



Maintenance Management and Training

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Importance of Maintenance

Maintenance costs for Europe (a German study):

Direct maintenance costs : about 1 500 Mrd. Euro / year

- Personnel (60 %): about 900 Mrd. Euro / year
- Material, spare parts (40 %): about 600 Mrd. Euro / year

Indirect maintenance costs I: about 7 500 Mrd. Euro / year

- Down time, quality, productivity, etc.
- lawyers, loss of image, etc.
- Training, investment in spare parts, etc.

Forum Vision Instandhaltung e.V. / 2004 Dortmund

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Importance of Maintenance

Maintenance costs for Germany:

Direct maintenance costs: about 250 Mrd. Euro / Jahr

In comparison

Car manufacturing: 135
Construction / infrastructure: 131
Electro-technique: 122
Food industry: 111
Chemical industry: 108

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Importance of Maintenance

**Thesis: 3rd World Congress on Maintenance /
EuroMaintenance 06**

Over 20 % of the World Gross National Product is spent on
Maintenance and Operative Costs.



Importance of Maintenance

Industrial production			
(% change) forecast last year in brackets			
	2005	2006	
Euro Area	2,0 (2,6)	2.6	
Germany	1,7 (2,8)	1.9	
France	0,4 (3,1)	1.4	
Italy	-0,4 (1,0)	1.5	
Sweden*	3,3 (3,0)	4.0	
U.K*	-0,4 (1,5)	1.0	
Poland	8,5 (8,5)	8.3	
Czech Republic	6,0 (5,4)	7.5	
Hungary	7,5 (7,7)	7.0	
Russia	5,5 (5,7)	4.7	
Romania	4,5 (7,0)	4.0	
Turkiye			

**Joao Ricciarelli, SKF Service Division,
EuroMaintenance 2006 / 3rd World
Congress on Maintenance, Basel**

Source: EIU 2005, * Manufacturing production Consensus

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Importance of Maintenance

Industrial Manufacturing:

- World-wide outsourcing

Heavy Machinery:

- Integration of maintenance in the product

Local Manufacturing (CH)

- Local outsourcing
- Local suppliers

General Tendency

Pressure from eastern countries
Friendly or un-friendly take over

Importance of Maintenance



Industrial equipments

Maintenance influences value and safety of machines and industrial equipments.

Importance of Maintenance



Infrastructure

Maintenance influences value and safety of infrastructure.

Importance of Maintenance



Buildings

Maintenance influences value and safety buildings.

Importance of Maintenance

What means this for Maintenance?



Importance of Maintenance

„Maintenance cost ?“



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Importance of Maintenance

„Value of Maintenance?“ ←————→ Maintenance costs

**Safety/
Environment**

Maintenance



Processes

**Production
Benchmarks**

**Support/
Resources**

Importance of Maintenance

Value of Maintenance

Indirect maintenance costs I: about 7 500 Mrd. Euro / year

- Down time, quality, productivity, etc.
- lawyers, loss of image, etc.
- Training, investment in spare parts, etc.

Reduction of indirect maintenance costs II

- Safety and security
- Environmental risks
- Less hygiene risks

„Value of Maintenance?“  Maintenance costs

Terminology

- Real Estate Management
- Facility Management
- Life Cycle Management
- Maintenance Management
- Physical Asset Management

Up to now,
no definition has had a real
breaking-through on the global market.

