



BILFINGER

TEBODIN

Tebodin

ISO 55000 Integration of Engineering and Maintenance

Bunnik | September 18th 2014

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- Introduction
- Scope ISO 55000
- Tebodin vision on Asset management
- ISO 55000 implementation



Leendert Dekker

Sr. Consultant Asset Management & Maintenance



- Specialized in support of organizations with:
 - Development and implementation of Asset Management (ISO 55000).
 - Performance contracts
 - Reliability Engineering (Life Cycle Cost Analysis)
 - Maintenance analysis
- Experience:
 - Food & Beverage, Defense, Infra, Property, Energy, Ports & Terminals, Oil & Gas & Chemicals
- Education:
 - MSc. Industrial Engineering & Management - TUE
 - BSc. Mechanical Engineering



Consultancy

- Economics and finance
- Environment and safety
- Energy
- Logistics
- Safety and risk management
- Asset Management & Maintenance
- Permitting support

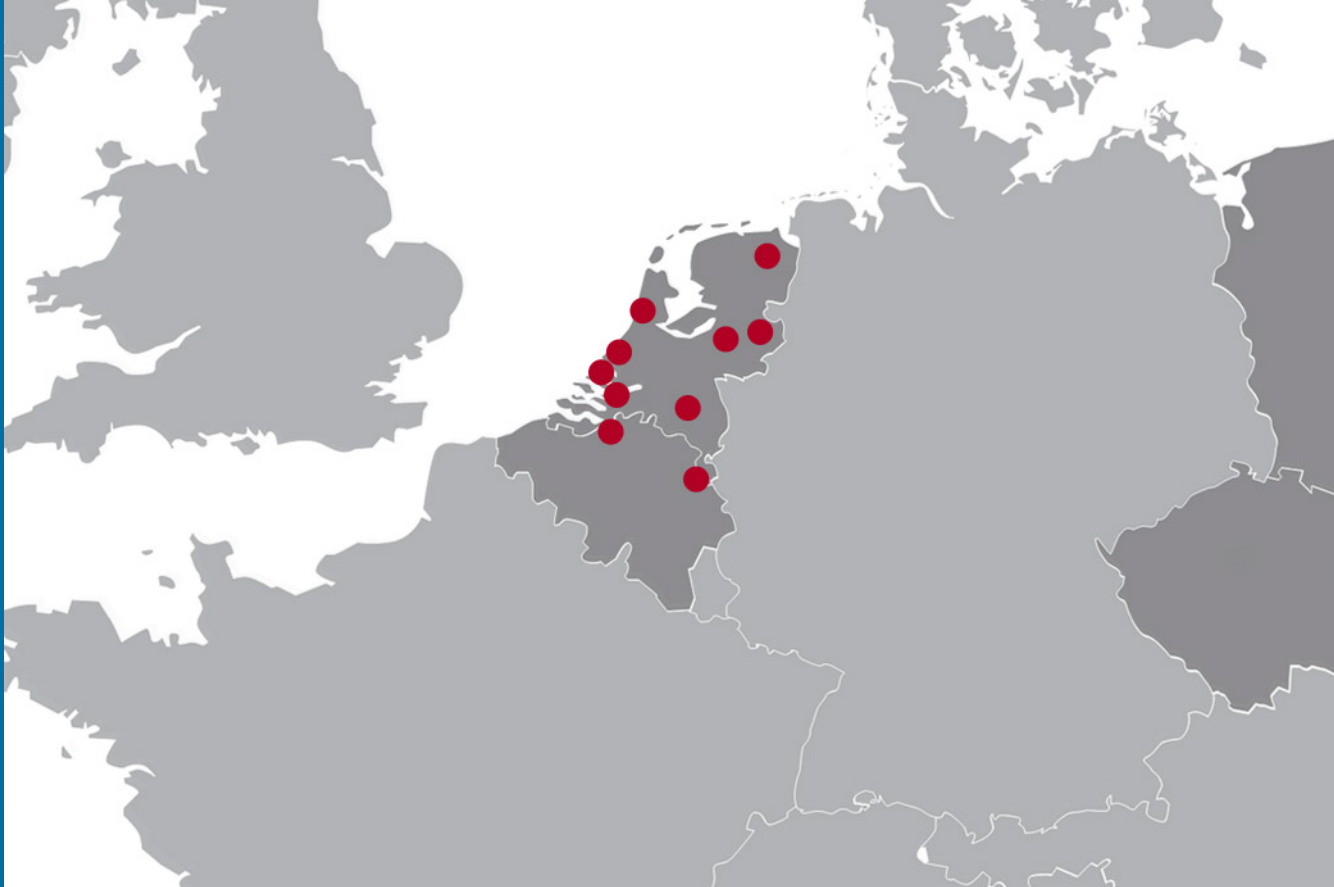
Design and engineering

- Process technology
- Civil, structural, architectural
- Infrastructure
- Building services, HVAC
- Mechanical
- Piping
- Electrical and process control
- Pipelines

Project services

- Project and construction management
- Construction supervision
- Procurement
- Estimating
- Project control

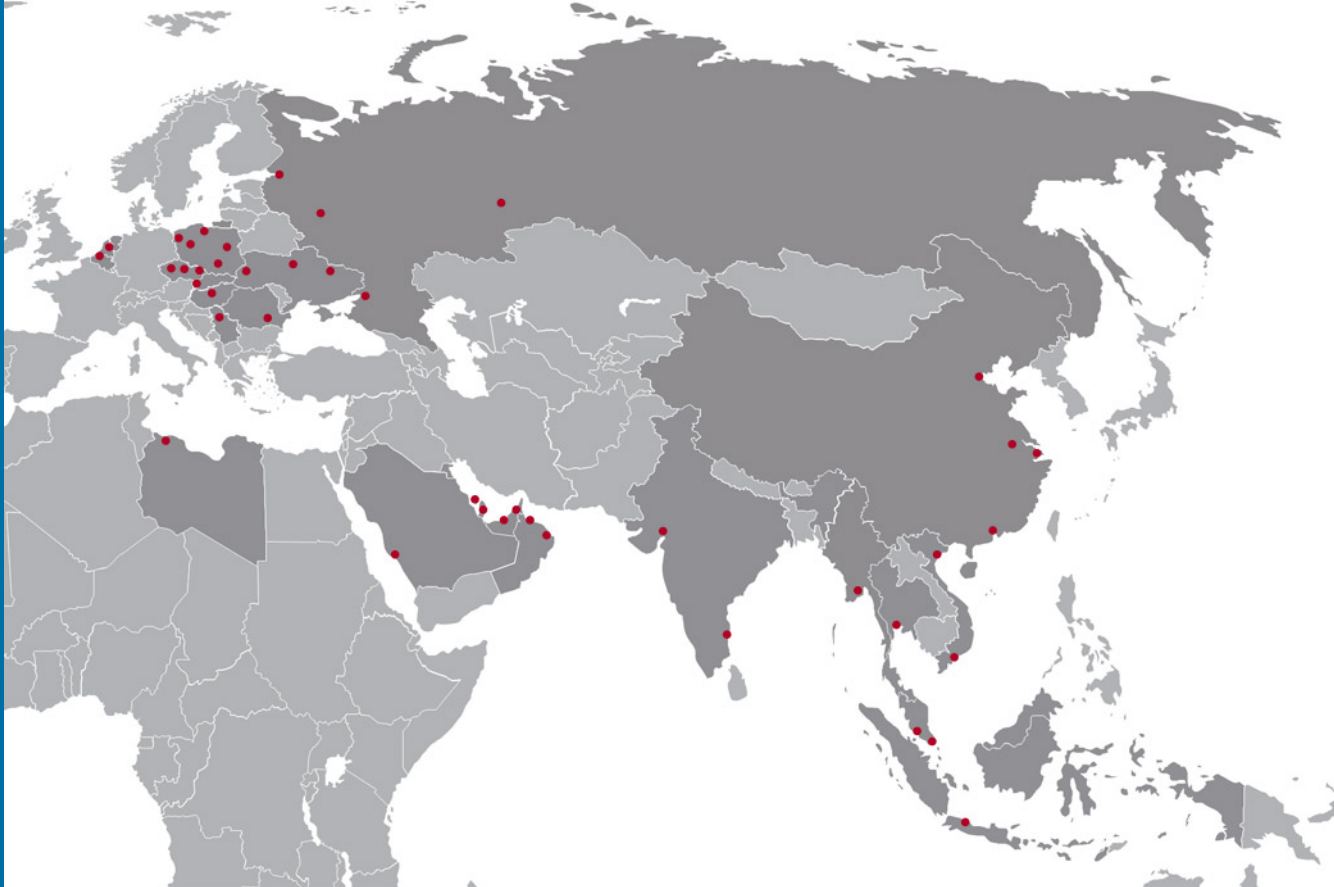
Office network Netherlands



Western Europe

- Belgium
 - Antwerp
- The Netherlands
 - Bergen Op Zoom
 - Deventer
 - Eindhoven
 - Groningen
 - Hengelo
 - Maastricht
 - Rotterdam
 - The Hague
 - Velsen

Our network



Western Europe

Belgium, The Netherlands

Central Europe

Czech Republic, Hungary, Poland, Romania, Serbia, Slovak Republic

Eastern Europe

Russia, Ukraine

Middle East

Bahrain, Oman, Qatar, Saudi Arabia, United Arab Emirates

Asia

China, India, Indonesia, Malaysia, Myanmar, Singapore, Thailand, Vietnam

Africa

Libya

Scope of ISO 55000



Own good / bad examples on:

