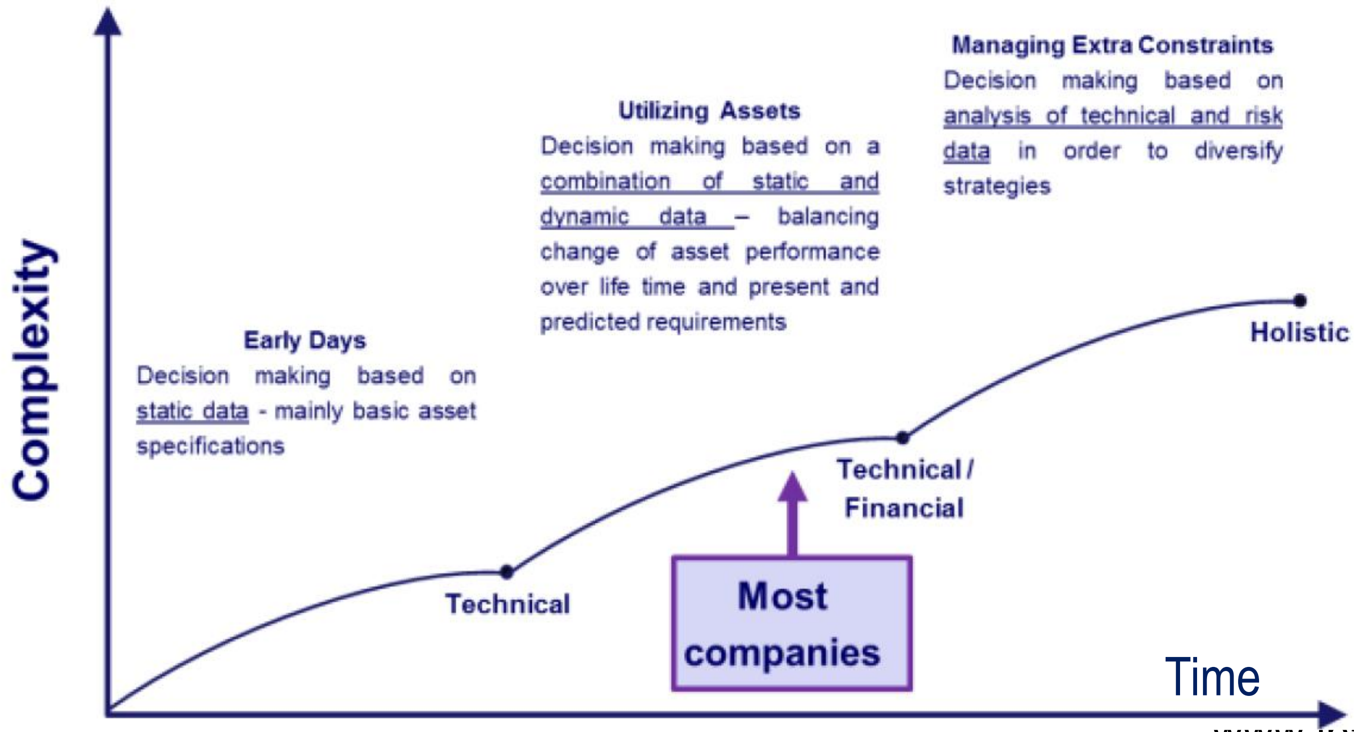
An Introduction to Asset Information Management and Implementations for EBAM

www.ipamc.org

Part 1:
Introduction

Why the asset information is necessary?

The ability to make sound **asset decisions** is dependent on having the right information. is a critical enabler for Asset Management.



Why the asset information is necessary?

Information should be needed to support one or more defined business process

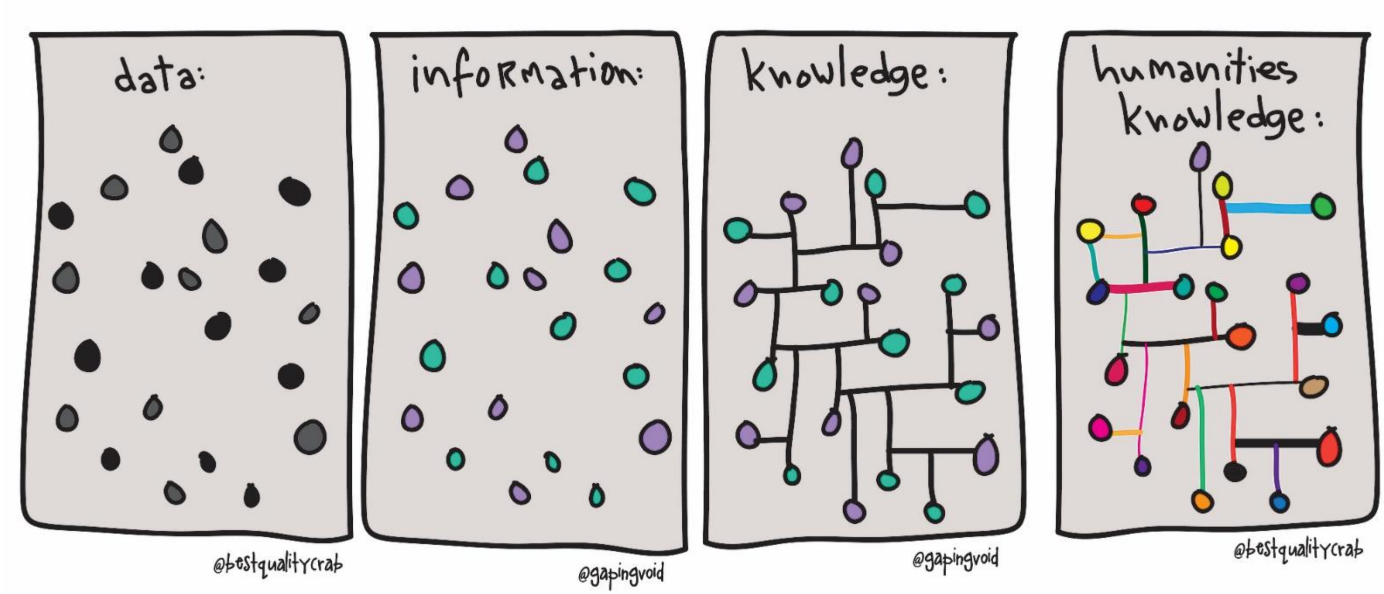
Strategic: To support a “Strategic Objectives”. (e.g measures of performance, environment, etc)

Tactical: To support “Technical Policy Development” (e.g. reliability, maintenance and failure data.

Operational: To deliver asset related work (e.g. location data to perform work at site)

From data to information

Information is the transformation of data into a usable form. Although data is information in and of itself, it is raw and outwardly inadequate to be of any specific use.



