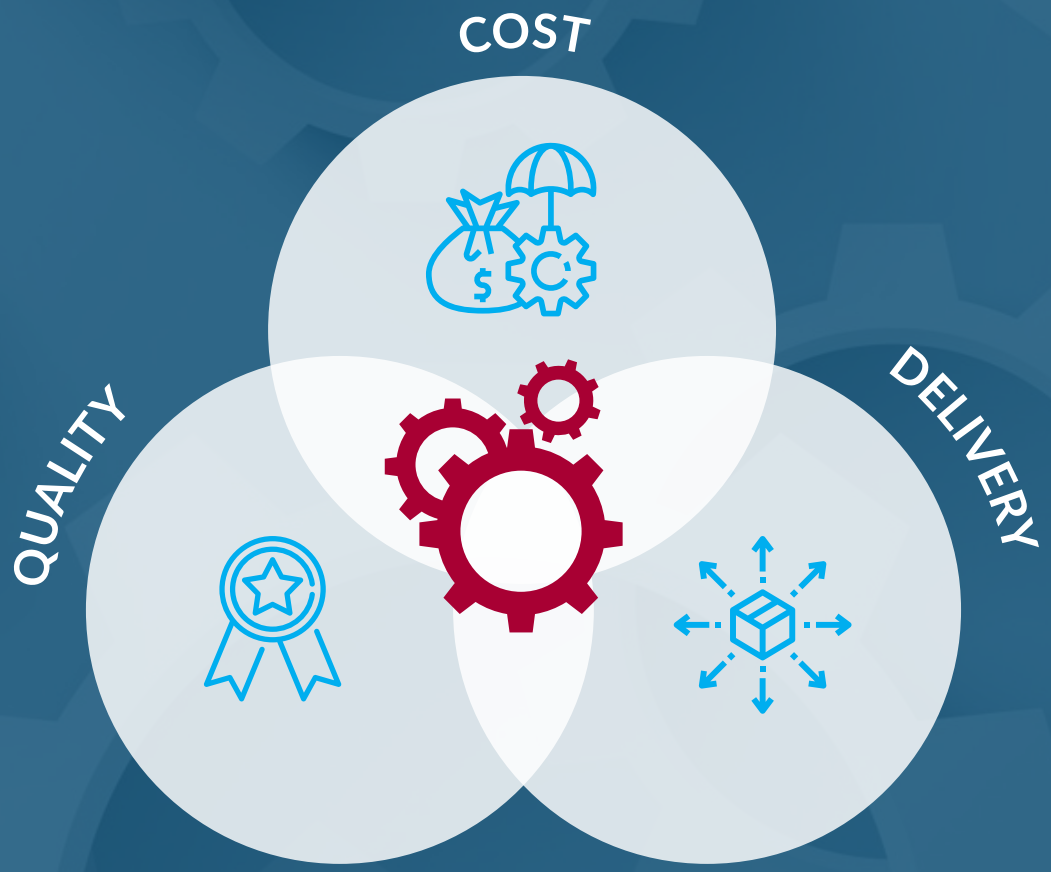
Best Practices in Quality, Cost and Delivery



8 Ways to Drive Performance Excellence

Implementation Engineers Industry Insights

IMPLEMENTATION ENGINEERS®

8 Ways to Drive Performance Excellence

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Introduction

To stay competitive, aerospace and defense companies are under intense pressure to optimize efficiency and effectiveness. Future leaders in the industry are those companies that can react quickly and maximize their full potential. Although most companies establish continuous improvement programs to ensure quality, reduce costs, and drive delivery in the supply chain, optimization of these programs through incremental improvements is what leads to Performance Excellence. In this Implementation Engineers Industry Insights paper, we outline eight areas for improvement within a company while looking at best practices in producing quality, driving down costs, and meeting delivery commitments.

