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Preparing graduate students to be HSE professionals



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ABSTRACT

The work of HSE (Health, Safety, Environment) professionals in industrial companies is a complex mix of reactive tasks requiring a fast response and more analytical tasks needing analyses. Moreover, doing this job means being able to dialog with different stakeholders, including operators in the field, top managers in headquarters and authorities, and to drive in parallel many different tasks at strategic, tactical and operational levels.

To face these challenges, companies are in the urgent need to hire competent people to manage health, safety and environment protection, cope with restrictive legal frameworks and preserve their image in the public that is increasingly more concerned about industrial risks. This opens opportunities for the new generations of postgraduate students:

“An academic qualification is regarded essential since those specialists must be capable to address new problems by applying knowledge and skills to situations not previously encountered”

[Arezes and Swuste (2012)]

In this paper, we present an analysis of missions, tasks and experience of HSE professionals, from which we identified the present and future roles, missions and required skills of a safety officer. This analysis was then used to define a postgraduate program aiming at providing students with the required knowledge, know-how and attitudes needed to succeed as HSE professionals in industrial, consultancy and insurance companies.

This program covers six complementary domains: legal and normative framework, risk analysis methods and tools, safety management systems, human and organizational aspects, leadership, emergency and crisis management. It is composed of lectures provided equally by faculty members and professionals, case studies and a set of field projects during which the group of students has to fulfill real missions provided by companies. The program also includes a 6-month internship in a company, during which the student is playing the role of junior HSE professional, under the supervision of a manager in the company and a member of the faculty.

Nowadays, most companies operate at a global scale in different countries. HSE professionals, like other managers need to work in an international context, with colleagues from different backgrounds and cultures. To prepare our students to this challenging environment, we select candidates from different countries and backgrounds and we balance these differences in relatively small cohorts of 15–20 students. This intercultural group gives each student opportunities to work with different skills and cultures in teams varying from one project to the next.

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1. Introduction

Graduate students in engineering and management possess academic knowledge and practical skills in a domain of expertise,

like mechanical engineering, chemistry, construction, electronics, human resources, accounting, etc. Some technical universities include HSE curricula, for instance in chemical engineering (Perrin and Laurent, 2008). Most universities and engineering schools provide students with management courses and organize internships in companies, but these students are not prepared to

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endorse the duties and responsibilities of a HSE professional as their first job after graduation.

Hale and Ytrehus (2004) trace the origins of the safety profession back to 1833 with the appointment of the first inspectors of factories in the UK. At the same period (1813), a first decree was established in France addressing prevention of accidents and measures to take in case of accident.

There is a long history of public bodies training engineers to safety in the Netherlands since the 19th century (Swuste et al., 2010) and in US since the 2nd World War (Heinrich, 1956). One of the first known postgraduate programs in HSE was launched in the Netherlands in 1989 (Hale and de Kroes, 1997); it was developed from an MSc course run in UK from 1974. Arezes and Swuste (2012) propose a survey of postgraduate courses in Europe aiming at training safety professionals. Where in the beginning the safety practitioner – according to the name of his function – was merely focused on process safety and personal safety of the employees, later on his tasks evolved to occupational health and environmental concerns (not to mention sometimes quality). So the general term of HSE professional is used in this paper to name this group of professionals.

Education of future HSE professionals follows the general trends of engineering: focusing on reliability and technological improvements in the early 20th century, concerns were extended to human behavior and more recently to organizational aspects and a dominant concern for safety management (Hale et al., 2005). These evolutions were also translated in national and international legal frameworks to ensure prevention of accidents, protection of populations, the environment, and other values at stake. Chang et al. (2012) propose a competency model of HSE professionals with correlations between competencies and safety functions. The European Network of Safety & Health Professional Organizations (ENSHPO) did a study of safety professionals (Hale et al., 2005) and developed a set of qualification standards (www.euroshm.org).

