3-D WORLD

News For The CADKEY/DataCAD User

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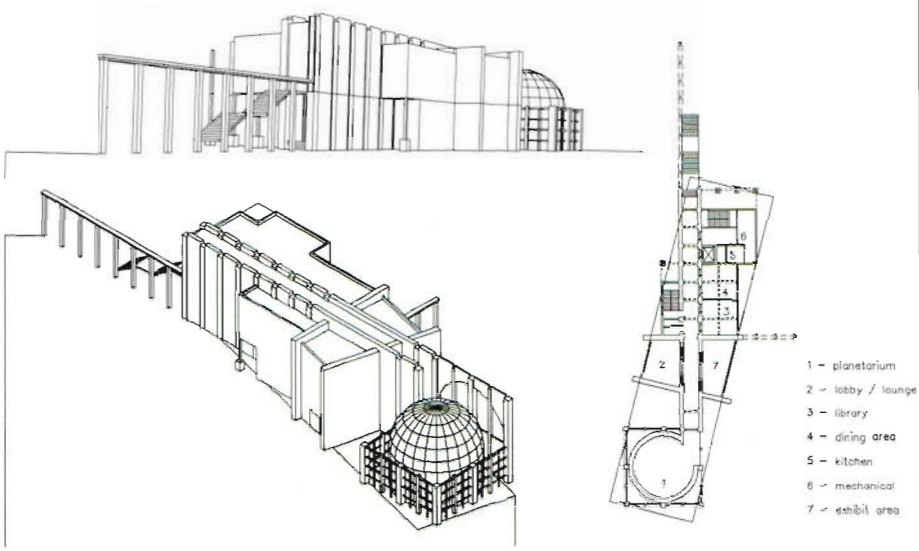

Planetarium designed by Laura Doty. Upper left: Entry perspective. Lower left: Axonometric view. Right: Plan view.

DataCAD Design Competition Terrific Success!

Laura Doty, a student in the School of Architecture at the University of Arkansas, Fayetteville, Arkansas, won $1,000 and a complete DataCAD system as first prize among the 175 entrants in ***Opening New Doors***, the architectural design competition sponsored jointly by the American Institute of Architecture Students (AIAS) and CADKEY, INC. The competition, which began on December 1, 1989, challenged student architects to complete the design of a full-scale building project by March 28, 1990, using DataCAD software. The judging took place on April 4, 1990 at the AIAS headquarters in Washington, D.C. Laura designed a planetarium. The building includes office space, exhibition space, a library, kitchen, and dining areas in addition to the planetarium itself. The actual planetarium features a hemispherical ceiling composed of 12 movable metal sections that can be opened for directly viewing stars on clear nights.

Laura noted in the abstract which accompanied her entry that she wanted to explore both the fictional and the factual scientific ideas that have emerged over time from man's interest in the stars. "The planetarium is a place of intrigue," she wrote, "for the educated researchers as well as those who simply enjoy the beauty of the heavens." Laura organized the garden in which the planetarium resides according to the constellation Cygnus the Swan, commonly known as the Northern Cross. She selected this constellation,

(Continued on page 2)

With More Than 50 New Features... DataCAD(R) (Version 4.0) Debuts at A/E/C Systems '90!

CADKEY, INC. reinforced DataCAD(R)'s claim to the title of ***The Architect's Software*** with the formal introduction of DataCAD (Version 4.0) at the opening of **A/E/C Systems '90**, on June 12, 1990, in Atlanta, Georgia. This latest version of DataCAD includes more than 50 new features derived directly from suggestions by a wide range of A/E/C professional users. It also incorporates DC MODELER™, DataCAD's three-dimensional modeling program, at no extra charge.

DataCAD (Version 4.0) is based on users' desire for increased speed and simplified command sequences, according to Berry

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Design Competition

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not only for its fame in fable and song, but also as a symbol for the planetarium.

Second and third prizes went to architectural students at Catholic University of America, Washington, D.C. Kyle H. Webb took the second prize of $500 with his design of a small, urban, branch post office, on a triangular site, facing Tenlye Circle, at the intersection of Wisconsin and Nebraska Avenues in Washington, D.C. Paige Allison Pullins earned the third prize of $250 with a home designed for a 42-acre site in Virginia, with a view of the Blue Ridge Mountains in the distance.

HONORABLE MENTION awards and prizes of $100 each went to three entrants: Brian Ingham, a student at Lawrence Technological University, Southfield, Michigan, for his design of an activity bridge in a park; Wyatt Hazlett II, who is studying at Schoolcraft College, Livonia, Michigan, for his design of a residence in San Diego, California, and David C. MacDougall, a student at Roger Williams College, Bristol, Rhode Island, for his design of a single-family dwelling.

Bridge from Student to Professional

At the judging, Douglas Bailey, President of the AIAS, noted, "Our organization, by its nature, supports the further development of students and helps them to bridge the gap between being students and professionals. Programs like this one foster creativity and skill application, and they demonstrate that students' talents deserve the attention of the AIAS, the industry, and the profession."

"We have a commitment to the integration of CAD into the toolset of American architects," said Berry Taylor, A/E/C Product Group Manager at CADKEY, INC. "The conceptual and architectural elements of these winning plans clearly demonstrate the growing level of familiarity that student architects have with computer-aided design using DataCAD."

Distinguished Judges

The competition jury was composed of Charles Sappanfield, FAIA, Dean of the School of Architecture at Ball State University, Muncie, Indiana; Nora R. Klebow, AIA, of Skidmore, Owings & Merrill, a pre-eminent architectural firm in San Francisco, California; Eric Teicholz, AIA, of Graphic Systems, Inc., Cambridge, Massachusetts, and Vivian Lee, an architectural student at the Washington/Alexandria Center of Virginia Polytechnic Institute.

The competition jury evaluated each entry on the basis of exterior image and organization, interior plan and organization, and the quality of presentation. In addition to slides of the design, each entry included a copy of the files created to produce the entry and a one-page abstract of 350 words or less describing the nature of the entry.

In addition to the monetary prizes awarded to the winners and honorable mentions, their local AIAS chapters also received monetary awards: $250 to the chapter of the first-place winner; $150 to the chapters of the second and third-place winners, and $50 to the chapters of the honorable mentions.

CADKEY, INC. and the American Institute of Architecture Students have committed to sponsor this competition again in 1991, with plans to make it even bigger and better.

DataCAD (Version 4.0)

(Continued from page 1)

Taylor, A/E/C Product Group Manager. By making some editing functions more automatic, DataCAD now allows users to modify drawings more rapidly and with fewer steps. DataCAD 4.0 also incorporates a software display list which increases the speed of screen redraw, panning, zooming, and object selection while editing. Berry said that some of these operations are up to ten times faster than in previous versions of DataCAD.

More Graphics Drivers

The number of graphics cards that DataCAD supports has increased from 30 to more than 80 to accomodate a full range of hardware preferences among DataCAD users.

"Our users clearly want the speed of the program increased so that their productivity will increase as well," Berry said. "We have consistently relied on their input to determine the direction of DataCAD so that the software is a program by and for architects. Version 4.0 is a product of that philosophy."

Berry indicated that the addition of several new macros adds increased functionality to DataCAD (Version 4.0). These macros include a parametric macro for 3-D modeling of windows and doors; the Viewmaster macro which allows the user to *walk through* designs; door label and window label macros, and a 3-D stair macro among others.

DataCAD's documentation has been completely rewritten with attrasctive new packaging. It provides users with more suggestions about how to take practical advantage of the software's features. DataCAD (Version 4.0) now offers improved plotting-file

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DataCAD/Velocity™ (Version 1.2) Released

The latest version of DataCAD/Velocity™, the full-featured, DataCAD and DC Modeler-compatible rendering system, began shipping to customers as of May 15, 1990. DataCAD/Velocity now includes an improved rendering kernel to provide better performance especially for the rendering of large complex images, as well as a completely redesigned, graphics-adapter interface. DataCAD/Velocity is a joint product with Circuit Studios. Velocity is a trademark of Circuit Studios.

Increased Flexibility

DataCAD/Velocity now provides greater flexibility in defining the type and resolution of output image files. Users can now choose to render a model to the resolution of the currently installed graphics adaptor or to the resolution of any one of 20 different, 256-color, graphics adaptors; to standard film or printer resolutions, or to a user-specified type of file and resolution. Users can also choose to produce full-color (32-bit) images, compressed-color (8-bit) images, or both, for use in creating background images. This new feature is also useful for combining images to create complex layered drawings.

New Image Merging

DataCAD/Velocity's new image merging system allows users to break down extremely complex models into individual pieces for rendering. The rendered images of the individual pieces can then be merged into a rendered image of the complete model.

DataCAD/Velocity (Version 1.2) also features two new file-conversion utility programs. One translates a full-color image file to the SCODL image-file format for use with digital film recorders and hard-copy output devices. The other translates a full-color image file to the TARGA image-file format for use with other image-processing software.

For placing orders, DataCAD/Velocity's part numbers are: D155-1200 (5.25-inch disks) and D153-1200 (3.5-inch disks).

Comments from the Editor

Two Customer Surveys Reach Same Conclusion!

CADKEY users participating in two completely independent surveys, PC WEEK's **Poll of Corporate Satisfaction** and APPLIANCE MANUFACTURER's survey for **1990 Suppliers of the Year**, have conferred accolades on CADKEY, especially for the accessibility and the quality of our product support. See page 5 for stories.

There is no connection between PC WEEK, published by Ziff-Davis Publishing Company, Boston, Massachusetts, and APPLIANCE MANUFACTURER, published by Corcoran Communication, Inc., Solon, Ohio. Yet, it is significant that the CADKEY users participating in each of these surveys have highlighted CADKEY's product support.