- Reliability
- Life Cycle Costs
- Performance
- Safety integrity
- Esthetics

Tebodin vision on Asset Management



ISO 55000
Asset Management

Tebodin vision on Asset Management strategic level



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ISO 55000
Asset Management

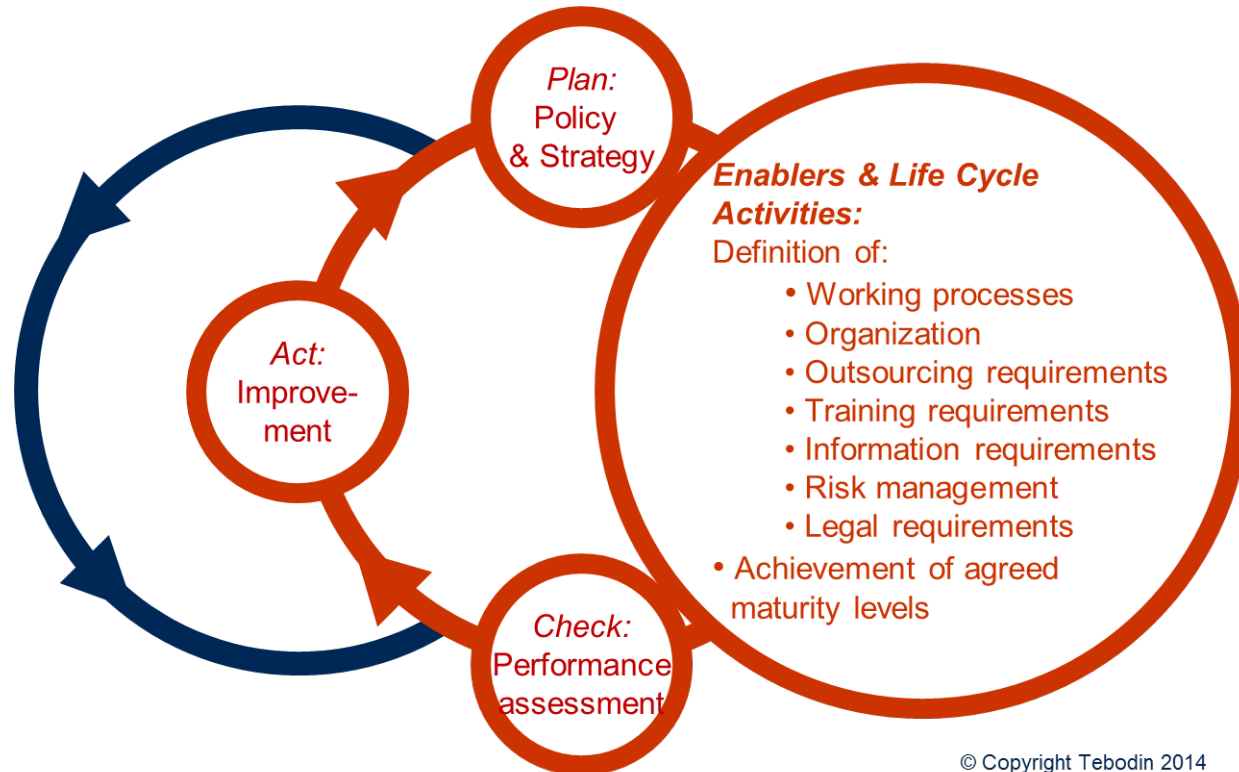
Tebodin vision on Asset Management strategic level



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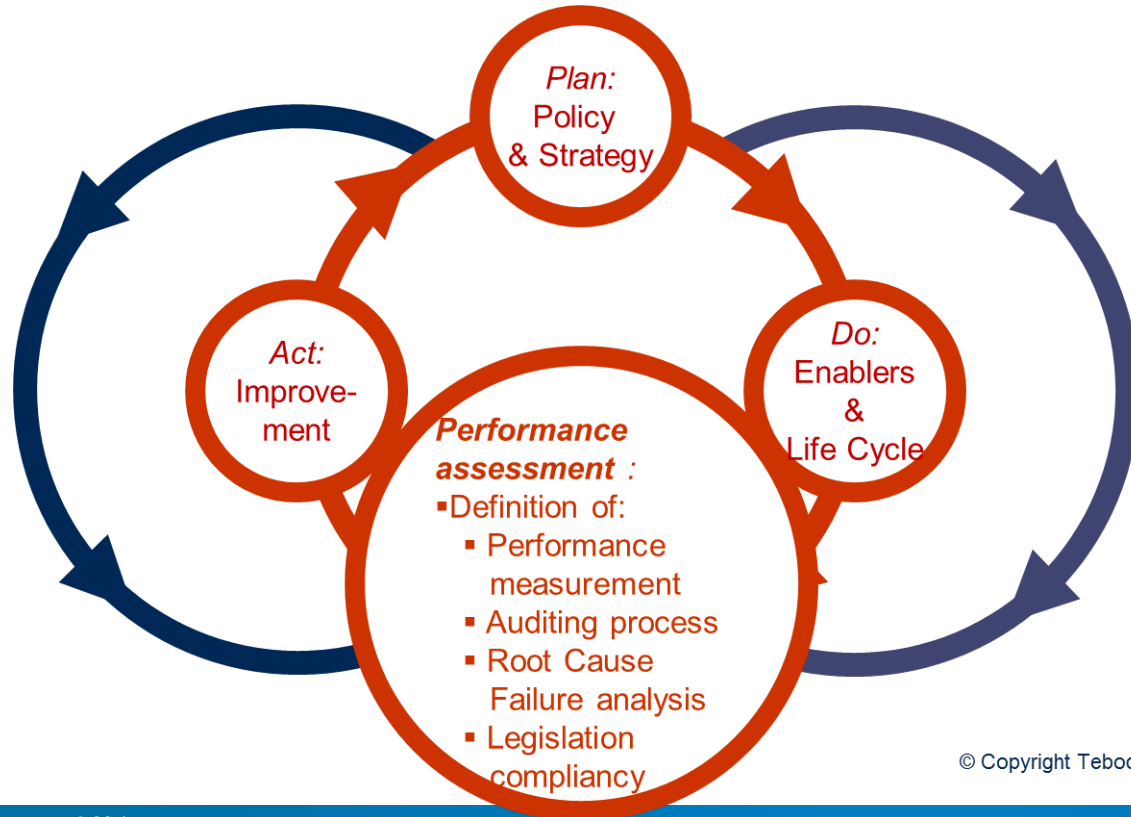
Tebodin vision on Asset Management strategic level



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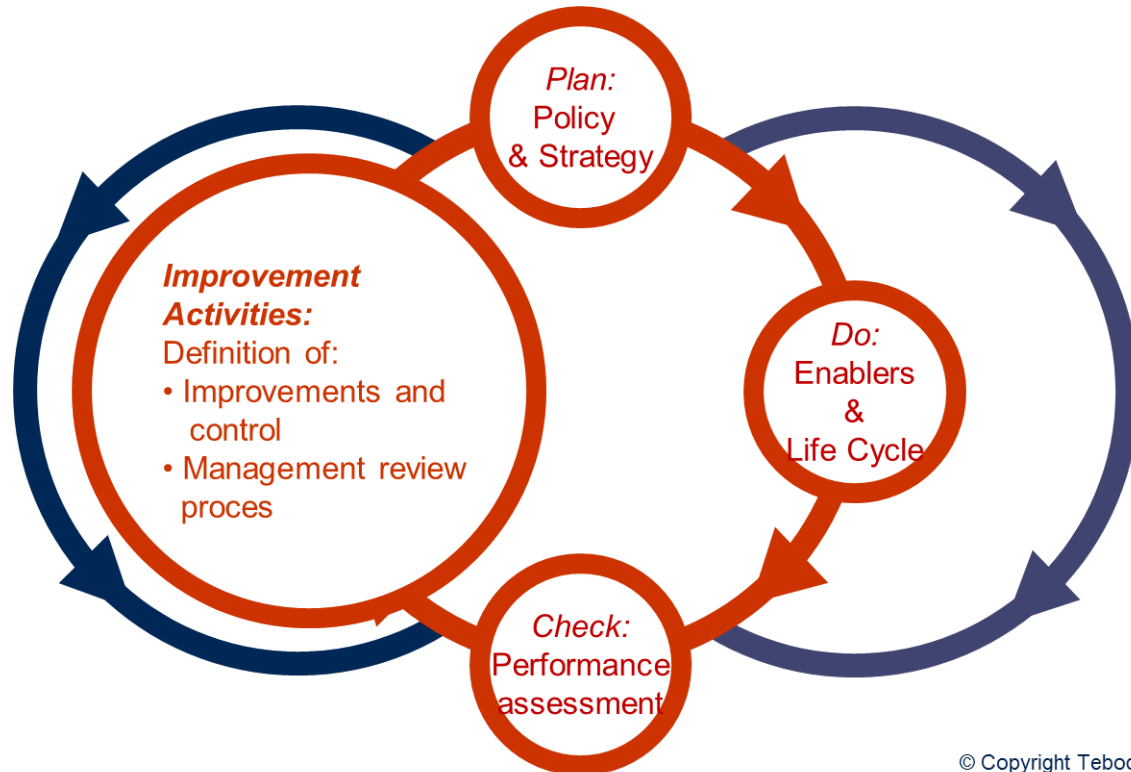
Tebodin vision on Asset Management strategic level



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Tebodin vision on Asset Management strategic level



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Tebodin vision on Asset Management tactical and operational level

