Vegam

MAKING FACTORIES SMARTER
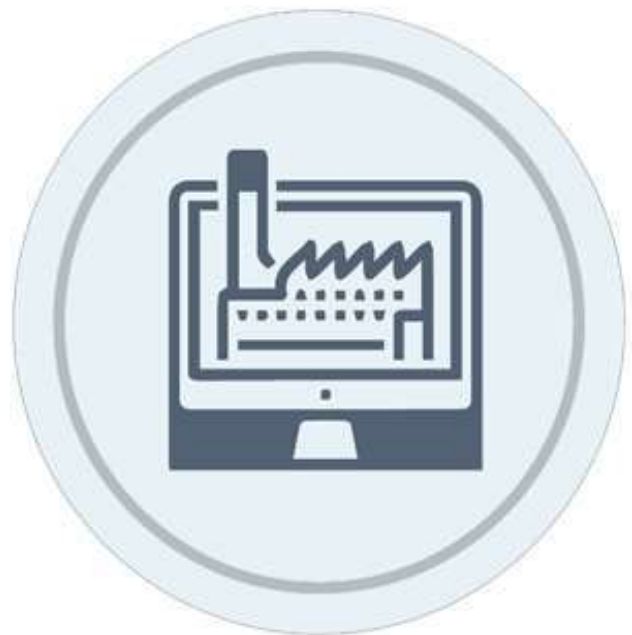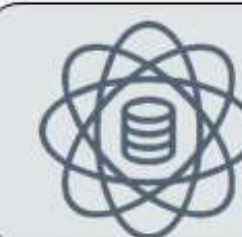
Digital Factories	Industrial IoT	Prescriptive Plant

Industry 4.0

Smart Factory

Data Science

Digital Transformation of Batch & Recipe based Manufacturing Industry (Case Study)

Implementing Vegam SFS (Chemicals) & vDigiTwin

Vegam
Making Factories Smarter

Customer Profile

- **Pioneer in Adhesive technologies**

- **Headquartered in Europe with Annual revenue over 20 Billion USD**

- **Well established IT Team and Infrastructure. Use of industry leading IT tools like SAP ERP, Azure cloud, DCS Systems, PLCs etc.**

- **200 Manufacturing units spread across 60 Countries**
  - Varying maturity (Manual Operations, Semi Automated and DCS Driven Operations)
  - 1000's of Raw Materials & 1000's of Finished Goods (SKUs)

- **Market Segments Addressed**
  - Automotive sector,
  - Metals sector,
  - Packaging & Consumer Goods
  - Electronics & Construction

- **Complex material handling needs**

- **Multi phase, recipe based manufacturing processes**

- **24/7 operations**

Problem Defined by Customer
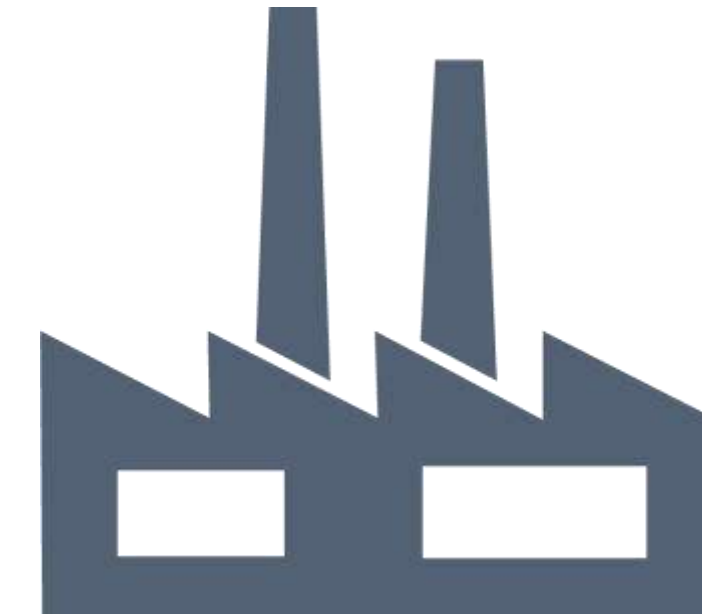
Corporate Level Challenges