Market

Facility Management

- Buildings
- Production
- Infrastructure
- Services

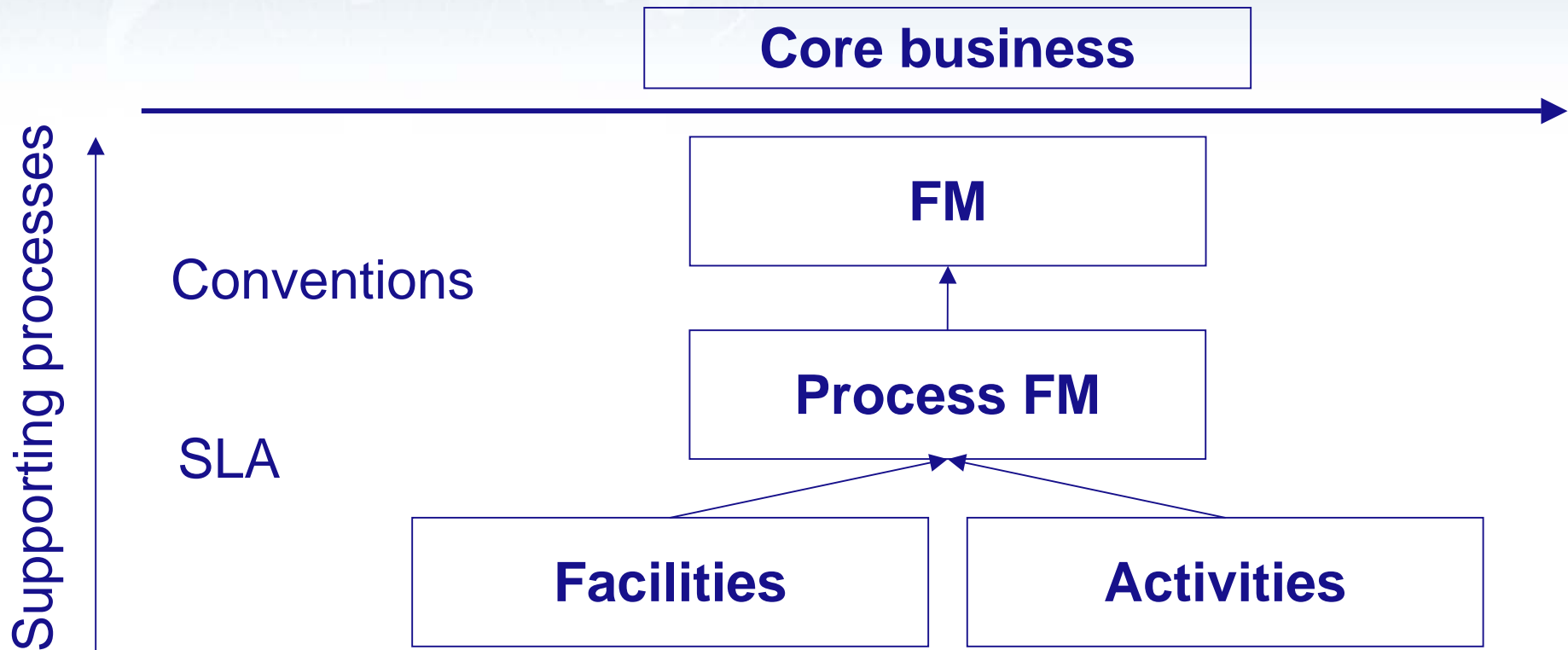
Definition CEN TC 348

Integration of processes within an organization to maintain and develop the agreed services which support and improve the effectiveness of its primary activities.