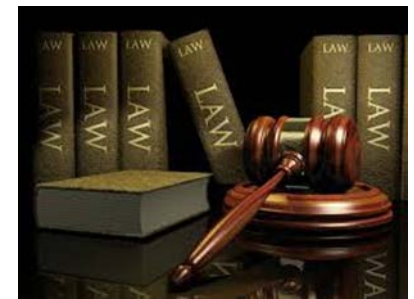
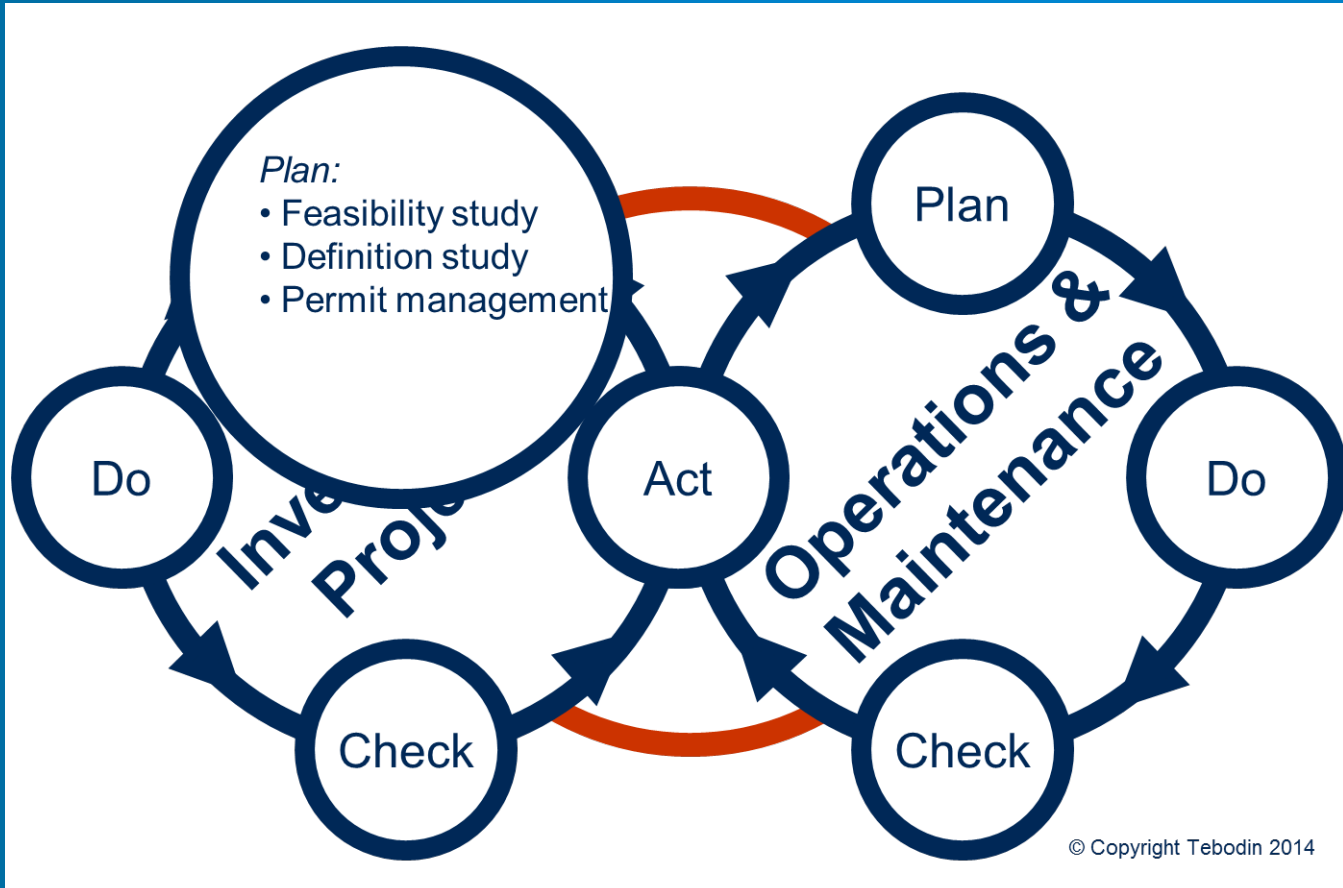


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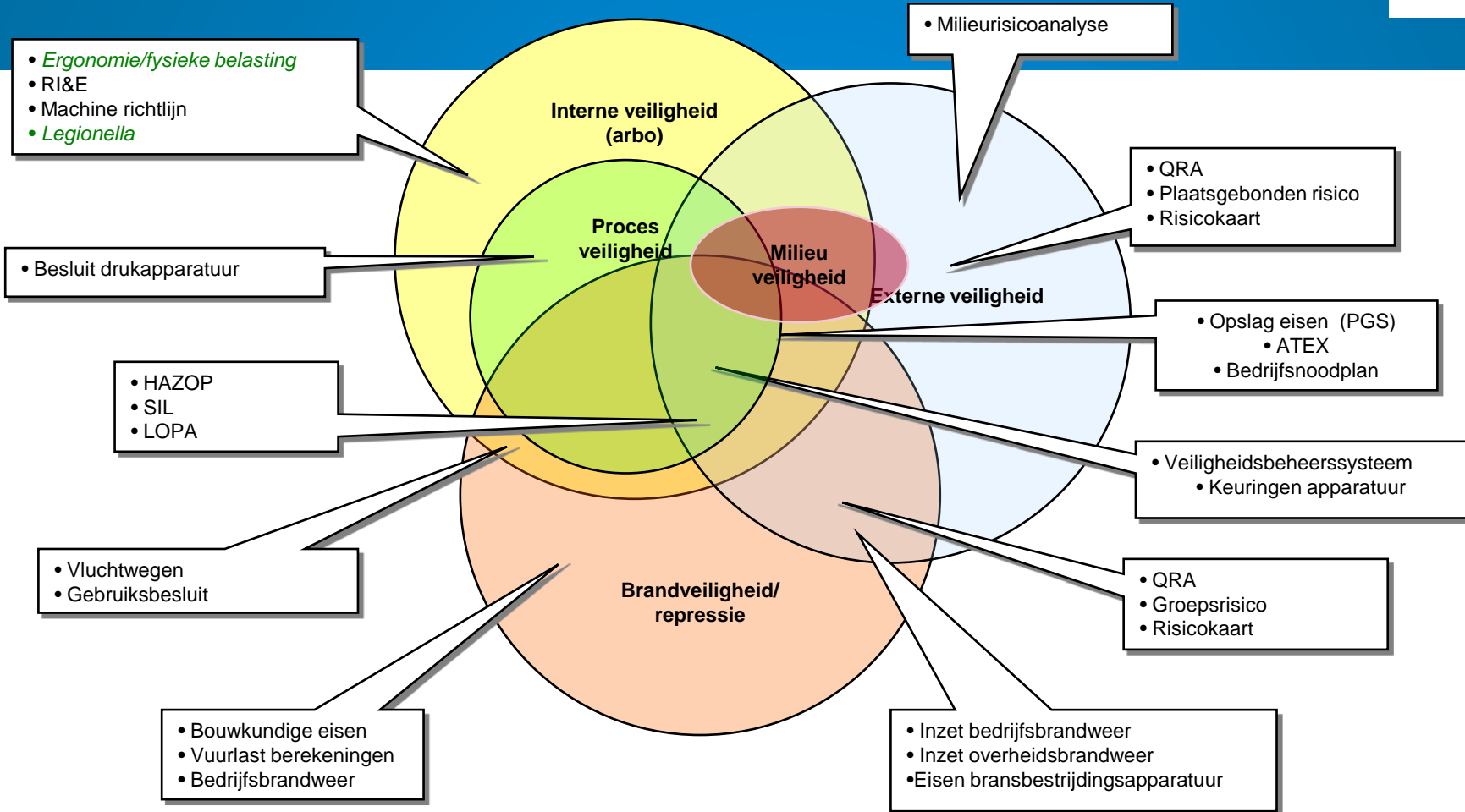


ISO 55000
Asset Management

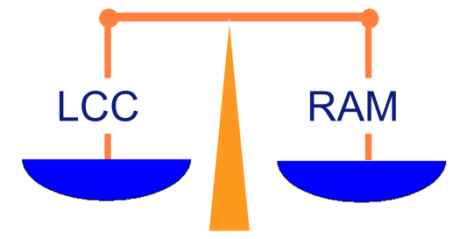
Tebodin vision on Asset Management tactical and operational level

