



THE 21<sup>ST</sup> INTERNATIONAL  
OPERATIONS & MAINTENANCE  
CONFERENCE IN THE ARAB COUNTRIES

# Automated maintenance, skills and decisions

How to define specifications, train and qualify maintenance experts

 #OmaintecConf

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مجموعة أكزيكون الدولية



# Introduction

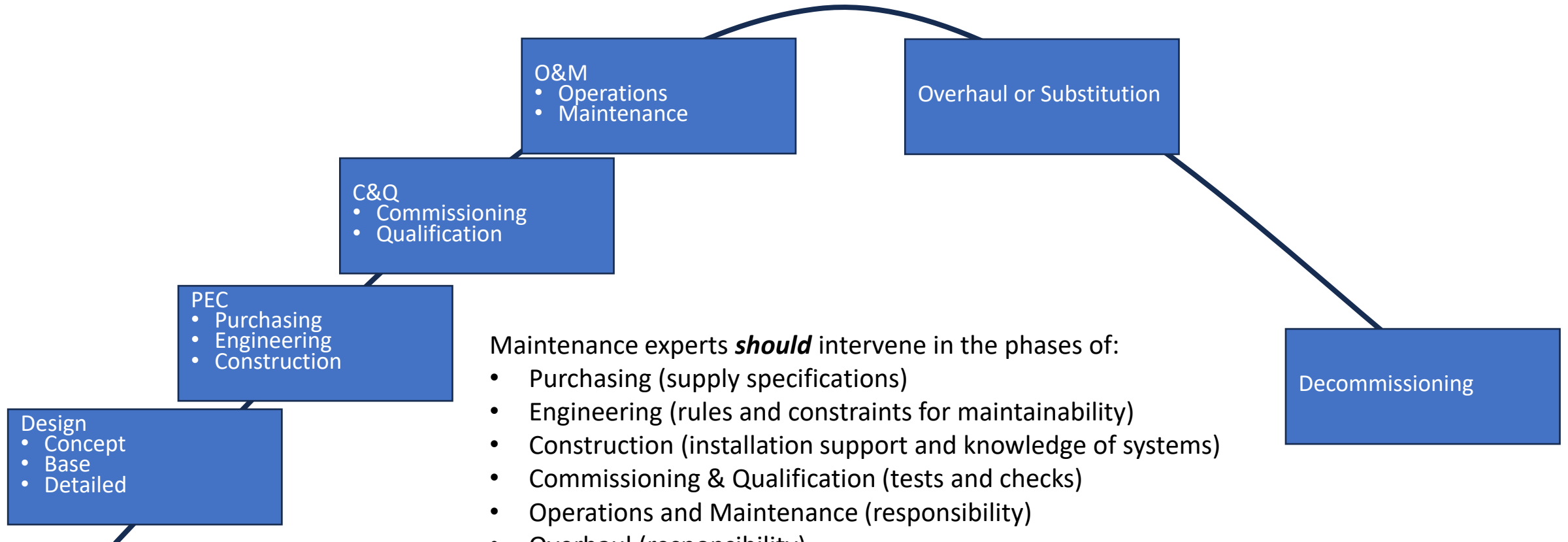
How long should a system last?

- A railway line depends on how long the structure will have reason to exist, i.e., as long as there is a need to connect two places by land to transport people and goods.
- The mechanical part will be designed to facilitate maintenance over time.
- The instrumental electronic part will be the one most subject to technological evolution and therefore must be easily adaptable.



# Introduction

What is the evolution of any system?



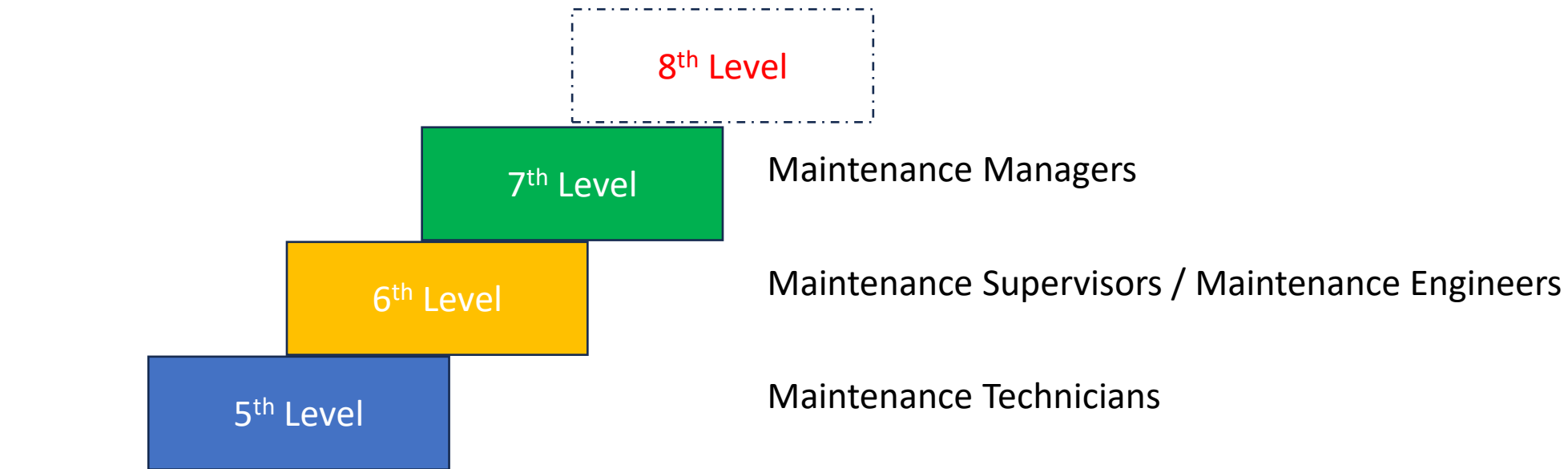
- Maintenance experts **should** intervene in the phases of:
- Purchasing (supply specifications)
  - Engineering (rules and constraints for maintainability)
  - Construction (installation support and knowledge of systems)
  - Commissioning & Qualification (tests and checks)
  - Operations and Maintenance (responsibility)
  - Overhaul (responsibility)
  - Decommissioning (responsibility)



