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OTC Training Centre Sdn Bhd

HRD awards 2022
TRAINING PROVIDER

MANUFACTURING EFFICIENCY IMPROVEMENT PROGRAM

HYBRID TRAINING

18 & 19 Nov 2026 (Wed & Thu)

Remote Online Training (Zoom) &
Dorsett Grand Subang Hotel, Selangor (Physical)

** Choose either Zoom OR Physical Session

100% HRDC CLAIMABLE

14 hours ZOOM & PHYSICAL Progra

REGISTER 3 PAX, FREE 1 SE

Course Objectives

By the end of this two-day program, participants will be able to:

Understand the Fundamentals of Manufacturing Efficiency
Develop a clear understanding of manufacturing efficiency, productivity, effectiveness, utilization, capacity, and their relationship to cost, quality, delivery, and overall operational performance.

Measure and Evaluate Manufacturing Performance
Apply key manufacturing performance indicators such as OEE, productivity, capacity utilization, cycle time, takt time, First Pass Yield (FPY), reject rate, MTBF, and MTTR to evaluate current performance.

Identify and Quantify Manufacturing Losses
Recognize the 8 Wastes and identify hidden losses including downtime, waiting, minor stoppages, reduced speed, defects, rework, excessive movement, WIP, and inefficient use of resources.

Improve Equipment Efficiency and Reliability
Analyze equipment-related losses using OEE, downtime analysis, MTBF, MTTR, and TPM principles to improve machine availability, performance, and reliability.

Optimize Cycle Time, Capacity and Production Flow
Apply cycle-time analysis, takt time, bottleneck identification, capacity analysis, and line-balancing techniques to improve production flow and maximize available capacity.

Improve Manpower and Workstation Productivity
Use time-study, standardized work, work-element analysis, workplace organization, and improved work methods to reduce unnecessary activities and improve manpower utilization.

Reduce Quality, Changeover and Process Losses
Apply FPY, defect analysis, Poka-Yoke, Jidoka, SMED, Pareto Analysis, 5 Whys, and Root Cause Analysis to reduce rejects, rework, setup time, and recurring production losses.

Develop a Sustainable Manufacturing Efficiency Improvement Plan
Integrate performance data and improvement tools to prioritize opportunities, establish measurable targets, develop action plans, monitor KPIs, and sustain improvements through continuous improvement and daily performance management.

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COURSE OVERVIEW

In today's highly competitive manufacturing environment, organizations are under continuous pressure to produce **more, faster, better, and at a lower cost**, while maintaining high standards of quality, safety, delivery, and customer satisfaction. Increasing production alone is no longer sufficient. Manufacturers must ensure that every available resource—**manpower, machines, materials, methods, time, energy, and technology**—is utilized effectively to create maximum value with minimum waste.

This is the foundation of **Manufacturing Efficiency**.

Manufacturing efficiency refers to an organization's ability to convert its available resources into **good-quality, saleable output with minimum losses**. An efficient manufacturing operation does not simply run machines continuously; it ensures that production takes place at the required speed, with minimal downtime, minimum defects, optimized manpower, controlled material usage, balanced processes, and smooth production flow.

A manufacturing facility may appear busy throughout the day while still operating inefficiently. Machines may be running, operators may be working, and products may be moving between processes, but significant capacity can still be lost through **breakdowns, minor stoppages, waiting, slow machine speeds, long changeovers, excessive movement, poor line balancing, defects, rework, material shortages, unnecessary inventory, and inefficient work methods**.

Therefore, one of the most important questions for manufacturing management is not simply:

"How much did we produce?"

but rather:

"How efficiently did we use our available resources to produce good products?"

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COURSE OVERVIEW

LEARNING OUTCOMES

Upon successful completion of the two-day program, participants will be able to:

1. **Explain the Principles of Manufacturing Efficiency**
Explain the relationship between manufacturing efficiency, productivity, utilization, capacity, quality, cost, delivery, and overall operational performance.

2. **Calculate Key Manufacturing Performance Indicators**
Accurately calculate and interpret OEE, Availability, Performance, Quality Rate, productivity, capacity utilization, cycle time, takt time, FPY, reject rate, MTBF, and MTTR.

3. **Identify and Quantify Manufacturing Losses**
Identify the 8 Wastes and quantify production losses arising from downtime, waiting, reduced speed, defects, rework, excessive movement, changeovers, WIP, and other non-value-added activities.

