**INTRODUCTION**

In this paper, it will present the Rotary Encoder, it is electronic mechanical device that is used for converting the angular position of shaft to the electrical signals. This device is typically use for monitoring or controlling the signal such as robotics. The Rotary Encoder is drawn in the Autodesk AutoCAD version 2022, it provides a series of steps of how is done in the video. The purpose here is to demonstrate the knowledge of AutoCAD such as 2D Fundamentals, Solid Modeling, UCS, and others. The use of AutoCAD when it comes in 3D, is not ideal for engineering modelling due its difficulty than usual 3D CAD such as SolidWorks. But this is good exercise for learning the AutoCAD.

**PROJECT DESCRIPTION**

To construct the rotary encoder, first is divide into the 10-part, namely; Nuts, Rotary Thread, Washer, Weight Adjustment, Inner Knob, Knob Stem, Rotary Body, Outer Knob, Green Plastic, and Circuit Board. Each of this has separate layer, so it can modified later if wants to improve the drawing or design. The detailed steps of how to draw these parts is presented in the video. Each of the faces or edges in the 3D view such as realistic mode can be see the different colors. The black and green color are the plastic part, while the matte zinc color indicates that it is metal part.

Using the 3D Modeling tools to convert the 2D drawing into the 3D, such as the Extrude and Presspull. Since, it is difficult to draw 2D lines or shapes in the surface or edge of 3D. By using the coordinate tools, it can adjust which Origin and View direction of X and Y axis to easily draw the 2D line in that point. In the layout part, assigning different colors for labels and annotations to avoid confusion. The Linetype is usually Continuous but it will different for hidden part of line. Then for the Lineweight, the default value is 0.25 mm for most part. In the hidden is smallest of them and the dimensions. The drawing is plotted in the size of 11 in. by 8.5 in. and the printed scale is 1:1, so it can easily print in the most paper.

**PROJECT TECHNICAL REQUIREMENT / SPECIFICATION**

*Requirements:*

* Color – The 3D Drawing is assigned in white color, while the annotations, dimensions, and labels are different colors.
* Font – The font text should be different in each layout and annotation.
* Line Type – The default line type is Continuous but use HIDDEN2 for hidden view, use other type if necessary.
* Line Weight – The size should be adjusted that depends on the visibility. The hidden line is thinner than the visible line.
* Layer – Each of the 3D drawings, annotations, dimensions and labels are separated by the different layer, so it can modified later.
* Paper Size – ANSI A 11” x 8.5” letter, Landscape
* Scale – The 3D Orthographic Projection are scale the same. The annotations, dimensions, and dimensions varies depends if it fit in the layout view.
* Units – The units should use is millimeter (mm).

*Specifications:*

*Table 1: Layout Properties*

|  |  |  |  |
| --- | --- | --- | --- |
| Layout Name | Color | Linetype | Lineweight |
| All 3D drawings (Nuts, etc…) | White | Continuous | 0.25 mm |
| Dimensions | Magenta | Continuous | 0.05 mm |
| Label | Cyan | Continuous | 0.25 mm |
| Layout Annotations | Green | Continuous | 0.09 mm |
| Leader Annotations | Blue | Continuous | 0.09 mm |
| MD\_Hidden | White | HIDDEN2 | 0.05 mm |
| MD\_Hidden Narrow | White | HIDDEN2 | 0.05 mm |
| MD\_Visible | White | Continuous | 0.09 mm |
| MD\_Visible Narrow | White | Continuous | 0.09 mm |
| Note | Red | Continuous | 0.13 mm |

*Table 2: Text Format*

|  |  |  |
| --- | --- | --- |
| Layout Name | Font Style | Font Size |
| Dimensions | Txt | 0.02 |
| Layout Annotations | Roman | 0.04 |
| Leader Annotations | Cambria | 1.0 |
| Label | Arial | 0.15 |
| Note | Calibri | 0.15 |

Table 3: Dimension Style Manager

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Annotative Name | Arrow Size | Center Marks | Text Height | Offset from Dim Line | Round Off |
| Dimensions | 0.01 | 0.01 | 0.015 | 0.02 | 2-decimal |