

EMGT 835 FIELD PROJECT

Improving the Execution and Influence of a Quality Group

By

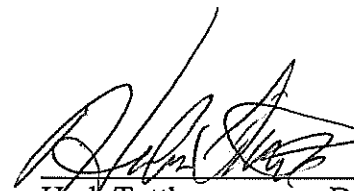
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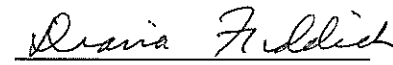
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Table of Contents

Acknowledgements.....	1
Executive Summary	2
Introduction.....	4
Literature Review.....	8
Execution.....	9
Strategic Planning and Execution.....	9
Workforce Focus	14
Knowledge Management.....	17
The Constraint of Existing Systems	18
Innovation.....	21
Influence.....	24
Alignment	24
Managing Up.....	26
Communication	29
Emotional Intelligence.....	30
Attract and Sustain Superior Talent.....	32
Building Alliances	35
Taking Power Quietly.....	37
Details of the Problem	40
History of Operations.....	40
Initial Quality Architecture Improvements	41
Future Plant Challenges	43
SWOT Analysis.....	43
Strengths	44
Weaknesses.....	44
Opportunities	46
Threats	48
Summary.....	50
Findings.....	52
Overview	52
Execution.....	53
Strategic Planning and Execution.....	53
Workforce Focus	57
Knowledge Management.....	60
Constraint of Existing Systems.....	64
Innovation.....	66
Influence.....	68
Alignment	68
Managing Up.....	71
Attract and Sustain Superior Talent.....	78
Building Alliances	81
Taking Power Quietly.....	83
Summary and Conclusions	86

Execution.....	86
Influence.....	88
Implementation.....	89
Suggestions for Additional Work	92
Exhibits	93
Bibliography	97
Glossary	100
References.....	102

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Executive Summary

National Conduit is a manufacturing company for the telecommunications industry. Though management stresses the importance of quality, management often overlooks quality due to a misunderstanding of its role. Management thinks of quality in terms of ISO 9001 certification, or specific tools associated with quality management systems. While this view does not harm the role of quality, it does not strengthen it either. The lack of engagement underutilizes the Quality team and systems for continual improvement.

National Conduit's Plant 1 Quality team needs to focus on two questions:

1. How do you execute a quality management system that adds value to the organization?
2. How do you grow the influence of the Quality team with other teams in Plant 1?

Understanding and answering these two questions leads to greater use of the Quality team in the role of continual improvement.

Execution relies on alignment to a single goal. Design and execute all aspects of the quality management systems such as auditing, corrective actions, or customer complaints, to support the single goal. For Plant 1, this single goal is building quality into the product to lower manufacturing costs and to provide a superior customer experience.

National Conduit selected the Six Sigma approach as the core of its continual improvement program. The Quality team should utilize these tools in all areas of their work. A systematic process of review – Plan – Do – Check – Act – should be part of the daily tasks for the Quality team. Use of the PDCA loop identifies and corrects issues in a timely fashion. While the use of existing National Conduit systems can strengthen execution, these systems must be balanced against the need for innovation.

Improving execution requires a focus on the workforce. Team members must develop hard skills, such as data analysis, and soft skills, such as facilitation and coaching. Interacting with a wide range of teams in the Plant 1 organization requires strong emotional intelligence in the Quality team. They must be aware of their own internal emotions and responses to deal with a wide range of issues and personalities.

Strong execution skills rely on influence to enact change. Alignment of the Quality team goals with the Plant 1 goals is important. Demonstrating this alignment to upper management, and convincing them of the Quality team's worth, is critical to gaining influence in the organization. This requires a change in communication. Communication must be positive and tuned in a manner that relates to the audience. For management, communication should be tuned to reflect the financial realities of quality issues and improvements. How does a project save money? How does a solution increase sales revenue?

Changes in influence require a superior team. The Quality team must build talent and attract outside talent. Alliances with other teams help strengthen influence. When a team is perceived as a strong performer with smart business ideas, other teams will want to support those ideas and be part of the winning solution.

A team that is willing to look inward proactively and work to improve its own financial performance helps the overall financial performance of the organization. Stronger performance, sharper execution, and integration with other teams results in increasing sales revenue and decreasing manufacturing costs on a shorter time horizon.

Introduction

National Conduit has manufactured telecommunication products for over 25 years. The telecommunication business soared in the late 1990s only to suffer a crash in 2001. Just prior to that crash, the Plant Manager at National's largest facility – Plant 1 – called for a new approach to quality as sales began to slow. The result was the creation of a quality architecture that covered the manufacturing process from raw materials and orders through to the final quality control.

In the nine years since the quality architecture was launched, Plant 1 has seen the amount of returned product drop by a stunning 90%. Volume has returned to pre-2001 levels, but with a different product mix. Order levels continue to be volatile due to uncertainty in the United States economy. Executive management focuses on cost reductions in operations to prevent a repeat of 2001. Amid all this, Plant 1 found itself with newly promoted Quality Manager who was asked to chart a course for the next three to five years. The question the new Quality Manager was facing: “now what?”

After a couple of months in his new position, the Quality Manager decided to meet his mentor – the Director of Corporate Quality – for lunch and seek advice. Two years before becoming Quality Manager, he had forged an unofficial mentor relationship with the Director of Corporate Quality. The goal of the relationship was neither technical improvement nor a better understanding of quality management systems, but rather to understand the need for relationships and the politics that occur at the higher levels of National Conduit.

Over dessert, the Quality Manager laid out his frustration. “Why is it we seem to talk about the importance of quality at all levels, yet I can't get any support for it? Projects are not

supported. Funding is tight. It's all talk and it just feels insincere. We don't really care about quality as a company."

The Director grinned while slowly stirring the heavy cream into his coffee. "I don't think I'd characterize it that way" was his response. "Quality is a lot like losing weight. We all talk about wanting to do it, but we really don't want to do what it takes to lose the weight," he continued.

The Director laid down the spoon. "Look at me. I could stand to lose some weight. I talk about it all the time. I know exactly what it would take: exercise, portion control, healthy choices in my food. But I don't take any of those actions to lose weight. I talk about it, but I don't support the goal." It was a viewpoint to which the Quality Manager could relate.

The Director continued. "Quality is no different. We do frequently talk about it, but we often don't want to do what it takes to achieve progress in quality. Managers feel like they will have to sacrifice to make quality improvements, and like a diet, those sacrifices last only a short while. You either need a dramatic event like a health crisis to force people to lose weight, or convince them in a way that's integral to their life. With quality, you may get a business event like the 2001 crash, or you have to figure out how to integrate quality into the daily business life."

The Quality Manager looked back on the past several years and realized that quality was always something separate from the business. Quality projects were always separate. Quality concepts such as Six Sigma were treated as an exception and not the rule when it came to projects. Quality tended to be viewed as non-value added since the rise of Lean Manufacturing in the past five years at Plant 1, and since quality was not considered "lean" it often was viewed as a burden. The future of the quality organization boiled down to two questions:

- 1. How do you execute a quality management system that adds value to the organization?*
- 2. How do you grow the influence of the quality team with other teams in Plant 1?*

The Quality Manager reviewed a number of books and found a variety of ideas about quality standards, quality tools, and implementation approaches. Many texts stressed the concept that quality must start from the top. While sounding good on the printed page or at a management conference, the idea did not appear to match the reality on the ground. A plant manager or CEO is constrained by the demands on their time. To expect them to take the lead on quality seems unrealistic. Could a strong quality management system begin deeper in the organization by individuals committed to quality and continuous improvement? As with losing weight, leadership may talk up the desire and the goal, but will not take specific actions if they cannot see the benefit. The quality organization needs to be the “health coach” that convinces leadership why losing weight is in line with their other goals. Waiting for quality to come from the top down does not appear to be the only answer. The reality is that National Conduit, like most quality organizations, is pressured from four different directions and illustrated in Exhibit 1.

For National Conduit, the prevailing business conditions are cost reductions. The business is extremely focused on aggressive cost reduction targets over the next three to five years. Industry standards involve the ISO 9001 standard as well as the internal corporate standards for manufacturing excellence. Other standards such as ISO 14001 and Sarbanes-Oxley can be incorporated into the quality management systems as well. Outside organizations include the Corporate Quality plan for all manufacturing plants over the next few years while the existing systems include the quality architecture already in place at Plant 1.

Traditional quality tools and standards will not produce an effective quality management system on their own. To improve the effectiveness and influence of quality one must look at how the quality organization is run and how it relates to other organizations and management. While there are a number of tools available to the quality practitioner, how the tools are selected and used will be vital to how effective the tool can be. Management is interested in improving the value-added steps of the process and eliminating waste. Execution is a first step in ensuring progress with any quality management system.

Management and other organizations must feel that quality improves their lives and is not a burden. The Quality team must not focus only on the facts, but also on the perception. Influence is important to adding value in the organization. Prioritizing projects, removing constraints, and assigning resources are not always done objectively. The Quality team needs to understand how decisions are made in the organization, and what skills are needed to influence these decisions in a positive way.

This project will look at two aspects of an effective quality organization – execution and influence. It will outline ideas for the Quality Manager to develop an organization for National Conduit that will provide superior results over the next three to five years.

Literature Review

The literature review for this field project began with the two questions posed in the Introduction:

- 1. How do you execute a quality management system that adds value to the organization?*
- 2. How do you grow the influence of the quality team with other teams in Plant 1?*

These two questions focus the literature review on two topics: execution and influence. Jim Collins' works Good to Great and Built to Last, Larry Bossidy's Execution: The Discipline of Getting Things Done, and Stanley Marash's Fusion Management were the central focus. Other works reviewed were Jeffrey Linker's The Toyota Way, Eliyahu Goldratt's The Goal, It's Not Luck, Critical Chain, and The Haystack Syndrome, and Mikael Harry and Richard Schroeder's work Six Sigma: The Breakthrough Management Strategy Revolutionizing the World's Top Corporations. The basis of review for issues regarding the interaction of people was Daniel Goleman's works Working with Emotional Intelligence and Social Intelligence. While these works were not the only ones reviewed, they formed the core of the literature review.

The literature review that follows will first look at topics in the area of execution. These areas include strategic planning and execution, workforce focus, knowledge management, the constraint of existing systems, and innovation. These areas were selected to focus on how a Quality team would select and manage projects, how it would manage personnel and information, and how it would balance innovation against the existing culture.

The second half of the literature review focuses on influence. In this topic, alignment, managing up, communication, emotional intelligence, attracting and sustaining superior talent, alliances, and the idea of taking power quietly are reviewed. These are the soft skills that occur

outside of statistical process control (SPC) or ISO 9001. These areas of focus were selected to look at how National Conduit's Quality team could convince other teams and management to invest in a variety of quality projects.

Execution

Strategic Planning and Execution

The starting point for any group is how it selects and executes projects. How does National Conduit determine its focus? What guiding principles should govern its decisions? How does the Quality team know what is right for them?

Strong execution relies on selecting effective projects for an organization. Jim Collins, author of the books Good to Great and Built to Last, studied the successes and failures of a number of companies. Collins concluded that the great companies achieved their breakthroughs through a series of good decisions, but that not all decisions were correct.¹ Decisions must involve “confronting the brutal facts of your situation” so the organization can adjust the strategy. Collins recommends focusing on three areas, or circles:

1. What you can be the best in the world at (and what you cannot),
2. What drives your economic engine, and
3. What are you deeply passionate about?²

For National Conduit the “world” is the plant environment. What does the Quality team do best? How does it differ from Engineering or Research & Development? Additionally, it must understand the economic engine of the plant. For National Conduit, that engine is focused on cost reduction for the next few years. The Quality team must determine how they contribute to

that engine. Finally, the Quality team needs to determine what its passion is. What skills energize the team and how do they focus that excitement to advance the quality objectives?

The importance of focus is a theme in Stephen Covey's The 7 Habits of Highly Effective People. While less data oriented than Collins' work, the book is widely read among the leadership at National Conduit and most individuals recognize the terminology. Covey suggests that the focus should be on items within the Circle of Influence. This focus is a more proactive approach as it allows organizations and individuals to work on things they can affect.³ For the Quality team, this means keeping the initial focus at the plant level. While there may be issues related to Customer Service or Field Sales, these departments are outside the control of plant management and, in the immediate future, are not within the Quality team's Circle of Influence.

Covey also references the concept of focus in his second habit "Begin with the End in Mind." Here he stresses the importance of starting with a clear understanding of the organization's destination. Understanding this destination helps the organization remain effective in achieving its goals.⁴ Collins' three circles of focus provide a means of defining the end state for an organization. Before the Quality team embarks on a new direction, it must select a destination. This destination may include targets on reducing scrap and rework on the shop floor, or eliminating in-process quality control tests by building quality into the product through error proofing. The importance of Collins' three areas of focus and Covey's habits is recognizing the need for a goal and working toward that goal.

While Collins' work focuses on the success of an entire business, it can apply to a specific team within an organization. Dr. Stanley Marash, however, brings the concept of focus to the quality arena in his book Fusion Management. Marash does not separate quality from the general business. He states that a strategic quality plan needs to integrate with the strategic

planning of the business. For National Conduit, this business strategy focuses on cost reduction over the next three years. Marash's strategic plan should address the following issues:

1. Identifying customer needs,
2. Determining customer needs and wants,
3. Converting customer needs and wants into measurable characteristics and features,
and
4. Working with the customer to verify that following the process and achieving the measures will in fact result in customer satisfaction.⁵

For the Quality team, these issues generally translate into customers needing a high-quality, reliable product delivered on time with an always-lowering price. Using standard "Voice of the Customer" techniques from Six Sigma, translating customer needs and wants into measurable characteristics is important to drive quality goals. A customer may desire a conduit to be an orange color, but to ensure a high-quality product, the plant must not only identify the specific standard for orange, but also the amount of acceptable variation allowed within a run of conduit and from one run to another. Quality goals and targets must link to the customer's needs and wants.

Once a group understands the business goals and customer desires, it may select the best project portfolio and still fail. Lawrence Bossiday, Chairman of the Board for Allied Signal/Honeywell, and Collins both stress that project selection is not enough. Execution and discipline are also important to success. The Quality team needs to select good projects and it must complete those projects. In Built to Last Collins states the importance of not only great intentions, but in executing on those intentions.⁶ This execution requires having mechanisms in place that will enable the organization to get the job done. Bossiday echoes the importance of

execution in his work, Execution: The Discipline of Getting Things Done, where he cites that strategy is typically not the failure, but rather the execution of that strategy.⁷ Bossiday states that a strategy for change must translate into concrete steps for action. It is the steps for action, or execution, that keeps the organization moving forward.

An example of such a challenge might be the deployment of statistical process control (SPC) across the manufacturing organization. The selection of such a project may align with business objectives; and the project could still fail. For example, deployment of an SPC system may require selecting a software package, making data connections to existing systems, training engineers in SPC, and selecting areas of focus in the deployment. If the training program is inadequate and engineers do not understand how to leverage SPC or set up the appropriate charts, then the adoption of the SPC system may be slow to non-existent. This would lead to project failure. In Bossiday's terms, the failure here is not in the strategic selection of SPC, but rather in the execution of deploying that strategy.

So how does a Quality team avoid the failure of execution? Building layers of management has never been a good solution. Collins spends Chapter 6 of Good to Great discussing the "Culture of Discipline." Here he lays out the importance of giving the organization some guidelines and then allowing the individuals to flourish in a culture of entrepreneurship. Bossiday takes a similar view by discussing how execution is a discipline. Bossiday sees execution as a method for exposing reality and acting on it. It is a method for questioning the situation, following through on the actions, and driving accountability.⁸ Just as Collins' stated the organization must "confront the brutal facts," Bossiday also believes that execution relies on how well the organization faces reality. Bossiday believes the heart of execution lies with three main processes: the people process, the strategy process, and the

operations process. In our example of deploying an SPC system, the Quality team should confront the fact that training was inadequate. It must question what went wrong, take accountability for this oversight, and develop a corrective action plan. Implementing the SPC system was a good strategy, but inadequate training led to a failed execution.

