

## The Computer Says.....

What ever happened to plain old traditional hand calculations? Recently I have attended several meetings and found that computer programs not only can give results they lead the user to become an interpreter. One engineer presenting his work stated the "Program" says this will fail. This was not the first time I have heard this, I am seeing it more and more. In one meeting were we found errors in the analysis, the explanation for the mistake was the computer program was wrong. Most often the program by a given trade name is used and you know the program has been proven for all but extreme applications.

What ever happened to an engineer performing and standing by his/her own work? A computer program is a tool that is utilized by a professional to increase productivity and the quality of his work. A computer program does not relieve the user of liability. You are expected to understand the theory behind the program and be familiar with the software enough to defend the results and understand the limitations of the tool. Practically all software programs have the legal language that completely relieves it of all liability. Don't ruin your career by using a program you don't fully understand by counting on the results in a critical engineering application.

Here are some suggested guidelines

when using new software for engineering applications.

1. Understand the basis of the theory of what you are trying to calculate. Know your limitations and the limitations of the program that you are using.
2. Select software with a known track record.
3. Develop a simple model (similar to the problem at hand) for which you can perform hand calculations to cross check results.
4. Run several test cases and sensitivity studies prior to looking at your current problem. Make sure you are able to calculate and determine good boundary conditions.
5. First try to run problems with known solutions to see if you can get good results.
6. Run the problem in steps that you are able to understand and interpret along the way.
7. Have your work checked by a competent engineering professional.



Frequently software companies have user groups that get together once a year. This is a good atmosphere to share war stories and understand the software's limitations.

In today's environment of the fast desk top, engineers are frequently tempted into jumping the gun and going for the big fully blown problem right away. In many cases engineers get caught up debating the results when unfortunately there is just a small bug in the simulation.



### *Knighthawk Project Update*

- 240 MW Gas Turbine Failure Analysis – Petrochemical
- Boiler Failure analysis – Petrochemical
- Piping Analysis – Offshore
- Heavy Industrial Equipment FEA – Machine Manufacturing
- Valve Analysis – NASA
- Non Linear FEA - Petrochemical
- Inlet Cone Design for TLE's – Petrochemical
- Integral Geared Compressor Failure Analysis – Petrochemical
- Aerodynamic Study of Inlet of TLE – Petrochemical
- High temperature mixer analysis – Petrochemical
- Cracked Gas Compressor Failure – Petrochemical
- Coal Gasification Reactor Failure Analysis – Power
- Rail Car Structural Dynamics – Petrochemical Transportation
- Custom Riser Flange Design – Off Shore
- Pelletizing Die Analysis – Petrochemical
- Exchanger Failure – Petrochemical
- Pipe Stress – Refinery
- Structural Dynamics – Rotating Equipment - Petrochemical
- TLE Coking Analysis – Petrochemical
- Piping Failure – Refinery
- Pipe Stress – Refinery
- Waste Heat Boiler Failure Analysis - Petrochemical

### *Cliff's Notes:*

Knighthawk has experience in using many software tools for many different applications. We also have written custom software for specific applications. We frequently use our tools in high exposure industrial applications and we understand the theory and the limitations of all programs we use.

We are please to add Mark Yuan to our staff of experts. Mark has masters in mechanical engineering and is an expert with software tools.

The first half of this year was a good run for our company and we appreciate everyone's business. Well the summer is over and the kids are back to school this week, what a relief. We told our boys that they have to be ready first thing Monday morning to go back to school. The six year old, attempted to negotiate a delay until Wednesday in hopes of another two days off. It didn't work and I anticipate him being an attorney one day.

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