Plant of the Year Award

TALON PETTY
MARKETING & BUSINESS DEVELOPMENT
FIELDCOMM GROUP
Background

• Recognizes innovative use of FOUNDATION™ Fieldbus, HART or WirelessHART Communication in real-time industrial process plant applications

• Is the only public award presented to end user companies to recognize ingenuity in the application of our technologies

• Recipients of the award set a positive example for the industry worldwide for their use of the valuable information in their smart devices
Pan Pacific Hotel Singapore
7 December 2018

Previous Recipients
2002 - 2017

DuPont De Lisle
USA

BP Cooper River
USA

Statoil Ormen Lange
Norway

Clariant
Germany

Mitsubishi Chemical
Japan

Sasol Solvents
South Africa

PDVSA
Venezuela

Shell Scotford Upgrader
Canada

MOL Danube Refinery
Hungary

Monsanto Muscatine
USA

Dow Chemical
USA

BHP South Flank FLNG
Australia

Nucor Steel
USA

MOL Danube
Refinery
Hungary

Detroit Water & Sewerage Dept.
USA

BP Canada Energy
Alberta, Canada

PDVSA
Venezuela

Statoil Ormen Lange
Norway

Monsanto Muscatine
USA

DuPont De Lisle
USA

BP Cooper River
USA

Statoil Ormen Lange
Norway
2018 Plant of the Year Winner
2018 Plant of the Year Award Winner is...

*Mangalore Refinery and Petrochemicals Limited*

First Winner from India!
About Mangalore Refinery - Company

- Subsidiary of Oil & Natural Gas Corporation (ONGC)
- Built in 3 Phases commissioned in 1996, 1999, and 2012 respectively
- 4th Phase in the works now
- Total crude processing capacity of 16 MMTPA
- Value added products like Pet Coke and PP
- 35,000+ instruments
- Multiple host systems
- Multiple protocol applications
About Mangalore Refinery – I&C Timeline

- Honeywell TDC3000 in 1995.
  - DE protocol for field devices.
  - Non Incendive concept.
  - System being upgraded to Experion-PKS.

- Tokyo Keiso TFMS
  - TRL/2 bus.
  - Level, Temperature & Density parameters and maintenance.

- Yokogawa Centum CS in 1999.
  - BRAIN protocol for field devices.
  - Non Incendive concept.
  - HIMA - Hibus within PLC.
  - Being upgraded to Centum VP.
About Mangalore Refinery – I&C Timeline

- **Yokogawa CS 3000 in 2006.**
  - FF devices for control and monitoring.
  - FNICO/FISCO for field devices.
  - OPC for third party system integration.
  - FF with HPT in 2010 for unit revamp.
  - First to use FF in process in India w/ control loops

- **Yokogawa Centum VP in 2012.**
  - Phase#3 refinery complex w/ FF field devices.
  - FISCO-iC for field devices.
  - SIS with HART pass-through modules.
  - All SIS connected devices with HART protocol.
  - Asset Management System for all field devices (FF & HART).
Digitalization is the Key!

- As evident by the progression of their Instrumentation and Controls equipment over the years, MRPL continues to go digital.
  - Snap action switches to Inductive proximity switches.
  - Magnetic seismic sensors to Piezo Electric sensors.
  - Pneumatic to SMART valve positioners.
  - Conventional to SMART MOVs.
  - Analyzers with enhanced diagnostics.
  - Radar level transmitters with HART, FF and TRL/2.
  - Variable Frequency Drives with Ethernet IP.
  - Wireless Gas Detectors network.
  - Documenting process calibrators with field device communication

- **Gain advantages through device diagnostics**
HART in Place of Proprietary Communications

- HART devices have replaced devices with DE and BRAIN.
  - Requires same make devices for replacement.
  - Cost of devices were high.
  - Replaced with HART devices.
  - Cost of replacement of HART devices is less due to competition.
  - HART enabled maintenance through AMS.
Value creation through HART enabled Devices

- **HART valve positioners in place of I/Ps with Pneumatic positioners.**
  - Connected to Asset Management System (AMS).
  - Preventive and Predictive maintenance from AMS.
  - Valve signature analysis.
  - Actuator leak detection.
  - Less Instrument air consumption.

