



















Our Company: CNHi structure

INDUSTRIAL



Our drivers in CNHi





INDUSTRIAL





AGENDA

• WHY WCM?

WORLD CLASS MANUFACTURING

- WHAT IS WCM
- PILLARS
- STRUCTURE
- AUDIT
- NEXT STEP



«Toyota is a wonder, they are the best and will continue to be so. They are the model to follow, we have to find the way to cover the gap between us and them as soon as possible»

> Sergio Marchionne (9 November 2004)



Why WCM







Kaizen Theory

6σ

Lean Manufacturing



MANAGEMENT COMMITMENT = CLARITY OF OBJECTIVES - KPI = ROUTE MAP TO WCM ALLOCATION OF HIGHLY QUALIFIED PEOPLE = COMMITMENT OF THE ORGANIZATION = COMPETENCE OF ORGANIZATION TIME AND BUDGET = LEVEL OF DETAIL = LEVEL OF EXPANSION = MOTIVATION OF OPERATORS



Why WCM





AGENDA

• WHY WCM?

WORLD CLASS MANUFACTURING

- WHAT IS WCM
- PILLARS
- STRUCTURE
- AUDIT
- NEXT STEP

What is WCM

The World Class Manufacturing is a LEVEL OF EXCELLENCE of total logistic/productive cycle. The concepts of CONTINUOUS IMPROVEMENT and TOTAL INVOLVEMENT OF COMPANY are the foundation.

> IT DETECTS WASTE AND LOSSES

IT INVOLVES ALL EMPLOYEES

IT INTRODUCES NEW TOOLS AND NEW METHODS





WCM main goals and principles



What are the main challenges to keep running system organized (different plants, locations, people, culture,...)?



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CHANGE MANAGEMENT

A 7 STEP APPROACH GUIDES REACTIVE TO PROACTIVE ACTIONS FOR EACH TECHNICAL PILLAR





EXPANSION

MODEL



LEAN CAFÉ _ 2021 September 23rd

PLANT

WORK PLACE ORGANIZATION





WORK PLACE ORGANIZATION



Before



After



Engine line



Engine line

INDUSTRIAL

WORK PLACE ORGANIZATION





WORK PLACE ORGANIZATION

Step 2

- MURIMURA
- MUDA



Not Value Added Operations passing fron reworking re-packing ransferring re-loading one hand to the other The T 2. re-stacking placing returning pushing lifting pulling pressing down putting on taking down = ----TID 12 measuring searchin mangin 0.2 E Bselecting shifting piling up taking off dividing - Sec]] watching unfastening adjusti being left over accumulating delaying stopping turning over alking transporting tentative tentative entative tentative placement tentative wi.ing insertion fastening assembly





LEAN CAFÉ _ 2021 September 23rd

hammering

putting together

positioning

picking up

holding

WORK PLACE ORGANIZATION









Outputs Examples





Outputs Examples









PILLARS

WCM Pillars







Logic approach:7 Steps Approach





Safety





To meet operators' requirements, promoting continuous improvement of safety at the workplace.



Safety

Purposes

- Drastically reduce the number of accidents
- Develop a culture of prevention as regards safety
- Constantly improve workplace ergonomics
- Develop specific professional skills

Main Activities

THE WAY WE WORK

- Periodic internal audits of safety
- Risk identification and assessment
- Systematic analysis of accidents
- Technical improvements to machines and to the workplace
- Education, training and control

Expected Results

- Workplaces improvement
- Elimination of conditions for potential accidents
- General SAFETY IMPROVEMENT(ergonomics, noise, ppe's, tools)



Cost Deployment





So that the management can apply an effective improvement plan addressing major causes of losses with maximum effectiveness, applying the most correct methods with the greatest impact.