No discussion of how to strategically plan for a Quality team would be complete without referring to the Malcolm-Baldrige award. The 2008 Malcolm-Baldrige criteria for Performance Excellence reflect the importance of understanding the customer, selecting a strategic plan, and focusing on the people and operations. Here the focus is on seven different categories:

1. Leadership
2. Strategic Planning
3. Customer and Market Focus
4. Measurement, Analysis, and Knowledge Management
5. Workforce Focus
6. Process Management
7. Results⁹

The Malcolm-Baldrige sections reflect the work of Marash, Collins, and Bossiday. Leadership in an organization must confront the brutal facts and establish a culture of discipline. Bossiday discusses the importance of Strategic Planning, Workforce Focus, and Process Management in his discussion of a strategy process, a people process, and an operations process. Marash covers Customer and Market Focus along with Measurement, Analysis, and Knowledge Management when he discusses turning customer wants and needs into measurable characteristics. Finally, Collins, Bossiday, and Marash stress Results by connecting the strategy and execution to the business goals.

Through all of these works, we see a common theme to develop a strategy that builds on strengths in the organization, supports the business goal, and focuses on the customer. The strategy must be executed well with a strong accountability and willingness to recognize the reality of the situation and make corrections as needed.

Workforce Focus

Strategy and execution are important, but neither will be done well without good people in the organization. Both Bossiday and Collins stress the importance of people in the execution of a strategy. Bossiday spends Chapter 9 of Execution: The Discipline of Getting Things Done discussing the people process. He states that while a strategy defines where the organization wants to go, the people process defines who is going to get it there. The people in an organization must understand the strategy and have the tools to execute it. They need an operating plan to execute the strategy. Bossiday outlines the importance of the operating plan as a way to guide the people, and to develop short-term targets out of the long-term strategic plan. This operating plan should tie the various parts of the organization together to reach the goal. For the Quality team, this means showing how the strategic quality plan ties in to engineering projects, or production targets, or financial goals.

Collins' discussion of a people plan uses the metaphor of having the right people on the bus. With Collins, the bus symbolizes the organization and he stresses the importance of having the right people not only on the bus, but also in the correct seats. For a Quality team, this means having people who understand quality and how it fits into an organization. It also means providing education to the Quality team to deepen their understanding of their role. For example, the production organization may have targets for completing production in compliance

with the schedule or for shipping on time. No matter how well suited an individual is to working on the Quality team, if they do not understand the production targets, then they may not work well with production.

Collins discusses the importance of people in Chapter 3 of Good to Great. He furthers the idea of the organization as the central focus in Built to Last. Here he talks about the importance of building a clock instead of telling time.¹⁰ This metaphor refers to building an enduring system or organization instead of a single product. This enduring system of philosophy and people is the secret to long-term success. Examples cited by Collins are General Electric, Boeing, and Sony. Each had initial product failures, but went on to build successful companies over time.

For National Conduit's Quality team, this means not focusing on a successful, single project. The Quality team needs to develop an understanding of the organization. It needs to understand how the organization is measured. It needs to identify gaps in the skills of its people, and develop plans to close those gaps. Such development must go beyond the current people on the team. The Quality team must develop in a way that it remains successful as people transition on and off the team.

Both Marash and Collins stress the need for long-term success in educating an organization. Marash speaks to individual successes on a smaller level in Fusion Management. He states the organization should focus on education and not training. Marash sees training as a one-time event while education is an improvement to the individual's knowledge base. He feels that a series of successes with a new process transforms the training into long-term education.¹¹ One example that demonstrates a difference between training and education is the Quality team's use of the statistical tool known as the Student t-test. The Quality team may encounter a

situation that requires the Student t-test. The Quality Engineer trains on how to use the Student t-test and apply it to the specific situation, but then cannot recognize the need for the tool in future situations. Educating the Quality Engineer on the technique, good references, and a method for identifying the need for such a test, along with a series of successful uses of the test, would be a better approach. This difference in training versus education is similar to Collins' view. Training individuals as a response to a crisis may provide an individual success story, but the long-term improvements enable the company's success by raising the education level of the individuals.

People are a focus to Jeffrey Liker as well. In his book The Toyota Way he outlines 14 principles for the organization. Three of the principles focus on people. Principle 10 - "Develop exceptional people and teams who follow your company's philosophy" – is a tactical approach to Collins' theory on building a long-term organization. Liker stresses the importance of developing a culture with values and beliefs that are lived over the years. He also stresses the importance of building teams not only for executing the work, but also for problem solving. Common goals and continuous reinforcement of the culture aid in the organization's success.¹²

For the Quality team, the development cannot focus only on tools. A solid education in the philosophy of the organization is important. At National Conduit, one such philosophy is the focus on "built-in quality" versus "tested-in quality." When selecting or executing a plan, the Quality team must remember to focus on the correct philosophy. If the solution to a problem is to deploy excessive testing and measurement, then the team is not following its core philosophy. Over time, this will lead to an incoherent approach to quality and confuse individuals on the Quality team. The building of a solid organization with well-educated people will not occur.

Knowledge Management

Having a good team of well-educated people means having a way to educate them and build on experience. How do they leverage the knowledge gained from their experience? How do they turn various pieces of data into information? Once an organization has the people in place and those people are reasonably knowledgeable about their jobs, then capitalizing on their knowledge becomes a new focus. Marash states that most organizations have plenty of data, but they do not know how to turn the data into information.¹³ The Quality team may think that first-pass yield is information. They can run an analysis of production data, and the system will tell them the Final Conduit Coating process has a first-pass yield of 85%. Do they have information or data?

Eliyahu Goldratt's discusses the difference between a data system and an information system in his work The Haystack Syndrome. Goldratt believes that answering a question without using a decision process is the result of a data system. The answer derives by simply capturing the required data. Goldratt would classify a system to report first-pass yield as a data system. One simply captures production data and reject data and calculates the first-pass yield. There was no decision process used. Higher-level questions that require a decision process to reach an answer use an information system.¹⁴ Improving first-pass yield using a Design of Experiments would be an information system. Here a decision process selects the specific experimental design and draws conclusions from the experimental data.

Too often knowledge management is equated with a technological system. Collins states that technology does not create momentum, but accelerates it.¹⁵ While a statistical software package may shorten analysis time, the organization must be good at analyzing data and finding root causes. No amount of technology is going to improve this. The organization must decide

how it will manage its historical knowledge. It must also develop methods for turning the vast amounts of data from manufacturing into useful information to drive the strategic plan. Finally, it must incorporate the endless stream of new information from customer complaints, engineering projects, and various corrective actions into its knowledge base, so that it may improve future performance.

The Constraint of Existing Systems

The cold reality of an organization is that people and knowledge operate within existing systems. The Quality team is not likely to get fancy new solutions to managing historical knowledge. Formal training opportunities for the Quality team will be limited due to Plant 1's desire to reduce fixed expenses. Here one must take exception to some of Collins' work.

Collins puts forth his concept of "The Council" that uses a loop consisting of "Ask Questions -> Dialogue and Debate -> Execute Decisions -> Autopsies and Analysis."¹⁶ Creating such an independent body is not necessarily needed, nor is the creation of a new loop. What Collins describes is nothing more than a variation on the PDCA process – Plan, Do, Check, Act. Here Collin's "Ask Questions" and "Dialogue and Debate" become Plan. "Execute Decisions" becomes Do. "Autopsies and Analysis" become Check and Act. Strengthening the use of the PDCA process, which is well known in quality and Six Sigma circles, rather than developing a new process would be more helpful. Liker and Meier discuss the strength of this process in their work The Toyota Way Fieldbook.¹⁷

National Conduit already has a number of teams in place for various areas. The Plant Staff recognized that complexity in the business and systems meant that many of these teams were not coordinating efforts. To improve integration, the Plant Staff created a cross-functional

team of supervisors and key individual contributors to assess strategy and provide recommendations to the Plant Staff. The Quality Manager holds a leading role on this team. On a less formal level, the Quality Manager has monthly lunch meetings with the two Engineering Supervisors and the Special Projects Engineer. These four form an unofficial “Council” that discusses current issues and project progress to determine where they can assist each other.

Too many teams and councils can lead to unnecessary bureaucracy. Collins believes that high levels of entrepreneurship and discipline are important to building a great organization.¹⁸ He sees bureaucracy promoting incompetence and a lack of discipline. Citing the philosophy of George Rathmann -- former CEO of Amgen -- Collins states that the alternative to a bureaucratic hierarchy is to build a culture of discipline. The reality of such a culture is that it lives within the existing corporate culture. Collins builds his culture around freedom and responsibility with self-disciplined people.¹⁹ He recommends focusing on the three circles – what you’re best at, what drives the economic engine, what you’re passionate about – and then developing a “stop doing list” to shift the culture. Collins stresses the need to breed, not mandate, a culture into the organization. It must become a culture of both disciplined thought and action. For National Conduit’s Quality team, breeding a culture into an organization will be a long-term process.

Goldratt speaks of culture and existing systems in a different manner throughout his works of The Goal, It’s Not Luck, and The Haystack Syndrome. In these works, Goldratt refers to the “necessary conditions.” Goldratt defines necessary conditions as requirements placed on an organization that are not directly involved with the goal of reducing inventory, reducing operating expenses, and increasing throughput. Various stakeholders such as customers, government, employees, and investors set necessary conditions. An example of one such necessary condition may be ISO 9001 registration. Goldratt’s goal for the company – reducing

inventory, reducing operating expenses, and increasing throughput²⁰ – could be accomplished without ISO 9001; however, customers may expect ISO 9001 as a necessary condition for sales. This becomes part of the existing systems and culture.

The National Conduit Quality team has a large number of necessary conditions established by external forces. These necessary conditions come from senior management, Corporate Quality, customers, or other groups within the plant. No improvements to the Quality team can be made without understanding these necessary conditions. Some conditions may be removed following Collins' idea of the "stop doing list"; however, many conditions will remain part of the culture.

For National Conduit, one major existing system in the culture is Six Sigma. This program began nearly seven years ago and any change in culture or approach will need to work with it. Marash stresses that Six Sigma is a management philosophy. He feels organizations incorrectly focus on the number of green belts and black belts. At National Conduit, this incorrect focus is seen frequently. The number of trained and certified belts is published in the quarterly newsletter. A plant goal for the year is to have 100% of all trained belts certified by year-end. Rather than focus on belts and a program, Marash believes Six Sigma is about customer-focused measurements and the Voice of the Customer, the use of qualitative and quantitative statistical tools, and the use of aggressive goal setting.²¹

Marash summarizes the work of Kaoru Ishikawa from What is Total Quality Control? The Japanese Way by citing some of Ishikawa's concepts. Ishikawa's concepts revolve around the use of data and facts, long-term goals, variation in the process, statistical process control, and treating the next process as the customer.²² All of these are valuable concepts, but to be accepted, they must work with the existing culture using existing terms and systems.

Although existing systems are a reality, there is a danger of falling into the “that’s the way we’ve always done it” trap. Marash cautions that an existing system can stifle innovation. As an example, he takes issue with the idea that ISO 9001 registration requires the design of effective systems and processes. Marash believes most organizations simply document existing processes to achieve registration.²³ In terms that Goldratt uses, Marash shows how the ISO registration is a necessary condition that does not directly support the goal. Marash believes documenting an existing process will lead to sub-optimization and allow non-value added steps to continue. The Quality team must balance working within the existing systems against allow the existing systems to stifle innovation.

Innovation

Can innovation occur if the Quality team is constrained by the existing systems and culture? Collins addresses the balance of the existing culture and the need for innovation. He believes an internal force with a mix of self-confidence and self-criticism should drive innovation. The self-confidence propels change while the self-criticism forces the changes to come internally before an external force requires change.²⁴ The Quality team must have self-confidence that they can affect change and bring others to their point of view. They must also have self-criticism and face the reality of their situation. Where things are not working right, they must identify and correct them on their own. The Quality team should strive for improvements before management forces improvements. Collins does not see this as a single point in time for the organization, but rather likens such change to the slow and consistent buildup of a flywheel.²⁵ The Quality team must continue to analyze itself and build up its successes.

Marash looks at driving innovation in the culture through his six-step model to implement Fusion Management. These steps are:

1. Define “As-Is” Condition
2. Launch Leadership Councils
3. Develop Integrated Strategic Plan
4. Training Leadership and Staff
5. Deploy Fusion Management Approach
6. Cascade Business Results

Knowing how management understands and utilizes the various programs in the organization - Six Sigma, Lean Manufacturing, ISO 9001, etc. - is Marash’s first step. From there, developing teams to manage the process and integrate the organization becomes important. The Quality team may not directly launch leadership councils, but it should work to influence the existing councils. This means taking a leadership role in the cross-functional team, forming quality circles with operators to build involvement, and having the Quality Manager continue to work through the social network of supervisors to integrate the Quality team with other teams. Communicating the Quality vision and being a leader in the Six Sigma approach can help drive improvement. Getting the organization to use similar tools and language can help drive innovation across the organization rather than in small pockets.²⁶ As a common language and toolset is developed, the Quality team needs to have a series of business successes to show plant leadership that the approach has financial merit.

The business successes cannot be limited to large projects with a large financial impact. Both Marash and Collins believe reliance on big projects will not lead to superior performance. A focus limited to “the vital few” can lead to missed, smaller opportunities in Marash’s opinion.

To combat this, Marash recommends the use of quality circles to fill in the gaps. One of the goals of quality circles is to achieve the total participation of all workers in the workplace.²⁷ Leveraging these workers can be a path toward accomplishing both large projects and smaller ones. The Quality team sees the need for such participation. Both the Quality team and the Engineering team are aware of a large number of small innovations that never rise high enough on the priority list to be implemented. By engaging all workers, smaller projects could be completed by teams of operators, leading to small improvements and increased morale on the shop floor.

Effective execution for the Quality team requires communicating all of the above ideas in a simple way. H. James Harrington provides a good summary of the multiple challenges of execution in his work The Five Pillars of Organizational Excellence. His pillars are

1. Process management
2. Project management
3. Change management
4. Knowledge management
5. Resource management

We see in these five pillars a summation of the writings of Collins, Bossiday, and Marash. Execution relies on the effective management of the systems, the people, and change. Selection and execution of projects forms the project management pillar. Maintaining a focus on the proper selection and education of the workforce forms the resource management pillar. Using the plant systems and product understanding to drive improvements is the knowledge management pillar. Managing the existing systems is the process management pillar. Driving

successful innovation is the change management pillar. Success in all five pillars will lead to a stronger Quality team.

Influence

Execution alone will not ensure the success or improvement of National Conduit's Quality team. The second question the Quality Manager asked himself was how do you grow the influence of the Quality organization with other organizations at Plant 1? The Literature Review continues by looking at what can help drive influence. This portion of the review began by looking at how the Quality team aligns with the organization as a whole.

Alignment

Execution depends on the ability to influence the organization. National Conduit is focused on cost reduction over the next several years. The Quality team needs to align its goals with this drive for cost reduction. Marash defines efficiency as getting something done quicker and with fewer resources. This definition aligns well with Plant 1's drive to reduce costs in all areas of manufacturing. Making systems more efficient may reduce cost, but what about improving the quality of output features? Traditional quality programs look at effectiveness by improving the quality of the output features. Should the team focus on efficiency or effectiveness?

Marash believes efficiency and effectiveness are complementary. He states they are complementary because a reduction in repair or rework will usually lead to a reduction in material usage, labor costs, and cycle times.²⁸ This understanding is important to align the

Quality team with the business. Any improvement in the Quality team's influence should begin with understanding that effective improvements that improve the quality of output features can also be efficient improvements that lower the cost of manufacturing. The Quality team needs to align with Goldratt's belief that the goal of the company is to reduce inventory and operating expense while improving throughput.

If the Quality team were to ignore what other teams were doing, misalignments in the organization could occur. Examples of this might include not paying attention to lean manufacturing projects, or failing to take advantage of engineering projects to correct quality issues. Developing a complicated inspection process that requires additional labor in a plant that is trying to reduce labor would also be an example of misalignment. Eliminating misalignments in the organization or eliminating practices that do not align with the core ideology is important according to Collins.²⁹ He cites several examples:

- incentive systems that reward the wrong behavior
- organizational structure that impedes progress
- strategies that drive the organization away from its basic purpose
- corporate policies that inhibit change and improvement
- office and building layout that stifles progress

These examples are areas the Quality team needs to critically analyze and determine if they lead to being misaligned with the organization. Is the Quality team driving the right behavior? Are there policies or systems that inhibit change? Does the Quality team's organizational structure or its relationships with other teams impede progress? Are its objectives focused on driving the short-term numbers, rather than improving the long-term goal? Collins states a tradeoff between short-term performance and long-term success is unnecessary and that

an organization can have both.³⁰ The Quality team needs to determine how to align with others to achieve both short-term and long-term goals.