- **Transparency over plant Operations**
- **Real time performance dashboards**
- **Local variations or missing standardization in processes**
- **Lack of collaboration**

Plant Level Challenges

- **Lack of transparency over value chain.**
- **Visualize Loses in capacity, productivity and cost**
- **End to end integrated digital system for execution control**
- **Local demands and locally driven optimizations suffer due to rigid SAP constrains.**

Derived Requirements

At Organization Level

- **Real time view of various plants operations**
- **Leverage good practices amongst plants**
- **Impact analysis of Continuous improvements initiatives across plants**
- **Real time and historical KPIs, Hierarchal KPI's with drill down**
- **Sustainability drivers and real-time monitoring across plants**
- **Safety, compliance and adherence to SOPs across plants**
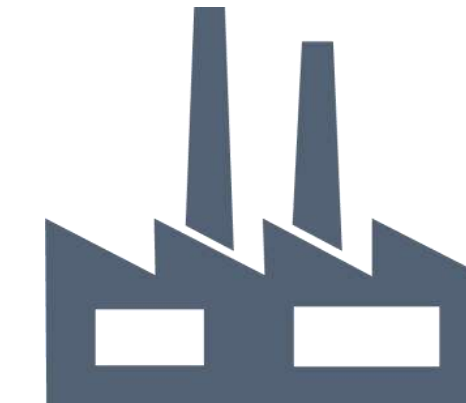
At Plant Level

- **Operate at Full capacity**
- **100% first time quality pass. Zero re-works**
- **Zero delays in delivering to customers**
- **Eliminate Inventory Variance & associated losses**
- **Enable continuous improvement strategies**
- **Known facts - impacting quality, yield and losses**
- **Eliminate customer complaints & respond effectively in case there are any**
- **Get alerts and notifications ahead of issues & failures**
- **Safer plans with Efficient, accurate and safe handling of Materials and Operations**
- **Sustainable operations – Lower utilities & energy**
- **Predictive inputs and prescription recommendations to transform plants into "AI / ML data driven operations"**
- **Consistent quality and yield**

Proposed Solution

- **Centralized or Regional Implementation to digitize all operations of the plants.**
  - **Map work flows & SOPs to digital SOPs**
  - **Enable devices and tracking mechanisms (Mobile, Hand Held, Barcode Scanners)**
- **Make operations Paper Less. Remove all paper based work-flows & transactions**
- **Bring on Smart Sensors, IOT devices for enhanced monitoring**
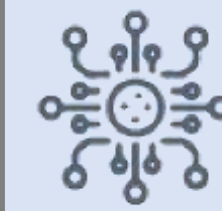
Vegam SFS
"I 4.0" Smart Execution System

- Warehouse
- Quality
- Staging / Kitting
- Manufacturing (Continuous, Batch Discrete)
- Maintenance
- KPIs, Dashboards & OEE Analysis
- Labelling Solution

- **Integrated all Silo Systems & Data. Develop relation references between data**
  - **SAP or ERP**
  - **Quality Systems / LMS Systems**
  - **Warehouse Systems**
  - **PLC , DCS , Sensors**
- **Enable KPIs, Dashboards, Value Stream Reports**
- **Enable access to relation data using API's. Open the data for any AI/ML engine.**

vDigiTwin
Digital Twin

- Integrate all Data Sources
- Unified Data structure
- Real-time visualization
- Simulation
- Performance & Outcome prediction
- AI/ML with Big Data

Why The Need to go Digital

Complex operational requirements and challenges. Each plant, production line, technology etc. has unique variation of operational work-flows & SOPs.

Batch Processing needs along with multiple recipes to produce the same item, results in complex operational challenges.

Tracking raw material lots along with accurate quantities consumed for production of a batch make the shop floor handling of materials human dependent with lots of recording of information. Paper based or log book based entries are bound to fail.

