The Concept and Practice of "Concurrent Engineering": A Collaborative Approach to Product Development

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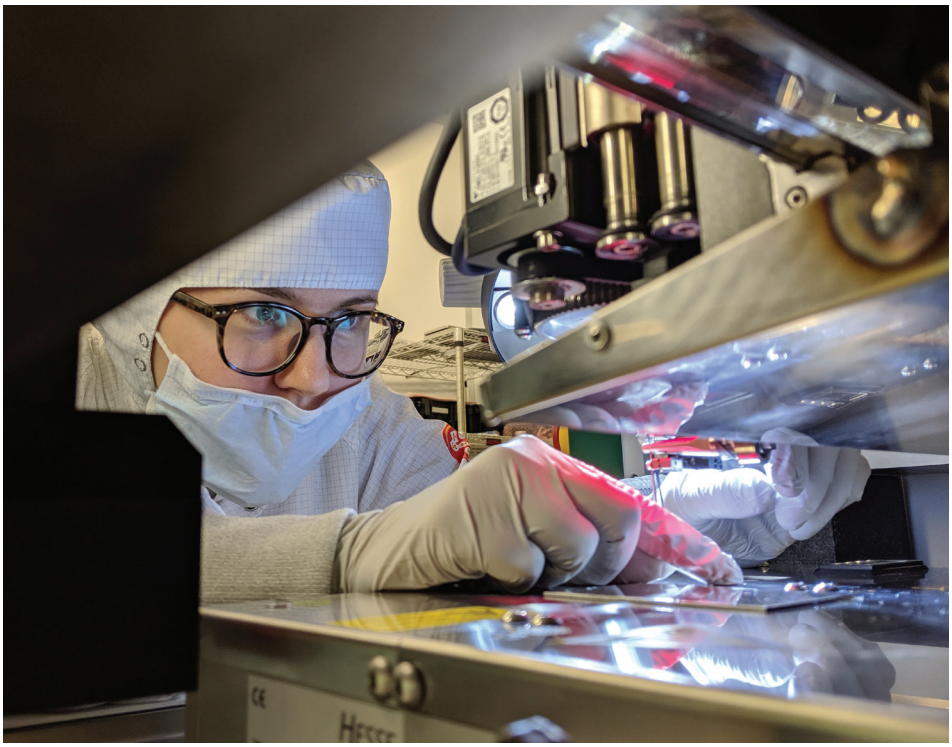
OVER THE YEARS, THERE HAS BEEN significant discussion about the concept of concurrent engineering. Engineering colleges and universities offer courses that emphasize the value of practicing concurrent engineering. This approach is also known as "simultaneous engineering" or "integrated product development (IPD)," but they all refer to the same fundamental principle. Concurrent engineering encompasses various perspectives: some see it as design engineers collaborating with process engineers once the design is finalized, while others view it as design engineers seeking input from different engineering groups. At SMART Microsystems, we believe in a comprehensive team approach from the very beginning of product design until its launch.

In many organizations, the process engineering group typically encounters the design for the first time when it is already finalized by the design engineering group. At this stage, iterations begin to modify the part or assembly to align it with a cost-effective process or an existing one. However, when the process engineering group passes the modified design to the manufacturing engineering group for review, it often requires additional iterations to ensure manufacturability. Consequently, the design might even return to the initial design group, only to discover that it no longer aligns with the original design intent.

These scenarios are not uncommon, and you may have witnessed firsthand the number of iterations required for product concepts that fail to be manufactured. Similarly, completed designs might prove unmanufacturable because the manufacturing team only sees them at the end, realizing they do not meet the design-to-cost goal.

Ironically, when some people hear the term "concurrent engineering," they react negatively, fearing prolonged discussions and missed deadlines due to the diverse opinions and disciplines involved. However, the opposite is true. A fully integrated concurrent engineering development cycle saves time and costs by eliminating costly iterative cycles.



That being said, implementing concurrent engineering incorrectly can indeed lead to the feared organizational complications. Simply seeking random input from other groups is usually insufficient, as is implementing concurrent engineering only at the beginning or end of product development. Both approaches can result in confusion, organizational issues, and missed deadlines.

The preferred approach is an interactive and collaborative one from beginning to end. One effective way to implement concurrent engineering is by leveraging the initial "concept phase" design review process to integrate different groups and their ideas. Seeking valuable insights from as many sources as possible at this early stage sets the process off on the right track.

So, who should be invited to these design reviews? Here is a shortlist of stakeholders to consider:

- The design engineering team should be present to contribute their insights into design intent and customer requirements.

- Program management representatives should be present to provide input on program timing and design-to-cost requirements.

- Process engineering experts should be present to ensure manufacturability of the design.

- Manufacturing engineering representatives should be present to consider the manufacturing needs once the product is released.

Furthermore, don't hesitate to invite participants from outside the product development responsibility. Machine operators, technicians, assembly personnel, and even individuals beyond the immediate scope can bring valuable perspectives. These team members should

not merely serve as placeholders to demonstrate compliance with the design philosophy of concurrent engineering but should be fully engaged stakeholders with respected input.

While large multidiscipline design corporations have the advantage of implementing concurrent engineering due to their internal development disciplines, smaller organizations or start-ups without formal structures must adopt a more creative design approach to leverage the benefits of concurrent engineering. One possibility for smaller groups is to engage outside entities in the review process.

At SMART Microsystems, we are a process and manufacturing engineering development firm that also provides contract manufacturing services to various firms, ranging from large corporations to small start-ups. We often participate as members of the concurrent engineering team during design reviews. When all team members recognize and respect the spirit and intent of this time-tested and valuable process, the outcome can be exceptionally powerful.

For more information, please visit our website at www.smartmicrosystems.com. ◆

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