Cost Deployment

Purposes

- Scientifically and systematically address the main items of loss of the plant production-logistics system
- Quantify potential expected economic benefits direct resources and managerial commitment toward activities with the greatest potential

Main Activities

THE WAY WE WORK

- Localization of losses
 (losses/processes matrix)
- Identification of sources of losses (source of losses/consequences matrix)
- Valorization of losses (source of losses/cost matrix)
- Valorization of expected benefits (costs/benefits matrix)

Expected Results

- Objective knowledge of the main causes of loss
- Improvement of managerial skills towards clear understanding of priorities and planned management of activities and benefits
- Improvement of the ability to plan all the skills necessary for application of the methods chosen
- Analysis of relationships between cost factors, processes that generate costs and the various types of rejects and losses



WCM THE WAY WE WORK

Focused Improvement





To eliminate the main wastes and losses identified previously through Cost Deployment, to avoid dedicating commitment and resources to nonpriority problems and to create know how to attack each specific loss.



Focused Improvement

Purposes

- Drastically reduce major production losses, eliminating process inefficiencies
- Eliminate non-value added activities in order to increase product cost competitiveness
- Develop specific professional problem-solving skills

Main Activities

 Define the activities to be carried out, objectives and resources for project implementation

THE WAY WE WORK

- Train the groups and monitor project progress implement the projects
- Provide the groups with the necessary specialist support
- Certify and actualize results

Expected Results

- A significant reduction of costs through:
 - improvement of overall equipment effectiveness (OEE)
 - reduction of set-up times
 - reduction of waste
 - professional growth and acquisition of the method
 - development of a wide-spread improvement-driven attitude.



Knowledge inventory





THE WAY WE WORK

People Development





- because skills and methods of work are often unable to guarantee error-free operations
- because of shortcomings in the skills assessment and improvement system
- because knowledge and motivation to improve are insufficient to enable the development of the required skills to support the improvement projects



People Development

Purposes

- Provide correct knowledge and skills for each workplace through a structured training system
- Develop the roles of maintenance technicians, technologists, specialists as the main agents of training
- Assure simple, effective documentation of knowledge and operating skills owned and developed that are to be deployed and maintained



- Your bio says you use 400+ tools. How do you ensure proper understanding of all these tools? PD
 - How do you handle training for so many tools and methods (460?)

Main Activities

- Mapping of skills required and possessed
- Analysis of gaps and definition of training plans
- Development of tools (4M, AM tags, OPL...) and training skills
- Setting up of the Training Center with the necessary materials and equipment

Expected Results

- Application of Quality Control for effective process control by operators: improvement of quality
- Good maintenance skills: improvement of efficiency
- Application of Autonomous Maintenance: knowledge and application of cleaning, inspection and lubrication by operators
- Zero human errors: application and deployment of error-proofing techniques (Poka Yoke)
- Reduction of the risk of accidents
- Improvement of climate and motivation





The way to approach – FI,PD,CD





WCM THE WAY WE WORK

Workplace Organization





- Because workplaces, materials and equipment are often downgraded, dirty and untidy
- o product quality is obtained with too many inspections and reworking
- o people's motivation can certainly be improved



Workplace Organization

Purposes

- Improve production efficiency and productivity:
 - restoring and maintaining basic conditions
 - eliminating non-value added
 activities operators involvement
 - improving product and equipment knowledge.

Main Activities

THE WAY WE WORK

- Setting up of the teams, training and preparation for the activity
- Elimination of everything that is not necessary, tidying and cleaning
- Analysis and elimination of non-value added activities
- Improvement of work cycles and of product quality through development of operators' skills

Expected Results

- Elimination of labour and material losses
- Improvement of product quality through application of a sturdy, error-proof process
- Improvement of productivity and process costs reduction
- Ergonomics and safety on the job
- Improvement of climate, motivation and proactiveness





Logistics and Customer Service





- o because stocks of material at the plant are high with heavy financial charges
- because there is a considerable risk of damage and obsolescence also due to the condition of the containers and the need for sequencing
- o because production has to be rescheduled frequently due to shortage of materials



