



Maintenance Master Data

– what is it and how are standards applied?

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Introduction & Overview

NEW CAPITAL
PROJECTS

BROWNFIELD
REMEDIATION

EAM\
MIGRATIONS

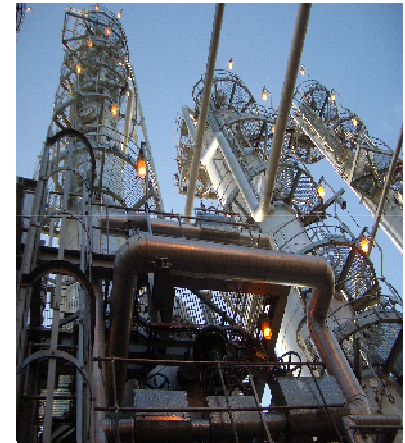
CHANGES FROM
OPERATIONS

About NRX

- NRX is a software company headquartered in Toronto, Canada, focused on improving the quality of Maintenance Data.

Unique Solution

- The *NRX Project Cloud* provides a unique solution for **building, standardizing, and sustaining maintenance master data**
- High quality master data accurately reflecting the physical plant and its needs is the backbone of both effective maintenance work management and asset management.



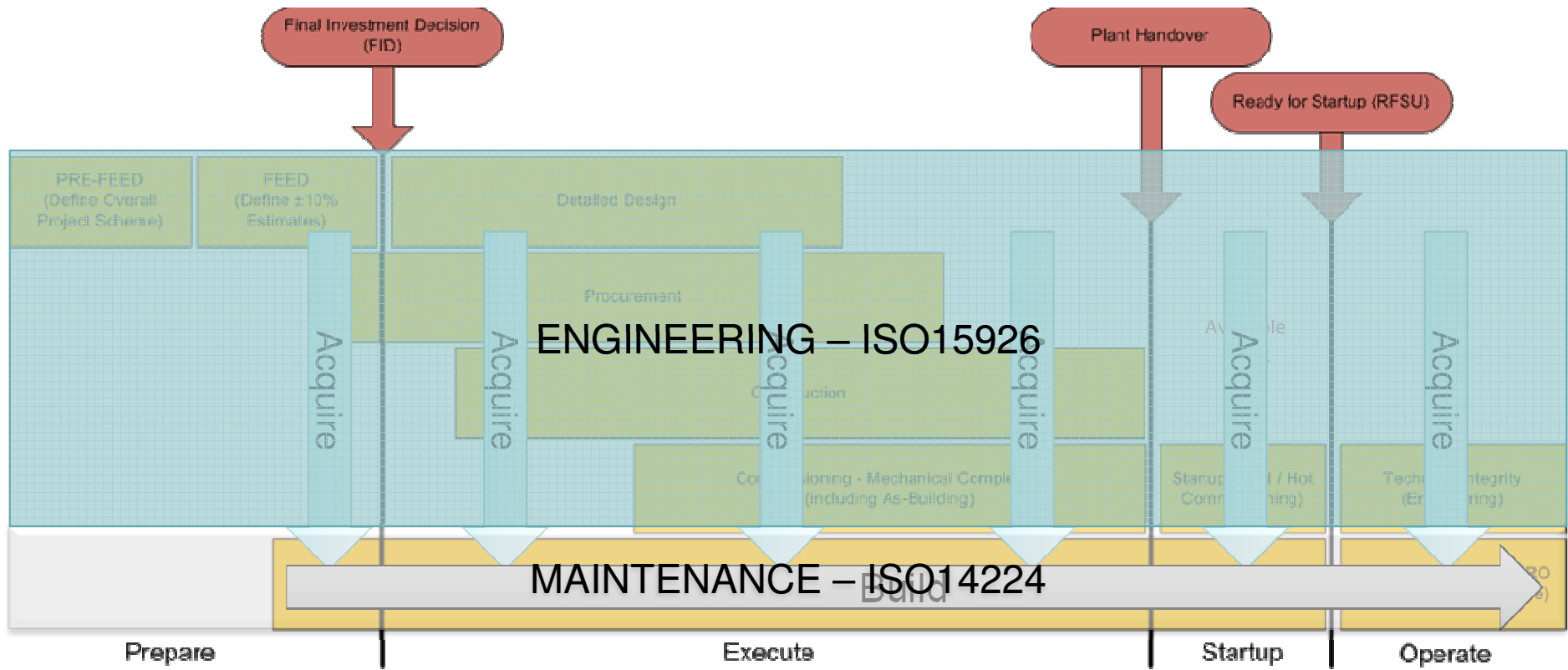
PCA POSC Caesar
Association

NRX[®]



ISO15926 & ISO14224

Capital Project Context



ISO14224

- Petroleum, petrochemical and natural gas industries — Collection and exchange of reliability and maintenance data for equipment
- Used extensively in building Maintenance Master Data in the oil & gas industry
 - Similar corporate standards in large mining organizations

- Maintenance Master Data
 - Maintenance Hierarchy
 - 8 Level Standard Hierarchy
 - Classes & Characteristics

- Maintenance System Configuration
 - Supported in major systems – SAP PM / Maximo
 - Failure Mechanisms
 - Failure Cause Codes
 - Detection Methods
 - Maintenance Activity
 - Failure Consequence Classification



ISO15926 RDL Example – Electric Generator

IdPCA	Designation	Superclass
RDS415709	ELECTRIC GENERATOR	RDS10019012291 RDS1000844
RDS5762419	ELECTRIC GENERATOR	
RDS873359	CURRENT GENERATOR	
RDS8646180	ALTERNATING CURRENT GENERATOR	
RDS1001699	ABB AMG 400 S4	
RDS1001834	EXCITER	
RDS5762464	FREQUENCY GENERATOR	
RDS5762055	INDUCTOR GENERATOR	
RDS1001564	PULSE GENERATOR	
RDS5762100	SYNCHRONOUS GENERATOR	
RDS5762509	TACHO-GENERATOR	
	VOLTAGE GENERATOR	RDS415709



