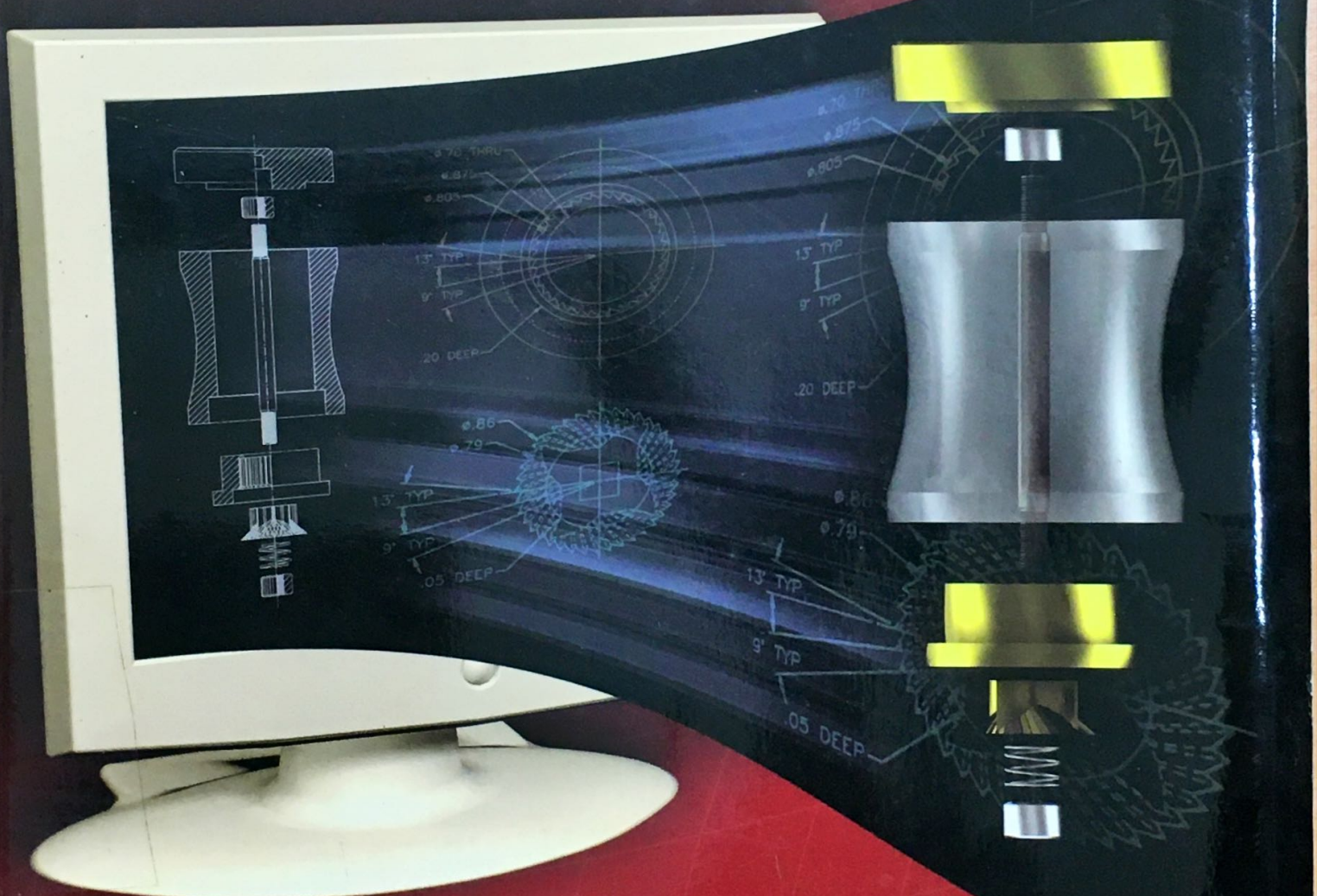
APPLYING AutoCAD® 2002 ADVANCED



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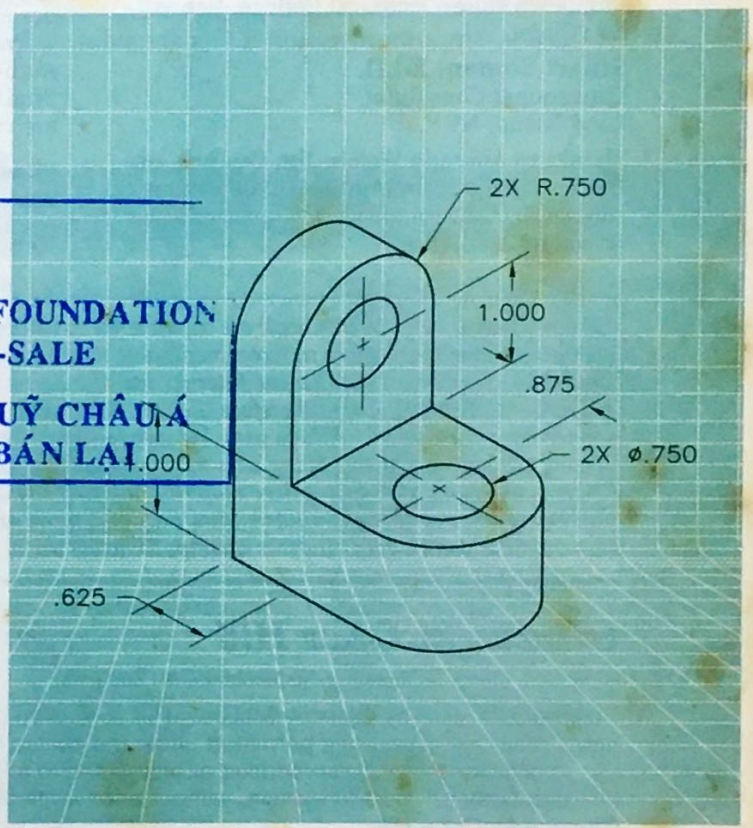
TERRY T. WOHLERS

APPLYING AutoCAD® 2002 ADVANCED

Terry T. Wohlers



Applying AutoCAD 2002: Advanced is a textbook for those who wish to learn how to use AutoCAD software. AutoCAD is a computer-aided drafting and design package produced by Autodesk, Inc. For information on how to obtain AutoCAD software, contact Autodesk.

This text was created using the AutoCAD® 2002 software.

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Reviewers & Contributors:

John M. Felser
Pompano Beach High School
Pompano Beach, FL

Don Grout, Ed.D.
Professor, retired, Champlain College
Burlington, VT

Gary J. Hordemann
Professor and Chair
Department of Mechanical Engineering
Gonzaga University
Spokane, WA

Wayne Samuelson
Chippewa Valley Technical College, Retired
Eau Claire, WI