Logistics and Customer Service

Purposes

- • establish JIT conditions inside the plant and with suppliers
- considerably reduce stock levels
- level volumes and production mix and improve line saturation
- **minimize internal handling**, also with direct deliveries by suppliers to the
- o assembly lines
- integrate the sales networks, manufacturing and purchasing

Main Activities

- • application of the Value Stream Map to identify losses and opportunities
- improvement of the internal and external logistics

THE WAY WE WORK

- Definition of a proper material flow feeding: JIS, JIT, internal sequencing, etc.
- Definition of a proper material call off system: from patrolling to kanban, call off, bom,...)
- redesign packaging systems
- deployment of the main materials handling methods (synchronous JIT, Kanban, two bins system, FIFO, shared external transport, etc.)

Expected Results

- prompt filling of orders Level of service and delivery Quality
- reduction of stocks and work in process
- o reduction of damage and obsolescence of materials
- o improvement of plant logistics skills



WCM THE WAY WE WORK

Autonomous Maintenance





because equipment is often in deteriorated conditions
 because machine efficiency does not comply with objectives
 because people's mativation can containly be improved

o because people's motivation can certainly be improved



Autonomous Maintenance

Purposes

- Improve the global efficiency of the production system:
 - stopping accelerated deterioration and restoring and maintaining basic conditions
 - involving people
 - improving product and equipment knowledge.

Main Activities

 Creation of the teams, training and preparation for the activity initial cleaning (cleaning for inspection and for knowledge)

THE WAY WE WORK

- Elimination of sources of contamination and inaccessible areas
- Definition and application of efficient, sustainable cleaning, inspection, lubrication and re-tightening cycles
- Improvement of inspection methods through development of operators' skills
- Focus operators' activities also through product quality control

Expected Results

- Improvement of overall equipment efficiency (OEE) and of product quality
- Extension of the useful life of the equipment
- Improvement of climate, motivation and proactiveness



WCM THE WAY WE WORK

Professional Maintenance





- because there is a high number of breakdowns
- o because no systematic Preventive Maintenance activities are carried out
- because stoppages are seldom analyzed
- o because there is little cooperation between operators and maintenance staff



Professional Maintenance

Purposes

- Increase machine efficiency (increase MTBF - reduce MTTR) by improving maintenance skills and using Fault Analysis techniques
- Facilitate cooperation between operators and maintenance staff in order to achieve Autonomous Maintenance objectives

Main Activities

- Deployment, control and breakdowns analysis
- o Improvement of maintenance staff skills
- Improve Planned Maintenance schedules to reduce costs

THE WAY WE WORK

- Support of operators engaged in Autonomous Maintenance (elimination of tags and improvement of cleaning, inspection and lubrication skills)
- Application of new maintenance techniques

Expected Results

- o Reduction of machine breakdowns
- Improved Overall Equipment Effectiveness (OEE)
- Increase in the percentage of Planned Maintenance
- Definition of a Preventive Maintenance plan
- o Motivation and professional growth of maintenance staff
- Improved cooperation between operators and maintenance staff



Quality Control



WCM

THE WAY WE WORK



- because customer satisfaction is not appropriate
- o because sometimes faulty products reach customers
- o because reject and reworking costs are high



Quality Control

Purposes

- Guarantee product quality for customers, minimizing costs
- Define production process conditions able to prevent occurrence of nonconformities
- Maintain the conditions defined in order to guarantee conformity in time
- Improve operators' problem solving knowledge

Expected Results

- Improved customer satisfaction
- A significant reduction in defects, rejects and reworking and therefore in the costs of non quality
- Deployment of quality improvement skills
- Increase in product quality improvement proposals



Main Activities

Deployment of defects, reworking and rejects in order to analyze the origin of non -conformities (QA matrix)

THE WAY WE WORK

- Definition of operating conditions able to guarantee the quality desired and process capability (QM matrix)
- Set-up, training and management of improvement teams
- Compilation of the X matrix and definition of Q
 Points and of prevention and maintenance cycles (capital-intensive areas)
- Definition of Standard Operating Procedures SOP (labour-intensive areas)



