

Automotive and transportation

American Axle & Manufacturing

Global automotive manufacturing company uses PLM to establish and achieve product cost targets

Product
PLM

Business challenges

Overcome increased industry complexity due to advancements in electrification and fuel efficiency

Design products to meet customer needs

Keys to success

Uncover potential cost savings with process- and database-based costing solution

Standardize globally accessible costing calculations and processes

Identify unprofitable variants as candidates for discontinuance

Visualize target cost gaps from a product/process standpoint

Results

Reduced costs in early stages of product development

Saved costs on supplier projects due to increased visibility and collaboration

PLM enables American Axle & Manufacturing to optimize design and product development costs

Revolutionizing the propulsion of future vehicles

American Axle & Manufacturing (AAM) is a global leader in designing, engineering, validating and manufacturing driveline, metal forming, powertrain and casting technologies for commercial and industrial automotive markets. AAM supplies all major automotive original equipment manufacturers (OEMs), such as General Motors Company (GM) and Fiat Chrysler

Automobiles US LLC (FCA), as well as several tier I suppliers. AAM is a multiple winner of GM's supplier of the year award (most recently in 2017), which is reserved for firms that have distinguished themselves by meeting performance metrics for quality, execution, innovation and total enterprise cost.

AAM competes with a variety of independent suppliers and distributors. Technology, design, quality and cost are the primary elements of competition in this industry segment. In addition to traditional competitors in the automotive sector, the trend towards advanced electronic integration has increased the level of new market entrants, including technology companies.



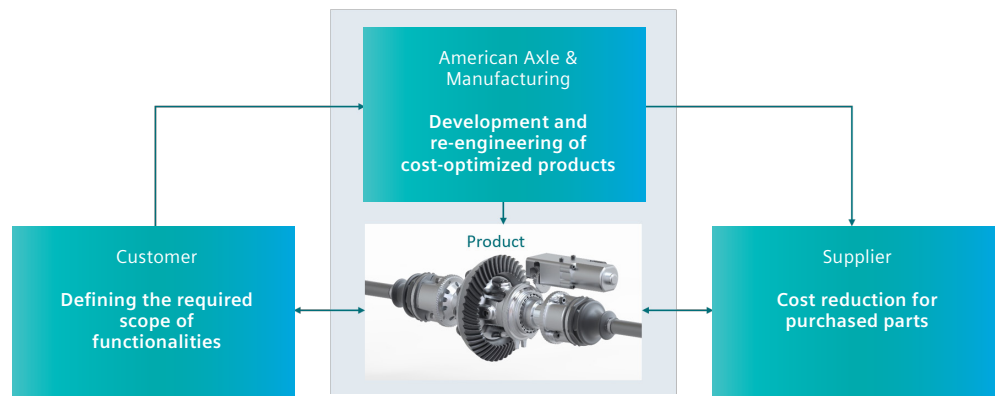
Customer, company and supplier are the three starting points for successful product cost optimization

Results (continued)

Realized significant time savings by leveraging global collaboration

Achieved target costs

Enhanced efficiency by allowing cost engineers to focus on design and product development



As one of its primary strategic objectives, AAM is committed to focusing on cost management to deliver exceptional value to customers. To this end, AAM has established a cost competitive, operationally flexible global manufacturing, engineering and sourcing footprint to increase its presence in global growth markets, support global product development initiatives and establish regional cost competitiveness.