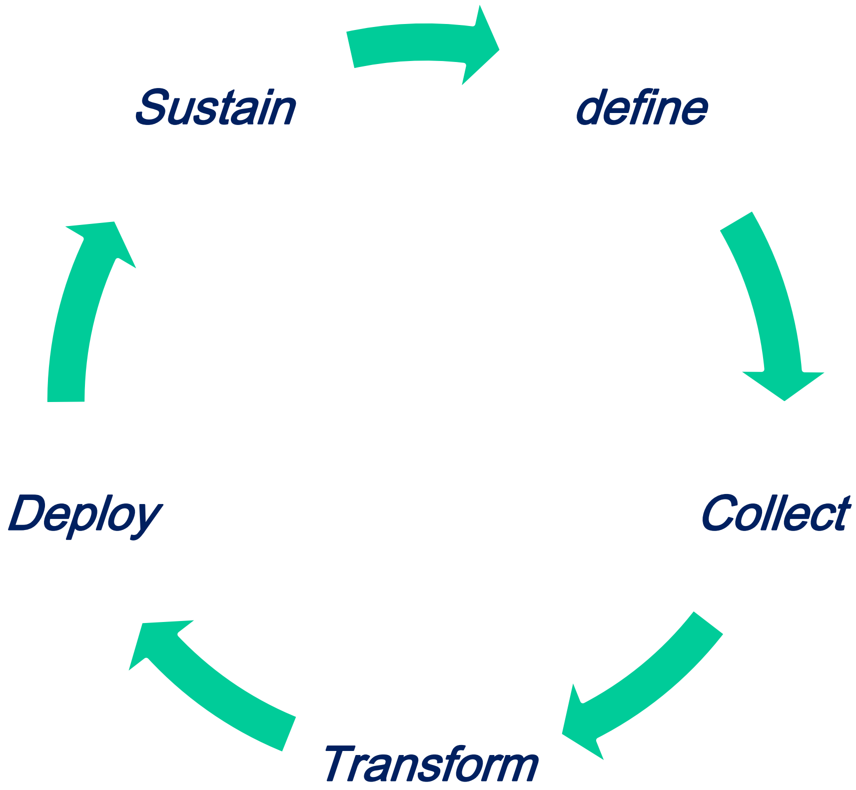
Information as an asset

An information asset is a body of information, defined and managed as a single unit so it can be understood, shared, protected and exploited effectively.

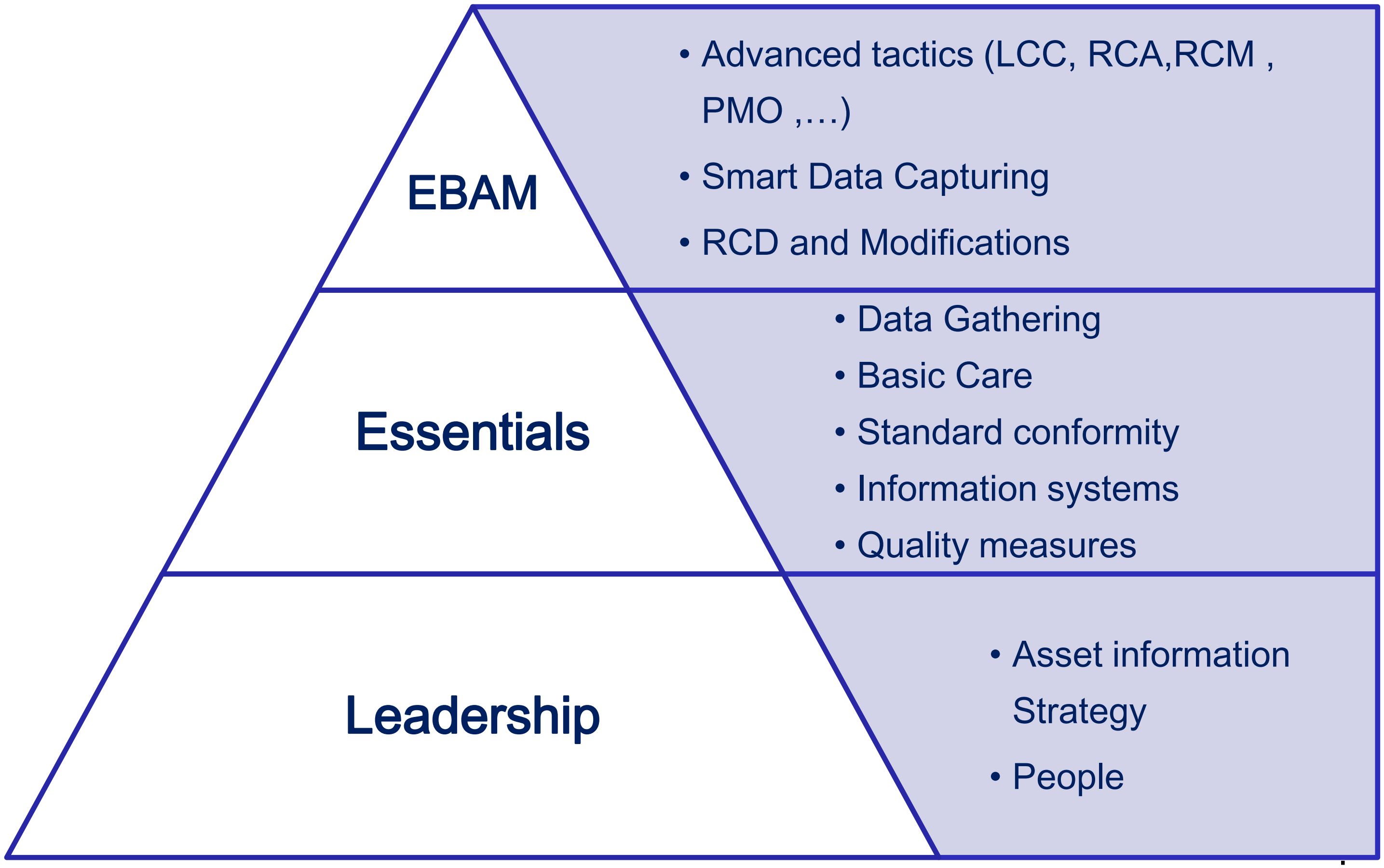
Information assets have recognizable and managed value, risk, content and lifecycles.

- A database of contacts is a clear example of a single information asset.
- All the files associated with a specific project may be considered a single information asset.