For years, industrial companies offered HSE jobs to experienced people who had a proven success in management positions, especially when this experience was gained in production or maintenance departments. The increasing complexity of companies acting in many different countries, as players in a network of stakeholders and subcontractors, the continuously growing importance of regulations and the specialization needed for facing complex hazards makes this choice less efficient nowadays. HSE jobs need people more specialized in HSE matters.

All companies and societies have to address risk management as it covers all activities and processes. The international standards organization ISO 31000 defines Risk as “the effect of uncertainty on objectives” (Purdy, 2010). HSE professionals in industrial companies take care of an important part of the risk management: health and safety of people inside and outside the company, and environment protection.

Nowadays, a large number of degrees in Hygiene, Safety and Environment (HSE) exist in all industrial countries; in France, 80 master degrees and 17 post master degrees showing the words “risk” or “safety” in their title are proposed on the market (Préventique, 2014).

In the first chapter of this article, we do a literature review about the role, tasks and skills of a safety professional. The second chapter presents safety education programs, their content, methods, and the competences needed by a safety professional. This analysis was then used to define a postgraduate program aiming at providing students with the required knowledge, know-how and attitudes needed to succeed as safety officers in industrial, consultancy and insurance companies, presented in the third chapter. We conclude with a discussion about the future of the profession of the safety professional.

2. The HSE professional

Kohn et al. (1991) made a survey among members of the American Society of Safety Engineers to investigate the background and missions of professionals. A series of questions were related to their responsibilities for “occupational safety management/engineering”. Participants were also asked to list specialized training programs necessary for career advancement. The overall ranking was: management, computer science (note that the survey dates from 1991), industrial hygiene, ergonomics, hazardous materials and fire science.

Hale and Ytrehus (2004) conducted a similar survey in two countries (Norway and Netherlands) that produced quite similar results in terms of core tasks carried out by HSE professionals. The main difference is the increase of organization-related tasks: design review, safety culture, organizational change, company policy, and safety management system. Table 1 compares the two surveys; for Hale and Ytrehus survey, only the tasks done by more than 60% of both Norwegian and Dutch samples are listed.

Within 13 years, the core tasks concerning organizational aspects of safety professionals’ job have increased. But first of all, what is a *safety professional*?

2.1. A growing need of professionals and quality trained people

Booth et al. (1991) identify several types of safety practitioners. Topic specialists are persons with specialist knowledge and expertise of particular hazards or stages of hazard control like occupational hygienists, radiation specialists. Safety service managers are responsible for running a Safety Service Department (sometimes without specific health and safety qualifications, but usually with general qualifications at graduate level and senior management expertise). So besides the general term of HSE professional, there exist different types of specialized jobs: occupational physicians, inspectors, auditors, insurance assessors, occupational hygienists or preventers.

We found in literature and professional life the terminology of ‘risk manager’. This function is more global and focusses more on the financial and strategic (marketing and commercial) aspects of risk management. We will focus in this paper on HSE professionals. A HSE professional has a responsibility for process safety, occupational health issues, environment and crisis and emergency management. He/she can develop a specialization (become a topic specialist as mentioned by Booth et al. (1991)) or become a safety service manager; he/she is the head of a safety or HSE department.

In order to design a HSE curriculum, we have to answer two main questions: what knowledge and competences are needed? What does industry expect from such graduated students? Harper (1962), Rockwell (1962) and Weaver (1962) addressed those questions in a reference paper about the “safety engineer”; more than 50 years later, we can be surprised that many of their findings are still valid and relevant!

First of all, the HSE professional’s role in industry is functional; he reports normally directly to the top management but has no hierarchical power in the company besides his own (often very small) team. The HSE professional is generally seen as an advisor and specialist, supplying support and information at all hierarchical levels. He/she must be able to speak with managers as with the operators in the workshops. He/she fosters HSE positive attitudes by stimulating middle management to apply the safety directives. HSE management is a line management responsibility, and management staff including top management isn’t always aware of their HSE duties in the company. Harper (1962) illustrates this through a little story:

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