

Mechanical Engineering News



For the Power, Petrochemical and Related Industries

Volume 23
June, 1997

The COADE Mechanical Engineering News Bulletin is intended to provide information about software applications and development for Mechanical Engineers serving the power, petrochemical, and related industries. The Bulletin also serves as the official notification vehicle for software errors discovered in those programs offered by COADE.

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Area Code Change Mandatory

As of June 7, 1997, it is mandatory to use the 281 area code (instead of the old 713) when contacting COADE by telephone, fax, or BBS.

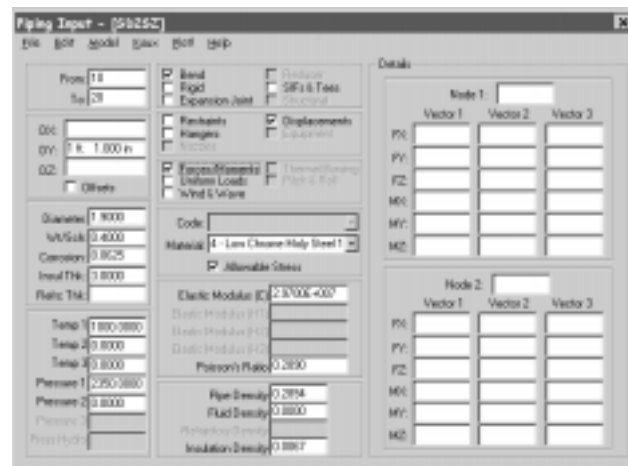
Price Increases

As of September 1, 1997, there will be an increase in the purchase price of the COADE Vessel software programs, PVELite and CodeCalc.

CAESAR II Version 4.00 (Windows 95/NT) will be automatically shipped to those users who are current on our Support, Maintenance, and Update plan. CAESAR II users who are not current must pay an additional surcharge above the regular penalty fee if they wish to renew their Support, Maintenance, and Update Agreement and receive the Windows version of CAESAR II.

The Windows Version of CAESAR II

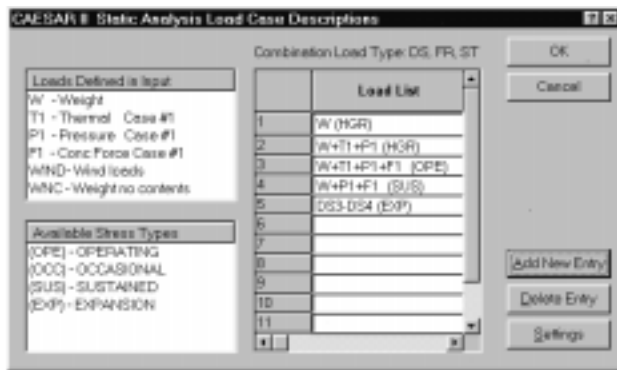
by: Richard Ay



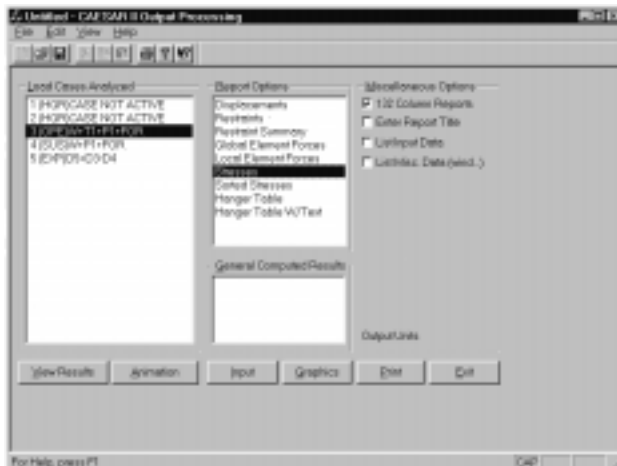
As stated in the documentation for the **CAESAR II** 3.24 update (see accompanying article), COADE is working on a native Windows 95/NT version of **CAESAR II**, which will be released as Version 4.00. Version 4.00 is scheduled for release in the Summer of 1997. The development of

Version 4.00 has been ongoing, in parallel with the development of Version 3.24. (*Version 3.24 is the last DOS based version of CAESAR II. All future versions will require at least Windows 95 as the minimum operating system. Version 4.00 will not run under DOS or Windows 3.1. Be sure you consider this fact when evaluating your PC requirements.*)

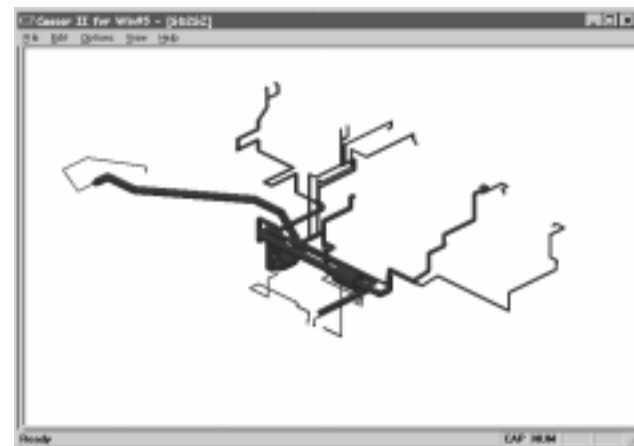
This Windows version is planned to take advantage of the Windows interface through the use of features such as: scrolling list boxes, tabbed dialog boxes, cut & paste, device independent drivers, common controls, and long file names.



While this version of CAESAR II will utilize these standard Windows interface controls, we are planning to keep the overall organization, logic, and operation of the program the same. This will allow a smooth transition from the DOS version to the Windows version, by maintaining the familiarization users have with the software. Anyone using the DOS version should not have any problem using the Windows version. In addition, the Windows version will maintain the same keyboard interface for those users who prefer the keyboard to the mouse. The achievement of these goals can be seen in the accompanying views of various screens from Version 4.00.



The Windows version will provide better memory management by utilizing the memory management scheme built into the operating system. This means the software will no longer run in “extended DOS memory”, and we can eliminate the need for the extended memory manager DOS4GW. Memory, its allocation, and its management are now controlled by the operating system.



Similarly, certain DOS configuration items are also controlled by the operating system as well. Items such as screen colors, screen resolution, and printers are now controlled at the system level by Windows. This will permit the elimination of a number of DOS program modules: the system check utility SYSCHK, the pen plot module PENPLT, the program loader C2 (merged with the Main Menu), and an overall simplification of the configuration module C2SETUP. Additionally, with the availability of the Windows NOTEPAD program, the need for C2EDIT has been eliminated.

COADE Seminars Receive IACET Accreditation

by: David Diehl

In recognition of the importance of ongoing education for professional engineers and the increased popularity in our pipe stress and pressure vessel classes, COADE sought certification of its Continuing Education Unit (CEU) by a recognized organization. The CEU is a unit of measure of instruction equal to 10 hours of formal training. In order to further qualify our use of the CEU, COADE applied to the International Association for Continuing Education and training (IACET) to become an Authorized CEU Sponsor.

Our application to IACET required improvements to our training in several areas. We now have a better idea of what

students need to learn, our materials are more standardized to meet those goals, and our course is evaluated by the students to confirm that the goals are met. Our documentation has also improved. Not only is a certificate issued to each student at the completion of a course, but any former student may now request a transcript for all COADE courses.

We can now say that as an Authorized CEU Sponsor, COADE's CEU criteria have been reviewed and approved by IACET. The CEU logo and our membership number will now appear on all training certificates issued by COADE.



The Basics of Electronic File Transfer and E-Mail

by: Richard Ay

Most PC users now have on-line access to a variety of services (if you don't have access, you need it). This access can range from the Internet, to services such as CompuServe, to Bulletin Board Systems. Each of these services provides a means to transmit files from one user to another. This article discusses the basic ins and outs of setting up file transfer activities and E-Mail.

First, you must know what to send. For COADE software, most problems can be simulated with only the input file. Occasionally special units or configuration files are also needed. It is not necessary to send the entire job (intermediate files and output files) for COADE to resolve the issue. Sending all job files just wastes transmission time on both ends.

Second, unless they are very small, all files transmitted electronically should be compressed into a .ZIP archive. This provides two benefits; first the only thing to be sent is the single .ZIP file, second the amount of data sent is reduced on the order of 50%. This speeds transmission times considerably.

