DOWNLOAD PDF ENGINEERING DRAWING BASICS BOOK

Chapter 1 : Engineering Drawing - Basant Agrawal - Google Books

Objective: To equip students with basic skills required in engineering drawings, electrical circuit diagrams, and communication. Course Purpose and forms of communication; technical communication, report writing, drawing.

Figure 16 - Pillow Block. This is how the remaining rear section would look. Diagonal lines cross-hatches show regions where materials have been cut by the cutting plane. Figure 17 - Section "A-A". This cross-sectional view section A-A, figure 17 , one that is orthogonal to the viewing direction, shows the relationships of lengths and diameters better. These drawings are easier to make than isometric drawings. Seasoned engineers can interpret orthogonal drawings without needing an isometric drawing, but this takes a bit of practice. The top "outside" view of the bearing is shown in figure It is an orthogonal perpendicular projection. Notice the direction of the arrows for the "A-A" cutting plane. Figure 18 - The top "outside" view of the bearing. Half-Sections A half-section is a view of an object showing one-half of the view in section, as in figure 19 and Figure 19 - Full and sectioned isometric views. Figure 20 - Front view and half section. The diagonal lines on the section drawing are used to indicate the area that has been theoretically cut. These lines are called section lining or cross-hatching. The lines are thin and are usually drawn at a degree angle to the major outline of the object. The spacing between lines should be uniform. A second, rarer, use of cross-hatching is to indicate the material of the object. One form of cross-hatching may be used for cast iron, another for bronze, and so forth. More usually, the type of material is indicated elsewhere on the drawing, making the use of different types of cross-hatching unnecessary. Figure 21 - Half section without hidden lines. Usually hidden dotted lines are not used on the cross-section unless they are needed for dimensioning purposes. Also, some hidden lines on the non-sectioned part of the drawings are not needed figure 12 since they become redundant information and may clutter the drawing. Sectioning Objects with Holes, Ribs, Etc. The cross-section on the right of figure 22 is technically correct. However, the convention in a drawing is to show the view on the left as the preferred method for sectioning this type of object. Figure 22 - Cross section. Dimensioning The purpose of dimensioning is to provide a clear and complete description of an object. A complete set of dimensions will permit only one interpretation needed to construct the part. Dimensioning should follow these guidelines. Definitions and Dimensions The dimension line is a thin line, broken in the middle to allow the placement of the dimension value, with arrowheads at each end figure Figure 23 - Dimensioned Drawing. An arrowhead is approximately 3 mm long and 1 mm wide. That is, the length is roughly three times the width. An extension line extends a line on the object to the dimension line. The first dimension line should be approximately 12 mm 0. Extension lines begin 1. A leader is a thin line used to connect a dimension with a particular area figure Figure 24 - Example drawing with a leader. A leader may also be used to indicate a note or comment about a specific area. When there is limited space, a heavy black dot may be substituted for the arrows, as in figure Also in this drawing, two holes are identical, allowing the "2x" notation to be used and the dimension to point to only one of the circles. Where To Put Dimensions The dimensions should be placed on the face that describes the feature most clearly. Examples of appropriate and inappropriate placing of dimensions are shown in figure Figure 25 - Example of appropriate and inappropriate dimensioning. In order to get the feel of what dimensioning is all about, we can start with a simple rectangular block. With this simple object, only three dimensions are needed to describe it completely figure There is little choice on where to put its dimensions. Figure 26 - Simple Object. We have to make some choices when we dimension a block with a notch or cutout figure It is usually best to dimension from a common line or surface. This can be called the datum line of surface. This eliminates the addition of measurement or machining inaccuracies that would come from "chain" or "series" dimensioning. Notice how the dimensions originate on the datum surfaces. We chose one datum surface in figure 27, and another in figure As long as we are consistent, it makes no difference. We are just showing the top view. Figure 27 - Surface datum example. Figure 28 - Surface datum example. In figure 29 we have shown a hole that we have chosen to dimension on the left side of the object. Figure 29 - Exampled of a dimensioned hole. When the left side of the block is "radiuses" as in figure 30, we break our rule that we should not duplicate dimensions. The total length

is known because the radius of the curve on the left side is given. Then, for clarity, we add the overall length of 60 and we note that it is a reference REF dimension. This means that it is not really required. Figure 30 - Example of a directly dimensioned hole. Somewhere on the paper, usually the bottom, there should be placed information on what measuring system is being used e. Figure 31 - Example of a directly dimensioned hole. This drawing is symmetric about the horizontal centerline. Centerlines chain-dotted are used for symmetric objects, and also for the center of circles and holes. We can dimension directly to the centerline, as in figure In some cases this method can be clearer than just dimensioning between surfaces. This is one of over 2, courses on OCW. Find materials for this course in the pages linked along the left. No enrollment or registration. Freely browse and use OCW materials at your own pace. Knowledge is your reward. Use OCW to guide your own life-long learning, or to teach others. Download files for later. Send to friends and colleagues. Modify, remix, and reuse just remember to cite OCW as the source.

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