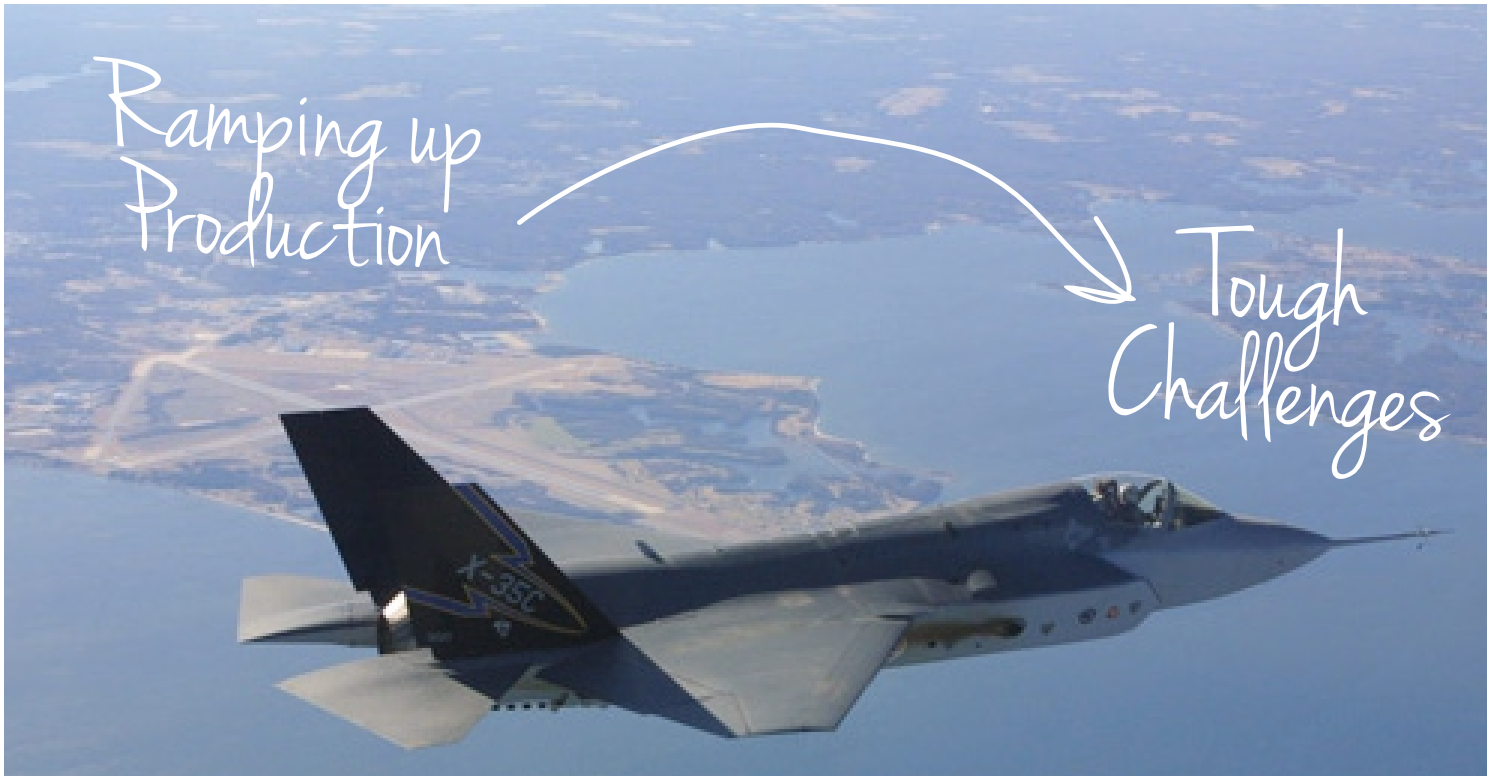
Challenges during growth

Today, the aerospace and defense industries are experiencing a huge growth phase. In such a competitive market, to win a contract, companies go through hundreds of steps and are selected only after undergoing rigorous qualification processes to prove they can produce a high-quality product at a high rate. The challenge is to ensure they simultaneously deliver the highest quality product while driving down costs.

Initially, the company goes into an engineering, manufacturing and development phase with audits for manufacturing and production readiness reviews (PRRs) to ensure they can fulfill all the requirements of the contract. After the qualification process, the company goes into the Low Rate Initial Production (LRIP) phase where requirements and expectations are met through each phase of production.

