Exploring ASD6

Latest generation of spring design software from SMI and UTS a step up from previous versions

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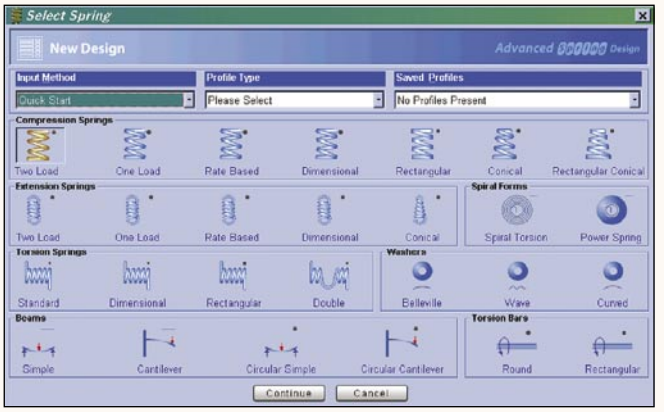

Figure 1: The ASD6 opening screen offers a choice of design mode and spring type.

After programming engineering software for years, there is one glaring fact of the discipline I can proclaim… It creates a work in progress, evolving at every turn. Such is Advanced Spring Design Version 6, just released this year by the Spring Manufacturers Institute (SMI) and Universal Technical Systems (UTS). It too is a growing, evolving engineering tool.

One of the strengths of an earlier, pre-Windows version (Spring Designer) developed by SMI was the ability to backsolve. This required engineers and quoters to enter very little data to build a design. The last version SMI put out, Graphical Spring Design Software 5.0, did not have that functionality, and that option was missed by many. The ASD6 version, however, includes the ability to backsolve and is a hybrid of the best that SMI has offered over the years.

The first improvement ASD6 offers is the ability to choose your input method (Figure 1, above). For those who want to just enter data and get back a pre-formatted result, there is the Quick Start Mode. You first choose the type of spring you want and start entering the input parameters.

When you have entered enough of the required input, the results are displayed in the output section. You also have certain input parameters labeled in italics, which can be left blank with no consequence. In the case of tolerances, those left blank will fill themselves in with the familiar SMI standard tolerancing…the very staple of the spring industry. Tolerances are the heart of this program, since any program can calculate formulas, but few deliver the tolerancing standard of the industry to compare with the tolerances on a given print. Therein lies a big chunk of the power of this software.

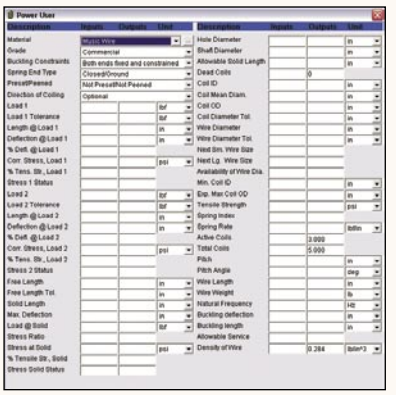

Figure 2: The Power User Mode offers users the ability to backsolve.

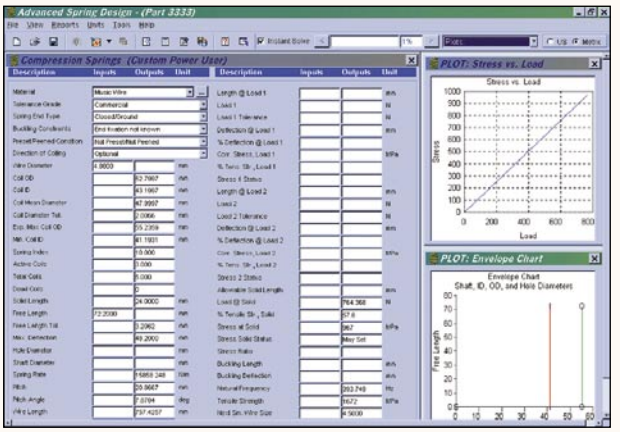

Figure 3: In addition to backsolving, the Custom Power User mode allows users to customize the design interface to suit their needs.

The next option is the Power User Mode (Figure 2, above). This is an engineer's delight, letting him or her skip around parameters and save time on designs. This is the backsolve method that I mentioned earlier. Input values are displayed in boldface, making the job that much easier. You can toggle an "Instant Solve" checkbox, and then let the program fill in the data. When checked, the program attempts to complete the design after each new input. Varying messages help you find your way to a successful design. If you check off the "Instant Solve," you can then calculate the parameters with the manual push of a button.

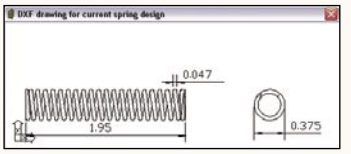

Figure 4: Users can export spring drawings generated by ASD6 into DXF format, which is compatible with CAD programs.

The best part, however, is the Custom Power

User Mode (Figure 3, page 38). This powerful function is one of the highlights of this new version. You can customize your own interface, in terms of both the parameters you want to enter and the order in which you enter them. For me, the obvious advantage to this is the ability to tailor your software to your business. Many spring houses are niche manufacturers and produce given products types over others. The Custom Power User Mode lets the user create a design program for their strong suit.

Another big improvement is the plotting of data this program performs (Figure 3). This is especially true for Goodman diagrams, which will surely be of great interest to a customer with high cycle requirements. The very purpose of many spring designs is the fatigue life under various conditions. With a Goodman diagram at your fingertips, a plot can be generated for graphical display to a customer, along with the design.