- **HART devices replaced conventional analog devices.**
  - Ease of device configuration, calibration and maintenance.
  - Interoperability and competitive pricing.
  - Temperature TXs with dual elements having hot standby feature improved reliability.
Advantages of HART

- **HART devices on AMS.**
  - Nucleonic type Level Instruments are HART enabled.
  - Maintenance of Nuclionic instruments performed from AMS.
  - Exposure of personnel to radiation minimized due to extensive use of AMS.
  - All devices connected to SIS are on HART protocol

- **HART devices secondary parameters.**
  - Parameters like density from Coriolis Mass flow meters.
  - Can be fetched to DCS directly or through HART splitters.
  - Cell Temperature of Pr/DP TXs are important for troubleshooting.
FOUNDATION Fieldbus

- **FF installation**
  - First Refinery with FF for Process Control.
  - 75+% valve positioners are FF.
  - PID in field devices (Control In Field).
  - FNICO/FISCO/FISCO-iC and HPT.
  - FNICO & FISCO/FISCO-iC used with Field Wiring blocks.
  - HPT with Field Barriers.
  - FISCO-iC and HPT with embedded advance network diagnostics.
Advantages of FOUNDATION Fieldbus

- **Installation and Commissioning.**
  - Faster construction due to less cabling.
  - Ease of loop checking without opening devices.
  - Quick and error free valve calibration.
  - Uniformity and ease of device configuration.

- **Plant Operation**
  - Availability of secondary and tertiary parameters.
  - Valve position feedback.
  - Device diagnostic messages to alert panel operator.
Advantages of FOUNDATION Fieldbus

- **Maintenance.**
  - Effective use of AMS.
  - Ease of Preventive and Predictive maintenance.
  - Ease of reconfiguration of devices.
  - Quick replacement.

- **Other benefits.**
  - Control in Field (CIF) reduced load on controller.
  - More fast scans loops possible with CIF.
  - MOVs with FF allowed flexibility of operation.
  - DCS Temp. MUXs were replaced by field FF Temp MUXs and reduced complexity.
  - Maintenance/upgradation of controller while plant still running.
  - Temperature TXs with dual elements having hot standby feature improved reliability.
  - Impulse line block detection.
Bottomline

All this digitalization, but for what!? 
MRPL Achievements

- 9,000 FOUNDATION Fieldbus devices including 1,800+ valve positioners
- 5,000 HART devices connected to the DCS via HART multiplexers, and used predominately on safety systems (SIS)
- WirelessHART is used on several varied applications with average battery life of approximately 3 years
- WirelessHART
- Device templating has greatly reduced commissioning time and reliability

$415,000 in savings
- Utilizing FOUNDATION Fieldbus for Motor Operated Valves, MRPL achieved an 80% reduction in I/O, cabling and footprint requirements

$800,000 in savings
- Utilizing Control in the Field, MRPL avoided a plant shut down

35,000+ devices

$6,000,000+ SAVINGS IN PROJECT COSTS
- 4th phase of the project will utilize HART and FOUNDATION Fieldbus exclusively and is targeted for completion in 2025
Additional Highlights

• Valve diagnostics provided by FF and HART reduce maintenance by **55 man days per month**

• Fuel and energy costs associated with scheduled valve maintenance costs **$60,000**. Data from smart devices has reduced unnecessary maintenance of these valves.

• WirelessHART Gas Detectors in service for **last 10 years**!

• All commissioning, decommissioning etc are handled by **field technicians which are trained on DCS**.

Read more at [https://www.fieldcommgroup.org/technologies/plant-year](https://www.fieldcommgroup.org/technologies/plant-year)
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