Version control and deployment of changing Recipes and SOPs is very complex. Eradication of paper based controls is mandatory.

Collaboration between departments and its impact on yield, quality and productivity requires unification of information flow across. Too many excels, emails, tools, applications allow for burying of root causes! Elimination of all silo systems and integration is key.

Vegam Approach & Value Proposition

Vegam SFS Platform, is a proven Industry 4.0 solution, that supports complex batch processing manufacturing needs.

Enterprise class, regional solution with security and ease of use for every entity involved.

Modular Architecture with modules supporting every aspect of the operations

- Security, Gate management, Material handling, Quality Control, Staging & Kitting, Production Process, Label Printing, Packing & Dispatch, and Maintenance.
- Connectors to integrate SAP / ERP, PLC , DCS, Printers, IoT, Sensors etc. Scalable Time Series with relation to Process and ERP.
- Each module has pre-developed functionalities to support work-flows, configuration and transaction hooks.
- Each module can be enhanced and customized at plant level, regional level
- Hierarchal KPI's, Dash Boards, Real Time Trends, Alerts, Deviations
- APIs and Interfaces to extend AI/ML systems, predictive alerts, prescriptive production

15+ years of experience working with complex plants and support in digitalization activities. 130+ plants across the globe using Vegam SFS Platform

Successful implementations in plants with varying degree of technology maturity. Manual, Semi Automated to full DCS controlled plants.

What Vegam SFS Offers

End-to-end digitalization solution

- Complete plant digitalization solutions packaged into one.
- Integrated View of Global Operations in Real-time to drives sustainable manufacturing
- We extend our capabilities to the solutions by bringing in IoT capabilities like
  - Real-time alerts
  - Real-time monitoring
  - Visualizations/operational visibility
  - Data analytics

Prescriptive Manufacturing

- Digital SOPs with support for multiple SKUs
- Comprehensive production data right from operations phases, materials, BOM, cycle times to operators responsible
- Paperless operations with real-time data capture and storage
- Analytics ready data with real-time trends and reports
- Ability to take strategic decisions based on data

Productivity Improvements

- Real-time process visibility
- Faster decisions
- Batch traceability
- Warehouse improvements
- Real-time OEE

Operator and operations friendly

- Better inter-departmental communications
- Flexible and adaptable solution
- In-built safety (HSE) information wherever necessary
- Faster decision making
- Better planning and scheduling
- GHS and CLP compliant labelling solutions integrated.

Solution Delivery Approach

Phase	Activity/Deliverables
Assessment Phase	Workshops to understand as-is process for the plants, assess the gaps and custom requirements
	Create blueprint and commercial proposal for implementing Vegam SFS
Implementation Phase	Customisation of Vegam SFS Modules to suit customer specific business requirements
	Deployment of Vegam SFS modules with master data configurations
	Conduct key-user training and provide necessary support for Go-Live
Post Implementation phase	Hyper care support
	Bug fixes warranty
	Optional Vegam's 24x7 support services

