makes easier projecting and developing the construction and also calculating the trajectory of movement becomes much clearer.

We have developed the interactive 3D model of pumping gear that based on 7CK8 schematic drawing[2] in development environment Autodesk 3D Studio Max 2017. All work was made according to technical requirements with all parameters of construction elements. This 3D model is layout of different separate blocks, which are corresponding to real setting. The general view of 3D modeled setting shown in figure 1.

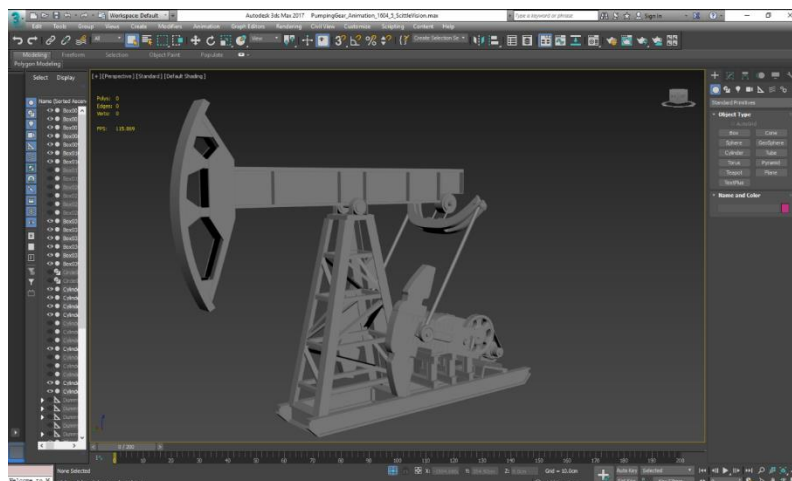
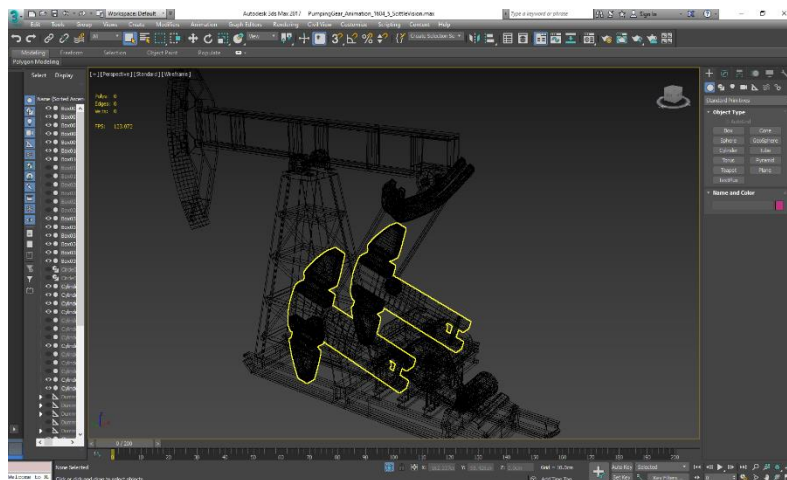


Figure 1 – general view of setting in development environment Autodesk 3D Studio Max 2017

There was conducted not only development solid part of 3D model but also consideration a topology of separate object parts. It allows you to edit each component independently of the overall setting. It opens new contemplations for projecting oil-gas equipment, according to analyzed data about equipment, which already in use, you can easily edit components that somehow moves out taking into account all the shortcomings in size or shape.

The structure of topology components and separate selected part of the construction which is editable shown in figure 2.

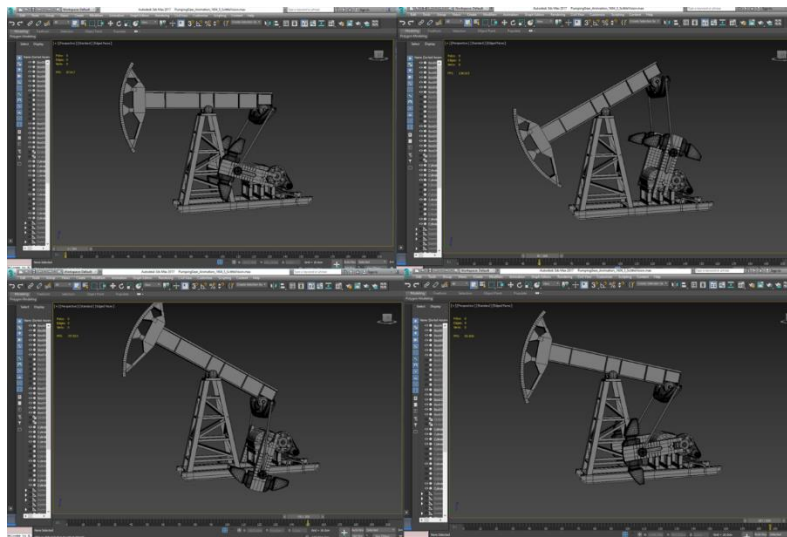
Also there was conducted a detailed analysis of the construction 7CK8 machine-tool and calculated trajectories of movement each movable component [2]. Details of trajectories produced by the animation and, with the help of that, it is possible to view the full cycle of equipment movement. The software package, which used for the model development, Autodesk 3D Studio Max 2017 provides animation graph, namely it is possible to observe which detail experiencing the largest relative motion.



**Figure 2 - The structure of topology components and separate selected part of the construction which is editable**

With the help of that it is possible to make calculations and partially predict the conditions of certain pieces of equipment.

Modeled setting in motion shown in figure 3.



**Figure 3 – Modeled setting 7CK8 in motion**

So, 3D modeling is perspective for implementation in oil-gas industry, specifically in the design of equipment as well as in the educational process. Thanks to the 3D modeling it is possible to simulate the design and equipment of varying complexity, define and edit various parameters of sizes and shapes, which greatly simplifies the development of new equipment and analysis of operating conditions of the working equipment. The ability to set the animation path can better understand and analyze the work of various units of equipment.

Also note that this model is a web-oriented that is suitable for integration into web page. Animated 3D models can greatly facilitate and accelerate the development of student laboratory and lecture material.

Literature sources:

1. K.L. Murdock Autodesk 3ds Max 2017 Complete Reference Guide: Perfect Paperback, 2016. 1270 p.
2. Станки - качалки по ГОСТ 5866-76.