Managing Up

Maintaining the alignment between the Quality team and the rest of the organization to achieve both short-term performance and long-term success will require influencing the Quality team's management chain. Influencing up the chain of command depends on communicating in a common language. Marash believes business was listening to the world's quality leaders – Crosby, Deming, Ishikawa, and Juran - in the 1970s; however, he does not believe American business schools instill what he calls “a comprehensive, information-driven approach to the quality process.”³¹ Collins warns of this communication challenge with his term “the tyranny of the OR.”³² This tyranny occurs when an organization believes two options are mutually exclusive and makes poor decisions based on this belief. Collins states that it is important for management to understand an organization does not have to choose between low cost or high quality. He believes high quality links to low costs.

A constant theme through Goldratt's works, The Goal, It's Not Luck, Critical Chain, and The Haystack Syndrome is the focus on three items: improving throughput, reducing inventory, and reducing operating expenses.³³ If the Quality team does not carefully manage upward and show how quality aligns with business goals, then management may fall prey to “the tyranny of the OR.” Quality goals may be perceived as something separate from the business goals with management believing it can have cost reductions OR quality, but not both. In the current cost reduction atmosphere of Plant 1, the Quality team would find itself on the sidelines.

A simple strategy is needed to align quality goals with the business goals. Miltenburg summarizes from the work of Juran's Quality Handbook by using the Cost of Quality approach.³⁴ This approach places the cost into four categories: external failure, internal failure, appraisal, and prevention. Improvements are judged against the financial impact to the business by reviewing the cost of each category.

Dr. A.V. Feigenbaum, past-President of the American Society for Quality and CEO of General Systems, Inc., revisited this topic in an article in Quality Progress. Feigenbaum discusses the Cost of Quality as it relates to the current pricing pressures on business. Feigenbaum believes that quality costs can lead to business losses in areas such as new product introduction, customer complaints, material waste, and poor deliveries. He ties a failure to manage quality directly to business failure.³⁵

The Cost of Quality approach provides a straightforward way to manage up and communicate business alignment. Mikel Harry and Richard Schroeder tie improved quality to success in their work Six Sigma: The Breakthrough Management Strategy Revolutionizing the World's Top Corporations. Throughout the book, the authors stress how the Six Sigma approach to quality links to the financial success of the organization. They even expand the definition of quality from product focused to business focused by defining quality as “a state in which value entitlement is realized for the customer and provided in every aspect of the business relationship.”³⁶

Harry and Schroeder also discuss the Cost of Quality, but caution the accepted theory has three problems: a “Detect and Fix” mentality shows costs increasing to improve quality, accounting systems do not accurately capture most quality-related costs, and costly and avoidable inefficiencies that occur in processes are often ignored.³⁷ Influencing management

will require overcoming these problems. Quality improvements can actually reduce costs when a prevention approach is used. Highlighting inefficiencies with better quantification can help convince management that the status quo is not good enough.

A final aspect of managing up involves the role of the Quality team. To many people at Plant 1, the primary function of the Quality team is not improvement. Because the Quality team is responsible for customer complaints, corrective actions, audits, and the disposition of rejected project, many individuals at Plant 1 see the Quality team's role in a negative light. They often believe that if the Quality team is involved, then there must be a problem. It is here that the Quality team's alignment can suffer from reactive thinking by upper management and other teams. Collins refers to such thinking as the "Doom Loop."

A Doom Loop occurs when results lead to a reaction without understanding. Management may declare a new direction for the Quality team without understanding an issue and without consideration to the unintended consequences of a sudden change in direction.³⁸ The Quality team must influence management to avoid this mistake. For example, a spike in returned materials in a single month can trigger the start of a Doom Loop. It takes influence to convince management not to focus on the short-term results, but to continue to look at the long-term trends. The Doom Loop departs from the culture of discipline in both thought and action, and results in a response not tied to the business reality.

National Conduit's Quality team needs to maintain alignment, tie quality improvements to cost reductions, and prevent unnecessary overreaction to single events. Accomplishing these tasks requires managing upward in the organization through common language and effective communication.

Communication

Communication is important to managing the relationship between the Quality team and management. Bossiday says that only the leader sets the tone of dialogue in the organization and that such dialogue is the core of the culture.³⁹ He defines the dialogue as negative when it is fragmented, politicized, and focused on cover up. He defines the dialogue as positive when it is candid, reality-based, debating, and focused on finding solutions. Collins takes a similar approach and believes there are four basic practices to keep the dialogue positive:

1. Lead with questions and not answers,
2. Engage in dialogue and debate, but not coercion,
3. Conduct autopsies without blame, and
4. Build “red flag” mechanisms to alert you to a problem.⁴⁰

At National Conduit, the Quality team is often involved with negative events, such as customer complaints, scrapped product, or late shipments due to non-conforming product. It is easy for communication in these situations to become negative as well. Plant 1 quality issues can become political when they involve performance pay for employees, or involve sales to a large customer. These politics often assign blame and rush to assign answers to problems, rather than leading with questions and focusing on solutions. The Quality team’s style of communication becomes an important factor in managing such negative events.

Daniel Goleman discusses the ability to influence through communication in his book Working with Emotional Intelligence. His discussion of influence and communication mirrors points discussed by Bossiday and Collins. Goleman says that people with a competence in influence know how to “fine tune” a presentation to appeal to the listener. Feigenbaum’s article on the Cost of Quality does just that: it tunes the presentation of quality to a cost approach that

appeals to business leadership. For the Quality team, communication about a negative event may be tuned toward costs or loss of sales when speaking with upper management. This same communication may be tuned toward setting operators up for success when communicating with the shop floor.

Goleman also states that to influence also involves an indirect approach to build consensus and support. He stresses the importance of building rapport with your audience.⁴¹ In the case of the Quality team's negative event, communicating in terms of future success rather than past failure helps build this rapport. Strong communication involves give and take, building mutual understanding, open communication, and a straightforward approach to difficult issues.⁴² Goleman's criteria match Collins and Bossiday with a focus on open dialogue, no blame, and an adherence to the reality of the situation.

The Quality team often finds itself in the crossfire. Management is upset with a customer complaint and rising costs. Engineering says the operators are not following the process. Operators say Engineering makes it too complicated and Management wants to eliminate their jobs. Plant 1's Quality team often mediates these differences in opinion. This requires strong skills in positive dialogue with the ability to build consensus and support from a variety of teams through well-tuned communication.

Emotional Intelligence

For a Quality team, positive dialogue is a challenge. The Quality team deals with unhappy customers, non-conforming products, failed audits, or facilitating corrective action plans. Typically, everyone views these events in a negative light. Goleman states that today's leadership must get the team to work toward a common goal and that emotional intelligence is a

critical tool in this endeavor. Communication must not de-motivate. Communication must be fact-based, but not harsh. Goleman recommends communication be specific, be timely, offer a solution, but be sensitive. He stresses that emotional intelligence is not about suppressing or failing to acknowledge emotions, but rather managing them in a constructive way.

The Quality team supports cross-functional teams. These teams are generally “fixing” something that is “broken.” These teams start from a negative position. Goleman cautions that knowledge workers often work in teams and that low emotional intelligence can derail the team. This is an important point for Quality personnel working on teams to solve a specific issue. Goleman summarizes emotional intelligence in five basic domains:

1. Self-awareness,
2. Managing emotions,
3. Motivation,
4. Recognizing emotions in others, and
5. Handling relationships.⁴³

The first three domains are important for Quality personnel to manage themselves. When dealing with an issue, self-awareness helps separate one’s feelings from the reality of the situation. Being able to manage one’s emotions helps the Quality team remain positive in negative situations. Being able to stay motivated helps prevent others on a team with low emotional intelligence from derailing the team. Domains 4 and 5 cover the Quality team’s interaction with others. Recognizing the emotions in others can help the Quality team defuse a situation, while properly handling relationships can help build consensus and rapport.

Emotional intelligence will vary from individual to individual. For a group to have strong emotional intelligence, integrity, and the ability to communicate and influence, there must

be a way to attract and sustain superior talent. To paraphrase Collins, the Quality team must be able to get the right people on the bus. While Collins said his studies found no specific ideology was essential to being a visionary company, he did find that authenticity was important.⁴⁴ The Quality team needs to have talent that remains authentic in its approach. Emotional intelligence must be sincere. If other teams sense a lack of authenticity, or suspect the Quality team's empathy is just for show, the team will encounter difficulty in influencing others.

Bossiday spends an entire chapter outlining "Seven Essential Behaviors" for superior execution.⁴⁵ Three of these behaviors focus on self-awareness and the relationship with others. Bossiday says one must know the business and the people and be willing to ask in-depth questions about both. Interactions must focus on realism. Bossiday recognizes that realism often makes people feel uncomfortable, while Collins believes that a culture should be uncomfortable to some degree. To support these interactions, people must know themselves. This mirrors Goleman's point of being self-aware. For Bossiday, emotional intelligence has four core qualities: authenticity, self-awareness, self-mastery, and humility. In each of these core qualities, we see the beliefs of Collins and Goleman.

The Quality team should strengthen its emotional intelligence. It must remain authentic in its relationships while understanding its own emotions and the emotions of others. It needs to maintain a positive focus on realism while building consensus and support from a resistant audience.

Attract and Sustain Superior Talent

Two of Bossiday's "Seven Essential Behaviors" drive execution: set clear goals and priority, and follow through. Clear goals and priorities simplify interaction with other teams.

They improve understanding, foster the elimination of misalignments, and allow everyone to evaluate the goals and act on them. Once these goals and priorities are set, Bossiday says that follow through is important to the execution. Follow through is necessary to ensure issues are addressed and resolved. Individuals in the Quality team need both behaviors. While setting the overall goals of the group is the responsibility of the Quality Manager, all Quality personnel should be able to set clear goals for their projects or corrective actions. Once a project is started, or a corrective action launched, Quality personnel must be rigorous in their follow through to ensure the actions are effective and completed in a timely fashion.

The remaining two behaviors in Bossiday's "Seven Essential Behaviors" focus on sustaining superior performance. If an organization identifies and attracts superior performers who can set clear goals and ensure rigorous follow through, then how does it retain them? Bossiday believes an organization must reward the doers on the team. Link rewards to performance to separate the high and low performers. This enables clear communication regarding who is a performer and who is not. Give honest feedback to allow lower performers the chance to improve.⁴⁶ Bossiday also believes that the organization should expand everyone's capabilities through coaching. His methodology is one of asking questions to get people to think rather than providing answers. The Quality team at National Conduit is best suited to people who are learners by nature. Solid data and root cause analyses build quality improvements. There is a constant requirement to incorporate new information with existing information to strengthen the quality architecture. The Quality team is well-suited to Bossiday's concept of expanding capabilities through coaching. This coaching and learning must be part of the culture of the Quality team. Bossiday states that 80% of learning takes place outside the classroom and

that all leaders need to be a teacher.⁴⁷ The Quality Manager must embrace coaching as a daily tool and members of the Quality team must learn to coach each other.

If the right people are selected, and the coaching is successful to build capability in the team, then the Quality team may find themselves with superior talent; however, superior, individual talent will still need to work as a team. The team must enjoy working together. As previously stated, Collins refers to this as getting the right people on the bus. Once on the bus, these people must strengthen as a team. They must communicate openly. Bossiday feels that an air of informality allows robust dialogue to flow freely.⁴⁸ He cautions that a formal setting can lead to higher-level individuals in the organization killing a topic or preventing the team from facing the brutal facts. Collins also stresses the importance of facing these brutal facts. We see in Goleman's work, however, that facing the brutal facts without some amount of emotional intelligence will only lead to a failure to influence. Empathy must temper the air of informality. The Quality team must be honest and authentic, but as Goleman stated in his five domains, they must manage their emotions and recognize the emotions in others. Bossiday believes that such a culture can be created without higher-level leadership creating it. The secret to expanding this culture is by showing profits and growth. A Quality team focused on Goldratt's goal (productivity, operating expense, and inventory) could build a culture within its own team without the direction of senior management. Advertising successes in the Quality team built on the honest dialogue would help spread the advantage of the informal approach. With the right people on the team, Collins believe the issue becomes not motivating people, but ensuring we do not de-motivate them.⁴⁹

A superior team should have a touch of envy and respect. People want to join a team or want to buy what that team is selling because they respect the team. Collins' research showed

that successful, visionary companies developed a cult-like culture. The people were extremely dedicated to the ideology of the company and not to a cult of personality surrounding any one individual.⁵⁰ His research showed that successful companies had a stronger indoctrination process into the company's ideology and a stronger "tightness of fit" between employees and the culture. For the Quality team, this means identifying a clear ideology and ensuring everyone understands how daily tasks support the ideology. Collins also found that a greater sense of elitism, or belonging to something special and superior, was a factor to the success of an organization.⁵¹ The members of the Quality team cannot feel that they are always the bearers of bad news. They must believe they can build the best organization and that they are an important team in Plant 1 achieving its short-term performance and long-term goals.

Building Alliances

No matter how well the Quality team works together, it remains only one part of the entire Plant 1 organization at National Conduit. The goal of building a superior Quality team is not to build walls around the team, but to build bridges to the rest of the organization. Manufacturing operations are a society. Goleman discusses these societal interactions in his work Social Intelligence. In this work, he discusses the effect of mirror neurons in personal interactions. Mirror neurons drive a response similar to the response we observe in other humans. Simple examples of mirror neurons are our tendency to smile when a child smiles at us, or to flinch when we see another human experience pain.⁵² Putting aside organizational behavior techniques, Goleman's work suggests that if the Quality team takes a hostile approach to a situation, then mirror neurons in others will drive a hostile response. Conversely, if the Quality team portrays a productive, happy, and helpful image, then other teams will likely respond in

kind and may have a desire to be part of such a team. To accomplish this, the Quality team must be mindful of Goleman's five domains. They must be self-aware, motivated, and be able to manage their emotions while recognizing the emotions in others and building relationships.

Organizational success is unlikely with only a superior Quality team focused on a few projects. Leverage the entire organization for success. Marash cites Ishikawa's quality circles as a method for leveraging the entire organization. To succeed, volunteers should staff these quality circles, be willing to study, and develop themselves. They should operate in tandem with other circles and teams to foster development and cooperation, and ultimately they should include the participation of all workers in the organization.⁵³ The Quality team should take a lead role in building these circles. Using the five domains of emotional intelligence and a positive dialogue, the Quality team is uniquely situated to solicit volunteers and foster the development.

Individuals participating in quality circles foster the spread of a culture. Collins states that developing and promoting insiders preserves the core values of a culture and stimulates progress. For example, when the Quality team needs a new technician, promoting a strong advocate for quality from the shop floor can strengthen the alliance between the Quality team and the Production team. When Engineering needs a new engineer, they may request a superior performer from the Quality team transfer to Engineering, strengthening the alliance between Engineering and Quality. This approach requires developing personnel and succession planning. There must be a method to identify strong internal candidates to ensure a continuity of the culture.⁵⁴ Bossiday believes a leader should spend 40% of his time selecting, appraising, and developing people. Obtaining the right people is a task the leader should not delegate. The leader has responsibility for motivating the team and being decisive on tough issues.⁵⁵

Taking Power Quietly

Developing a Quality team with strong influence will involve change. Goldratt's work The Goal is a story about changing the culture of the organization. In his work, he lays out five layers of resistance to change:⁵⁶

1. "It's out of our hands" – someone else is at fault
2. Arguing that the proposed solution cannot possibly yield the desired outcome
3. "Yes, but..." – arguing the proposed solution will lead to negative effects
4. Raising obstacles that will prevent the implementation
5. Raising doubts about the collaboration of others

In attempting to make a cultural shift toward improvement, the team will encounter each of these stages. Self-criticism will be needed to move the Quality team past the first layer of resistance. Confronting the brutal facts and engaging in honest, positive dialogue will be needed to pass the second and third layers. Emotional intelligence will be needed to handle layers four and five. The Quality team must be aware of its own emotions and motivations to understand why it is raising obstacles. It must also recognize the emotions in others to avoid external obstacles and to avoid having doubts about other organizations. It cannot wait for management to force the collaboration externally, but rather must build the relationships with other organizations from within.