Customer Success Story

Strategic Partner across the customers global operations

27 Plants 100% on Vegam SFS Platform & Digital Twin

56 Plants using modules of Vegam SFS Platform

28 Countries spanning all continents

35-100% Increase in productivity with ROI in 12 months

24/7 Support & one hour SLA for Critical Issues

100% Safe Operations. Reduced Accidents

10000+ Complex SOP's and Recipes Supported

Multiple DCS, PLC, IoTs Interfaced
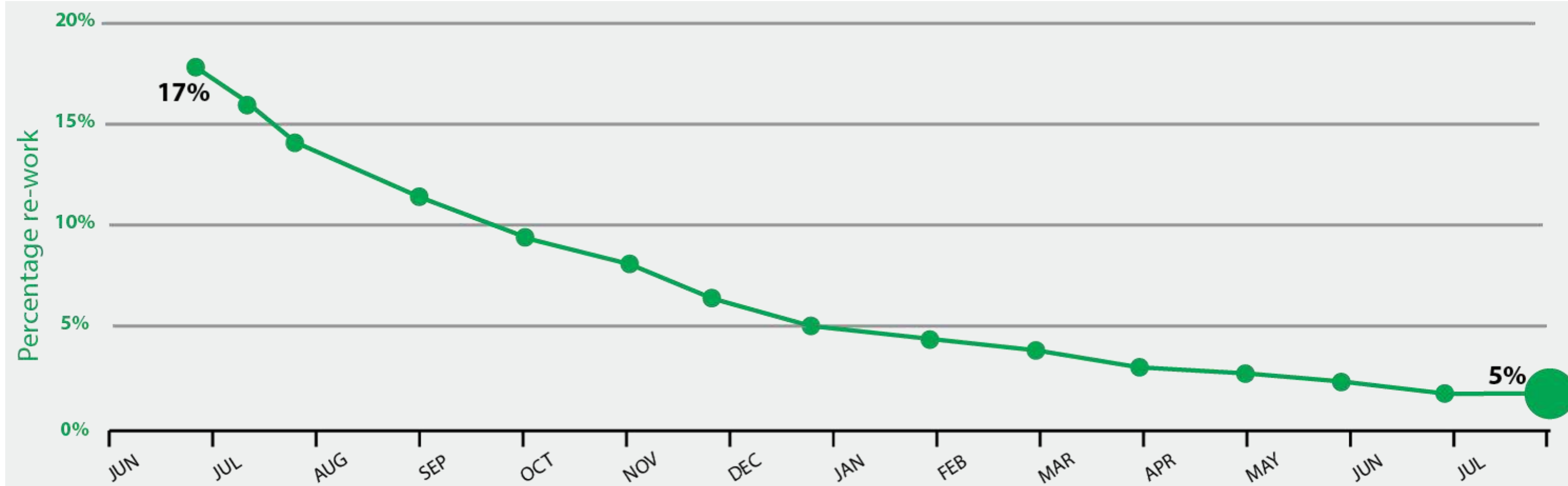
1500 Users on Vegam SFS

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Customer Achievements

Productivity Improvements

In one of the sites, which was handling over 6000 raw materials, efficient raw material handling and adherence to SOP was critical for profitable business.

Quality of production depends on
- Raw material quality
- Adherence to SOP
- Critical process parameters
- Environmental factors
- Resources used
- Changeover process

Average rework on an order was at **17%** before Vegam SFS implementation.

Digital manufacturing -Drivers for enhanced quality of production

- Controlled raw materials usage. Strict FEFO with real time validation
- Transparent Operation with digital record of every phase and step involved. Tighter adherence to SOP
- Integration with IoT Sensors and CCPs with real-time deviations alert - Improved quality
- Accurate batch history and structured data - Enable analytics and Prescriptive manufacturing
- Less re-work on a production order - Better OEE and lesser energy needs.

Vegam SFS platform with **end-to-end digitalization** was able to achieve **100% FEFO,** resulting in **20% reduction** in inventory losses and **40% improvement in Right First Time outputs** resulting in improved quality, better warehouse accuracy and enhanced OEE

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Productivity Improvements

Site	Before Vegam SFS Tons/Day	24 Months After SFS Tons/Day	Increase%
Plant 1	60	128	113
Plant 2	35	69	97
Plant 3	67	95	41
Plant 4	196	340	73
Plant 5	67	115	71

Productivity Improvement of at least 35-40% could be achieved across sites.

Key Drivers

- Reduced Re-works. Increased first time QC Pass
- Adherence to SOPs with accurate RM Batch & Quantity
- Visible Downtime Reasons
- Real time execution control
- Guided production with Minute level time tracking
- Digitalized SOP, MTM and Morning meetings

Cost Saving / Avoidance

- An Improvement in productivity would support cost avoidance as Investment projects related to additional demands can be delayed or avoided. Also the additional capacity can be converted to FTE reduction.