For instance, say a company receives a defense contract to build a component for a F-35 Joint Strike Fighter. The defense contractor must work through the process before going into a full-rate production environment. Along the way, they continuously resolve any issues in the process. Once the engineering firm is ready for production, they ramp up. This is a tough challenge, especially with lead time compression.

The overarching challenges during full rate production (FRP) are what companies strive to solve. Everything points to quality and efficiency. After the initial LRIP phase, when the FRP environment begins, companies strive to meet the requirements while trying to resolve glitches, quality issues and supply chain issues in manufacturing, continuously working to improve.



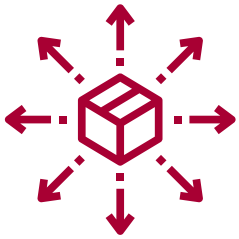
A Strategy for Success

Companies need sound strategies to meet the growth. When the company begins production on several components per month, they scale to demand. To accomplish this feat, they might need to change the infrastructure, hire employees and select strategic partners in the supply chain. With all the moving parts in manufacturing, meeting all the requirements is no easy feat. People must be trained to communicate and coordinate across the value stream to implement changes quickly. In addition, companies produce more in a compressed time period, so they need greater throughput from supplier partners to meet delivery schedules. Results must be predictable throughout the entire supply chain because if there is an issue, there will be a ripple effect.

In light of the challenges that aerospace and defense companies face, it is critical an optimized Performance Excellence program is in place. Of course, optimizing a Performance Excellence program has its own set of challenges, but over the years Implementation Engineers has observed three main challenges when implementing Performance Excellence initiatives. They are:

Quality

Cost



Delivery

- **Quality in Manufacturing** - Companies must attain 100% quality in all requirements for products and functionality across the supply chain, This includes flawless execution in quality manufacturing and sound strategies in business practices.

- **Cost Drivers** - material costs, compliance costs, engineering costs, overhead costs, direct labor costs, manufacturing costs, cost of poor quality and other costs to produce components must be analyzed, assessed and reduced. components must be analyzed, assessed and reduced.

- **Delivery Schedules** - with more orders, companies have greater demands for vendors and suppliers. This means that delivery schedules must be met on time. Parts shortages, quality issues, and manufacturing lead time must meet expectations. There is less buffer to absorb off-schedule conditions and brute force doesn't work at higher rates.

Implementation Engineers breaks Performance Excellence down into eight categories. To be effective, companies turn to a specific approach to reach sustainability and maintain quality in each one of these areas:

1. Human Capital Development (HCD)

People are the single most important asset in a company, so human capital development (HCD) is critical during a growth phase. When a manufacturer ramps up production, typically they onboard and train new employees. Hiring new people in itself is a challenge for any organization; training them to be proficient is another. Best practices is hiring people with the right skill set and making sure a structure is in place before they step into the position.

Many companies have a senior workforce. The challenge becomes how to harness information to transfer their skills and knowledge to train new hires. The structure must allow for mentors and coaches to have the time and resources to train new employees as they step into their new roles. If people are busy doing their day jobs and suddenly they're responsible for ten people, there's no bandwidth for training. Therefore, putting a succession strategy in place ahead of time, before hiring, is important.

Many companies start leadership programs and succession plans so new people can understand the scope of the organization through functional areas. A handoff occurs from both upstream and downstream partners to make sure everyone within the organization is more effective and efficient. Having a rotational program for high potentials where people learn various skill sets and understand the big picture makes the team more functional.

When companies ramp up, they will get all sorts of applicants with varying levels of experience. An effective training program should not be one size fits all, but rather incorporate multiple methods to ensure the knowledge transfer is effective for all the learning styles. For example, companies need to train an engineer differently from an accountant, and need to train a 40-year-old differently than a college graduate.

When companies hire bright, young people out of universities, these graduates may have some engineering knowledge, but need to be trained on processes and procedures unique to the company. People coming out of school today learn a different way--they expect learning that is visual and process driven with a well-defined system in place. It's not like the old days of manuals and schematics. Companies want to transfer the information to the new hires in the fastest, most efficient way possible. Expectations for codifying knowledge need to be set before new employees walk through the door.