Marash discusses what needs to change. He stresses a movement from the hard skills of planning, controlling, giving orders, instinct, and crisis to one of mentoring, coaching/facilitating, setting the example, fact-based, and consistent behavior.⁵⁷ This shift is consistent in what Bossiday and Collins stress in their writings. Taking the Quality team in a

new direction requires more focus on the people in the organization rather than the specific tools, and would require the 40% of time that Bossiday says a leader must use on people development.

Collins' research found that successful, visionary companies had Level 5 leaders. Collins defines a Level 5 leader as one who "builds enduring greatness through a paradoxical blend of personal humility and professional will."⁵⁸ He believes that such a leader is strong and does not blindly yield to authority. This leader will build their local team into one of the best in the organization with the goal of doing what is necessary to make the overall company great.⁵⁹ They do not wait on direction from senior management. Whether or not the Quality team contains a Level 5 leader is unknown. The important takeaway from Collin's work is the concept that building a great organization does not require waiting for senior management to build it. Local supervision can employ a variety of techniques to build a strong team. Similarly, Bossiday states that while superior execution should begin with senior leaders, it can still be practiced lower in the organization. He recommends a Six Sigma approach, looking to minimize variation in the organization and continually raising expectations and standards.⁶⁰

Pushing excellence from lower in the organization may be threatening to others. Collins cautions the importance of being rigorous but not ruthless in advancing an organization.⁶¹ He defines rigorous as "consistently applying exacting standards at all times and at all levels, especially in upper management." Collins' rigorous approach to building alliances will need to be balanced with Goleman's approach to empathy. The Quality team cannot build a superior organization to dominate others. It must proceed with humility and a dedication to being part of an enduring greatness for National Conduit. Collins uses an example of a window and a mirror. He recommends looking out the window to give credit when things go well, and looking in the

mirror to take responsibility rather than blame bad luck. He found this approach to be common in great companies.⁶²

Just as successful execution must utilize the existing systems of National Conduit, successful influence must utilize the existing culture. Bossiday finds it is important to understand the Social Operating Mechanisms in a culture. He defines these as the formal and informal communication exchanges that occur in the organization. These mechanisms reach across organizational boundaries and define information flows and working relationships. They allow individuals that do not have regular working relationships to share views. The monthly lunch between the Quality Manager and the Engineering Supervisors is part of the Social Operating Mechanisms. The fact that several engineers and operators attend the same church where the Vice-President of Operations is a deacon forms another type of operating mechanism. The plant manager playing on a golf outing team with an R&D engineer, a planner, and a warehouse associate forms yet another, temporary operating mechanism. These Social Operating Mechanisms are important because they are where the beliefs and behaviors of a culture play out. The Quality team needs to understand these mechanisms to advance its campaign for a new culture.

The ability to influence the organization will require the Quality team to ensure its goals align with the organization, to communicate effectively and manage up, to attract and sustain talent with a strong emotional intelligence, and to build alliances across the organization. Where execution focuses on expanding the hard skills in the team, influence will require a large amount of coaching in the soft skills. This balance will be applied to the problems detailed in the next section.

Details of the Problem

History of Operations

National Conduit has manufactured telecommunication products for over 25 years. During this time, Plant 1 focused on product supporting long-haul installations in the outside plant market. These products were buried in long lengths underground after being constructed to industry standards. Volumes grew steadily through the late 1990s because of Plant 1 being a supplier to the telecommunications industry. With high demand in the marketplace and constrained capacity, management determined the customer complaint rate was acceptable. No major initiatives drove quality improvements or cost reduction.

A management change in 2000 coupled with two large field issues drove a renewed interest in quality improvements. National Conduit suffered a large field failure of product that resulted in a \$2 million warranty hit on installed product. Several months later, a manufacturing upset caused an additional \$5 million of at-risk product to be installed in the field. While testing showed the at-risk product was acceptable, the plant manager at Plant 1 determined there was a need for a new strategy to quality. Plant 1 launched a new quality architecture initiative in early 2001.

Six months into the new initiative, the telecommunications industry suffered a dramatic drop in demand. As a supplier to the telecommunications industry, Plant 1 suffered a drop in demand that resulted in terminating over 50% of the workforce. Cost controls became a central focus to save the business. A sister business that sold conduit into a different market was merged into Plant 1 as part of an organizational consolidation. The original quality architecture initiative was extended to this new product line.

Prior to the telecommunications downturn, Plant 1 had two, quality related teams. The first team handled traditional quality assurance functions: documentation, auditing, corrective and preventative actions, and customer returns. The second team drove the quality architecture initiative. It had two maintenance-of-business functions: calibration and the maintenance of quality control test equipment. The combined teams had nearly 30 people. Because of the downturn, layoffs reduced both teams to a total of 10 people and merged the teams under a single supervisor. Quality architecture initiatives slowed as maintenance of business tasks became the team's central function.

During the past seven years, the Quality team has worked to streamline existing maintenance of business tasks while taking on new maintenance of business tasks. This period includes a company-wide conversion in the Enterprise Resource Planning system along with a plant conversion in the Manufacturing Execution System. Both systems increased the amount of workload for the Quality team in the maintenance of business area. The company also introduced a Six Sigma program during this period in which the Quality team participates.

In parallel, management felt the solution to cost containment was the introduction of lean manufacturing. Plant 1 formed a new team to focus on lean initiatives, ensuring the team executed projects while not being burdened with maintenance of business tasks. The Lean team and Quality team report to the same manager.

Initial Quality Architecture Improvements

Exhibits 2 and 3 show the trend in customer returns for both product lines. Both product lines show a return rate of 1.00 for 2002. All other years show a ratio of a given year's return rate compared to 2002.

Product Line 1 began quality architecture improvements in 2002. During the same year, Plant 1 introduced a major, new product. A number of quality issues occurred as the new product transferred from limited R&D production to full-scale manufacturing, increasing customer returns in 2003. Quality and Engineering initiatives were able to bring the customer return level below 2002 rates; however, a perceived minor process change in 2004 led to a large field issue in late 2005. The Quality and Engineering teams worked through 2005 and early 2006 to correct this field issue and customer return levels began to decrease through the next several years. Since 2007, customer return levels have stayed effectively flat with no major declines in customer returns.

Product Line 2 has a different history. The product line had no major product introductions until 2006. This allowed an easier deployment for the quality architecture. Product Line 2 also benefited from the field failures in Product Line 1. The Quality and Engineering teams focused on improved change management when Product Line 2 began new product introduction in 2006. As with Product Line 1, customer return levels for Product Line 2 have stayed effectively flat since 2006 with no major declines in customer returns.

Both product lines have made slow, consistent improvements in quality. Customer complaints that were common years ago are rarely heard today. During these years, there has been a rise in customer expectations. New markets are more sensitive to cosmetic issues. Conduit is now being used in shorter sections with customers paying closer attention to the level of quality along the entire length. Special requirements have been on the rise. The combination of these factors has led to internal quality improvements not being reflected in the rate of customer returns.

Future Plant Challenges

A meeting of key front line supervisors occurred in June 2009 to discuss challenges facing Plant 1 in the upcoming years. The team consisted of the Manufacturing Systems' Supervisor, the Scheduling Supervisor, the Senior Engineer in Lean Manufacturing, two Production Supervisors, the senior Controls Engineer, one of the Engineering Supervisors, and the Quality Manager. During a brainstorming session, the team agreed that future challenges summarized as follows:

1. Cost will continue to be a driver. Manufacturing costs must be reduced despite rising raw material and labor costs.
2. Product complexity will continue to be a reality. Growth will occur in niche markets with special requirements.
3. National Conduit is moving to common global processes. These include a common Enterprise Resource Planning (ERP) system, a common Manufacturing Execution System (MES), common Business Intelligence tools, and common expectations found in the various corporate manufacturing excellence checklists.
4. Maintaining a positive customer experience will be critical to maintain and grow market share.

SWOT Analysis

Following the meeting of June 2009, the Quality team sat down in July 2009 to discuss their future. The Quality Manager led the group through a SWOT Analysis (Strengths – Weaknesses – Opportunities – Threats). Following the analysis, the team completed a Strength Finders survey.⁶³ The results of the Strength Finders survey are in Exhibit 4. The SWOT analysis summary is in Exhibit 5.

Strengths

The Quality team felt that skills and team interactions were its strengths. The team has extensive knowledge of a wide range of plant systems. Plant 1 has extensive monitoring systems and so the Quality team has access to a “data rich environment.” Team members’ computer skills range from good to exceptional. Analytical skills are generally strong throughout the team. The team also has a high level of experience at Plant 1. While two of the engineers have less than five years with National Conduit, the remaining eight personnel have greater than 10 years with the company. Five of the technicians have over 15 years at Plant 1.

Personal interactions within the team are strong. The team is diverse with six women and four men. Ages range from the late 20s to the early 60s, placing baby boomers, Generation X, and Millennials on the team. Team members also have a wide variety of interests with respect to music, family activities, and past work experience. Open discussion and debate is strongly encouraged by the Quality Manager and practiced by all members of the team. Nobody is shy about speaking up at a team meeting. Team members have a good working relationship with each other and a positive relationship with shop floor operators.

Weaknesses

The discussion of weaknesses led to a more lively debate. This may be due to the nature of a job in Quality. The first weakness the team identified was the goal of the Quality team. There was considerable consensus that Plant 1 did not have a clear quality goal and that the mission of the team is misunderstood. The quality architecture initiative is eight years old. The team felt it was still relevant, but somewhat outdated. Quality objectives did not link to other

groups. Quality objectives would focus on rejects and rework while Engineering objectives focused on cost reduction. The team felt the lack of synergy slowed progress.

Maintenance of business was another concern. The team felt that the high level of maintenance of business was the largest impediment to completing project work. The Quality Manager concurred with this assessment as he considers the balance between project work and maintenance of business to be his most difficult challenge. The team also stated that the lack of resources slowed preventative action implementation. Other teams within Plant 1 are reluctant to engage in strong preventative actions due to a lack of resources. The perception across the plant is that resources cannot divert from daily tasks and cost reduction projects to implement sound quality improvements. Looking inward, the team also believed they did not execute projects and tasks in the most efficient manner nor did they effectively use the Six Sigma methodology.

The Quality team felt their lack of efficiency was due in part to their ability to manage information. While the team has strong analytical abilities and access to a wide variety of data, the result of the two often leads to information overload. The Quality team administers the corrective action process, the customer return process, and the engineering change process. The Quality team provides project support to engineering projects and R&D projects. Despite all this, the Quality team continues to struggle to convert this data into information. The team further felt they did not understand the customer. Specifically, they had no sense and feel of what the customer truly wanted in quality. Lack of direct access hampers the ability to understand the Voice of the Customer. Plant 1 does not directly interface with customers. Customer Service, Field Sales, and Product Line Management handle customer interaction through the corporate offices. While Production participates on the various business teams, the Quality team has no such representation.

While the team felt it interacted well with each other and had positive relations with other teams, it conceded it did not engage the other teams well. When faced with a corrective action situation, the Quality team often would attempt to analyze and determine a corrective action on its own rather than partner with another team. The lack of common objectives among teams aggravates this situation. The Quality team is at a disadvantage when it does not engage other teams because most quality initiatives rely on other teams to complete various project tasks. The Quality team was concerned at their lack of interaction with other teams. Many expressed a belief that management viewed the Quality team as a hindrance to improvement rather than a help.

Opportunities

The Quality team felt there were a number of opportunities in the near future. Two technically related opportunities were a move from inspection-based quality to error proofing and the recent advances in measurement and control systems. Over the last several years, Engineering has made a number of advances in using process controls to remove the human interaction needed in manufacturing. In the past, most processes allowed operators to change a wide range of settings during the run. Today, most process parameters automatically setup through a downloaded recipe. Increased monitoring of the product allows the manufacturing line to reject product automatically to prevent its use in downstream processes.

There is agreement among many teams of the need for more error proofing. The Quality team, Lean team, and Engineering team have been in discussions over the last few months to determine ways to improve error proofing. The original quality architecture was inspection focused and it has taken time to convince management of the need to increase error proofing.

Support for a new approach to quality is building in upper management as well. A new global engineering team is forming over the next year to deploy best practices in engineering, quality, and lean principles across the global organization. The global lead for quality is the original author of the Plant 1 quality architecture. The Quality team felt this was a good opportunity to begin a fresh approach.

The global lead for quality developed the new approach to Built-In Quality Control. This approach evolved from tools developed during the initial quality architecture deployment. Now after a number of years, the tools have been refined to provide a new approach to building in quality rather than testing in quality. The Vice-President of manufacturing at National Conduit supports this new approach.

Recent corporate restructuring provides new opportunities for the Quality team. All manufacturing operations now report to a single Vice-President. This structure removes a number of silos that developed in the manufacturing organization. Best practice sharing between plants, along with more open and frequent communication, leads to quality improvement opportunities. Plant 1 provides material to Plant 3. The integration of manufacturing allows improved understanding of the Plant 3 Voice of the Customer by Plant 1. Plants that functioned as competitors in the past must now function as collaborators.

While external collaboration is an opportunity, the Quality team felt an increase in internal collaboration was beneficial. The Plant 1 Quality team supports a number of development projects, but does not build on the interaction with other teams. The members of the Quality team felt improving the interaction with other teams was a large opportunity.

Customer complaints rose over the past year. The Quality team decided this increase in returns was an opportunity rather than a threat. The past three years of customer complaints are

lower than previous years. The team felt this decrease in complaints removed pressure from the quality systems. There was a belief that quality was under control and the focus should be only on lean improvements. Customer expectations continue to rise for National Conduit's product. Although the nature of the customer complaints shifted from function issues to cosmetic issues, the rise in complaint numbers leads to a perception that Plant 1 needs quality improvements. This perception provides an opportunity to push a new approach to quality.

Threats

The Quality team divided threats into three main categories: perception issues, cost reduction, and systems. The team felt its perception was the most important issue. Many team members felt the organization viewed lean manufacturing as value-added, but not quality. Quality was a slow and bureaucratic process. The team argued about the validity of this perception, but in the end, all agreed that this was the perception.

The nature of quality improvements compounds the perception issue. Over the past eight years, Plant 1 completed most of the easy quality improvements. Current quality improvements often require a design of experiment (DOE) with significant testing or data collection. Improvements require support of multiple teams such as Engineering, Manufacturing Systems Support, and Information Technology. In addition to this support, there is the support and training of Production personnel. The complexity of improvements requires careful change management. Past attempts to shortcut the change management process have resulted in product failures in the field. While the benefit to better change management control has been a drastic reduction in issues related to changes, it has come at the price of a bureaucratic perception of the Quality team.

The organization's focus on cost also affects the perception of the Quality team. When asked how Plant 1 can reduce costs, individuals in many areas of the organization cited lean manufacturing. Quality is viewed as a necessary condition to ensure ISO 9001 compliance. While plant management metrics contain targets for customer complaints, the remaining metrics focus on productivity, scrap, and on-time shipments. Quality is separate from cost, rather than something that can drive productivity, scrap, and on-time shipments.

As part of cost reduction, Plant 1 has been looking at fixed labor costs. Management has stated that Plant 1 has 30 additional fixed labor heads than Plant 2. There will likely be a drive to lower fixed labor over the next five years through attrition or reallocation of resources. The Quality team believed this was a threat because fewer resources meant an increasing challenge in completing projects while managing the maintenance of business. The Quality Manager believes a reduction of two individuals by attrition is likely. Future improvements to the Quality team and related systems will need to account for fewer resources.

Finally, it was felt the Quality team faced two major system issues: personnel development and existing systems. There is limited advancement for quality personnel. Engineers seeking promotion to Senior Engineer status will need to leave the team to gain additional cross-functional experience. Technicians can advance to Senior Technician status; however, three of the five technicians have already achieved that status. New challenges and developing new skills will be important to motivating individuals.

Systems used to support the quality management systems are scheduled for replacement. The Quality team completed a change in the system to manage customer complaints when National Conduit changed the Enterprise Resource Planning system. This change resulted in additional labor needed to manage the new system. The Quality team spent the last 18 months

attempting to streamline the process. In the next three to five years, the Quality team's main systems – documentation, calibration, corrective/preventative actions, and the discussion database – will be phased out due to National Conduit eliminating the software platform. Resources from the Quality team will help convert to, train on, and implement the new systems. The Quality team considered the support required for each new system a threat in light of decreasing head count at Plant 1, and the difficult transition experienced with the customer complaint system.