- **All sites shows achievement in productivity within 2-3 months of deployment.**
- **Re-works, QC Rejects reduced significantly**

Warehouse Receiving Cycle Time Reduction

Site	Before Vegam SFS -In Minutes	24 Months After SFS -In Minutes	Reduction %
Plant 1	44	16	63%
Plant 2	16	9	47%
Plant 3	18	5	74%
Plant 4	63	13	80
Plant 5	121	20	82%

Assumption : New Site X
- 30% (min) Reduction in cycle times could be achieved across site.

Key Drivers
- Real time process execution
- Automation of SAP transactions
- Morning Meeting and Daily KPI Monitoring
- Clear accountability

Cost Saving / Avoidance
- A reduction in cycle time indicates capacity to manage additional Volume. All sites shows clear increase in Handling Volume with no additional FTE or reduced FTE.
- Plant 1 – 7 FTE/ 2 Fork Lifts reduced(Volume increase 13%)
- Plant 2 – 1 FTE Reduced (Volume Increase 26%)
- Plant 3 – 2 FTE reduced (Volume increase 19%)
- Plant 4 – 0 FTE Change (Volume Increase 21%)
- Plant 5 – 0 FTE change (Volume Increase 6%)

*Volume increase are mainly due to warehouse consolidation activities done as part of productivity improvements.
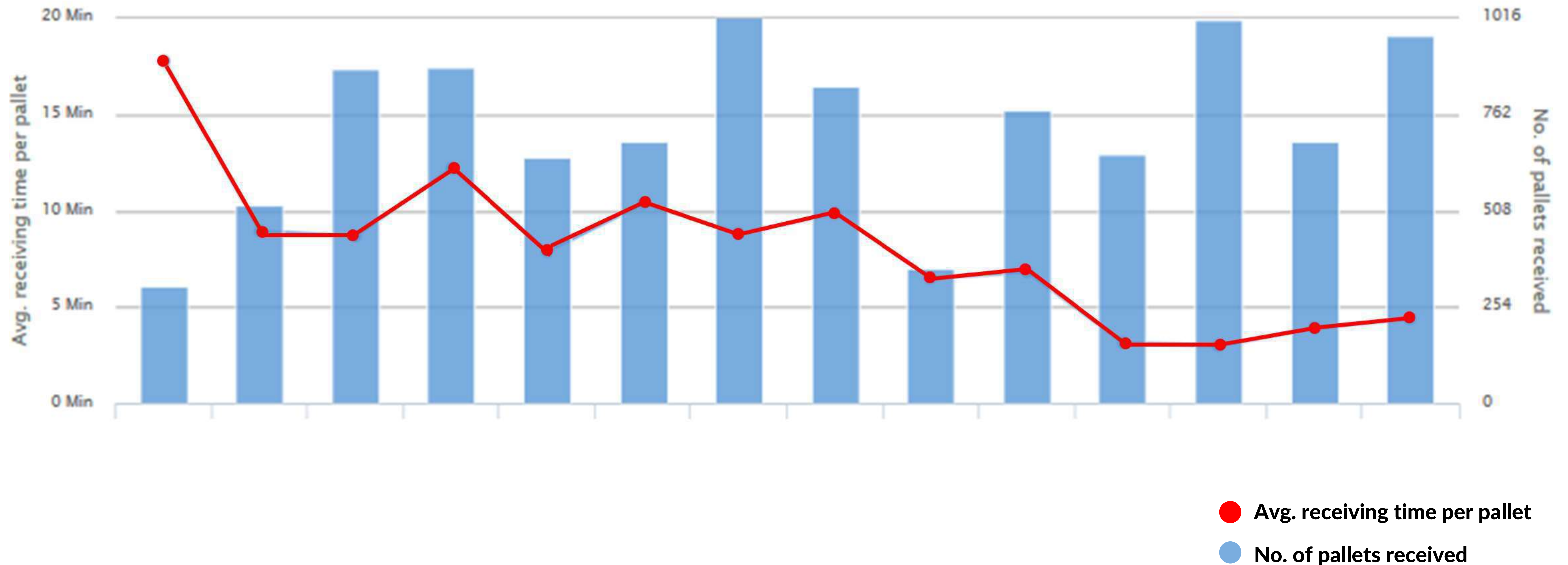
Cycle time reduction achieved across all sites with a strong downward trend within 2 months of deployment.

