

# POTENTIAL PREPARATION OF TECHNICAL DOCUMENTATION WITH MEASUREIT IN BLENDER

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**Abstract:** It is customary for the preparation of technical documentation to use CAD (computer aided design) systems. Depending on the design and functionality they are divided into low, medium and high class. In certain cases, there are developed alternative software applications or such added to other basic systems with broad opportunities for development. At the present time open source programs are more widely used. This reinforces the interest of designers, engineers and architects to find possible application of such programs in the workflow. Contemporary and very good solution gives Blender free software with specialized application "MeasureIt".

**Keywords:** BLENDER, TECHNICAL, DRAWING, SKETCH, MEASUREIT

## 1. Introduction

It happens so that sometimes the high cost of specialized CAD systems and specialized programs for preparation of technical documentation become an obstacle to consumers, causing many professionals to seek other options for carrying out their work. Open source software programs offer somewhat solution to this issue, with some remarks about the functional capabilities and competitiveness of proven paid programs. At this stage a free license, accessible and popular programs are FreeCAD, LibreCAD, NanoCAD, TigerCAD, and others [1, 2]. Of course each of these programs is specific in nature and has positive aspects. Typically, the free license leads to a lack of the necessary renewal of activity in functionality and as a rule this type of programming to some extent lag functionally behind the leading paid CAD systems [3, 4]. An exception is GNU 3D software Blender [5 - 8]. Originally developed as a 3D graphics system later on there were created a number of additional features including the ability to draw up technical documentation. This can be considered a breakthrough in 3D graphics systems because of their main purpose. A very good application is the free application MeasureIt Addon specially developed for Blender software.

## 2. Prerequisites and ways to solve the problem

Opportunities provided by MeasureIt are of great importance in the development of technical documentation, as well as ordinary dimensioning and annotation. MeasureIt has the following functionality:

- create annotations;
- display orthogonal segments;
- mesh vertex to vertex measure (length between vertices in the same mesh);
- mesh vertex labeling (add a label to any mesh vertex; identify different areas or objects in the scene);
- object to object (distance between object origins, vertex to origin or vertex to vertex);
- object to origin (distance between object origin to scene origin or vertex to scene origin);
- arrows (line, triangle, TShape);
- vertex to origin in one axis measure;
- work with different scales;
- calculate areas (edit and object mode);
- sum automatically several segments;
- measures rendering (opengl and final render).

For integration of the application MeasureIt Addon in Blender software it is required to be taken off and added to Blender User Preferences Addon. Fig.1 shows the scheme of integration of MeasureIt Addon in Blender.

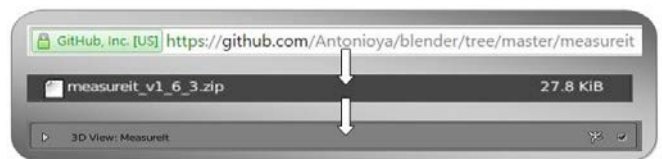


Fig. 1 Integration of MeasureIt Addon in Blender

General view of MeasureIt Addon is shown in Fig.2

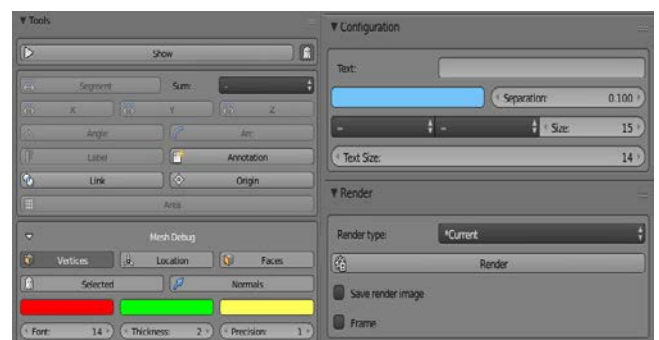


Fig. 2 General view of MeasureIt Addon

## 3. Solution of the researched problem

The aim of this study is specifying the functionality of MeasureIt Addon. For a detailed study of capabilities of MeasureIt Addon is necessary an exemplary model to be developed. Fig. 3 illustrates an exemplary model of Hot-Rolled Steel - ot-Finished Structural Hollow Section - Rectangular Tube with size 250x150h10x10mm (Standard ISO 657-14) [9-16], which will serve as a research model on which will be applied capabilities of MeasureIt Addon for preparation of technical documentation in Blender software.