Summary

Upon completion of the SWOT analysis, the members of the Quality group agreed they were at a turning point. A summary of the challenges facing the group in the areas of execution and influence follows:

Execution

- Strong knowledge of plant systems and analytical skills
- Quality architecture is somewhat outdated, high maintenance of business, and objectives not linked to other teams
- New global engineering team is bringing a new approach to quality
- Major system changes for group in next three to five years

Influence

- Diversity in team and a positive working relationship with other teams
- Quality not fully engaged with other teams and often perceived as a hindrance
- New management structure breaking down silos between manufacturing plants and a need for error proofing is recognized
- Quality is seen as separate from cost reduction rather than part of cost reduction

Findings

Overview

National Conduit wants to be the low cost provider of high-quality conduit for the telecommunication industry. The company was founded 50 years ago and seeks to stay in business another 50 years. To achieve this goal, National Conduit must continue to offer a product portfolio that attracts customers, and it must generate sufficient financial returns to maintain its workforce, continue product development, and satisfy investors.

The Plant 1 Quality team must contribute to the National Conduit business goals. The Quality team contributes to the business goals in two main ways:

1. Using the quality management systems to eliminate the waste due to mistakes, thus leading to reduced costs, and
2. Delighting the customer with product and service quality, providing a superior customer experience that leads to growth in revenues

To achieve the first objective, the Quality team must ensure the quality management systems are improving throughput, reducing inventory, and reducing operating expenses.⁶⁴ The second objective is achieved through a better understanding of the Voice of the Customer and the reduction of variation in the manufacturing process to improve product performance and service quality. The Plant 1 Quality team must answer the following questions:

1. *How do you execute a quality management system that adds value to the organization?*
2. *How do you grow the influence of the quality team with other teams in Plant 1?*

Execution

Strategic Planning and Execution

Finding
<p>The Plant 1 Quality team lacks a single, central goal. The team pursues a number of maintenance of business tasks, supports a variety of projects, and runs quality projects, but there is no central goal.</p>

The lack of a central goal translates into a lack of progress. Non-value added work distracts the Quality team. The Quality team does not drive improvements. This results in a stagnation of improvements. The customer complaint rate remains effectively constant over the past several years. The lack of process understanding limits improvement. This results in unnecessary manufacturing costs due to scrap and rework. In the past 12 months, Plant 1 has average \$20,000 in scrap per manufacturing day. In a market with increasing pressure on price, Plant 1 must leverage improved quality to lower manufacturing costs.

Finding
<p>The Quality team also lacks a clear purpose. In project meetings and in conversations with other Plant 1 management, the Quality Manager discovered confusion over the role of the Quality team and what talents the Quality team provided on a project.</p>

The lack of purpose leads to confusion. Work is not executed effectively and project team members are not utilized to their best ability. Continual improvement is weakened because Quality team members are not clear on priorities and focus.

Taking a lesson from Covey's The 7 Habits of Highly Effective People, the first step is to "begin with the end in mind."⁶⁵ For the Plant 1 Quality team, the goal is the elimination of waste. Waste from improper design, waste from improper manufacturing, and customer complaints. The ideal goal would be zero customer complaints and zero scrap in manufacturing.

Using Collins' "Three Circles of the Hedgehog Concept"⁶⁶ the Quality group is defined in Exhibit 6. The Plant 1 Quality team is deeply passionate about eliminating mistakes in manufacturing and waste. They have a strong skill set in facilitating root cause analyses and error proofing with the technical experts in Engineering, Production, and other supporting teams. Pricing pressure in the marketplace drives Plant 1 to reduce manufacturing costs.

Achieving this goal requires focus on a single goal. National Conduit has recently launched a revitalized approach to its existing quality architecture. This approach is called Built-In Quality Control. It builds on concepts from the Toyota Production System⁶⁷ and Deming's concept of eliminating the need for mass inspection by building quality into the product.⁶⁸

To implement Built-In Quality Control, Plant 1 will need to follow a strategic quality plan as outlined by Marash in Fusion Management.⁶⁹ Internal and external customers are identified and their needs and wants are defined. Plant 1 refers to this process by the Six Sigma term Voice of the Customer. These needs and wants are then converted into critical-to-quality product parameters that are then mapped to a variety of process inputs. Once the relationship between product parameters and process inputs is understood, the Quality team develops a Built-In Quality Control matrix that identifies what needs to be controlled in manufacturing, what the limits are, and how it is controlled. The Built-In Quality Control process allows Plant 1 to

understand cause and effect, to monitor and control inputs, and to identify and correct deficiencies, thereby eliminating waste.

Placing Built-In Quality Control as the central focus for the Plant 1 Quality team allows the various ISO 9001 quality management systems to drive continual improvement. In the past, these quality systems were often used only for the sake of maintaining ISO 9001 registration. The new focus leverages the systems to eliminate waste.

A simple tactical approach drives the new strategic focus. Bossiday states that execution is fundamental to strategy and has to shape it.⁷⁰ This fundamental discipline requires no complex tools, but only the uncompromising use of the Plan-Do-Check-Act (PDCA) loop.⁷¹ For both project objectives and maintenance-of-business tasks, the Quality team will utilize the PDCA loop to ensure they are completing work effectively and learning from each iteration of the loop. This new cultural approach will be two way. The Quality Manager will hold the team members accountable, and team members are expected to hold the Quality Manager accountable as well. Projects must have clearly defined goals that support the business, a time line with milestones, and a process for evaluation and accountability.

Finding
The Quality team lacks a clear set of priorities and a governing philosophy. This issue leads to confusion in the workplace and does not allow team members to work effectively.

When confronted with issues on the manufacturing floor, or in project meetings, Quality team members do not respond well. Decisions are delayed for discussion with management. Projects take longer, decisions cannot be made in real-time, and productivity suffers. The drive

for cost reduction at Plant 1 drives reduction in the fixed cost workforce. A shrinking workforce means all employees must act with autonomy to improve efficiencies.

The nature of business at Plant 1 requires two things: all team members must act with autonomy, and the team needs to know how it spends its time. A culture of discipline needs to be balanced with an “ethic of entrepreneurship.”⁷² The team must understand some basic priorities and should encourage others to live by them. For the Quality team, these priorities are Safety, Quality, and Productivity. Safety is first not only for legal reasons, but also because National Conduit management is adamant about the importance of safety. Quality comes second because the drive is to eliminate waste and lower costs. Many a parent has quoted John Wooden’s wisdom to their child: “If you don’t have time to do it right, when will you have time to do it over?”⁷³ Manufacturing is no different. The second pillar of the Toyota Production System stresses the importance of stopping a process to build in quality.⁷⁴ The final priority is productivity. The Quality team needs to ensure its actions are helping to improve productivity to reduce the operating expense of Plant 1.

Entrepreneurial team members need a guiding philosophy. Plant 1 is very involved in recycling and environmental stewardship. It also implemented lean manufacturing many years ago. Cost pressures led to reductions in work force. The combination of these events produces a simple philosophy for the Quality group: Smarter, Leaner, Greener. All team members should reference this philosophy in their daily jobs. Is there a smarter way to complete this task? Can I make this process leaner? Can I eliminate wasted materials or energy and be greener? Keeping these three philosophies in mind drives a mindset of continuous improvement.

To work smarter and leaner, the Quality team should develop a “stop doing list.”⁷⁵ To stop doing non-value added tasks, one must understand know the tasks. The Quality team

provides support for manufacturing, which means its labor is charged against the various product lines at Plant 1. In essence, the team is similar to a consulting business. Part of the culture of discipline will be to track its work. By knowing how much time is spent on various projects and maintenance-of-business, the Quality team can develop a “stop doing list” and look for ways to work smarter and leaner.

The strategic plan is straightforward. Focus on eliminating waste through the deployment of Built-In Quality Control. Utilize the PDCA loop to enforce a culture of discipline. Continually look for opportunities to make processes smarter, leaner, and greener. Monitor the time spent on tasks and processes to quantify costs and improvement opportunities.

Workforce Focus

Finding
The Quality team must invest more in people. The team invested considerable effort in building solid systems and tools for the quality management systems. Solid training to develop employees should be given equal effort.

All Quality team members possess the necessary skills to do their jobs, but there has not been a process to develop those skills to improve the effectiveness of the team. National Conduit already possesses an extensive online training system with several hundred online training modules. The Quality team failed to leverage this training resource.

Poor workforce development translates into unnecessary costs in time and resources. The lack of skills results in inefficiencies in completing tasks. A data analysis that should take an hour instead takes a day due to a poor understanding of how to collect data, and select and

execute the proper analysis tools. Projects take longer than necessary due to weak project management skills, and a failure to understand and implement the PDCA loop. Delays of this nature result in higher labor costs and missed opportunities in cost savings due to project delays. On a human level, not challenging or developing employees misses the chance to build star performers in the organization who could take quality to the next level.

Build an enduring culture of discipline; do not discipline it into the organization.⁷⁶ Building such a culture means developing the people. The Plant 1 Quality team has an annual budget of approximately one million dollars. 93% of this budget is for salary, wages, benefits, and recognition awards. People are the number one investment in the Quality team and, to that end, the focus of the culture must be on developing the workforce.

Team members must understand how their jobs, and how they execute those jobs, affect the quality of Plant 1 products and services. They must also understand how they affect the business goals of the plant. This understanding will help the entrepreneurial spirit of the team if individuals understand their role. Tie projects and tasks to the business goals and understand this relationship during the planning stage. The Quality team should take opportunities to remind each other and other teams of the quality philosophy – Smarter, Leaner, Greener – and the Quality team priorities – Safety, Quality, and Productivity. Helping the team stay on message will help solidify the culture. Deming believes management should create a consistency of purpose toward improvement of the product and service.⁷⁷

Allot time for training, but do not limit that training to hard skills such as statistics or data analysis. While the hard skills are important in a quality role, the softer skills are often forgotten. The Quality team identified facilitation as something they do best. Understanding how to run the manufacturing line falls to Production, while understanding the technical aspects of the process

and product falls to Engineering. The Quality team facilitates the process of improvement. At Plant 1, when a major process upset is being investigated, the Quality team facilitates the investigation through the CAPA system. The Quality team facilitates customer complaints. The Quality team will facilitate the development of the Built-In Quality Control plans. To support this facilitation role, the Quality team should develop its facilitation skills. It will also need to develop its root cause analysis skills along with skills in the concept of error proofing. These skills allow the Quality team to leverage the knowledge of other teams and drive continuous improvement.

Project Management skills must also be developed. Project management requires a rigorous use of the PDCA loop. Team members must understand the balance among time, cost, and performance while maintaining good customer relations.⁷⁸ Individuals should develop skills in planning tasks, managing resources, and managing the interface points of a project.

The development of the Quality workforce should focus on the culture of Built-In Quality Control by:

- Exercising project management skills on any project involving the development of a Built-In Quality Control matrix,
- Practicing facilitation skills anytime the Quality team is leading a discussion,
- Identifying immediate opportunities to put new training into action⁷⁹, and
- Utilizing the PDCA loop to identify areas where education was weak on a given project.

Developing the workforce does not need to start from a clean sheet of paper. On a general level, National Conduit faces the same challenges other businesses face. The Quality team should look at established references to determine training opportunities. These references

would include the American Society for Quality (ASQ) Guide to the Quality Body of Knowledge, the Project Management Body of Knowledge, or a variety of references for Six Sigma Green Belts and Black Belts. Since Plant 1 is located in a town with a community college, the Quality team should look at training opportunities through the local community college as well.

Viewed from the perspective of the PDCA loop, workforce development should rely heavily on the “Check” stage. Feedback is critical to checking development. The Quality Manager should seek feedback from the individual team members on a regular basis. Did team members have the proper skill sets to complete the job effectively? The Quality Manager and team members should solicit feedback from other teams. “Check” others for their perception on the Quality team’s strengths and weaknesses and then “Act” to identify educational opportunities to improve in these areas.

Knowledge Management

Finding
The Plant 1 Quality team fails to leverage data for continual improvement and to build organizational knowledge.

The Plant 1 Quality team fails to leverage data for continual improvement and to build organizational knowledge. The inefficient use of data results in quality issues occurring repeatedly, resulting in unnecessary scrap and a loss of productivity. The customer complaint rate remains relatively constant. Past complaints are not eliminating future complaints. In one instance, Plant 1 failed to deploy the corrective action implemented for one customer issue

across the entire manufacturing organization. Nine months later a similar customer complaint resulted in approximately two million dollars of at-risk product in the field.

Plant 1 handles large amounts of data related to products and processes. Data is received from customer complaints, manufacturing rejects, product and process changes, and audits of the manufacturing processes. This data needs to be translated into information and Plant 1 needs to develop this information into long-term knowledge. The Plant 1 Quality team manages four systems in accordance with ISO 9001 that support this data collection:

1. the customer complaint system,
2. the corrective action/preventative action (CAPA) system,
3. the internal auditing process, and
4. the change management system

Traditionally, each system has been independent of the other and used for specific intentions. For example, the CAPA system tracks correcting internal non-conformities in accordance with ISO 9001 requirements; however, external customer complaints flow through the customer complaint system. They are viewed as two different systems.

Manufacturing rejects or customer complaints should be viewed as a failure to control the process. Either a process input was unknown, or a process input was not controlled. These process inputs will be identified in the new Built-In Quality Control matrix. These matrices are a focal point for developing information on the process. To continue to build and refine these matrices, the data collected from the various action systems must be channeled into the Built-In Quality Control matrices as shown in Exhibit 7.

Root cause analyses performed as part of corrective actions and customer complaints should serve to update or revise the Built-In Quality Control matrix. The change management

system is used by Plant 1 to control new product, process, or equipment introductions as well as changes to existing products, processes, or equipment. Updating the Built-In Quality Control matrix should be an output of the change management process. Finally, the Quality team performs internal audits of the various plant processes in accordance with ISO 9001. These audits should be process-based and should use the Built-In Quality Control matrix as a reference to confirm process inputs are being controlled, and when found not in control, that appropriate actions are taking place.

The Quality team should focus on a single train of thought. Because different tools are used to administer each of the systems seen in Exhibit 7, there is a tendency to think about each system differently. At their core, all systems follow the same approach, which is based on the scientific method. For Plant 1, the current variation on the scientific method is the Six Sigma DMAIC process. For customer complaints, corrective/preventative actions, and change management, the process to follow is always DMAIC:

- DEFINE the problem to be solved
- MEASURE the current state of the problem
- ANALYZE the root cause of the problem
- IMPROVE the system to reduce or eliminate the problem
- CONTROL the system to prevent further reoccurrence

Harry and Schroeder add an additional three steps to the process, placing RECOGNIZE prior to the DEFINE stage, and STANDARDIZE and INTEGRATE following the CONTROL stage.⁸⁰

Process-based auditing identifies gaps in existing systems and corrects the gaps with the necessary DMAIC steps in the CAPA system. The use of the Built-In Quality Control matrix

provides for a standard process to integrate process inputs and deploy lessons learned horizontally through the plant.

Finding
Institutional knowledge is weak. Plant 1 has an experienced workforce, but much of the institutional knowledge lies in workers' heads.

Plant 1 is at long-term risk due to its aging workforce. New employees often relearn information through trial and error due to the lack of knowledge management. This approach results in unnecessary labor costs while individuals train in a new position, and missed opportunities for cost reduction because individuals do not understand a given issue or process.

In one specific case, the Plant 1 Quality team and Engineering team were working to resolve a customer issue. The teams reviewed past reports and designed experiments to test their theories. During a progress meeting where the design of experiments was reviewed, the team learned that an employee at another location was part of the initial product design team ten years ago. The team contacted the employee, and gained insight into the initial lessons learned during product design. The result was a complete overhaul in the design of experiments, and a loss of two weeks in the project due to duplicate work.

Building historic knowledge is important to the long-term usefulness of the Built-In Quality Control matrices. During a variety of recent projects at Plant 1, team members found they did not understand why processes were setup a given way, or why the target and range was selected for certain set points. There may have been a report stored in the technical library, but it would require research to find. The Quality team must drive better documentation referencing.

Just as a college paper requires footnotes, production and engineering documentation must require footnotes.

Plant 1 has a sister plant in another state. The production documentation often has footnotes that references the experimental report used to define a given set point. This approach to documentation helps the sister plant manage information over the years as people move in and out of various jobs. Plant 1 should adopt this as a best practice and begin a more detailed practice of documenting references.

Constraint of Existing Systems

Finding
The lack of workforce development leads to a lack of understanding of existing tools and systems. This lack of understanding translates into inefficient and ineffective projects.