Codifying Knowledge

Codifying Knowledge is arranging information as a systematic collection of complementary methods that takes into account various learning styles. When training is offered in multiple ways, this enables people to understand standards and draw the same conclusions via different methods. This may include hands-on simulation, classroom style, videos, tests/exercises, practice, observations, visual diagrams, etc.

It is proven that combining multiple methods in a single training event is quite effective. When people can understand the context, purpose, and details and implement the information into their day-to-day work, the training is successful. In manufacturing, codifying knowledge, both written and unwritten, is relaying information so people of various learning styles can understand the processes efficiently.

Each person thinks and learns in new and different ways. When someone reads information efficiently after 20 years, they have found best practices. The key is teaching others how to access the information through best practices. Codifying that knowledge through a variety of methods, like face-to-face training and virtual methods, will reach various learning styles. When a variety of touchpoints are used to transfer the information, knowledge is gained more effectively. Codifying knowledge ensures a collection of methods are in place to train people in different ways so they learn to perform at optimal levels of success.

2. Supply Chain

Supply chain includes an integrated set of processes to get a product to market. These processes include logistics, warehousing, movement of materials, vendor deliveries and manufacturing. Supply chain functions go above and beyond to make sure all requirements are met to 100% quality and delivery. Therefore, companies must keep a high level of accountability while keeping an eye on cost, changes in production and quality in manufacturing.

Today, companies that flourish have excellent visibility into the supply chain in terms of production performance and any issues that may impact quality. Supply chain is the link to profitability as companies with high performing supply chains achieve revenue growth greater than average.

When people look at the supply chain holistically they look at value added cost versus piece per price. For instance, when selecting vendors, for years people were focused on the best price. Today, companies find Total Cost is more important. This is a value-based way of looking at supply chain versus price paid for a piece part. In times of growth, suppliers who provide the best price may not always be the best strategic or long-term company to partner with. Small vendors may may encounter delivery issues, which ultimately cost money in the long run. Large vendors may lack flexibility to offer the service needs of the business. Suppliers must have the ability to handle the growth when there are spikes in demand.

Supply chain must perform quality audits, especially during change. When customers change, requirements change. Aerospace and defense companies learn how to do things better and faster as they go through sometimes thousands of design changes which can create a ripple effect throughout the supply chain. Therefore, when changes occur, companies must communicate that to the supply chain so everyone is on the same page and not course correcting. When there are escapes, this indicates a lack of execution. That's why accountability and constantly measuring the right behaviors is necessary.

3. Operations & Manufacturing

Operations & Manufacturing is the heart and lifeblood of a company. In operations, high-performance management is determined by how well leadership sets up their teams for success by improving hour-by-hour and day-by-day, while executing flawlessly. When companies have barriers or gaps, leadership needs to head them off before they become a big issue. Companies must have a continuous process for identifying opportunities and problems using data and observations to continuously improve. However, many variables can get in the way of executing flawlessly including managing people and reducing waste.