Third, **attach** the files to an E-Mail message, do not **include** them in the message. By attaching the file, it remains a separate entity and can be moved about freely on the recipients end. If the file is included, then the recipient must edit out the file, which is close to impossible if the data is binary.

Fourth, in the E-Mail message, state what the attachment is supposed to contain. This informs the recipient of what to expect, in case of file corruption, or something is accidentally not sent. Additionally, E-Mail signatures should contain a company name and a fax number as minimal information. Often times the senders "reply to" address is incorrect and unless other contact information is provided, we can not respond to the message.

Fifth, most transmissions should be performed as **binary data**, even if the attachment is text. Text can be thought of as "readable" binary data. Therefore you can send text as binary, but not binary as text. Sending a binary program input file as text will cause file corruption. Setting your communications package to default to binary transmissions is a safe setting that will work 99% of the time.

Sixth, unless it will improve the readability of the message, do not include the original message in your response. (The sender will remember the message, or have access to a copy of the message.) Including the original message in the response causes E-Mail to grow to large documents, increasing transmission time, and wastes paper when printed.

Also watch the total size of what you intend to send via E-Mail. Many services impose limits on the size of attachments. These limits range from 100 Kbytes up to 1 Mbyte. Exceeding these limits rejects the transfer.

Finally, it is not necessary to flag your E-Mail message as **priority**. COADE treats all E-Mail documents (and faxes) as priority, urgent. E-Mail and faxes are answered immediately upon receipt.

CAESAR II Version 3.24 - The Most Comprehensive Release in 3 Years

by: Richard Ay

In March 1997, COADE released Version 3.24 of the **CAESAR II** Pipe Stress Analysis program. This release incorporates many enhancements and new features, many of which have been suggested by the user community. The following items have been incorporated into **CAESAR II** for the 3.24 release.

- Multiple displacement, force, and uniform load vectors incorporated to facilitate better loading definitions.
- A “user modifiable” material data base (including allowable stresses and other Code data) is provided with automatic data update for temperature, material, and Code changes.
- Expanded valve & flange data base (from COADE’s **CADWorx/PIPE** package).
- Improved analysis for FRP (fiberglass) pipe, including vendor material files and the UKOOA code.
- BS (British Standard) 5500 nozzle flexibility calculations have been added.
- Enhanced link to COADE’s **CADWorx/PIPE** package. This is the industry’s 1st intelligent, fully functional, bi-directional link between CAD and Pipe Stress programs.
- Additional data bases for: spring hanger and structural steel tables.
- Modifications to address the “Year 2000” issue.
- API-610 8th edition added.
- ASCE 95 wind procedures implemented.
- Improvements to the Intergraph and Cadpipe interfaces.

Many other improvements have been made to the program for this release to make operations easier for users. Items such as: eight character file names, multiple users in the same data directory, and the specification of the active units file from the Configuration Module will make operations much smoother.

Following up on the work in progress for Version 3.24, the “A” patch was released in early May. The major component of the “A” patch is the incorporation of the IGE-TD/12

pipng code. (This code missed the 3.24 release due to schedule slippage.) Most of the other changes in the “A” patch deal with file name problems as a result of increasing the job name from 6 to 8 characters. The 3.24 “A” patch can be downloaded from our WEB site (www.coade.com) or from our BBS (281-890-7286).

What Is Coming in TANK Version 1.50

by: Richard Ay

TANK Version 1.50 has been completed and has just been released. The major changes for this version of the software are:

- API-650 Addendum 3 updates (December 1996) incorporated.
- Grillage computations per API-650 Appendix I added.
- Configuration option for considering corroded shell in Appendix F computations.
- Modifications for the “Year 2000” have been incorporated.
- A new section has been added to the “Allowed Fluid Height” report, which shows the allowed fluid height for the tank as a whole. (The current report shows the allowed fluid heights above the bottom of each individual course.)
- Two modifications were made to the shell course duplication logic. First, versions prior to 1.50 did not duplicate material properties on new shell courses added to an existing input file. This ability has been added for Version 1.50.

The second modification allows the duplication of the corrosion allowance to the upper courses to be stopped by entering a value of zero. Previous versions treated zero as a blank, permitting the duplication of the corrosion from lower courses.

- Numerous additional warning messages have been added to the software as a result of user suggestions. For example, activating API-650 Appendix A or API-653 for thickness computations, now causes a “*warning message*” to be generated if the joint efficiency is left as 1.0 on the General Tank Data Spreadsheet.

New in CADWorx/PIPE Version 1.10

by: Pat Patel

CADWorx/PIPE version 1.10 started shipping in April 1997. New features associated with version 1.10 are Auto-Insertion and support for **CAESAR II** 3.24.

Automatic insertion of components into existing pipe runs was added which is a great new time saving feature. You can route a piping run and then go back and freely insert components into the run as required. If **CADWorx** detects the presence of piping, the insertion of the component into the run takes place. If this location was randomly picked, a new prompt will appear to confirm the distance from the end of the pipe. This feature is only available in AutoCAD Release 13 DOS and Windows.

This version has also been modified to support **CAESAR II** version 3.24 file format. Previous versions of **CADWorx/PIPE** are not compatible with **CAESAR II** version 3.24. **CADWorx/PIPE** version 1.10 is still compatible with earlier versions of **CAESAR II**. This can be controlled by using the startup defaults dialog to direct **CADWorx/PIPE** to use either 3.23 or 3.24.

CADWorx/PIPE version 1.10 will be the last release that supports AutoCAD Release 12 for DOS and Windows. AutoCAD Release 12 does not include the automatic insertion feature mentioned above. Since development of AutoCAD Release 14 is currently taking place, future development of **CADWorx/PIPE** for Release 12 has been dropped.

This version will also be the last release that supports AutoCAD Release 13 for DOS. Bugs found in this version will be corrected, but no additional functionality will be added. The Windows version of **CADWorx/PIPE** for Release 13 will be maintained and improved for quite a while and should be identical to AutoCAD Release 14 for the near future.

The primary decision to support only one platform (Windows) was due to Autodesk leading us in this direction. AutoCAD Release 14 will only be supplied for the Windows 95, Windows NT 3.51, and Window NT 4.00. This allows Autodesk (and COADE) to provide the user with a much better product. It provides us more time to devote to improving the present product instead of trying to maintain 5 different versions.

What's new in CADWorx/PIPE Version 2.00 (July 1997)

by: Pat Patel

CADWorx/PIPE Version 2.00 is planned for release in July 1997. As mentioned above, this version will support only AutoCAD Release 13c4 and Release 14 for Windows.

The following new components are planned for **CADWorx/PIPE**: reducing flange, reducing coupling, nipple-o-let, lateral-o-let, 22.5° elbow, 11.25° elbow, Y shape, flanged 90° elbow, flanged pipe, flanged tee, flanged concentric, flanged eccentric, concentric swage with hub, and eccentric swage with hub. Hopefully these new components will provide **CADWorx/PIPE** the functionality required in other piping systems such as copper, PVC, etc.

The specifications editor will be enhanced and reorganized in this version. The current specification editor dialog sorts and lists the components by the component's program sequence and displays them in a typical list box. The program sequence is a unique number that is assigned to each component in **CADWorx/PIPE**. For example, all pipes have a program sequence of one, 90° long radius elbows are two, and so on. In previous versions, the specification entries were listed from 1 to 107 which sometimes proved inadequate for quickly locating a component within the specification. In version 2.00, there will be 14 new components with program sequence of 108 to 121 (the new component listed above). The new dialog will list the components by types such as elbows, tees, reducers, valves. Elbows would list all types like butt weld, threaded and socketed. These individual groups will show up in the list box instead of the entire 121 components. This allows the user to quickly find and determine what components are available within the specification.

The ability to generate database files in **CADWorx/PIPE** will be added to version 2.00. The database files will contain the components extended data (xdata) such as spec, size, etc. This xdata is attached to the centerline of all **CADWorx** components and can selectively be stored to an external database file. The user can add their own information associated with each component by adding columns to the database file with any database management system. With this version of **CADWorx/PIPE**, the database will not have links back to the drawing but this may be added in a future release. The database files will be generated using the Window's Open Database Connectivity (ODBC) technology.

