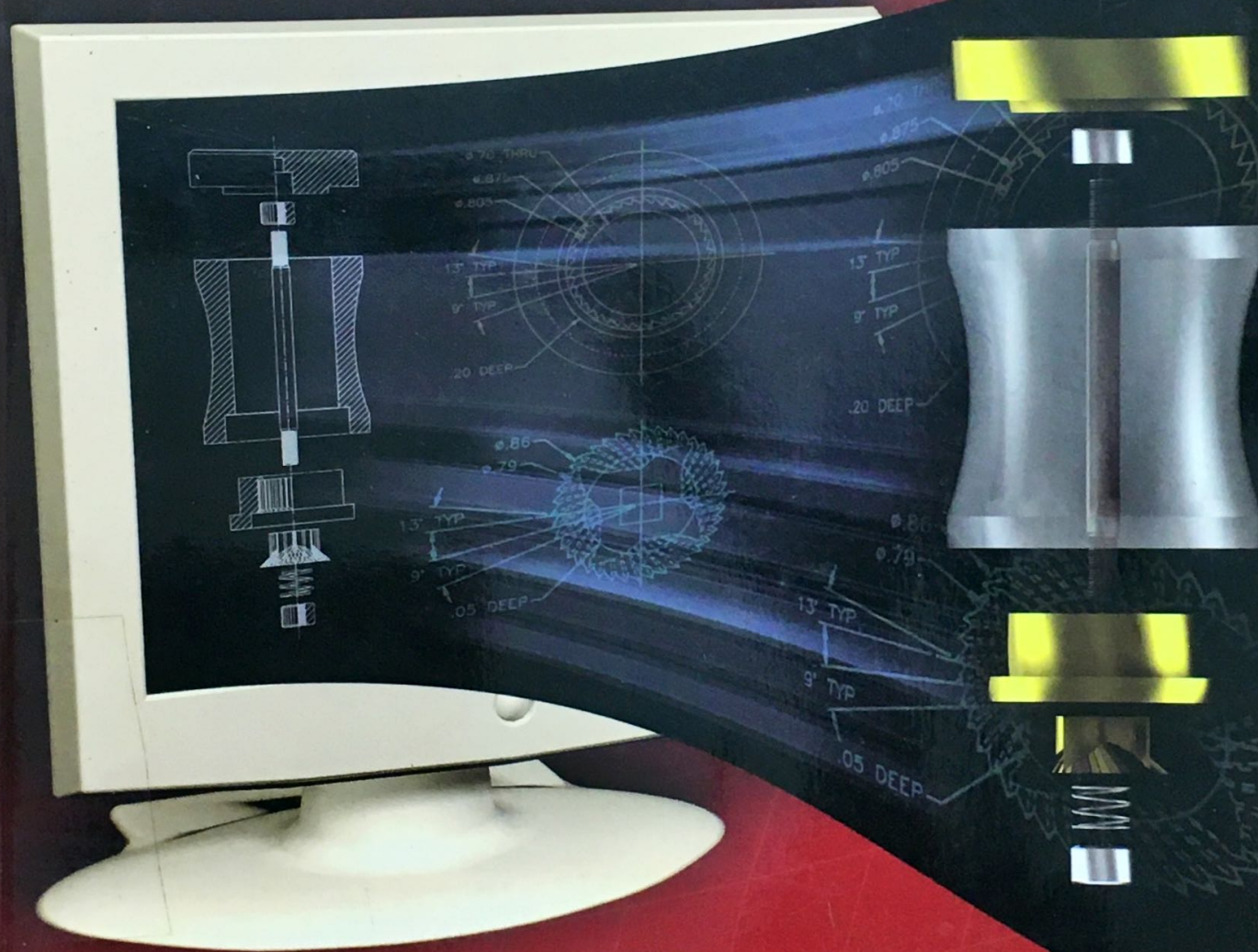


APPLYING

AutoCAD[®] 2002

A D V A N C E D



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TERRY T. WOHLERS

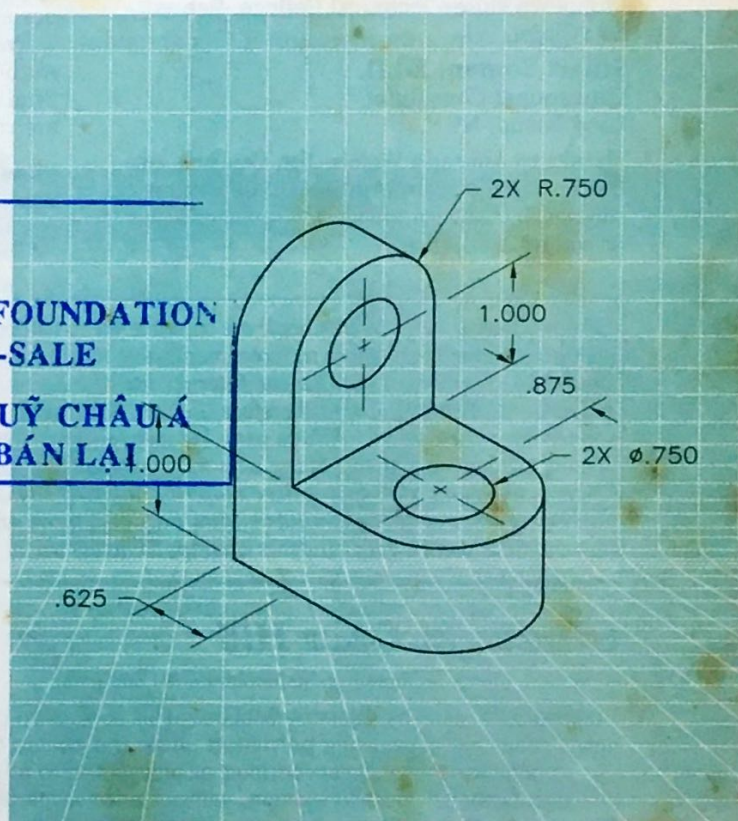
APPLYING AutoCAD® 2002 ADVANCED

Terry T. Wohlers

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KHÔNG ĐƯỢC BÁN LẠI

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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Thanks to **Amanda Welch, Jim Quanci, and the members of the AutoCAD 2002 team at Autodesk, Inc.**, for answering questions and providing assistance.

Published with the assistance of
Publishing Advisory Services, Inc.

Cover design by Pudik Graphics, Inc.
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Send all inquiries to:
Glencoe/McGraw-Hill
3008 W. Willow Knolls Drive
Peoria, IL 61614

ISBN 0-07-828542-9 (Student text, Advanced)

Printed in the United States of America.

3 4 5 6 7 8 9 10 009 06 05 04 03