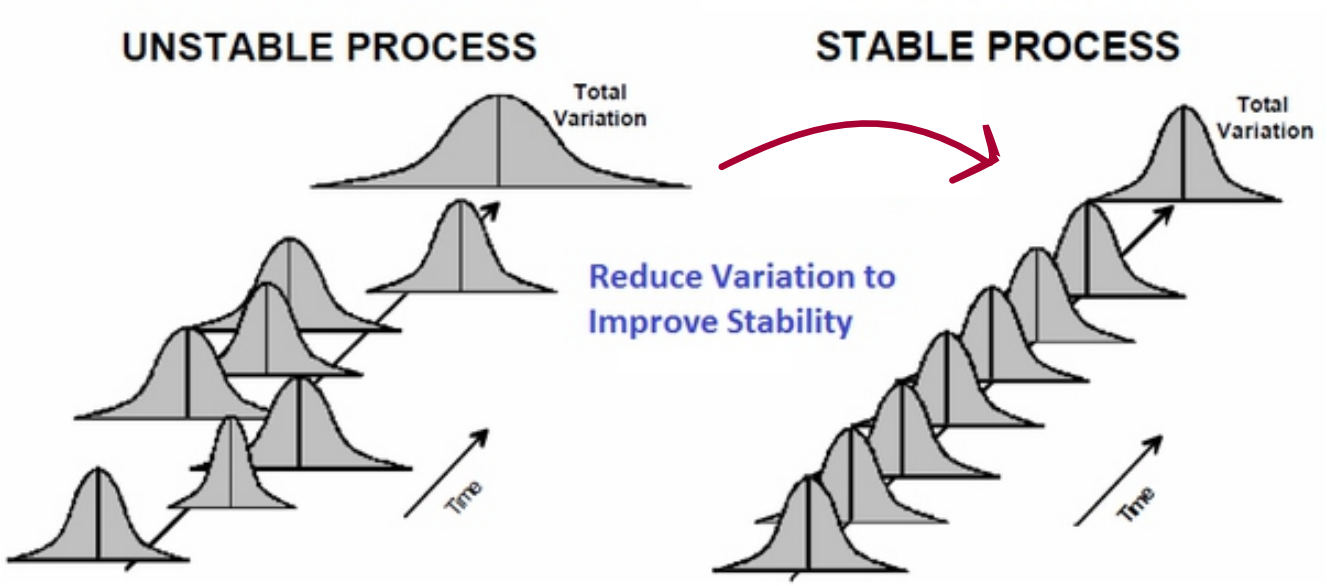
Managing human capital is part of the equation. When someone steps into a new role on the manufacturing line, the leadership team has to support them with good coaching. Expectations must be set so roles and responsibilities are clear. How well employees perform their jobs must be measured and documented. When the structural components of roles and responsibilities are in place, employees can be successful. Since employees are the ones doing the work, seeing the issues and having the best ideas to improve, it is best to harness their skills and provide them with as much accountability as possible - this is critical in achieving a flexible and high performing workforce

Keeping down costs and reducing waste in manufacturing poses significant challenges to ROI as well. Lean is one of the tools Implementation Engineers deploys to eliminate waste in the process. Huge gains are usually possible by working on flow and reducing waste by working collaboratively across support groups with process engineers, supply chain managers, and design engineers. Companies need to reduce waste before they expand and build infrastructure to support growth. Transferring bad habits and poor processes to a new or expanded facility can often occur. After taking an assessment and effectively reducing waste, the scope of an expansion is often less necessary than initially perceived.

4. Big Data

Using data correctly makes top-level analysis seamless and requires fewer people or hours to get basic answers. However, showing data on a dashboard is only part of the equation. People often jump to digital but need to know how to define processes, use structure and implement a high-performance management (HPM) system to use the data effectively. High performing companies today take data and turn it into information that drives sustainable improvements, but a good foundation must be in place in order to use that data. The solution is to be data-driven and learn how to apply the data to make behavioral changes.

Implementation Engineers is technology agnostic and outcome driven. We feel It is important to look at people through varying levels of the organization to understand where the root cause of a problem originated. The digital dashboard allows companies to look across the value stream, manufacturing, supply chain, procurement, and delivery with success. The goal is to deliver on time and within budget with the quality required by the customer. Data can help do that.



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Big Data in Action

A number of clients have jumped to digital solutions without having a strong foundation. In many cases the companies were not using the dashboard effectively; they didn't believe the numbers and they weren't driving performance. In these circumstances it is best to get back to basics which start with aligning the organization to the key performance indicators that will drive behavior and ensure sustainable results. The company started writing the information down every two hours to see how it went, drilling into data. It took months of changing the behavior. Then they got more advanced and changed the matrix and started using digitization and dashboards. Eventually, they started measuring more items. That's the evolution - having the foundation of putting in the right processes and leadership support in the place first and then using technology to streamline the process.

5. Engineering & Product Development

Engineering and product development is the front end of the entire manufacturing process and can make or break the value stream. The development team must thoroughly understand the voice of the customer so engineers come up with the effective, efficient designs to maximize speed to market and customer performance. One challenge facing most engineers today is compression. Product design engineers are more constrained which means they have less time and less budget to produce a more technologically-advanced product.

When Implementation Engineers helps companies improve their design cycle, initially many client engineers and designers have good ideas about how to improve manufacturing. However, part of the challenge is getting data back to the source and feeding key learnings back into the group. Communication spanning cross-functional teams is vital to perfecting engineering innovations. Using approaches such as Design for Six Sigma help drive product development and improve product quality while driving the reduction in engineering changes during the production phases.