Market

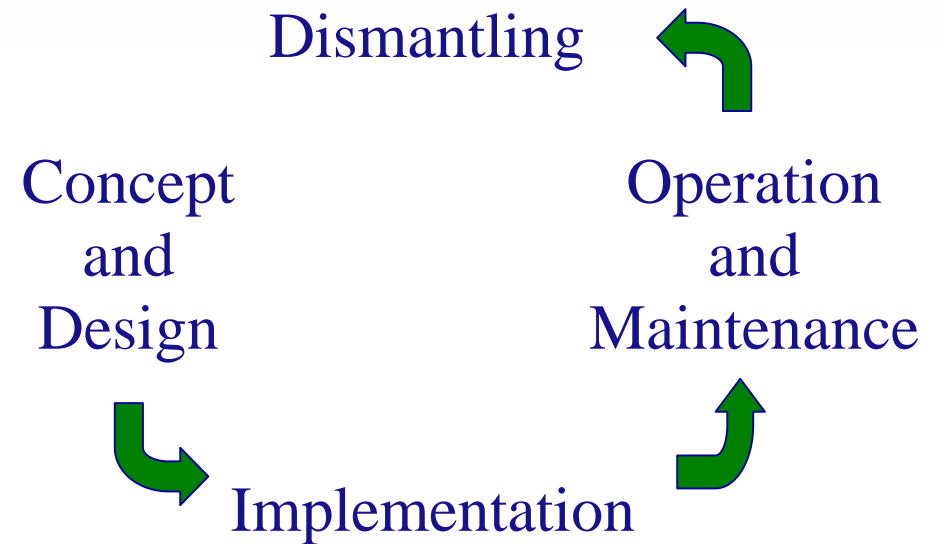
Facility Management



Market



Life-Cycle Management



Market

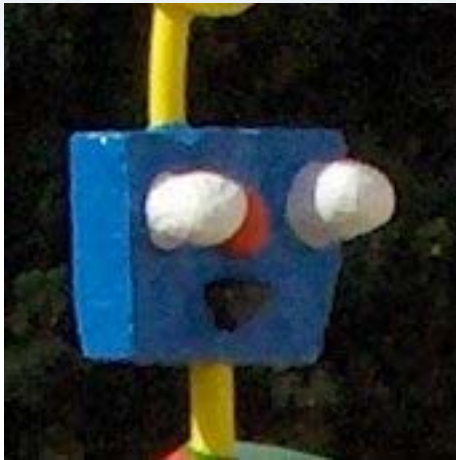
„Growth and Added Value“ !



April 2006: Mr. Markus Akermann, CEO of Holcim declared as global strategy: **„Growth and Added Value“** (Le Temps).

Market

Maintenance Management



**Responsibilities
Maintenance Policy**

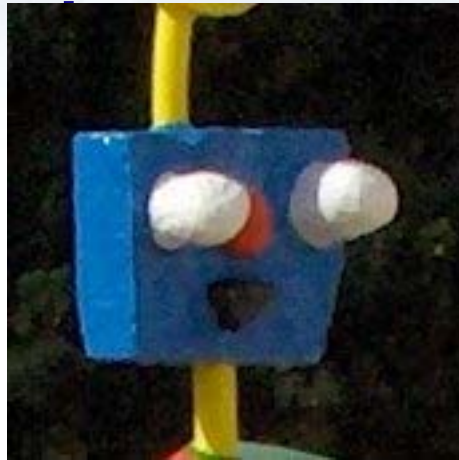
Maintenance Concept

Maintenance Strategy

Maintenance Processes

Market

Maintenance Management



Maintenance (EN 13306:2001)
Combination of all actions during the life cycle of an item intending to retain it in, or restore it to, a state in which it can perform the requires functions.

Market

Physical Asset Management !



for creating and sustaining
defined valuable
outcomes through all the
life-cycle phases.