CADWorx/P&ID Preview

COADE plans on releasing **CADWorx/P&ID** later this year. This process and instrumentation drafting package will work with AutoCAD Release 13c4 and 14 for Windows 95/NT. The P&ID will be a database driven application which will use the Open Database Connective (ODBC) standard setup for Windows 95/NT. ODBC allows the end user to determine what type of database output to use (dBase, Access, FoxPro, Excel, Paradox, Oracle, SQL Server, etc.). Since Windows 95/NT is becoming the standard operating system for PCs, most database applications have an ODBC driver. **CADWorx/P&ID** will write a database file for whatever ODBC drivers that are configured on the user's machine. Windows 95/NT ships with all ODBC database drivers mentioned above.

The P&ID allows three options concerning database links to the drawing files. The first option involves no database links to the drawing, the second option involves keeping the database internal to the drawing (DWG) file, and the third option involves keeping the database files external to the drawing. With the third option, multiple drawings can read and write to the same database files.

When using external database files, the P&ID requires the user to create a project directory. This directory will contain all drawings and database files that have links with each other. In addition, project specific settings are also kept in this directory. Drawing files can be added or deleted from the project. Essentially, all the drawings and database files are kept in one location for easy access and use.

There are five basic type of components in **CADWorx/P&ID** each with a link into a database table. These five types of components are lines, instruments, valves, vessels, and mechanical. The columns in these tables can be changed dynamically by the user per project requirements. A certain number of data columns are used to maintain the relational aspect of the database but the user can add additional data columns dynamically to completely customize the database table for each project. The customized format of the database tables are kept in the project directory allowing each project to have a customized database.

As mentioned above, all the components in the P&ID will have a link to a database table. To access and modify the linked information, the user would simply edit the component or process (similar to *CEDIT* in the piping package). The

dialog box shown in Figure 1 appears when a process line or component is edited. This dialog box allows the user to enter or modify the size, spec, and tag number associated with this process line. The *Additional Data* button allows the modification of the dynamic data for the process line that was set up with the project. The *Documentation* button shows the user all the documents linked to the line or entity as shown in Figure 2 (a set of pump curves attached to a pump in the drawing). Documents can be added, deleted, or viewed from this dialog. The *Additional Data* button in the documentation dialog shows the dynamic data that's available. All information presented in the figures are stored in the database tables or internally in the drawing. This information could be edited outside of **CADWorx/P&ID** with any database program.



Figure 1 - Editing Line Attributes

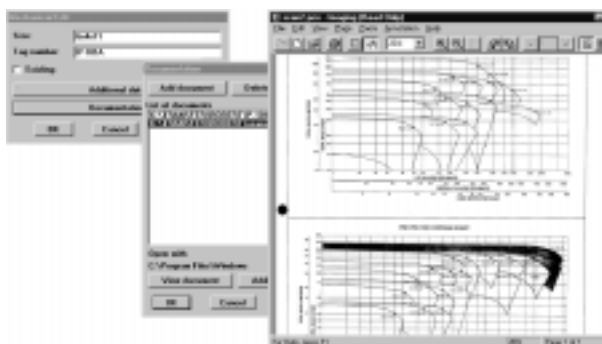


Figure 2 - Linked Documents (Pump Curves)

CADWorx/PIPE Working Demo Version 1.10

by: Robert Wheat

CADWorx/PIPE now has a working demo version with all the functionality of the full run program. The demo version is available on the **CADWorx** page of the COADE Web site (<http://www.coade.com/pcadworx.htm>). The demo version requires AutoCAD Release 13c4 for Windows 95/NT. The only differences between the full run (purchased) version and the demo version are: the demo version will only allow components with sizes of 2 inch, 4 inch, and 6 inch; the demo version only comes with the 150 and 300 pound template specifications. An extensive Windows based tutorial is provided with the demo to introduce all the features of **CADWorx/PIPE**.

Best CADWorx/PIPE Drawing Contest

COADE is sponsoring a **CADWorx/PIPE** best drawing contest. The winner gets one year of free maintenance and upgrades for **CADWorx/PIPE** (currently valued at \$500.00 US Dollars).

The rules for the contest are:

- Any type of drawing (Orthographic, Isometric, or 3D) drawn in **CADWorx/PIPE** can be submitted.
- Required are any user created specifications or data files that were used in the drawing.
- Drawings can be submitted in the following manner to COADE: email drawings and data files to query@coade.com; mail drawings or data files to COADE's street address on floppy disk; upload the drawings and data files to COADE's BBS site (281-890-7286).
- There is no limit to how many drawings a single person or company can submit.
- The winner of the contest will be decided by the **CADWorx** Development Staff.
- The winner will be announced in the next publication of Mechanical Engineering News and the winning drawing will also be posted on our Web page (<http://www.coade.com/>).
- All drawings must be submitted to COADE by January 1, 1998, when the contest ends.

What is Coming in CODECALC Version 5.60

by: Tom Ren

We are releasing **CODECALC** Version 5.60 in late June (ASME Section VIII code Addenda -1996 becomes mandatory on July 1). The major changes are:

- The new material database in **CODECALC** now includes *all the ASME Section II Part D* materials (over 2000) listed for **ASME Section VIII Div. 1**.
- **ASME Section VIII Div. 1, Addenda 1996** code updates
 - Changes for *MDMT* calculations.
 - References to nominal thickness vs. actual thickness.
 - References to design pressure vs. MAWP.
 - Updates for *Floating Heads, Thick Expansion Joints and ASME Tubesheets*.
 - Changes for large nozzle calculations per Code Case-2236 for Appendix 1-7(b).
- The **ASCE-95** wind code has been incorporated into the *Leg & Lug* and *Horizontal Vessel* modules.
- *WRC107 Module: ASME Sec VIII Div. 2* stress indices and **WRC-107** SIF(kn, kb) values are incorporated. Also rectangular reinforcing pad analysis has been added.
- *Conical Sections: With knuckle and/or flare*, the *moment of inertia* per guidelines in Appendix 1-8 is computed.
- *Nozzle Module: The nozzle retirement* (discard) thickness and maximum corrosion allowance are now iterated per reinforced area requirement and UG45, etc.
- *ASME Tubesheet Module & TEMA Tubesheet: The iteration algorithm* for the required tubesheet thickness calculation is improved to ensure convergence.
- *Leg & Lug Module: Forces and moments* for WRC107 analysis are now displayed.
- *Basing Module: Top ring or plate required thickness* is also calculated per Moss.
- *Graphics: The graphics* (scaled and dimensioned plots for every component) have been enhanced.
- *Examples: The examples* (including typical Code examples) have been expanded.

The COADE WEB Site

by: Richard Ay

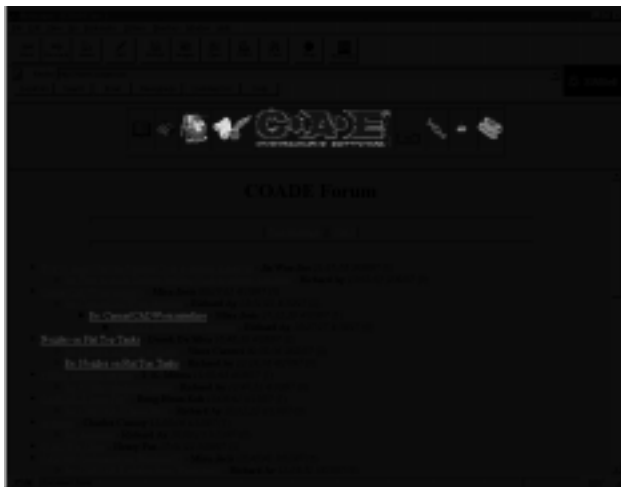
Usage of the COADE WEB site has increased significantly in recent months. Users and potential clients can obtain the latest information on products, product development, and download demos and patch files. (The NEWS file on this site is regularly updated so that users can stay informed about COADE software products.) Recently, two new capabilities have been added to the COADE WEB page, a search engine, and a discussion forum.

ESL Driver Installation Utility:

COADE has developed a small utility program to install the necessary ESL drivers for Windows 95 and Windows NT. This utility loads the necessary drivers via the SYSTEM.INI file or the System Registry based on the type of ESL identified by the user. This utility can be downloaded from the COADE WEB site.