Receive Cycle

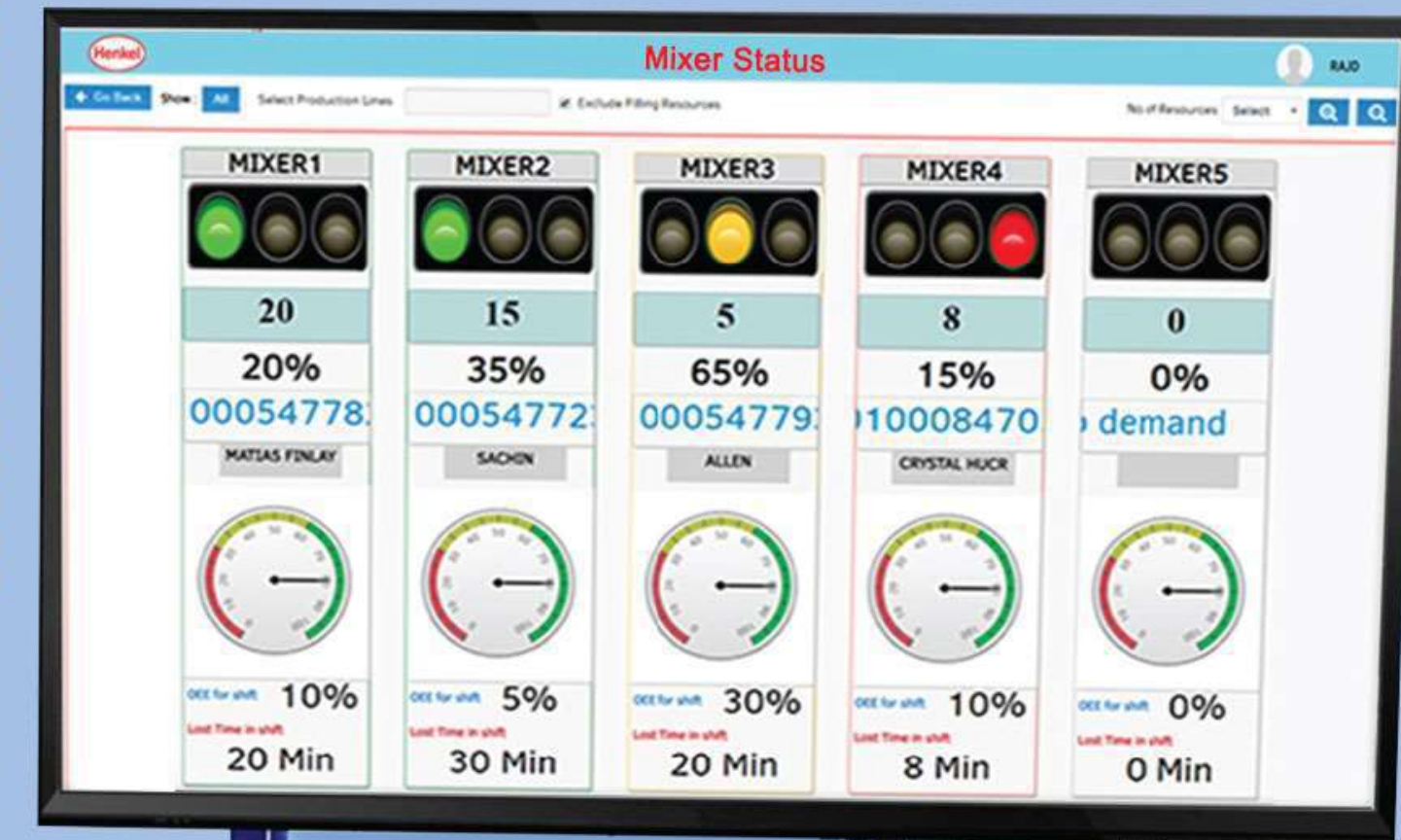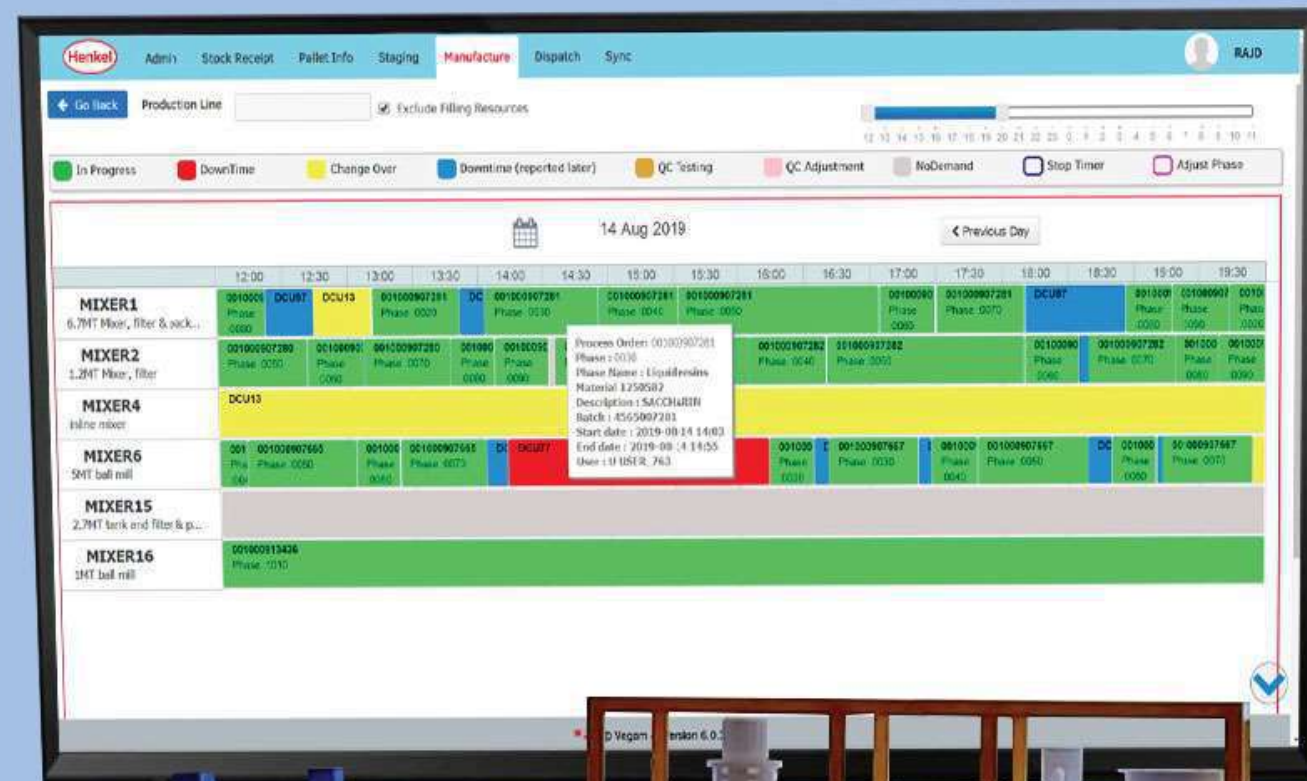**Avg. receiving time per pallet has reduced while no. of pallets received has increased**