Asset Information life cycle



Excellence in Asset Information management



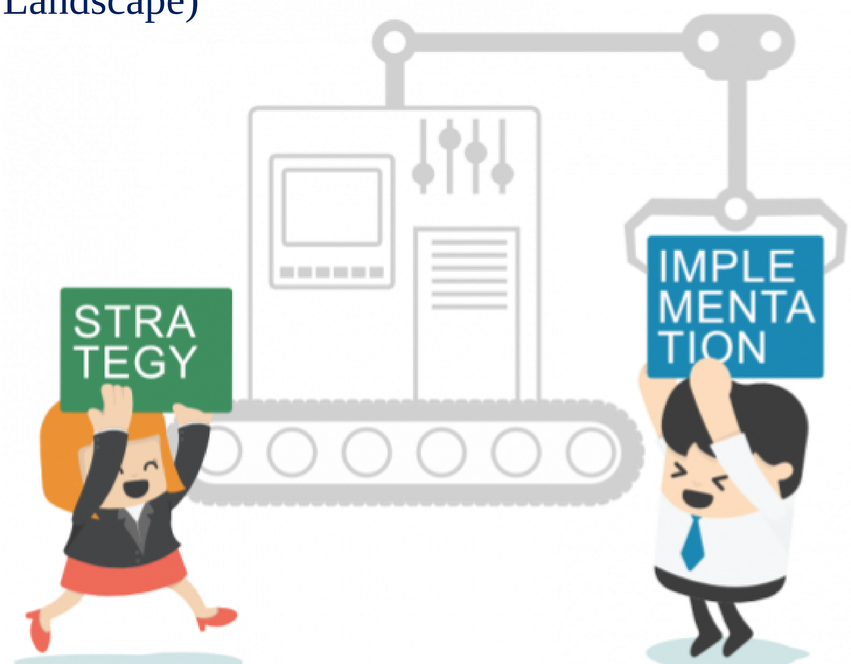
International Physical Asset Management Conference

Strategy

Definition:

The strategic approach to the definition, collection, management, reporting and overall governance of asset information necessary to support the implementation of an organization’s asset management strategy and objectives.

(The GFMAM AM Landscape)



www.ipamc.org

People

Bottom up operational information should align with the top down strategic information, and business reporting should be based on a **"single source of truth".**

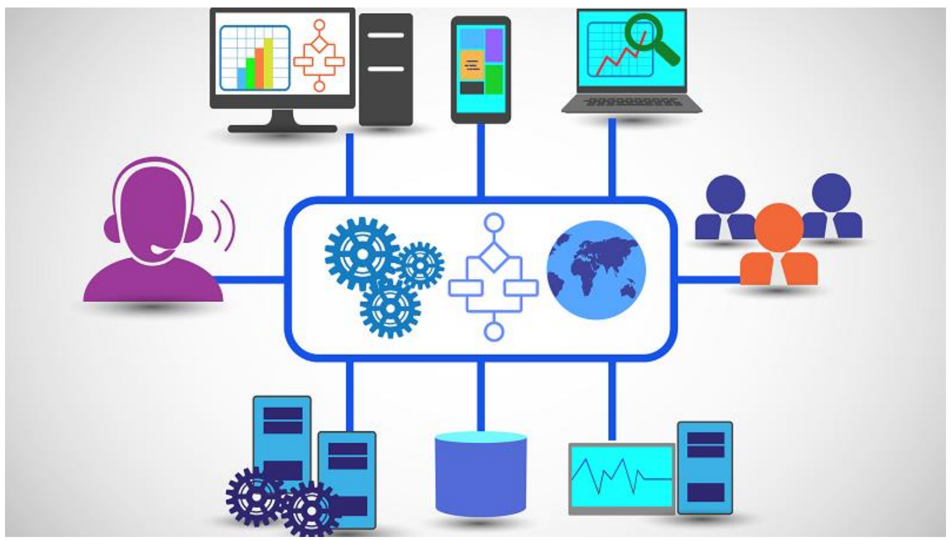
Standard conformity

Asset information standards includes the development of standards and guidelines that insure a consistent approach to the recording of asset information needs defined in the asset information strategy.

- ***ISO 55001, Asset management — Management systems — Requirements, Clause 7.5***
- ***ISO 27000/1/2- Information security management systems***
- ***ISO 14224- Petroleum, petrochemical and natural gas industries Collection and exchange of reliability and maintenance data for equipment***

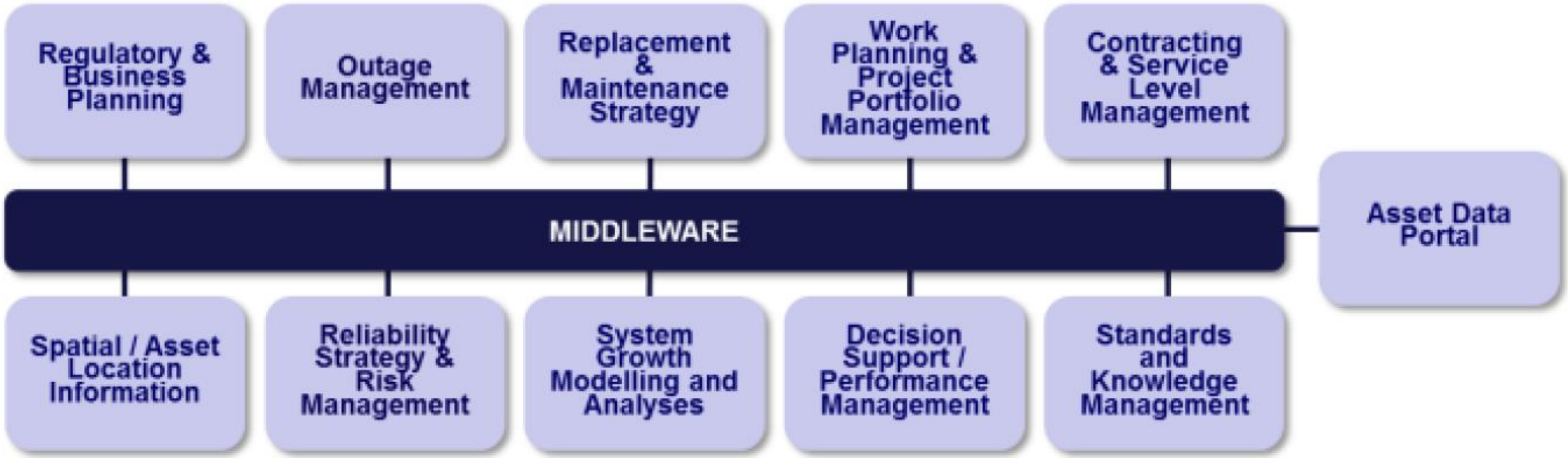
Information system

An asset management information system is a computer-based system (e.g. CMMS/EAM) which is designed to assist the user to create and maintain documentation for the asset management function.