With a higher volume of programs, companies want to design for manufacturability with representation and coordination across groups, so additionally the manufacturing folks, who have good ideas, are heard. Many times, all teams aren't properly integrated within initial phases of product design. Setting up strong coordination and communication up front in design among key stakeholders ensures success during initial production.

Compression Challenges

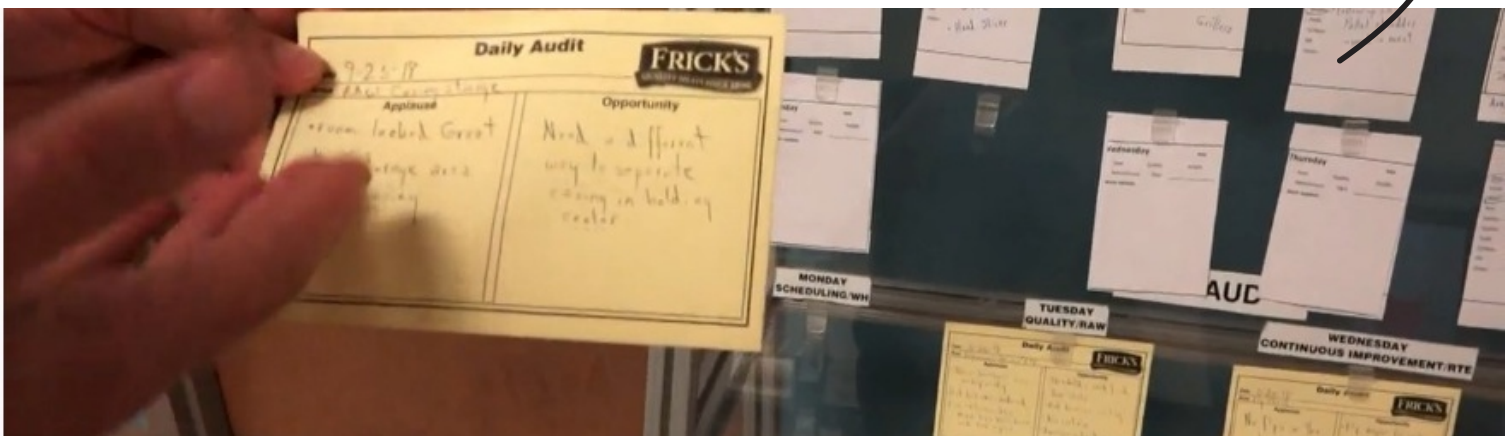
Compression is the amount of time it takes to design a new product. With compression, companies have rapid changes that require them to be more effective in the engineering processes. With more compression, companies want to make the right changes at the right time as quickly as possible.

With compression comes challenges. Companies must:

- Handle coordination across groups
- Increase visibility with the digital dashboard
- Understand why they have engineering changes
- Determine which changes they can bundle together to implement the change.

Watch our Case Study Video

The key is to coordinate all the efforts so that any change provides minimal disruption to the full supply chain and value stream. Making that process as seamless as possible is extremely important.



https://www.implementation.com/freeresources/a-day-in-the-life-of-an-operations-leader/

6. Quality Management

Quality needs to be embedded in the culture across every single organization within the company to achieve 100% quality at all times. Companies need the right structure, skill set, and culture to attain quality.

