

# PROFESSIONAL UNIVERSITY TRAINING FOR THE SAFETY ENGINEER

RENATO LAGANÀ

*DArTe, Università Mediterranea of Reggio Calabria, Italy*

The knowledge acquired through university courses is an important aspect of training for technicians who will address issues related to building-site safety. They must become aware of their social role characterizing the profession of safety manager. Mediterranean University of Reggio Calabria started a course on the safety of construction sites more than 15 years ago, first at the Faculty of Architecture, later at the Faculty of Engineering. The activity on health and safety management has also been the subject of several meetings and symposia. Together, with trade unions and businesses, they have given rise to synergy resulting in the 2010 ratification of an agreement protocol with National Institute of Accident at Work (INAIL). The first initiative launched last year was the first-level master's degree on the management of health and safety in temporary sites. This paper features some of the achievements and new training opportunities targeting the various operators engaged in the business of training in the workplace.

*Keywords:* Safety management, University master, Trainers' safety.

## 1 THE TEACHING OF SAFETY BETWEEN DIDACTICS AND TRAINING

The School of Architecture at the Mediterranean University - Reggio Calabria was the first to deal inside the Degree Course in Architecture with training courses on the safety of construction sites nationwide. Since May 1997, under the Studies Seminar "Safety in the process of training of the Architect" (Laganà 2011a), organized by the Architecture program and the Department DASTEC, it saw the need to introduce the issue of safety on construction sites within architectural education.

Maintaining this perspective, the five-year Bachelor of Science course in Architecture has adopted courses (in alternating years) in Design Safety and Operational Safety. They were addressed in the issues contained in Annex V (Art. 10) of Legislative Decree 494/1996, concerning the "Training Course for workplace safety in the construction industry" (Gottfried 2000).

The course took place through lectures, tutorials and seminars on the following topics: a) existing legislation on safety and health in the workplace; b) occupational diseases; c) statistics on the violations of the rules on construction sites; d) risk analysis; e) good practice standards and criteria for the organization of construction sites and the execution of work safely; f) methods for the preparation of Safety Plans and coordination.

The duration of these courses was sixty hours per year, and students were allowed to complete the cycle within 120 hours provided for by Legislative Decree 494/1996.

Seminars were organized within the courses to include our university teachers as well as offer instruction to other Italian university professors, judges, doctors, labor inspectors, and officials and representatives of the joint bodies established in the building industry. The frequency of the two courses has allowed the achievement of one of the requirements of Art. 10 of 494/1996, namely the possibility of obtaining “a university certificate attesting success in an examination or examinations of the course or a university degree”, equivalent for the purposes of knowledge acquired through the course of Annex V.

Since the academic year 2005-2006, the Master of Science in Construction Management and Architecture program has provided discipline in choosing Construction Ergonomics and Safety. The program, which related to the topics of design teaching and construction sites, and an integrative seminar (held with the participation of academics and other Italian universities, occupational physicians, health inspectors, official allowance and representatives of the joint bodies established in the building industry) made it possible to complete such training (Laganà 2011b). In the following years, arguments relating to safety training in the yards were covered by the Organization of the Health and Safety program. Related to the teaching of the Construction Design and Construction Site courses, participation in technical seminars was carried out as part of the National Week of Safety in sites.

With the enactment of Legislative Decree 81/2008, amended and supplemented by Decree-Law 106/2009 (also called TUS - Unified Safety Law), conditions for issuing certifications have changed (Di Giuda 2011). The Internal Rules on certifications issued to participants was therefore adjusted as required by law. The courses are held in the new undergraduate program in Construction, Construction Management, and Safety and Environment, and were attended by students from other graduate programs (Architecture, Engineering, etc.).

## **2 THE MASTER’S DEGREE**

On the basis of the Protocol of Understanding signed in December 2010 between the Mediterranean University and the INAIL (National Institute for Insurance against Accidents at Work), the Regional Directorate of Calabria launched the University Master’s Degree in “Management of health and safety in temporary construction sites” (Laganà and Barbato 2011). The Master’s Degree was launched in September 2012, with the goal of creating professionals who can effectively enter the work force, from which comes an increasing demand for operating technicians who can interpret what is established and regulated in the Unified Safety Law (Legislative Decree no. 81/2008 as amended).

The activity of the Master’s degree has been provided to members through 1,500 hours of training, a comprehensive and integrated view of the methods, and practices needed to acquire the knowledge and skills of advanced level to assume the functions of safety managers in manufacturing building products. The training activities of the program, organized into 10 modules, have been carried out in the School of Architecture at the Mediterranean University, the provincial offices of INAIL, and the Institute for Building School Education and Safety of Reggio Calabria (ESEFS).