Receiving Cycle For Palletized Materials

- ● Avg. receiving time per pallet
- ● No. of pallets received

Vegam SFS Showcased by Client @ Toyota Supplier Meet
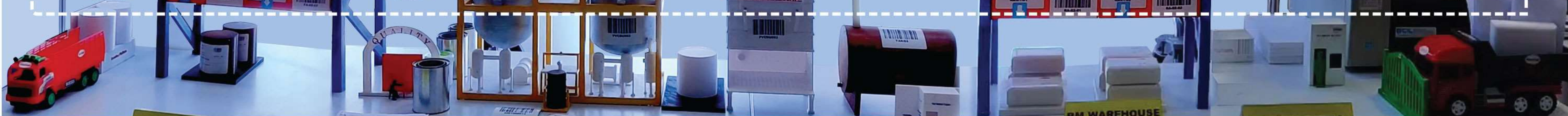
Summary of What Vegam Enabled

Prescriptive Manufacturing

- Enabled the first chemical plant globally to operate recipe-based production in a "Prescriptive Manufacturing" mode. QC Team now works before production starts!
- Production Operations
- Globalized production operations across regions and countries on to the same platform, enabling effective cross-learning of Good Manufacturing Practices
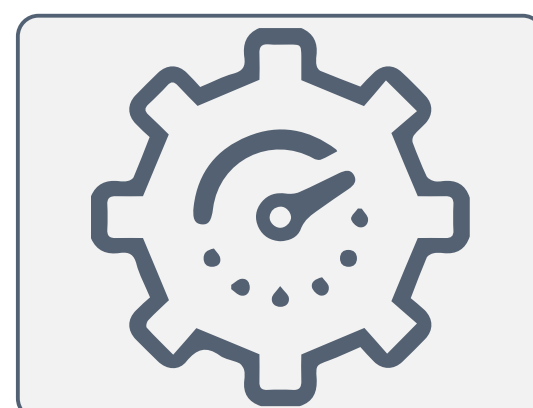
Paperless Factories

Turning one of the largest chemical manufacturing facility into a truly paperless plant in 2011; As of today, 14 plants operate in "Paper-free" Environment
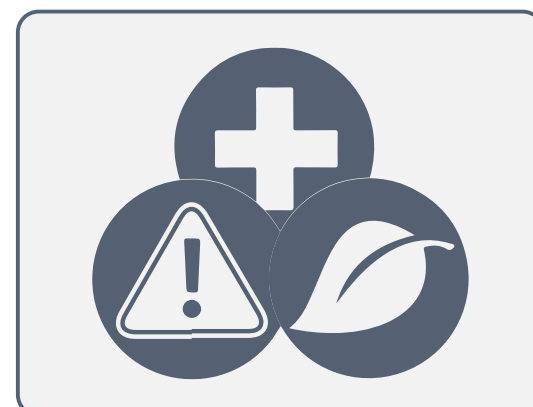
HSE

Enhanced plant and operator safety by eliminating human error in handling dangerous chemicals. Critical accidents reduced from one every six months to zero.
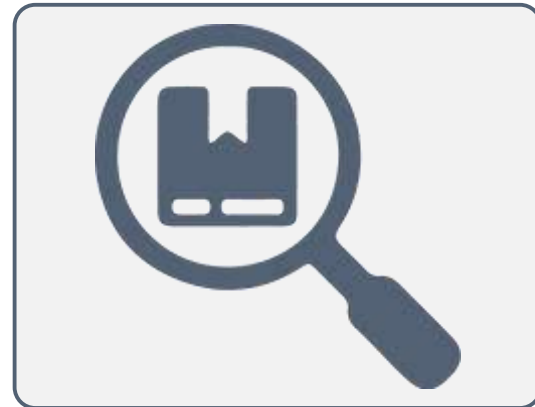
Multi-level OEE

Achieved the first multi-level OEE that looks at OEE in a revolutionary manner, helping assess OEE across processes, instead of just FG

Summary of **What Vegam Enabled**

Traceability

Production history facilitated batch traceability. Production details of old finished goods can also be traced in no time.

Transparency

Inefficiency on the shop floor at each stage can be identified in an instantaneous manner.

Bottleneck identification

Resource level reports help identify bottlenecks in the production process. Eliminating the bottlenecks increase quality and productivity.

Faster Decision Making

Real time metrics help in faster response to any defects leading to production and time savings.

'Whether you refer to it as Industry 4.0, The Industrial Internet,
Smart Factory or business as usual, it is impossible to avoid it.'

Nathan Robinson, CEO of The Leadership Network

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