When faced with an issue of holes in the wall of conduit, the Plant 1 team spent several weeks attempting to solve the problem. The project team attempted to use the DMAIC process, but failed to understand the tools. After weeks of confusion and experiments, the team determined a measurement system analysis was needed. The analysis found that the measurement system was incapable and confounded the data from previous experiments. The inability to leverage existing systems resulted in several hundred hours of lost labor, material costs on experiments that yielded poor data, and a delay in satisfying the customer. Plant 1 nearly lost a one million dollar sales account due to their inability to leverage the existing tools at their disposal.

The Quality team is one small part of the overall Plant 1 structure. Plant 1 is one plant in the National Conduit organization. Any improvement to the Quality team's execution must work within the existing systems. National Conduit selected the Six Sigma approach as its methodology to improvement. The Quality team should utilize Six Sigma tools, such as the DMAIC process or the PDCA loop, to improve its ability to execute. Educational opportunities should align with the Six Sigma toolset to minimize the introduction of competing or confusing terminology and tools into the organization. The Quality team must also recognize that ISO 9001 registration is an ongoing reality. Improvements in execution must remain compliant with the ISO 9001 standard.

Since National Conduit is rolling out the Built-In Quality Control program to all locations over the next several years, The Quality team can leverage this new approach to improve its execution without creating a new system. Modifying the approach of supporting systems can be restricted to Plant 1 and if the approach of focusing on the Built-In Quality Control matrix is successful, then it can be deployed to other locations. While National Conduit may choose to standardize on tools, the Quality team must recognize there is latitude in how the tools are integrated into the organization.

National Conduit's selection of Six Sigma is not in conflict with the Built-In Quality Control program. Both approaches require understanding the Voice of the Customer, and using qualitative and quantitative tools to achieve aggressive goals.⁸¹ The challenge for the Plant 1 Quality team is not to view ISO 9001, Six Sigma, or Built-In Quality Control as boundaries. While they are existing systems, they must be viewed as enablers and not as systems that stifle innovation.⁸²

The Quality team has encountered this issue with the documentation system. On numerous occasions, the Quality team has attempted to improve documentation or reduce unnecessary documentation as the result of an internal audit. System owners often resist suggestions for change citing requirements of ISO 9001. In reality, the cited requirements do not exist, and the Quality team spends time educating system owners on the actual requirements of the ISO 9001 process. The focus on Built-In Quality Control and the use of Six Sigma tools must not stifle the innovation process.

The entrepreneurial approach should be added to the Quality team's daily roles. Team members should have greater latitude to do their jobs and interact with other teams. Rather than trying to identify and manage every task in a project, team members should be coached through milestones. Rigorous use of the PDCA loop should balance increasing freedom for team members with an understanding of accountability.

Innovation

Finding
Existing systems stifle innovation. Existing systems and organizational structure constrain potential solutions. The result is restricted continual improvement and a loss of cost savings for Plant 1. Project teams often feel there are no additional cost savings remaining. Existing assumptions are not challenged and savings are unrealized.

The constraint of existing systems must be balanced with innovation. For the Quality team, a mix of self-confidence and self-criticism can drive this innovation.⁸³ The Quality team should not be afraid to start with a blank sheet. Ask questions and then dialogue and debate the

responses. Once this approach formulates and executes a plan, then the autopsy and analysis of the results needs to take place.⁸⁴ Too often, the Quality team falsely starts from the constraints of the existing process, and does not take time to review the results of the completed actions. The PDCA loop should be used more rigorously.

Plant 1 does not leverage existing resources in the innovation process. Engineering leads major improvements. Plant 1 has a Continual Improvement Suggestion Program (CISP), but this program is often limited to smaller improvements. Repeated issues with print statements placed along the length of the conduit were assigned to Engineering. Due to other projects, this issue was prioritized low. Scrap costs due to illegible print were approximately \$250,000 per year. During a conversation with operators, the Quality Manager found a pair of operators who had a suggestion for how to improve the marking tape position and eliminate print errors. The operators believed such a project was restricted to Engineering and beyond the scope of the CISP. The operator solution yielded a 50% reduction in print errors, saving \$125,000 per year. Plant 1 failed to realize this savings for several years due to a failure in leveraging innovative ideas from all employees.

When confronted with non-conformities, the Quality team has tried to drive the corrective actions. This approach fails to leverage the organization. The Quality team's strength in the organization is the ability to facilitate. Engaging the Production operators, Engineering, and other support teams in developing and executing a solution will lead to improved innovation. Liker states that production groups are the focus of problem solving in the Toyota Production System.⁸⁵ The Quality team has ten people while the production operators number several hundred. It makes sense that when facilitated properly, several hundred achieve more innovation than ten do.

Innovate solutions can be driven through quality circles. The danger for the Quality team is implementing these circles. The setting of goals and allocation of resources resides with management. If the Quality team attempts to utilize quality circles without Plant 1 management support, the process will founder as it did with many other western companies.⁸⁶ To deploy quality circles, the Quality team should work with the existing leadership teams in the Plant 1 organization to obtain support. An anecdotal survey of Plant 1 management by the Quality Manager found upper management recognized the untapped potential of quality circles and identified the need for them; however, they had simply failed to implement them. The Quality team is in a position to facilitate the creation of quality circles and assist Plant 1 management in tapping in to potential innovations.

Influence

Alignment

Finding
The Quality team is aligned with Plant 1 goals for cost reduction; however, Plant 1 management does not understand the alignment. The quality management systems continue to be seen as a requirement of ISO 9001 rather than a vehicle to deliver cost reductions and continual improvement.

Various projects exclude quality representation. In one instance, the Procurement team led a project to cost reduce shipping containers. The Quality team became aware of the project when customer complaints reported the new containers were falling apart and were unable to

handle the weight of shipped material. During the root cause investigation, the Quality team learned of the cost reduction project and asked the Procurement team why the Quality team was not consulted.

The Procurement team felt the cost reduction project did not affect product quality and did not see value in adding the Quality team to the project. As a result, a variety of technical and customer requirements were misunderstood, resulting in an ineffective shipping container, and lost time and money to replace the damaged product. The Procurement team had to re-open the original project to develop a new shipping container. An incorrect belief that the Quality team skills and responsibilities were not aligned with the Procurement activities contributed to wasted resources, lost time, and unnecessary cost in scrap and replacement product.

Plant 1 focuses on cost reduction and the Quality team plans to use the Built-In Quality Control program to reduce internal rejects and remakes. The reduction in repair and rework will lead to a reduction in material usage, labor costs, and cycle times.⁸⁷ Plant management agrees with the Quality Manager that the level of customer complaints is acceptable and will not jeopardize future sales. Both parties agree that focusing on internal rejects will help lower costs for Plant 1 and will drive the level of customer complaints even lower.

Focusing the quality systems on the Built-In Quality Control program aligns with National Conduit goals. Upper management within the company is directing the deployment of Built-In Quality Control at all locations. Capitalizing on this tool to improve execution for the Quality team keeps Plant 1 aligned with company goals.

The Quality team must be aware of misalignments. Several recent attempts at operator scorecards resulted in encouraging the wrong behavior. Management created a large project team to improve first-pass yield numbers. Operators began to address issues outside the systems

and did not report rejected material. This led to an improvement in first-pass yield numbers without a true process improvement. The Quality team will work with management to integrate the Built-In Quality Control program into the process of improving first -pass yield. The goal of this integration is to remain focused on long-term system improvements, but still realize short-term gains when appropriate.

The new Global Engineering team is responsible for deploying the Built-In Quality Control program. The Quality team is communicating with Global Engineering to ensure the Plant 1 deployment aligns with the intentions of the Global Engineering team. The challenge with this alignment lies in the supporting systems. National Conduit management tasked the Global Engineering team with deploying the Built-In Quality Control program, but not with realigning the supporting quality management systems. The Quality team at Plant 1 will be developing this realignment in hopes of proving a best practice.

Metrics drive National Conduit behavior. As a result, the Quality team developed a number of metrics over the years for management reporting. At least some of these metrics are driving the wrong behavior. An example of this wrong behavior involves a metric for the days to close a corrective action. A review of several corrective actions found that solid, long-term actions, which would eliminate the root cause of the issue, were avoided because the assignment of resources and the implementation would exceed the target for the days-to-close metric. This caused Plant 1 to implement a corrective action that stopped bad product from getting to the customer, but did not eliminate waste in manufacturing or correct the actual root cause of the problem. A full review of quality metrics is needed to determine the intended goals of various systems, and how to properly measure the effectiveness of each system.

Managing Up

Finding

When asked to define the purpose of the Quality team, most Plant 1 management responds with the need to comply with ISO 9001 and to handle customer complaints. The idea that the Quality team is a continual improvement team that improves customer satisfaction while lowering manufacturing costs is often overlooked. Plant 1 objectives support this misunderstanding by having one plant initiative for improving quality and a second plant initiative for reducing cost.

The Quality team has not done a good job in managing up. This led to a perception of the quality management systems as a requirement of ISO 9001 rather than a process for continual improvement. To correct this perception, the Quality team must proactively change its interaction with management.

The Quality team must first break the “tyranny of the OR.”⁸⁸ Two misconceptions exist at Plant 1 that exemplifies this tyranny:

1. Plant 1 can have high quality OR low cost, and
2. Projects can be executed quickly OR follow the DMAIC approach.

To correct these misconceptions, the Quality team needs to ensure quality improvements have a cost component to them, and that cost component is the leading result of a project. One of the goals of Six Sigma is to be a management philosophy where results demonstrate true financial improvements dropping to the bottom line.⁸⁹ Showing how a quality improvement improves first-pass yield is important, but showing the dollar savings on the bottom line is critical.

As facilitators, the Quality team needs to develop proficiency with the Six Sigma tools. Leading other teams through an efficient Failure Mode Effect Analysis (FMEA), or through a

root cause analysis, can help eliminate the perception that the DMAIC approach takes time. By understanding that all actions can follow the DMAIC process, and selectively using the Six Sigma tool set, the Quality team can reduce the desire to abandon the DMAIC process for a “quick solution.”

Plant 1 has goals to reduce fixed and variable costs, improve productivity, and improve inventory turns. This is no different from Goldratt’s focus on operating expense, throughput, and inventory.⁹⁰ The Quality team should understand where the quality management systems and projects affect these three objectives. The simple approach is to develop a Cost of Quality plan. Cost of Quality typically involves tracking the costs in external failures (customer complaints), internal failures (manufacturing rejects), appraisal (quality inspections), and prevention.⁹¹

Implementing a tracking system for the Cost of Quality and for tracking the Quality team’s time on various projects and tasks will develop better data to drive management decisions. Such a system must focus on management decisions, and not on policing the work force, lest it violate Deming’s desire to eliminate management by numbers and numerical goals.⁹² An example of using such a system is the customer complaint process. Tracking the Cost of Quality for customer complaints provides management with a financial cost for each complaint. A quality improvement that can eliminate a given customer complaint can then be translated into a financial savings for National Conduit. Additionally, by tracking the time spent on managing customer complaints, the Quality team can report on a percentage of total time, or number of man-hours, that are needed to manage the complaints. A project to streamline the customer complaint process can then be shown to have direct financial impact on Plant 1 financials.

The Quality team must recognize that Plant 1 management is dealing with a large number of daily issues from production schedules and deliveries, to safety and environmental concerns, to various human resource issues. The Quality team needs to show proactively how their systems and jobs contribute to the goals of Plant 1 to change perception and build support for future projects.

Communication

Finding
Encounters with the Quality team have a negative perception. Internal audits are viewed as burdensome. Calling the Quality team to the production floor is viewed negatively. Engineering worries that the Quality team will not approve their projects. Individuals from the Quality team are viewed positively. Production and Engineering personnel regularly comment on how an individual from the Quality team was beneficial to a specific issue. This disconnect hurts the perception of the Quality team and the individuals on that team, resulting in a failure to utilize the Quality team resources or hurting career options for team members.

An important component to managing up and across the Plant 1 organization is communication. The Quality Manager sets the tone of dialogue in the Quality team and that tone forms the culture for the team.⁹³ A simple place to start with communication is with Collins' four basic practices.⁹⁴

1. Lead with questions and not answers,
2. Engage in dialogue and debate, but not coercion,
3. Conduct autopsies without blame, and

4. Build “red flag” mechanisms to alert you to a problem

Stating rules and building them into the culture are two different things. To begin a cultural change in communication, the Quality team should review these rules as part of the PDCA loop. The “Check” portion of this loop should include not only a review of the project objectives and milestones, but also a review of communications in meetings or other venues with a focus on whether the Quality team was following these guidelines.

At Plant 1, quality issues can become a negative event. In the past, customers have elevated single quality events with product in the field to top management, often without telling Plant 1 or Customer Service that such an issue exists. Top management reacts with requests for information and constant reports. In the rush to keep top management happy, the event takes on a negative perception because the reaction is often out of proportion to the quality issue, and because plant workers feel that top management views them as incompetent. At the plant level, workers also perceive internal audits negatively. Long lists of observations by the Quality team appear like an external group coming to tell workers how to do their job.

The Quality team cannot prevent top management involvement in issues, or force a change in the workers’ perception, but it can change how it responds. By changing the tone of communication from negative to positive without failing to “confront the brutal facts” as Collins says, the Quality team can change the reception of the message. Instead of saying that top management is involved in an issue, consider saying top management is assisting in maintaining a positive relationship with the customer. Instead of a long list of observations, restrict audit findings to a few key “areas for improvement” and highlight several good practices. If the Quality team communicates in a positive tone and remains positive when dealing with quality issues, then other teams will respond in kind because of the response of mirror neurons.⁹⁵

Finding

The Quality team has not tuned communication. For example, the Quality team reports customer complaints in a parts-per-million rate. The Quality team does not communicate these complaints in a dollar value.

Management and operators do not understand the costs of warranty costs and customer good will, causing Plant 1 to fail to translate customer complaints into opportunities for continual improvement and cost reduction. Scrap costs of several thousand dollars may seem small to Plant 1; however, losing a customer that provides hundreds of thousands of dollars to the gross margin changes the perception of an issue.

Positive communication alone is not a solution. To be effective, tune the communication to the audience. When dealing with management, the Quality team should remember to tune communication to financial results. When dealing with workers, the Quality team may tune communication to how an issue affects their wallets. Following a recent quality issue where workers used the wrong material and shipped the product to a customer, the Quality Manager spoke at a production meeting to the workers. The issue was reviewed, the cost of scrap product was reviewed, and the amount of sales revenue generated by the specific customer was reviewed. Workers were surprised to see that while product costs were a few hundred dollars, the loss of the customer could result in nearly a million dollars to Plant 1 in lost revenue.

Since the workers receive variable compensation that is partly determined by customer complaints, the Quality Manager reviewed the impact one issue has on their variable compensation. Following the meeting, the Quality Manager received a large amount of positive

feedback from the workers. The workers felt they understood the financial impact of losing a customer to a quality issue, the impact the issue had on workers (in their wallet), and why the Quality team had rules in effect that would prevent this issue.

Focusing on positive communication and tuning that communication to the audience will help the Quality team begin to change perceptions. Explaining not only the facts of an incident, but also the “why” behind the incident will help engage the workers. With these changes to communication, the Quality team will be able to convince various groups at Plant 1 that addressing quality issues in a systematic fashion is in the best interest of the company.

Emotional Intelligence

Finding
Effective communication relies heavily on emotional intelligence. Goleman states that failing to read emotional cues in others and poorly managing social interactions results in poor influence. ⁹⁶

Emotional intelligence will prove to be the most difficult area for the Quality team. Goleman’s first two components of emotional intelligence are self-awareness and self-regulation. Self-awareness involves knowing one’s internal state, along with their preferences and intuitions. Self-regulation is the process of managing one’s internal emotional state and the accompanying impulses.⁹⁷ Emotional intelligence is not a tool or form to execute. It requires the individual to spend time in self-evaluation of their feelings and behaviors.

The Quality team can benefit by learning about the concept of emotional intelligence. This should include a basic understanding of Bossiday’s seven essential behaviors: know your people and your business, insist on realism, set clear goals and priorities, follow through, reward

the doers, expand people's capabilities, and know yourself.⁹⁸ It can also involve training on the subject in areas such as conflict management and situational behavior. Typically, such classes are restricted to supervisors; however, there is benefit in getting workers lower in the organization to understand the techniques.