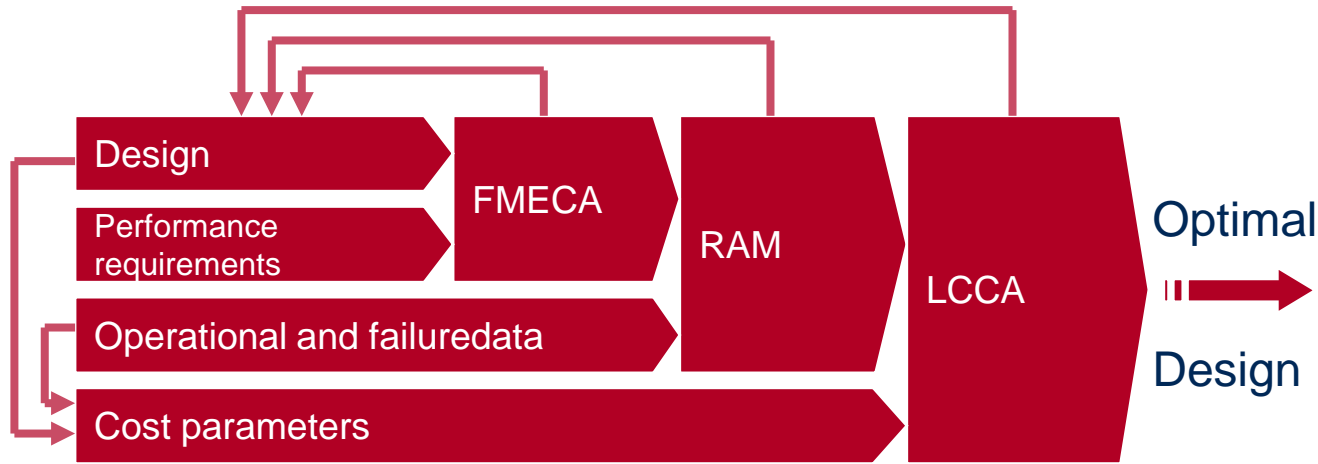


Permit Management & Legislation



Tebodin vision on Asset Management tactical and operational level



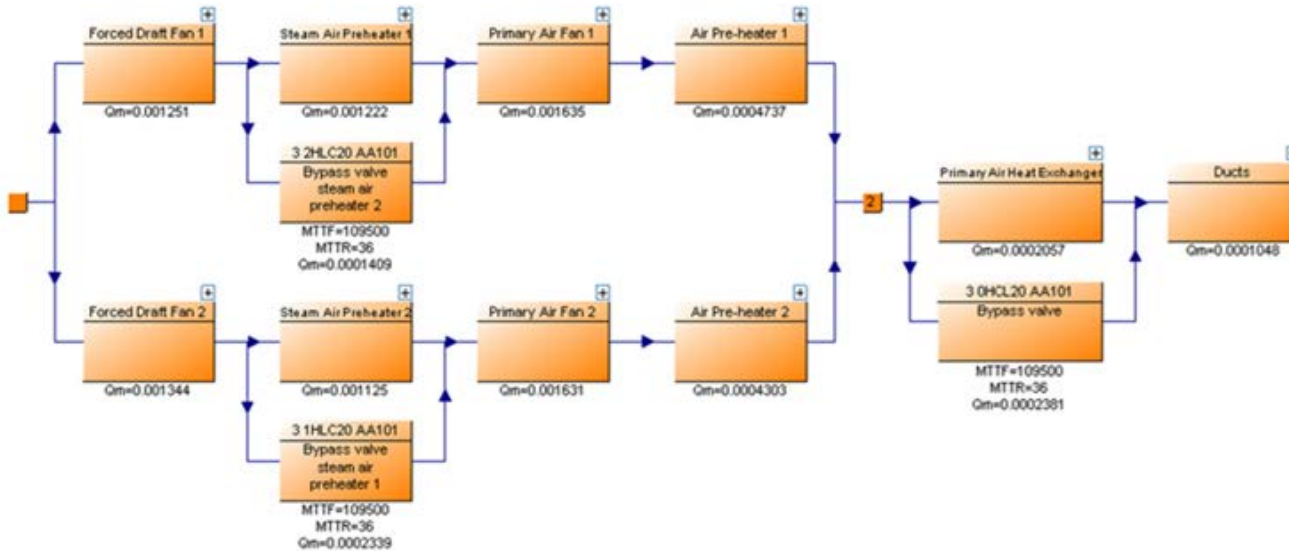


- FMECA:
 - Failure Mode Effect & Criticality Analysis (Qualitative)
- RAM:
 - Reliability, Availability & Maintainability Analysis
Quantitative comparison of design alternatives
- LCCA:
 - Life Cycle Cost Analysis (Quantitative)

Decompositie			Falen		Risico									
Object	Sub-object (1)	Component	Aantal	Faalmodus	Faalkans	Effect op beschikbaarheid	Levertijd s.p.m.s	Reparatieduur	Detecteerbaarheid	Risico RPN				
			1	Vollopen filters Minimaal 2x per jaar (verwachting)	5	Vaker dan eens per 5 jaar.	Geen effect op enkele koudig systeem	Levertijd tussen 8 en 24 uur (standaard componenten via 3 handel)	2	Gerepareerd binnen 2-5 uur uur	1	Defectie via een alarm met automatisch inschakelen van redundante.	15	
			1	Versuilen	4	Eens per jaar tot eens per 5 jaar.	Geen effect op enkele koudig systeem	1	Direct beschikbaar	1	Gerepareerd binnen 2 uur	3	Periodiek e inspectie met registratie	12
		Stoombevochtiger	1	Algemene storing	3	Eens per 5 jaar tot eens per 10 jaar.	Geen effect op enkele koudig systeem	Levertijd tussen 24 - 48 uur (OEM componenten of the shie)	4	2	Gerepareerd binnen 2-5 uur uur	1	Defectie via een alarm met automatisch inschakelen van redundante.	12
		Koelunit voor LBK	2	Defecte ventilator, regeling	3	Eens per 5 jaar tot eens per 10 jaar.	Geen effect op enkele koudig systeem	Levertijd tussen 24 - 48 uur (OEM componenten of the shie)	4	2	Gerepareerd binnen 2-5 uur uur	1	Defectie via een alarm met automatisch inschakelen van redundante.	12
		Circulatiepomp gekoeld water LBK	4	Slijtage	2	Eens per 10 jaar tot eens per 25 jaar.	Geen effect op enkele koudig systeem	Levertijd tussen 8 en 24 uur (standaard componenten via 3 handel)	3	2	Gerepareerd binnen 2-5 uur uur	1	Defectie via een alarm met automatisch inschakelen van redundante.	6
		Lucht aanleien, vervullen		Corrosie	1	Minder dan eens per 25 jaar.	Vertraagd effect op enkele koudig systeem. (-6 uur)	Levertijd tussen 8 en 24 uur (standaard componenten via 3 handel)	3	2	Gerepareerd binnen 2-5 uur uur	1	Defectie via een alarm met automatisch inschakelen van redundante.	6
		Appendages gekoeld water LBK	20	Slijtage	1	Minder dan eens per 25 jaar.	Geen effect op enkele koudig systeem	Levertijd < 6 uur (standaard componenten in bus monteur)	2	2	Gerepareerd binnen 2-5 uur uur	1	Defectie via een alarm met automatisch inschakelen van redundante.	2
		Luchtbehandeling		Luchtbehandelingskast	1	Minder dan eens per 25 jaar.	Geen effect op enkele koudig systeem	1	Direct beschikbaar	1	Gerepareerd binnen 1 uur	1	Defectie via een alarm met automatisch inschakelen van redundante.	1
						High critical			RPN 10-25					

FMECA

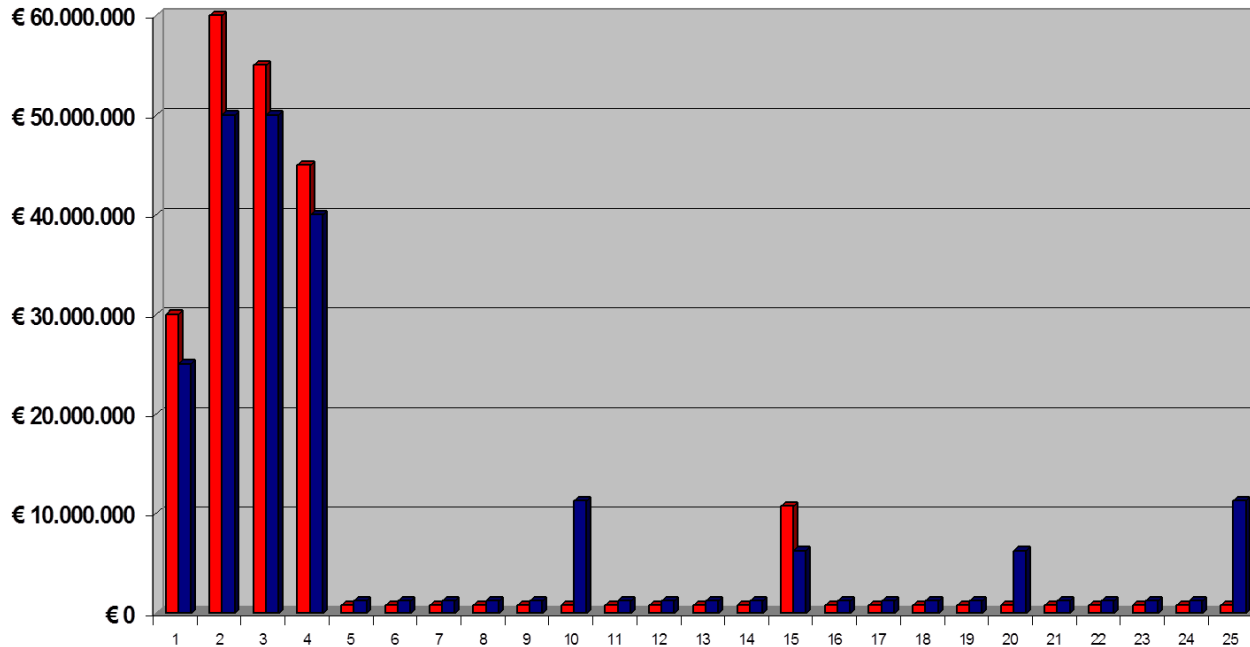
- Identification of critical components
- Failure frequency P)
- Effect of failure (E)
- Risks (R)
- Definition of measures:
 - Maintenance
 - Spare parts
 - Operations
- Residual risks



RAM

- Reliability Block Diagram
- Isograph Avsim+ software
- Input:
 - MTBF
 - MTTR
- Output:
 - Availability
 - Number of outages