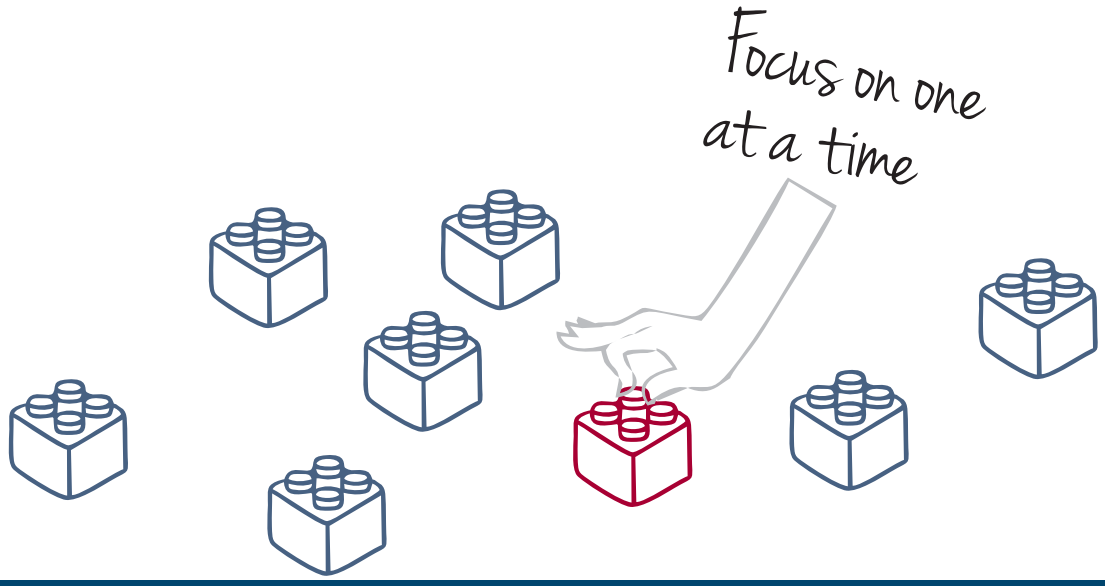
Some quality issues are supplier-related. Often, It is necessary to go back to the supply chain or vendor management for quality audits to make changes. Other times, issues are internally related and need additional coordination and input from cross-functional teams. Some quality issues are paperwork-related, so companies look at why that is. Companies see major escapes because of a lack of execution. Having an accountability structure in place and ways to measure the right behaviors is important.

Implementation Engineers takes a pragmatic approach using preventative action through Six Sigma and data-driven approaches. This allows for properly addressing root causes rather than going after symptoms. Prioritization of opportunities becomes key as every organization is balancing time, budget and resources in driving towards 100% first pass yield. Some things can be fixed today; others things need different problem-solving methodologies. Using the right tool for the right job is what companies need to strive toward.

7. Maintenance & Reliability

Companies must have good reliability programs in place for machine centers. When they start seeing variation in what their equipment produces, equipment might be lacking. Companies need preventative maintenance on equipment so it is producing as designed.

Without maintenance and reliability processes in place, companies may see variations in manufacturing. Maintenance and reliability is sustainment post production which is the overhaul component. Many times to grow, companies must look not only on the capital side, but at machining centers, material flow, and infrastructures required to produce.



