Reduce Defects per Million by As Much As 96% with Continuous Improvement

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TraceLink Agile Process Teams for Supply Chain Issue Management (APT-SCIM) provides a digital foundation for continuous process improvement through methodologies like Six Sigma and Lean by providing a systematic approach to issue management. At the core of this approach is the capability to enable internal users and supply chain partner users to log all issues, as even small issues can lead to a major supply chain disruption.

Companies using APT-SCIM in combination with the 5-step Six Sigma DMAIC process improvement methodology have reduced defects per million by as much as 96%.

An example of this played out in March 2021 when a factory worker attached the wrong ingredient canister to the wrong machine. As a result, 15 million doses of COVID-19 vaccine had to be destroyed and this small incident propelled two companies into the global news. The follow-up investigation found that because of this lack of attention to good manufacturing practices, an additional 60 million doses needed to be destroyed—more than enough to vaccinate any one of the entire populations of 215 countries! All of this could have been prevented if all operator incidents on the factory floor were reported and addressed through a

continuous improvement program to identify the root cause and put better practices in place.

Six Sigma is one of the most widely used continuous improvement methodologies and core to its success is statistical measurement of potential and real incidents—measured in defect per million opportunities (DPMO), and generally abbreviated to defects per million (DPM). Every step in the supply chain process is a DPMO, as every step in the process represents potential “defects” in the supply chain process. Defects are defined as anything that causes the failure to deliver a quality product on-time, in-full (OTIF) without unnecessary additional cost. Achieving a Six Sigma product and process quality level means reducing defects to 3.4 out of a million, or a 99.9996% quality level.

Many manufacturers are content to operate at the Three (23K DPM) or Four Sigma (6.2K DPM) level. For example, a product with 50 components and a 10-step manufacturing process that is made in quantities of 100K per month creates more than 50 million defect opportunities per month—a manufacturer does not have to be large to reach high DPM levels. In this example, a manufacturer operating at a Four Sigma Level, or about a 99.3% quality level, would generate 310,000 defects! At the Six Sigma level it would be 170 defects or 99.94% reduction in DPM.

Improving from Four Sigma to Six Sigma does not happen overnight. Companies that achieve Six Sigma set milestones for both the identification of actual defects and goals for the continuous improvement projects designed to reduce DPM. Companies using APT-SCIM in combination with the 5-step Six Sigma DMAIC process improvement methodology have reduced defects per million by as much as 96%.

APT-SCIM guides users through a progression of easy-to-use, configurable dropdown lists to capture a complete definition of the issue. A financial impact field enables managers to assign a financial value to the issue to measure the consequences of not resolving the issue and prioritize Six Sigma projects. With this

rigorous definition and quantification of the issue, APT-SCIM supports the first two steps in the DMAIC methodology—define and measure. The system also builds a history of issues, resolutions, root causes, and recurring problems which enables more measurement and analysis to support the third step of DMAIC: analyze.

The recurring problems and issues with high financial impact discovered during the analyze step are good targets for process improvement projects. The ability to collaborate with supply chain partners during the resolution processes further enriches the information collected. This information supports corrective and preventive actions (CAPA) developed to improve the process supporting the "improve" step of DMAIC.

Once processes are improved, APT-SCIM provides dashboards to monitor these processes to ensure that issues do not recur. For process improvements that impact multiple supply chain partners, the process network capability of APT-SCIM enables precise monitoring of a group of supply chain partners. This supports the final step of DMAIC: control.

In one case study, a TraceLink customer used APT-SCIM to track and resolve all business processes and quality defects. At the beginning of the APT-SCIM deployment, they determined that they were operating slightly below the Four Sigma level with 8.4K DPM. By methodically logging these defects, collaboratively resolving issues and executing DMAIC process improvement projects over a four year period, they achieved the Five Sigma level with 200 DPM or a 96% reduction in DPM.

The business impact of a 96% reduction in DPM is even more important as it enabled a 97% reduction in manufacturing disruptions and an 82% improvement in customer delivery performance. Financial metrics including a reduction in the cost of goods sold (COGS) and improved revenue were also achieved, but these results are subjects of other blog posts.

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