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.



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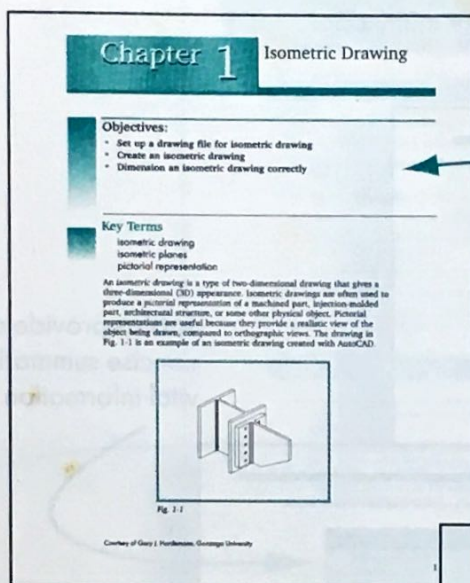
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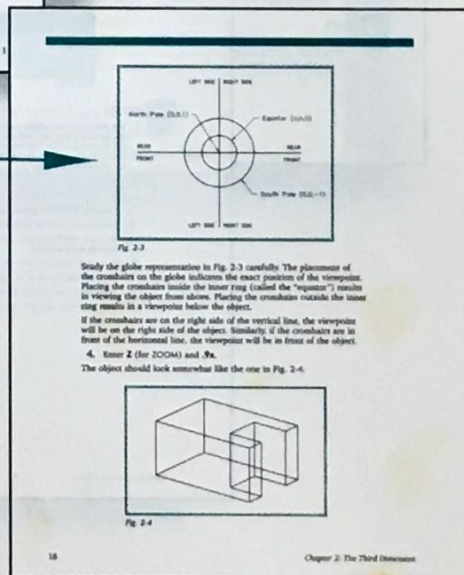
A Practical Approach

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.



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.

Explanatory **illustrations** clarify challenging concepts.



User's Guide (Continued)

For now, ignore the Absolute to WCS and Relative to UCS radio buttons at the top of the dialog box.

Focus on the half-circle located at the right. It allows you to set the viewpoint height.

3. Pick a point (as shown in Fig. 2-7) so that you view the object from above at a 60° angle and pick the **OK** button.

You should now be viewing the object from above at a 60° angle.

4. Enter **HIDE**.

5. Display the dialog box again.

The full circle (located in the left half of the dialog box) allows you to set the viewpoint rotation.