Early cost planning for new products

AAM invests heavily in the development of advanced technology products to help customers meet market demands. AAM develops and commercializes battery-electric and hybrid-drive systems to improve fuel efficiency and reduce carbon dioxide (CO₂) emissions. As customers focus on reducing weight with the use of aluminum and other lightweight alternatives, AAM is well positioned to deliver innovative, industry-leading solutions. AAM's portfolio includes

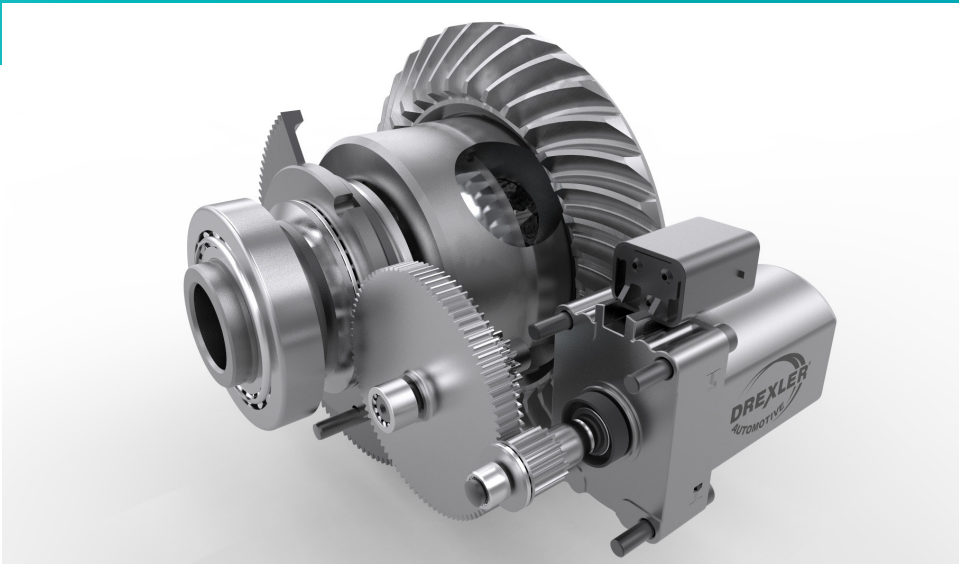
high-efficiency axles, aluminum axles, all-wheel drive (AWD) applications and hybrid electric drive technology that significantly reduces mass and improves fuel economy and efficiency.

In order to fulfill its strategic goals, AAM must manage targeted costs. For this purpose, target costing is used, which offers systematic planning and impacting of costs. In order for target costing to be successfully applied at AAM, cross-departmental and cross-company teams are indispensable. Product development and engineering, procurement, cost engineering and finance work closely together to make sure AAM doesn't exceed product cost caps.

Target costing steps at AAM

AAM uses target costing in the design and development phases to exert a flexible and active influence on the price-determining

PLM for product costing unites all of the company's cost information into one central database, which means all employees share the same data foundation.



"The PLM solution for product costing has helped us run successful supplier workshops for years by providing a transparent view of the cost of purchased parts. This allows us to achieve the envisioned cost savings in projects with our suppliers."

Surya Chiravuri
Senior Manager,
Value Analysis and Value
Engineering
American Axle &
Manufacturing

functions or components of a new product. AAM determines its market-oriented and competitor-oriented target costs as top-down values that reflect the customer's demand, and as bottom-up values that outline what is technically feasible against the background of cost-optimized production and assembly.

AAM implements its cost optimization initiative by conducting workshops with multifunctional teams. The workshops are work sessions in which participants brainstorm, troubleshoot and try to solve problems and improve their processes. The cost optimization team consists of anyone responsible for product development, cost engineering, finance and purchasing. Target costs are distributed among the components according to the importance of customer needs. Components that deviate from their cost targets can be identified at an early stage of development by splitting costs down to the individual components.

"For us, precise cost calculations are extremely important at this early design stage, especially because at that point in time we often lack product information, such as 3D data," says Surya Chiravuri, senior manager, value analysis and value engineering, AAM. "In other words, the technical product specifications are mostly unknown or unclear. That's why we did not consider a purely parametric-based solution, but a bottom-up costing solution."

