Agenda

- The Industrial Revolutions
- What is Industry 4.0
- The significance of Connected Processes
- The Journey to Industry 4.0
- Digital Transformation
- Shopfloor-Online (the heart of the digital factory)
The Industry Revolutions

• **1\textsuperscript{st} Industrial Revolution** between 1760 ~ 1860
  - Hand Production Method to Machines
  - Originated in Britain
  - Textile Industry at the heart of it...

• **2\textsuperscript{nd} Industrial Revolution** 1817 ~ 1914
  - Also known as the Technological Revolution
  - The Bessemer process (first economic production of steel)

• **3\textsuperscript{rd} Industrial Revolution** 1960 ~ Present Day
  - Built around renewable energy
  - Electronics
  - Internet

• **4\textsuperscript{th} Industrial Revolution ~ Tomorrow**
  - Smart Manufacturing
  - Intelligent solutions
  - Mobile
  - Cloud
What is Industry 4.0?

Some terminology to get acquainted with...

- **IT**
  - Information Technology - Back Office Systems
    - ERP
    - Email
    - Office Applications

- **OT**
  - Operations Technology - Factory Side Systems
    - Inspection Systems
    - Bar Coding
    - Line Sensors / PLC’s

- **IoT**
  - Internet of Things
    - Air conditioning / Heating controls
    - Remote control of CCTV / Security systems
    - Remote control of Lighting

- **IIoT**
  - Industrial Internet of Things
    - Industrial devices connected to the internet
Today’s manufacturing typically has low levels of Integration between IT and OT

Information Technology (IT)
Office Information Technology

Operations Technology (OT)
Automation Systems on the factory floor

Convergence of IT and OT will allow decision makers to drive inefficiencies out of the manufacturing operations.

MES provides the method of convergence.
What is Industry 4.0?

Finance, Inventory and Core business functions

Operators, Supervisors, Process Engineers and Continuous Improvement & Operations Managers

Manufacturing in real-time

Plant Operations
Layer 3 – MES
Days, Shifts, Hours, Minutes, Seconds

Plant Equipment
(Automation & PLCs)
Layers 0,1,2

Machines, Logic, Lines, Sensors

Purchasing and Supply Chain, Customers, Sales Order Management

Production Counts, Detect Counts, Downtime, Process Parameters, Quality & Gauging Systems

ERP
Layer 4
Days, Months, Quarters & Years
What is Industry 4.0?

- **Plant Equipment** (Automation & PLCs) - Layers 0,1,2
- **Plant Operations** - Layer 3 – MES
  - Days, Shifts, Hours, Minutes, Seconds
- **ERP**
  - Layer 4
  - Days, Months, Quarters & Years
What is Industry 4.0?

- **ERP** is the BUSINESS system
- It has the BIG picture
- Used by OFFICE workers

- **MES** is the MANUFACTURING system
- It has DETAILED manufacturing information
- Used by FACTORY workers
- User friendly, fast, with much automation
What is Industry 4.0?

Plant Equipment (Automation & PLCs)
Layers 0,1,2

Plant Operations
Layer 3 – MES
Days, Shifts, Hours, Minutes, Seconds

ERP
Layer 4
Days, Months, Quarters & Years

Production Operations
Quality Operations
Maintenance Operations
Inventory Operations

Layers 0,1,2
The Significance of the Connected Processes in a single MES
The Significance of the Connected Processes in a single MES

The panacea of the perfect **Smart Factory** has all the measurement systems, line sensors and computer systems joined up in a completely seamless manner...

The data from the measurement systems, sensors and computer systems would be available to each other... and talk to each other!

Predictive Analysis could determine when tool changes or maintenance is really required

These new technologies & capabilities could dramatically change manufacturing operations.

Spoilage rates could be cut, HFI could be eliminated, Line Availability (Uptime) could be increased, non value-added manpower could be a thing of the past.
Smart Manufacturing.... It’s a journey

- It might be a long journey!
- It’s a journey that can only be made with incremental steps
- You don’t have to get travel sickness making the journey!

All plants can be Smarter even with existing systems…

Start with a **DIGITAL TRANSFORMATION** strategy

- Connect your measurement systems and Quality Data to a centralised MES
- Connect your machines, sensors and PLC’s to a centralised MES
- Tag your critical Assets and track their use in a centralised MES
The Digital Transformation

Digitising the Quality Data...

Manufacturing Execution System

- Lube Weight
- Dome Depth
- Trim Height
- Top Wall
- Mid Wall
- Bottom Wall
- Dome Reversal
- Rim Varnish
- pH Flouride
- Oven Temps
- Axial Load
- Lacquer Weights
- Dome Reversal
- Pin Holes
- Colour
- Film Weights
- Flange Diameter
- Decoration Defects
The Digital Transformation

Digitising the Production Data...

Manufacturing Execution System

Cupper Counts
Downtime
Short Cans
Trimmer Faults

Bodymaker Counts
Downtime

pH

Fluoride

Oven zone temperatures

Varnish

Label Changes

Pressure

Downtime

Production Counts

Inks

Tooling

Production Counts

Carbon

Production Counts

Lacquer

Energy

Downtime

Production Counts

Sprayer

Decorator

Cupper Sprayer

Bodymaker

Washer

Oven

Sprayer

Necker
The Digital Transformation

Digitising the Inventory and Asset Data

Manufacturing Execution System

Raw Materials

Coil Changes

Press Tools

Tool Assignments

Maintenance Schedules

Complex Tool Packs

Tool Repairs

Maintenance Schedules

Punches

Tool Repairs

Rings

Pallet Labels

Pallets of Bright Cans

Pallets of Finished Goods

HFI

Manufacturing Execution System
The Digital Transformation

- All factory (Operations Technology) data will go into one place
- All users will be able to access it from wherever they are
- No data will be recorded on paper
- No reports manipulated in Excel
- Information will be immediate, live, accurate, correct
- Data will be transformed into actionable items
- Performance, status, problems will be instantly visible to all
- Users will be alerted to problems (SMS, email)
- Users will be guided through business processes
Shopfloor-Online: The Heart of the Digital Factory

**Production Operations**
- Scheduling
- Job Tracking
- Downtime
- Production Counting
- Waste
- Line Log Book
- OEE
- Labour

**Inventory Operations**
- Inventory
- Label Printing
- Traceability – Consumption
- Build Traceability
- Warehousing / Logistics

**Quality Operations**
- Quality Checks
- SPC
- Process Monitoring
- Links to Documents
- Concerns/CAPA
- Supplier Complaints
- Customer Complaints

**Maintenance Operations**
- Asset Register
- Maintenance Management
- Repairs
- Tool Management
- Energy
Shopfloor-Online: The heart of the Digital Factory
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- 2 Piece Can.
- 3 Piece Can.
- Ends.
- Aerosol / Bottle.
- 150+ Can Plants globally using Lighthouse’s Shopfloor-Online software suite!
Shopfloor-Online: The heart of the Digital Factory

Architecture
- One database = one system
- Browser based
- No Client Installation

For Users
- Access from anywhere
- Easy to use
- Easy for training

For IT
- Cloud or On-Premise
- Scalable (single factory / multi factories)
- Easy deployment
- Standard IT infrastructure
Start your **Digital Transformation** journey now

www.LighthouseSystems.com

Thank You!