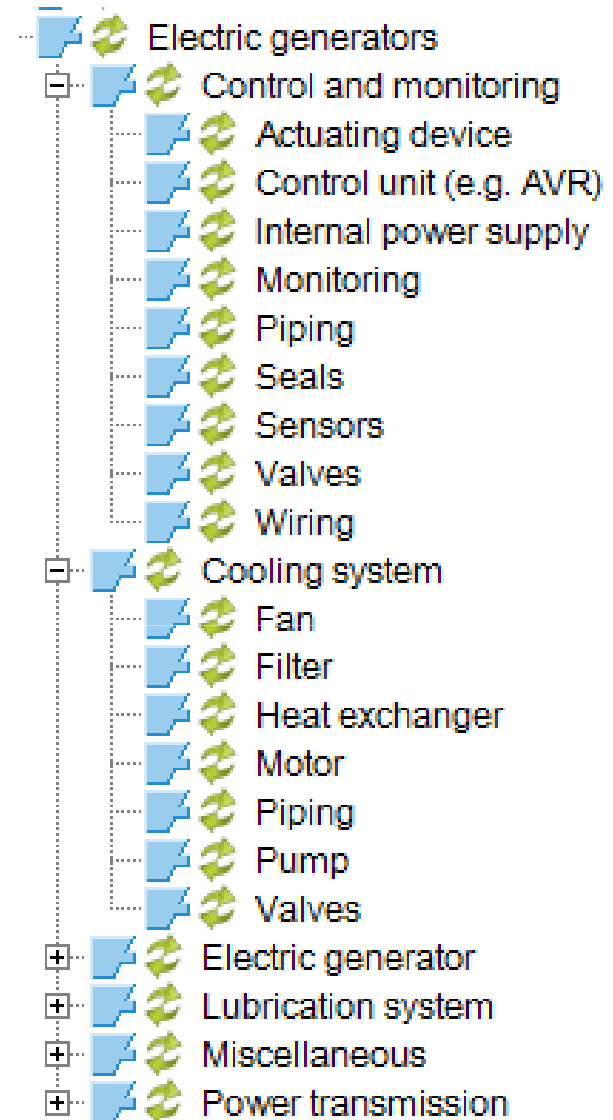
ISO14224 Example

**INTERNATIONAL
STANDARD**

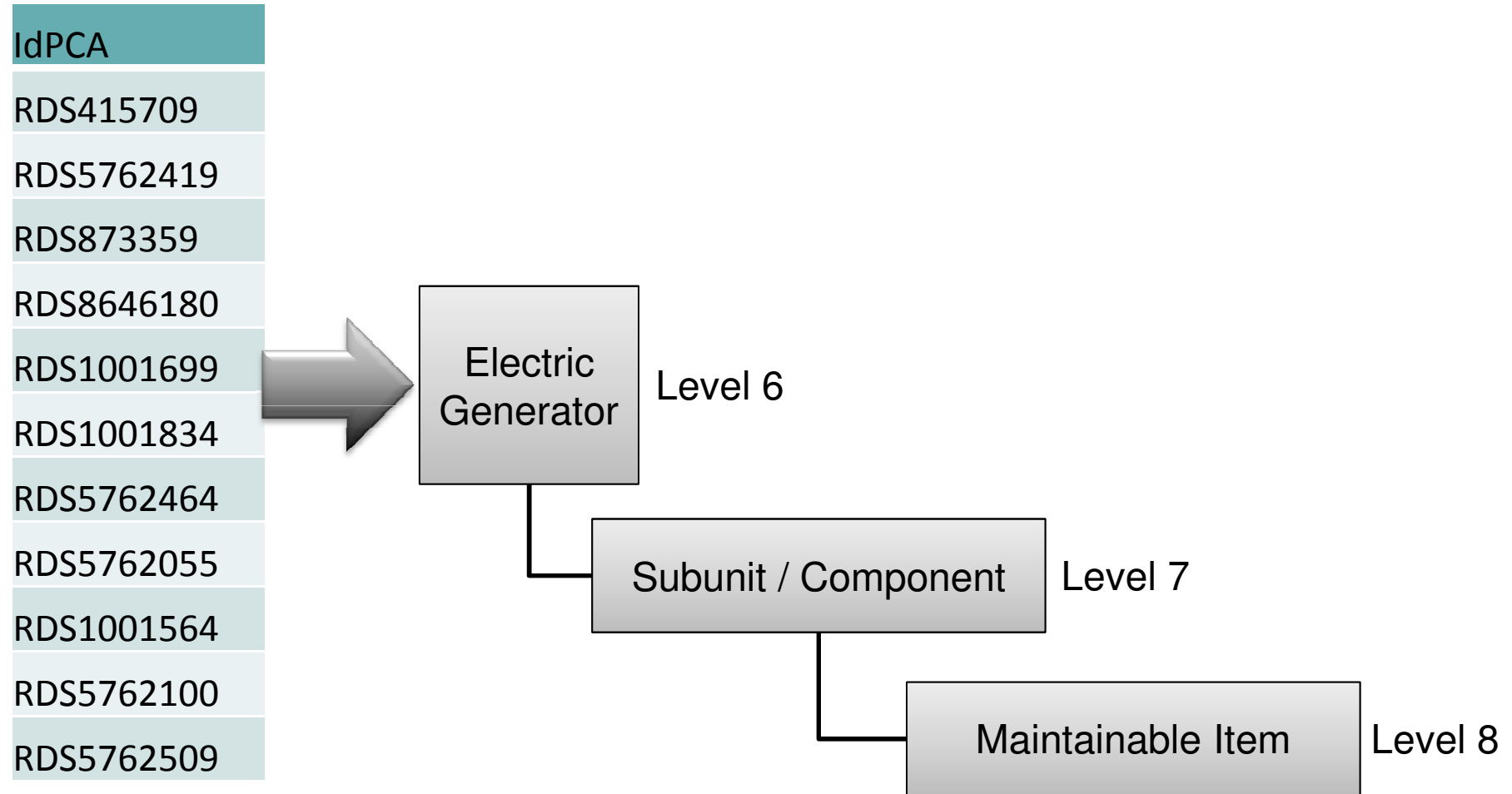
**ISO
14224**

Second edition
2006-12-15

Petroleum, petrochemical and natural gas industries — Collection and exchange of reliability and maintenance data for equipment



Mapping from Engineering to Maintenance

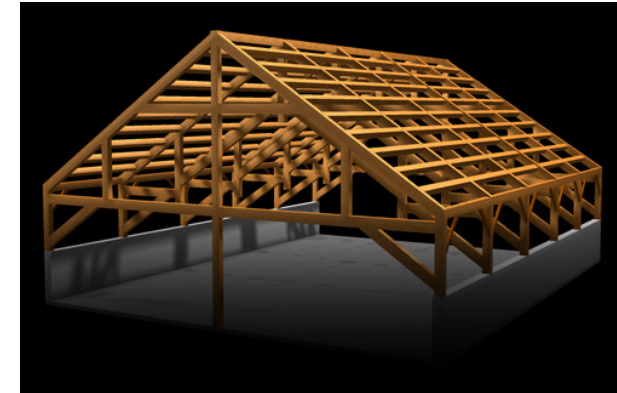


The Maintenance Problem?

Inputs



Results



- Engineer
- Built
- Data
- Relia
- Analy
- Vendor
- Information
- Feedback from
- Operations

**Not an ETL Problem
(Extract-Transform-Load)**

- Maintenance schedules
- Spare parts lists
- Operating Procedures
- Safety Procedures

Corporate Master Data
Standards.

/CMMS
ng
sure
h





It's not enough

ARC Workshop
Houston - October 13th, 2008

Operational Readiness
Reality Check

- ❖ Equipment data doesn't tell you how to operate, or maintain equipment in a safe and reliable manner.
- ❖ Other Information (usually document form)
 - ❖ Drawings
 - ❖ Recommended Operating Procedures
 - ❖ Recommended Safety Procedures
 - ❖ Recommended Maintenance Procedures
 - ❖ Recommended Maintenance schedules