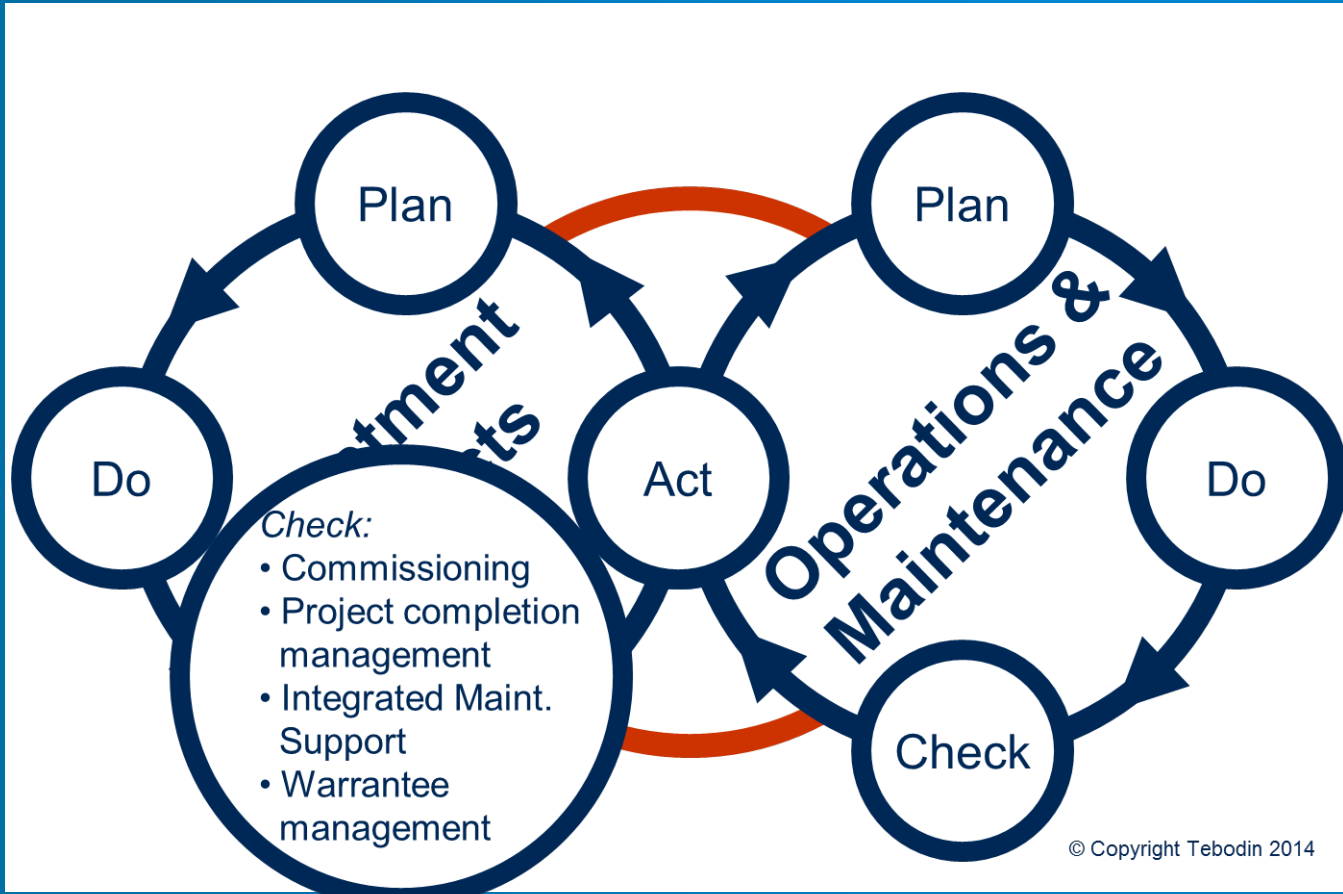
Totale kosten per alternatief per jaar



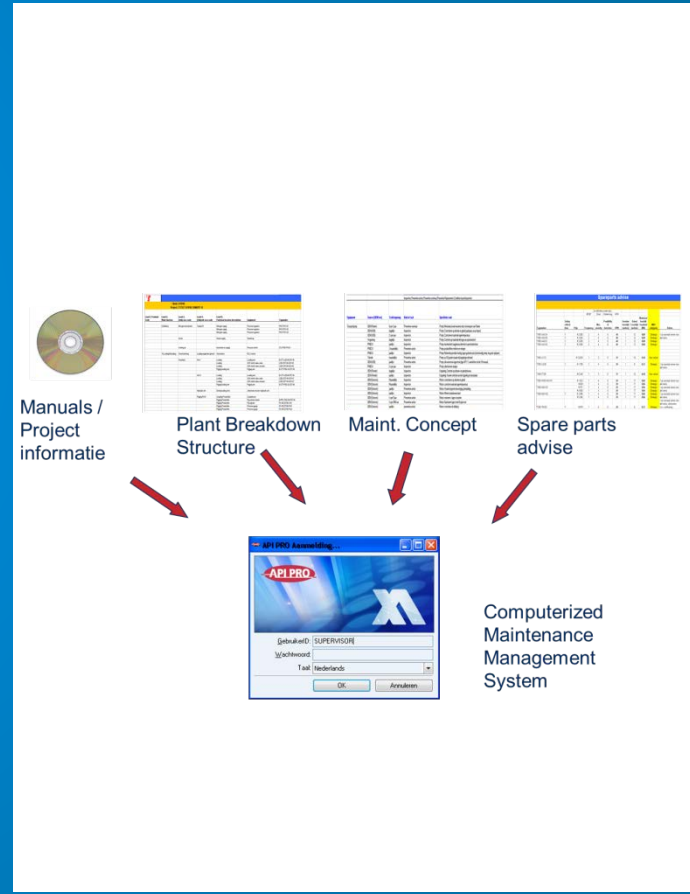
LCCA

- Net Present Value
- Comparison of alternatives
- CAPEX:
 - Design, Construction
- OPEX:
 - Energy
 - Maintenance
 - Operations
 - Supplies

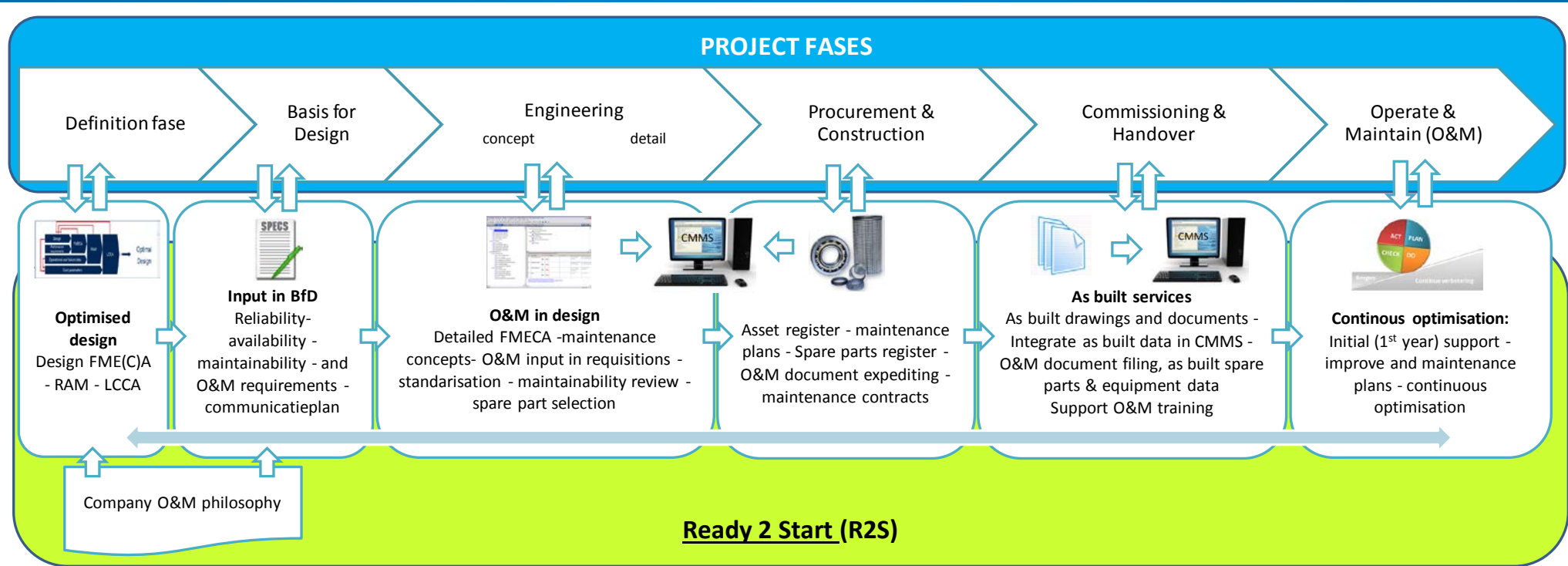
Tebodin vision on Asset Management tactical and operational level



