

The Third Dimension of Engineering

Over the course of the last two decades, advancements in parametric solid modeling programs have revolutionized the field of mechanical engineering. When **ACD** began using Pro/ENGINEER (ProE) about seventeen years ago, the state-of-the-art program was used to model the complex surfaces of the turbine wheels and perform a Finite Element Analysis (FEA) to determine the natural frequencies of the blades. Early versions of the ProE program also enabled **ACD** to model parts and perform stress analysis on some complex structures.

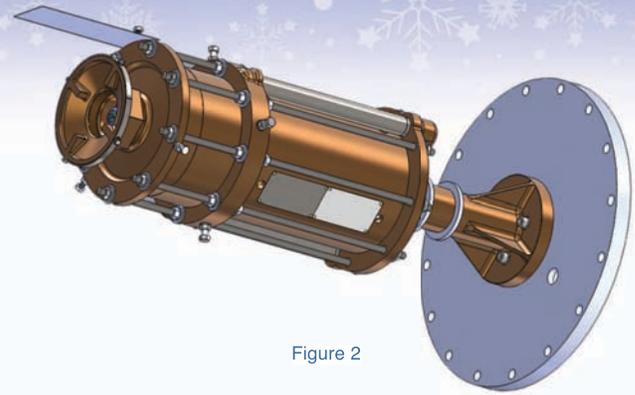


Figure 2

The trend of CAD-driven engineering has grown worldwide. SolidWorks has been used extensively in India by Cryogenic Design Services (CDS), a company providing support in creating models and assemblies of **ACD** pumps and turboexpanders. SolidWorks is fully integrated with the corporate Product Lifecycle Management (PLM) package, providing full control and management of all the electronic data produced by the engineering groups and allowing the sharing of information among group companies.

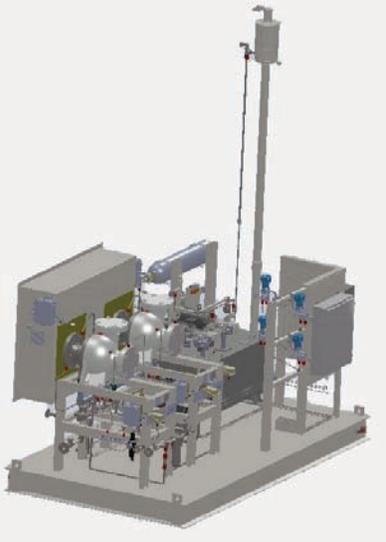


Figure 1

ACD's engineering group has standardized its engineering efforts with the use of SolidWorks, another advanced 3-D Computer-Aided Design (CAD) software program. SolidWorks allows **ACD** engineers to produce P&ID and electrical diagrams, schematics, manufacturing and assembly drawings, centrifugal and reciprocating pump and turboexpander system assemblies. Engineers can now perform stress, modal, heat transfer, and flow analysis to ensure product performance using the program results. Additional software features allow the creation of product bulletins and IOM manuals, as well as the ability to utilize Computer-Aided Manufacturing (CAM) via its fully-integrated SolidCAM program, which can be used to create the CNC code for both lathes and 5-axis milling machines.

With the ability to quickly produce customer submittal drawings (such as P&IDs and Electrical and Interface Control Drawings) in the early stages of each project, solid modeling software has continued to revolutionize the mechanical engineering process. BOM's can now be directly imported into the MRP system and ICD drawings and manufacturing programming can be created directly from models, significantly improving accuracy. Additionally, design time for new pump applications is significantly reduced as most of **ACD**'s pump product line is fully modeled in 3-D.

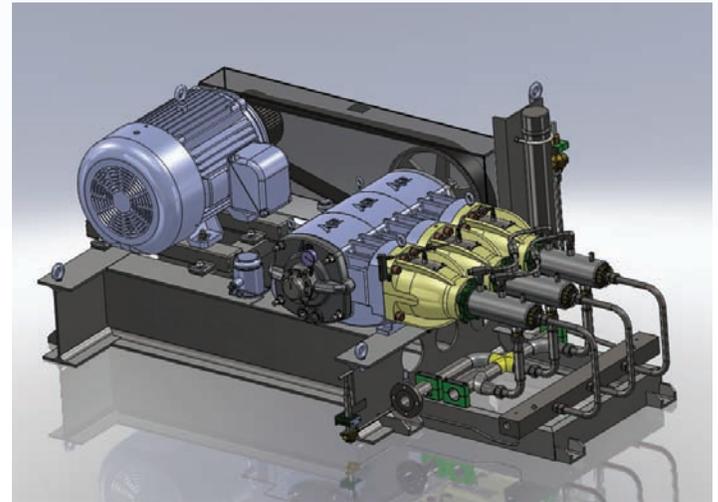


Figure 3

As parametric solid modeling programs continue to advance, engineering and manufacturing capabilities will evolve. **ACD** continues to utilize the latest advancements in software and manufacturing technology in an ongoing effort to provide our customers with the latest efficiency and reliability-enhancing options. Future issues of Frostbyte will have articles on the process and advantages of stress analysis, modal analysis, computational fluid dynamics, and computer-aided manufacturing.

For more information contact Craig Fennessy at ACD, + 1 949 261 7533 or cfennessy@acdcom.com.