Stuart Soman, Ed.D.
Educational Consultant
Long Island, NY

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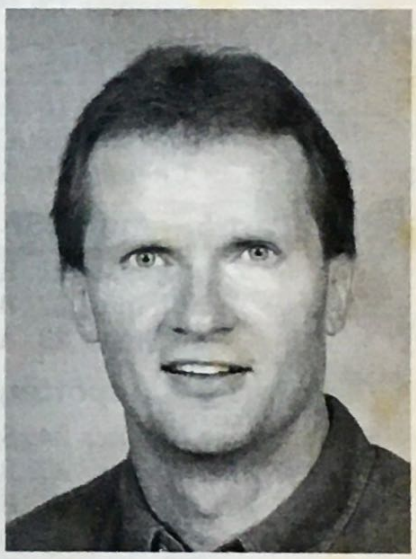
Applying AutoCAD Expands into Two Books

Since the first edition was published in 1986, ***Applying AutoCAD*** has provided clear, step-by-step instruction in using the AutoCAD® computer-aided drafting and design software. Now, that tradition continues in a new, more convenient format.

- ***Applying AutoCAD 2002: Fundamentals*** is targeted for those who are new to AutoCAD. It covers the AutoCAD commands and functions used to create, edit, store, and print engineering drawings.
- ***Applying AutoCAD 2002: Advanced*** assumes a basic knowledge of AutoCAD. It covers surface modeling, rendering, and solid modeling. This edition also provides instruction in customizing AutoCAD's menus, introduces AutoLISP, and explains how to use AutoCAD's commands and features to import, export, and share files.