The first module provided knowledge about the regulatory framework from the evolution of Italian legislation and the most recent EU directives. It has therefore raised

specific attention about employment law and forms of assessment of company management. Consistent with the requirements of the Consolidated Law on Occupational Safety, an emphasis was placed upon the duty required of the criminal safety workplace with the knowledge related to systems of supervision, and contrasted with controls over illegal employment.

The second module focused on specific aspects of the formation of a designer who can interpret and assist the evolution of the project, with choices that have to be implemented in the operational phase of productive time expressed in the site. Particular attention was given to the evaluation of safety costs, and to the preparation of work files, with time-organizational safety of future-maintenance building to be carried out in the life cycle of the buildings.

In the third module, particular attention was paid to the management of the production-phase building carried out on the temporary site. Students must then tackle the preparation methods of the Operational Safety Plan (a document required for all construction work that needs to be drawn up by the successful tenderer and the other contracting companies). The attention to management and to the specific safety of site management was addressed, with specific qualifications on the management of the Site Induction and Toolbox Talk, and techniques for the management of operative meetings.

In two successive modules, teachers at INAIL were aware of the insurance system through their knowledge of the relationship between insurance, insurance premiums, and procedures for the denunciation of accidents and financial benefits that come with it. The attention to databases and related INAIL accident indicators have provided the necessary information to determine the probability and random variables that are the basis of the careful planning of prevention activities performed on site.

They were then taken through an educational module on the management and control of risks, and specific knowledge of occupational medicine with attention to occupational diseases. They then go over the risks of falls from height and manual handling of loads, which are the most frequent causes of accidents on site. Afterwards, they must analyze the risk of other conditions that may occur on site, with specific information on the chemical and physical risks, the risk of asbestos exposure, and the risks of electric shock and fire hazards.

After completing the first cycle of modules, students tackle the issues related to new organizational models and operating environments, and the contractual forms deepening the topics related to the organization of enterprise and project management techniques. Attention was paid to risk analysis and management in quality of safety, with respect to the information contained in the models UNI-INAIL and the BS OSHAS 18001 in 2007 (Laganà 2012).

The relationship between safety and contract forms allows students to draw insights on various forms of contracts during the construction of buildings. In this sense, the program evaluated the forms of procedure, the reward systems to be implemented to reduce the risk, the procedures for the preparation of contract documents, and specifications in the parts that deal with the technical procedures and safety.

In the next module, attention was directed towards site logistics and environmental impact assessments. When training short-term safety technicians, an important ability to cultivate was managing the organization of the site in relation to different types of processing (pre-fabrication, demolition, recovery and restoration). Students then tackled the issues of operational planning and operational programming aimed at job

site logistics, and the formulation and management of work schedules. A special emphasis was placed on site impacts in relation to the building work environment, i.e., taking care of the organization of waste disposal.

The last phase of training covered the operational activities on site. Wide coverage is given to demonstrations on the prevention of falls, knowledge of construction machinery, formwork systems and casting of reinforced concrete, the manual handling loads, installation, proper use and dismantling of scaffolding.

This last series of lectures alternated between visits to external sites (e.g., the site of the Restoration Work of the Cathedral of Villa S. Giovanni, the site of the Works Valorization of the Aragonese Castle of Reggio Calabria, the site of the works of restoration of the facade of the Cathedral Basilica of Reggio Calabria, the site of engineering works (bridges and tunnels) of the motorway between Scilla and Palmi). Students then put their training into practice at qualified construction companies reported by ANCE (National Association of Builders) Calabria, partner of the Master's degree program. The activities performed at construction sites and offices of the prevention system allowed the interns to compete directly with experts to better understand the ways of practical implementation of health and safety.

At the conclusion of the educational experience, students drew up the following research thesis proposal:

### **1. *The Risk of Asbestos***

Student Pallone A. prepared an e-book containing the basics, information and operating procedures. It was intended for professionals and workers at construction sites, identifying a path of knowledge to safely deal with construction activity in the presence of asbestos.

### **2. *DVR-Standardized Risk Assessment Document: Creating a website***

The safety system generated by the synergy between universities and INAIL was brought out of university classrooms to serve the community. Editor Benincasa M. created a website that presented arguments, concerning the guidelines and the opinions of authoritative legal references of the Risk Assessment Document, in a public, accessible, and user-friendly format.

### **3. *Safety at Work: A Right for Everyone***

The subfund with the highest levels of risk to worker safety is that of construction buildings. Editor Gencarelli R. highlighted the peculiarities of operations of construction sites with high levels of frequency and severity of worker injuries.