 - ❖ Recommended spare parts lists.
 - ❖ etc
- ❖ If we get all of this and it's accurate, then we're done, right?



We're not done yet

ARC Workshop
Houston - October 13th, 2008

Operational Readiness
Reality Check

Recommended does not equal accepted or
optimized

- ❖ Review, Revise, and Accept
 - ❖ Make general procedures specific to the operation
 - ❖ Convert documents to data
 - ❖ Reflect Maintenance and Operating Strategies
 - ❖ Reflect established EHS policies and procedures
- ❖ Deliver,
 - ❖ Get it in the hands of the people who need them.

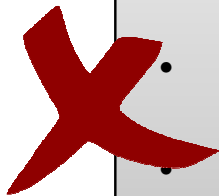


Business Challenges

Reduction of Maintenance Cost



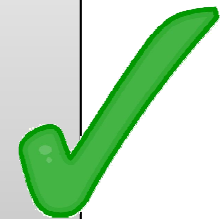
Reactive Maintenance
“Fix it when it breaks”



- Don't replace parts with remaining useful life
- Don't spend money on planning
- No requirement for Maintenance Master Data



Scheduled Maintenance
“Avoid breakdowns”



- Avoid impacts to Production, Environment and Life
- Lower costs by fixing small issues before they become large issues
- More efficient use of Personnel & Supply Chain
- **Requires high quality Maintenance Master Data**