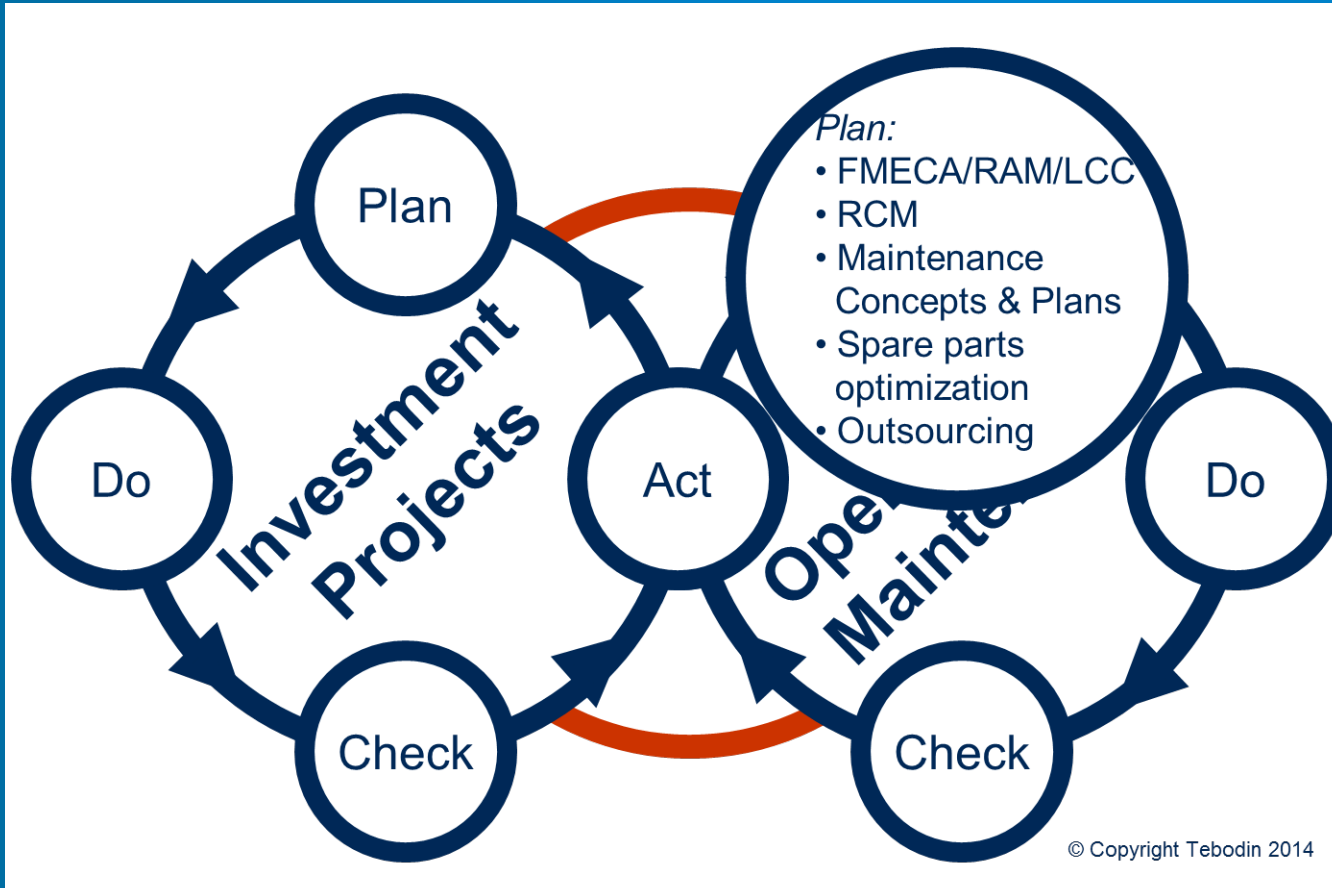
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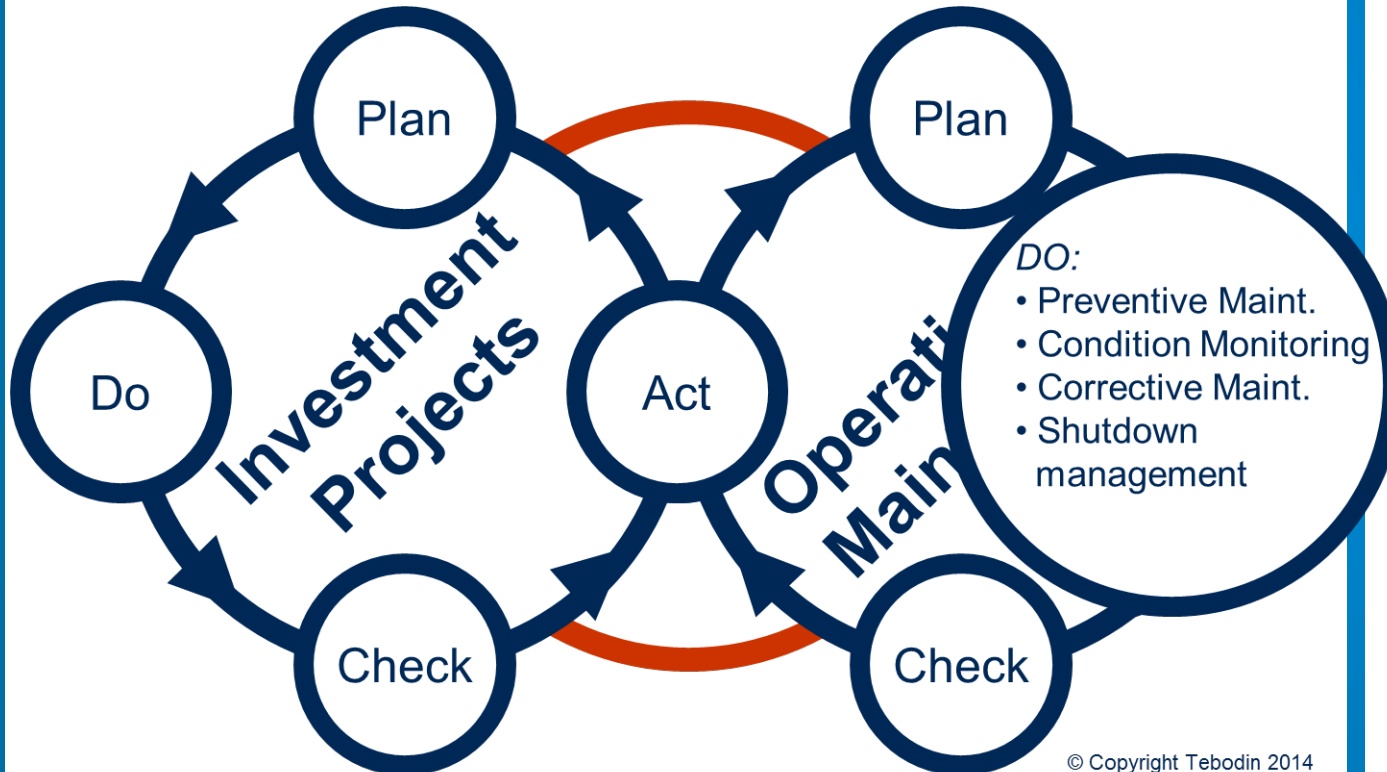
Ready to start process



