Chemtech Reduces Rework by 50% Through Company-Wide Process Improvement Capability Program Using CMMI®

Company Background

Chemtech develops engineering projects and high-end industrial IT solutions for industrial ventures worldwide. Headquartered in Rio de Janeiro, Brazil, the company excels in major venture projects, such as pre-salt platforms, refineries, and other industrial plants around the world.

As a member of the Siemens group, Chemtech operates in the oil and gas, chemical and petrochemical, metals and mining, gas and energy, power generation, transmission, and distribution industries.

> **❝ With the CMMI, the entire team overcame challenges and created new tools and standards, developing a new state-of-the-art process for software development.❞**
>
> –CARLOS HENRIQUE NOVAGA ALVES, GENERAL MANAGER FOR INDUSTRIAL IT SOLUTIONS, CHEMTECH

THE BUSINESS NEED

Chemtech wished to implement a process improvement program across four of its locations. Previously, each office had in place its own processes, tools and templates, terminology, and project management methodology. Every time there was a need to share resources among projects and sites, a lot of effort was spent exchanging knowledge; and there was a huge learning curve for all involved. In addition, there were no standardized metrics to compare each site performance and project quality. Although Chemtech had previously implemented an ISO 9001 process for project management and quality control, only a few project management tools were shared across the organization. The company believed that by unifying knowledge from these separate offices with CMMI, project managers would be able to share knowledge, resources, and best practices.

Overseeing this effort was the company's industrial IT business line, responsible for all process automation, operational intelligence, cybersecurity, network infrastructure, and software development projects within the company. It has more than 100 employees, and today represents almost 40 percent of Chemtech's total size and annual revenue.
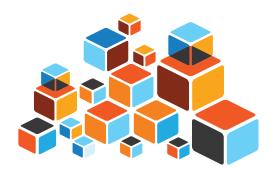
The project had four business goals:

- Review and improve all technical and project management processes within the organization.

- Leverage the industrial IT technical and management knowledge throughout all Chemtech locations.

- Improve product and project quality.

- Reduce the company's rework and non-compliance costs (NCC).

The project management process also needed to be integrated with Siemens PM@Siemens methodology, which is a global standard for all Siemens business units and companies.

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THE SOLUTION

The organization deployed CMMI for Development, version 1.3 (CMMI-DEV, V1.3), for this program. This model provides a comprehensive, integrated set of guidelines for developing products and services. It is useful for anyone interested in process improvement in a development environment.

During Chemtech's CMMI implementation, the team used the "thinking outside the box" model, investing time to accomplish the following:

- Rethink process value
- Develop automation tools that could speed up the process
- Reduce rework
- Take advantage of leading and new technologies available on the market to increase product quality and traceability

RESULTS

Chemtech initially integrated and leveraged a unified development process at four of its locations using CMMI. This approach let the entire team work with standard tools and processes, communicate with the same terminology, and easily trade resources for other projects and industry segments.

The ISO 9001 processes employed by Chemtech covered approximately 62 of the quality and project management practices in CMMI-DEV. CMMI-DEV provided an additional 70 practices that resulted in a development process that thoroughly addressed the engineering, management, and quality aspects of the development life cycle.

The company has since applied processes to help it achieve a CMMI Maturity Level 3 rating at all of its locations. The CMMI-DEV has enabled Chemtech to revise its tools and templates, and during the first six months of implementation of the more capable process it reduced rework by almost 50 percent through new automation technologies. Chemtech also became more efficient and competitive in the market while increasing customer satisfaction and product quality.

BUSINESS BENEFITS

Increased product quality.

The overall number of non-conformities identified on project deliverables has been reduced by 50 percent following the adoption of the CMMI model. The team now has an updated and consolidated view of all the processes, and has a better understanding of the tools, templates, and artifacts to use during project life cycle. For example, a verification and validation automated process has been implemented, which includes new automated checklist and automatic code inspection techniques.

Increased productivity.

Through the use of automated processes and tools, the team is now able to create and validate documents in a faster and more standardized way. Using checklists and automated workflows, Chemtech reduced document review time by 20 percent. It is also effectively reusing components and artifacts across different projects.

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Reduced costs.

By implementing new processes and tools for automated continuous integration (CI), automated testing, and code inspection techniques, Chemtech was able to reduce its development costs and increase its project margins. Additionally, the cost performance index (CPI) was improved and number of delayed projects decreased.

Reduced rework.

Non-compliance costs (NCC) include scope deviation, organizational changes, and effort estimation deviation. Chemtech has successfully achieved a reduction of NCC after just six months of CMMI deployment, which is a saving of almost $400,000. Better methods are in place for understanding and tracking user, functional, and non-functional requirements throughout the project life cycle, which have provided the necessary tools and documentation to reduce rework due to misunderstanding of requirements during the development, testing, and deployment phases.

Estimation assertiveness.

With Chemtech's new standard estimation process, different sites can estimate project size and effort based on predefined templates and metrics, enabling the sales team to quickly respond to proposal requests.

"The entire team overcame challenges and created new tools and standards, developing a new state-of-the-art process for software development," said Carlos Henrique Novaga Alves, general manager for industrial IT solutions at Chemtech. "This has provided a unique opportunity for the team to rethink the way our process is executed—from gathering requirements to increasing productivity. The deployment of the CMMI was also a way to leverage process knowledge amongst all collaborators, training the entire team on the new process and tools while creating a new standard of work."

LESSONS LEARNED

Companies intending to implement the CMMI should consider investing in process automation. They should also invest in training for teams so that they might better understand the business value of each CMMI requirement and how it affects project quality and performance. This approach could also help them envision new tools for fulfilling model requirements in an innovative and cost-effective way.

> **CMMI has helped us to systematically organize our software development process areas, structuring them based on the CMMI process areas and focusing on already identified gaps in our system. Each process area's requirements were reviewed; and the process and related tools were redesigned, focusing on user ability, rework reduction, and automation of repeatable tasks.**
>
> –RAFAEL ANICET ZANINI,
> PROJECT MANAGER, CHEMTECH

About CMMI® Institute

CMMI® Institute (**CMMI**institute.com) is the organization behind the Capability Maturity Model Integration (CMMI), the globally-adopted capability improvement framework that guides organizations in their journeys to achieve high maturity in their performance. CMMI Institute is the global leader in the advancement of best practices in people, process, and technology. The institute provides the tools and support for organizations to benchmark their capabilities by comparing their operations to best practices and identifying performance gaps. For over 25 years, thousands of high-performing organizations in a variety of industries, including aerospace, finance, health services, software, defense, transportation, and telecommunications, have earned a CMMI maturity level rating to benchmark their performance and prove they are capable business partners and suppliers.

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