We at CADKEY appreciate your votes of confidence.

DataCAD Users' Groups

Recently a significant number of DataCAD users have inquired about local DataCAD Users' Groups in their areas. See page 10 for a list all of the DataCAD Users' Groups of which we are aware. The next issue of **3-D WORLD** will include a listing of CADKEY Users' Groups.

See page 7 for a story about the DataCAD Users' Meeting at **A/E/C Systems '90**.

DataCAD Helps to Rebuild Armenia

The Soviet Union's Ministry of Construction has purchased 30 DataCAD(tm) systems, along with 20 copies of DC Modeler™ and DataCAD Velocity™, to assist in rebuilding the areas of Armenia devastated by the major earthquake of December 7, 1988. The Ministry of Construction obtained the software through GIXI, a CADKEY/DataCAD distributor in France which has branch offices in the Soviet Union and Czechoslovakia.

Vast Devastation

The earthquake, measuring 6.9 on the Richter scale, wreaked havoc in the mountainous northwest region of Armenia. It destroyed at least 32 mountain villages, completely demolished Spitak, a town of 20,000 people, and devastated Leninakan, a city of 290,000 people. The earthquake left an estimated 500,000 people homeless and took at least 25,000 lives.

Jean-Marc Apreleff, Marie-Christine Thély, Paul Lévêque and Jean-Paul Coulon of GIXI informed CADKEY, INC. of the project in early April 1990. "We are all very excited here at CADKEY about our DataCAD products contributing to the reconstruction of Armenia," Eileen O'Hare and Michael Piekarz, European Regional Managers respectively for CADKEY and DataCAD products, replied to GIXI.

Individuality in Rebuilding

"This is a perfect application for an A/E/C package like DataCAD," said Jeff Hall, Director of International Sales. "Considering the volume of building that the Soviets must undertake, instead of simply *cookie-cutting* the houses, they have chosen to make use of DataCAD's flexibility, and can

(Continued on page 4)

DataCAD (Version 4.0)

(Continued from page 2)

management and improved file-translation capabilities through DXF. It also allows drawings created by an architect or a designer to be shared easily with other professionals, such as engineers and draftspeople.

DC Modeler Included

Berry noted that incorporating DC Modeler with DataCAD will enable users to create more geometrically accurate images because the program allows them to draw and edit in three dimensions, and automatically converts those drawings and edits into two dimensions for plans and elevations. DC Modeler also allows users to create and edit complex, three-dimensional solid objects. Such solid models can be used to create buildings of any degree of complexity. They also assist in linking DataCAD to the newest rendering programs, including the latest release of DataCAD/Velocity™.

DataCAD (Version 4.0) runs on IBM PC/AT and compatible computers with 640K RAM and a math coprocessor. The maximum size for a drawing file has been increased from 4MB to 6MB.

DataCAD (Version 4.0) will be available for shipment to customers in August, 1990. A year-long maintenance contract is available complemented by CADKEY's full technical support and training services.

DataCAD (Version 4.0) is the eighth major release of DataCAD since the program's introduction in 1985. It is the first major release since CADKEY acquired the software from Microtecture, Inc. in 1989.

A complete modeling, design, and rendering capability composed of DataCAD (including DC Modeler), DataCAD/Velocity and a maintenance/support contract will be offered as a bundled package.

DataCAD and Armenia

(Continued from page 3)

now offer some individuality to each project," he continued. "By establishing a series of basic, almost interchangeable, building components, they can now mix and match modules to create unlimited variations."

Familiar with U.S.S.R.

GIXI has been working with government ministries and research organizations in the Soviet Union since late 1987, to expand the use of computers and CAD/CAM. During a meeting at the Ministry of Construction, GIXI introduced DataCAD as a possible solution to the ministry's unprecedented need to design new housing units and other buildings as rapidly as possible. "DataCAD is now the kernel, the nucleus, of a unified effort by nine research institutes in Armenia to make significant progress in reconstruction," said Jean-Marc Apreleff of GIXI. "DataCAD gives our Armenian friends the best design tools adapted to their specific needs. They will use DataCAD in conjunction with mathematical software that they have developed themselves." The development center for this massive rebuilding project is located in Erevan, the capital of the Armenian Soviet Socialist Republic.

"There are other software products with greater name recognition, but none is more respected in the architectural community than DataCAD," explained Berry Taylor, Product Manager for CADKEY's A/E/C Product Group. "We trust that our reputation had something to do with the Soviets' request for DataCAD. And, if we can speed up the disaster recovery with our technology, we are proud to help."

PC WEEK Poll of Corporate Satisfaction Says: "CADKEY Excels!"

CADKEY 3™ (Version 3.5) shared the top spot in PC WEEK's Poll of Corporate Satisfaction, dated April 30, 1990. The newspaper's latest CAD survey asked users of five high-end CAD packages: CADKEY 3 (Version 3.5), AutoCAD (Release 10), MicroStation PC™ (Version 3.0), CADvance™ (Version 3.5), and VersaCAD/386™ (Version 5.4), to rate their satisfaction with the product that they are using according to 12 attributes (categories). PC WEEK's overall weighted scores for each product, based on 100 as a perfect score, generated from the information submitted by each product's users, display these results: CADKEY 3: 80, AutoCAD: 80, MicroStation PC: 79, CADvance: 78, and VersaCAD/386: 78.

PC WEEK's accompanying **Chart Notes** which explain its poll, identify the product characteristics on which these CAD packages were surveyed as: completeness and organization of documentation, clarity of documentation, ease of training, ease of use after training, feature flexibility, output-driver support, input-driver support, accessibility of product support, quality of product support, value relative to cost, general reliability, and overall performance. In the **Survey Methodology** of its Poll of Corporate Satisfaction, PC WEEK writes, "PC WEEK Polls strive to gather data on corporate satisfaction with those product characteristics that cannot be measured by benchmark tests or found in product-specification sheets — particularly those related to a product's ability to function in real-life workplace settings."

"Accounting for its tie for highest overall score, CADKEY received several highest or next-to-highest attribute scores from its buyers," PC WEEK writes. "CADKEY garnered highest scores in both vendor support attributes." The vendor support attributes are the accessibility of product support and the quality of product support.

Editor's Note: AutoCAD is a trademark of Autodesk, Inc.; MicroStation PC is a trademark of Intergraph Corporation; CADvance is a trademark of Isicad, Inc., and VersaCAD/386 is a trademark of Prime Computer, Inc.

CADKEY, INC. Voted 1990 Supplier of the Year!

CADKEY customers who are readers of APPLIANCE MANUFACTURER, a magazine devoted to the interests and to the solution of problems in the consumer, commercial, and business appliance industry, have voted CADKEY, INC. one of the **1990 Suppliers of the Year**, in the category of CAD/CAM/CAE/CIM Software. CADKEY received this news in a letter of congratulations from Joe Jancsurak, Senior Editor of APPLIANCE MANUFACTURER, published by Corcoran Communications, Inc., Solon, Ohio.

"This is the fourth year that APPLIANCE MANUFACTURER has surveyed our readership to have them tell us which of their suppliers are doing a good job," Mr. Jancsurak wrote. It is **your customers** (Mr. Jancsurak's emphasis) who have voted you to this list of superior suppliers to the consumer, commercial, and business appliance industry served by APPLIANCE MANUFACTURER magazine. Congratulations, again, on your fine service to our readers, your customers!"

The May issue of APPLIANCE MANUFACTURER included a listing, by category, of all of the reader-selected **1990 Suppliers of the Year**.

Unusual Endorsement for CADKEY RENDER!

CADENCE Quietly Acknowledges CADKEY's Technological Leadership

"Right now the only way for an end user to get RenderMan quality output is either from CADKEY or, soon, from Autodesk."

This public acknowledgement that CADKEY RENDER™ is the first, and so far the only commercially available rendering product based on the Photorealistic RenderMan Interface™ is noteworthy in itself. However, where this acknowledgement appears is even more remarkable: in a feature article entitled, *A Standard Interface in the Works*, in the March 1990 issue of CADENCE. CADENCE is an independent magazine, dedicated to the use of AutoCAD®, published by Ariel Communications, Inc. of Austin, Texas.

The article describes at length the future Autodesk RenderMan™ product that is expected to be released later this year, possibly as early as July, to compete directly with CADKEY RENDER™ which is available right now.

CADENCE's acknowledgement of CADKEY RENDER recalled

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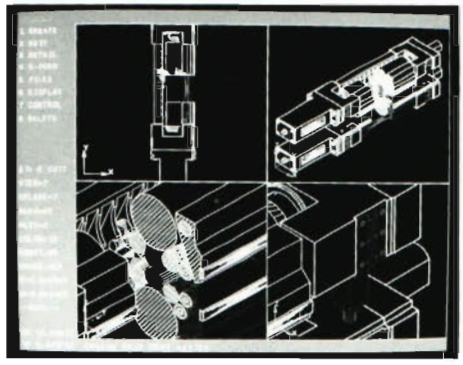
CADKEY® Light™



Low-End CAD Has Reached New Heights!

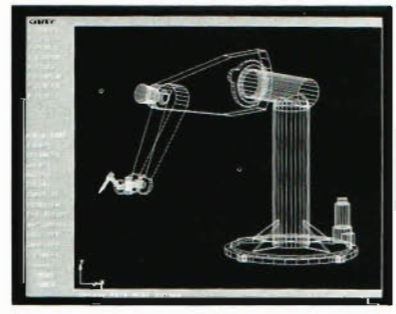
Introducing CADKEY *Light*™ *— Designing your ideas has never been so easy, so professional and so affordable!*

Now, for the first time, a leader in the field of computer-aided design brings all the high-end, professional elements of CAD technology to a new personal level.