6. Pick a point so that you will view the object at a 135° angle and pick **OK**.

7. Remove hidden lines.

8. Display the dialog box again.

The two edit boxes enable you to enter values for the rotation and height.

9. Pick the **Set to Plan View** button and pick **OK**.

10. **3D Orbit**.

11. Experiment further with the Viewpoint Fringe dialog box.

12. Display the top view and **3D Orbit** or **3D Orbit** and 1.

22

3D Orbit

3D Orbit is a tool for manipulating the view of 3D models by clicking and dragging. It's especially useful because it allows you to view 3D models while they are shaded or wireframe. Orbi's right-click shortcut menu offers rotating objects, panning, zooming, and clipping planes. You will explore these features in later chapters.

1. Pick the **3D Orbit** button from the **3D** toolbar.

2. Pick the **3D Orbit** button from the **3D** toolbar.

3. Pick the **3D Orbit** button from the **3D** toolbar.

4. Pick the **3D Orbit** button from the **3D** toolbar.

5. Pick the **3D Orbit** button from the **3D** toolbar.

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37. Pick the **3D Orbit** button from the **3D** toolbar.

38. Pick the **3D Orbit** button from the **3D** toolbar.

39. Pick the **3D Orbit** button from the **3D** toolbar.

40. Pick the **3D Orbit** button from the **3D** toolbar.



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



HINT:

To complete Step 8, you must choose to return to the plan view and use the **MIRROR** command to complete the model.

9. Save your work.

10. Generate a view similar to the one in Fig. 3-5.

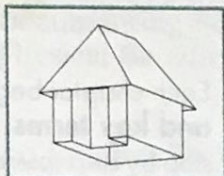


Fig. 3-5

Controlling Visibility of Edges

3D faces can contain visible and invisible edges. These edges are useful for connecting two or more faces.

1. Generate the plan view.

2. Generate the plan view.

3. Generate the plan view.

4. Generate the plan view.

5. Generate the plan view.

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39. Generate the plan view.

40. Generate the plan view.

The type of mesh displayed is controlled by the **SURFTYPE** system variable, as shown in Table 6-1.

Value of SURFTYPE	Surface Type
5	Quadratic B-spline
6	Cubic B-spline
8	Bezier

Table 6-1



NOTE:

The differences among the various types of surface meshes are mathematical in nature and are beyond the scope of this textbook. The type of mesh used by engineers and designers depends on the effects they want to create and the mathematical constraints within which they are working.

Let's create a quadratic B-spline from our original mesh.

1. Enter the **SURFTYPE** system variable.

2. Enter 5 to specify the quadratic B-spline surface.

3. Enter the **PEDIT** command, pick the mesh, and enter the **Smooth** surface option.

The 3D polygon mesh changes to a quadratic B-spline surface.

4. Enter the **EXIT** option to exit the **PEDIT** command.

5. Close the **Surface** and **UCS** toolbars.

6. Save your work and exit AutoCAD.

7. Save your work and exit AutoCAD.

8. Save your work and exit AutoCAD.

9. Save your work and exit AutoCAD.

10. Save your work and exit AutoCAD.

11. Save your work and exit AutoCAD.

12. Save your work and exit AutoCAD.

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20. Save your work and exit AutoCAD.

21. Save your work and exit AutoCAD.

22. Save your work and exit AutoCAD.

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.

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

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?

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

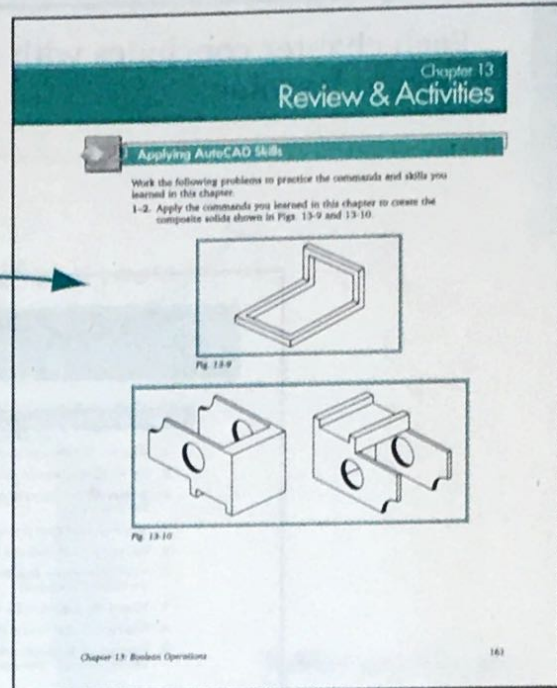
User's Guide (Continued)



Applying AutoCAD Skills

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

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.