About the Author



For more than two decades, Terry Wohlers has focused his education, research, and practice on design and manufacturing. He has authored more than 250 books, articles, reports, and technical papers on engineering and manufacturing automation. He has presented to thousands of engineers and managers and has been a keynote speaker at major industry events in Asia, Europe, the Middle East, North and South America, and South Africa.

Wohlers is a renowned CAD educator. He developed and taught the first graduate and undergraduate courses on CAD at Colorado State University in 1983. Since then, he has taught many courses and given countless lectures on CAD and related subjects. In 1986, he founded Wohlers Associates, Inc., an independent consulting firm that provides organizations with technical and strategic advice on the new developments and trends in CAD/CAM, rapid prototyping, and manufacturing.

He was also the author and instructor of the first self-instructional university independent study courses on AutoCAD and CADKEY. An estimated 2,000 practicing design professionals from around the world have enrolled in them.

Wohlers holds an affiliate faculty position at Colorado State University's Department of Manufacturing Technology & Construction Management and has worked on various projects in cooperation with the university's Department of Mechanical Engineering.

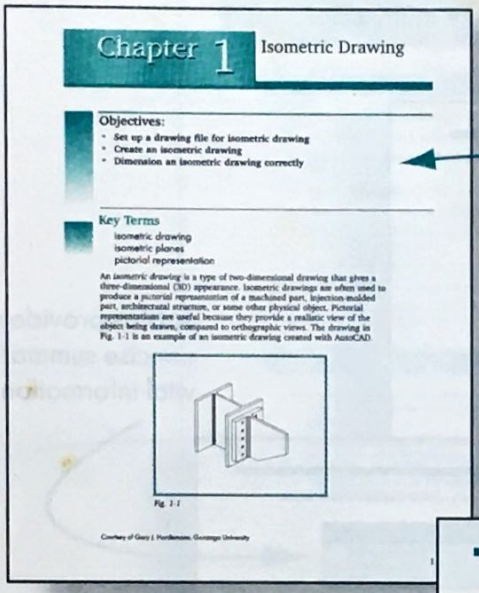
Contents in Brief

APPLYING AutoCAD® 2002 ADVANCED

User's Guide

A Practical Approach

Applying AutoCAD 2002: Advanced presents each advanced feature of the AutoCAD® 2002 software in a logical, sequential format. You will build skills as you read about and apply techniques, solve problems, and practice computer-aided drafting and design.


Chapter 1 Isometric Drawing

Objectives:
- Set up a drawing file for isometric drawing
- Create an isometric drawing
- Dimension an isometric drawing correctly

Key Terms
isometric drawing
isometric planes
pictorial representation

An isometric drawing is a type of two-dimensional drawing that gives a three-dimensional (3D) appearance. Isometric drawings are often used to produce a pictorial representation of a machined part, injection-molded part, architectural structure, or some other physical object. Pictorial representations are useful because they provide a realistic view of the object being drawn, compared to orthographic views. The drawing in Fig. 1-1 is an example of an isometric drawing created with AutoCAD.

Fig. 1-1

Courtesy of Gary J. Hoffenstein, Gonzaga University

Each chapter begins with **objectives and key terms.** The content consists of step-by-step exercises that present key concepts based on the chapter's objectives.

