



Visualization Chapter 6

Assembly Drawings

Assembly Drawings

Sometimes engineering drawings, especially those showing an assembled product, become very complicated. In order to see all the details, a special type of drawing called a section view is created. Section views are used to expose internal features. They are drawn as if someone has removed part of the object, or even cut the entire object in half, so that you can see the hidden features.

In detailed drawings with sections, standard symbols, sometimes called hatch patterns, cross-hatching, or section lining, have been created to indicate specific materials. These help you visualize what the complete object looks like, and show exactly what it is made of. Organizations such as ANSI (the American National Standards Institute) have created standard symbols for everything from plastic to steel and even leather and concrete.

Since there are hundreds, if not thousands, of materials used to create products, there cannot be an individual symbol for every material. Sometimes new patterns are created, and sometimes a simple pattern of parallel 45° lines is used in place of a material that does not have its own standard pattern. In these exercises, you will look at a variety of standard symbols. You will also have the opportunity to create some symbols of your own.

Exercises

Exercise 1

On the next page is an example of an assembly drawing that has a section view to help you see the interior details that you could not otherwise see. Notice that the views are lined up orthographically, top to bottom and side to side.

List the number of different materials you see in the section view. Keep in mind that if two separate parts are made of the same material, they will have the same pattern. Determine if the patterns make it easier to identify individual parts in the assembly.

Although the lines in these hatch patterns are typically drawn at 45°, the pattern itself should never be parallel or perpendicular to other patterns or to visible (solid) lines of the object, to prevent confusion between adjacent parts and between which lines are part of the pattern and which lines are part of the outline of the object. Are all of the patterns on this drawing at 45°?

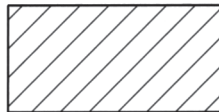


Visualization Chapter 6

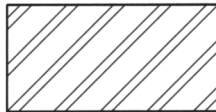
Assembly Drawings

Exercise 2

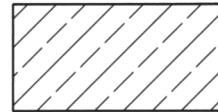
Here are examples of ANSI standard section lines, or hatch patterns, for a variety of materials.



(A) Cast or malleable iron and general use for all materials



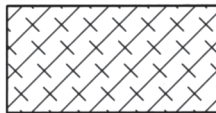
(B) Steel



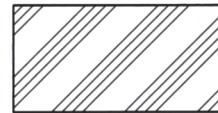
(C) Bronze, brass, copper, and compositions



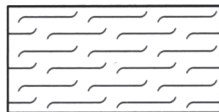
(D) White metal, zinc, lead, babbitt, and alloys



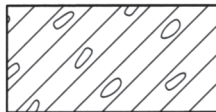
(E) Magnesium, aluminum, and aluminum alloys



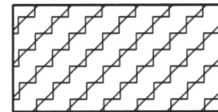
(F) Rubber, plastic, and electrical insulation



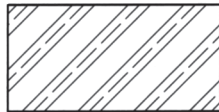
(G) Cork, felt, leather and fiber



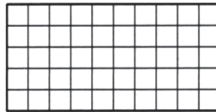
(H) Sound insulation



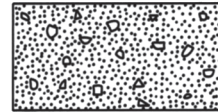
(I) Thermal insulation



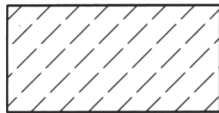
(J) Titanium and refractory material



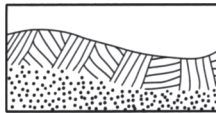
(K) Electric windings, electromagnets, resistance, etc.



(L) Concrete



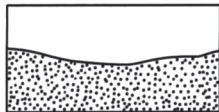
(M) Marble, slate, glass, porcelain, etc.



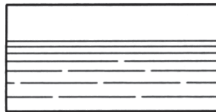
(N) Earth



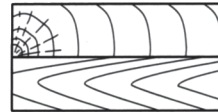
(O) Rock



(P) Sand



(Q) Water and other liquids



(R) Cross grain > With grain > Wood

Reprinted from "Technical Graphics Communication, Fourth Edition" by Gary R. Bertoline, Eric N. Wiebe, Nathan W. Hartman, and William A. Ross, by permission of The McGraw-Hill Companies.



Visualization Chapter 6

Assembly Drawings

Determine if any of the patterns actually look like the materials they represent. List which ones do and which ones do not. For three of the ones you think do not look like the materials they represent, sketch the ANSI section lines as they are given, then beside it sketch your idea for a different pattern. Next, pick three materials that are not represented in the examples and sketch your ideas of good representative patterns for them. Explain in a few sentences why you think your patterns represent the materials you chose.