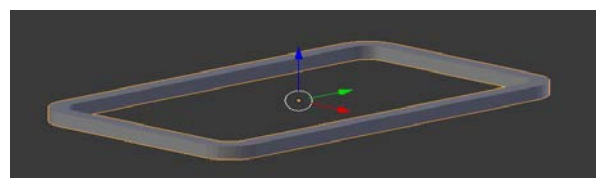


Fig. 3 Hot-Rolled Steel – Hot-Finished Structural Hollow Section – Rectangular Tube with size 250x150h10x10mm (Standard ISO 657 – 14)

Before starting the sizing it is necessary to make the required settings and definitions on the scene, the camera and render (Camera Ortho View; Blender scene render freestyle; World: horizon color: white, zenith color: black, ambient color: white; Render layers: freestyle lineset, lineset color: black; Camera

location: X:0, Y:0, Z:0.5; camera rotation: X:0, Y:0, Z:0; camera Orthographic scale: 0.6). Fig. 4 shows the correct configuration of the scene.

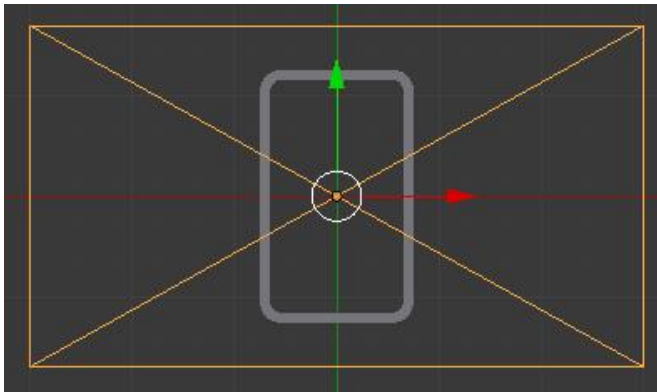


Fig. 4 Configuration camera view (Ortho)

Fig. 5 shows a general view of dimensional settings (in standby Edit Mode) at stage before starting the final render.

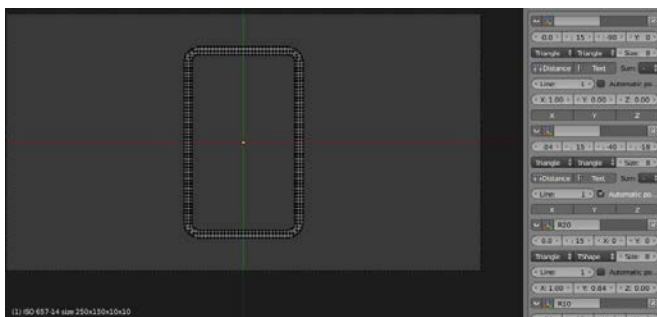


Fig. 5 General view of dimensional settings in Edit Mode

#### 4. Results and discussion

Results of sizing of the model Hot-Rolled Steel – Hot-Finished Structural Hollow Section – Rectangular Tube (Camera Ortho View; size 250x150x10x10mm; Standard ISO 657 – 14) in Blender is shown on Fig.6.

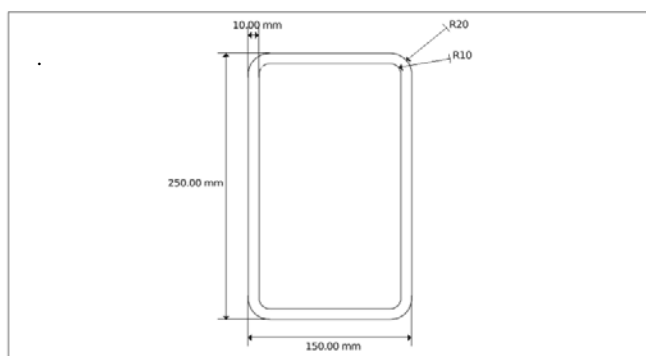


Fig. 6 Technical drawing - scheme result

In developing the technical documentation of exemplary model impresses the great importance of how the network nodes of the model are located. This is especially important when defining geometrical relationships in automatic dimensioning. This is certainly a factor that influenced the creation of any drawing (technical or architectural) of a set model. As of today (December 2015) the current version MeasureIt Addon 1.6.3 is actual, where these errors are removed in: quadview, object to vertex link, alpha for lines. Along with this there are limitations that should be noted in the set of tools necessary for designing vocational technical

documents according to standards. Despite the inconveniences the positive aspects of MeasureIt Addon are undeniable in terms of: very convenient management, well-structured functional panels, innovative approaches, very good quality of the final image and mostly successful adaptation of automatic and drafting tools, which is a breakthrough in systems of this type. Because of its specificity of a no CAD system, application MeasureIt Addon in Blender lays the foundation for a progressive beginning, which in favorable conditions can turn into a fully functional application.

#### 5. Conclusion

Blender software is one of the fastest developing systems. Originally created in the field of 3D graphics Blender gradually began to develop in many other functional areas. With its free license, easy, affordable and innovative interface, Blender boosts multiple users and developers to contribute to the positive progress of the program. The application MeasureIt Addon, specialized in the preparation of technical documentation opens new and important opportunities for designers, engineers and architects. MeasureIt Addon fills a very important segment in the system Blender, which makes the program suitable and successful choice in the realization of technical documentation.

#### 6. Literature

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