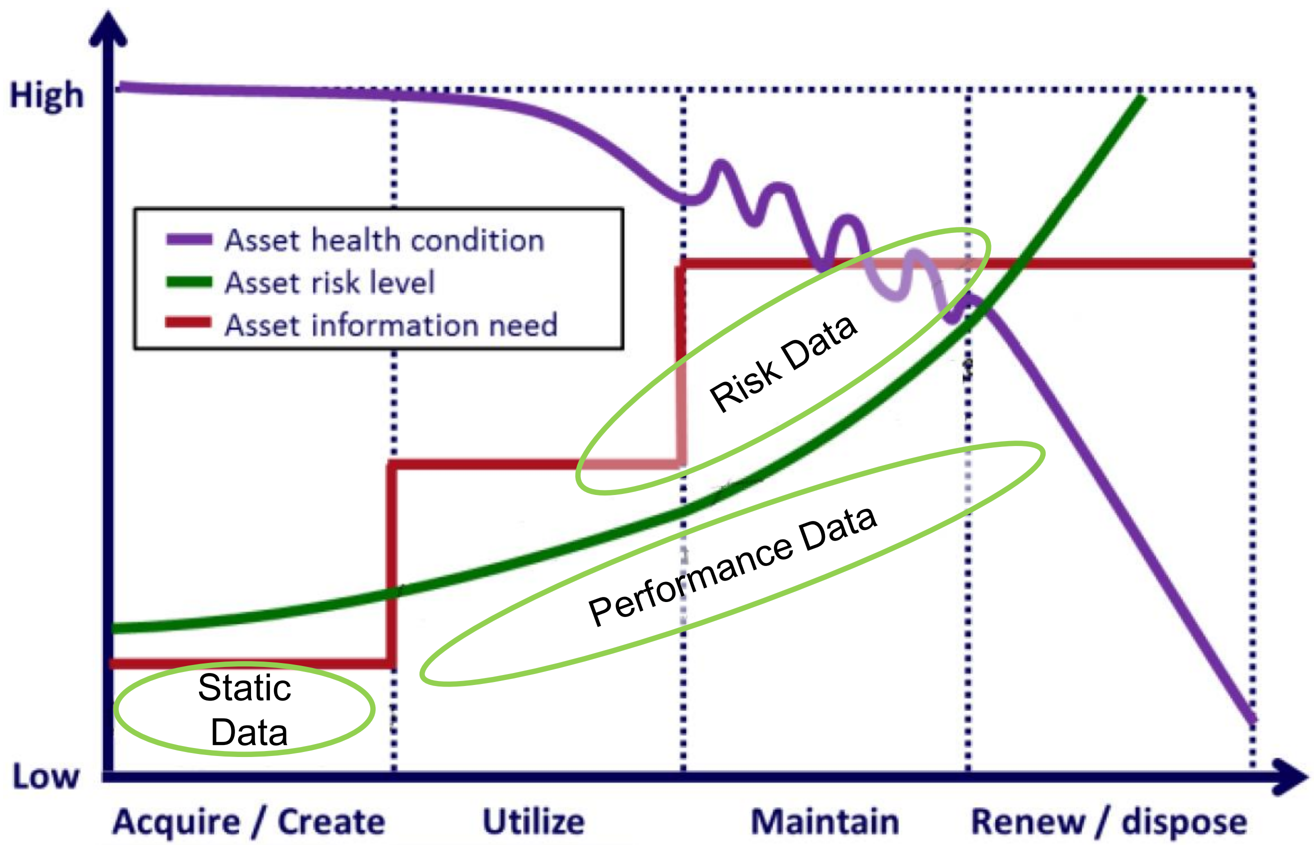
www.ipamc.org

Information system



Source: Application Service Areas of IT Architecture [Vroedt & Hoving]

Data Gathering through asset life cycle



Development of data needs during an asset's life cycle [Vroedt & Hoving]

Data Gathering through asset life cycle

ACQUIRE: Static Data

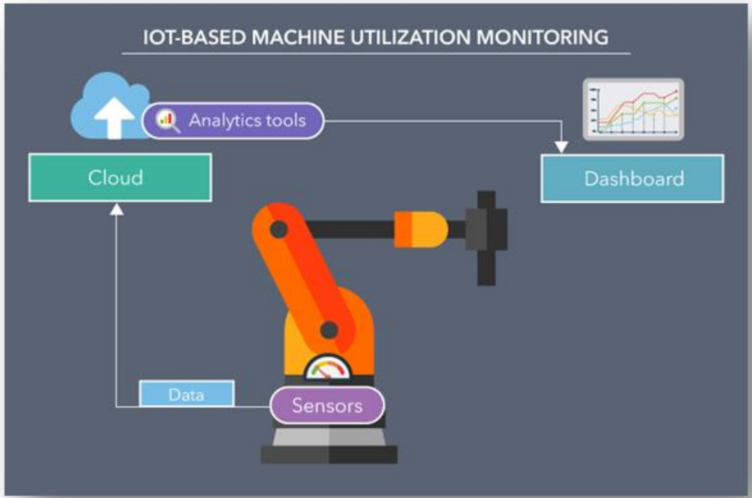
- Asset identification
- Asset class
- Equipment components
- Engineering data
- Asset location

www.ipamc.org

Data Gathering through asset life cycle

UTILIZE: Performance Data

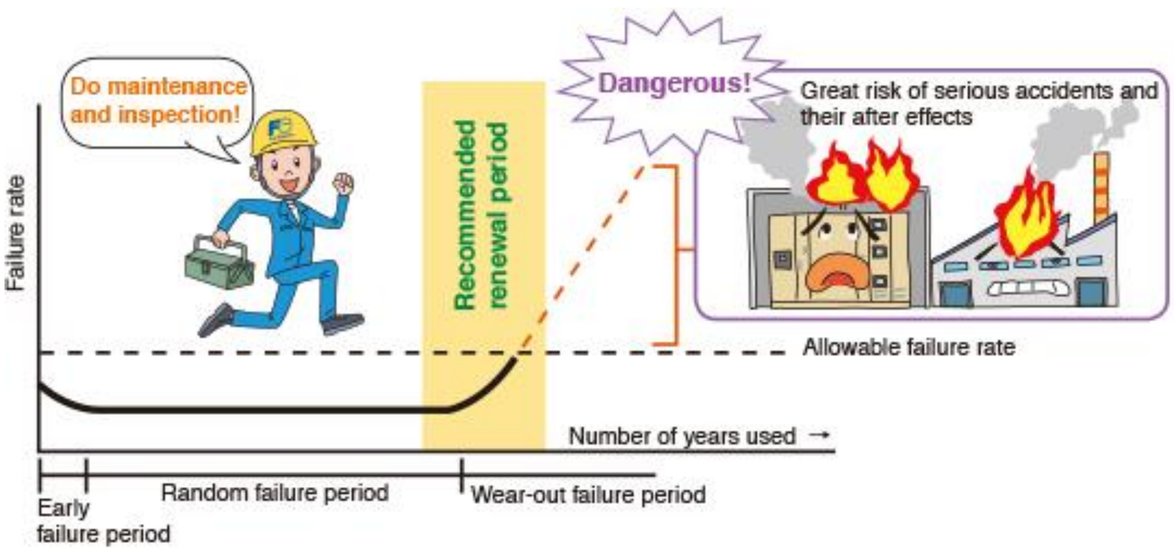
- In-service records
- Condition survey
- Maintenance history
- Asset outage statistics
- Asset defect statistics
- Asset fault statistics
- Utilization / loads statistics
- Targets and measures



