

**PLANT SYSTEMS INTEGRATION USING THE SAMI  
MODEL TO ACHIEVE ASSET EFFECTIVENESS IN  
MODERN PLANTS**

by

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## **DECLARATION**

This thesis is the result of my own independent work, except where otherwise stated. Other sources are acknowledged by giving explicit references. A bibliography is appended.

Signed .....

Date .....

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## **DEDICATION**

This work is dedicated to my wife Liana. Her belief in my abilities is constant and has helped me to persevere when doubts arose. Her love, encouragement, and support are the key success factors in my life.

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## **ABSTRACT**

In recent years, industrial plant maintenance has changed dramatically. These changes are due to a considerable increase in the number and variety of physical plant assets, increased design complexity, new maintenance techniques and changing perspectives regarding on how to perform maintenance effectively. Managers at modern process plants are becoming increasingly aware of the extent to which equipment failure affects safety and the environment.

Process plant personnel are limited in their ability to accurately and consistently evaluate the health of plant assets. Due to poor record keeping, maintenance staff often has little defence against aging equipment and asset failures. As a result companies have undertaken to implement planned equipment maintenance schedules and install new technology to allow for efficient tracking and analysing of equipment health across the board.

The introduction of an integrated asset management solution is presented in this thesis. The integrated asset management solution will assist maintenance staff to cost-effectively predict the probability of asset failure prior to the occurrence of any actual plant incidents. The integrated solution documented in this thesis will be implemented at the Sasol Solvents site to enhance plant availability, maximum up time for all plant assets and plant safety.

Strategic Asset Management Inc. (SAMI) uses the Operational Reliability Maturity Continuum model to improve profitability, efficiency and equipment reliability. The SAMI empirical model employs various stages to address improved performance and asset management and was used as a guideline to develop an integrated solution to optimise plant performance and profits.

The integrated asset management solution, documented in this thesis, was developed with the intended function of bringing information from diverse plant based systems and field

equipment to the maintenance personnel in an understandable interface so that the information can be used to improve the reliability and availability of all plant assets.

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## **GLOSSARY OF TERMS AND SYMBOLS**

<b>ACE</b>	Application Control Environment
<b>AM</b>	AssetManager
<b>AMS</b>	Asset Management System (Emerson)
<b>APC</b>	Advance Process Control
<b>DCS</b>	Distributed Control System
<b>DD</b>	Device Descriptor Files
<b>ESD</b>	Emergency Shutdown System
<b>EBI</b>	Enterprise Buildings Integrator
<b>FDM</b>	Field Device Manager
<b>FF</b>	Foundation Field Bus
<b>FSC</b>	Fail Safe Control (Honeywell)
<b>HCF</b>	HART Communication Foundation
<b>HART</b>	Highway Addressable Remote Transducer
<b>OLE</b>	Object Link Embedded
<b>OPC</b>	OLE for Process Control
<b>PHD</b>	Plant Historian Database
<b>PID</b>	Proportional, integral and derivative control
<b>RCM</b>	Reliability Centered Maintenance
<b>RDI</b>	Real-time Data Interface
<b>RCFA</b>	Root Cause Failure Analysis
<b>RMPCT</b>	Robust Multivariable Predictive Control Technology
<b>RTDC</b>	Real Time Data Collector
<b>SAMI</b>	Strategic Asset Management Inc.
<b>SIL</b>	Safety Integrity Level
<b>SCADA</b>	Supervisory Control and Data Acquisition