Pre-briefing meetings would be an innovative approach to improving emotional intelligence in the Quality team. By reviewing the meeting agenda, the meeting attendees, and the likely responses to issues, the team can better prepare for reacting to the various emotions that may occur. The goal of such a pre-brief would be to proactively manage the interaction with others in the meeting, rather than attempt to manage the interaction reactively in the heat of the moment.

In one instance, a National Conduit R&D engineer requested experimental time for a time-constrained project. Plant 1 did not want to divert resources and declined to assist. The meeting took on a negative tone with the R&D engineer not wanting to hear the Plant 1 "excuses." The Quality Manager, who was a fan of the Star Trek genre, recalled the engineer was also a fan of Star Trek. The Quality Manager retold a scene from the movies that stressed the importance of knowing "why things work aboard a starship."⁹⁹ While others in the meeting felt the Star Trek reference was silly, the R&D engineer immediately related to the scene. This rapport changed the tone of the meeting and the R&D engineer explained in more detail the importance of the experiment and the timing. The dialogue restarted in a positive light and R&D and Plant 1 reached a win-win solution.

Attract and Sustain Superior Talent

Finding

Plant 1 management view individual Quality team members as superior performers. Production and Engineering personnel view individual Quality team members as having high integrity. Individuals outside the Quality team are not interested in joining the Quality team for a variety of reasons. The existing team has a good start to sustain talent; however, the team perception makes it difficult to attract new talent.

Execution and influence rely on the individuals that comprise the team. The Quality team needs superior talent to execute and influence the Plant 1 organization. Other teams must respect individuals on the Quality team for influence to be effective. The Quality team as a team must demonstrate value to the organization to earn respect. Using Bossiday's seven essential behaviors can help attract and sustain superior talent.

The Quality team needs to clarify its goals and priorities. Outside organizations do not understand what the team does. Providing clear direction helps team members stay on track, achieve milestones in a timely fashion, and achieve positive results. Not matter how good an individual performer is, if the individual does not have goals and priorities, then they will be perceived as a weaker performer. Frequent feedback and use of the PDCA loop helps team members stay on track and offers them the opportunity to seek assistance.

Maslow's Hierarchy of Needs provides a good benchmark.¹⁰⁰ National Conduit provides the lower, physiological and safety needs through salary and a safe work environment. The Quality team needs to provide the higher needs of social, self-esteem, and self-actualization. Open and informal communication can establish a more social setting for team members. A

comfortable social setting is important to team members who spend eight hours a day together. Setting milestones and encouraging entrepreneurship can build self-esteem in the group. Recognition within the group and external to the group plays a role in building self-esteem. The Quality Manager must take opportunities with other managers and upper management to recognize the work the Quality team is doing.

Self-actualization, the need to achieve one's full potential, will depend on the individual. Understanding what drives an individual is critical to knowing how to assist in self-actualization. In the Quality team, there are individuals who enjoy a challenge. Providing increasingly difficult projects and education opportunities aids their self-actualization. Other team members value their family life. Providing flexible working hours, or a laptop to work from home, fosters their self-fulfillment as a parent and makes them a better worker.

To understand the drivers for self-esteem and self-actualization, the Quality team can use several tools. The Myers-Briggs Type Indicator, the Strengths Finder 2.0 by Tom Rath, and the Career Anchors by Edgar Schein are all methods for allowing team members and the Quality Manager to understand motivation and tailor the work environment accordingly. National Conduit has a number of online tools available for employee development. The Quality team should utilize the PDCA loop to with these tools to ensure a systematic method for understanding and reviewing motivation.

Developing individuals on the Quality team is important, but equally important is the hiring practice and the promotional practice. Past interviews have focused on the hard skills, such as statistics, or data analysis. Hard skills can be taught. Soft skills, such as integrity and emotional intelligence, are more difficult to teach. When interviewing new individuals for the group, the focus should be on the soft skills. Based on Collins' hedgehog concept and

Goleman's emotional intelligence, the Quality Manager believes integrity, facilitation, delivery, and a questioning attitude are important.

The Quality team often has to resolve a dispute between other teams. Quality decisions can result in scrap costs and missed shipments. Individual Quality team members must have integrity to ensure the Quality team remains an impartial party in the plant environment. When Production and Engineering disagree on whether a product complies with manufacturing standards, the Quality team must resolve the disagreement without taking sides. Whenever one team disagrees with another team, Plant 1 management views the Quality team as an independent third party that can resolve the dispute.

As previously identified, the Quality team plays a large role in facilitating root cause analyses and solutions. Individuals should have some level of facilitation to work in the team. The importance of emotional intelligence and the need for positive communications is delivery. The individual should be able to delivery a variety of messages to other teams within the plant, and convince those teams of the value of the message. Finally, a question attitude goes along with the emotional intelligence. Individuals hired into the team should seek to ask questions to gain understanding rather than dictate answers.

Part of self-actualization for an individual will involve moving on to a new position. By working to develop the execution and influence skills of an individual, and publicizing their success, that individual is viewed favorably for other job opportunities. Assisting Quality team members in obtaining other positions helps build a network of Quality alumni who can be of assistance in other areas of the organization, and it provides good advertisement for the Quality team when it needs to recruit a new team member.

Building Alliances

Finding
Despite reservations by other teams at Plant 1, the Quality team has good, collaborative relationships with other teams. The practice of “attorney-client privilege” built trust between the Quality team and Production operators. The group does not have high visibility, resulting in lost opportunities for the Quality team to influence projects and day-to-day operations.

Quality is one team among many at Plant 1. Success relies on the Quality team’s ability to collaborate with other teams. Collaboration improves when other teams want to work with the Quality team. To that end, the Quality team needs to work on building alliances across the plant.

A positive attitude and message are important to building alliances. Quality team members need to project helpfulness and a positive tone. Goleman’s work in social intelligence indicates that if the Quality team takes a hostile or negative approach to work, then the approach will be reflected back by other teams. The Quality Manager needs to project this positive tone in dealing with other members of Plant 1 management, and the Quality team members need to project the positive tone in their individual dealings. The team should use the PDCA loop to analyze how well they are maintaining a positive tone.

The Quality team should build on the positive tone to create quality circles for issues. Membership on the quality circle should be voluntary and should drive mutual development between the Quality team and other organizations in the circle.¹⁰¹ The eventual goal should be to engage all workers in some form of quality circle. Positive experiences in a quality circle will build a positive relationship between the Quality team and Production rather than fostering a feeling that the Quality team is a police force.

Alliances are built by understanding the Social Operating Mechanisms described by Bossiday. For Plant 1, these mechanisms occur inside the plant and outside. The Quality Manager already has routine lunches with the Engineering Supervisors to foster understanding among the teams. Plant 1 has a daily operations meeting each morning. Following this meeting, many individuals discuss issues one-on-one, or take a few moments to socialize or request a favor. Because so many people come to the meeting and it occurs at the same time every day, the operations meeting is a good place to “catch” people and talk with them. This social setting is more effective than e-mail due to its informal and personal nature. More team members need to attend the meeting on a regular basis.

Engineering also hosts a “morning market” to review rejects from the previous manufacturing day. The Quality team has not been a regular participant in these meetings, but to be viewed as a credible partner in continual improvement, attendance is required. The team needs to establish a method for covering these meetings on a daily basis.

On a weekly basis, Plant 1 management holds a project update meeting. Project leaders report on their projects on a periodic basis, with three or four projects covered each week. The project updates are a good forum to gain publicity by presenting, they provide an informal setting for discussing issues after the meeting, and they are an unofficial method of judging engagement by seeing which teams attend. Making the meeting a priority helps keep the Quality team informed on the status of various projects, and due to its proximity to lunchtime, it provides the opportunity for spontaneous lunch invitations, which help foster team building across the organization.

Being more visible at plant events and communication meetings builds relationships. Having a more informal relationship at the individual or group level improves collaboration.

Through strong alliances with other groups, the Quality team can improve its ability to gain and provide support for Plant 1 projects.

Taking Power Quietly

Finding
The Plant Manager and upper management at National Conduit are juggling a complex series of business issues and decisions. Waiting for a top-down approach to improve the influence of the Quality team is unrealistic. Pursuing a faster approach to expanding influence will support the deployment of the Built-In Quality Control strategy and lead to stronger continual improvement and cost reduction.

Improving the execution and influence of the Quality team will not come from upper management. The team must be willing to foster change within itself. Goldratt lays out five layers of resistance to change.¹⁰² The Quality team must leverage self-criticism to address each of these layers in its own organization. It must understand each of the layers and be prepared for addressing each layer in a variety of situations. The ability to manage resistance to change strengthens the importance of emotional intelligence in the Quality team. Listening to reasons why something cannot be done will likely lead to frustration.

Winning over a resistant audience or collaborating on a solution is not something the Quality team should outsource to upper management. Team members should use their own influencing skills and seek the guidance of others on the Quality team to break through barriers in the organization. National Conduit management respects individuals and teams that can work together. Bringing issues of conflict to upper management for resolution rarely reflects well on either side of the conflict.

The Quality team should follow Marash's advice and move from the hard skills of planning, controlling, and giving orders to a softer approach of mentoring, facilitating, and setting the example.¹⁰³ If a project team seems stuck on an issue and suggests the team needs guidance from upper management, then the Quality team should coach the team through some options before approaching management. Rather than let the team abandon the process and look to upper management for guidance, the Quality team should attempt to facilitate several options to present to upper management for feedback.

The operating model for the Quality team should be one of service and not direction. Rather than mandate a solution or a Six Sigma approach, show how certain tools can benefit the situation. Do not tell Engineering to fix something, but use the Built-In Quality Control process to help eliminate the problem and free Engineering's time.

Focusing on the people is important to a successful service model. Support the individual members of the Quality team. Ensure interactions between the Quality team and others teams are positive. Follow Collins window/mirror model by looking external to the team (out the window) to give praise and thanks, but look internal to the team (into the mirror) for responsibility and accountability.

The Quality team does not need to wait for direction from upper management to begin this transformation. Building a superior Quality team can start low in the organization with the Plant 1 Quality Manager. Bossiday recommends a manager spend 40% of their time on developing people. This equates to two days out of a five-day workweek. Finding that time will require the Quality Manager delegating more duties to the team; however, done right, this delegation can foster individual development, and the investment in people development will

lead to a stronger Quality team, improved costs for Plant 1, and a superior experience for National Conduit's customers.

Summary and Conclusions

The Plant 1 Quality team contributes to the National Conduit business goals by:

1. Lower costs by eliminating waste, and
2. Growing revenue with superior product and service quality at a low price

To accomplish these goals, the Quality team needs improvements in the areas of execution and influence.

Execution

Execution improves by eliminating a variety of objectives and focusing on a single goal. For the Quality team, this single goal is the pursuit of the Built-In Quality Control program. All actions within the Quality team should support this single goal. Communication within the team and among other teams should support this single goal. The purpose of the Quality team is to drive Built-In Quality Control and eliminate waste.

Activities associated with the quality management systems must be tied to the Built-In Quality Control program. The results of a corrective action or a change management request should force a review of the Built-In Quality Control program and determine the necessary upgrades. Actions taken by the Quality team should result in the elimination of some form of waste.

Driving this new behavior and focus requires investment in the Quality team workforce. Team members will need a strong understanding of Built-In Quality Control. Team members will also need an understanding of how the quality management systems support Built-In Quality Control. Team members must understand plant operations, and possess the necessary analysis and facilitation skills to perform their duties.

Rigorous use of the Plan-Do-Check-Act loop will identify shortcomings in performance and provide an opportunity for feedback. The PDCA loop also provides opportunities to identify weaknesses in workforce development. Educational opportunities can then be identified to strengthen performance in individuals and the team. Industry guidelines, such as the American Society for Quality Guid to the Quality Book for Knowledge, can be leveraged to identify educational topics.

The information and experience gained from quality management system activities supports the Built-In Quality Control program. Using various systems such as customer complaints or internal audits to make improvements to the Built-In Quality Control program will build institutional knowledge. Utilizing a single process for these actions will further strengthen the process. This single process at Plant 1 will be DMAIC. All activities follow the DMAIC steps of identifying a problem, understanding the current situation, analyzing the situation, making improvements, and monitoring the improvements for the desired response. Pursuit of this methodology will bring consistency to a variety of systems that will ultimately drive Built-In Quality Control and eliminate waste.

The Quality team must balance the existing systems and innovation. Since National Conduit adopted the Six Sigma methodology, it makes sense for the Quality team to use the tools provided in that methodology. The team must be willing to innovate as necessary. If an existing process is complex or error ridden, then the Quality team should facilitate improvements starting from a clean sheet of paper.

Continual improvement requires leveraging all available talent. The Quality team should facilitate quality circles to bring Engineering, Maintenance, and Production operators together to solve problems. Individuals need to be empowered to suggest and implement improvements;

however, they must be provided the necessary tools to manage such improvements. The Quality team can facilitate these circles and provide the necessary tools.

Influence

Execution alone cannot improve the Quality team's ability to eliminate waste and deliver a superior customer experience. The goals and objectives of the Quality team must align with the overall business. Focusing on the Built-In Quality Control program, and ensuring management understands how this program reduces manufacturing costs, is important to maintaining alignment between the Quality team goals and National Conduit goals.

The Quality team must not expect management to see the alignment. It must utilize tuned communication to demonstrate the alignment between the Built-In Quality Control program and the overall Plant 1 goals. Communication should not be in obscure quality terms, but in financial terms understood by management. When communicating with other teams at Plant 1, the Quality team should communicate in terms of wasted labor, scrap dollars, or lost time. All employees are conditioned to these concepts through regular plant communication meeting and the five-year old lean manufacturing initiative.

Communication should be positive, but fact-based. When an error is found in product or service, the tone should be one of opportunity and not blame. The Quality team must understand how to motivate other teams without alienating them. It must understand emotional cues in others and properly manage social interactions. To improve social interactions, the Quality team needs to strengthen emotional intelligence. The team must be self-aware of their own emotional state during an issue to manage their response. Strong social interactions lead to positive perceptions and a willingness by other teams to accept input and direction from the Quality team.

The influence of the Quality team requires strong performers now and in the future. The Quality team already possesses strong performers in many areas, but can continue to improve in the area of influence. Perception must be improved if the Quality team is going to attract superior talent in the future. Workforce development must balance between hard skills, such as data analysis, and soft skills, such as facilitation and coaching.

The result of strong Quality team with the emotional intelligence to ensure positive communication and value is the ability to build alliances. Strong alliances with other teams at Plant 1 ensure the goals of various teams remain aligned. When goals become misaligned, an alliance makes it easier to facilitate alignment. These alliances also build greater visibility between the Quality team and other teams at Plant 1.

With strong alliances, properly aligned objectives, and a positive perception by management, the Quality team can be a strong player in the Plant 1 organization. Leveraging the knowledge contained in the quality management systems can lead to continual improvement in eliminating waste and reducing cost while providing a superior customer experience.

Implementation

The Plant 1 Quality Team began implementing changes in the fourth quarter of 2009. The new Global Engineering initiative was launched for the Built-In Quality Control program. The Quality team reviewed the program and discussed ways to align the quality management system to the Built-In Quality Control program. The diagram in Exhibit 7 was developed to communicate how this alignment should take place.

During the first quarter of 2010, the Quality team focused on communication. The Quality Manager halted two projects – a conversion to process-based auditing and the

deployment of statistical process control – in order to align them with the Built-In Quality Control program. Plant 1 management and the Engineering team supported the decision. Neither project on its own supported the Plant 1 objectives; however, when linked to the Built-In Quality Control program, both could be powerful tools to eliminate mistakes.

In March 2010, the Quality Manager started a focus on the PDCA loop. The loop is often drawn on a white board during meetings to remind everyone of the process. Part of individual objective reviews with Quality team members uses the PDCA loop to identify shortcomings and corrective actions. The team trained on the DMAIC steps. The Quality Manager established a relationship between DMAIC and the quality management system.

Periodic reviews of the CAPA system and the Change Management system began in March. The initial reviews focused on redefining metrics to determine what makes the systems effective. During the second quarter of 2010, the Quality team plans to launch a review of the Documentation system to improve system effectiveness.

The Quality Manager initiated monthly lunches with the Engineering supervisors to discuss personnel, projects, and direction. This building of alliances proved valuable in February 2010 during a targeted workforce reduction. The two Engineering teams and the Quality team were able to adjust to the reduction together rather than independently. The Quality Manager also mandated that Quality Engineers and Quality Technicians begin attending daily production meetings, weekly project review meetings, and monthly engineering reviews. Quality team members report that the interaction is positive and that the meetings educate them on a variety of issues.