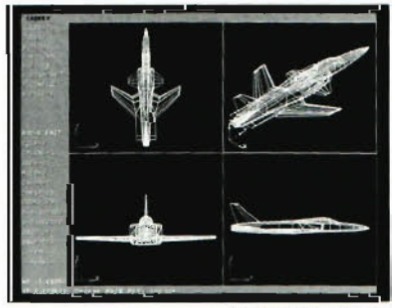
Patterned after the award-winning CADKEY 3 system, CADKEY Light offers the serious (or not so serious) designer, creator, thinker, draftsperson, student or would-be inventor the ability to create three-dimensional design and professional detailed drawings at an affordable price.

Here are just a few of the features you'll find in CADKEY Light:

- Fully integrated 2-D drafting and 3-D design capabilities
- A highly acclaimed, easy-to-use menu structure with all English commands
- "Getting Started Guide" and CADKEY's revolutionary step-by-step Tutorial
- Prompt line and history line to keep track of your progress
- Instant access to dozens of key functions from anywhere in the menu structure
- Accurate dimensioning to ANSI and international engineering standards, in English or metric units
- 256 levels, 16 colors, multiple viewports
- Unlimited number of user-defined views
- Full file compatibility with the CADKEY 3 system
- Packaged with both 5¼″ and 3½″ diskettes



For more CADKEY Light information please contact your local CADKEY Dealer or CADKEY at **1-800-654-3413**



CADKEY INC

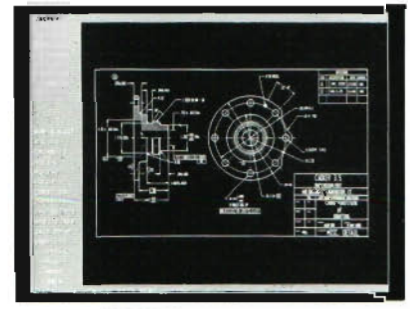
440 Oakland Street
Manchester, CT 06040-2100
Tel: (203) 647-0220
FAX: (203) 646-7120

And you don't have to stop there . . .

Those of you requiring ever-increasing CAD power have a full upgrade path to CADKEY 3. CADKEY 3 includes all the high-end CAD capabilities that automotive, aerospace and naval manufacturers have come to rely on for their engineering design. Both CADKEY Light and CADKEY 3 enjoy the same user interface with full file compatibility.

The choice is clear — Get the professional introduction to computer-aided design with CADKEY Light, and start designing ideas as big as your imagination!

Hardware Requirements: IBM PC or compatibles and the Personal System/2 series, DOS 2.1 and higher, 640K RAM, hard disk drive and one floppy disk drive. Supports most graphics cards (EGA, VGA, Hercules and compatibles, IBM 8514 and compatibles, most high resolution graphics cards), popular input devices, printers and plotters.



CADKEY Light™ — The Most Versatile, Low-End CAD System on the Market!

CADKEY INC. proudly introduces CADKEY Light™, the new name for CADKEY 1™ (Version 1.5). Patterned after the award-winning CADKEY 3™ (Version 3.5), CADKEY Light is a non-copy-protected, personal, 2-D/3-D, CAD system, that is 100% upwardly compatible with CADKEY 3 (Version 3.5). Shipment to customers began on May 18, 1990.

CADKEY Light joins its sibling product, well-renowned CADKEY STUDENT™, in the low-end CAD market. CADKEY STUDENT is the new name for CADKEY 1 (Version 1.4). CADKEY STUDENT is significantly more limited than CADKEY Light. However, CADKEY STUDENT can run with only 512KB of memory and even on purely dual-floppy-disk systems. Over the years, CADKEY STUDENT has introduced thousands of newcomers all around the world (from middle school, through college, and in continuing-education programs) to true, 3-D, computer-aided design and drafting. Together, CADKEY Light and CADKEY STUDENT form a family of low-cost, high-performance 2-D/3-D CAD systems.

CADKEY Light features all the 2-D drafting features and 3-D modeling elements for which CADKEY has received PC MAGAZINE's **EDITOR'S CHOICE** three times, in 1986, in 1988, and in 1990 (more than any other CAD software):

— CADKEY's user interface, especially the intuitive logic of its command menus and its economy of keystrokes through the *Immediate Mode* commands.
— CADKEY's flexible dimensioning capabilities.
— CADKEY's ability to create as many views of a design as the user needs.
— CADKEY's true 3-D data base used throughout all features and entities.

CADKEY Light also features totally associative 3-D cursor interaction in one or four viewports. Similar to CADKEY 3 (Version 3.5), you can begin a design in one view, finish it in another, and see your design in one or four viewport(s) at the same time. Pop-up menus in selected functions allow users more direct access to levels, files, the group table, and the color table. CADKEY Light also provides increased use of icons for visual assistance in selected functions and CADKEY TUTOR.

CADKEY Light's hardware requirements include an IBM PC/XT or AT, or other fully-compatible MS-DOS-based computer, hard disk (with a minimum of 3.5MB of free disk space), and one 5.25-inch or 3.5-inch floppy drive. For its operating system environment, CADKEY Light requires MS-DOS™ (Version 2.0 or later) and 640KB of system memory. CADKEY Light works with all of the graphics adapters, input devices, plotters, and printers supported by CADKEY 3. For placing orders, CADKEY Light's part number is: D052-1500.

Quiet Acknowledgement of CADKEY RENDER

(Continued from page 5)

earlier statements by Bill Kolomyjec and Chuck Kolstad of Pixar, Inc., the developer of the Photorealistic RenderMan Interface. CADKEY RENDER's first public demonstration took place at AUTOFACT in October 1989. Bill Kolomyjec, Pixar's RenderMan evangelist, said, "This is a real feather in CADKEY's cap. At least six CAD software companies have announced plans to develop rendering software using the RenderMan interface. **CADKEY is the first to introduce a commercial product**."

CADKEY RENDER's formal introduction took place in February at NDES '90. Chuck Kolstad, President of Pixar, said, Pixar is enthusiastic about the availability of CADKEY RENDER. We believe this system will be tremendously useful to CADKEY users. It will allow them to reach new render-quality frontiers in design and presentation-image making."

CADKEY RENDER began shipping to customers in March 1990.

We applaud CADENCE's objective reporting of the significant fact that right now the only way for an end user to get RenderMan quality output is from CADKEY.

"STANDING ROOM ONLY" DataCAD User's Meeting at A/E/C Systems '90

More than 100 DataCAD users assembled around 6:30 p.m., Wednesday, June 13, 1990, at the Omni Hotel in Atlanta, Georgia, to participate in the National DataCAD Users' Meeting that took place during A/E/C Systems '90.

Berry Taylor, A/E/C Product Group Manager, presented a summary of the developments in the DataCAD product line since its acquisition by CADKEY in 1989. He described briefly the work of the three DataCAD development teams who have been working in parallel. One team specializes in new application macros for DataCAD users. The second team has focused on producing DataCAD (Version 4.0). The third team

(Continued on page 19)

Now, Even More Reasons to Contact your CADKEY® Dealer...

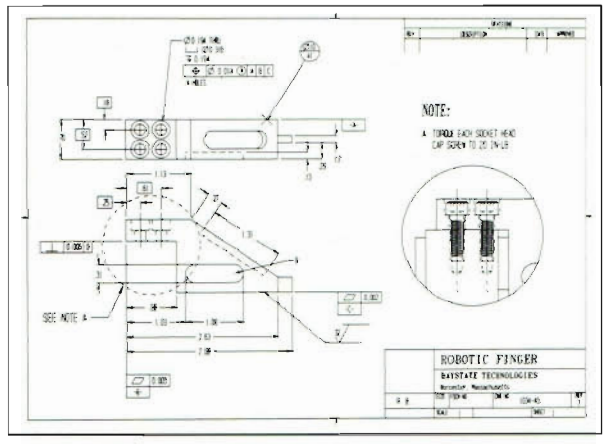
DRAFT-PAK™

RELEASE 2

If you are a mechanical designer or engineer you need DRAFT- PAK V.3.5, Release 2. Don't take our word for it. Ask your CADKEY dealer to show you first hand how the new Release 2 version of DRAFT-PAK with full metric and ISO support can make you even more productive with your CAD system.

With its many new features and complete 150 page documentation package, DRAFT-PAK will save you valuable design and detailing time through powerful 2-D and 3-D parametric programs built right into the CADKEY menu. DRAFT-PAK's many valuable enhancement functions include:

- English/metric and ANSI/ISO support.
- Construction plane and multiple viewport support.
- Automatic grouping option.
- Familiar tree structured CADKEY menu interface.



- 3-D parametric features including drilled, tapped, counterbored, countersunk, counterdrilled holes, slots and pockets.
- Automatic hole labelling utilities-with ANSI/ISO and custom label capabilities.
- Parametric fasteners: automatically generates all types of screws, bolts, nuts with optional washer creation.
- Geometric dimensioning and tolerancing to ANSI/ISO standards to generate callout symbols based on datums, true positions, and features such as flatness and perpendicularity.
- Automatic weld symbol creation.
- Automatic generation of surface finish symbols, datum targets, dimensioning symbols, bolt circles, center lines, section lines and balloon notes.
- Automatic creation of 2-D/3-D mechanical elements such as springs, racks and gears using true involutes.
- Design/Detailing Utilities such as:

-Depth and attribute setting functions.
-Unique level manager and text based picture manager.
-Drawing/part statistics function.
-Automatic drawing layout function, that allows you to create a multiview drawing from a 3-D wireframe in seconds.
-Border/Chart script files to automatically fill in customized borders and charts with text.

