

# Cosmodyne adopts 3D plant design tool

Cosmodyne now performs plant designs using advanced 3D solid modeling. Traditional 2D computer aided design or CAD is becoming obsolete in the engineering design arena as more sophisticated and user-friendly 3D CAD software is developed. Autodesk's 2D AutoCAD® is the design software of choice for many organizations and has been the workhorse of Cosmodyne's plant engineering for many years. While AutoCAD has been 3D enabled for several years, the basic 3D system was difficult to use without moving to the more sophisticated Mechanical Desktop version. About a year ago, an evaluation was made for several mid-range 3D CAD software suppliers including Autodesk's Mechanical Desktop® (MDT version 5), SolidWorks Inc's SolidWorks® 2000, and Unigraphics's SolidEdge®.

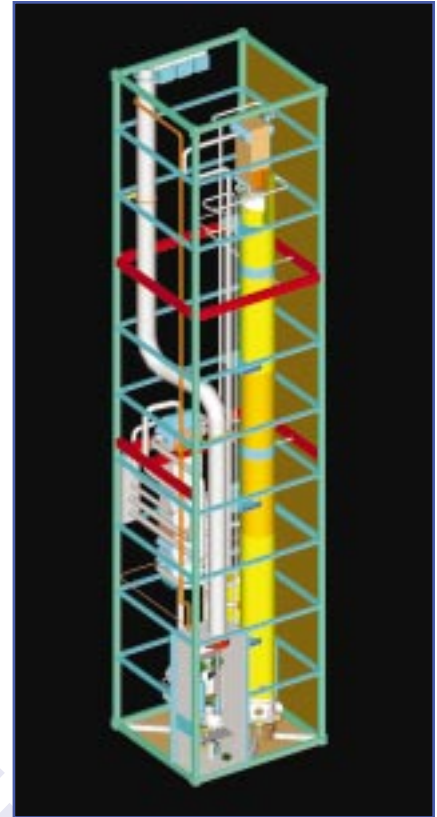
Cosmodyne selected Autodesk's MDT because it provides not only most of the desirable features and functions, but also draws on the existing AutoCAD expertise of our design staff. All designers received a week-long training course to learn the key areas of MDT's design commands. The familiar AutoCAD interface remains with many more commands focused on 3D modeling and visual tools. The last year has been a challenge in building a core 3D capability, but with key support from Cosmodyne engineers Bruce van Dongen and Ken Faulkner, Cosmodyne was able to develop the methods and processes required for a manageable 3D plant design tool.

The 3D advantages realized so far include quicker concept to design; better packaging assessment; integrated bills of materials; parts library development; and product configuration management. The 3D approach is a far superior and faster method for plant design. Cosmodyne designers now

select 3D parts from a library and parametrically insert them into an assembly. Designers aren't required to focus on 2D geometry/layout, views, and isometrics. The CAD software automatically generates all of those items. Instead, the designer becomes a Virtual Assembly (VA) designer. The BOM generator in MDT is a key tool in producing bills/lists of materials required for manufacturing. Each 3D part generated and stored in the parts library has key information like part number, material, etc. embedded into its database. When the part is inserted into an assembly, this information follows it to the assembly BOM in MDT. Currently, the MDT BOMs are manually transferred to our MIS system. The next step is to develop an interface with the MIS system to automate this function.

As is widely known by its customers, Cosmodyne's plant designs feature the assembly of vessels, piping, and equipment in standardized "containers" and frame sizes. This modular design approach facilitates a quick customer site plant assembly and commissioning. The 3D designers can now visually assemble the plant components into these containers and frames. Piping is routed and inspected "virtually" for clearance. This is a key benefit in producing tight, space efficient assemblies. The latest Cosmodyne product, the TGN 1000, a turboexpander refrigerated version of the liquid assist LGN1000 nitrogen gas generator, features a coldbox with many integrated assemblies and components in a compact 8' x 8.5' x 40' frame as seen in the rendering produced using MDT.

Lastly, changes to solid assembly models are made easily using parametric design. Parametric design is a key feature of MDT that enables the designer to create variables within the part model that are



*Cosmodyne cold box rendered in Autodesk's Mechanical Desktop.®*

tied to key geometry features such as diameter, length, thickness, etc. Once the variable is defined, a simple click on the part enables that variable to be changed and the model reflects that change. Parts connected or constrained to the part follow along with those changes.

Software changes fast in the 3D modeling world. Cosmodyne is now evaluating Autodesk's next generation of 3D solid modeling tools, Inventor, to replace MDT. Inventor claims to reduce model memory requirements and CPU overhead from the memory/CPU intensive MDT. Conversion from MDT to Inventor is relatively easy. Inventor features, however, do not yet match MDT, but Autodesk provides updates at 4-6 month intervals to integrate the desired features (they are at version 4).

For more information, contact Gregory Mason at Cosmodyne, tel+1.310.320.5650 or gmason@cosmodyne.com.