The search engine allows a user to query all of the files on our web site for a particular text string. For example, you could search for “friction”, “extended memory”, or a particular software patch. This search ability allows users to quickly find a file on a specific topic of interest.

The discussion forum is an area of the web page set aside for users to post *public* messages. Anyone can answer or comment on these messages. This discussion forum allows users to obtain answers to questions and obtain alternative ideas from not only the COADE staff, but other users as well. The more the forum is used, the more beneficial it will become. A partial listing of the topics and responses in the forum is shown in the figure below.



If you rely on COADE software, you should check this WEB page regularly. The “Home” page contains a note showing the last date the site was updated. This date and the News file are your best means of staying current on your applications.

Frequently Asked Questions about CODECALC and PVElite

by: Tom Ren and Scott Mayeux

1) What is the difference between PVElite and CODECALC?

CODECALC is a *component* design and analysis program for pressure vessels and heat exchangers per ASME VIII Div.1, TEMA, WRC107, etc. It is currently a DOS-based program. PVElite is the state-of-the-art *complete* design and analysis program for pressure vessels (tall tower and horizontal vessels), plus component design and analysis. It does comprehensive wind, seismic and combined load analysis. PVElite includes all the CODECALC capabilities. In addition to ASME VIII Div.1, PVElite 3.0 also designs per Div.2 and BS5500. What’s more, PVElite 3.0 is a full 32-bit Windows 95/NT program, with a highly interactive graphical user interface including on-line help for every input field.

2) How do you Analyze Hill-side Nozzles?

The user needs to input the shell/head type and nozzle offset dimension from the centerline. According to UG-37 and Appendix L-7.7.8, for hill-side nozzles, 2 separate analyses may be necessary. The first analysis should be run in the longitudinal (hillside) direction – the offset distance should be specified and the angle should be set to 0 or blank. The program will use F=0.5 unless there is a reinforcing pad. The second analysis should be run in the Hoop direction with an angle of 90 degrees (F=1.0 is used internally). For CODECALC, please review Appendix L-7.7.8 and the program supplied example file *checks* (nozzle item #9, 10 and 11) for details. For PVElite, these two steps are combined automatically based on the input hillside nozzle offset dimension.

3) Why are there no nozzle reinforcement results for Small Nozzles?

Per UG-36, for certain “small nozzles”, it is not required to perform the area replacement calculations. However, you may choose to print the area calculations by toggling

the item “*Area_Calcs_for_Small_Nozzles*” under **Computation Control Directives** from **Config** under **Utilities**. Note that **CODECALC** calculates the areas internally in order to estimate the AMAWP based on the input geometry. You may also delete the AMAWP results from the report if you like.

4) **Is the table or the chart used for external pressure calculations?**

Both **CODECALC 5.5** and **PVElite 3.0** perform external pressure calculations based on the external pressure *charts*, not the tables. Briefly, based on Do/t and L/Do, using ASME Section II Part D Fig. G to obtain parameter **A**, using the corresponding external pressure chart for the material to get **B**, then MAWP is calculated. Note that the tables were derived from the chart, not the chart from the table. It is more accurate to use the chart.

5) **How is the knuckle-to-cylinder junction treated under external pressure?**

Per **ASME VIII Div.1** UG-28(b)(4) with Fig. UG-28.1, and Appendix 1-8: when the knuckle-to-cylinder junction is a line of support, the moment of inertia should satisfy Appendix 1-8 rules. The calculation procedure should follow Appendix L-3.3. **CODECALC 5.60** and **PVElite 3.10** will include such calculations for knuckle-to-cylinder junction. However, because the shell/knuckle/cone is usually so close to the resulting neutral axis, the calculated moment of inertia may often be much smaller than the required. For this type of geometry, Appendix 1-8 seems to be a very conservative requirement.

Please note that without a knuckle and/or a flare, the current and previous **CODECALC** and **PVElite** versions have been calculating the moment of inertia per Appendix 1-8. Please also note that the program can calculate the half-apex angle with a knuckle and/or flare – it will show a warning if the calculated value is different from the input angle, but the program still uses user supplied angle.

6) **How do you check and edit material properties?**

If you choose the material directly from the program database, the properties should have been properly retrieved. You may view the detail properties while selecting the material. If you enter your own material name and if the material is not in our database, you need to supply the related material properties. In **PVElite** you may check and edit the current material properties from the “material dialog box” by hitting [Enter] in the material

input field. In **CODECALC**, you may use [F8] in the material input field to get access the **CODECALC** materials property editor.

The complete ASME material database is included in **PVElite 3.0** (for Div.1 and Div.2), and **CODECALC 5.6** (for Div.1). The user may also add “user defined materials” (old materials, non-ASME materials) to the material database for direct retrieval.

7) **How do you change or make a new units file?**

Both **PVElite** and **CODECALC** allow the user to choose *English, mm* or *SI units*, or a user-defined units system – any units, any combinations you want.

In **PVElite 3.0**, choose **Utility** from the *Main Menu*, select **Set Unit** and pick one units file (*.fil) from \PVWin\System subdirectory. If you want to create your own units file, you may select **Make Unit** from **Utility**, and pick any kind of unit combination you like or even create your own units, then save as one new *.fil file.

In **CODECALC**, choose **Utility** from *Main Menu*, select **Config** and pick **Database Definitions** to set one units file as default. Select **SwapUnit** from **Utility** to change the current input file to the default units. Or select **MakeUnit** from **Utility** to make a new *.fil file.

How to use WRC107 program in CAESAR II, PVElite, and CODECALC

by: Tom Ren

Currently **CAESAR II**, **PVElite** and **CODECALC** contain a **WRC-107** program module to calculate the local stresses at the attachment/vessel intersection. This module is based on “*Local Stresses in Spherical and Cylindrical Shells due to External Loadings*”, **Welding Research Council Bulletin 107**, August 1965, and revision 1979, based on the prior work of P.P. Bijlaard.

In order to facilitate the user’s evaluation of these local stresses, the **WRC-107** program now has a powerful *stress summation* capability. The program computes overall stress intensities on a vessel/nozzle intersection in accordance with **ASME Section VIII Division 2 Appendix-4** rules. Local vessel stress calculations for *SUSTained*, *EXPansion*, and/or *OCCassional* external nozzle loads along with pressure stresses are transformed into code defined stress computations. The output, in the form of general primary membrane stress **Pm**, local primary membrane stress **PI**,

and secondary stress **Q** and their appropriate combinations, can be compared with Section VIII Div. 2 rules based on user input cold and hot stress intensity allowables S_{mc} and S_{mh} (from ASME part D Table 2A).

The following example is illustrated using the **CODECALC** program. The input and output are almost identical for **CAESAR II** and **PVELite**. **CODECALC** and **PVELite** also allow input based on **WRC-107** conventions.

The vessel and nozzle geometry are: Vertical cylindrical shell OD DV=120", thickness TV=.75", Horizontal nozzle OD DN=12.75", thickness TN=.375", with 90° intersection. Design pressure 150 psi, external piping loads are supplied by piping stress engineer (probably using **CAESAR II**) for both **SUSTAINED** and **EXPANSION** cases in global coordinates.

First you need to check geometry limitations to determine if **WRC-107** is applicable for an elastic analysis. The conditions ($0.0571 < DN/DV < 0.571$, $DV/TV > 50$ and 90° intersection) are indeed met for this case, so **WRC-107** is applicable. Set the attachment type as round and hollow for the nozzle. There is no reinforcing pad. If the geometry includes a reinforcing pad, the program will perform two analyses. The first analysis will compute the stresses at the edge of the nozzle. The second stress analysis will be at the edge of the reinforcing pad.

Second you need to input orientations for the Vessel and Nozzle. The sign of the vessel centerline direction vector can be + or - and follows the location of data point (A->D) convention defined by **WRC-107**. Remember that points A and B always lie along the direction of the vessel. The nozzle direction vector is defined as a vector pointing from the nozzle connection to the centerline of the vessel. The Vessel and Nozzle direction cosine should always be perpendicular in order to use **WRC-107**.

Then you can input the nozzle loads as global forces and moments for both the Sustained and Expansion cases. You may also include Occasional loads if any. The program will automatically convert the loads to local loads according to the **WRC-107** conventions. In **PVELite**, **CODECALC** and future versions of **CAESAR II**, you can also plot those loads per **WRC107** conventions.