- 3-D to 2-D part compression function removes overlapping/duplicate entities, and compresses arcs and circles on edge into lines.
- Table generation/Hole list utility.
- Dual dimensioning utility (metric/English).

Please contact your local CADKEY/DRAFT-PAK dealer for a demo or further details

NEW VERSION WITH METRIC/ISO STANDARDS AND OVER FIFTEEN POWERFUL NEW FUNCTIONS

BT BAYSTATE TECHNOLOGIES
30 Westview Road, Worcester, MA 01602

CADKEY
INTEGRATED ENHANCEMENT
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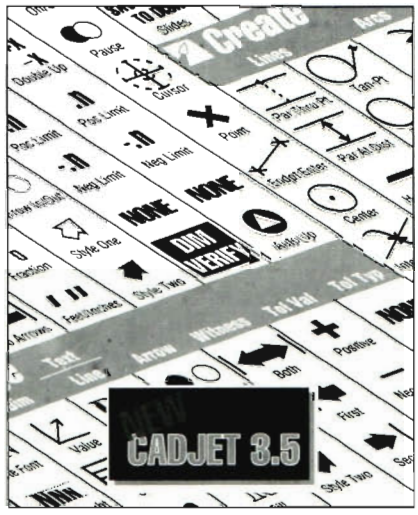
Slip on a CADJET™ Template and FLY through CADKEY™!

- **Work up to 10 times faster with CADKEY™ by making all menu choices direclty from the CADJET™ Template drawing surface!**
- **No more memorizing keyboard commands or searching through menus with a mouse!**
- **Spend one hour with CADJET and you'll never go back to the CADKEY menu again!**

Slip a CADJET Template over your digitizing pad and fly through CADKEY! Access all the standard CADKEY menu commands directly from your digitizing pad with a press of the stylus.

You'll be amazed by how much faster you can work. See why so many menu users are making the switch to CADJET.

Apply pre-programmed SubTemplates or design your own subtemplates to customize the master CADJET Template. Easily define and place your commands and instructions right on the CADJET Template to eliminate thousands of time-consuming keystrokes.



The CADJET template slips right over your digitizing pad allowing you to make all menu choices direct from the drawing surface. Once installed, CADJET loads automatically whenever you boot up CADKEY.

"CADJET is well laidout. It groups the CADKEY commands in an order that makes sense to CADKEY users. The bright background colors and logical icons make it visually appealing. It is easy to see that CADJET will add to the productivity of any CADKEY user. With all of the CADKEY commands at the user's fingertips, less time will be required to learn the system."

Paul Resnarte Co-Author of USING CADKEY

Try CADJET for 30 days with NO OBLIGATION!

UNCONDITIONAL 30 DAY MONEY BACK REFUND

Use CADJET 3.5 for 30 days and if you are not completely satisfied return it for a full refund.

We won't even charge your account for thirty days. You have nothing to lose!

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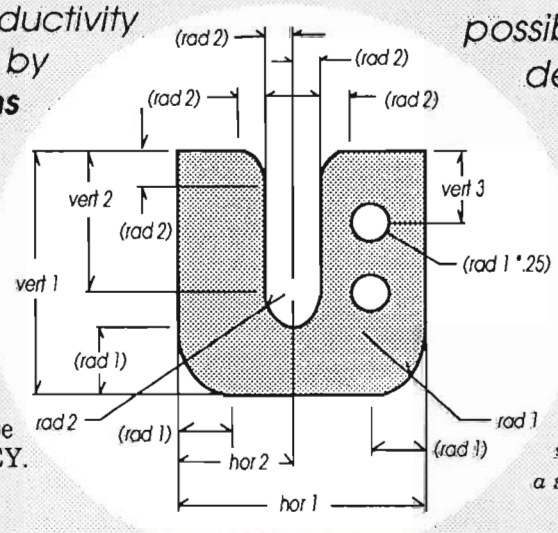
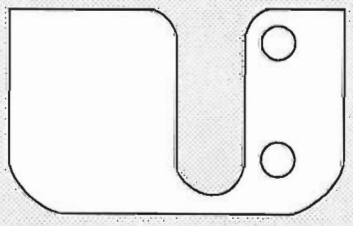
Using CADL, PS generates a parametric program for use with the parts that you have designed in CADKEY.

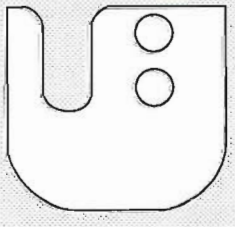


With ***PS*** *there are unlimited possibilities for altering the design of your parts.*

PS is easy to use. You don't need to understand the CADL program, *you only need the ability to draw and dimension in CADKEY.* PS will set up a parametric program for each of your parts that will allow you to design any permutation that you might need to create.

You can purchase this valuable software program for $395.00, *a small price - and well worth it.*





CADKEY®
CHICAGO

2525 oakton suite c 33
arlington heights 60005
phone 1-708-640-1853

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DataCAD Users' Groups

DataCAD users frequently request information about where and when a local Users' Group meets. Here is a listing of DataCAD Users' Groups for your convenience. Some users' groups have formal names; others do not. Members frequently host meetings at different locations. The address listed with the contact person's name is not necessarily the meeting place. If your DataCAD Users' Group is not included in this listing, please let us know.

State	Location/Contact	Meetings/ Serving
Calif.	Orange County Area Jean-Paul Jean Bassenian/Lagoni Architects 2031 Orchard Dr. Santa Ana Heights, CA (714) 553-9100	Monthly. Orange County.
	Sacramento Area Bill Edgington 2110 Enterprise Blvd. W. Sacramento, CA	Sacramento.
	San Diego Area Gary Brooke La Jolla CAD 7721 Herschel Av. La Jolla, CA 92037 (619) 456-2325	Monthly. Greater San Diego area.
	San Fernando Chapter/ A.I.A., Los Angeles Area DataCAD Users' Group Beverly Bolin 14951 Califa St. Van Nuys, CA 91411 (818) 781-7108	Monthly. Greater Los Angeles area.
Conn.	Central Connecticut Tracy Powell Micro Engineering Solutions 470 Murdock Av. Meriden, CT 06450 (203) 630-3630	Monthly. Greater Hartford-Meriden area.
	Stamford Area David Chilenskas Entré Computer Center 777 Summer St. Stamford, CT 06901 (203) 967-2233	Monthly. Fairfield Cty., CT; Westchester Cty., NY.
Ga.	Greater Atlanta Area John Gorman Gorman & Associates 20 Perimeter Park, Atlanta, GA 30341 (404) 455-6367	Central Georgia.
Ill.	Chicago Area Julie. L. Keverian Hancock & Hancock 230 N. Michigan Av. Chicago, IL 60601 (312) 346-7155	Monthly. Northern Illinois and Indiana.
Mass.	DBUG DataCAD Boston Users' Group Evan Shu Evan Shu Architects 10 Thatcher St., #515 Boston, MA 02113 (617) 720-6035 or Rick Gleason The Gleason Partnership 114 Commonwealth Av. Boston, MA 02116 (617) 267-7754	Monthly. Eastern Massachusetts.
Md.	Maryland-D.C. Area Mark Dowjat CADD Group, Inc. 12104 Heritage Pk. Cir. Silver Springs, MD (301) 942-5801	Monthly. Baltimore-Washington.
Mich.	MUD Michigan Users of DataCAD James A. Remus Granger Construction P.O. Box 22187 Lansing, MI 48909 (517) 393-1670	Monthly. Lansing & Central Tri-county area.
Minn.	Minnesota Area Steve Rick Entré Computer Center Northwest Center, #150 55 East 5th St. St. Paul, MN 55101 (612) 222-6200	Bi-monthly Minnesota, parts of Iowa and Wisconsin.
Mo.	Central States Nicholas Peckham or Mike Goldschmidt Peckham & Wright Architects 18 North Eighth St. Columbia, MO 65201 (314) 449-2683	Monthly. Missouri; Eastern Kansas; Southern Illinois.
N.C.	Charlotte Area Brian Turner ADEP Architects Outlet Square, #721 Charlotte, NC 3204 (704) 375-6038	Greater Charlotte area.
	RADIUS Raleigh Area DataCAD Information & User Support Mark Dickey P.O. Box 12253 Raleigh, NC 27605	Quarterly. Greater Raleigh area.
N.J.	DUNE DataCAD Users of the Northeast Allen Weitzman The Ives Group 14-25 Plaza Rd. Fair Lawn, NJ 07410 (201) 791-7444	Monthly. Bergen Cty., NJ; Manhattan, Brooklyn, Rockland Cty., NY
Pa.	DETAIL DataCAD Enthusiasts Trading Advice In Lancaster Terry Bergen ComputerLand of Lancaster 1360 Harrisburg Pike Lancaster, PA (717) 291-2111	Monthly. South Central Pennsylvania.
R.I.	Southeastern New England Carlos Kiamco Peter Ashton Diane Carlino Entré Computer Center 385 South Main Street Providence, RI (401) 831-7280	Monthly. Rhode Island, SE Massachusetts, E. Connecticut.
Tenn.	MAD Memphis Area DataCAD Users Dick Eades Eades Association of Architects 6807 Amersham Memphis, TN 38119 (901) 756-5596	Monthly. Western Tennessee.
Texas	Dallas-Fort Worth Area Jim Fay Urban Architecture 7001 Preston Rd., #210 Dallas, TX 75205 (214) 522-8494 or Rick Ferrara Richard Ferrara Architects 445 East Walnut St., #131 Richardson, TX 75081	Monthly. Greater Dallas & Fort Worth.
Va.	Central Virginia Area Roger O'Dell John Fornaro, A.I.A. 414 East Market St. Charlottesville, VA (804) 296-5432	Monthly. Greater Charlottesville
	Tidewater Area Tim Pruitt I.V. Harris & Associates 329 Office Square Lane Virginia Beach, VA (804) 499-8628	Monthly. Southeastern Virginia.