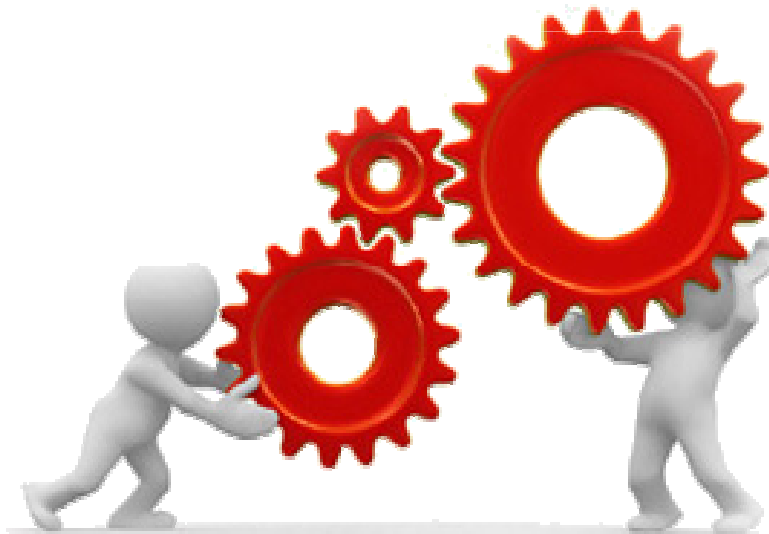
Reduction of IT Cost



Every application in the IT Landscape introduces an overhead and cost

Minimize the numbers of applications that IT has to support

Focus IT resources on keeping the core mission critical systems in operation to support the business functions



Organization Roles & Master Data

IT Organization defines a Template that incoming master data must conform to.

Typically a spreadsheet

Maintenance Organization builds Maintenance Master Data in the standard Template

Maintenance Organization responsible for quality of data



Common Issues with Template Approach

PRO : "We can do anything in a spreadsheet"