For years, AAM has been using PLM for product costing to help determine bottom-up target costs and comparing them with top-down target costs. The process- and database-based costing solution is valuable because its reliable product calculations and target cost derivations can be generated on assemblies and components in the early stages of product development. PLM for product costing unites all of the company's cost information into one central database, which means all employees share the same data foundation. In addition to information from enterprise resource planning (ERP), product lifecycle management (PLM), product data management (PDM), computer-aided design (CAD) and Microsoft Excel spreadsheet software, it includes external benchmark data that is optimally integrated in the software and available to the user at all times. Both the internal cost data and the external benchmark data are regularly updated.

By evaluating the individual cost parameters using the cycle time calculator integrated into PLM for product costing and the PLM data-base, the actual costs can be displayed transparently on the basis of material prices, manufacturing processes, additional costs and overhead costs. Finally, in the workshops the top-down costs are

compared with the bottom-up costs as well as the existing offers in purchasing. The difference between the estimated actual costs and the target costs is clearly visualized in PLM for product costing. Based on this, AAM's cost optimization team determines how to close the cost gap.

First, the group evaluates the part substitutions that reduce costs but still provides the product features and benefits necessary to meet customer requirements. The team also considers opportunities to reduce costs by improving efficiencies. Thus, AAM can continuously optimize its margins in individual functional areas or assemblies. In order to ensure that target costs are met, the team jointly defines cost reduction measures. In addition to internal operations, AAM relies on savings opportunities from its supply chain to meet cost targets.

Procurement target costing at AAM

By immediately establishing the target costs and requirements for individual components, AAM integrates its suppliers into the process at an early stage of development. The know-how of the suppliers for reducing costs and improving quality flows into the planning phase. With PLM for product costing and the PLM database, purchase price analyses can be created quickly, transparently and, most importantly, comprehensibly. The cost analysis is based on an estimate along the bill-of-materials (BOM) structure, which also shows production steps, special costs and detailed overhead structures.



The best-practice price serves as the target price for the supplier. For both parties, the cost drivers are transparent in the form of cost breakdowns. Thus, they can jointly determine deviations of the offer prices in workshops and define measures to remedy them. It often only becomes apparent in such workshops the AAM supplier is not aware of its own cost weaknesses at the product or process level. The problems become clear through cooperation and can be solved together, making it a win-win situation for both partners.

"PLM for product costing has helped us run successful supplier workshops for years by providing a transparent view of the cost of purchased parts," says Surya. "This allows us to achieve the envisioned cost savings in projects with our suppliers."

PLM supports AAM in developing and achieving target costs.

Customer's primary business

American Axle & Manufacturing is a global leader in the design, engineering, validation and manufacturing of driveline, metal forming, powertrain and casting technologies for commercial and industrial automotive markets.
www.aam.com

Customer location

Detroit, Michigan
United States

"The PLM solution for product costing helps us achieve cost reductions in individual projects through the development of optimal technical solutions coupled with a reduction of purchased parts and material costs on the procurement market."

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Maintain target costs across the production life

Ongoing monitoring of costs has created continuous transparency. Within the framework of review meetings, goals are tracked during production to ensure target manufacturing costs are met. PLM supports AAM in developing and achieving target costs. Three positive effects of enhanced transparency include heightened awareness of development costs, sustainable reduction in product costs and an increased market and customer orientation in all development efforts.

"The PLM solution for product costing helps us achieve cost reductions in individual projects through the development of optimal technical solutions coupled with a reduction of purchased parts and material costs on the procurement market," says Surya.

A future with PLM product costing

Calculating tooling costs is a high priority at AAM. In today's competitive environment, precisely calculating tool costs determines profits and losses in the early planning and offer phases. To deliver transparency and reproducibility of cost calculations, AAM plans to continue to use PLM for product costing to reliably and transparently identify and determine the interactions between component and tool costs for different quantities, and tool designs for product and tool costs. PLM is currently being used in AAM locations in North America and Europe and will be rolled out globally in order to further support the competitiveness of the company's products.

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