Acquisition – Ownership – Control - Utilization

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Market

Physical Asset Management: A growing market



**International and Governmental
Organizations**

Financial Systems – Insurance

Legal Systems

**Asset owners – Asset Operators –
Asset Users**

**Government Agencies
Organizations for Standardization**

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Market

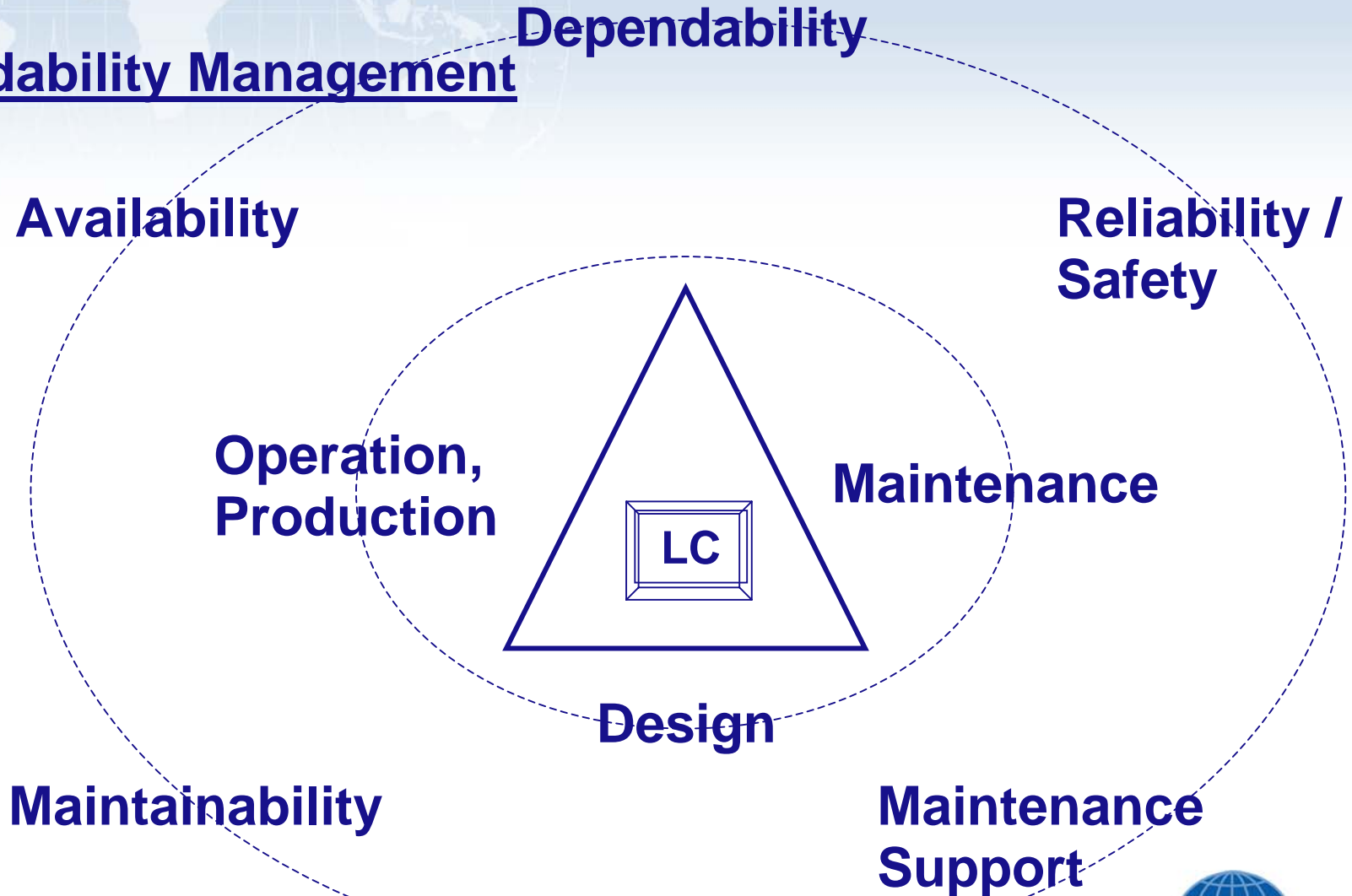
Physical Assets include :



- **Manufacturing**
- **Buildings**
- **Power**
- **Telecommunication**
- **Railways**
- **Roads**
- **Public services**

Market

Dependability Management



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Market

Dependability Management



IEC 60300-1 - Dependability management

Part 1: Dependability management systems

IEC 60300-2 - Dependability management

Part 2: Guidelines for dependability management

IEC 60300-3-10 - Dependability management

Part 3-10: Application guide - Maintainability

IEC 60300-3-14 - Dependability management

Part 3-14: Application guide - Maintenance and maintenance support

IEC 60706-2 - Maintainability of equipment - Part 2: Maintainability requirements and studies during the design and development phase

IEC 60706-3 - Maintainability of equipment

Part 3: Verification and collection, analysis and presentation of data

IEC 60706-5 - Maintainability of equipment

Part 5: Testability and diagnostic testing

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Market

Dependability Management

Terminology

Specification

Integrated Logistic Support

Maintenance and Maintenance Support

Life Cycle Costing

Maintainability

Risk Management

Risk Analysis

Collection / Presentation of Data

Reliability Centered Maintenance

Reliability Prediction

Statistical Analyses of Reliability

Reliability Testing

Design Review

Market

Maintenance Management – CEN Documents

ENV 13269: Maintenance - Guideline on preparation of maintenance contracts

EN 13306: Maintenance - Terminology

prEN 13460: 2001: Maintenance - Documents for Maintenance

prCEN/TS 15331: Criteria for design, management and control of maintenance services for buildings

prEN 15341: Maintenance - Maintenance Key Performance Indicators

TC 319: N 169: Maintenance – Qualification of Maintenance personnel

Market

Certification and standardization

ISO 9001: 2000

Quality Management

ISO 14001: 2004

Requirements for an environmental management system

OHSAS 18001:1999

Requirements for occupational health and safety management systems

ILO-OSH 2001 - International Labor Office (ILO)