If your DataCAD Users' Group is not included in this list, please inform Danielle Cote at CADKEY so that we may publicize your meeting schedule. Telephone (203) 647-0220.

If you would like to start a new DataCAD Users' Group in your area, please call Danielle Cote. A **FREE** DataCAD Users' Group Start-Up Kit is available to help you.

New Application Product Developed by CADKEY Distributor

ASCONGRAPH Announces New Opportunities for CADDInspector & CADKEY!

ASCONGRAPH, the CADKEY distributor for Brazil, has developed a microprocessor-equipped printed-circuit board that allows CADDInspector™ or CADKEY 3™ to communicate with **any** coordinate measuring machine (CMM). The company has tested its first-level production model of this intelligent board with Mitutoyo, DEA, Brown & Sharpe and Mora machines. ASCONGRAPH's board works in an expansion slot of an IBM-compatible personal computer.

"Our intelligent printed-circuit board now creates the possibility of a direct link between engineering design and quality control, linking CADDInspector and CADKEY 3 with any CMM," said Oscar Zanquetta, Managing Director of ASCONGRAPH. "We are facilitating better communication between the design and inspection departments, putting CADKEY right in the CMM."

Oscar indicated that, with ASCONGRAPH's intelligent board, it is possible to load the CAD design of a part to be inspected into the CMM's computer and inspect parts through CADDInspector and CADKEY. CADKEY displays the part's nominal x,y,z coordinates, and CADDInspector verifies the accuracy of the actual x,y,z coordinates in comparison with these nominal coordinates. "Furthermore," Oscar said, "it is not necessary for the part to have been designed with CADKEY. We can take the part data from any CAD system (CADAM, CATIA, Computervision, AutoCAD, etc.) through IGES or DXF translation, and inspect actual parts against the nominal data."

"The coordinate data collected through a CMM, either for inspection or for reverse engineering, are not limited to geometric elements such as lines, circles, and planes," Oscar added.

(Continued on page 12)

TRAINING SCHEDULE AT CADKEY, INC.

We have Training dates scheduled through August, 1990. Please call Heather Lavery in the Product Support Department to register (203) 647-0220.

Course	July	Aug.	Sept.
Introduction to CADKEY	30-1	27-29	24-26
Introduction to DataCAD	23-25	13-15	10-12
Advanced Geometric Modeling		2-3	6-7
Introduction to CADL		20-22	
CADKEY SOLIDS	12-13	23-24	

CADKEY/DataCAD Training In U.S. & Canada

Many authorized CADKEY and DataCAD Training Centers have scheduled courses in addition to the training available at CADKEY's world headquarters here in Manchester, CT. The following is a list of who is doing what, where, and when:

State	CTC	Location/Contact	Course	Dates
Ala.	Jacksonville State University	Jacksonville, AL Dr. P.S. Yeh (205)782-5229	*Intro.* to *CADKEY*	Jul. 11-13 Aug. 22-24
	The Bevill Center	1011 E. Broad St. Gadsden, AL Scott Schultz (205)547-5782	*Intro.* to *CADKEY*	Aug. 27-29
Calif.	CAD Micro-Systems	11936 W.Jefferson Blvd. Suite A Culver City, CA Monica Hunter (213)391-7226	*Intro. to CADKEY* *Advanced CADKEY* *CADKEY SOLIDS* *CADL*	Jul. 11-13 Jul. 18-19 Jul. 24 Jul. 26
	Consulting Services International	7311 Van Nuys Blvd. Van Nuys, CA Bob Messamer (818)994-8881	*Intro.* to *CADKEY* *Advanced CADKEY*	3rd full week of each month. Scheduled on request.
	Desktop Productions	18200 Yorba Linda Bd. Yorba Linda, CA Carol Buehrens (714)579-3066	*DataCAD for the Architect* Tue./Thurs. or Wed./Fri. *DC Modeler* *DataCAD A/E/C Commercial* *DataCAD Keybd.Macros* *DataCAD Piping Tmplts.*	Jul. 10-19 Jul. 18-27 Jul. 24 - Aug. 2 Aug. 7-16 Aug. 15-24 Aug. 21-29 Sept. 5-14 Sept. 11-20 Sept. 19-28 Aug. 1, 28 Sep. 27 Jul. 11 Aug. 3 Sept. 6 Aug. 8 Aug. 8

News from Technical Support

A 9600 baud modem has been installed on CADKEY's in-house electronic bulletin board:
(203) 647-8523

CADKEY/DataCAD Training in U.S. & Canada (continued)

State	CTC	Location/Contact	Course	Dates
Calif.	Poelman's Design Service	901 Campisi Way, #360 Campbell, CA Mike Poelman (408)377-3585	*Intro. to CADKEY* *CADKEY* *SOLIDS*	Aug. 28-30 Oct. 29-31 Jul. 24-26 Sept. 25-27
	Ukiah High School	1000 Low Gap Rd. Ukiah, CA Jim Howlett (707)463-5253, x284	*Intro. to CADKEY*	Sept. 7-9
Colo.	CADKEY Colorado	4285 S. Ulster St. Pkwy. Suite 402 Denver, CO (303)770-2024	*Intro. to CADKEY* *Advanced CADKEY* *CADL*	Scheduled on request during the Summer.
Conn.	Central Connecticut State University	1615 Stanley Street New Britain, CT Paul Resetarits (203)827-7262	*Intro. to CADKEY* *Advanced CADKEY*	Aug. 13-15 Aug. 16-17
	Datamat Programming Systems	9 Mott Avenue Norwalk, CT Matt Reuben (203)855-8102	*Intro. to CADKEY*	Jul. 16-20 Aug. 20-24 Sept. 24-28
	University of Hartford	S.I. Ward College of Technology 200 Bloomfield Av. W. Hartford, CT Don De Bonee (203)243-4763	*Intro. to CADKEY*	Wed. Sept. 5 to Dec. 12
Ill.	PFB Concepts	2525 E. Oakton Av. Arlington Heights, IL Bob Konczal (708)640-1853	*Intro. to CADKEY* *Advanced CADKEY* *CADKEY SOLIDS* *CADL*	Jul. 11-13 Aug. 8-10 Jul. 25-27 Aug. 22-24 Jul. 19-20 Aug. 16-17 Jul. 7-8
	Triton College	2000 Fifth Av. River Grove, IL Employee Development Peggy Hosty (312)456-0300, x539	*Intro. to CADKEY* *Intermed. CADKEY*	Mon. & Wed. Aug. 6-22 Sat. Jul. 14-Aug. 4
Iowa	Iowa Lakes Community College	300 South 18th St. Estherville, IA Roger Patocka (712)362-2604	*Intro. to CADKEY*	Jul. 19-21 Special schedules by request.
Md.	Anne Arundel Community College	101 College Parkway Arnold, MD Sina Sepehri (301)541-2435	*Intro. to CADKEY*	Aug. 13-16
Mich.	Future Solutions	5900 N. Lilley Rd. #101 Canton, MI Paul Zwarka (313)981-7455 FAX: (313)981-7473	*Intro. to CADKEY* *Advanced CADKEY*	Jul. 31 - Aug. 1 Aug. 28-30 Oct. 2-4 Jul. 10-11 Aug. 6-7 Sept. 5-6

ASCONGRAPH

(Continued from page 11)

"These data also include points for 3-D splines and for complex surfaces to be used with CADKEY SURFACES™."

Coordinate measuring machines electronically display the data on parts inspected using a read-out device. Different CMM manufacturers use different formats for their read-out data. The ASCONGRAPH board eliminates the problem of different read-out data formats by collecting its input directly from the CMM's transducers and probe in the form of sine-wave or square-wave signals. These are the same electrical signals that the CMM sends to its own read-out device for display. ASCONGRAPH's printed circuit board works in parallel with the CMM's read-out display. ASCONGRAPH's board receives these sine or square-wave signals and converts them into a form that CADDInspector and CADKEY 3 can receive.

"This board configures the electrical signals received directly from the CMM," Oscar continued. "It can also perform calculations, such as offsets, scale, spatial alignment of the part, the diameter and center of holes, etc. The board feeds these data directly into CADKEY."

"This same concept can apply to linking CADKEY with CNC machine tools, to digitize parts directly through the machine tool, using a probe instead of a cutter, and using the machine tool's own controller to drive it automatically," Oscar said. "Whether using measuring machines or milling machines, we can now collect three-dimensional part data directly into CADKEY, without any modification to the machine itself. The data in CADKEY can then be used with CAM packages."

"We are putting CADKEY into the production and inspection environment without requiring any modification to CMM or CNC equipment," Oscar concluded, "because we are getting the data directly from the machine's transducers and probe, in parallel with the machine's own read-out system."

(Continued on page 17)

First CADKEY Training Center in Eastern Europe!