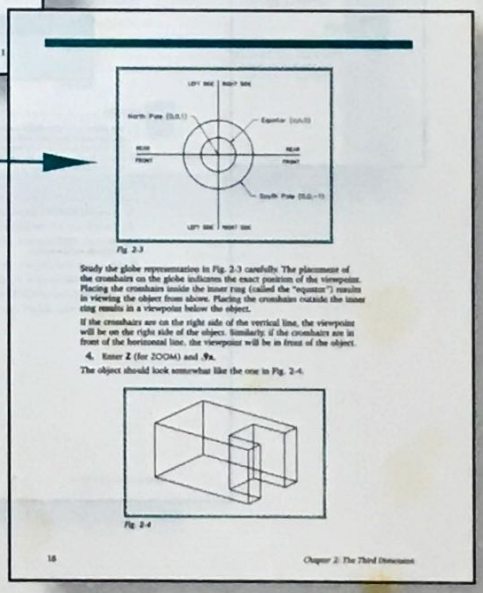


Fig. 2-3

Study the globe representation in Fig. 2-3 carefully. The placement of the crosshairs on the globe indicates the exact position of the viewpoint. Placing the crosshairs inside the inner ring (called the "equator") results in viewing the object from above. Placing the crosshairs outside the inner ring results in a viewpoint below the object.

If the crosshairs are on the right side of the vertical line, the viewpoint will be on the right side of the object. Similarly, if the crosshairs are in front of the horizontal line, the viewpoint will be in front of the object.

4. Enter **Z** (for ZOOM) and **.9x**.

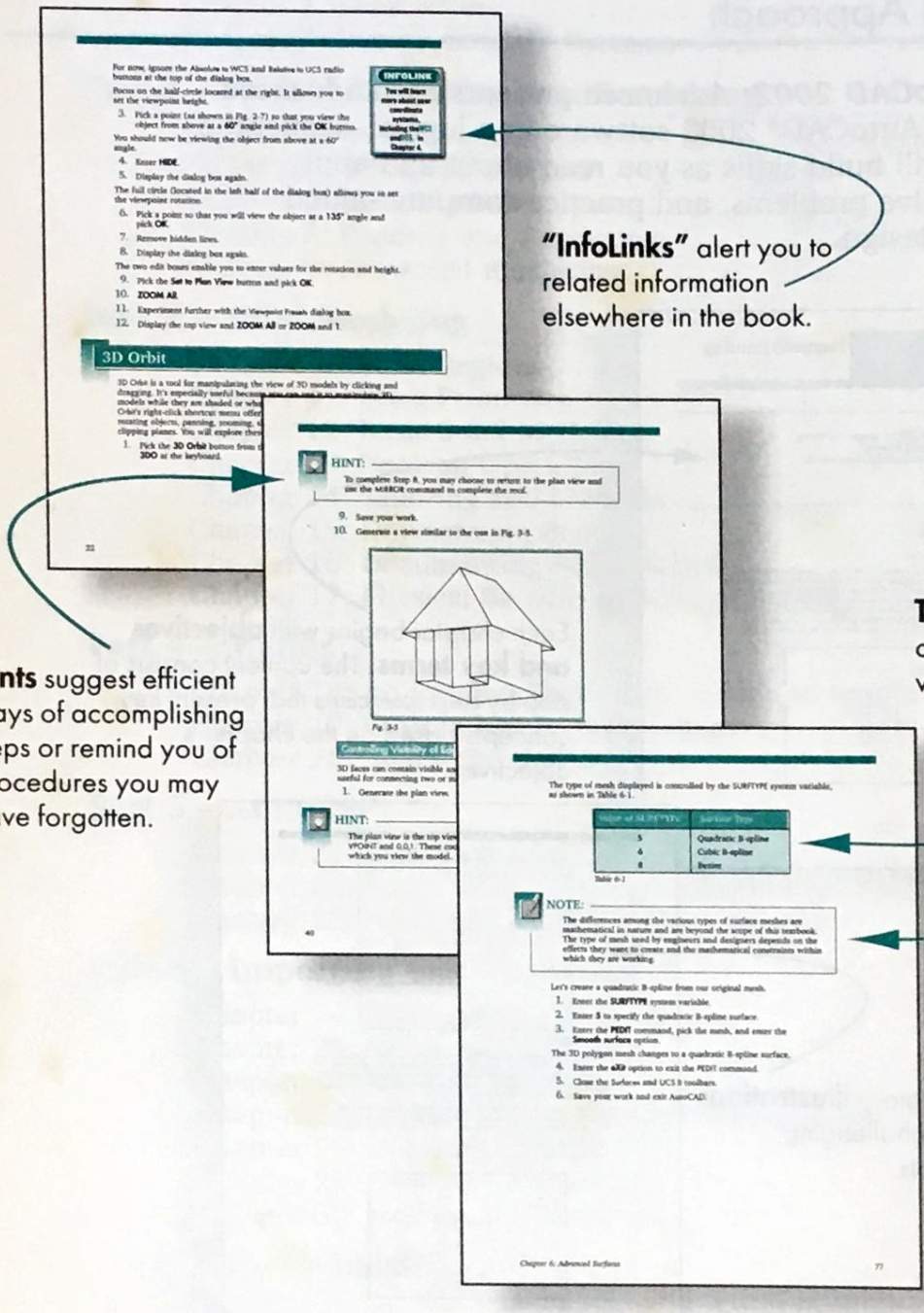
The object should look somewhat like the one in Fig. 2-4.