Next you need to decide if you want to include *pressure thrust* (pressure times area of the opening). The default is Yes. Normally you need to include pressure thrust. If you have an anchor close to the intersection, you may not need to. For this example, the pressure thrust is included, and we choose to use the latest **WRC-107** version/edition.

In many instances, the geometric parameter Beta exceeds

the parameter Gamma for certain **WRC-107** curves. You need to decide if you want to use the last point on the curve that is available, or use interactive control to input your own value. For this example, we let the program take the last value from the curve.

For regular analysis, DO NOT include "WRC107 stress concentration factors K_n and K_b " (in **CAESAR II** version 3.24 input 0.0 or leave the fillet Radius between the Vessel and Nozzle blank). Also DO NOT include "Pressure Stress Indices per Div. 2 AD-560.7". Now you can run the program to review the results. The primary stress due to the internal pressure and the shake down stress due to the external loads are automatically combined and summed per ASME VIII Div.2 Appendix-4 Fig. 4-130.1 and stress intensities are compared with their allowables.

Finally you need to check whether or not the elastic approach as outlined in **ASME VIII Div.2**, AD-160 is satisfactory. If yes, the analysis is now completed. If some of the conditions of AD-160 are not satisfied, you probably need to perform the formal fatigue analysis. Peak stresses are required to be calculated or estimated. You may consider using AD-560 "Alternative Rules for Nozzle Design" instead of Article 4-6 "Stresses in Openings for Fatigue Evaluation" to calculate the peak pressure stress for the opening. If all conditions of AD-560.1 through AD-560.6 are satisfied, the stress indices given in Table AD-560.7 may be used. If you indicate "Yes", the program will use these pressure stress indices to modify the primary stress due to internal pressure (hoop and longitudinal stress).

For external loads, the highest peak stress are usually localized in fillets and transitions. If you decide to use **WRC107** stress concentration factors (K_n , K_b), the fillet radius between the Vessel and Nozzle is required. (If a reinforcing pad is used, the program assumes the same pad fillet radius.) The program will make a crude approximation and use **WRC107 Appendix-B** equations (3) and (4) to estimate K_n and K_b . The tension and bending stresses are thus modified using K_n and K_b respectively. The program outputs the local stresses for 4 pairs of points (upper and lower) at the intersection. You *should not* direct the program to perform the stress summations. Instead you should determine which stresses should be added based on locations in order to obtain the peak **stress level**, then use Appendix-4 & 5 rules and fatigue curves depending on operation cycles.

Based on comparisons with finite element analysis, it is known that the top tip of the fillet weld on the nozzle usually experiences the highest peak stress due to external loads. So it is conservative to add all the peak stresses after including both pressure stress indices and concentration

factors. Note that the stress summation may ONLY be used to check **stress intensities**, not stress levels. You need the peak **stress level** to perform fatigue analysis. The current stress summation routine does not compare stress level with fatigue allowables per Appendix-5. However, you may find the stress summation results useful to compare the combined effect due to the stress concentration factor and pressure stress indices.

WRC 107 Example including WRC107 Summations:

```

CODECALC 5.60                               COADE Engineering Software, Inc.
FileName : WRC_example
WRC107 Analysis : Newsletter                 ITEM: 1, 05:50pm, 05/29/97

Input Echo, WRC107 Number 1,                Description: Newsletter

Diameter Basis for Vessel                    VBASIS      OD
Cylindrical or Spherical Vessel             CYLSPH      Spherical
Corrosion Allowance for Vessel              CAS          .0000 in.
Vessel Diameter                             DV          120.000 in.
Vessel Thickness                             TV          .750 in.

Attachment Type                              TYPE         Round
WRC107 Attachment Classification            HOLSOL      Hollow

Diameter Basis for Nozzle                   NBASIS      OD
Corrosion Allowance for Nozzle             CAN          .0000 in.
Nozzle Diameter                             DN          12.750 in.
Nozzle Thickness                             TN          .375 in.

Vessel Centerline Direction Cosine         VX          .000
Vessel Centerline Direction Cosine         VY         -1.000
Vessel Centerline Direction Cosine         VZ          .000
Nozzle Centerline Direction Cosine         NX          1.000
Nozzle Centerline Direction Cosine         NY          .000
Nozzle Centerline Direction Cosine         NZ          .000

Cold S.I. Allowable                         Smc         20000.00 psi
Hot S.I. Allowable                          Smh         20000.00 psi

Global Force (SUS)                          Fx          1000.00 lb.
Global Force (SUS)                          Fy          2000.00 lb.
Global Force (SUS)                          Fz          3000.00 lb.
Global Moment (SUS)                         Mx          4000.00 ft.lb.
Global Moment (SUS)                         My          5000.00 ft.lb.
Global Moment (SUS)                         Mz          6000.00 ft.lb.
Internal Pressure (SUS)                     P           150.00 psig
Include Pressure Thrust                      Yes

Global Force (EXP)                          Fx          1500.00 lb.
Global Force (EXP)                          Fy          2500.00 lb.
Global Force (EXP)                          Fz          3500.00 lb.
Global Moment (EXP)                         Mx          4500.00 ft.lb.
Global Moment (EXP)                         My          5500.00 ft.lb.
Global Moment (EXP)                         Mz          6500.00 ft.lb.

Use Interactive Control                      INTACT      No
WRC107 Version                             VERSION     March 1979 ( B1 & B2 )

Include WRC107 SIF(Kn,Kb)-concentration factors No
Include Pressure Stress Indices per Div. 2   No
    
```



Listed below are the results:

WRC 107 Stress Calculation for **SUSTAINED** loads:

Radial Load	P	-15964.60	lb.
Circumferential Shear	(VC) V2	3000.00	lb.
Longitudinal Shear	(VL) V1	-2000.00	lb.
Circumferential Moment	(MC) M1	5000.00	ft.lb.
Longitudinal Moment	(ML) M2	6000.00	ft.lb.
Torsional Moment	MT	-4000.00	ft.lb.

Dimensionless Param: U = .95 TAU = 16.50 RHO = 4.00 (2.00)

Dimensionless Loads for Spherical Shells

Curves read for Figure Value

N(x) * T / P	SP 7	.02660
M(x) / P	SP 7	.00914
N(x) * T * SQRT(Rm * T) / MC	SM 7	.04601
M(x) * SQRT(Rm * T) / MC	SM 7	.01681
N(x) * T * SQRT(Rm * T) / ML	SM 7	.04601
M(x) * SQRT(Rm * T) / ML	SM 7	.01681

N(y) * T / P	SP 7	.20684
M(y) / P	SP 7	.02807
N(y) * T * SQRT(Rm * T) / MC	SM 7	.27508
M(y) * SQRT(Rm * T) / MC	SM 7	.06637
N(y) * T * SQRT(Rm * T) / ML	SM 7	.27508
M(y) * SQRT(Rm * T) / ML	SM 7	.06637

Stress Concentration Factors Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Nozzle Junction

Type of Stress	Load	Stress Values at (psi)							
		Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Rad. Memb. P		755	755	755	755	755	755	755	755
Rad. Bend. P		1556	-1556	1556	-1556	1556	-1556	1556	-1556
Rad. Memb. MC		0	0	0	0	-733	-733	733	733
Rad. Bend. MC		0	0	0	0	-1609	1609	1609	-1609
Rad. Memb. ML		-880	-880	880	880	0	0	0	0
Rad. Bend. ML		-1931	1931	1931	-1931	0	0	0	0
Tot. Rad. Str.		-500	250	5122	-1852	-31	75	4653	-1677
Tang. Memb. P		5870	5870	5870	5870	5870	5870	5870	5870
Tang. Bend. P		4780	-4780	4780	-4780	4780	-4780	4780	-4780
Tang. Memb. MC		0	0	0	0	-4387	-4387	4387	4387
Tang. Bend. MC		0	0	0	0	-6351	6351	6351	-6351
Tang. Memb. ML		-5265	-5265	5265	5265	0	0	0	0
Tang. Bend. ML		-7621	7621	7621	-7621	0	0	0	0
Tot. Tang. Str.		-2236	3446	23536	-1266	-88	3054	21388	-874
Shear VC		199	199	-199	-199	0	0	0	0
Shear VL		0	0	0	0	133	133	-133	-133
Shear MT		-250	-250	-250	-250	-250	-250	-250	-250
Tot. Shear		-51	-51	-449	-449	-117	-117	-383	-383
Str. Int.		2237	3446	23546	2095	240	3058	21396	1830

WRC 107 Stress Calculation for **EXPANSION** loads:

Radial Load	P	1500.00	lb.
Circumferential Shear	(VC) V2	3500.00	lb.
Longitudinal Shear	(VL) V1	-2500.00	lb.
Circumferential Moment	(MC) M1	5500.00	ft.lb.
Longitudinal Moment	(ML) M2	6500.00	ft.lb.
Torsional Moment	MT	-4500.00	ft.lb.