The University of Miskolc, Hungary, boasts not only of its eighteenth-century roots in the University of Selmecbánya, but also of the fact that it is the first CADKEY™ Training Center in Eastern Europe. The new CADKEY Training Center's 20 workstations, equipped with CADKEY 3™ (Version 3.5), have just completed their first semester in a program intended to introduce all of the university's students to computer-aided design and drafting using CADKEY software. "CADKEY is now a required course at the University of Miskolc," said Dr. László Balla, Director of the university's Computer Center. "Our goal is to establish a complete CIM Technology Transfer Center, CIMTRANS, here within the next two years, in collaboration with MULTICAD Studio which provided the hardware and software for our educational center."

The university's educational center will offer semester courses in CADKEY for its regular students. The center already offers specialized, continuing-education programs in CADKEY for people employed in a variety of industries. The first two courses took place on May 21-25 and June 11-16, 1990. The next CADKEY courses are scheduled for July 2-6 and August 6-10, 1990.

"The University of Miskolc is one of only two technical universities in Hungary," László continued. "The other is Budapest Technical University." Miskolc, a city of about 200,000 people, lies in Northeastern Hungary, a heavily industrialized region. "Recent expansion of our curriculum of Mining, Metallurgy, and Mechanical Engineering to include Law and Economics, prompted a change in the university's name from the Technical University for Heavy Industry to the University of Miskolc," László explained.

The University of Miskolc numbers 2,500 full-time undergraduate students and 1,000 post-graduate students. Most of the students are native Hungarians, but foreign students are

(Continued on page 14)

CADKEY/DataCAD Training in U.S. & Canada (continued)

State	CTC	Location/Contact	Course	Dates
Minn.	Albert Lea Technical Institute	2200 Tech Dr. Albert Lea, MN Larry Gilderhus (507)373-0656	*Intro. to CADKEY* *Advanced CADKEY*	Scheduled on request.
	Anoka Ramsey Community College	11200 Mississippi Blvd. Coon Rapids, MN George Heron (612)427-2600	*Intro. to CADKEY* *Intermed. CADKEY* *Macros & Calculator* *CADKEY SOLIDS* *CADKEY for Educators*	Tu. & Th. eve.: Jul. 17-Aug. 2 Jul. 11-13 Tu. & Th. eve.: Jul. 23-Aug. 8 Aug. 13 Evenings: Aug. 27, 28, 30 Aug. 22-24 Aug. 15-17
	St. Paul Technical Institute	235 Marshall Ave. St. Paul, MN Michael Haffner (612)221-1307	*Intro. to CADKEY*	Call for schedule.
N.C.	Entré Computer Center	110 Charlotte Plaza Charlotte, NC John Murphy (704)332-1557	*DataCAD I* *DataCAD II* *DC Modeler*	Scheduled on request.
	Wake Technical Community College	9101 Fayetteville Rd. Raleigh, NC Brian Matthews (919)772-0551, x172	*Intro. to DataCAD*	Summer Course. Call for schedule.
N.H.	Portsmouth Senior High School	Alumni Drive Portsmouth, NH Kenneth Webber (603)436-7100	*Intro. to CADKEY*	Call for schedule.
N.Y.	Iona College	725 North Avenue New Rochelle, NY Flory Netsch (914)235-1360	*Intro. to CADKEY*	Jul. 12
	S.U.N.Y. at Farmingdale	School of Engineering Lupton Hall Farmingdale, NY Harriet Kaiser (516)420-2311	*Intro. to CADKEY* *Advanced CADKEY*	Mon. evenings: Sept. 10-Oct. 15 Mon. evenings: Oct. 29-Dec. 3
Ohio	CAD CAM, Inc.	2844 East River Rd. Dayton, OH Stephen Bishop (513)293-3381	*Intro. to CADKEY* *Advanced CADKEY*	Jul. 9-11 Jul. 16-18 Jul. 30-Aug. 1 Aug. 20-22 Jul. 19-20
	Progressive Computing	6964 Spinach Dr. Mentor, OH Mark Orzen (216)255-0460 FAX: (216)255-0605	*Intro. to CADKEY* *CADL CADKEY* *MACROS CADKEY* *SOLIDS*	Jul. 10-11 Jul. 24-25 Jul. 26 Jul. 30-31

CADKEY/DataCAD Training in U.S. & Canada (continued)

State	CTC	Location/Contact	Course	Dates
Okla.	Oklahoma State University	301 Cordell South Stillwater, OK Gerald McClain (405)744-5709	*Advanced CADKEY*	Jul. 25-27
Ore.	Rogue Community College	3345 Redwood Hwy. Grants Pass, OR Del Harris (503)479-5541	*Intro. to CAD/CAM*	Tu. & Th. eve.: Jul. 2-Aug. 24
Pa.	Computer-Land	1360 Harrisburg Pike Lancaster, PA Lori Fraser (717)291-2111	*Intro. to DataCAD* *Advanced DataCAD*	Scheduled on request, on site or in house.
	Edinboro University of PA	G-34 Hendricks Hall Edinboro, PA Peter Mathews (814)732-2592	*Intro. to CADKEY*	Aug. 13-15
	Penn. State Univ.at Erie, Behrend College	Station Road Erie, PA. Pat Espin (814)898-6103	*Advanced CADKEY* *CADKEY SOLIDS*	Jul. 12-13 Aug. 16-17
S.D.	Northern State University	Box 705 Aberdeen, SD Jerry Sauer (605)622-2571	*Intro. to CADKEY*	Jul. 9-13
Texas	MLC CAD Systems	5316 Highway 290West Austin, TX Pat Stutz (512)892-6311	*Intro. to CADKEY* *Advanced CADKEY*	Jul. 25-27 Aug. 29-31 Scheduled on request.
	Texas Tech University	P.O. Box 4200 Lubbock, TX Mary Bentancourt (806)742-3451	*Intro. to CADKEY*	Aug. 21-23
Va.	Republic Research Training Center	855 West Main St. Charlottesville, VA Gregg Kendrick (804)296-9747 (800)476-4454	*DataCAD I* *DataCAD II* *DataCAD 3-D*	Jul. 16-18 Aug. 13-14 Aug. 15-16
	Virginia Polytechnic Institute	144 Smyth Hall Blacksburg, VA Allen Bame (703)231-6480	*Intro. to CADKEY*	Aug. 1-3
Wash.	Everett Community College	801 Wetmore Av. Everett, WA Stu Barger (206)259-7151	*Intro. to CADKEY*	Oct. 10-12
Wis.	North Central Technical College	1000 Campus Dr. Wausau, WI Michael Clark (715)675-3331	*Intro. to CADKEY*	Aug. 8-10 Dec. 27-29 Additional courses on request.

CADKEY in Eastern Europe

(Continued from page 13)

welcome, too. Courses for Hungarians are taught in Magyar, their native language. However, English is the language used in courses for foreign students. Most students come to specialize in Engineering: mining, metallurgical, or mechanical. CADKEY plays a significant role in each of these disciplines at Miskolc.

Varied Applications for CADKEY

"The Faculty of Mechanical Engineering currently uses CADKEY in its *traditional* role," László continued, "creating three-dimensional parts and assemblies. The Faculty of Metallurgy uses CADKEY to design forging tools. The Faculty of Mining uses CADKEY to create graphical systems, to represent the strata of mineral deposits, and to design the tunnels of mines. The Computer Center uses CADKEY to develop the graphical data base for its Geographical Information System."

The University of Miskolc has been involved with computer technology for many years. However, until recently restrictive regulations governing the export of technology to Communist countries by members of the North Atlantic Treaty Organization and Japan hindered Hungarians' access to the latest high technology, especially minicomputers and mainframes. The university does have one Siemens mainframe computer, but it is not used for CAD/CAM. On the other hand, personal computers of the IBM-compatible XT and AT levels became available in Hungary within a year or two of their appearance in the commercial market. They soon appeared at the university. With the easing of Cold-War tensions, the Technical University of Budapest and the University of Miskolc will jointly be able to obtain an IBM mainframe with CATIA™. This mainframe computer, linked in a heterogeneous network to the minicomputers, personal computers and CADKEY software already at Miskolc, figures prominently in the university's plans for its CIM Technology Transfer Center. "We have a clear goal of linking all our work into an integrated system from PC through mainframe: design, drafting, analysis, manu-

facturing, production planning, quality control, inventory management, and accounting," László said.

The University of Miskolc's relationship with MULTICAD Studio is one of co-founder and customer. MULTICAD Studio is a partially privately-owned, engineering and consulting company, founded on January 1, 1989, through the collaboration of the University of Miskolc, a Hungarian industrial-innovation bank, a large industrial cooperative and some other private firms. It is one of the two CADKEY distributors in Hungary. The company has its headquarters in Budapest and a branch office in Miskolc. MULTICAD Studio grew out of a CAD consulting group that had begun in 1985, and that had been working with the university since 1987.

Looking for Real 3-D Solutions

"The CAD products that we were distributing were only two-dimensional," said Gábor Benjámin, MULTICAD's Marketing Manager. "2-D products present serious problems for serious mechanical design. We were looking for real 3-D solutions. We even considered developing software to provide real 3-D capabilities as additions to our existing 2-D packages, when some people at the university told us about CADKEY. They had heard of CADKEY from people in Canada. We asked ourselves, `Why re-invent the wheel?' However, due to existing export-license restrictions, we could not obtain a copy of CADKEY at that time."

In November 1987, I happened to attend **EDUCATEC**, an educational software trade show in Paris," Gábor continued. "And there, I saw CADKEY."

MULTICAD Studio's basic philosophy is to provide complete CAD/CAE/CAM solutions to the Hungarian market based on CADKEY in conjunction with other design, analysis and manufacturing tools that link directly to CADKEY. "We believe that industrial firms will soon require these real 3-D solutions," Gábor added. "At the same time, we are putting concentrated effort into supplying Hungarian technical education with the same software tools to educate a new generation of technical professionals to build a competitive industry."

