Case Study

Hitachi Rail Integrates CMMI® Performance Solutions Throughout Their Improvement Journey to Improve Efficiency, Customer Satisfaction, and Sustainable Growth

The Business Need

Hitachi Rail began their CMMI journey in 2008 and continues their continuous improvement efforts to better achieve business objectives and increase customer satisfaction. They understand the value of the CMMI model and appraisal methodology to achieve those goals. Specifically, Hitachi Rail used their most recent appraisal to help them:

- Improve Lines of Business (LoBs) governance
- Improve conformance for the whole lifecycle of products and services to quality and safety requirements, standards, and company procedures with a common organization at the product and service level
- Ensure customer expectations and contractual quality requirements are met, verifying their application for all the project phases
- Maintain project profitability
- Establish a mindset of measuring performance and learning from experience to improve effectiveness and efficiency

The process monitoring is based on KPI management: these KPIs and associated targets are business-oriented and reflect performance for the Hitachi Rail Control worldwide organization, and deal with processes effectiveness and efficiency. Measurement and analysis of the following business objectives by KPIs were implemented to:

- Reduce defect density
- Monitor and reduce design specification rejection
- Reduce software (SW) defects
- Reduce manufacturing (hardware) loss cost

Company Background

Hitachi Rail is connecting the future of mobility—helping every passenger, customer, and community enjoy the benefits of more seamless, sustainable journeys. The company's pioneering technology enables more than 18 billion passenger journeys every year and helps to safely transport millions of tons of freight. As a trusted partner to operators around the world, Hitachi Rail delivers every part of the railway, from manufacturing and maintaining high-speed bullet trains to digital signalling infrastructure and more.

Hitachi Rail is delivering value for its customers through Digital Transformation. The company's new Smart Mobility and Digital Asset Management solutions are cutting costs, carbon, and congestion while offering more choice and convenience to passengers than ever before. Hitachi Rail is becoming a climate change innovator by innovating greener products with its customers—such as battery trains, and through its commitment to reduce its own CO2 emissions to net zero by 2030.

For more information, go to **hitachirail.com**

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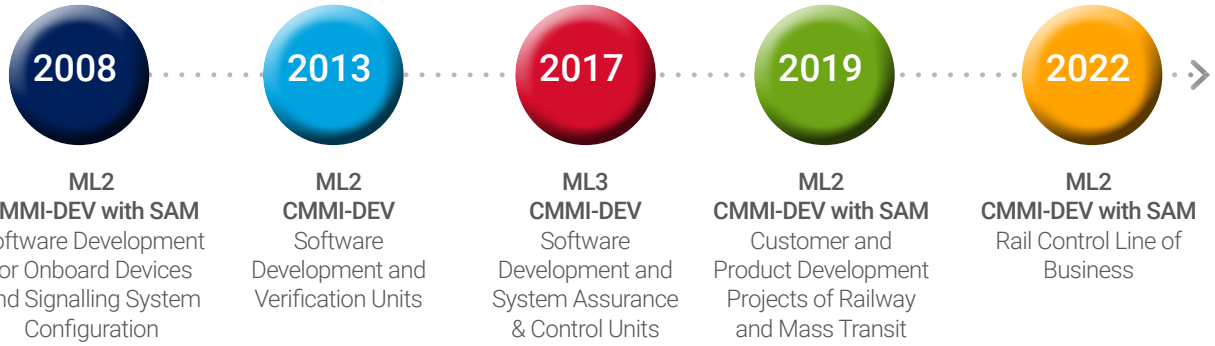
Hitachi Rail's Maturity Level Milestones

Hitachi Rail's CMMI journey over the years, includes extending its appraisal scope from software to hardware at system level, adding multiple departments and a greater number of people involved.



2008
ML2
CMMI-DEV with SAM
Software Development for Onboard Devices and Signalling System Configuration

2013
ML2
CMMI-DEV
Software Development and Verification Units

2017
ML3
CMMI-DEV
Software Development and System Assurance & Control Units

2019
ML2
CMMI-DEV with SAM
Customer and Product Development Projects of Railway and Mass Transit

2022
ML2
CMMI-DEV with SAM
Rail Control Line of Business

The Solution

The CMMI Development (DEV) domain was selected because its integrated set of best practices improves performance and key capabilities for organizations that develop products, components, and services. Some Hitachi Rail contracts (primarily in the US and Taiwan) require they achieve at least CMMI Maturity Level 2 to demonstrate they have a defined set of processes that are followed at the organizational level.

In fact, the CMMI model is so well integrated into the organization, that it has become their "common language", shared worldwide including in Europe, US, Asia, and Australia.