Guidelines on occupational safety and health management systems

ISO 26000 : 2008

Social Responsibility (Sustainability) – no certification

Market



Servicekonzepte

- Real Estate Management
- Facility Management
- Life Cycle Management
- Maintenance Management
- Physical Asset Management
- Dependability Management

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Market

Quality Management

Customers' requirements

**Responsibility
(Concept and Strategy)**
Customer oriented

Customers' satisfaction

Management of Resources
People, Parts, Materials,
Information systems, etc.

**Measurement, analysis,
improvement**

Assessment of Maintenance

**Maintenance
Product**

Product and Services
Maintenance Processes

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Market

Qualification und Certification - Maintenance:

- European Experts in Maintenance Management
- SMRP Professional Certification Program
- Profissionais Certificados ABRAMAN



For Service Providers !

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Training and Education

1. **EFNMS:** Qualification and certification have 1st priority.
2. **Leonardo da Vinci project (VOMTE)** - SE, DK, BE, SI, SK, IE: Validation System regarding the competence of Maintenance Technicians.
3. **Leonardo da Vinci project (TRAIN IN MAIN)** - GR, UK, LV, BG, LT, SE: providing training material for maintenance.
4. **Leonardo da Vinci project (EuroMaint)** – NL, CZ, DK, IT, PT, SE, RO, SI, UK, EFNMS: Actual requirements of competencies for maintenance managers and engineers, including a procedure for a Personal Development Plan, training material.
5. **CEN TC 319 and 348:** Standards and reports.
6. **The European Commission** has adopted a draft - recommendation about the establishment of a European Qualifications Framework **for lifelong learning.**

Training and Education



**European Federation of National Maintenance Societies,
European Training Committee :**

The following three levels were described:

1. The European Maintenance Technician (level C)
2. The European Maintenance Supervisor (level B)
3. The European Maintenance Manager (level A)

Training and Education



The European Maintenance Technician is a craft person with at least two years of practical experience in maintenance and sufficient theoretical knowledge to independently perform and co-ordinate maintenance activities (responsible for short term decisions and communication).

The European Maintenance Supervisor is a person with at least two years of practical experience in maintenance and sufficient theoretical knowledge to independently perform and co-ordinate maintenance projects (responsible for medium term decisions).

Training and Education



The European Maintenance Manager is a person with approved engineering background and sufficient theoretical knowledge to perform and co-ordinate maintenance.

Training and Education



QUESTIONS:

Does maintenance personnel have the required competence to meet the future in our rapidly changing World?

There are companies with less than 50% of skilled collaborators in maintenance.

Training and Education



Maintenance Technician

There are two main reasons for focusing on the training of blue color people:

- On the workshop floor reliable communicators and decision makers are needed.
- Live-long learning possibilities are motivating factors.

Training and Education

Profile of a Maintenance Technician in practice

- He has practical skills and the associates theoretical knowledge and understanding necessary to perform the principal tasks in maintenance.
- He has the bases to impart and develop the social skills and the personal qualities
- He is able to work as part of a team.
- He has an appropriate attitude and outlook to perform.
- He can take the responsibility for short term decisions, on the shop floor.
- He likes to communicate horizontally and vertically.
- He speaks the same language as engineers.

Training and Education



Swiss Market :

More than 1500 Maintenance Technicians have been qualified in the last 12 years.
More than 200 Maintenance Supervisors