Limited Reuse & Standardization



Template Changes Frequently



Template spreadsheet process is error prone

I hate

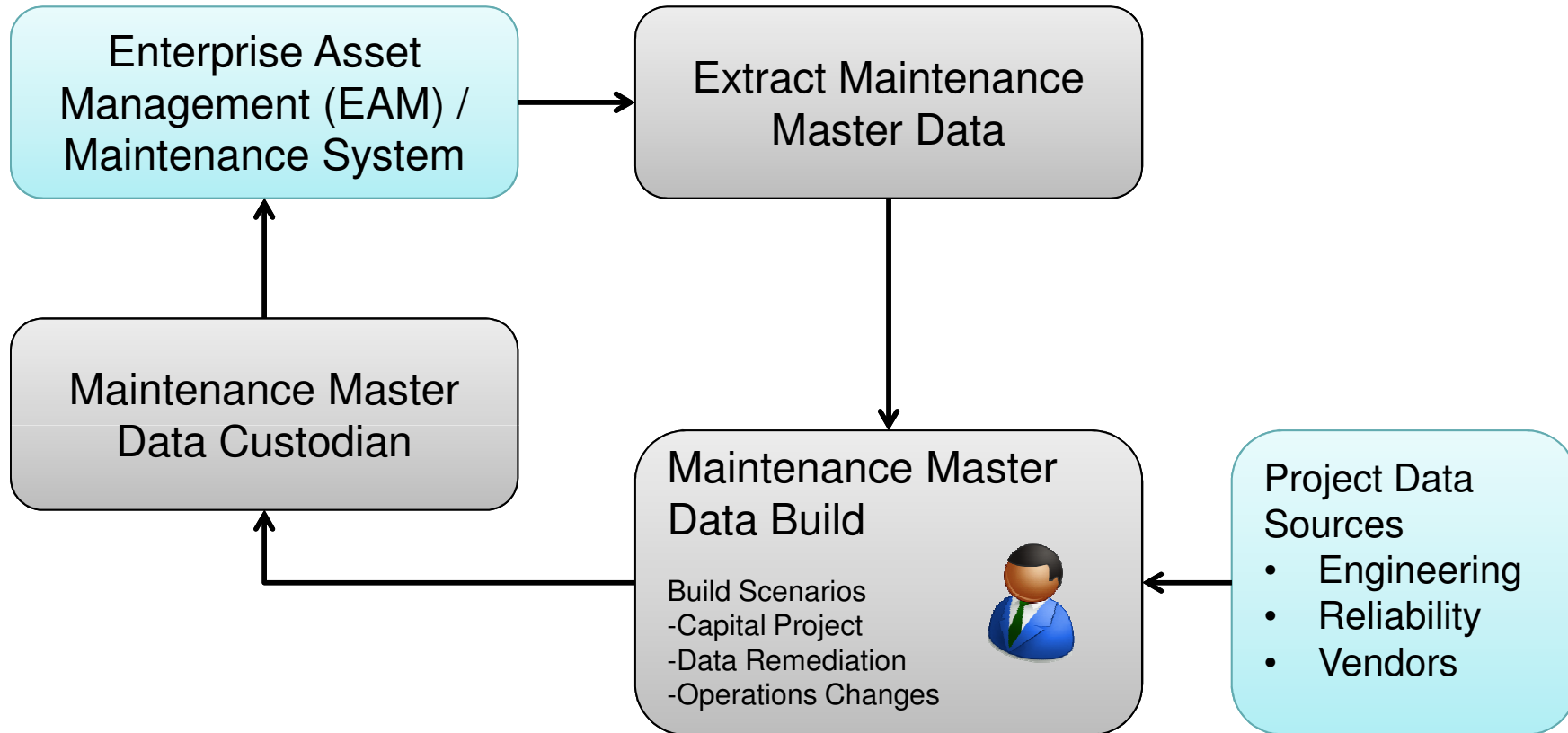


CON : "We can do anything in a spreadsheet"