8. Total Performance Excellence

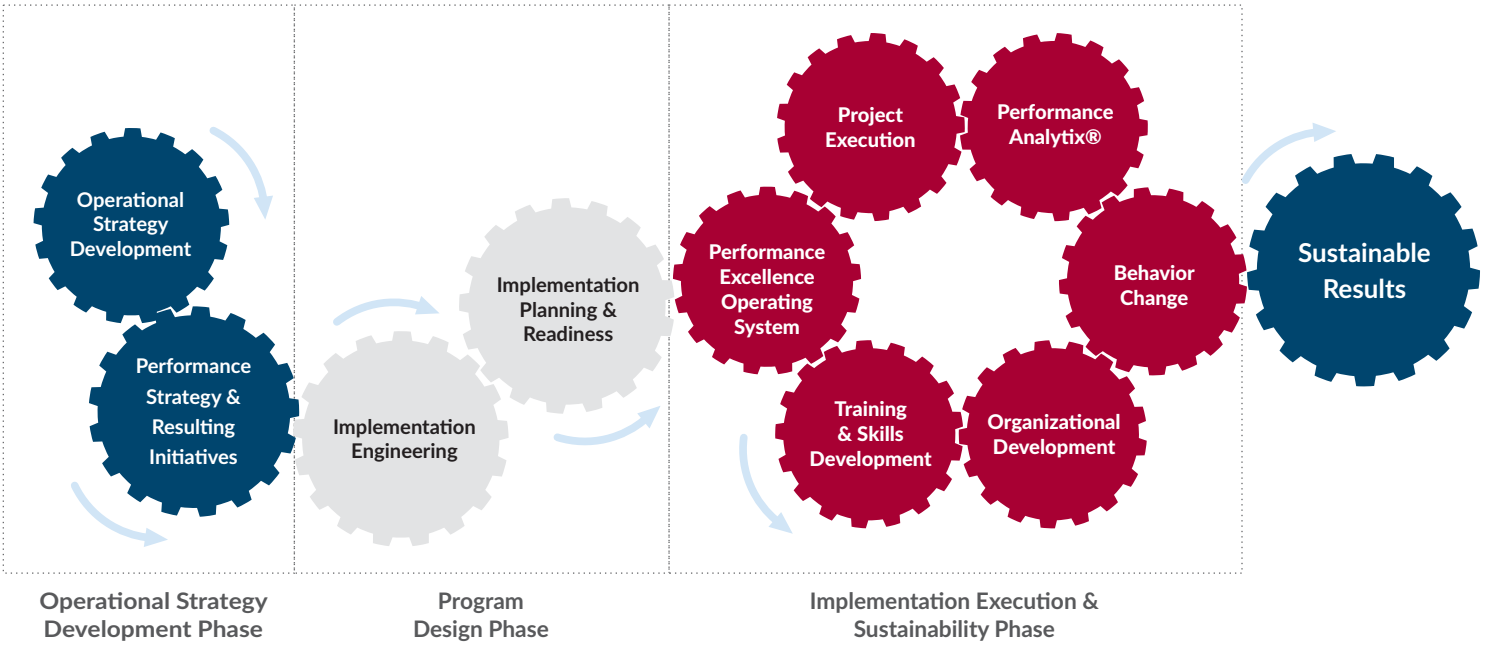
Total Performance Excellence means looking at every detail and taking a holistic view of the entire company with a strategy in place to achieve performance. This means looking at the operations piece, tactical piece, people piece and analyzing which ones are hurting the performance or which ones are going well.

Some companies try to tackle everything at once with limited success. An incoming consulting company finds it hard to fix everything at once. It requires them to break everything down and eat the elephant one bite at a time. They go through and assess the performance level and maturity of each area before diving into where time, energy and focus should be spent. Typically, problem areas are solved with a better tactical plan and better execution, improved training of people or repairing processes which are not effective and efficient.

Problem identification is half of the equation and how to resolve the problem is the other half. Each company has tools they've been trained on it's a matter of using the right tools for the job. It's important to focus on three initiatives first which are people, processes and systems and technology.

By looking at deficiencies around performance holistically, companies will see some common elements and changes that need to be made. Then they can align the quality, cost, and delivery they are looking for.

enCompass®



Summary

To keep up with the increasingly rapid growth within the aerospace and defense industries, companies have to become more streamlined and productive than ever before. It is imperative that companies stay flexible so they can react quickly and maximize their full potential. Established and continuous improvement programs ensure quality, reduce costs and drive delivery. Optimization of these programs through incremental improvements helps companies to succeed. To achieve Performance Excellence (PE) a company should adhere to the eight areas for growth potential.

Following these guidelines is a good strategic plan for growth. To keep up with increasing production, companies continually strive to improve while looking at best practices in producing 100% quality in manufacturing, while keeping an eye on costs and maximizing delivery.

If people are on their own Island, in their own world, they may optimize one area at the detriment of other areas. We ask our clients if they understand the big picture and where we are going. If people understand the big picture, then they can look at their day-to-day jobs for ways to improve.

Mike Petsas
SVP Operations and Supply Chain

NEXT STEPS

- Schedule a meeting with our team to learn about our enCompass® methodology and how IE can improve your operations
- Interested in learning more about the topics covered in this white paper? Call us at 1-312-474-6184 and reference the paper you're interested in. We would love to discuss your initiatives.
- Visit www.implementation.com to find out more about our services

IMPLEMENTATION ENGINEERS®

At our core, Implementation Engineers is a data-driven, global firm with a razor-sharp focus on enhancing mining and manufacturing operations.

We have volumes of success stories, and they can all be attributed to our revolutionary enCompass® methodology. This industry-first approach gives us not only the knowledge to inform you of what needs to be done but the power to actually implement those solutions for lasting impact.

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