

## Welcome

Welcome to the November/December issue of MechNEWS™, a service provided by MechSigma Consulting, Inc. In this issue, we discuss the differences between first-angle and third-angle orthographic projection.

We hope you enjoy this issue of MechNEWS™ and continue to [tell your colleagues about it](#).

### Orthographic Projection<sup>1</sup>

The *engineering drawing* is one of the most important communication tools that an engineering company possesses. Although some companies use three-dimensional (3-D) computer aided design databases to produce parts, many companies are still using traditional two-dimensional (2-D) drawings.

The earliest known technical drawing (a plan view of a fortress) was created about 4000 BC but the practice of drawing views of an object on projection planes was not developed until the early part of the fifteenth century. Three hundred years later, Gaspard Monge (9 May 1746 - 28 July 1818) introduced two planes of projection at right angles to each other for graphical description of solid objects. He generalized these techniques into a system called *géométrie descriptive*, which is now known as orthographic projection.

Monge's *first-angle* orthographic projection is common in Europe and Asia. In the late nineteenth century, most companies in the United States switched to *third-angle* projection. The names *first* and *third* designate the 3-D quadrant that the object is placed in Figure 1.

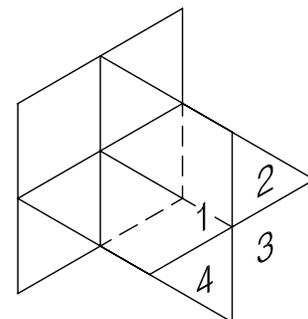


Figure 1

(Continued)

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MechNEWS™, contact us at:

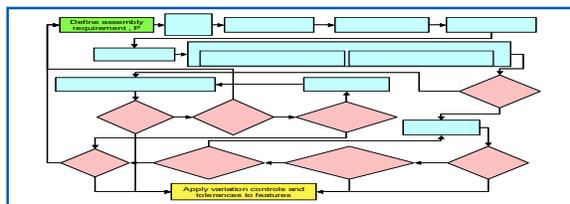
[NEWS@mechsigma.com](mailto:NEWS@mechsigma.com)

### Events:

The next meeting of the Y14 Committee is scheduled for the week of February 5, 2007, at the Helmsley Sandcastle Hotel in Sarasota, Florida. These meetings are open to the public.

### Mechanical Tolerancing Methodology

We offer a comprehensive methodology, *MechPRO™*, that takes your assembly tolerance requirements and automatically defines the (GD&T) controls and allowable tolerances to control part variation to Six Sigma quality. We offer: an analysis software tool, *MechTOL™*; a database software tool, *MechDATA™*, and a three-day workshop to support this methodology.



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### Need Help?

MechSigma offers on-site training in mechanical tolerancing and GD&T.

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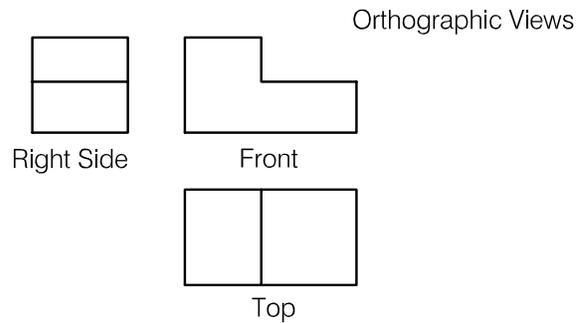
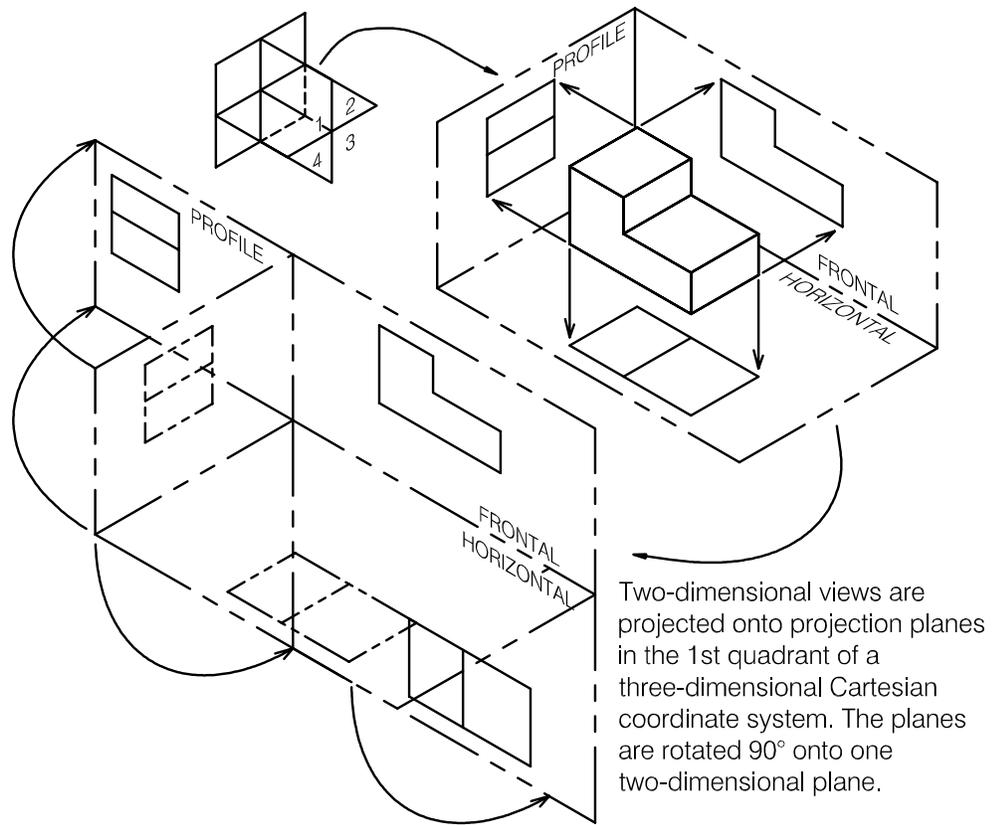


1. Most of the material for this article is taken from Pat McCuiston's *Drawing Interpretation* chapter in *Dimensioning and Tolerancing Handbook* (ISBN 0-07-018131-4).