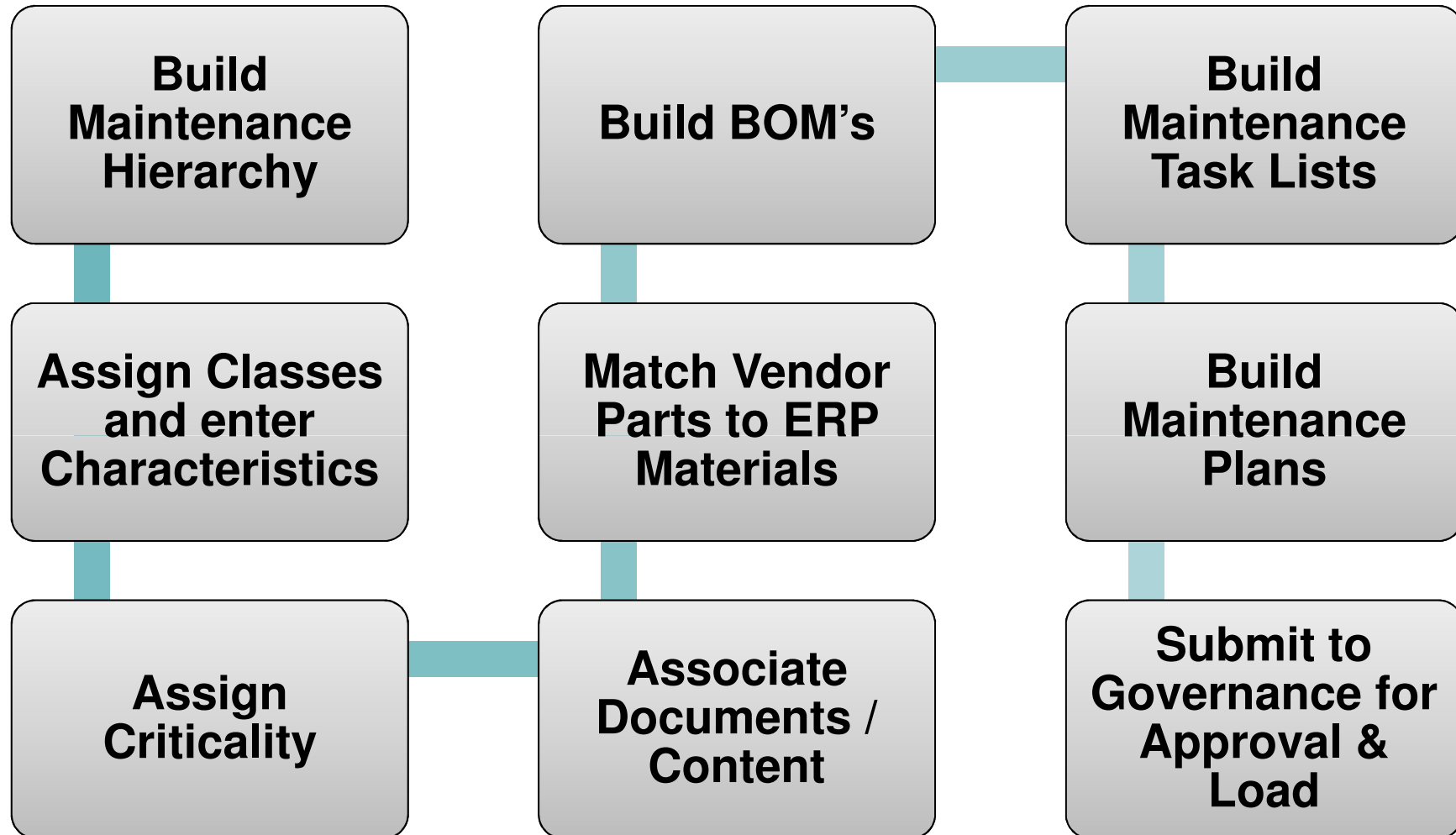
Concurrent Changes not Visible

Difficult to understand the impact of change

End to End Maintenance Build Process



Build Maintenance Master Data





Reference Data

General Reference Data

- Data Dictionary
- Units of Measure/Issue
- Classes & Characteristics

Dictionary Entries

Field Name	Field Code	Data Type
Material Group	MATKL	string
Base Unit of Measure	UNIT_OF_MEASURE	string
Division	SPART	string
Industry Sector	MBRSH	string
Material Type	MTART	string
Old Material Number	BISMT	string
Vendor Number	LIFNR	string
Account category reference	ACCT_CAT	string
Valuation Class	VALUATION_CLASS	string
Planning Plant	WERKS	string
Work Center	ARBPL	string
Currency	WAERS	string
Maintenance Plant	PLANT	string
Business area	GSBER	string

Change Number	Entry Type Field Name	Entry Type Field Code	Entry Name	Entry Code
Inspection Point	Equipment category	EQTYP	Containers	C
Plant associated		EQTYP	Machines	M
		EQTYP	Production resources/tools	P
		EQTYP	Serialised Assets	Z
	Functional location category	FLTYP	Hierarchy Functional Assets	A
		FLTYP	Tag Functional Assets	B
		FLTYP	Organisational Structure	C
		FLTYP	Tags Non Maintainable	D
	Country of manufacture	HERLD	Andorra	AD
		HERLD	Utd. Arab. Emir.	AE
		HERLD	Afghanistan	AF
	HERLD	Antigua/Barbads	AG	
	HERLD	Anguilla	AI	
	HERLD	Albania	AL	