Dimensionless Param: U = .95 TAU = 16.50 RHO = 4.00 (2.00)

Dimensionless Loads for Spherical Shells

Curves read for Figure Value

N(x) * T / P	SP 7	.02660
M(x) / P	SP 7	.00914
N(x) * T * SQRT(Rm * T) / MC	SM 7	.04601
M(x) * SQRT(Rm * T) / MC	SM 7	.01681
N(x) * T * SQRT(Rm * T) / ML	SM 7	.04601
M(x) * SQRT(Rm * T) / ML	SM 7	.01681

N(y) * T / P	SP 7	.20684
M(y) / P	SP 7	.02807
N(y) * T * SQRT(Rm * T) / MC	SM 7	.27508
M(y) * SQRT(Rm * T) / MC	SM 7	.06637
N(y) * T * SQRT(Rm * T) / ML	SM 7	.27508
M(y) * SQRT(Rm * T) / ML	SM 7	.06637

Stress Concentration Factors Kn = 1.00, Kb = 1.00

Stresses in the Vessel at the Nozzle Junction

Type of Stress	Load	Stress Values at (psi)							
		Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Rad. Memb. P		-70	-70	-70	-70	-70	-70	-70	-70
Rad. Bend. P		-146	146	-146	146	-146	146	-146	146
Rad. Memb. MC		0	0	0	0	-807	-807	807	807
Rad. Bend. MC		0	0	0	0	-1770	1770	1770	-1770
Rad. Memb. ML		-954	-954	954	954	0	0	0	0
Rad. Bend. ML		-2091	2091	2091	-2091	0	0	0	0
Tot. Rad. Str.		-3261	1213	2829	-1061	-2793	1039	2361	-887
Tang. Memb. P		-551	-551	-551	-551	-551	-551	-551	-551
Tang. Bend. P		-449	449	-449	449	-449	449	-449	449
Tang. Memb. MC		0	0	0	0	-4826	-4826	4826	4826
Tang. Bend. MC		0	0	0	0	-6986	6986	6986	-6986
Tang. Memb. ML		-5704	-5704	5704	5704	0	0	0	0
Tang. Bend. ML		-8257	8257	8257	-8257	0	0	0	0
Tot. Tang. Str.		-14961	2451	12961	-2655	-12812	2058	10812	-2262
Shear VC		233	233	-233	-233	0	0	0	0
Shear VL		0	0	0	0	166	166	-166	-166
Shear MT		-281	-281	-281	-281	-281	-281	-281	-281
Tot. Shear		-48	-48	-514	-514	-115	-115	-447	-447
Str. Int.		14961	2452	12987	2806	12813	2070	10835	2394

WRC 107 Stress Summations:

Vessel Stress Summation @ Nozzle Junction

Type of Stress Int.	Location	Stress Values at (psi)							
		Au	Al	Bu	Bl	Cu	Cl	Du	Dl
Rad. Pm (SUS)		5925	5925	5925	5925	5925	5925	5925	5925
Rad. P1 (SUS)		-125	-125	1635	1635	22	22	1488	1488
Rad. Q (SUS)		-375	375	3487	-3487	-53	53	3165	-3165
Rad. Q (EXP)		-3261	1213	2829	-1061	-2793	1039	2361	-887
Long. Pm (SUS)		5925	5925	5925	5925	5925	5925	5925	5925
Long. P1 (SUS)		605	605	11135	11135	1483	1483	10257	10257
Long. Q (SUS)		-2841	2841	12401	-12401	-1571	1571	11131	-11131
Long. Q (EXP)		-14961	2451	12961	-2655	-12812	2058	10812	-2262
Shear Pm (SUS)		0	0	0	0	0	0	0	0
Shear P1 (SUS)		199	199	-199	-199	133	133	-133	-133
Shear Q (SUS)		-250	-250	-250	-250	-250	-250	-250	-250
Shear Q (EXP)		-48	-48	-514	-514	-115	-115	-447	-447
Pm (SUS)		5925	5925	5925	5925	5925	5925	5925	5925
Pm+P1 (SUS)		6580	6580	17064	17064	7420	7420	16184	16184
Pm+P1+Q (Total)		13437	11824	42454	3594	10086	11050	38152	3952
Type of Stress Int.		Max. S.I. (psi)		S.I. Allowable (psi)				Result	
Pm (SUS)		5925		20000				Passed	
Pm+P1 (SUS)		17064		30000				Passed	
Pm+P1+Q (TOTAL)		42454		60000				Passed	

The CODECALC Program, (C) 1989-1997 by COADE Engineering Software

PC Hardware & Systems for the Engineering User (Part 23)

by: Richard Ay

Configuring Windows 95 For Usage (Part 2)

(Note, COADE takes no responsibility for any of the changes you may make to your operating system as a result of this article. Furthermore, COADE does not offer technical support on Windows 95, Windows NT, or any other operating system. Any custom configuration at the operating system level should be performed by knowledgeable system personnel only!)

This is the second half of the article that appeared in the October 1996 issue of Mechanical Engineering News.)

Running Batch Files

A DOS batch file, that starts a Windows 95/NT program, continues processing batch file commands while the program is running. This can be a major problem if certain batch commands are dependent on the completion status of preceding commands and programs. The solution is to place the instruction "START /W" in front of the batch file line that invokes the Windows program. The "/W" switch causes the batch file to wait until the program terminates before continuing on to the next command.

Installing Additional Parts of Windows 95

Depending on whether or not, and how, your hardware vendor pre-installed Windows 95, some facilities may not be available. Any missing components should be on the Windows 95 diskettes or CD-ROM. To install a missing component, for example the Clipboard Viewer, the following steps are required (assuming the presence of the Windows 95 CD-ROM).

From the START menu, select SETTINGS, then CONTROL PANEL. From the CONTROL PANEL group select the icon for Add/Remove Programs. Once the Add/Remove Programs dialog box comes up, select the tab for Windows Setup. In the resulting scroll box, installed Windows components are shown in a white check box. Windows components only partially installed are shown with a gray check box. Double Click the gray box which corresponds to the component group you need to install. Then, select the specific component from the new scroll box. Once the selected item has been checked, select OK to begin the installation procedure, and follow the screen prompts.

Quick Re-Start of Windows 95

One of the tips currently circulating is a keystroke to perform a *quick* restart of Windows 95. On the "Shut Down" menu is an option labeled "Restart the Computer". This option is essentially a "warm boot". Installed memory is checked, drivers are reloaded, and Windows 95 is restarted. If all you want to do is restart Windows 95, you can avoid the shut down, memory check, and driver re-loading by holding the [Shift] key down as you click [Ok] on the "Shut Down" menu. *Be warned however, this procedure also skips reading the AUTOEXEC.BAT and CONFIG.SYS files.* This procedure only restarts Windows 95!

(Note that Windows 95 and Windows NT do not normally need AUTOEXEC.BAT or a CONFIG.SYS files. Unless you require these files for DOS applications, you are better off without them, as they just reduce the available system resources for Windows.)

Keeping Up To Date

As with any software program, errors and omissions will be discovered in Windows 95. When such problems are found and fixed, software companies release Updates or Patches. The first such patch to Windows 95 was released by Microsoft in late February 1996. This patch corrects a number of small problems with the operating system. This patch is officially referred to as "Service Pack 1". This patch can be obtained directly from Microsoft's WWW page on the Internet. (For those running Windows NT, the last patch level for Version 3.51 is "level 4", and the current patch level for Version 4.00 is "level 2".) These service packs can be downloaded from Microsoft's WEB site.