Fig. 2-4

18 Chapter 2: The Third Dimension

Explanatory **illustrations** clarify challenging concepts.

User's Guide (Continued)



"InfoLinks" alert you to related information elsewhere in the book.

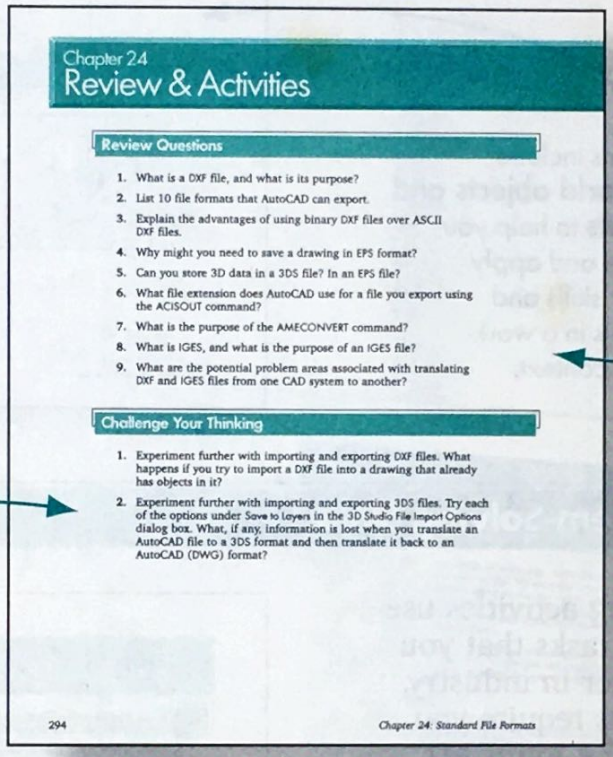
Hints suggest efficient ways of accomplishing steps or remind you of procedures you may have forgotten.

Tables provide clear, concise summaries of vital information.

Notes placed throughout the chapters highlight relevant information and identify alternate commands or methods available to perform a function.

Chapter Review & Activities

Each chapter concludes with activities that review, reinforce, and expand learning.



Chapter 24
Review & Activities

Review Questions

1. What is a DXF file, and what is its purpose?
2. List 10 file formats that AutoCAD can export.
3. Explain the advantages of using binary DXF files over ASCII DXF files.
4. Why might you need to save a drawing in EPS format?
5. Can you store 3D data in a 3DS file? In an EPS file?
6. What file extension does AutoCAD use for a file you export using the ACISOUT command?
7. What is the purpose of the AMECONVERT command?
8. What is IGES, and what is the purpose of an IGES file?
9. What are the potential problem areas associated with translating DXF and IGES files from one CAD system to another?

Challenge Your Thinking

1. Experiment further with importing and exporting DXF files. What happens if you try to import a DXF file into a drawing that already has objects in it?
2. Experiment further with importing and exporting 3DS files. Try each of the options under Save to Layers in the 3D Studio File Import Options dialog box. What, if any, information is lost when you translate an AutoCAD file to a 3DS format and then translate it back to an AutoCAD (DWG) format?

