Cost target attainment has always been critical during product development, but the downturn made that even more significant. In a downturn, especially in markets where discretionary spending drives purchasing behavior, reduced volumes magnify the effects of missing cost targets on gross margins.

As part of a corporate initiative, Mercury Marine pushed its new product teams to continually deliver results to maintain its engineering innovation lead. To make those products profitable, the cost engineering team introduced its own innovations. By 'retooling' its approach to managing product cost on new development programs, the cost engineering team produced dramatic improvements compared to programs introduced just a few years ago.

For example, recently released or current programs are either at or below cost targets.

"This accuracy energizes the product-development community and provides confidence that with due diligence and effort, our game-changing products will be profitable and well received," said John Bayless, Program Management Director at Mercury Marine.

How did Mercury Marine get there? Starting with core elements of a new target setting process, Mercury focused on incremental improvements in each area of every program until a high-performing, repeatable process was established. The Target Setting Process elements include:

- Stair-Step Approach to Cross-functional Consensus

  - Meetings designed to align Marketing, Engineering, Manufacturing and Management on cost estimate assumptions, as well as to reconcile estimates with market-driven cost goals.

- BDI piece cost modeling

  - Use Boothroyd–Dewhurst Design for Manufacturing and Assembly Software which provided detailed, benchmark-derived, customizable cycle time database used to estimate piece cost with inputs that range from back of napkin design ideas up to ProE models.

- Cost modeling feedback during Concept Phase

  - Identify problem areas early, changes take place on paper versus new tools.

- Diligent data management

  - Consistent treatment of cost data, broken down to the lowest levels that allows for manipulation and presentation of data in various forms.

- Cost Target delegation

  - Assign meaningful, aggressive and achievable cost targets to design managers and commodity managers that challenge engineers toward creative solutions.

  - Visual Management that provides consistent presentation of information over time.

Once the elements are working together, product teams are provided early, accurate data in an easily understood format that enables better decision making throughout the product development process.

This is where PLM helps drive cost management. Implementing a standard Large Assembly Management (LAM) methodology with established, consistent product structure across all development programs will drive BOM accuracy in addition to cost validation and reporting.

"Having a common BOM management technique allows for consistent downstream consumption of the product bill to

Process Focused Innovation Management

enable standard program management dashboards and foster an environment for cross-functional collaboration," stated Bayless. "Cross-functional participation in weekly product reviews, along with easily accessed data management by all program team stakeholders are keys to our success.

To make product cost and cross-functional attribute management easy, Mercury Marine developed a .NET application hosted within SharePoint. The application automatically transfers the product structure and relevant engineering attributes from Teamcenter, as well as ERP attributes into a spreadsheet-like interface within SharePoint. This provides global cross-functional contributors a robust environment to manage their role-specific attributes while having read-only visibility to information mastered in other systems. This application also enables faster program decisions and information accuracy across all product development phases.

For example, Mercury Marine uses a phase-gate review process for managing new product programs headed by a Product Acceptance Committee (PAC). Program managers are expected to present their program to the PAC at a pre-set frequency, and requirements vary to pass each phase.

The Gate 0 review requires a written program charter based on market factors without actual cost data to launch a product idea feasibility study.

"Program team members work together to establish a Target cost for the product using BDI (DFM/DFA), supplier estimates, current prices, and best estimates based upon documented assumptions," said Gordon Flores, Cost Engineering Manager at Mercury Marine. "Estimates are also derived from actual BOM and plant costs."

As the product gains definition and all parties agree to Target costs, they are locked in at the system level. Then the program manager returns to the PAC with more concrete details, the Target cost becomes written into the program contract at Gate 2.

From Gate 2 forward, the costs are closely monitored using Visual Management. Cost data is captured for each week from the program cost tracking tool by functional system.

"Having the design managers accountable for their system maintains their focus on cost targets throughout the program," emphasized Flores. "This would not be possible without the LAM and cross-functional access to information."

See Chart 1 for an example of visual management.

As programs evolve through Gate 3, cost focus shifts from managing the Target cost, to an engineer's 'Most Likely' value based on discussions with suppliers, buyers, and the design maturity. From there, cost engineers begin establishing the 'Best Information Material Cost', which is calculated based upon supply chain production quotes for new parts or current contract prices for existing parts, along with various burdens to get a final start of production product cost.