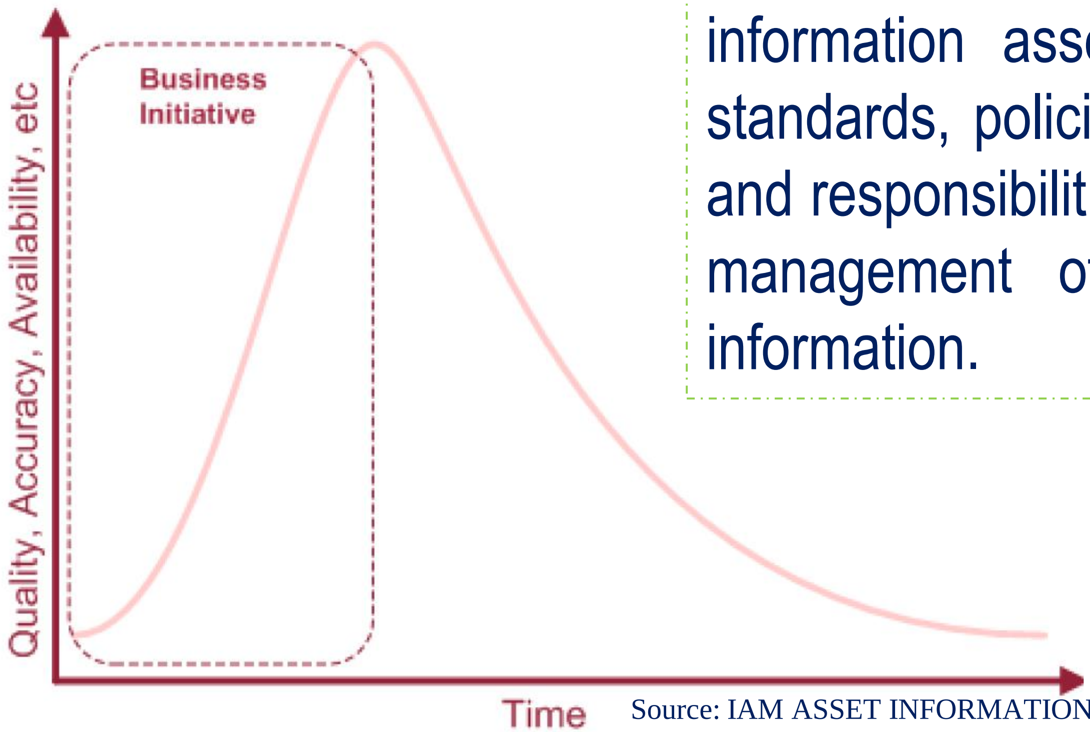
Data Gathering through asset life cycle

MAINTAIN/RENEW: Risk Data

Miscellaneous data needed for sound and defendable decision making like regulatory requirements and risk documentation but also safety, benchmark data, customer interruption and status of work in relation to targeted risk reduction



Sustaining quality (information governance and support)



Information governance and support is how an organization controls its information assets. It includes the standards, policies, processes, roles and responsibilities that direct overall management of an organization's information.

Source: IAM ASSET INFORMATION GUIDELINES

Sustaining quality (information governance and support)

People, Roles & Responsibilities

- Who manages information ?
- Information consumers
  Information creators
- Business Area Sponsors
- IT Services

Knowledge of Information

- List of Information Assets
- Risk of information
- IT System Maps
- Asset Management Policies
- Business Process Maps
- Quality of information

Management arrangements

- Documented Rules & Requirements
- AM & Business Policies & Strategies
- Information & Data Standards
- Quality system: Local & Corporate
- Supply Contract arrangements

Source: IAM ASSET INFORMATION GUIDELINES

Quality Measures

Asset data quality encompasses a number of specific data quality measures:

- Accuracy
- Completeness
- Consistency
- Validity
- Timeliness
- Uniqueness

Source: IAM Anatomy

EVIDENCE-BASED ASSET MANAGEMENT

There are five key evidence based asset management decision areas:

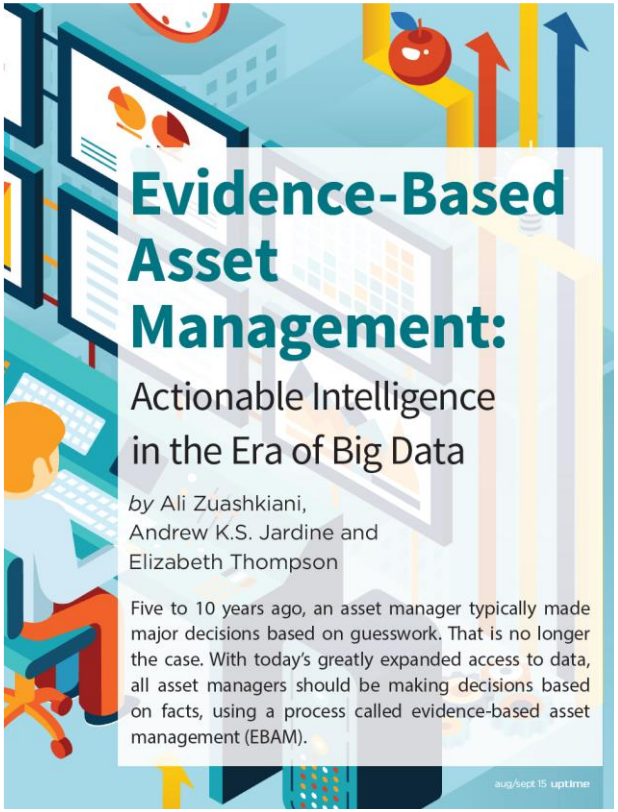
1. Optimizing life cycle costing decisions;

2. Optimizing maintenance tactics such as preventive replacement strategies;

3. Optimizing inspection policies such as predictive maintenance and failure finding intervals;

4. Optimizing resource requirements such as establishing maintenance crew sizes;

5. Ensuring the right spares and the right time



Evidence-Based Asset Management:

Actionable Intelligence in the Era of Big Data

by Ali Zuashkiani, Andrew K.S. Jardine and Elizabeth Thompson

Five to 10 years ago, an asset manager typically made major decisions based on guesswork. That is no longer the case. With today's greatly expanded access to data, all asset managers should be making decisions based on facts, using a process called evidence-based asset management (EBAM).

aug/sept 15 uptime

EVIDENCE-BASED ASSET MANAGEMENT

AM Analysis:

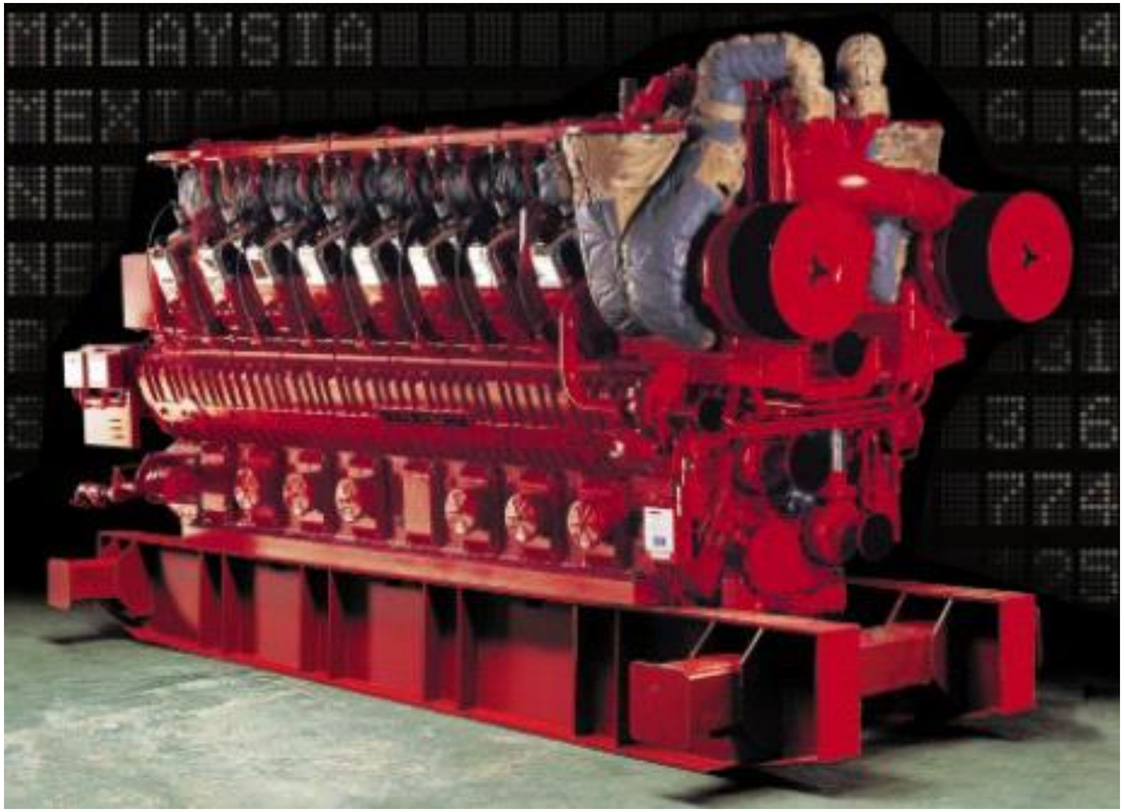
- Life Cycle Costing (LCC)
- Reliability/ Availability Analyses
- Reliability Centered Maintenance (RCM)
- Root Cause Analysis (RCA)
- Spare-parts analysis (SPA)

Safety Analysis:

- Risk-based Inspection (RBI)
- Safety Integrity Level (SIL)
- Quantitative Risk Analysis (QRA)
- Environmental- and social-impact assessment (ESIA)

Part 2:
Evident Base Asset Management (EBAM) Examples

Combustion engine



PERDEC - Main

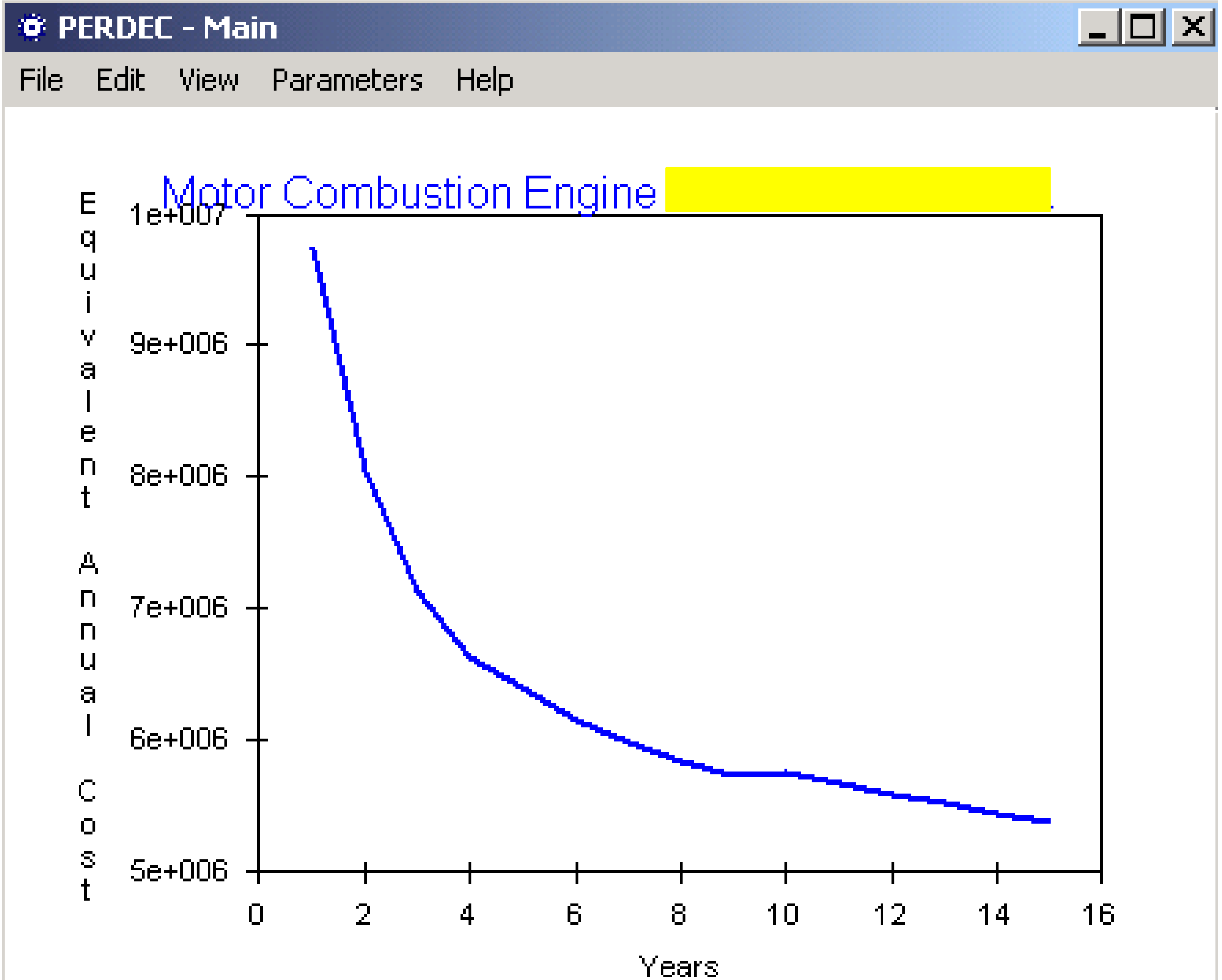
File Edit View Parameters Help

Description: Motor Combustion Engine

Number of Years: 15 Acquisition Cost: 19,000,000 Best Year: 15

Parameters

Age of Machine(s)	O&M Cost	Resale Value	Resale Rate(%)	EAC
1 Year Old	1,865,452	14,250,000	75	9,745,270
2 Years Old	1,785,272	12,350,000	65	8,045,406
3 Years Old	1,777,479	11,400,000	60	7,124,224
4 Years Old	1,706,532	10,450,000	55	6,623,218
5 Years Old	2,152,536	9,500,000	50	6,381,419
6 Years Old	1,706,532	8,550,000	45	6,147,929
7 Years Old	1,706,532	7,600,000	40	5,971,463
8 Years Old	1,706,532	6,650,000	35	5,831,667
9 Years Old	1,706,532	5,700,000	30	5,717,186
10 Years Old	3,791,041	4,750,000	25	5,739,227
11 Years Old	1,706,532	3,800,000	20	5,652,398