CADKEY/DataCAD Training in U.S. & Canada (continued)

State	CTC	Location/Contact	Course	Dates
Wyo.	University of Wyoming	3085 Engineering Bldg. P.O. Box 3295 Laramie WY Donald Polson (307) 766-6450	*Intro. to CADKEY*	Jul. 25-27 Aug. 20-22

CANADA

Prov.	CTC	Location/Contact	Course	Dates
New Brunswick	New Brunswick Community College	P.O. Box 2100, Sta. A CAD/CAM Dept. 1234 Mountain Rd. Moncton, N.B. Wayne Ritchie (506) 856-2169	*Intro. to CADKEY*	10 week course beginning Jul. 2
Nova Scotia	Technical University of Nova Scotia	P.O. Box 1000 Halifax, N.S. Andrew Harvie (902) 420-7764	*Intro. to CADKEY* *Advanced CADKEY*	Jul. 9-11 Jul. 16-17
Ontario	Algonquin College	200 Lees Avenue Ottawa, Ontario Peter Casey (613) 594-3888, x5904	*Intro to CADKEY* *Advanced CADKEY* *System Customization*	Jul. 11-13 Jul. 18-20 Jul. 25-27
	CADCORP	250 Consumers Rd. Willowdale, Ontario Linda Newstead (416) 492-5982	*Intro. to CADKEY* *Advanced CADKEY*	Jul. 23-27 Jul. 30-Aug. 3 Aug. 20-24 Sept. 10-14 Jul. 13-15 Aug. 27-29
	JB Marketing Associates	82 Spruceside Cresc. Fonthill, Ontario John Bradford (416) 892-8025	*DataCAD I* *DataCAD II*	Scheduled on request.
	Klear Concept Data	465 Rogers St. Peterborough, Ontario John Punshon (705) 742-3354	*Intro to CADKEY*	Jul. 23-25 Aug. 21-23 Sept. 18-20
	Naylor-McLeod Group	1425 Bishop St. Cambridge, Ontario Brian Naylor (519) 622-4495	*Intro. to CADKEY*	Scheduled on request.
	Ryerson Polytechnical Institute, C.A.T.E.	350 Victoria Street Toronto, Ontario K. Doddridge (416) 979-5106	*Intro. to CADKEY*	Scheduled on request.
Québec	Vanier College	425 Blvd. Maisonneuve West, Suite 1100 Montréal, Québec Dave Gallagher (514) 281-9807	*Intro. to CADKEY*	Tu. & Th. Sept,. 4-Dec. 6

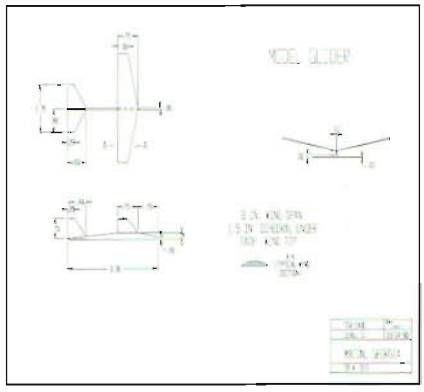
CADKEY and DataCAD Training Centers that would like dates of scheduled training courses to appear in 3-D WORLD, contact Peter Mancini, Educational Programs, CADKEY, INC., 440 Oakland Street, Manchester, CT 06040-2100. Telephone: (203) 647-0220. FAX: (203) 646-7120.

CADKEY Software at TSA and VICA State Competitions

Students Compete To Represent Their States At National Conferences!

Savannah, Georgia

Angela Lee Oliver's design of a model glider with a 1.5-inch dihedral angle between the cockpit and the tips of its wings, earned her the opportunity to represent Georgia and her school, H.V. Jenkins High School of Savannah, in the CAD competition at the Technology Student Association's National Conference in Corpus Christi, Texas, June 19-24, 1990.



Angela's entry in the TSA CAD competition.

Eighteen students, each representing a different high school, took part in the TSA State Competition in Macon, Georgia, on March 24. Starting from an isometric picture, all of the participants were required to design and dimension the front, right-side, top, and if possible, isometric views of this glider during a three-hour period.

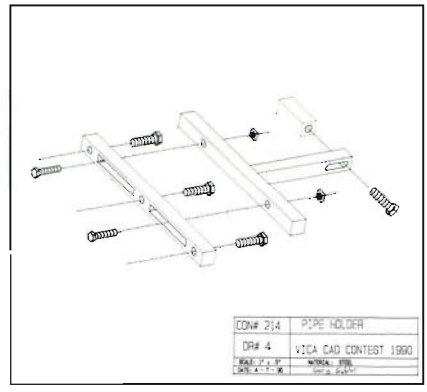
Angela used CADKEY 1™ (Version 1.4) to produce her design. Other students in the competition used CADKEY 3™ (Version 3.5), AppleCAD™, AutoCAD™, and Autosketch™.

Angela, a senior at H.V. Jenkins High School, has been studying computer-aided design and drafting with CADKEY for three semesters in the Industrial Arts program. Leonard Lemay, Angela's teacher, has been

(Continued on next page)

Portland, Oregon

Gary Gabler's first-prize design of a pipe clamp won him the right to represent Oregon and his high school at the National Leadership Conference and United States Skill Olympics of the Vocational Industrial Clubs of America in Tulsa, Oklahoma, June 25-30, 1990. Gary is a senior at Benson Polytechnic High School in Portland, Oregon. Nine students representing individual high schools participated in the CAD Competition that took place during the two-day VICA State Conference at Clackamas Community College, Oregon City, Oregon, April 6-7.



Gary's entry in the VICA CAD competition.

All of the students received the same specifications describing the design that they were to create. The students were free to implement the specifications to the best of their ability. The specifications stipulated that the design had to be an adjustable pipe clamp to mount nominal-sized pipe, 4-6 inches in diameter, onto both a wall and a ceiling. In addition to designing the pipe clamp, the students were required to dimension it and to put specific types of data (object lines, hidden lines, center lines, and notes) on different levels.

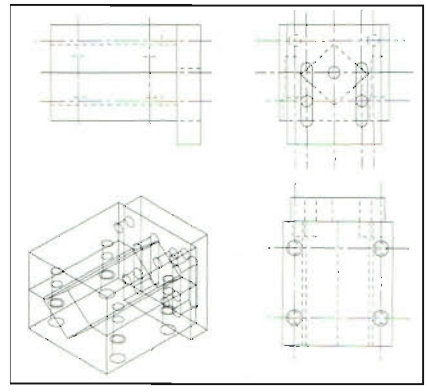
Gary used CADKEY 3 (Version

(Continued on next page)

Yuma, Arizona

Robert Thompson, a senior at KOFA High School, Yuma, Arizona, won the silver medal in the Arizona VICA State Competition with his design of a cube-shaped part with an appendage and with round holes and one large rectangular hole inside the cube. Sixty students from high schools around Arizona participated in the VICA State Competition at the Phoenix Civic Center, April 26-28, 1990.

Every student received the same specifications describing the design to be created during a period of two and one-half hours. The competition required top, front, right and isometric views of the design with dimensioning. In this VICA competition, the participants were not allowed to keep the part files that they had



Robert's entry in the VICA CAD competition.

created. Robert re-created the accompanying illustration from memory.

Robert created his design with CADKEY 1™ (Version 1.4). Other students also used CADKEY 1, AutoCAD™, and VersaCAD™.

Robert first encountered computer-aided design and drafting during his senior year in high school. The Technology

(Continued on next page)

Yuma, Arizona (continued)

Department introduced CADD and CADKEY into KOFA High School's curriculum in the 1989-1990 academic year through the energetic interest of Mr. John Bender-Ream who taught drafting. (Mr. Bender-Ream died suddenly on May 4, 1990.)

KOFA High School is a typical comprehensive high school according to Don Hoyt, Chairman of the Technology Department. KOFA is an acronym for a gold mine called the *King of Arizona* located near Yuma.

Robert plans to study Engineering at Arizona State University beginning in September, 1990. He is not certain whether he wants to major in Mechanical Engineering or Aerospace Engineering.

Editor's Note: CADKEY sadly notes the death of John Bender-Ream, and we offer our condolences to his family.

KOFA High School is seeking to fill the void created by John Bender-Ream's untimely death, and has requested our help. The school is looking for a person who knows CADKEY, and who has experience in industry, as well as qualifications in secondary education. Interested applicants should contact Dan Farar, Principal, or Don Hoyt, Chairman of the Technology Department, KOFA High School, 3100 Avenue A, Yuma, AZ 85364. Telephone: (602) 726-5750.

Savannah, Georgia (continued)

teaching CADD with CADKEY at H.V. Jenkins High School for three years. H.V. Jenkins High School is a Robotics Engineering Select School and a Magnet School in the Savannah/ Chatham County Public Schools.

Angela plans to attend the Georgia Institute of Technology after graduation from high school. She is interested in both Mechanical Engineering and Architecture, although right now she is leaning more towards majoring in Architecture.

The Technology Student Association of which Angela is a member, was formerly known as the American Industrial Arts Student Association.

Portland, Oregon (continued)

3.5) to create his design. Other participants used AutoCAD™ and VersaCAD™.

Gary Gabler has been studying Engineering at Benson Polytechnic High School for two years. As part of his program, Gary has been learning CADD with CADKEY for a year and a half. Benson Polytechnic requires that all of its 1600 students take at least one year of computer-aided design and drafting. The Drafting Department includes teachers who are engineers and a licensed architect. Gary Beck, Gary Gabler's teacher, has taught CADKEY at Benson Polytechnic for three years.