4. **Analyze Production Capacity and Bottlenecks**
Evaluate theoretical versus actual capacity, identify process bottlenecks, determine capacity gaps, and recommend actions to increase effective production capacity.

5. **Apply Time Study and Line-Balancing Techniques**
Conduct basic time studies, analyze work elements and cycle times, balance operator workloads, reduce idle time, and improve production flow and manpower productivity.

6. **Analyze Equipment and Quality Performance**
Use OEE, downtime Pareto, MTBF, MTTR, FPY, reject data, and other performance measures to identify equipment and quality improvement opportunities.

7. **Apply Practical Problem-Solving and Improvement Tools**
Apply tools such as Pareto Analysis, 5 Whys, Fishbone Diagram, Root Cause Analysis, Poka-Yoke, TPM, SMED, standardized work, and PDCA to address manufacturing efficiency problems.

8. **Develop a Data-Driven Manufacturing Efficiency Improvement Plan**
Analyze actual or simulated manufacturing data, prioritize improvement opportunities, establish measurable targets, recommend countermeasures, and develop an action plan to move from:

CURRENT PERFORMANCE → IDENTIFY LOSSES → ROOT CAUSE → IMPROVEMENT → MEASURE RESULTS → STANDARDIZE → SUSTAIN

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COURSE OVERVIEW

LEARNING METHODOLOGY – WORKSHOP-BASED APPROACH

The **Manufacturing Efficiency Improvement Program** will adopt a highly practical, **workshop-based and experiential learning methodology**. The emphasis is on enabling participants to **learn by doing**, rather than relying mainly on classroom lectures.

The recommended learning approach is approximately **30% facilitator input and 70% practical workshops, simulations, calculations, case studies, and group activities**.

The methodology will include:

- **Interactive Facilitator Sessions** – Key manufacturing efficiency concepts and tools will be introduced through short, focused discussions supported by practical manufacturing examples.
- **Hands-On Calculation Workshops** – Participants will work with production data to calculate OEE, Availability, Performance, Quality, productivity, capacity utilization, cycle time, takt time, FPY, reject rate, MTBF, and MTTR.
- **Manufacturing Waste Identification Workshop** – Participants will analyze production situations to identify the **8 Wastes**, non-value-added activities, hidden capacity losses, and opportunities for improvement.
- **Time Study and Line-Balancing Simulation** – Teams will measure work elements, analyze cycle times, identify bottlenecks, balance workloads, and redesign processes to improve flow and productivity.
- **OEE and Downtime Analysis Workshop** – Participants will analyze machine performance and downtime data, construct Pareto analyses, identify major equipment losses, and recommend actions to improve equipment effectiveness.
- **Problem-Solving Group Exercises** – Realistic manufacturing problems will be analyzed using **Pareto Analysis, Fishbone Diagram, 5 Whys, Root Cause Analysis, PDCA, and 5W1H** to move participants from symptoms toward root causes and sustainable countermeasures.
- **Improvement Simulations and Team Challenges** – Participants will experience a simulated production process, measure its initial performance, implement improvements, and compare **Before vs. After** results. This reinforces the relationship between Lean improvement actions and measurable manufacturing performance.
- **Manufacturing Efficiency Improvement Project** – At the end of the program, teams will integrate the tools learned to analyze a manufacturing case and develop a practical improvement plan covering:

Current State → Performance Gap → Loss Analysis → Root Cause → Countermeasures → Target → KPI → Action Plan → Sustain

The overall learning philosophy is:

LEARN → PRACTICE → ANALYZE → IMPROVE → MEASURE → STANDARDIZE

This workshop-based approach ensures that participants leave the program not only understanding the concepts of manufacturing efficiency, but also having the practical capability to **identify losses, analyze data, solve problems, and implement measurable efficiency improvements in their own workplace**.