2006: 50 Facility Managers on Supervisor level

Postgraduate Courses for Facility and Real Estate Managers

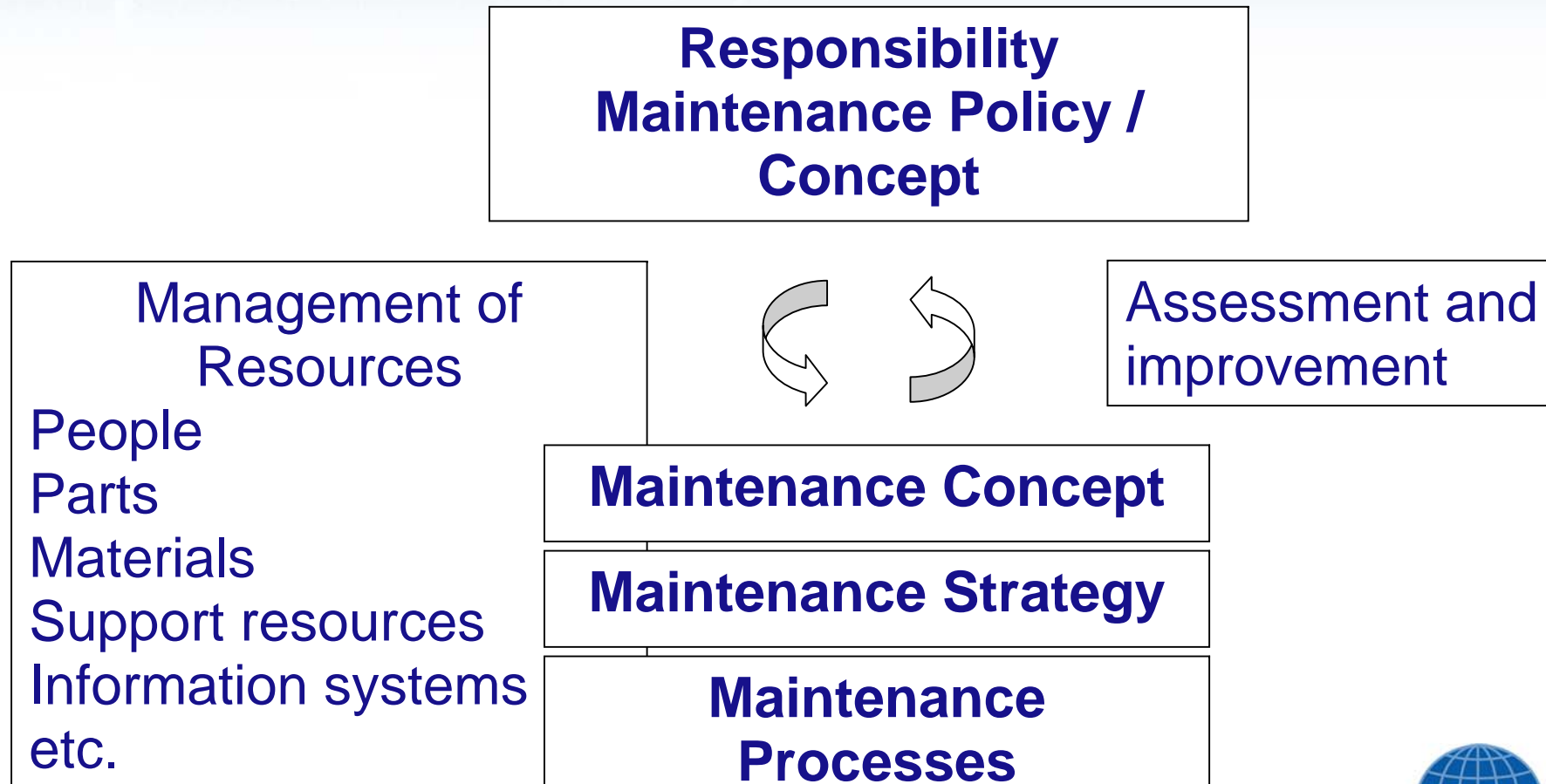
Training and Education

TRAINING AND QUALIFICATION NEEDS:

1. Qualification of customer's maintenance personnel by the equipment suppliers
2. Qualification in maintenance contracting
3. Specific maintenance tasks and processes
4. Qualification related to specific objectives
5. Qualification related to specific locations
6. Qualification related to environmental aspects and regulatory requirements
7. Qualification related to health, safety, environment and regulatory requirements
8. Qualification related to handling of hazardous materials

Summary

Added Value is the main issue !





Buon Natale e Felice Anno Nuovo !

Thank you very much for giving me the opportunity to talk to you.

Guido Walt

www.wear-management.ch

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