Course Content

World-Class Engineering Asset Management Training Course Day 1 Content

Course Introduction

• Discovering the 'Hidden Factory'
• Value Stream Concept
• Enterprise Asset Management System
• Concepts in Enterprise Asset Management

MACHINE DESIGN SETS THE LIMITS

• Understand How Machines are Designed
• Everyone has an Important Part to Play
• Common Wrongs Humans Do To Machine

THE HUMAN FACTOR IS THE GREATEST ENEMY

• The 'Human Element' in Asset Management
• Reliability of Human Dependant Processes
• Work (activities and practices) is a Series Process
• The Reliability of Systems
• Reliability of Series Work Processes
• Improving Series Process Reliability
• Reliability of Parallel Work Process

DEFECT AND FAILURE TRUE COST

• The Truth is Hidden Under the Surface
• Where Profit is Lost in Business Processes
• The Purpose of Business
• Maintenance is an Economic Decision
• Impact of Defects and Failures
• Defect and Failure True (DAFT) Costs go Company-wide
• Failure Costs Surge thru the Company
• Separate the True Downtime Costs so you can see them for what they are
• Calculating the True Downtime Costs

THE PHYSICS OF FAILURE

• The Physics Behind Equipment Failures
• Over-stressed Parts - Overload
• Over-stressed Parts - Fatigue
• Using Physics of Failure to Build Reliability
• Operator and Maintainer Error

THE LIFE CYCLE OF MACHINERY

• Plant and Equipment Life Cycle
• When Operating Costs are Committed
• What Makes a Productive Equipment Life?
• Design-in a Low Cost Operating Life
• Maximising Life Cycle Profits
Course Content Continued

EQUIPMENT RELIABILITY

• Measuring the Likelihood of Failure
• Reliability of Parts and Components
• Equipment Reliability Strategies
• The Reliability of Parts and of Systems of Parts (i.e. Machines)
• Failure Prediction – Weibull Reliability of Parts and Components
• Reliability Mathematics
• Measuring Reliability for Components – Weibull Plot
• Measuring the Reliability of Systems - Crow/AMSAA

CONTROLLING EQUIPMENT FAILURE

• The Degradation Cycle
• Failure Mode Effects Analysis (FMEA) Fundamentals
• Defects Cause Failure
• The Best are Proactive – They Do Defect Elimination and Failure Prevention
• The Problems start with Variation
• "A Problem happens whenever there is Deviation from the Current Standard."
• Controlling Process Variation
• Benefits of Failure Elimination

RISK MANAGEMENT, RISK PREVENTION and RISK REDUCTION

• What is a High Potential Incident?
• How the Swiss Cheese Slices Lined Up for the Titanic
• Understanding and Measuring Risk
• Similarity between Safety Incidents and Equipment Failures
• Risk Management Process
• The Application of Risk Based Principles to Maintenance
• Identify Your Equipment Risks and Priority Equipment
• Equipment Criticality
• Match Maintenance Strategy to Equipment Criticality

MAINTENANCE IS A RISK REDUCTION FUNCTION

• Choosing of Maintenance Type
• Life Cycle Risk Management Strategy Model
• Improve Safety and Reliability by Removing Risk
• Maintenance Strategies for Risk Reduction
• Match Maintenance Strategies to Risk
• Reliability does not cost money - Lack of reliability is what costs money

IMPORTANCE OF STANDARDS FOR MACHINES AND WORK

• Set Reliability Standards and Start Standardising Practices
• Design Organisational Systems and Structures that Support Reliability
• Multifunction Teams Promote Better Equipment Performance

KEY PERFORMANCE INDICATORS

• Measuring Equipment Performance
• Measuring KPIs and Outcomes
Course Content Continued

World-Class Engineering Asset Management Training Course Day 2 Content

BUILD-IN PLANT AND EQUIPMENT WELLNESS AT DESIGN

- Plant and Equipment Life Cycle
- Ask for Maximum Life Cycle Profit
- Solving Bad Equipment Life Cycle Costs
- Calculate Failure Costs During Design
- Design and Operating Costs Total Optimisation Review (DOCTOR)

MANAGE PLANT and EQUIPMENT LIFE CYCLE RISK

- Life Cycle Risk Management Strategy
- Equipment Refurbishment Decisions and the Cost Drivers
- Effects of Production Process Variability
- Apply Basic Statistical Control and Visual Management
- When Process Variability is Out-of-Control
- Process Quality Control Starts by Setting Outcome Limits
- Problems are Variations Caused by Defects
- Move to ‘Preventive’ Quality Control

CONTROLLING the RELIABILITY of HUMAN DEPENDENT PROCESSES

- Activity 5 - Human Error Rates
- Reliability of Human Dependent Processes
- Accuracy Controlled Expert
- Accuracy Controlled SOPs Prevent Variation
- Including 3T Failure Prevention in SOPs
- Accuracy Controlled Enterprise (ACE) Standard Operating Procedures
- Failure Preventing Job Procedures - 3Ts Builds Accuracy Control into SOPs
- Waste is Eliminated in this Process
- Standardize Human Dependent Processes with Accuracy Controlled Procedures