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COURSE CONTENT

DAY 1 – Understanding, Measuring & Analyzing Manufacturing Efficiency

Module 1: Fundamentals of Manufacturing Efficiency

- Definition and importance of manufacturing efficiency
- Manufacturing efficiency vs. productivity vs. effectiveness
- Efficiency, utilization and capacity
- Relationship between productivity, quality, cost and delivery
- Understanding input, process and output
- The 5M+E concept: Man, Machine, Material, Method, Measurement and Environment
- Key factors affecting manufacturing efficiency
- Identifying hidden production losses

Module 2: Lean Manufacturing & Waste Elimination

- Introduction to Lean Manufacturing principles
- Value-added vs. non-value-added activities
- Understanding the 8 Wastes – DOWNTIME
  - Defects
  - Overproduction
  - Waiting
  - Non-utilized talent
  - Transportation
  - Inventory
  - Motion
  - Extra-processing
- Identifying waste within manufacturing processes
- Quantifying the impact of waste on productivity
- Techniques for eliminating and reducing waste
- Workshop: Manufacturing Waste Identification Exercise

Module 3: Measuring Manufacturing Performance

- Understanding manufacturing KPIs
- Production output and productivity
- Labor productivity and units per man-hour
- Machine utilization
- Capacity utilization
- Yield and reject rate
- First Pass Yield (FPY)
- Cycle time and lead time
- Cost of Poor Quality
- Establishing manufacturing performance baselines
- Workshop: Manufacturing KPI Calculation

Module 4: Overall Equipment Effectiveness (OEE)

- Introduction to OEE
- Understanding the OEE model
- Availability, Performance and Quality
- Calculating Availability
- Calculating Performance
- Calculating Quality Rate
- Calculating overall OEE
- Understanding the Six Big Losses
- Planned vs. unplanned downtime
- Identifying OEE improvement opportunities
- Using OEE to recover hidden manufacturing capacity
- Workshop: OEE Calculation and Loss Analysis

Module 5: Cycle Time, Takt Time & Capacity Analysis

- Understanding cycle time
- Understanding takt time
- Cycle time vs. takt time
- Theoretical vs. effective capacity
- Capacity utilization
- Determining production requirements from customer demand
- Identifying capacity gaps
- Bottleneck identification
- Constraint management
- Improving throughput at bottleneck operations
- Workshop: Cycle Time, Takt Time and Capacity Calculation

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COURSE CONTENT

DAY 2 – Improving & Sustaining Manufacturing Efficiency

Module 6: Time Study & Manpower Productivity

- Introduction to work measurement
- Understanding work elements
- Conducting a basic time study
- Observed time, normal time and standard time
- Identifying operator waiting and unnecessary motion
- Manpower utilization
- Units per man-hour
- Multi-machine and man-machine considerations
- Standardized work
- Improving work methods
- Workshop: Time Study and Productivity Improvement

Module 7: Line Balancing & Production Flow

- Principles of line balancing
- Workstation cycle-time analysis
- Identifying bottleneck stations
- Workload distribution
- Operator balancing
- Understanding balance loss and idle time
- Calculating line efficiency
- Improving manufacturing flow
- One-piece flow concepts
- Reducing WIP between processes
- Workplace and layout improvement
- Workshop: Line-Balancing Simulation

Module 8: Equipment Reliability & Downtime Reduction

- Relationship between maintenance and manufacturing efficiency
- Breakdown and downtime losses
- Introduction to Total Productive Maintenance (TPM)
- Autonomous Maintenance
- Planned and preventive maintenance
- Understanding MTBF
- Understanding MTTR
- Equipment reliability and availability
- Minor stoppage analysis
- Downtime Pareto analysis
- Prioritizing equipment improvement opportunities
- Workshop: Downtime, MTBF and MTTR Analysis

Module 9: Quality & Changeover Efficiency

- Relationship between quality and manufacturing efficiency
- Scrap, defects and rework as capacity losses
- First Pass Yield improvement
- Quality at source
- Introduction to Poka-Yoke
- Introduction to Jidoka
- Understanding setup and changeover losses
- Introduction to SMED
- Internal vs. external setup activities
- Reducing setup and changeover time
- Standardizing improved changeover practices
- Workshop: Quality and Changeover Improvement Exercise

Module 10: Problem Solving for Manufacturing Efficiency

- Identifying and defining efficiency problems
- Data-based problem solving
- Pareto Analysis
- Fishbone/Cause-and-Effect Diagram
- 5 Whys Analysis
- Root Cause Analysis
- Developing corrective and preventive actions
- PDCA continuous improvement cycle
- Prioritizing improvement projects
- Verifying improvement results

Module 11: Manufacturing Efficiency Improvement Action Plan

- Establishing current-state performance
- Identifying performance gaps
- Prioritizing major manufacturing losses
- Setting measurable efficiency targets
- Selecting appropriate improvement tools
- Establishing KPIs and monitoring methods
- Developing responsibility and timelines
- Standardizing successful improvements
- Sustaining improvements through daily management
- Continuous improvement and Kaizen