Units Of Measure

Actual Customer EAM UOM		ISO15926 Part 4 UOM		
UOM Code	UOM Description	CODE	DESCRIPTION	CATEGORY
MS2	Meter/second squared	m/s2	metre per second squared	acceleration scale
DEG	Degree angle	dega	degree-angle	angle scale
ACR	Acre	acre	acre	area scale
FTK	Square foot	ft2	square foot	area scale
HAR	Hectare	ha	hectare	area scale
INK	Square inch	in2	square inch	area scale
KMK	Square kilometer	km2	square kilometre	area scale
MIK	Square mile	mile2	square mile	area scale
YDK	Square yard	yd2	square yard	area scale
KGV	Kilogram/cubic meter	kg/m3	kilogram per cubic metre	density scale
PAS	Pascal second	Pa.s	pascal second	dynamic viscosity scale
AH	Ampere hour	A.h	ampere hour	electric charge scale
GV	Gigajoule	GJ	gigajoule	energy scale
M2S	Square meter/second	m2/s	square metre per second	kinematic viscosity scale

Dictionary Values

Classes & Characteristics

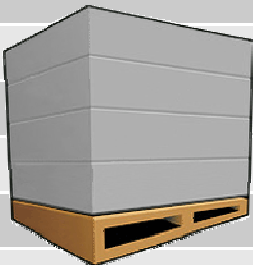
Table A.34 — Equipment-specific data — Heat exchangers

Name	Description	Unit or code list	Priority
Fluid, hot side	Fluid type	Oil, gas, condensate, freshwater, steam, sea water, crude oil, oily water, flare gas, water/glycol, methanol, nitrogen, chemicals, hydrocarbon, air	High
Fluid, cold side	Fluid type	Oil, gas, condensate, freshwater, steam, sea water, crude oil, oily water, flare gas, water/glycol, methanol, nitrogen, chemicals, hydrocarbon, air	High
Rated heat transfer	Design value	Kilowatt	Medium
Heat-transfer area	—	Metres squared	Medium
Utilization	Used/rated heat transfer	Percent	Medium
Pressure, hot side	Design pressure	Pascal (bar)	Medium
Pressure, cold side	Design pressure	Pascal (bar)	Medium
Temperature drop, hot side	Operating	Degrees Celsius	Low
Temperature rise, cold side	Operating	Degrees Celsius	Low
Size – diameter	External	Millimetres	Medium
Size – length	External	Metres	Medium
Number of tubes/plates	—	Number	Low
Tube/plate material	Specify material type in tubes/plates.	Free text	Medium

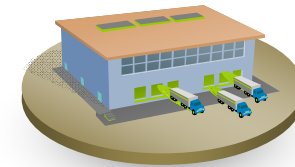


Supply Chain Reference Data

ERP Materials

Master Data Category	Example Items
Basic data	Description, Basic Unit of Measure
Purchasing	Manufacturer Part number, Manufacturer
General plant data storage	Temperature, Container
Warehouse Management	
MRP (Material required planning)	
Accounting	Valuation Class, Currency, Tax Price
Costing	
Quality Management	
Plant Stock	
Storage Location Stock	
Classification	
Forecasting	
Purchase Order Text	
Foreign Trade: Import Data	

May have multiple Parts/Vendors per Material



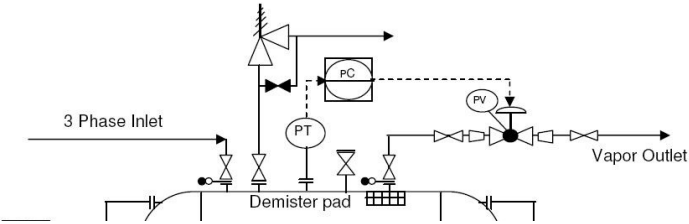
ERP Manufacturers

Need to avoid duplicates

INGERSOL RAND
 INGERSOLL RAND
 INGERSOLL-RAND
 INGERSOL-RAND

Typically controlled by the Supply Chain Organization with Master Data Governance Solutions

Asset Hierarchy



ERROR: stackunderflow
OFFENDING COMMAND: ~
STACK: