

# Hospital engineer professional profile and training



## A The project

*The Forum DACH, a collaborative platform of the hospital technician from Austria, Germany, Switzerland and Holland has set itself the task of creating a document to frame the professional profile of the engineer in healthcare facilities. This paper is to be structured in way that with its help the whole issue of the job profile - including its related problematic nature - can be presented to the competent bodies and authorities. Subsequently, efforts should be pursued to give the professional image of a Hospital Engineer a statutory framework.*

*Given the interest of European countries that are represented in the IFHE-EU, to the task and the outcome, the present study will be translated in English for further publication in other member states. With sufficient support from the IFHE-EU this work is to be presented to the competent bodies of the EU in order to obtain a decision at European level to regulate and determine the profession of an engineering manager in the health sector.*

## B Engineering Manager in the Health Care Sector

Hospital Engineering and Technical Manager

Job description

### B1 The current situation

The job of an Engineering manager in the healthcare / hospital sector within the German-speaking countries but also in most of the European countries professionals have, despite its firm grounding in health care, no generally accepted professional image. But a recognized and accredited occupational profile is a precondition to establish proper corresponding training and competence systems to give employers and institutions sufficient security when establishing and organizing engineering units within its health care institutions in terms of proper tasks and competences and corresponding pay systems.

The business critical dependence of operating technical processes and systems to ensure patients, staff & visitor safety in the hospital continues to grow in leaps and bounds. At the same time the understanding of technology and technology skills of users, operators and management decreases. Without a suitably trained technical team which is well integrated into the decision-making team a safe operation and economical technical business management cannot be guaranteed.

Looking at official European data on health professions the hospital technician or engineering manager in the health care is not mentioned.

What prevented the authority or those responsible to create and implement a concrete professional image so far? Probably a variety of reasons have been decisive for that.

With the establishment and development of technology in the hospital in recent decades it has not been possible, perhaps intended, to create similar regulated structures within all hospitals. Many hospitals have different structures and organized its engineering units differently.

In addition, as part of the so-called restructuring of the recent years, a rather experimental reorganization was conducted, without having any real basis for this kind of decision- making, responsibilities have been moved and passed on.

Thinking of, for example, the somewhat idiosyncratic assignment of medical technology to IT or the integration of technology to FM without assigning the technical unit a management focus.

The different sizes of hospitals and clinics also hindered the formation of uniform structures due to the different required case depth, intensity and complexity of technology needed.

The division of the technology into areas of construction, operating buildings and medical technology, consciously done to prevent the technological areas of becoming too big, did the rest. A cumbersome re-connection of these technological areas have been carried out by economists lacking the experience and knowledge in the matter but who did their best giving the impression of dominating it all.

There was a lack of appropriate documentation to present the concerns of the engineer for his own professional field at various offices and administrations. It lacked and still lacks lobbies for it.

This is certainly only a part of the causes that have prevented to enforce a generally accepted professional image. In addition, the hospital management had no particular interest to support the Engineering Manager. The reasons are many.

## **B2 Fundamentals to outline the profession**

Thanks to the previously collected documents of German Engineers Associations (FKT, IHS, OVKT), existing job descriptions from the hospitals as well as other provided information furnishing working principles, it is now possible to design a scheme and build up a profession profile.

Main components of the profession are the remit including authority and associated skills obtained via education, training and work experience.

The job profile determined on the basis of experience, developments and innovations, including any resulting current interpretations of bundled specific requirements and activities, is to be put down in a completed work after agreement of interest and consensus with all parties concerned, in order to be officially recognized and recorded. This description usually includes only the significant skills and activities and their objectives. They should reflect the essential characteristics of the profession, like the main tasks and minimum necessary skills and behaviours.

Within European countries there are, looking at the same hospital categories, little differences in the tasks and the offered technical courses are reasonably comparable. Institutional training is hardly found.

Healthcare Engineering's in its full scope of the claims and the resulting tasks, even if its importance is seen in terms of functionality and operation of health care facilities, is difficult to learn within the normal singular educational path and training. Regular studies are rarely offered in the European countries resulting in a graduate degree in hospital technology. Additional training for skilled tradesmen and technicians is offered only recently.

### **B3 What kind of circumstances we are confronted with now:**

Regarding the profession of hospital technician, third parties have no clear picture about performance, function and actual activities, and are not able to visualize a corresponding job profile.

This profession is certainly one of the more difficult to frame, encompassing complex activities, with its tasks unfortunately rarely transported to the public and has no common job title. It cannot be reduced to a single profession in the traditional sense because it is a range of different professions, often including specific aspects of even further various professions.

There is no common understanding among the general public which activities are related to hospital technology. The profession lacks a regulated education and there is currently no institutionally fixed job description, for example, by the hospital Engineering & Technical associations.

Regarding to the development of a new job description -thus the institutional definition, for example, by the organizations or the legislator - one has to accept this starting point position and considering it while developing and implementing a professional image.

## **B4 Summary and Outlook**

A task group is now creating a professional profile at senior management level of the Engineering & Technical management. This means that when it is completed, all components can be forwarded and broken down to the departments and subsequently on to the advisors and maintenance-group level. For this extensive work an allocation of tasks to experts is necessary within the organizations. With the help of the in the IFHEEurope (International Federation of Hospital Engineering - Europe) represented hospital Engineering & Technical associations, a further objective is a EU project to implement in the bodies of the European Union should be submitted.

## **C JOB DESCRIPTION**

### **C1 Areas of responsibility and competence:**

Here existing job descriptions were an appropriate basis for the professional image.

Goals:

The post holder has to recognise and prioritise the necessary tasks within the given resources and the decisions of management in such that:

- All costs incurred in its field tasks are accurate, timely and the work is done economically;
- The given cost and investment budgets are adhered;
- The necessary management performance indicators of the hospital to be determined;
- The maintenance of property, buildings and the medical technologies used within, all satisfy all legal requirements;
- Economical operation of the general building facilities and medical technical facilities is guaranteed; high availability of building services and medical technology is given; a high level of skilled employees and motivation is achieved; the preventive measures (2.5. Accident Prevention) in assigned area to be observed in compliance with the statutory regulations;
- Good governance techniques are applied to the Engineering and technical systems such that the superior authority is informed regarding to extraordinary events, in particular taking into account the risk - management, in the technical area at any time.

The Clinical Engineering & Technical Manager is to inform and advise the hospital management in a form that it is able to plan and decide replacement and new investment in time. The post holder has to arrange a working relationship between technical areas with other areas of the hospital so that the flow of information runs

smoothly at any time and an overall good cooperation is ensured to minimise any impact on patient care or services .

## **C2 Duties and powers**

The Clinical Engineering & Technical Manager to observe the following technical tasks, within the existing resources and the decisions of the superior management:

- Ensure the smooth operation of the hospital technology and patient services;
- Preservation of the building substance;
- Creation and coordination of the maintenance plan;
- Preparation, completion and maintenance of controlling, engineering, architects and service contracts within his competences;
- Ensure compliance with legal requirements and given quality characteristics of ongoing construction and maintenance activities;
- Coordination of external and internal service providers; commissioning and monitoring of construction, renovation and maintenance work on the buildings of the hospital; coordination of construction, repair and maintenance activities with other departments; preparation of analyses, reports and statistics on hospital management; securing facilities and building documentation; building up and maintaining a maintenance control system;
- Preparation and upkeep of a building and area management plan; - strategic and operational management of the technical area (personnel management, budget management, other resources, etc.);
- Organising an energy management strategy;
- Cooperation with the responsible persons for special functions (2.8. Fire protection, occupational safety, waste, environment, radiation protection, quality etc. )

## **C3 He decides on:**

- Targets and annual program in subordinate entities; Priorities for repairs and maintenance;
- Procuring and allocation of maintenance and repair contracts within the budget to external service providers;
- Decrease of partial performance and completion for all construction projects;
- Personnel measures in the technical area under the rules of procedure (setup and deployment of staff, skills training, staff development);
- Release of incoming invoices in the technical area for material goods and services;
- Business trips and errands in the technical area, possibly in the form of a general scheme;

- Carrying out own or implementing service maintenance and assigning repair jobs on buildings, services, medical technical equipment and vehicles in the context of applicable limits and the budget;
- Details of the safety checks and inspections of most vulnerable parts of machinery and equipment and workplaces (for example as part of the implementation of the operational safety regulation.) by the relevant institutions
- Annual safety program and additional topics and priorities for regular safety training;
- Powers and responsibilities of the subordinate fields and their leaders.
- Risk Management – assessment , planning & assurance .

**C4 He advises** superior authority in the following matters:

- Formation of financial provisions for major repairs or new / replacement investments in maintenance and facilities and medical technology;
- Establishing and modifying the summits of all wage earners in the technical area in individual cases as well as for the regular wage and salary adjustments for technical applications in their fundamental basics by liaising with Human Resources;
- Opportunities and models to measure performance and evaluate performance in the Engineering & Technical areas.

**C5 He informs** his superior authority in the following matters:

- Unscheduled and therefore not budgeted maintenance and replacement investments;
- overall condition of the building structural fabric, services and medical technology;
- Expected changes in the allocated budgets.
- About anticipated risks to buildings and facilities and medical technology facilities

**C6 Special powers**

- The Clinical Engineering & Technical Manager is a member of various committees (for example: hygiene, health & safety at work, waste, environment, IT, capital planning).
- The Clinical Engineering & Technical Manager has access to all confidential documents, needed to perform their duties (to be individually defined per hospital).
- He has the following powers: (to be individually defined per hospital).

- Ideally, the Clinical Engineering & Technical Manager is an integrated member of the organisation`s extended management system .

## **D EDUCATIONAL and TRAINING REQUIREMENTS**

What skills are now actually needed for a first-class professional operating as a hospital Engineering & Technical person at management level? Opinions on that will go apart between the skilled experts and training managers.