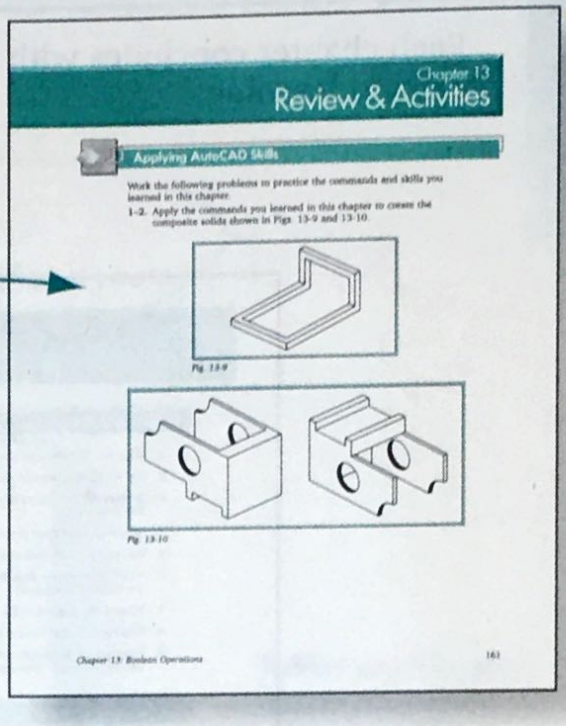
294 *Chapter 24: Standard File Formats*

Review Questions at the end of each chapter allow you to check your comprehension of basic chapter content.

Challenge Your Thinking questions require you to reason, research, and explore concepts in further detail.

Applying AutoCAD Skills

Problems at the end of each chapter help you gauge your understanding of the skills taught in the chapter.


Chapter 13
Review & Activities

Applying AutoCAD Skills

Work the following problems to practice the commands and skills you learned in this chapter.

1–2. Apply the commands you learned in this chapter to create the composite solids shown in Figs. 13-9 and 13-10.

Fig. 13-9

Fig. 13-10

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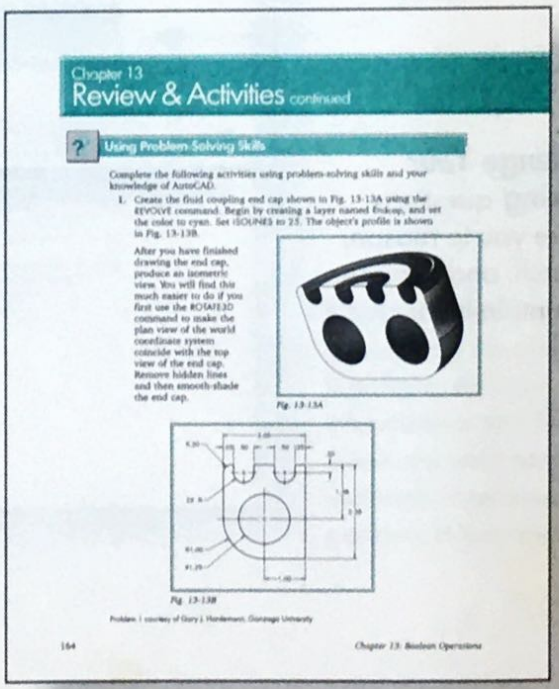
Problems include **real-world objects and concepts** to help you practice and apply chapter skills and concepts in a work-related context.

Using Problem-Solving Skills

Problem-solving activities use representative tasks that you might encounter in industry. These problems require you to synthesize the AutoCAD skills presented throughout the text to arrive at practical solutions.


Chapter 13
Review & Activities continued

Using Problem-Solving Skills

Complete the following activities using problem-solving skills and your knowledge of AutoCAD.

1. Create the fluid coupling end cap shown in Fig. 13-13A using the REVOLVE command. Begin by creating a layer named Enclosp, and set the color to cyan. Set ISOLINES to 25. The object's profile is shown in Fig. 13-13B.

After you have finished drawing the end cap, produce an isometric view. You will find this much easier to do if you first use the ROTATE3D command to make the plan view of the world coordinate system coincide with the top view of the end cap. Remove hidden lines and then smooth-shade the end cap.

Fig. 13-13A

Fig. 13-13B

Problem 1 courtesy of Gary J. Hondermarck, Gonzaga University

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