Early Equipment Management & Early Product Management





- because new equipment start-up times are often longer than expected
- because equipment is not designed to optimize operational running costs
- Because it's extremely important to minimize the cash spent and reduce the time to market
 - Because it's important to reach for the goal of a world class product launch through cross-functional teamwork



Early Equipment Management & Early Product Management

Purposes

- Start new equipment in the defined time
- o Guarantee fast, stable start-up
- Reduce Life Cycle Cost (LCC)
- Design equipment that is easy to operate, maintain and inspect
- For EPM the focus is the continuous improvement to current products.

Expected Results

- o Reduced life costs of the equipment
- o Reliable, maintainable, accessible, easy to operate, inspect, clean, low noise equipment
- o Definition of economically sustainable Preventive Maintenance cycles in the design phase
- Fast set-up and start-up
- High product quality





How do you involve engineering/design area into the WCM activities?

Main Activities

- Formal insertion of EEM in the product development process through specific design reviews
- Definition of quotes and specifications of supply consistent with user's needs (operation, maintenance, inspection, disposal)
- Co-design initiatives
- Knowledge management building for EPM
- Utilizing front loading, moves to preventive and proactive
- Design standards and checklists guide the preventive and proactive improvements.

WCM THE WAY WE WORK

Environment & Energy





 To meet the needs of operators and of civil society, guaranteeing correct management of the environment



Environment & Energy



Did not see any mention of commitment to Net Zero or Circular Economy as part of the elimination of waste. Do you have such a policy?

Purposes

- Comply with environmental management e requirements and regulations
- Develop a culture of prevention as regards the environment
- Continuously improve the conditions of the working environment, also over and above regulatory and legal obligations

Main Activities

- Periodic internal audits on the impact of the factory on the surrounding environment
- Identification and prevention of risks
- Application of ISO 14000 standards
- Technical improvements to equipment
- Training, education and control

• Develop specific professional skills

Expected Results

- Reduction in energy consumption
- Reduction in the generation of polluting substances and noise
- Increase in the amount of material recycled
- Improvement of the working environment
- o Elimination of the conditions for potential environmental accidents





How can we apply these concepts? What is the structure and organization?

180

SIRUG

t

WCM Association Members





EVALUATION MECHANISM

Change Management

Audit and Assessment System





Audit System

TECHNICAL PILLARS

- 1. Health & Safety
- 2. Cost Deployment
- 3. Focused Improvement
- 4. Autonomous Activities
 - Work Place Organization
 - Autonomous Maintenance
- 5. Professional Maintenance
- 6. Quality Control Safety
- 7. Logistics Customer Service
- 8. EEM / EPM
- 9. People Development
- 10.Environment/Energy

MANAGERIAL PILLARS

- 11. Management Commitment
- 12. Clarity of Objectives
- 13. Route Map to WCM
- 14. Allocation Highly Qualified People
- 15. Commitment of Organization
- 16.Competence of Organization towards Improvement
- 17. Time and Budget
- 18.Level of Detail
- 19. Level of Expansion
- 20. Motivation of Operators



Audit Awards







CNHi Audit Awards

Detail & Best Virtual Plant

Ī	WCM	2019	2020	2021	
- Roadmap	# Plants involved	55	55	56	
	# Bronze plants	25	28	29	all in Europe
	# Silver plants	15	16	16	
	# Gold plants	2	2	3	
	# World Class plants				





World Class Supplier

The major part of the value of a PLANT SUPPORT car/truck/equipment comes from the supplier LANT SUPPORT Involve the strategic suppliers into the programme. Create a robust partnership, based on the growth of people. Improve conditions through a win-win approach.