Gary plans to study Mechanical Engineering and Aerospace Engineering at Portland State University after graduation from high school. He hopes to pursue advanced work at Oregon State University sometime in the future.

Editor's Note: AppleCAD is a trademark of Apple Computer Corporation. AutoCAD and Autosketch are trademarks of Autodesk, Inc. VersaCAD is a trademark of Prime Computer, Inc.

ASCONGRAPH

(Continued from page 12)

"ASCONGRAPH's intelligent printed-circuit board adds only about 50% to the price of CADKEY 3 or CADDInspector," Oscar noted. "We expect to begin shipping our product in August, 1990."

For additional information about ASCONGRAPH's intelligent board, contact ASCONGRAPH, LTDA, Rua Alvarenga 879, 05509 Sao Paulo, SP, Brazil. Telephone (from outside of Brazil): 55-11-814-5441 or 55-11-814-5297. FAX: 55-11-211-4295.

SWECOMEX

(Continued from page 20)

attached to the heat exchanger or pressure vessel;

-----cyclic and dynamic reactions due to variations in pressure or temperature;

-----impact reactions due to fluid shock;

-----even weather-related and seismic reactions in some cases.

"So far, we have been taking advantage of only 50% CADKEY's power because most of the drawings that the plant needs to construct heat exchangers and pressure vessels are in two dimensions," said Octavio Perales. "But, we are thinking of using CADKEY's three-dimensional capabilities soon to design all the parts of rectangular surface condensers."

CADKEY in Heat-Exchanger Design

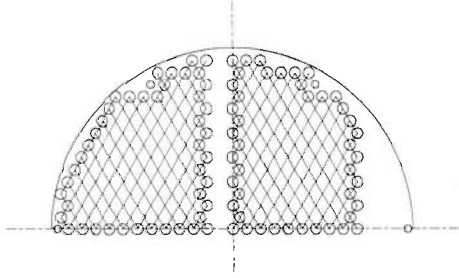
According to Octavio Perales, SWECOMEX typically uses CADKEY in designing its heat exchangers to verify that the number of tubes required by the thermal design will physically fit inside the internal diameter of the heat exchanger's shell. A designer creates a circle to represent the limit of the tubes that the shell can contain and identifies it as the Limit Tube Circle (LTC). He/she displays a grid with one of four standard, circular tube patterns inside the LTC: (1) a triangle with 30-degree angles, (2) a triangle with 60-degree angles, (3) square with four 90-degree angles, or (4) a diamond shape (i.e., a square rotated 45 degrees). The designer aligns the snap to the grid and begins to add circles

representing peripheral tubes into the LTC using the grid. Then he verifies that all of the tubes are contained inside the Limit Tube Circle (shell), and that the number of tubes corresponds to the quantity required by the thermal design. This design becomes a template.

After the template is dimensioned, the next step is to design the tube bundles inside the heat exchanger, and to generate, through a computer program, the calculations that yield the thickness and dimensions of all of the heat exchanger's components: shell, channel side, flanges, tube sheets, covers, heads, nozzle, reinforcement, supports, etc. The designer dimensions the equipment using the results of these calculations, and also taking into consideration the standard dimensions imposed by the plant's manufacturing facilities.

Now a draftsman prepares a preliminary bill of materials and uses CADKEY to create all the part files that will become the plant's manufacturing drawings. The draftsman enters all the customer's data, final dimensions and material specifications into CADKEY through a computer program that creates a CADL file containing all the text, circles, arcs, lines, points, polylines and other primitive entities to be included in the design. He/she then calls up a part file that is a multi-level *master file* for the particular type of heat exchanger being designed, and executes the CADL file containing the specific data for this design. All of the data entities appear in their proper locations in the master file. Using different combinations of levels in a master file, along with the program that generates the CADL file containing all the coordinate data, allows considerable flexibility in the design process.
After the master file has been reviewed and any necessary corrections made, the design is plotted in A or B size on a Houston Instruments DMP-40 plotter. If the draftsman needs to plot all of his master files at one time, he saves each one as a pattern file and they are all plotted later, in a batch mode, on a Zericon 4800 A-E plotter that handles paper up to size E.

"The process is essentially the same for designing pressure vessels," Octavio Perales said. "Right now, we are completing a computer program that will link the results obtained from the calculations program directly with CADKEY to produce manufacturing drawings without the need for draftsmen to intervene. This will avoid errors that they may generate as they are entering design data."



A heat-exchanger tube template.

Other Elements in Heat-Exchanger Design

Most heat exchangers contain segmented deflectors which serve both to support the tubes inside the shell and to direct the flow of fluid from the side of the shell across the tubes. Critical elements are: the space between the tubes and the holes in the deflectors; the space between the deflectors and the interior of the shell; the space between the tubes outside of the tube bundle and the interior of the shell, and the free space between the tubes in the tube bundle.

Incrustation poses serious problems with heat exchangers. During operation, a film of dirt, rust, resins, or insoluble salts gradually forms on the surfaces of the tubes. This film represents an additional surface which resists the transfer of heat due to the deposits.

Applications for Heat Exchangers

SWECOMEX's heat exchangers find applications in a wide variety of industries. SWECOMEX has produced shell-and-tube exchangers for the world's largest, solar, electric-power generating systems, as well as systems for synthesizing ammonia, and processing oil. Air-cooled condensers with finned tubes, surface condensers and feed-water heaters work in conventional power-generating plants. Air-cooled condensers with finned tubes also play major roles in a variety of process industries. SWECOMEX pressure vessels work in water-treatment systems for removing minerals from water.

SWECOMEX's products meet all applicable the standards of the American Society of Mechanical Engineers, the Tubular Exchanger Manufacturers Association, the Heat Exchange Institute, the American Society for Testing and Materials, the American Petroleum Institute, the Association of American Railroads, the American National Standards Institute, the American Bureau of Shipping, and the Heat Transfer Research, Inc.

DataCAD Users' Meeting

(Continued from page 7)

has been developing a major DataCAD release planned for some time in 1991. He explained that the reason for having three teams working in parallel is to move DataCAD forward rapidly in advancing the state of the art for A/E/C software. Animated questions and answers went on throughout the meeting.

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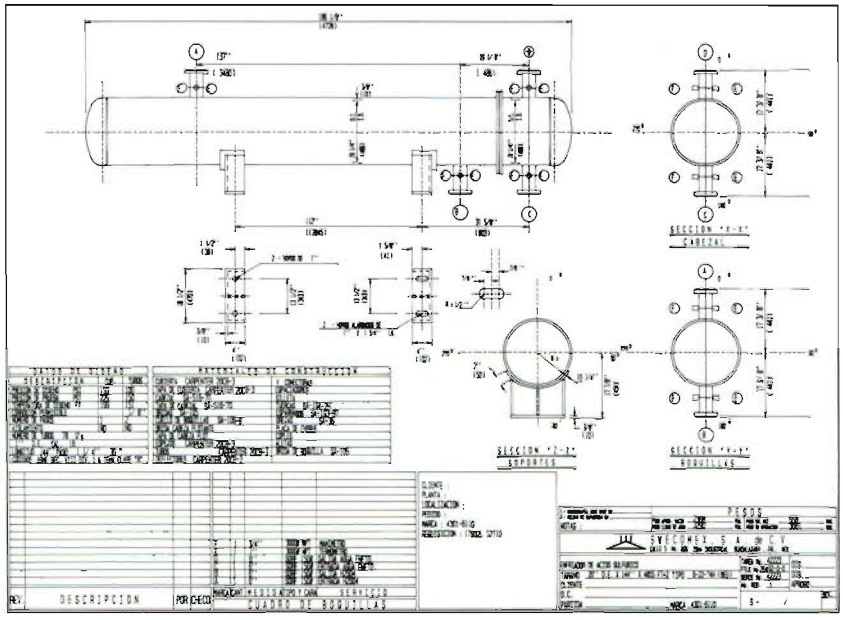
SWECOMEX Uses CADKEY 3™ To Design Heat Exchangers Used Around The World!

SWECOMEX, S.A., of Guadalajara, Jalisco, Mexico, has been designing and manufacturing heat-transfer process equipment for more than thirty years. For more than three years, SWECOMEX's engineers have been using CADKEY® to design their heat exchangers.

"We have been using CADKEY for our design work ever since Version 2.02," said Octavio Perales, Chief of Engineering Mechanization. "Since the arrival of Version 3.12, we also use CADKEY to design pressure vessels."

A heat exchanger is any device, such as a radiator, for transferring heat energy from a warmer medium to a cooler medium. SWECOMEX custom designs many different types of heat exchangers. They can range from one tube inside another with a small exchange surface to complex condensers for the discharge of steam from turbines in which there can be many square miles of exchange surface. Between these two extremes lies a very wide gamut of shell-and-tube heat exchangers, each identified by distinctive design characteristics, for example, U-shaped tube bundles, finned tubes, fixed tube sheets, floating head, etc.



A refrigeration unit to cool sulfuric acid.

Two Essential Elements in Heat-Exchanger Design

The design of heat exchangers involves two essential elements: (1) thermodynamic and fluid-processing requirements, and (2) mechanical requirements. The process requirements determine the mechanical requirements. SWECOMEX's Engineering Department is responsible for the mechanical design of all the equipment that the company manufactures.

Calculating the thickness and dimensions needed in the design of each component of a heat exchanger or of a pressure vessel must take into account:

- internal and external pressures;
- loading on the equipment due to the weight of the vessel and its contents;
- static reactions due to the weight of equipment

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