## First-Angle Projection

In first-angle projection, the object is placed in the first quadrant identified in Figure 1. The object appears between the observer and the coordinate viewing planes on which the object is orthogonally projected. As the planes unfold, the top view is shown below the front view and the right side view is shown on the left side of the front view. See Figure 2. If other views were shown, the bottom view is shown on the top and the left side view is shown on the right.

*(Continued)*



**Figure 2**

## Joke of the Bi-Month

A man in Phoenix calls his son in New York the day before his wife's birthday and says, "I hate to ruin your day, but I have to tell you that your mother and I are divorcing; forty-five years of misery is enough."

"Pop, what are you talking about?" the son screams.

"We can't stand the sight of each other any longer," the father says. "We're sick of each other, and I'm sick of talking about this, so you call your sister in Chicago and tell her."

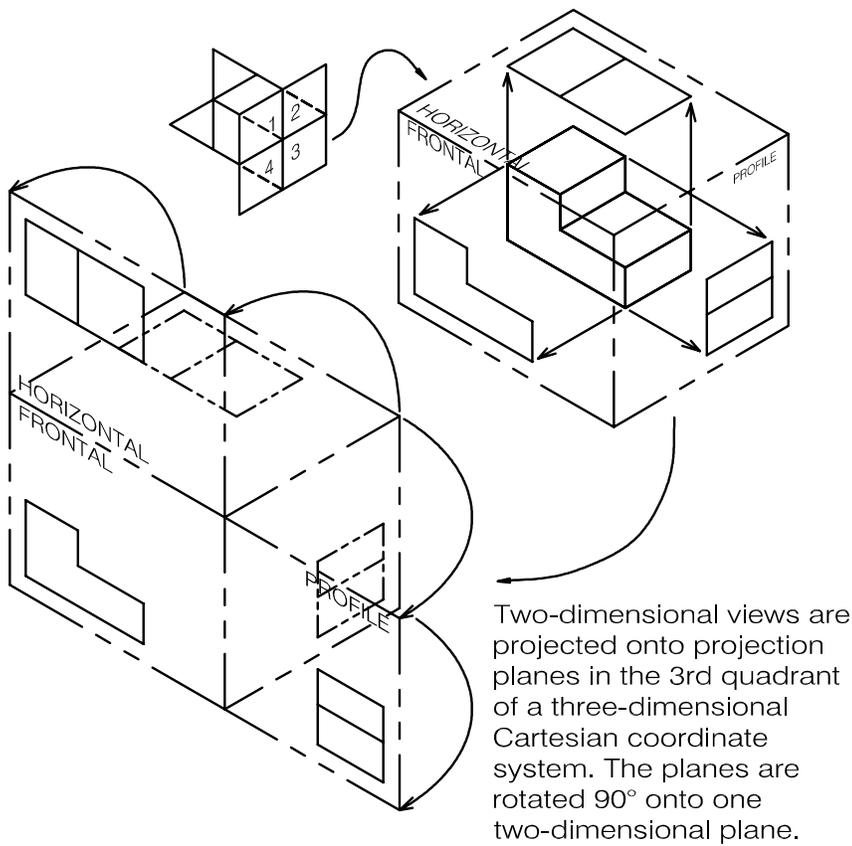
Frantic, the son calls his sister, who explodes on the phone. "Like heck they're getting divorced," she shouts, "I'll take care of this." She calls Phoenix immediately, and screams at her father, "You are NOT getting divorced. Don't do a single thing until I get there. I'm calling my brother back, and we'll both be there tomorrow. Until then, don't do a thing, DO YOU HEAR ME?" and hangs up.

The old man hangs up his phone and turns to his wife. "Okay" he says, "they're coming for your birthday and paying their own way."



## Third-Angle Projection

In third-angle projection, the object is placed in the third quadrant identified in Figure 1. The object appears behind the coordinate viewing planes on which the object is orthogonally projected. As the planes unfold, the top view is shown above the front view and the right side view is shown on the right side of the front view. See Figure 3. If other views were shown, the bottom view is shown on the bottom and the left side view is shown on the left.



### Orthographic Views

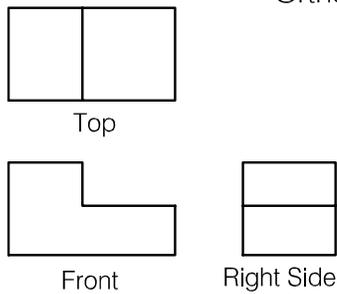


Figure 3

## Summary

With the globalization of product design and manufacture, it is necessary to understand the drafting practices of different countries and organizations. The practices that we use in the US may not be the same as those in Europe. ANSI standards may or may not be similar to ISO standards. The method of projecting views should be indicated on the drawing. The drawing title block should contain one of the two symbols shown in Figure 4 to indicate first-angle or third-angle projection.

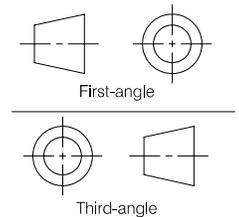


Figure 4