During March 2010, the ability to sustain and attract superior talent became an issue. The Quality team lost one Quality Engineer during the workforce reduction in February. A

second Quality Engineer accepted a position with Global Engineering. This reduces the number of Quality Engineers from three to two at a time when fixed salary, wages, and benefits are under scrutiny. At the writing of this paper, it remains unknown what talent is available to fill the gaps in staffing. In response to these losses, the Quality Manager requested feedback from the Quality Engineers on what has gone well and what has not gone well during the past three years. The Quality Manager and Engineering Supervisors also initiated discussions with Human Resources to discuss talent development options.

At the start of April 2010, Human Resources provided information to Plant 1 management regarding online, professional development courses that were available. The courses are on the internal National Conduit training system and are free to employees. A review of the courses found approximately 15 individual courses on the topic of emotional intelligence. The Quality Manager will assign coursework to the Quality team during the second and third quarters of 2010.

The Quality team agreed to a mid-year review in June or July to evaluate some of the team changes. Pending the feedback from team members, the Quality Manager will look at implementing further changes to enhance execution and influence.

Suggestions for Additional Work

1. A discussion of how to reorganize and manage a work team based on H. James Harrington's "Five Pillars of Organizational Excellence."
2. Managing organizational knowledge with a wiki-based system: such knowledge may include project tracking and updates, technical reports, or the deployment of an ISO 9001 compliant documentation system.
3. Successfully deploying TRIZ in a manufacturing environment with examples of companies that utilize the method
4. The role of metrics in an organization and how such metrics can inadvertently drive the wrong behavior
5. The importance of emotional intelligence in the workplace
6. The importance of social intelligence in the workplace

Exhibits

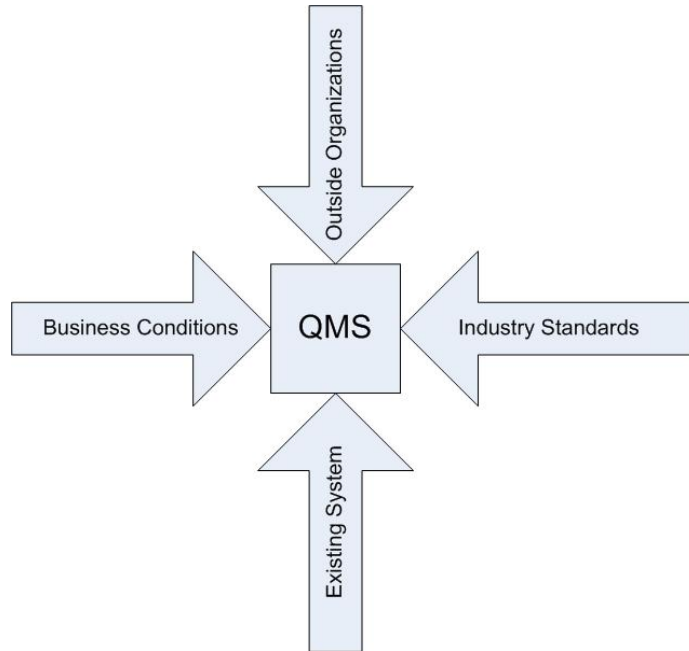


Exhibit 1 - Four External Forces on National Conduit Quality Systems

**Product Line 1
Customer Return Rate
(Based on 2002 baseline = 1.0)**

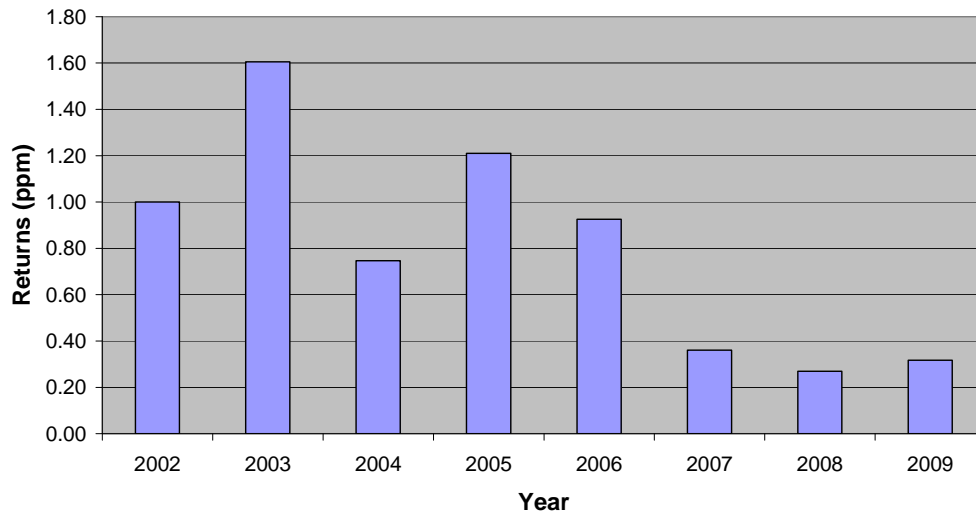


Exhibit 2 - Product Line 1 Customer Return Rate

**Product Line 2
Customer Return Rate
Based on 2002 baseline = 1.0**

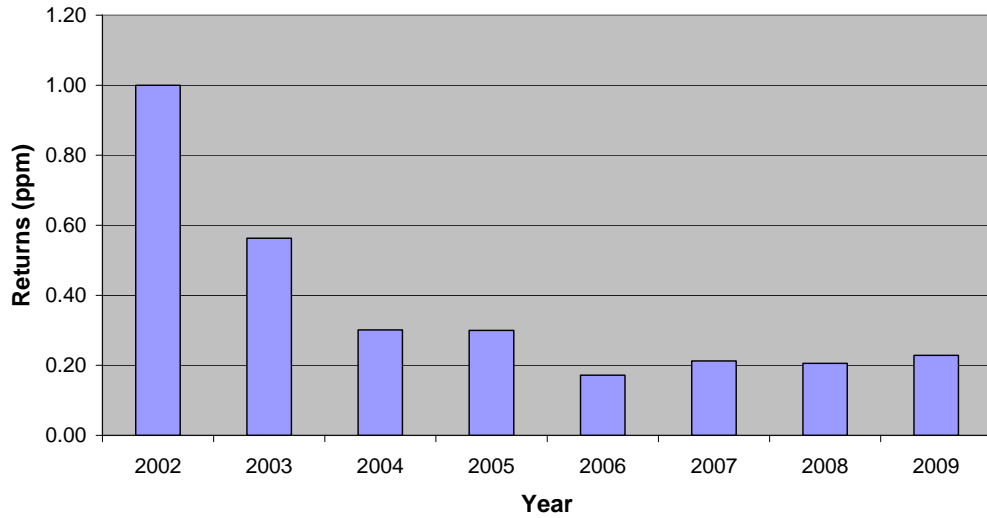


Exhibit 3 - Product Line 2 Customer Return Rate

**Top Strengths for National Conduit Quality Group
Results from Strengths Finder 2.0**

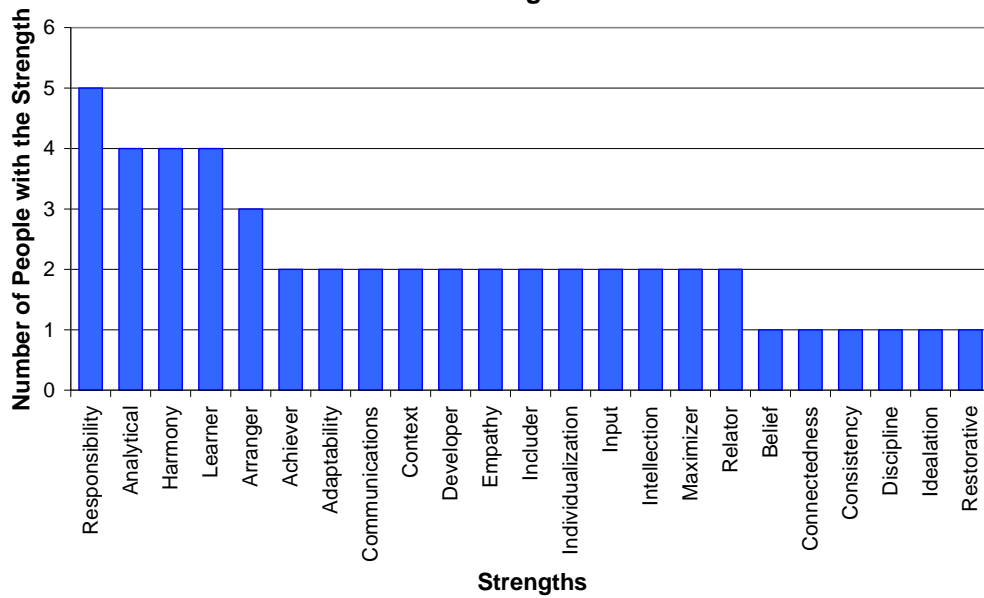


Exhibit 4 - Quality Team Strength Finder Results

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"> • Extensive knowledge of plant systems • Diversity in age, sex, interests, and skills • Good working relationship among team members • Team members are open to discussion and debate • Strong analytical skills • High experience level: 2 team members with less than 5 years at plant, 8 team members with greater than 10 years at plant • Positive relationship with shop floor operators • Data rich environment 	<ul style="list-style-type: none"> • No clear goal to quality • Quality Architecture plan is 8 years old • Not fully utilizing Six Sigma • Don't engage other groups well • Quality objectives not linked to other groups' objectives • High maintenance of business impedes project work • Lack of resources to implement preventative actions • Quality viewed as a hindrance rather than a help by some in management • Lack of efficiency in completing projects and tasks • Information management – unable to fully leverage Engineering changes, reject data, customer complaint data, etc. • No sense and feel of the customer requirements • Dependent on many other groups to accomplish tasks 	<ul style="list-style-type: none"> • Advances in measurement and control systems • Learning from other divisions and plants • Formation of a new divisional engineering group • New approach to Built-In Quality is supported at the VP Level • Manufacturing reorganization places all plants under a single boss • Push to move from inspection-based quality to error-proofing • Project support and interaction with other groups • Increase in customer return rate 	<ul style="list-style-type: none"> • Perception that Quality is not value-added and that Lean Manufacturing is the only future • Limited technical career path for Quality personnel • Cost reduction is key to business, but Quality is seen as an ISO requirement • Management metrics do not always support quality (productivity, on-time shipments, scrap, etc.) • Plant management believes over 30 personnel must be cut from fixed costs over next 5 years • Most easy quality improvements are done, requiring increasing effort to make improvements • Upcoming system conversions

Exhibit 5 - SWOT Analysis of Quality Team

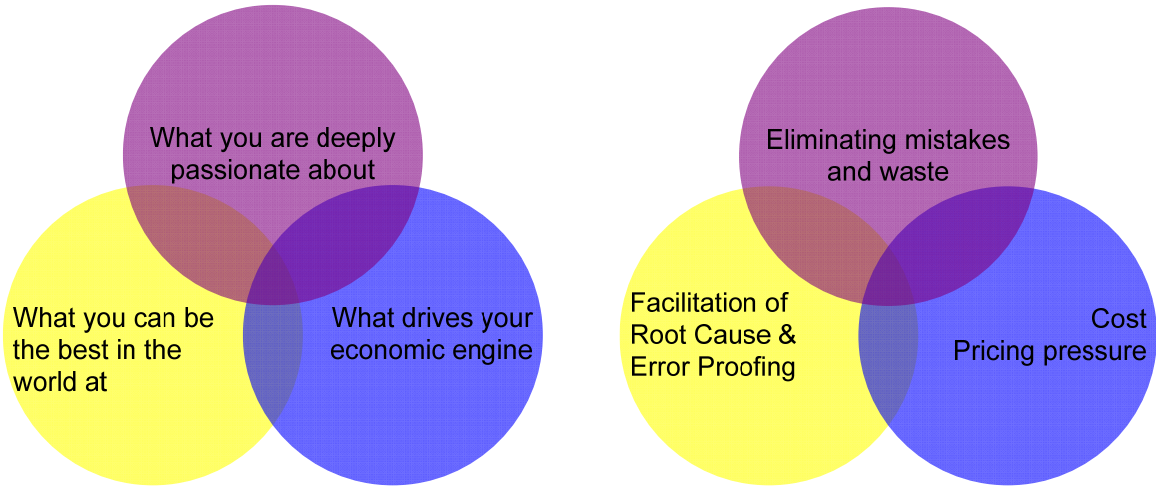


Exhibit 6 - Three Circle of Hedgehog Concept for Quality Team

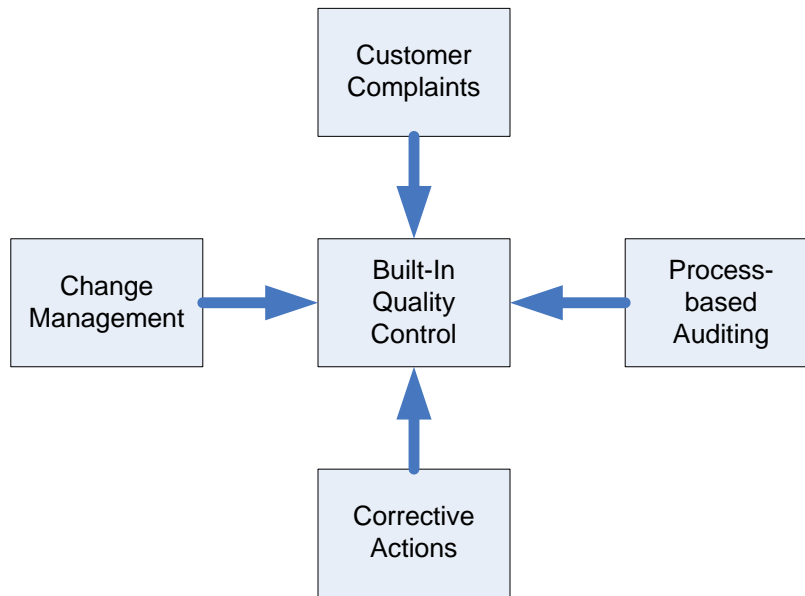


Exhibit 7 - Support of Built-In Quality Control

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Glossary

Attorney-client privilege – a term used by the Plant 1 Quality team that refers to how the Quality team treats conversations with Production operators. Based on the legal concept where communication between an attorney and his client is considered confidential, the Quality team maintains confidentiality on information provided by Production operators. This technique allows operators to approach the Quality team with issues without fear of reprisal or discipline.

Black belt – Six Sigma term for an individual with advanced understanding of the Six Sigma methodology and advanced understanding of statistics, and who provides direction and technical advice to improvement teams

Cycle time – National Conduit's term for the time between initiating the production of a given order until that order is in final inventory

Design of experiments – a statistical method for setting up a manufacturing experiment with controlled input variables and identified responses

First-pass yield – National Conduit method for measuring the yield of a process, defined as a percentage of the number of pieces manufactured without a reject divided by the total number of pieces manufactured in a given process

Green belt – Six Sigma term for an individual trained in the Six Sigma methodology and basic statistics who leads improvement teams

Maintenance of business – National Conduit term for repetitive business tasks that are required to keep the business running, but are not part of a continual improvement project

Plant staff – National Conduit’s generic term for all direct reports to the plant manager

Quality circles – Kaoru Isikawa’s term for a voluntary, interdisciplinary team that is formed to identify and solve problems

Quality management system – the organizational structure, procedures, processes, and resources needed to implement quality management¹⁰⁴

Six Sigma – “a business process that allows companies to drastically improve their bottom line by designing and monitoring everyday business activities in ways that minimize waste and resources while increasing customer satisfaction. Six sigma guides companies into making fewer mistakes in everything they do – from filling out a purchase order to manufacturing airplane engines – eliminating lapses in quality at the earliest possible occurrence.”¹⁰⁵

Voice of the Customer – collective insight into customer needs, wants, perceptions, and preferences gained through direct and indirect questioning¹⁰⁶

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²⁰ Eliyahu M. Goldratt, The Goal, 2d rev. ed. (Great Barrington, MA: The North River Press, 1986), 297.

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²² Ibid., 74.

²³ Ibid., 118-120.

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²⁵ Collins, 169.

²⁶ Marash, Berman, and Flynn, 140-155.

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³² Collins and Porras, 43-45.

³³ Goldratt, The Goal, 297.

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⁴⁶ Ibid., 92-96.

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