

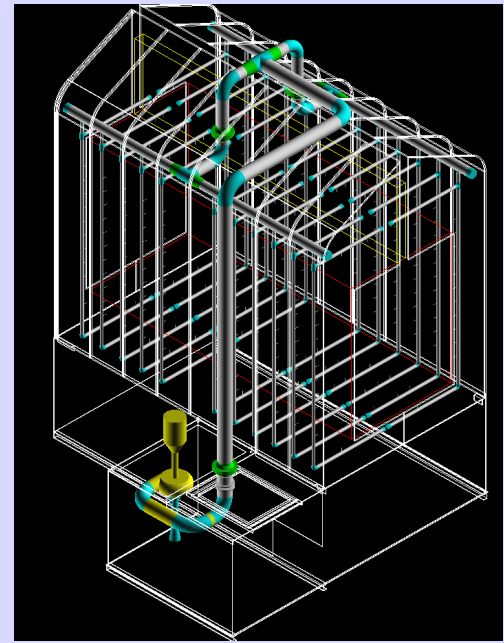


# Industrial Finishing Systems

TechnoSoft, Inc. has developed a knowledge-based engineering system for design and analysis of industrial finishing systems to enable more design configurations to be explored in less time.

Industrial finishing systems are used to clean, coat, and paint automotive and industrial machinery components. Due to the wide variety of parts that must be accommodated by finishing systems, they take on many different sizes and configurations. This variation makes it very challenging to implement "design automation" using traditional CAD systems. As a result, a knowledge-based engineering (KBE) approach was chosen to provide more power and flexibility in development of the system.

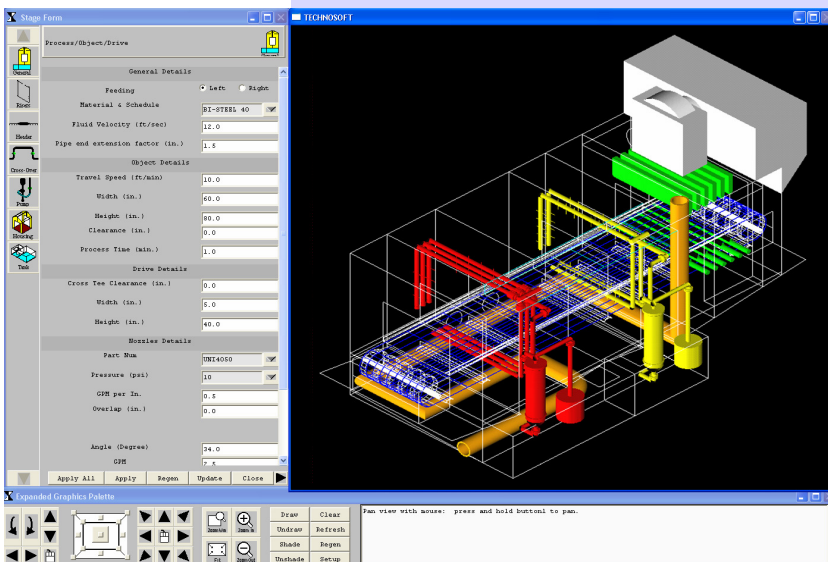
TechnoSoft's Adaptive Modeling Language (AML) was used to implement the KBE system. Design rules, standards, and engineering calculations were captured within AML to eliminate mundane tasks and ensure adherence



Standard components such as piping, valves, nozzles, blowers, heating elements, and tanks are all selected by the designer from "catalogs." For example, piping can be selected by schedule and material type. Pipe connections can be selected from threaded, press fit, or butt-welded. Non-standard items such as conveyors are configured within the system as well.

System outputs include a 3D solid model, spray pattern visualization, general arrangement drawings, detailed production drawings, bill of materials, cost estimate, and mass properties (wet and dry). The 3D geometry models and drawings generated by AML are compatible with 2D and 3D CAD systems such as AutoCAD®, SolidWorks®, Solid Edge®, and Unigraphics®, so they can be easily shared with customers and suppliers.

A number of external programs were integrated with the KBE system in order to automate the design validation process. As a result, complete finishing systems can be designed and validated in a matter of a few hours. Major changes and minor tweaks can be made in minutes, giving engineers the flexibility to perform trade studies to maximize performance and minimize cost.



to incorporate design standards, while still providing a highly interactive design environment.

Inputs to the KBE system include overall process time, time allotted to various stages, part dimensions, part sides to be finished, fluid flow rates and operating pressures.