



The 5 Pillars of Optimal System Design

Designing an effective and long-lasting system—one that will not only meet current requirements but will also provide exceptional performance and quality into the future—is a challenge that many manufacturers struggle to meet.

This article looks at how to design an optimal system using five focus points as the pillars on which to build your successful system.

Categories of an Optimal System

When the time comes to begin designing an optimal system, there are five main pillars you should use to ensure the quality of your design:

- Repeatability
- Reliability
- Consistency
- Accuracy
- Intelligence

By making sure that you have considered each of these categories, and the optimal way to incorporate them into your design, you will be well on course to creating a high-quality, long-lasting system for your organization.

Repeatability

First, your system should be constructed to ensure that it produces consistent results time and again.

Without a mindset that has repeatability at the forefront, consistency suffers and productivity soon follows. Systems that don't have repeatability built in to them then go on to produce scattered, uneven results.

The goal of your system is to produce the same high-quality product each and every time. To make this happen, you have to have repeatability built in to the core of your design.

Reliability

A good system depends on reliability. In essence, this means building a system that:

- Requires very little maintenance
- Can be monitored with minimal hands-on work
- Doesn't need a lot of replacement parts

A system matching these criteria will reduce costs as it won't require a great deal of extra investment over the long-term. Of course, everything decays over time; you can't fight atrophy. But with the idea of reliability built in as one of the five pillars of your design, then you can optimize the system by making it work efficiently for longer. In this way, a good design pays for itself very, very quickly.

Consistency

Designing for consistency means ensuring the process or equipment you use is readily available and proven in your field of business. With a consistent system, you will always be able to find suitable replacement parts, even if you need to seek out an alternative manufacturer. Because all the parts in your system have a history of performance and reliability, your whole design has a strong and solid foundation.

A system that has been designed with consistency is also easier to service as it doesn't require specific specialist knowledge. Consistency in both design and how the design will work in a practical setting are essential for optimum performance and long-term functionality.



Accuracy

Accuracy means that the system will do exactly what it's supposed to do within a very tight bandwidth of performance characteristics.

Accuracy in your design provides a level of consistency that can be relied upon again and again: the process does the same thing repeatedly, giving the same result, and doesn't waste materials on excess production or defective output.

Without building accuracy into the design of your process, you're likely to produce material that is out of spec and unacceptable in terms of quality and utility. As a result, the cost of ownership increases, taking the cost of goods with it.

Intelligence

The fifth pillar of optimal system design is intelligence: a system that can communicate in advance to let you know how well it is performing—and what, if anything, needs to be done to assure continued output quality.

An intelligent system continually evaluates inputs and conditions to determine whether it is operating with the right blend of chemistries, such as the level of moisture required for pill manufacturing, or the mixture

of gases needed to ensure high-quality output in your manufacturing process.

The system can know to open or close a valve—to increase the amount of a certain material or to stop adding it. And it can self-correct and then communicate the details to system operators, even remotely. Employees can be home at night with their family and see that their systems are all running properly.

Benefits of an Optimal System

An effective system relies on one thing above all others: careful and intelligent design. By applying the principles built in to the five pillars discussed above, you can be confident that your system will perform to a high standard, for a minimum of costs, and for many years to come.

Companies may feel like they need support with optimal system design. Valin can help organizations like yours to create cost-effective and high-quality system designs by providing onsite consultation and risk-assessment services. Working closely with Valin, firms can develop an understanding of the optimal requirements for their machines or processes. From there, Valin can assist in solution design, including hardware and software upgrades, and be available to offer support and expertise through the implementation, training, and system validation stages.

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