# Roles in Maintenance

Is it really necessary to qualify professional skills?

The **European Qualification Framework** covers all types and all levels of qualifications and the use of learning outcomes makes it clear what a person knows, understands and is able to do.



Is it important to be certified?

Many companies are starting to request it while it is now an obligation for public administrations.



# Maintenance Technicians

They should:

- be system integrators, with mechanical, electrical, IT skills and more;
- have the ability to identify problems and find satisfactory solutions, even if not yet documented;
- record the problems encountered, the solutions proposed and those that have led to satisfactory results, i.e., create a history of the problems faced and the solutions adopted, both effective and attempted but unsuccessful.

Topics:

- Homogenization of knowledge of mechanics and electrology
  - LV switching components
  - Safety devices
  - Use of asynchronous machines
  - Frequency converters
  - ...
- ...
- Robotics and robot programming
  - Vision systems
  - Interfacing robot systems with vision systems
  - Implementation of motion control systems with one or more axes
  - Implementation of IIoT systems
  - Interfacing with company IT systems



# Maintenance Supervisors

They should:

- be able to teach, train, encourage and coordinate technicians;
- initiate interventions and monitor performance and warning signs.

The course is at Master level (60 ECTS credits) and was developed in SUPSI (UAS of Southern Switzerland) and subdivided into modules (Certificates of at least 10 credits) to be selected on according to the incoming knowledge and professional expectations of the participants.

The course is actually held at the School of Management of the University of Turin.

For maintenance supervisors, the suggested modules are:

- CAS in Industrial Maintenance Management
- CAS in Operations Management
- CAS in Human Resource Management
- CAS in Quality Management and Continuous Improvement
- CAS in Supply Chain Management
- CAS in Facility Management

Programs can be tailored to specific business needs and participant expectations.



# Maintenance Engineers

They should be able to:

- analyse and interpret the warning signs;
- define best practices for first avoiding and then solving problems;
- study solutions for continuous improvement, adapting the opportunities given by new technologies and making use of the information received from the field;
- indicate how to create new products, services and systems to allow the maintainability of the assets as well as their useful life as long as possible.

For maintenance engineers, the suggested modules are:

- CAS in Industrial Maintenance Management
- CAS in Plant Engineering by using Computer Aided tools
- CAS in Risk Management, Business Continuity and Disaster Recovery
- CAS in Project Management Professional
- CAS in Reliability Excellence

Programs can be tailored to specific business needs and participant expectations.



# Maintenance Managers

They:

- should define strategies not only for maintenance but also for managing the assets;
- no longer have to limit themselves to vertical specialism, but will be able to optimize the aspects of production or service delivery, with technical and organizational requirements;
- must be Business Unit managers, not only managers of Production, Maintenance, Procurement, etc.

Training must deal more with aspects related to the measurement of performance, the technical and economic evaluation of projects, assets and works, as well as regulatory aspects and ways of conducting personnel, the so-called soft skills.

## Examples of seminars

- Balance sheet and general ledger
- Industrial accounting
- Work measurement
- Technical pre-calculation
- Decision calculation
- Staff evaluation
- Empowering skills





# Competences

Knowledge and experiences (gained through robust basic tools training) such as:

- diploma (or equivalent qualification);
- degree;
- postgraduate studies, if requires: doctorate, master, others;
- training courses;
- specialization courses;
- significant experiences within organizations;
- significant experiences on specific projects;
- other significant experiences (for example, participation in challenging projects, exhibitions, conferences, publications).



# Competences

Abilities deriving from personal qualities, to use in the activities carried out at different levels. They are constitutive elements, which express abilities, dependent on the target position:

- authority (leadership);
- innovation;
- autonomy;
- commitment and passion;
- diagnosis and synthesis;
- dialectic/argumentation;
- problem setting and problem solving;
- know-how transfer;
- motivation of people;
- group work.



# Competences

Skills are defined as a set of elements including:

- the body of knowledge, intended as a set of systematic knowledge, disciplines and paradigms shared by the professional community at different levels (technician, supervisor, engineer, manager);
- a system of values that is expressed through organizational attitudes and behaviours (professional action);
- specialist know-how, acquired by applying models, methodologies, techniques and approaches, gaining experience and results aware of the use of the body of theories;
- the ability to relate and the operating methodologies applied in order to implement the projects and obtain the expected/agreed results;
- the ability to apply them in the activity and to be demonstrated with evidence and results (effectiveness).



## Proposals for training courses

Each training proposal must adapt to the organization of the company, the potential of its resources and the objectives of both.

If you are interested in learning more, you can contact me:

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