### **4. *The System Management of Health and Safety at Work***

The decrease of accidents registered in Italy in recent years must not lower the level of caution, because technological innovation is changing many production processes. The introduction of organizational and management models, known as Management Systems Work Safety (SGSL) allows firms to schedule jobs. According to student Udardi M. R., plant investment and reorganization of work structures allow the implementation of a process of improvement awareness.

### **5. *The Economics of Safety Management in Small and Medium-sized Firms***

Starting from actual operating conditions of small and medium-sized companies which constitute a substantial share of the building industry, editor Nocera B. set the objective of identifying topics that can raise awareness in the business owner. Implementing the measures needed to reduce the risks the firm can be made in terms of working well by taking advantage of a better harmony and corporate savings on your insurance costs.

### **6. *The Management of Construction and Demolition Wastes on Construction Sites***

One of the most evident problems in temporary construction sites is that of waste management. Often, in addition to the amount provided for in the projects, one must deal with other waste resulting from the construction site supplies that have different types of disposal. Editor Spatari S. analyzed the issue not only from the perspective of “green” disposal, but also predicted action to mitigate environmental impact and waste of primary resources.

### **7. *The Efficiency of Education as a Tool for the Prevention of Accidents***

The general measures of protection in the field of safety prevention activities have the aim of avoiding or reducing the risks to which workers were exposed. Editor Maio S. analyzed the preventive measures that the employer must put in place such as training, information, and training of workers. These elements have become in recent decades a very important role by placing the worker at the center of attention as an active conscious and responsible in job performance in terms of safety.

### **8. *Communicate Safety: Management, Health and Quality Control***

After identifying the problems related to the organization of building sites, then analyzing the various aspects of corporate management, editor Serratore B. defined possible awareness campaigns that can have the greatest influence on safety culture as part of the process of quality management. Attention was drawn to legal education that needs to be part of school programs to promote risk awareness and integrate “a culture of regularity”.

### **9. *Communicate Safety: The Restoration Site***

The specifications typical of the site that, according to the historical artifact can assume different characters; are investigated to specify operational methodologies. Prior knowledge, the necessary investigations to define the static conditions, and the management of operating time are very important factors to define a specific workplace. Student Vasile D noted that knowledge of the risks of working are necessary to protect the health and safety of workers. Also, information on the value of cultural heritage and environmental protection need to be made explicit in the early stages of the building.

### **10. *The Yard in the Areas Affected by an Earthquake: Risk Scenarios and Working Procedures for Safety***

The seismic event that hit the city of L'Aquila (6 April 2009), resulting in the destruction and damage of many buildings, has seen the initiation of two types of interventions to begin reconstruction. Many initiatives were aimed at ensuring the safety of workers and operators, becoming a repository of important information for

those who must manage new sites. First, consolidation operations and safety of the areas of intervention were carried out. Then work was started at the site after the earthquake. Editor Amaddeo S. identified and highlighted the types of risk with specific attention to the need for coordination while working simultaneously with multiple sites.

A comparison emerged between two components of the training. The management of Health and Safety Management Operators on construction sites found, in the insights of the research thesis, a useful working tool aimed at the specific formation of Safety Managers. This program have expanded the usual scenarios of the formation by competing with operational issues needed to improve the practice of safety in temporary sites.

### 3 CONCLUSIONS

The information process started through university education has enabled the initiation of knowledge regarding health and safety in the workplace, while at the same time acquiring progressive information on technical and cultural aspects that characterize the education of architects and engineers. The university does not focus upon only one activity geared to train future professionals. Instead, with its educational program, stands as an active subject in the permanent care of the training of all those who are directly involved in the production of building.

### References

- Di Giuda, G. M., *Progettazione e Gestione della Sicurezza nei Cantieri Edili*, Milano, 2011.
- Gottfried, A., Education and training in the building process and integration of safety disciplines: The Italian experience, *Designing for Safety and Health Proceedings*, London, 2000.
- Laganà, R., *Aspetti Innovative della Sicurezza in Edilizia*, Reggio Calabria, 2011a.
- Laganà, R., *La Gestione della Sicurezza nel Cantiere*, Reggio Calabria, 2011b.
- Laganà, R., and Barbato, M., University Experiences in the Training of Safety Managers, *Prevention - Means to the End of Construction Injuries, Illnesses and Fatalities*, Proceedings of CIB W099, Washington DC, 2011.
- Laganà R., Il Progetto della Sicurezza e la Pratica del Coordinamento durante l'Esecuzione dei Lavori, *aRCh – Periodico dell'Ordine degli Architetti Pianificatori Paesaggisti e Conservatori della Provincia di Reggio Calabria*, July, 2012.