Once you start *patching* software (whether application or system software) it is always nice to have a way to check to see what "patch level" a particular machine has installed. COADE provides the program "COADEXE" to scan its .EXE files and report the patch level. Windows 95 provides the "Update Information Tool" to report its updates. This utility can be found from the START button by selecting *Programs*, then *Accessories*, then *System Tools* (*once the patch has been installed*).

"Service Pack 2" for Windows 95 has been released to OEM vendors, for distribution on their new PC machines. Contact your computer vendor to obtain this latest patch which they received from Microsoft.

Other Sources of Information

As Windows 95 is used in production environments by more and more people, anomalies will be discovered. Some

of these may be errors, general difficulties, or convenience issues. Today, many new hints and tips are published on the Internet. One of the best sources for information on Windows 95 is the web site at: <http://www.creativelement.com/win95ann/>. This site lists many problems and solutions users of Windows 95 have discovered.

Another good source of information on Windows 95 is the "Windows 95 Plus" package from Microsoft. This package includes a CD-ROM and a 1000 page text. The CD contains additional drivers, utilities, and information. The text explains many items concerning usage and configuration of the operating system.

Additional information can be found in the standard trade magazines, such as Byte and PC Magazine. Some of the more important Windows 95 related articles from PC Magazine are:

Vol	Page	Title
14-17	345	VFAT File System
14-17	362	Dynamic Control Panel
14-17	370	Long file names on Novell
14-17	423	Directory Structure of Win95
14-17	424	Win95 Annotated File List
14-18	109	Registry Instead of Environment
14-18	122	Netware Login & Long File Names
14-18	124	Better DOS Configuration
14-18	251	Registry Part 1
14-19	329	Registry Part 2
14-20	271	Exploring the Win95 Registry
15-1	271	Registry Part 3
15-	281	Explore Hotkeys in Win95
15-15	299	Now You're Playing with Power Toys
16-11	243	Partitioning Your Hard Disks

Not for the Faint of Heart

For some time now, it has been possible to obtain a set of *unofficial* Windows 95 extensions from Microsoft. These extensions, known as *Power Toys*, are available from Microsoft's WEB page. This set of 13 modules is not supported by Microsoft, so play with it at your own risk. However, one of the new utilities is *Tweak UI*. This module allows modification of many of the Windows User Interface characteristics which were previously untouchable, including the ability to save your password for automatic login. This alone makes acquiring *Power Toys* worthwhile. If you acquire *Power Toys*, you should check back with the Microsoft WEB site periodically, since this set of programs has been updated several times since its first release.

Another one of the options in *Tweak UI* allows the system

to always boot up to the *Boot Menu*. This is the same menu obtained by pressing [F8] when the floppy disk drivers are being loaded. (If you haven't turned off the Windows 95 logo screen you can't see this, you just have to hit [F8] during the display of the animated blue bar display.) This *Boot Menu* gives the options of booting to: a safe mode Windows, safe mode with network support, the command prompt, etc. This is invaluable when diagnosing a Operating System or Network problems.

If you really want to take control of your system, there are further modifications that can be made. First, in the C:\WINDOWS directory, rename logos.sys and logow.sys to logos.sav and logow.sav respectively. These files are the startup and shutdown graphics screens. If Windows 95 can't find them (as .sys files) it won't display them. **Next, make an AUTOEXEC.BAT file and add the command WIN as the last line.** The AUTOEXEC.BAT file will insure COMMAND.COM is loaded before Windows 95 starts up. Edit the MSDOS.SYS file again (discussed above) and insert the line *BootGui=0* in the *[Options]* section. These changes make the system boot to the command prompt, but the WIN command starts Windows 95 as normal (assuming you selected Normal Startup from the Boot Menu). These changes now leave you in MS DOS Version 7.0 when you choose "Shut down the computer". Basically all you are doing is shutting down Windows 95.

CAESAR II Notices

Listed below are those errors & omissions in the **CAESAR II** program that have been identified since the last newsletter.

- 1) Equipment Module: An error was found in the output generation of the allowable loads for API-617 nozzles, when the shaft is parallel to the "Z" axis. The allowables were switched twice, causing the allowables to display as if the shaft was aligned with the "X" axis. This error was corrected in Patch E to Version 3.23, and posted to the BBS and WEB sites.

An error was found in the output pass/fail status flag for vertical in-line pumps. This error caused the opposite status to be reported. This error was corrected in Patch F to Version 3.23, and posted to the BBS and WEB sites.

An error was found in multiple passes through the HEI output module which caused the graphic and allowable moments to be reported incorrectly. This error was corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

- 2) Error Check Module: A units conversion error was found when converting the API-650 nozzle expansion coefficient. This error was corrected in Patch E to Version 3.23, and posted to the BBS and WEB sites.

An error was found in the computation of the CODETI miter bend SIF calculation. The out-of-plane SIF value was computed using the .75 factor instead of the .9 factor. This error was corrected in Patch E to Version 3.23, and posted to the BBS and WEB sites.

The proper defaults for certain UKOOA allowable stress terms were not set properly if these fields were left blank. This error was corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

A correction was made to the allowed length of structural job file names. This error was corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

A correction was made in the API-650 nozzle print routine to properly output the value of "delta temperature" for non-English units. This error was corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

- 3) Input Units Conversion module: A units conversion error was found when converting the API-650 nozzle expansion coefficient. This error was corrected in Patch E to Version 3.23, and posted to the BBS and WEB sites.

A problem was found when importing CADWorx/PIPE generated models, when not in English units. This error was corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

- 4) Input Module: An incorrect counter value was found which could cause this module to abort when generating node numbers in the expansion joint and buried pipe modelers. This error was corrected in and incorporated into the 3.24 release.

The use of 8 character job names did not function properly when including structural jobs or attempting to save the current input as a "new" job. These errors were corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

- 5) Stress Computation Module: An error was discovered in the computation of the allowable stresses for the Z662 piping code. This error was corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

- 6) Static Output Module: For B31.4 operating cases, the “sorted stress” routine did not function properly since the allowable on some elements could be zero. This error was corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

Due to the increased length of the job name, the Stoomwezen Certificate did not print properly. This error was corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

- 7) WRC-107 Module: An uninitialized control variable was found which could cause this module to abort if the data for the Sustained case was omitted. This error was corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

A local coordinate transformation error was discovered for spherical heads. This error was corrected in Patch B to Version 3.24, and posted to the BBS and WEB sites.

- 8) Intergraph Interface: The condition of terminating an elbow on the header side of a tee was not handled properly. This error was corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

- 9) Configuration Module: The original 3.24 release contained an inefficient link, which resulted in an increased memory requirement. This error was corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

The available options for the “Default Piping Code” skipped FDBR. This error was corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

- 10) Material Data Base Editor: A correction was made to the formatting of certain title strings, used when printing the materials. This problem was corrected in Patch A to Version 3.24, and posted to the BBS and WEB sites.

- 11) Structural Preprocessor: An error was found in the Plot module when the RANGE command was used, the node range could not be obtained from the user. This problem was corrected in Patch B to Version 3.24, and posted to the BBS and WEB sites.

TANK Notices

Listed below are those errors & omissions in the **TANK** program that have been identified since the last newsletter.

- 1) Error Check Module: A units conversion error was found when converting the API-650 nozzle expansion coefficient. This error was corrected in Patch B to Version 1.40 and posted to the BBS and WEB sites.
- 2) Input Units Conversion module: A units conversion error was found when converting the API-650 nozzle expansion coefficient. This error was corrected in Patch B to Version 1.40 and posted to the BBS and WEB sites.

PV Elite Notices

Listed below are those errors & omissions in the **PV Elite** program that have been identified since the last newsletter.

- 1) The calculation of the dynamic wind gust factor in the ASCE 95 code was in error. A conversion constant was missing, causing the factor to be slightly lower than it should be.
- 2) The thickness of the top plate computed in the basing design for the Moss method was low. A dimension in the equation was not being multiplied by 2, causing the result to be slightly lower than it should have been. This problem was fixed in version 3.
- 3) The M.A.W.P. for blind flanges was being reported as the Design pressure for geometries that were acceptable.
- 4) In some cases, the nozzle evaluation would abort, with a message stating that the shell thickness was insufficient, when the nozzle was on a vessel element that contained 1 or more stiffening rings.
- 5) In the component module, after a new file has been created, some extraneous characters would appear in the printout for labels involving psi and psig.
- 6) In version 3, some users could not access the material database. An “internal application error” would appear and not allow access.