Tebodin vision on Asset Management tactical and operational level

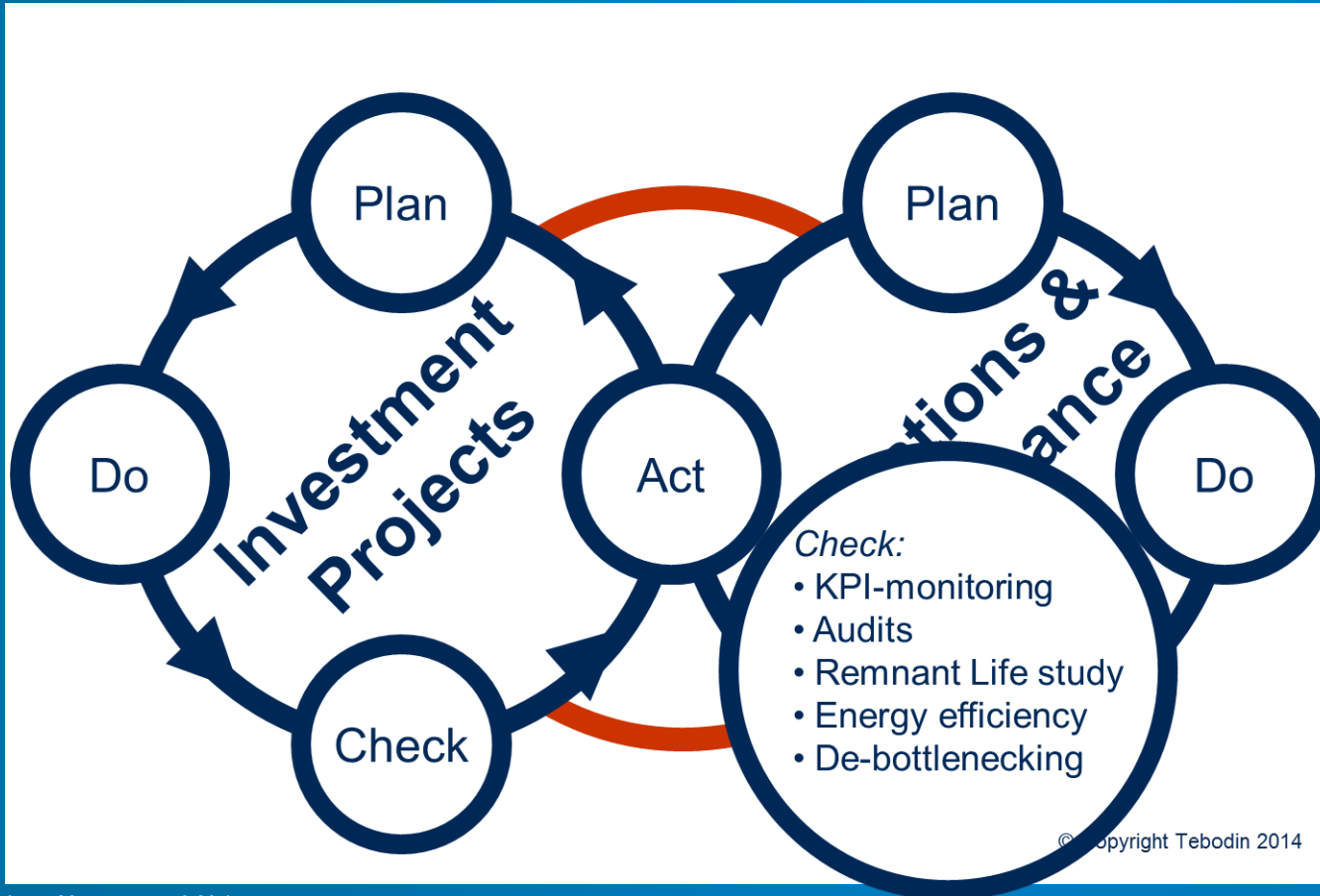


Tebodin vision on Asset Management tactical and operational level

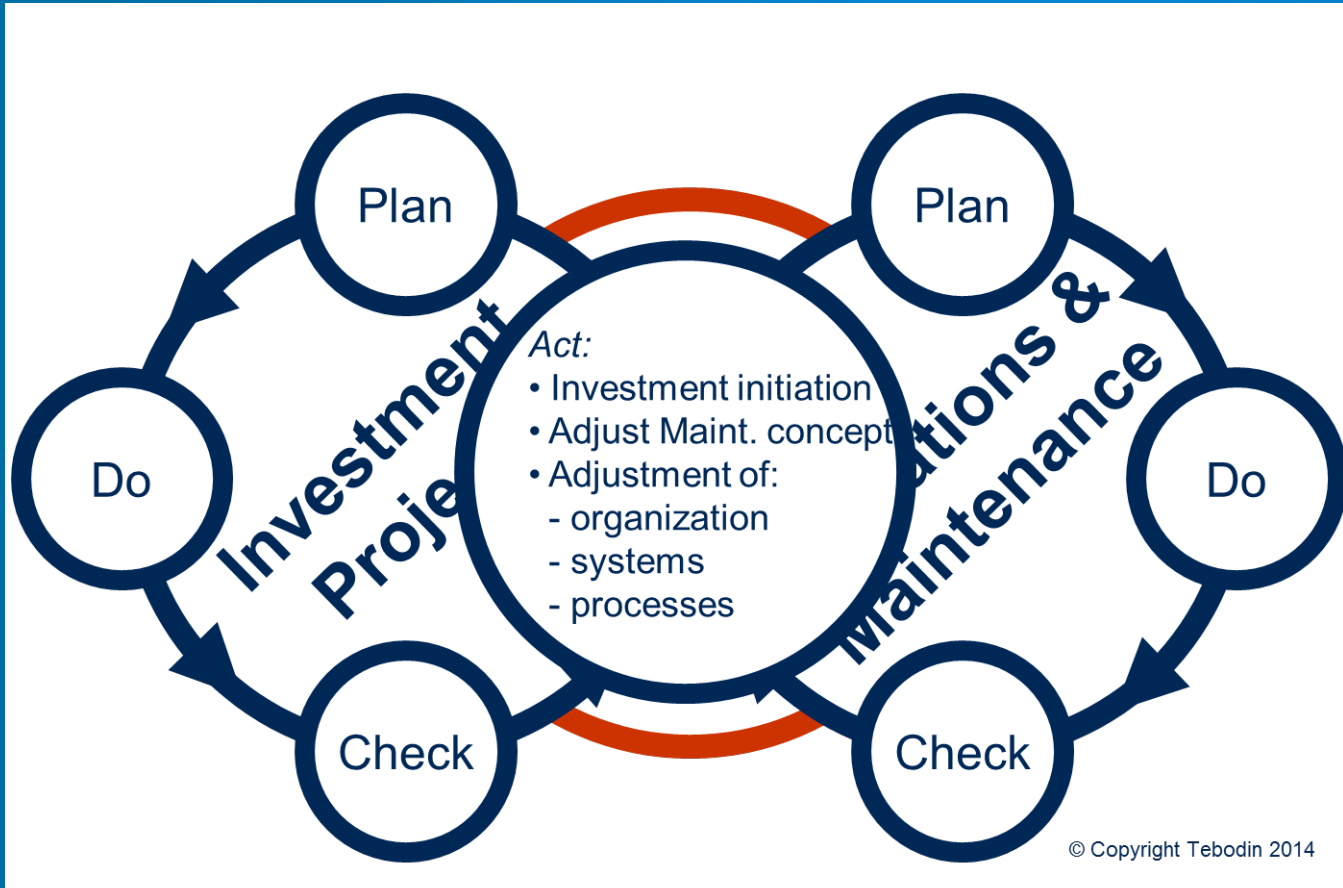


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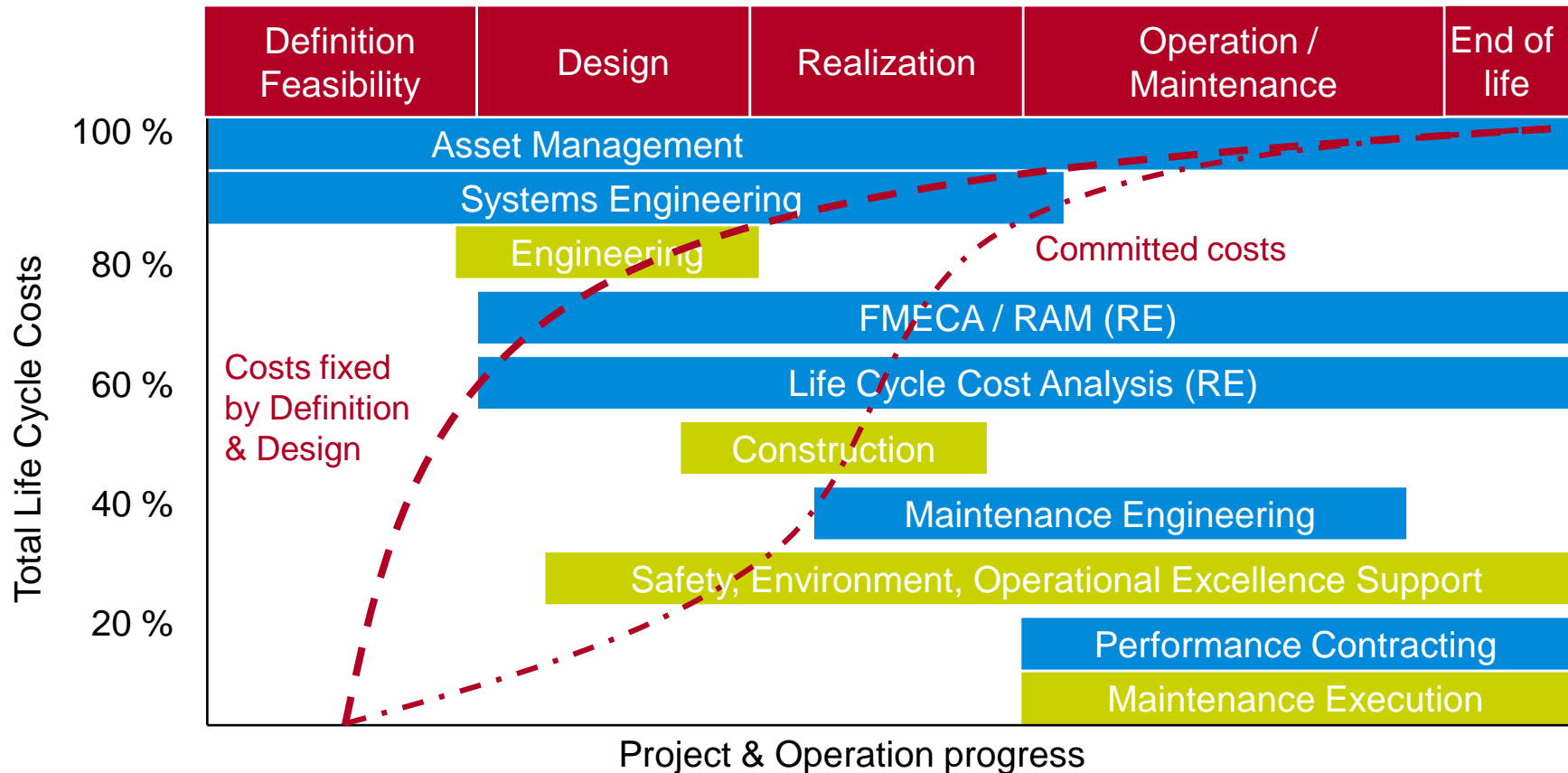
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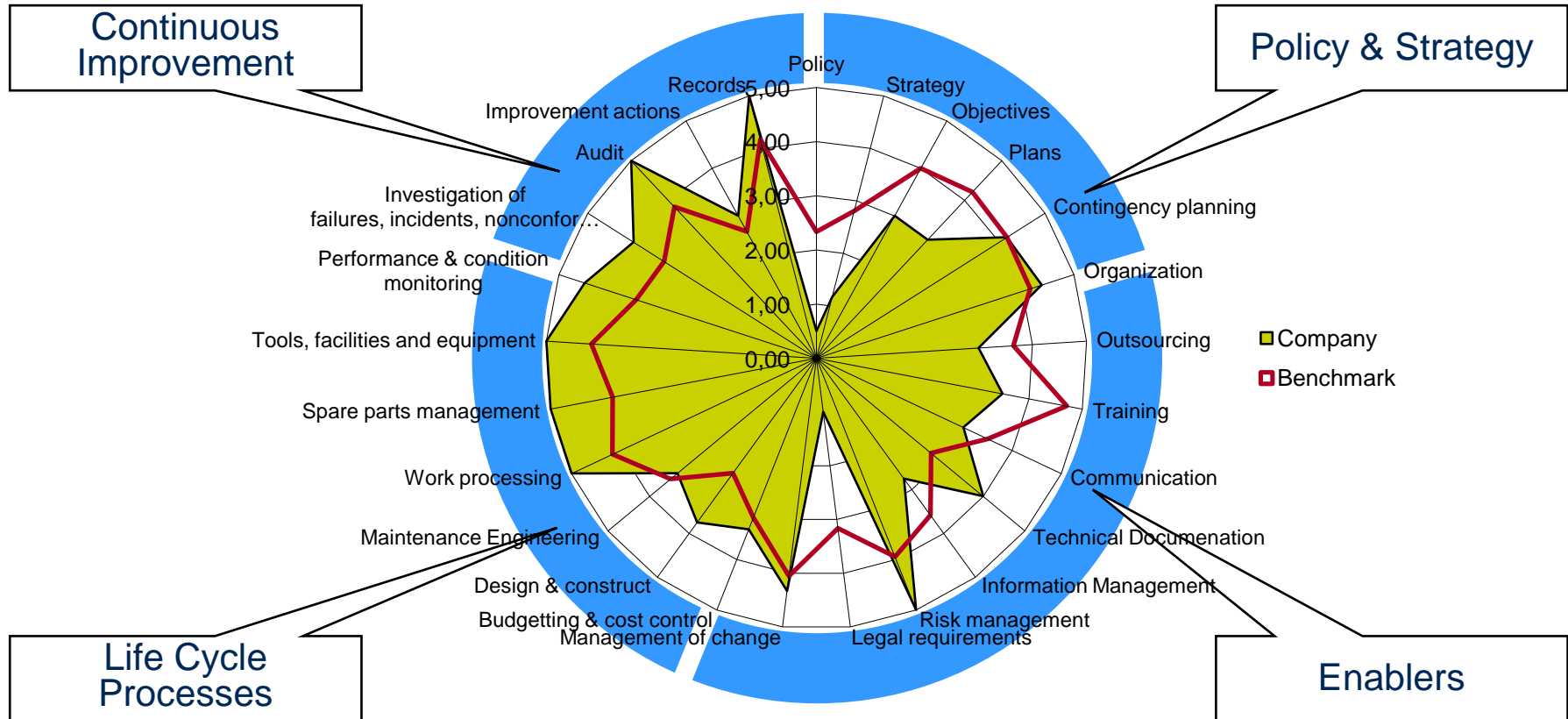
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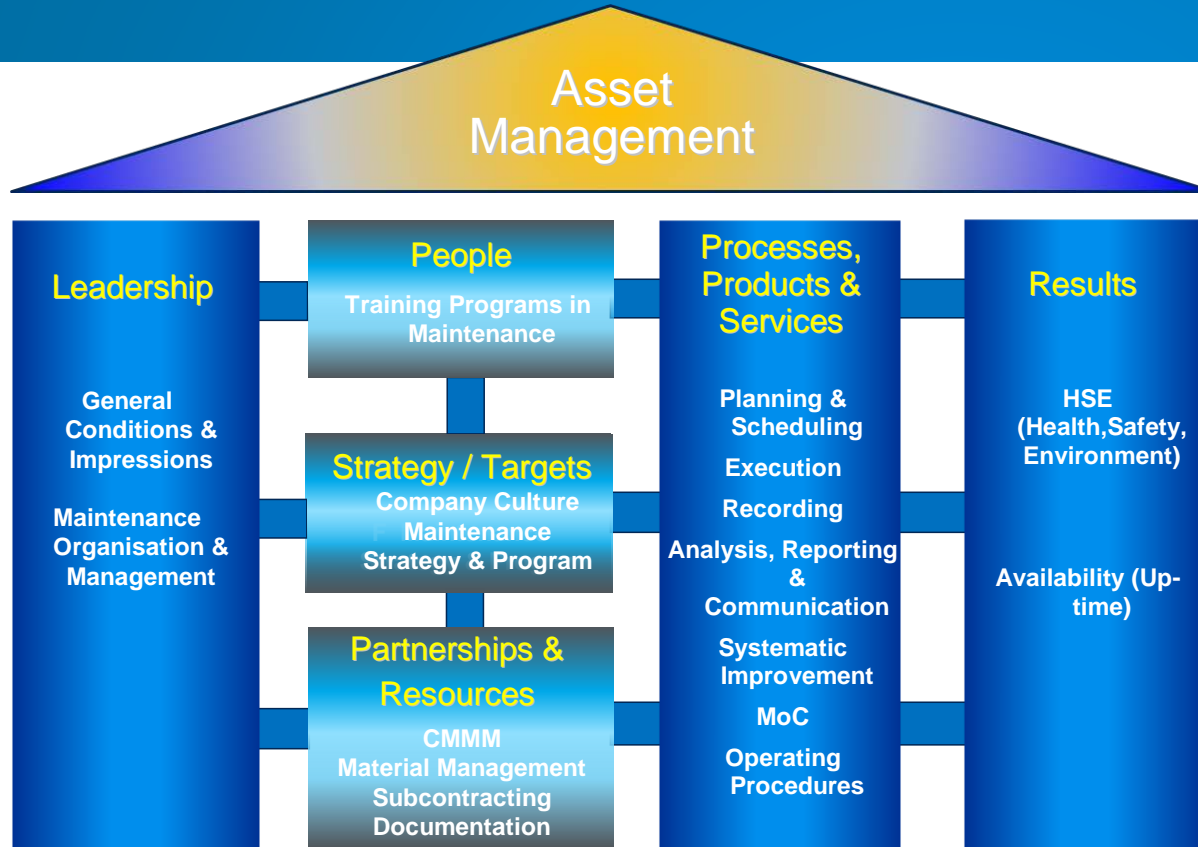
Life Cycle



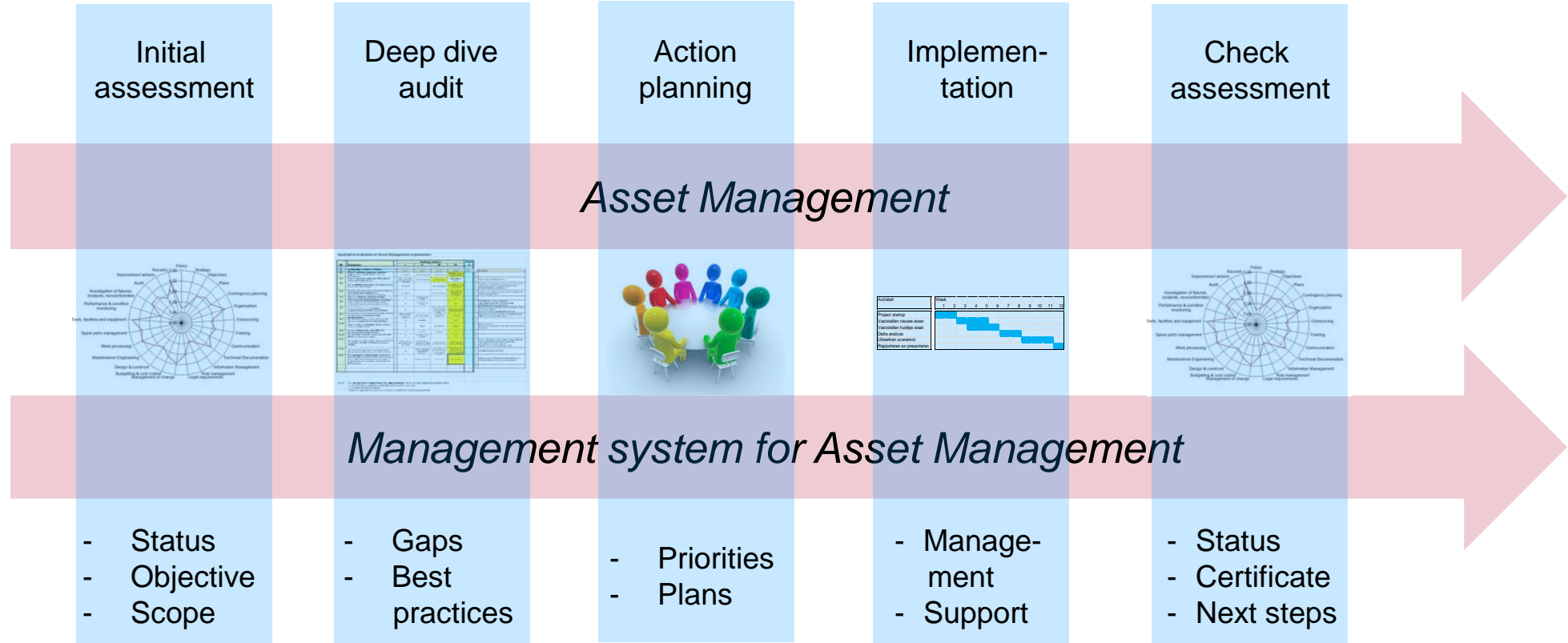
ISO 55000 assessment



Assessment aspects



CMMM= Computerised Maintenance Management System
MoC= Management of Change



ISO 55000 implementation aspects

- Demonstrable management commitment and leadership
- Definition and recording of Policy, SAMP, objectives and plans
- Definition of procedures and workinstructions
- Definition of organization and roles
- Maintenance management system
- Risk management system
- Performance measurement system
- Implemented Management System for Asset Management
- Minimum level of implementation and awareness of the organization

ISO 55000 implementation

- Program management / support
- Auditing
- Action definition
- Communication / Change management
- Implementation support:
 - Method development
 - Reliability engineering
 - Maintenance engineering
- Certification by partner (BSI)





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Questions

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