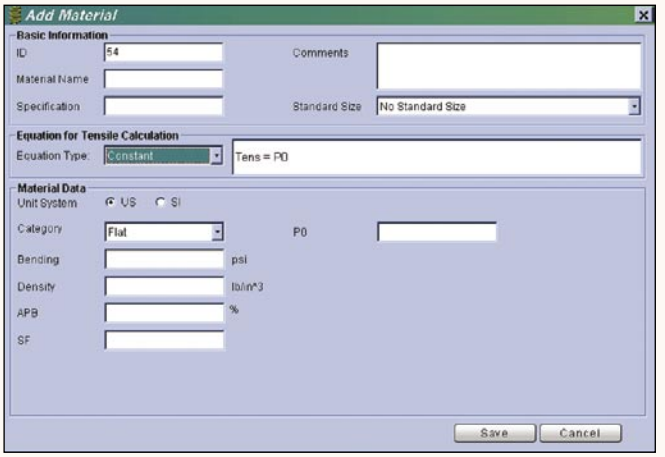

Figure 5: The ASD6 materials database includes 53 materials, and users can easily add more, if they choose.

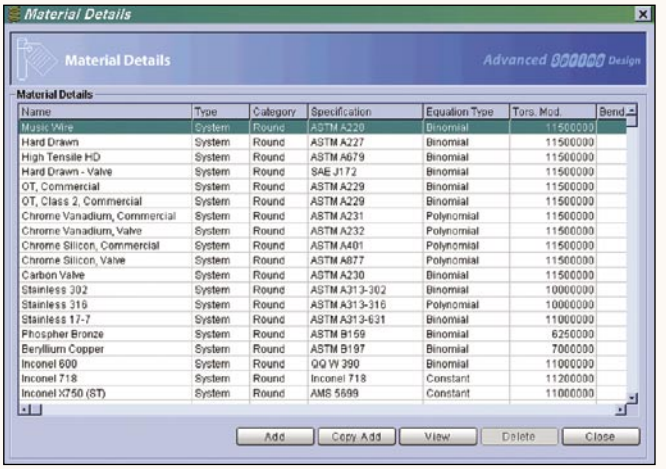

Figure 6: Materials are defined in the Material Details window, and users can add or edit materials from there.

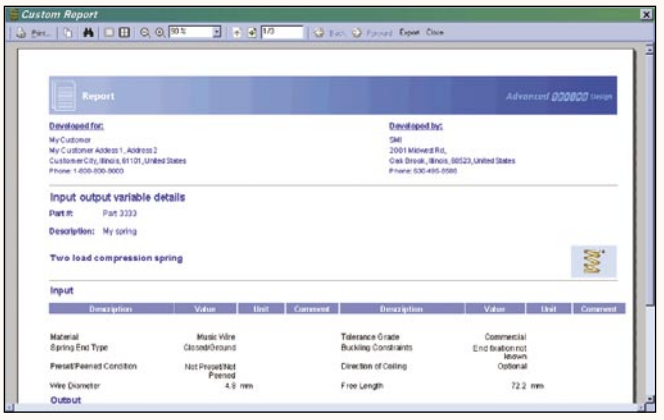

Figure 7: ASD6 can generate a complete spring design reports, which users can customize before sending to customers.

A Rate (load per de ection) plot is also available for hardcopy. Of the seven different plots available, all can be displayed on-screen before printing. They can also be stacked in usual Windows convention for review as your design progresses.

For those with drawing requirements, the spring drawing can now be exported in a DXF format (Figure 4, page 38) and e-mailed from your desktop to your customer, who can then import the DXF file into a CAD program.

Materials can be easily edited and added with ASD6 (Figure 5, left). You can even get into the higher order of material tensile strength definition with either binomial or polynomial entries. Also, the materials are much better defined than in the 5.0 version by using the Materials Details Form (Figure 6, below). This dialogue box contains data such as Material Name, Category (cross-section), Specification (AISI, ASTM, DIN, etc.), Equation Type (Constant, Binomial, Polynomial), Torsional Modulus, Bending Modulus, and so forth.

Another of ASD6's noticeable improvements is the use of the variables change box. This entry allows you to choose a given parameter and have that parameter displayed in a box at the top of the interface (Figure 3). For instance, if you wanted to change the diameter by 2% to see what effect it has on the design, you would click on the given diameter box (whichever is most appropriate) and it will appear in the "variables" box. To the right of the box is an "increments" box in percent. You would then enter the number "2" in that box. On both sides of the number field are < (decrease) and > (increase) symbols. If you click on the decrement symbol, the body diameter will be lowered by 2%, and the resulting design will re ect the change. This is also true if you are displaying plots at the same time. The plots will refresh to re ect the new diameter's effect on the design. A big advantage of this decrement/increment toggle is the exposure it gives to a novice quoter. A new designer may not have the math skills to know what to do for a given design improvement. We all tend to be creatures of habit and pick up on subtle tendencies. A person who uses this "scenario" type of function can actually learn some intuitive insight into the changes that wire size, for instance, yields before they understand the math behind the changes.

The last key improvement I'll mention is the multi-user ability. If you have an internal server with dozens of

clients (something typical of an OEM customer), a multi-seat version can be had that will allow an unlimited number of users at the same location to use, customize and share spring design data and drawings. A big plus!

To close, I found the ASD6 version to be a much-improved tool over its predecessors. Again, the evolution is all part of any program's life.

So, what's next from SMI and UTS? I would like to see even more torsion/spring members added to the list. One missing member of the family is snap rings, both internal and external. The calculations are pretty straightforward (compared with Belleville washers, for example) and the end configurations are of standard variety. I would also like to see the more complex springs that are usually low on the radar – this would include anything with a variable pitch and/or in combination with a variable diameter. My last comment would be toward drawings. In the last few years we have seen enormous leaps in both the power and price of 3D modeling software. The ability to model springs in this way will probably be a next step for SMI and one that will keep them the best at what they do.

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