For their latest appraisal, Hitachi Rail chose to concentrate on these capabilities:

- Ensure Quality
- Design and Develop Products
- Planning & Management
- Maintain Habit and Persistence
- Improve Performance
- Supply Chain Management
- Selecting and Managing Suppliers

"CMMI for Development helped the entire organization understand how processes have a direct impact on performance and the achievement of business goals. It represents a shift in Hitachi Rail's approach to quality and generates positive work habits—pushing managers and engineers to leverage greater insight into the effectiveness of internal practices and models and identify the necessary corrective actions. Adherence to processes, once reviewed with this mindset, is now not a company mandate, but an effective tool to deliver superior products, services, and solutions."

Alfredo Drago, CMMI Assessment Sponsor, General Manager, Global Signalling—Rail Control

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Key Performance Goals Achieved

Throughout their CMMI journey, Hitachi Rail has seen impactful organizational benefits. They include:

- Getting things exactly right for the customer, the first time, and every time
- Creating products that work perfectly and function reliably
- Improving processes that enable them to work more efficiently and effectively
- Raising their operational performance to new heights

Business Objectives	Measurement	Before Improvement	After Improvement	Improvement Action and Benefits
Reduce defect density	Quarterly monitoring of the rate of failed site functional signaling tests with respect to the executed ones	Defect density: 17.17%	Defect density: 15.73%	**Benefit:** • Provided cost/benefit and ROI related to the defectiveness of components Life Cycle • Customer satisfaction **Improvement:** • More focus on process efficiency vs. effectiveness (pursuing the right goals and efficiency (high-ROI, cost-efficient)) • Peer Review should be more effective at system engineering
Monitor and reduce design specification rejection	Achieve design specifications approvals with no more than 2.5 cycles of submissions and review	KPI stable and within the internal acceptance threshold		**Benefit:** • Provided cost/benefit and ROI insight needed on how detailed we should design • Customer satisfaction **Improvement:** • More focus on process efficiency vs. effectiveness (pursuing the right goals and efficiency (high-ROI, cost-efficient) • Peer Review should be more effective at design level
Reduce software (SW) defects	Monthly measurement of the effort spent to fix SW issues vs. total development effort	KPI stable and within the internal acceptance threshold		**Benefit:** • Provided cost/benefit and ROI insight needed on how detailed we should design software • Customer satisfaction **Improvement:** • More focus on process efficiency vs. effectiveness (pursuing the right goals and efficiency (high-ROI, cost-efficient) • Peer Review should be more effective at software level
Reduce manufacturing (Hardware) loss cost	Ratio between value of loss costs vs. the MFG output monthly actuals	Loss cost: 0.8%	Loss cost: 0.6%	**Benefit:** • Provided cost/benefit and ROI insight needed on how detailed we should design hardware • Customer satisfaction **Improvement:** • More focus on process efficiency vs. effectiveness (pursuing the right goals and efficiency (high-ROI, cost-efficient) • Peer Review should be more effective at hardware level

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Lessons Learned

The CMMI model and emphasis on best practices have enabled Hitachi Rail to build, improve, and compare key capabilities that address Hitachi Rail Control business challenges. CMMI has improved Hitachi Rail's capability to develop quality products and services that meet the needs of customers and end users by identifying and correcting internal inefficiencies and reshaping their internal processes, making them an effective instrument for quality enhancement and customer satisfaction. Their recent appraisal helped Hitachi Rail: Improve time to market; improve product quality and reduce defects; lower loss costs; and improve planning and budgeting.

Because of Hitachi Rail's years-long CMMI journey, they understood it was important to evaluate their current processes and capabilities against the CMMI model, specifically focusing on their key business objectives. Their established Quality Management System (QMS) continued the relevant measurement and analysis for the organization, collecting reports and feedback, allowing governance to operate effectively and efficiently to achieve their stated goals. Their adoption of a process approach methodology that identifies entry criteria, input, tasks, verification, output, exit criteria (EITVOX model) has facilitated and improved the communication and common understanding of the processes and the associated benefits towards the achievement of business objectives. **By integrating CMMI into their improvement journey, Hitachi Rail continues to achieve enhanced efficiency, customer satisfaction, and sustainable growth in an ever-evolving business landscape.**

"The Appraisal team, which included internal members with relevant process and product expertise, proactively identified problems and improvement opportunities and noted the relevant findings to help achieve business objectives. This CMMI appraisal methodology, starting from the inside, engages and inspires all of us toward a continuous improvement process culture, enhancing processes, capability, and performance."

Mauro Neri, Appraisal Team Member, Principal Quality Engineer,
Group SHEQ (Safety Health Environment Quality) - Quality Reporting Rail Control

About ISACA

ISACA® (www.isaca.org) is a global community advancing individuals and organizations in their pursuit of digital trust. For more than 50 years, ISACA has equipped individuals and enterprises with the knowledge, credentials, education, training and community to progress their careers, transform their organizations, and build a more trusted and ethical digital world. ISACA is a global professional association and learning organization that leverages the expertise of its more than 165,000 members who work in digital trust fields such as information security, governance, assurance, risk, privacy and quality. It has a presence in 188 countries, including 225 chapters worldwide. Through its foundation One In Tech, ISACA supports IT education and career pathways for underresourced and underrepresented populations.

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