Results gained from experience, discussions on education and training include:

**D1** In the **technology section**, the following **priorities** are to be set to:

**D1 1 Basic knowledge of technology and natural sciences,**

**D1 2 English in theory and practice**

**D1 3 Facility Management**

**D1 4 Structural engineering,** legal basics, building materials, building physics principles, static basis for the use of space, room book, master planning concepts, business organization planning, competitions, authorities, procedures, architectural planning, HT-coordination. Medical planning priorities, type and design of building procurement contracts / fees, programme & project management and construction controlling. Demands on the hospital construction and civil engineering services from the hospital engineering services incl. electrical engineering services, medical engineering services, from the Safety Officer for Medical Equipment and Patient Security and.....( *proposal to expand* ), in-house standards, financing and funding models in university hospitals and other health care facilities, organizational and operational organizations in construction, acceptance/taking over construction and related trades, building contracts (planning and regulatory supervision)

**D1 5 HVAC (heating, ventilation, air conditioning, plumbing incl. medical gas supply) including energy management**

Legal basics, water supply and waste disposal, sanitation, plumbing equipment, including broadcasting equipment and facilities. Heat supply, general and medical gas supply

**D1 6 Ventilation and air conditioning technology**

**D1 7 Hospital Engineering Services - coordination**

**D1 8 Medical Technology**

Basic medical knowledge, parts of special medical technology: functional diagnostics, imaging systems, therapy, monitoring, laboratory equipment, hygiene technology, miscellaneous, IT in MT, Safety Officer (SO).

**D1 9 Business organization:** Technical management, documentation, device file, device cycle, maintenance, consulting, safety engineering, strategic planning, procurement, interfaces of services with main business of providing healthcare.

### **D1 10 Electrical Engineering, IT**

Electrical supply / electrical installations: power installations, high, medium, low voltage supplies and communication systems

Commercial- and house appliances: supply of kitchens, laundries and special undertakings, kitchen and laundry facilities or equipment, economic goods and products of the electrical engineering equipment, Emergency and back-up of power supply systems, redevelopment of power supply systems energy management (see heat supply), sustainable power generation plants including Combined Heat & Power installations

Digital Signal Processing and Communication Technology: Networks and bus systems, central building control, multimedia applications, building documentations- and operating systems, resource and planning systems

Modern communication technology, department and ward communication, patients' telephone - telecommunications facilities, internal radio communication, DECT (Digital Enhanced Cordless Telecommunications), fire prevention and alarm detection systems, parking systems, building automation, central building control/management systems.

### **D1 11 Transportation systems, logistics**

Transportation demand and logistics, elevators and escalators, conveyors, automated goods, transport systems- high duty units, floor conveyors and electric transportation devices, conveyors; pneumatic tube systems, sub underground networks and utility shafts, special installations

### **D1 12 Waste disposal technology**

Ecology and waste organization, waste legislation and state of the art, environmental management systems, waste - and dangerous goods requirements, waste disposal and delivery, waste recycling, waste treatment systems for disposal of special waste

### **D1 13 Laws and regulations with technical content, standards and regulations Crisis management and security**

**D2 The business knowledge** should include:

#### **D2 1 Fundamental knowledge of management and leadership,**

Introduction to health care, historical development, demography and health, legal basics, institutions and figures in health care, health care - benefits, costs and funding

#### **D2 2 Business Law**

#### **D2 3 Labour and Social Law**

#### **D2 4 Accountancy**

**D2 5 Finance and Investment**

**D2 6 Controlling**

**D2 7 Quality Management - Total Quality Management**

**D2 8 Quantitative Management Methods**

**D2 9 Strategy and business plan**, strategic analysis, strategic choice, strategic planning, strategy implementation

**D2 10 Budget planning**, budget preparation, budget negotiations, budget control

**D2 11 Procurement**

**D2 12 Programme, Project and Process Management**

**D2 13 Organization Development and Human Resources**

**D2 14 Fundamentals of leadership**, leadership tasks, management styles, management tools, self-management, resilience **D2 15 Basics of Communication**

**D2 16 Team Training**

**D2 17 Presentation**

**D2 18 Conflict Management and Mediation**

**D3 Medical terminology and technology:** Selected concepts and processes of anatomy, physiology, special diagnostic and therapeutic procedures, surgical procedures, anaesthesia and intensive care medicine, pathology, other departments, selected care/nursing process

**D4 Hospital Epidemiology and Control of Infection:** Introduction to hygiene, legal basis, requirements for hospital sanitation, hygiene behaviour personnel, infection control procedures and equipment for cleaning, decontamination, disinfection and sterilization

Planning requirements for the construction and operation tasks of medical supervision, state of the art equipment and facilities of hygiene technology, hygiene requirements for technical equipment, supervision of construction, hygiene checks of hospital equipment, hygiene in establishments (for example: kitchen, laundry, cleaning, workshops)

## D5 Summary

**With an appropriate focus formation from preceding training and through continuing education the senior technicians is able to achieve a comprehensive knowledge to do justice to the complex and extensive demands on the profession. The constant technological changes in the technology fields require a continuous adaptation of education and training.**

**Healthcare reforms that affect the management processes must also be considered.**

**The present document provides a comprehensive and extensive framework and is to be adapted in detail with the implementation in accordance with the objectives to be achieved.**

**Dipl.-Ing. Detlef Mostler**