SYSTEM-WIDE THINKING

- Effect of System Failures Across Life Cycle
- Variability and Risk Across the Life Cycle
- Think ‘System Wide’ Solutions
- World Class Practices at Every Step
- World Class Practice In Every Step Requires a Quality Management System
- Stop Equipment Failures in the same way that you stop Safety Incidents

RISK REDUCTION, RISK MANAGEMENT, RISK CONTROL, RISK MITIGATION, RISK PREVENTION

- What Risks Are Out There?
- Risk Reduction vs Safety Management
- Which Risk Reduction Methods are Best?
- Combining Strategies for Reliability Improvement
- Using Condition Monitoring to Optimise Availability
Course Content Continued

THE PRECISION DOMAIN

• Precision Maintenance of Machinery is …
• Precision is a Serious Opportunity
• Precision Domain - A Powerful Business Case
• Precision Maintenance and CBM used Together Effectively Reduce Failure

PEOPLE ARE ALL THAT MATTERS

• A Champion Team
• Hierarchy of Performance Indicators
• Benchmarking for Direction
• Benchmarking for Performance
• Tale of Two Types of Organisation
• Characteristics of Top Reliability Performers
• Cultural Characteristics
• The Pacesetter’s Business Model
• Create an Equipment Performance Vision
• Develop A Route Map to Follow
• Keeping People Focused on Reliability
• Creating Reliability Across the Life Cycle

CASE STUDY No 1 - POWERTRANS

• The PowerTrans Approach
• Asset Operation Sets Strategy
• Organisation Structure
• Start with a Corporate Asset Management Policy
• Set the Maintenance Objectives
• Cascaded Performance Measures
• Challenge Organisational Structure and Culture to Seek ‘Passion and Spirit’
• Overview of PowerTrans Process

CASE STUDY 2 - DuPont Chemicals EXPERIENCE

• Benchmark to Recognise Where You Are
• Business Competitiveness Needs …
• Organizations Need to Focus on What Delivers Excellence
• Plant Uptime Became The Driver
• Set Important Business Success Indicators
• Develop a Plan of How to Get There
• Integrated Business Systems
• Systems Thinking is Needed for Uptime
• Tools on the Journey to Reliability
• Prerequisites for Success
• Defect and Failure Elimination
• Problems from the Workplace
• Work On the ‘Human Element’ Factor
• Apply a Change Management Process
• DuPont Asset Management Overview

IMPORTANCE OF SETTING STANDARDS and STANDARDISING

• Standards and Standardisation
• Asset Management in a Nutshell
PROVIDING PLANT WELLNESS

• Manage the Plant and Equipment Life Cycle
• Decommissioning and Disposal
• Plant and Equipment Operation
• Construction and Commissioning
• Procurement and Supply
• Detailed Design and Engineering
• Feasibility and Financial Approval
• Best Practices through the Life Cycle
• The Philosophies of Plant Wellness
• The Financial Steps to Plant Wellness

JUSTIFYING USE OF BEST PRACTICES IN ENTERPRISE ASSET MANAGEMENT

• Implications of DAFT Costs for Risk Management
• Acceptable Equipment Item Failure Domain
• Risk – Reduce Chance or Reduce Consequence?
• Justifying Use of Asset Management - When Loosing Market Share
• Justifying Use of Asset Management - When Production Output is too Low
• Justifying Use of Asset Management - When Maximising Life Cycle Profit
• Financial Benefits of a Reliability Focus
• Good Asset Management Extends Equipment Productive Life

THE JOURNEY TO WORLD-CLASS ENTERPRISE ASSET MANAGEMENT

• Another View of EAM Excellence Journey
• Integrated System to Reliability and Plant Wellness
• The Standard Reliability Creation Model
• Reliability Principles to Fast-track Business Improvement
• Where to Focus for Quick Payback

A DIFFERENT MODEL FOR ENTERPRISES WHO WANT 'PLANT WELLNESS'

• The People of Plant Wellness
• The Culture of Plant Wellness
• The ‘Wholeness’ of Plant Wellness
• Where Next with Plant Wellness?
• Taking Plant Wellness into the Organization
• Asset Management Goals
• Developing Plant Wellness Mindset
• To Introduce Asset Life Cycle Risk Management (and get Plant Wellness)

MANAGING CHANGE MANAGEMENT

• Change Management Matrix
• A Mechanism to ‘Push The Limit’
• Components of the 5 Step ‘Change to Win’ Cycle
• The First Wheel of ‘Change to Win’ Cycle - Management Preparation
• The Second Wheel of ‘Change to Win’ Cycle - Identify Current State
• The Third Wheel of ‘Change to Win’ Cycle - The Best Practices
• The Fourth Wheel of ‘Change to Win’ Cycle - Develop the Future State
• The Fifth Wheel of ‘Change to Win’ Cycle - Put SOPs into the Workplace
• Prototype to Learn and Prove Worth
Course Content Continued

- For change to be successful and effective in the long term, it is ...
- Activity 9 – ‘Asset Management Tool Kit’.
- Activity 10 – Asset Management Strategy Requirements

SAM's 'PLANT WELLNESS' PLAN

- Sam’s Enterprise Asset Management Plan
- Champions Needed