CODECALC Notices

Listed below are those errors & omissions in the **CODECALC** program that have been identified since the last newsletter. These corrections are included in Patches D and F, available for download from our BBS and WEB sites.

- 1) **Tubesheet:** This is the program for Tubesheet per TEMA rules. Fixed a calculation per one footnote for TEMA-7.132. A typo was fixed related to STTMAX per RCB-7.23. Also fixed one comparison for STTCOM per RCB-7.24.
- 2) **Flange:** This is the program for Flanges. Fixed an unit conversion error for intermediate print for STO and STA. Included corrosion allowance for blind flange even if user did not specify "including CA for Flange". Also fixed one redundant warning for CC5.50d. For blind flange, the corrosion allowance was not considered for TEMA cover deflection calculations.
- 3) **Graphics:** Input graphics for Tubesheets, Flanges and WRC107 are improved for certain geometries.
- 4) **Nozzle:** This is the program for Nozzle calculations. UG45A should reflect Joint Efficiency even though UG37 uses $E = 1.0$. For large nozzle (App 1-7) calculations, with re-pad, the computed membrane stress S_m was slightly higher than it should be. Also added thickness and diameter limit comparisons for large nozzle, if the physical limit is smaller than the decay length. Changed the large nozzle criteria from ID comparison with shell to OD.

Added a note for hillside nozzle off cylindrical shell to remind the comparison with 90 degree (hoop) angle.

- 5) **Leg&Lug:** This is the program for Leg and Lug. Rearranged the Wind input. Also fixed one redundant factor Gh if user entered the wind pressure.

COADE Names Van Laan President

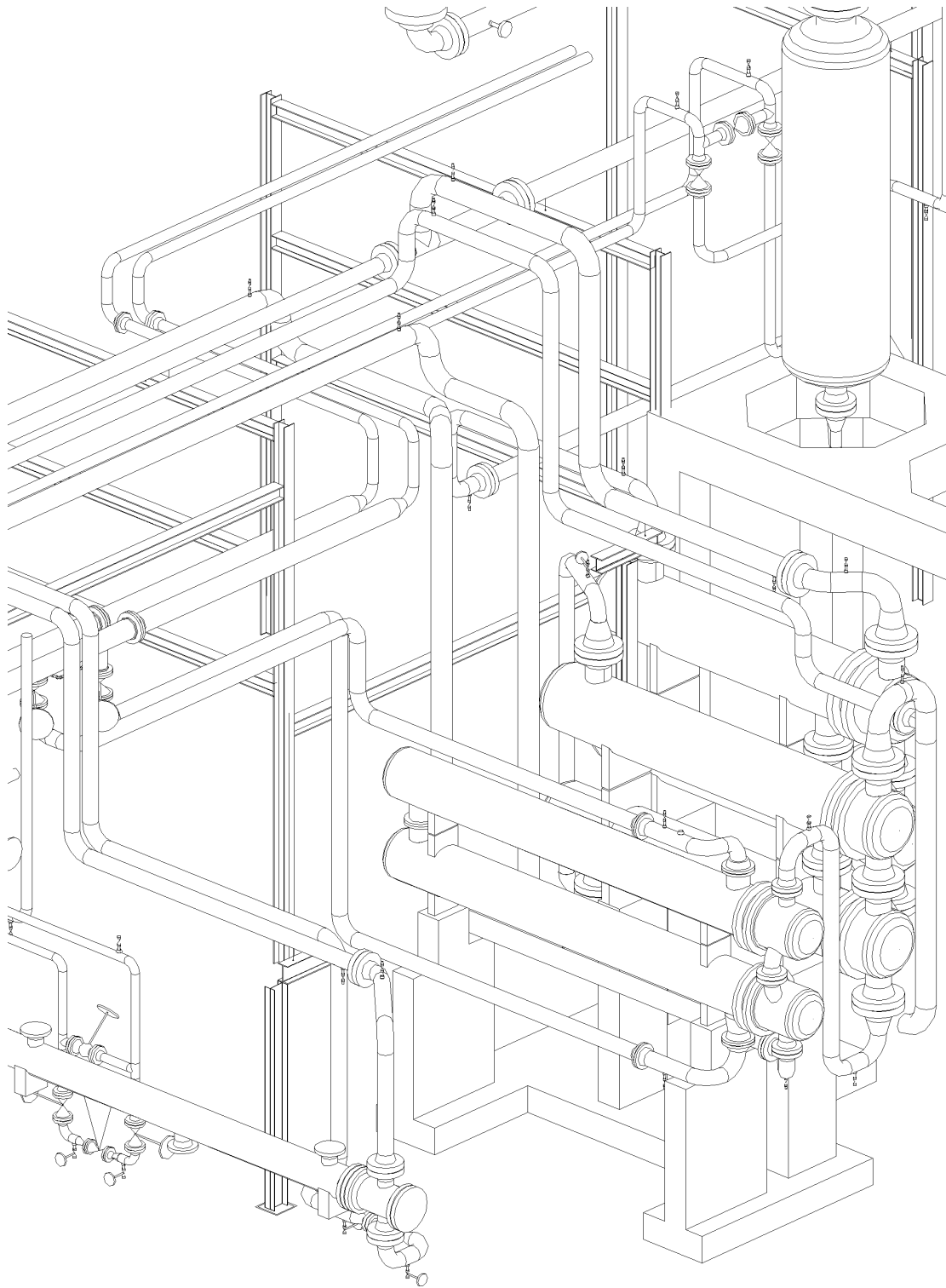
COADE Engineering Software has promoted Thomas J. (Tom) Van Laan to the position of President effective April 1, 1997. The announcement was made by Rex O. Evans, the company's Chairman of the Board, who has served as president of the company since 1988. Evans will continue his responsibilities as Chairman of the Board for COADE.

According to Evans, having Van Laan as president will allow them to focus more attention on both the long-term planning and the day-to-day operations of the company. "Tom has been an asset for the company as Vice President-Engineering Technology, as has acquired a deep understanding of our products and markets over the past seven years," Evans stated, "and, combined with his leadership abilities, I expect him to be a highly effective president for COADE." In discussing his promotion, Van Laan discussed some areas in which he plans to focus. "I plan to work closely with our product development and technical support groups to ensure we continue COADE's legacy of continual software updates and personalized, knowledgeable software support," Van Laan said. "These have been keys to COADE's success and will continue to be critical in our customer relationships in the future. I also intend to see that COADE continues to hold its position of industry leadership in the area of integration of the design and analytical functions." Van Laan, who first joined COADE in 1989, has 19 years of experience in stress analysis and software development in the field of piping, pressure vessels and structures. Van Laan earned a BSCE from Massachusetts Institute of Technology, an MBA from New York Institute of Technology and a Master of Computer Science from Pace University. He holds P.E. licenses in several states.

Evans, who as co-founder was instrumental in building COADE from a minor division of McGraw Hill to a worldwide leader in engineering analysis and design software, will continue his corporate level involvement as Chairman. Evans, who holds a BSME from Texas Tech University, is a licensed professional engineer with over 26 years of analysis and design experience in the field of piping and pressure vessels.

In addition to Rex Evans and Tom Van Laan, other owners/managers of the company include Richard Ay, Jr., P.E.; David Diehl, P.E. and Bill Evans, each of whom brings extensive additional experience to the company's operations. Richard Ay, who is the company's Vice President-Software Development, joined COADE in 1985. He has 20 years of analytical and programming experience in piping, pressure vessels and structural design. David Diehl, Marketing

Manager and head of the company's technical training division, joined COADE in 1986. He has over 20 years of experience in marketing of engineering software. Bill Evans, Sales and Operations Manager, joined COADE in 1988. He has over 17 years of success as a business owner as well as demonstrated success in sales. Other key managers include Robert Wheat, who heads the company's CAD product development, and Scott Mayeux, who heads the company's pressure vessel product development team, who together bring 30+ years of experience to their positions at COADE.



CADWorx/Pipe Model

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