This practice keeps focus on the program targets throughout the development evolution of the product.
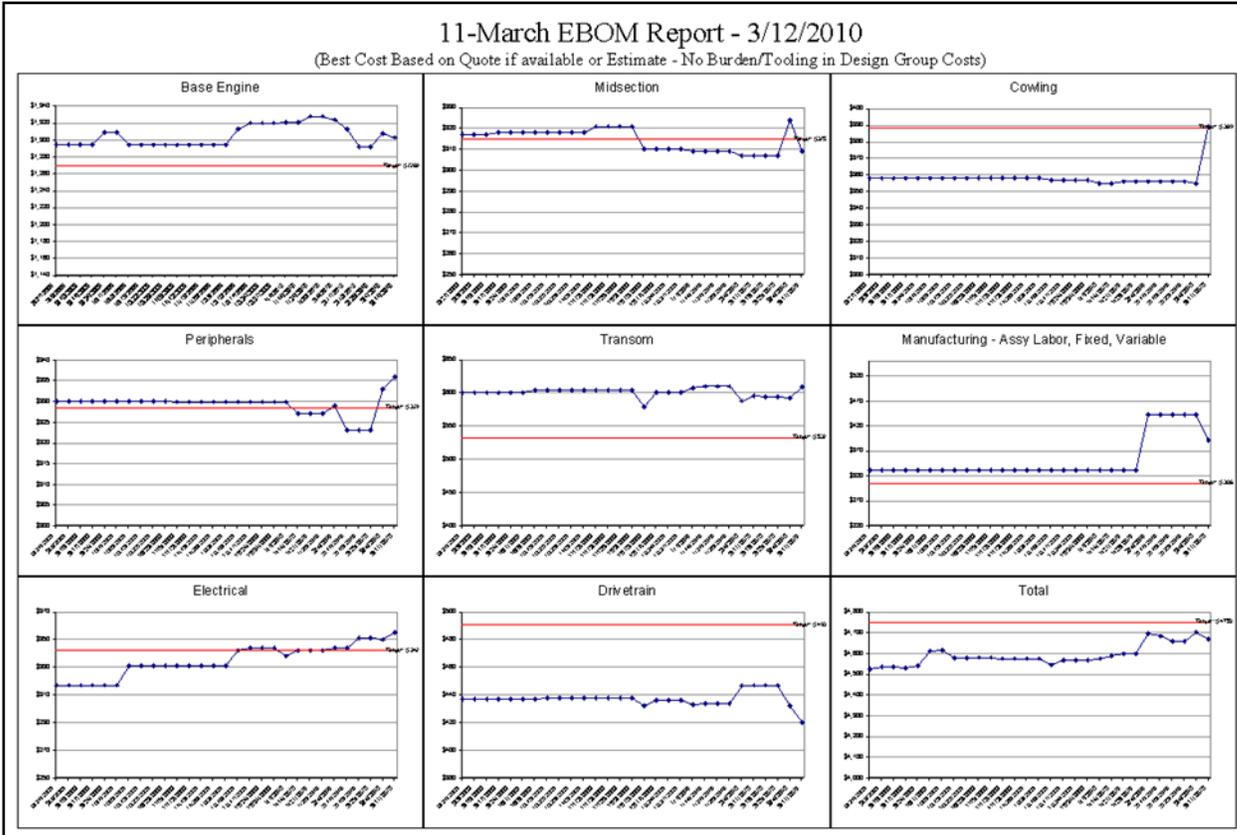
Beyond the program team, there are

Chart 1

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many stakeholders who require insight into timely, program cost data for decision making and program guidance:

Brunswick Board of Directors

Understands the competitiveness, from a cost perspective, of a program design; therefore, can support the product strategy

Product Approval Committee (PAC)

Confident in the cost estimates within the business case (plan and execution are the same); therefore, can support the product development team and make portfolio decisions

General Manager

Confident in the cost estimates and can make decisions regarding product features to set the product strategy

Program Manager

At the start targets are realistic; therefore, has a higher probability of success

Early warnings of cost-related issues; therefore, can initiate containment and preventative actions while there is still time to react

Commodity Manager/Procurement

Thorough understanding of cost drivers; therefore, can negotiate piece prices and capital costs from an informed perspective

Design Manager/Component Manager/Designer

Visible early warnings of cost-related issues; therefore, can initiate containment and preventative actions while there is still time to react

Cost engineers working closely with cross-functional contributors from design engineering, manufacturing, and supply chain are able to collaboratively solve issues that might prevent the targets from being achieved.

By working together, and using the Target Setting Process elements, program cost management is delivering results for Mercury Marine and its shareholders.

Mercury PLM Services Unique Perspective

Our differing approach concentrates on understanding your process as a must for success. A process-centric approach requires businesses to review and question existing work streams to understand "why," "what," and "how" work should be done to establish efficient cross-functional work flows that are consistent, repeatable and scalable for growth.

We also offer a unique perspective for helping organizations considering a Product Lifecycle Management implementation because we view PLM from a manufacturing business user's vantage point since we live and breathe it daily.

Because we work in a dynamic, global product-development environment that supports a worldwide manufacturing footprint, we have a user's perspective that helps drive results and realize improvements.

Several of our experts also have been deeply involved with our ISO 9000 certification effort, as well as configuration management, and engineering document-management practices. Mercury PLM Services is a Siemens Zone SI Partner.

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