PERDEC - Main
File Edit View Parameters Help
Motor Combustion Engine
Equivalent Annual Cost
1e+007
9e+006
8e+006
7e+006
6e+006
5e+006
0 2 4 6 8 10 12 14 16
Years

Electric engine

PERDEC - Main

File Edit View Parameters Help

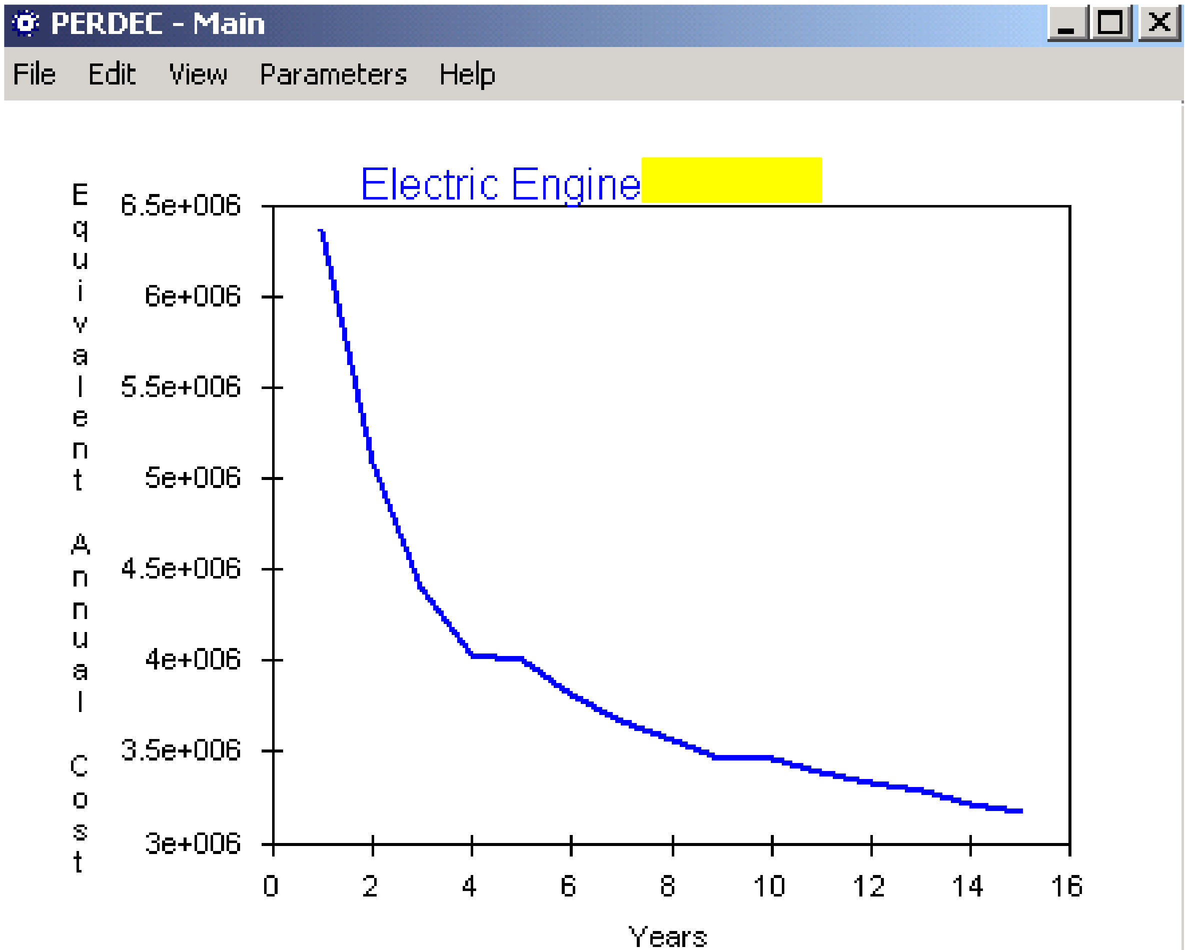
Description: Electric Engine

Number of Years: 15 Acquisition Cost: 14,527,281 Best Year: 15

Parameters

Age of Machine(s)	O&M Cost	Resale Value	Resale Rate(%)	EAC
1 Year Old	477,551	10,895,461	75.0000	6,360,096
2 Years Old	477,551	9,442,733	65.0000	5,093,182
3 Years Old	477,551	8,716,369	60.0000	4,401,685
4 Years Old	477,551	7,990,005	55.0000	4,037,466
5 Years Old	1,604,027	7,263,640	50.0000	3,997,722
6 Years Old	477,551	6,537,276	45.0000	3,811,215
7 Years Old	477,551	5,810,912	40.0000	3,670,698
8 Years Old	477,551	5,084,548	35.0000	3,559,710
9 Years Old	477,551	4,358,184	30.0000	3,469,069
10 Years Old	1,604,027	3,631,820	25.0000	3,457,035
11 Years Old	477,551	2,905,456	20.0000	3,389,817

Electric engine



Conclusion

For combustion engine :
Minimum EAC is @ 15 years and is $ 5,364,911

For electric engine:
Minimum EAC is @ 15 years and is $ 3,167,937

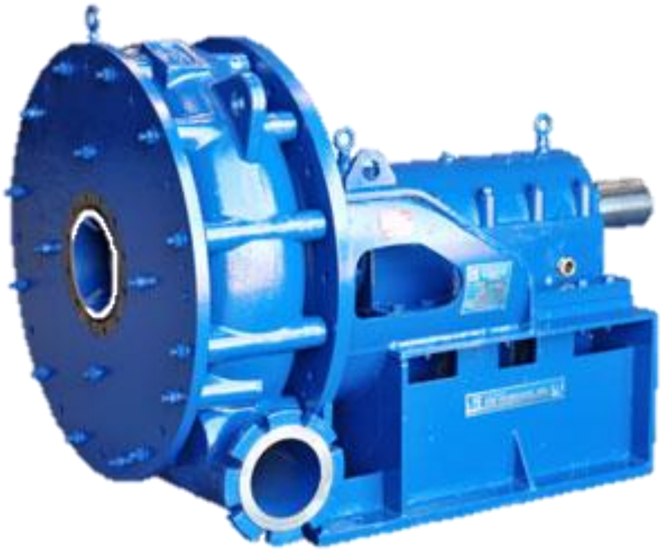
“Best buy” is electric engine and economic benefit per year is:
$ 2,196,938

Thus over a 15 year life the overall benefit is:
$ 32, 954, 070 per engine. (15 x 2,196,938)