WCM Suppliers

Detail & deliverables







RESULTS



Environment and Energy

CNHi WW







0% -1 IN HAZARDOUS WASTE GENERATED PER HOUR OF PRODUCTION

WASTE GENERATED PER PRODUCTION UNIT CNH INDUSTRIAL WORLDWIDE (kg/total manufacturing hours")



HAZARDOUS WASTE GENERATED PER PRODUCTION U CNH INDUSTRIAL WORLDWIDE (kg/total manufacturing hours?)

> 0.40 0.33 Target 2018 vs. 2014 -17% 2014 2015 2016



INDUSTRIAL



Target 2022 vs. 2014

-14%



+21%

OF EMPLOYEES

MANAGEMENT

TRAINED ON ENERGY

(🗘

ENERGY CONSUMPTION PER PRODUCTION UNIT CNH INDUSTRIAL WORLDWIDE (GJ/hour of production)





Energy Reduction



CO2 Reduction



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2016

47

ISO 50001 CERTIFIED

56%

SOURCES

OF ELECTRICITY

FROM RENEWABLE

ELECTRICITY CONSUMPTION FROM RENEWABLE SOURCES

CNH INDUSTRIAL WORLDWIDE (tons of CO./hour of produ

0.0078 0.0078

2015

2014 2015 2016

2014

55.8

Target 2020

Target 2022 vs. 2014

-20%

PLANTS

Engagement

Best Practices

CNHi WW



 Suggestions per person
 13,7
 14

 10,8
 12,1
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WCM data and figures

From 2020 Annual Report

World Class Manufacturing

In striving to consolidate and maintain high standards of excellence in its manufacturing systems, CNH Industrial applies principles of World Class Manufacturing ("WCM"), the innovative program for continuous improvement that encompasses the most effective manufacturing methodologies. These include: Total Quality Control ("TQC"), Total Productive Maintenance ("TPM"), Total Industrial Engineering ("TIE"), and Just In Time ("JIT"). Applying rigorous methods and procedures, WCM aims to eliminate all types of waste and loss, including zero injuries, zero defects, zero breakdowns, zero waste, reduced inventories, and punctual delivery of parts by suppliers to plants, and thereafter to dealers and end users. The WCM system is applied to all departments, embracing numerous topics including safety in the workplace, the environment, quality, logistics, in-house and specialist maintenance, human resources, and process and product engineering (involving the reorganization of work stations, the installation of new machinery, and new product launches). Actions for continuous improvement are driven by the Cost Deployment pillar of WCM, which precisely identifies all plant wastes and losses, guides the activities of the corporate functions in charge of containing and eliminating the sources of waste, evaluates project feasibility, and assesses and certifies the results achieved by carefully monitoring specific performance indicators.

One of the main features of WCM is the way it incentivizes employees to engage and take responsibility, contributing directly to process optimization through a consistent system for collecting suggestions. This allows individuals to acquire and develop skills and good practices that are then shared across plants, forming a network of expertise and knowledge for the benefit of the Group. In 2020, approximately 346,100 suggestions were collected across the plants where WCM principles are applied, with an average of 11.4 per employee. The projects implemented in 2020 within WCM generated savings of approximately \$68.2 million.

Each WCM pillar involves a seven-step approach and auditing process, culminating in several awards (bronze, silver, gold, and world class). As of December 31, 2020, 55 plants were participating in the program, representing 99% of revenues from sales of products manufactured in Group's plants. By the end of 2020 2 plants have gold awards, 16 plants have silver awards and 28 plants have bronze awards.



AGENDA

- WHY WCM?
- WORLD CLASS MANUFACTURING
- PEOPLE IN WCM
- NEXT STEP

What is "World Class" ?



- It's not a procedure
- It's not a project
- It's not a Book of Knowledge

WORLD CLASS COMPANY is a PROGRAM to CHANGE BEHAVIOURS and BUILD UP KNOWLEDGE to continuously LEAN UP the Company

THE CHALLENGE is "DO THE RIGHT THINGS ON THE FIRST TIME"



World Class Company (WCC)







«Something done in right way always can be done better»

Gianni Agnelli

