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WHITE PAPER

Benefits of Design to Value

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Benefits of Design to Value

Pump design has a significant impact on overall value, from features and configurations to costs, materials and operating parameters. Pump manufacturers can increase customer value while also cutting costs and speeding up time to market. Design to Value processes give companies the opportunity to trigger innovation in existing product portfolios.

Some pump manufacturers are adopting enhanced product development processes based on Design to Value principles. The goals of these programs are to:

- Enhance product performance based on direct customer input
- Utilize best practices to address customer needs and pain points
- Standardize designs to encourage modularity and reduce complexity and design variants
- Increase use of commercial components and standardize parts across product lines
- Pre-engineer bills of materials and component designs for both make-to-order and assemble-to-order products
- Optimize product value with a focus on fit-for-purpose materials of construction

Product development processes have led to the development of pumps and other flow management equipment that are optimized, longer-lasting, more cost-effective, energy-efficient and customizable. The Design to Value process is an intensive, interdisciplinary problem-solving methodology that focuses on aligning the design to the market-driven functional requirements.

The Design to Value process benchmarks competitive, customer and supplier/manufacturer insights to meet three specific objectives:

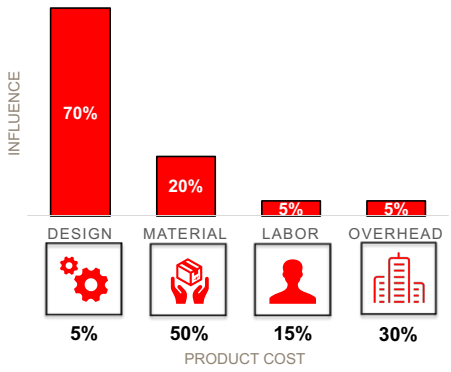
- Understand the features and functionalities customers value.
- Identify current design best practices.
- Integrate that information to minimize the costs required to deliver users' desired features and functionalities.

Product design's influence on total cost

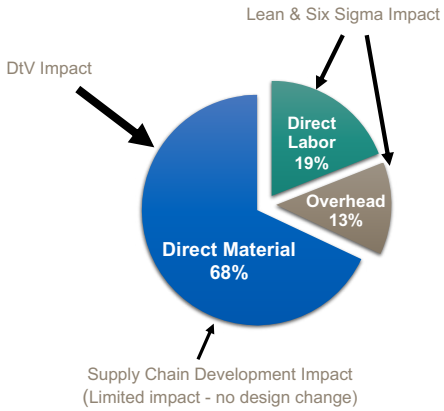
Product costs include materials, labor, design and overhead. Product design time is a percentage of the overall cost. However, the design itself has a significant influence on the product's cost.

Given the large influence that product design plays, pump manufacturers have an opportunity to reduce the costs for customers while simultaneously enhancing equipment functionality.

Influence vs. product cost



Typical cost distribution of a product



The Design to Value process

The Design to Value process leverages five steps: kick-off, data acquisition, workshop, implementation and launch. Each step plays a critical role to successfully address customer needs.

Kick-off

The kick-off phase includes communicating core team assignments, developing a product overview, establishing target objectives, and creating a project checklist. In establishing target objectives, the team scrutinizes market requirements and cost-reduction targets and evaluates similar products on the market.

The project team includes multiple disciplines, each of whom brings insight to the process. The cross-functional team includes employees from manufacturing, supply chain, engineering, product management and sales.

Information gathering

The information gathering phase is focused on addressing customer pain points. The team interviews customers to learn what they expect from the product. Customer input includes product performance specs and features, product lifespan, construction materials, customization and configuration options, maintenance concerns, lead times, cost considerations, industry standards compliance, and more.

The team combines customer insights with other data to develop a complete picture of what the product must include to deliver the optimal value. Additional data points include quality and warranty reviews, detailed bill of materials analyses, manufacturing site visits and competitor benchmarking.

Workshop

In the workshop phase, the team uses data to generate ideas for product improvement. This phase includes steps to develop, evaluate, test and refine a broad range of ideas to improve the product. Priority is placed on standardizing and simplifying the design while maximizing the value provided by customer-requested functions.

At the end of this phase, the team will have a solid proposal for how to implement design changes in order to develop new products or enhance existing products.

Implementation

This phase includes validating and consolidating the team's proposal from the workshop phase. With a final plan, the team can move forward with allocating resources, project scoping, project risk management, proposal execution and cost revision exercises that are required to bring the proposal to life.

The engineering team also develops new designs supported by state-of-the-art analysis methodology. Supply chain and operations teams implement optimal sourcing and manufacturing strategies. All these tasks are aimed at increasing product value.

Launch

Product launch is the orchestrated introduction of a new or improved product to the market. These are the events surrounding making the product available for sale. It entails several elements and activities, including completion of a product launch readiness review, launching a direct marketing/advertising campaign, crafting marketing and sales enablement literature, product demonstrations, sales training and inventory stocking.

Vertical turbine pumps

The success of the Design to Value process is demonstrated in our vertical turbine pump (VTP) and vertical turbine, double-case pump (VPC) product lines.

The Flowserve VTP pump is a single-casing, diffuser-type, vertical turbine pump. Flowserve VTP pumps are installed in wet-pit or deep-well applications where net positive suction head (NPSH) is ample. The Flowserve VPC pump is a double-casing, diffuser-type, vertical turbine pump. Available in single or multistage construction, as well as standard and ISO 13709/API 610 compliant designs, VPC pumps are designed for continuous-duty applications and are well-suited for services with limited NPSH.

Flowserve redesigned its VTP and VPC pumps based on customer feedback as part of the Design to Value process. The redesigned VTP and VPC pump models provide engineered flexibility with a global design, yet are customized with regional features. A global manufacturing footprint allows fast, local service of a comprehensive portfolio.

As a direct result of the Design to Value process, the VTP and VPC pump models offer enhanced value to customers, including:

- *Optimized hydraulic coverage:* The Design to Value process allows the pumps' hydraulic coverage to meet nearly any duty condition requirement.
- *In-depth pump analysis:* Structural (reed critical frequency, nozzle loads, seismic calculations), rotor dynamic (torsional, lateral) and thermal analyses are available to optimize pump performance and reliability.
- *Multiple design configurations:* A variety of configurations enable the pumps to meet the requirements of a diverse range of applications and installation demands.
- *Wide range of material options:* Customers can select materials including, but not limited to, iron, bronze, carbon steel and duplex stainless steel, to maximize pump life in a range of applications.

VPC pump

VTP pump

Conclusion

Pump design significantly impacts its value. A formalized Design to Value process allows pump manufacturers to develop or enhance products to meet the needs of customers. By focusing on improving the value of a product's functional requirements, pump manufacturers can design products that are optimized, longer-lasting, more cost-effective, energy-efficient and customizable.

About the author

Marc Buckler

Marc Buckler has been with Flowserve for more than 22 years. Marc has held roles in application engineering, project management and product management. In his current role as global product leader, he is responsible for the company's industrial vertical pump portfolio. He earned a bachelor's degree in mechanical engineering from Georgia Tech and an MBA from Mount St. Mary's University.

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