Fleet size is 4
OVERALL ECONOMIC BENEFIT = **$ 131,816,280**

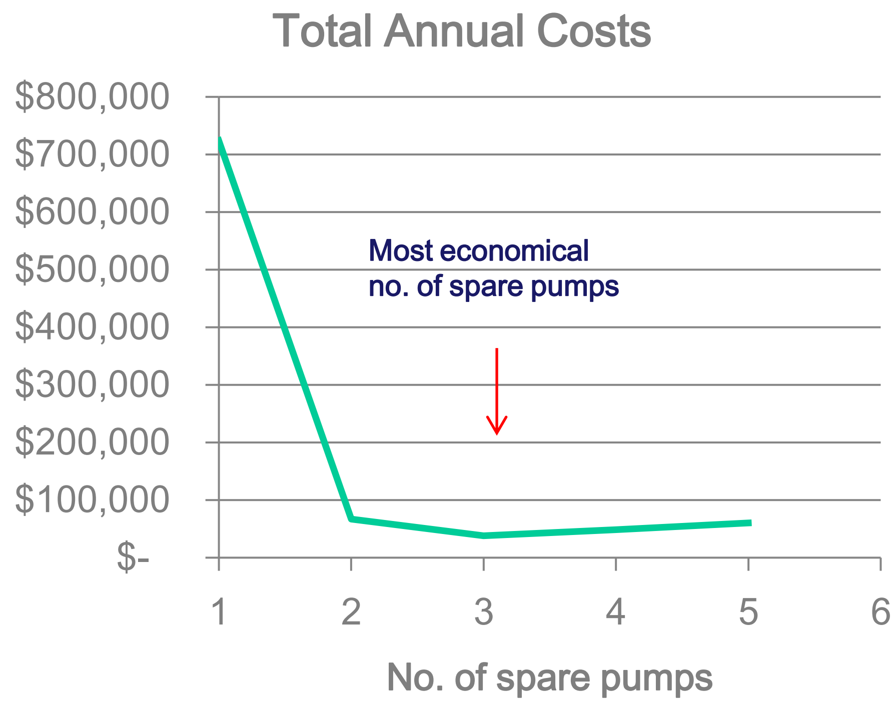
Optimum Number of Capital Spares-TFT Pumps

Number of Pumps	**6**
3 Barges on Sand Dump 8	
MTB removals (days)	**456.25**
MTTRepair (days)	**14**
Cost of Spare Pump	**$110,000.00**
Down time cost ($/day)	**$125,000.00**
Holding Cost ($/day)	**$33.15**



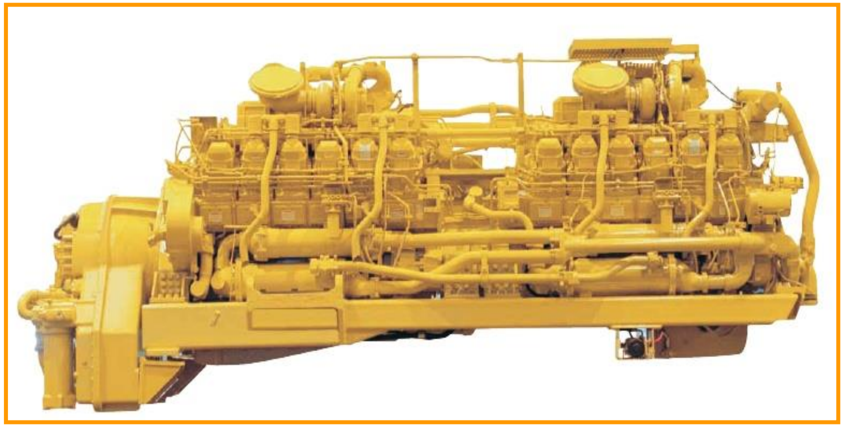
Optimum Number of Capital Spares-TFT Pumps

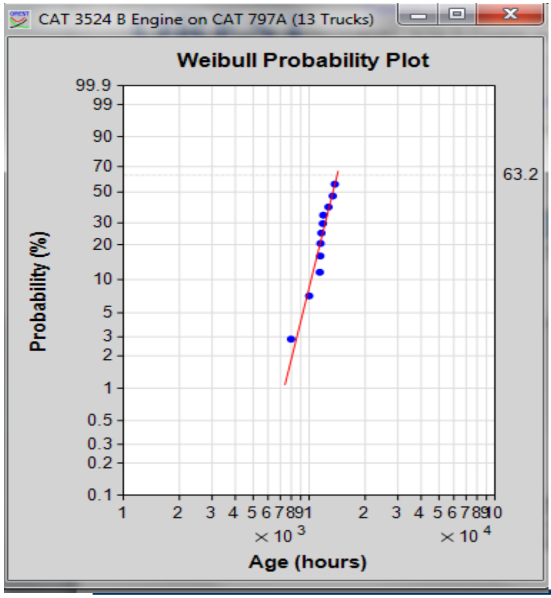
No. of Spares	Annual Cost	Reliability
0	$ 8,154,100	97.02%
1	$ 724,525	99.74%
2	$ 66,832	99.98%
3	$ 38,216	100.00%
4	$ 48,399	100.00%
5	$ 60,517	100.00%

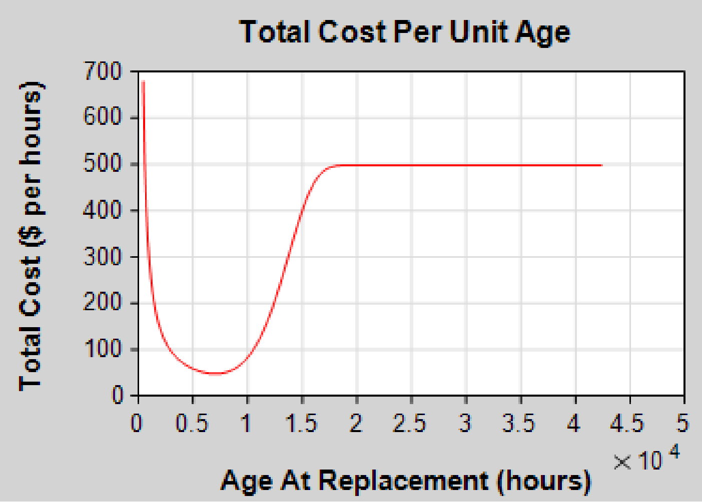


Optimum Preventive Replacement of Cat 3524B Engines

ABC currently operates a fleet of 13 CAT 797A Haul Trucks at their Oil Sands facility at Ft McMurray in Alberta. All of these machines are powered by CAT 3524 Diesel Engines, which have been experienced failures on different systems. Current Part Contract expects 18000 GOH for Engine Change-Out. The propose of this analysis is to assess the optimal engine replacement time based on ages and costs by using available data







Optimum Policy

Optimum policy is to replace the engines every 7000 hours.

Expected savings for the whole fleet of 13 trucks compared to the OEM recommended replacement time of 18000 hours:

$40,000,000 per year

www.ipamc.org

Questions