

Proceedings of the CIB World Building Congress 2016

Volume III

Building up business operations and their
logic

Shaping materials and technologies

Edited by
Arto Saari
Pekka Huovinen



TAMPERE UNIVERSITY OF TECHNOLOGY



Tampereen teknillinen yliopisto. Rakennustekniikan laitos.
Rakennustuotanto ja -talous. Raportti 18
Tampere University of Technology. Department of Civil Engineering.
Construction Management and Economics. Report 18

Arto Saari & Pekka Huovinen (eds.)

WBC16 Proceedings : Volume III

Building Up Business Operations and Their Logic

Shaping Materials and Technologies

Tampere University of Technology. Department of Civil Engineering
Tampere 2016

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Published by: TUT – Tampere University of Technology

ISBN 978-952-15-3740-0 (set)
ISBN 978-952-15-3741-7 (vol. I)
ISBN 978-952-15-3742-4 (vol. II)
ISBN 978-952-15-3743-1 (vol. III)
ISBN 978-952-15-3744-8 (vol. IV)
ISBN 978-952-15-3745-5 (vol. V)
ISSN 1797-8904

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Design and Safety: From the EU Directives to the National Legislation

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Abstract

This contribution wants to examine the relationship between the role of the designer and the role of the safety coordinator in design and construction phase.

EU technical analysis say that the designer plays a key role in the design preparation stage, and is so important in preventing occupational risks on construction sites. In national codes the relationship between design and safety it is not so strong.

The chronological path of EU directives dealing with Health and Safety at work in temporary and mobile sites it is analysed, starting from 92/57/EEC till arriving to the later EEC communications on the subject. Contemporary, the national Italian legislation is analysed, from Decree 494/96 till Decree 81/08, with the specific aim to search the connection between the role of designer with respect to the safety in project development. This way it is possible to reconstruct the actual link among architectural design and safety design.

It is thus possible to individuate the weak points in this relationship that lead to a difficult safety management in construction phase; main finding is that the connection between design and safety has been transposed into national standards in very different ways and only through a cultural awareness of the designers on the issues of health and safety objectives of Directive 92/57/EEC will be reached.

Keywords: Safety, design, legislation

1. Introduction

Health and safety issue in construction industry has a great importance. The importance of the theme is ratified by the specific European health and safety on construction sites directives that dictate the guidelines for the state members regulations. All European states are then provided with health and safety legislation concerning construction sites that is related with the common European principles.

Therefore if we analyse the data of accidents in construction industry in the various Member States on the basis of annual Eurostat report, it is possible to note a particularly variable trend within the Member States. The data shared by all European countries is a general decline in accidents: between 2008 and 2012 (latest available consolidated data) accidents in the workplace, in construction industry, had a decrease of 46%. But the fact remains that the number of accidents in construction is considerably higher than that recorded in other economic activities

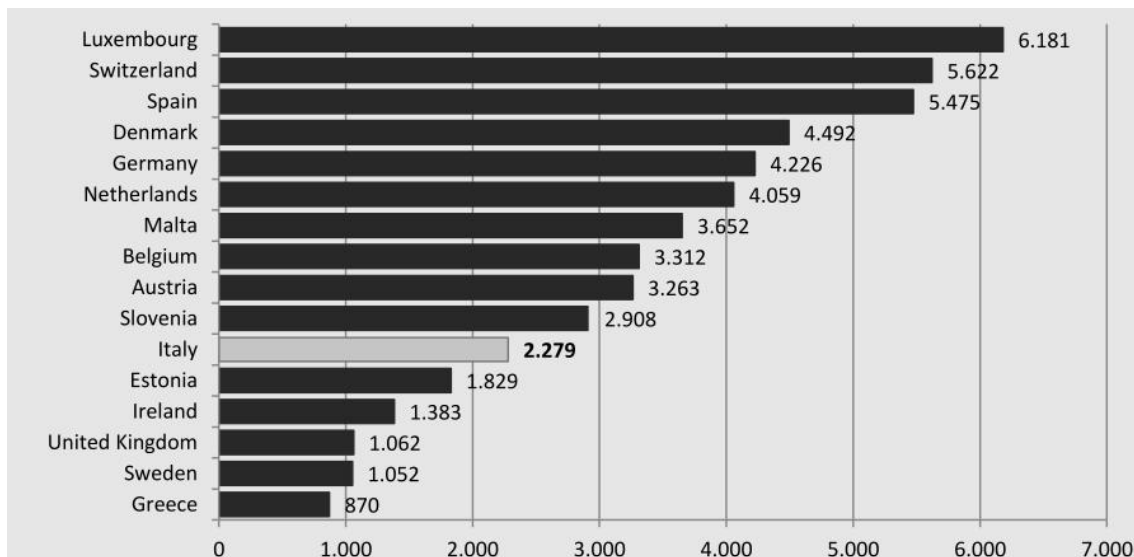


Figure 1: Accidents per 100,000 workers in construction in 2012 (Cresme Ricerche spa, 2014)

The international comparison shows that Italy, in 2012, was well below Germany (4,226) and Spain (5,475). However, considering the most serious accidents, i.e. fatal accidents, Italian ranking radically changes. This may partly be due to the vast spread of the informal economy and the specific entrepreneurial fabric (mainly made up of small and micro enterprises) can lead to under-reporting of less serious accidents.

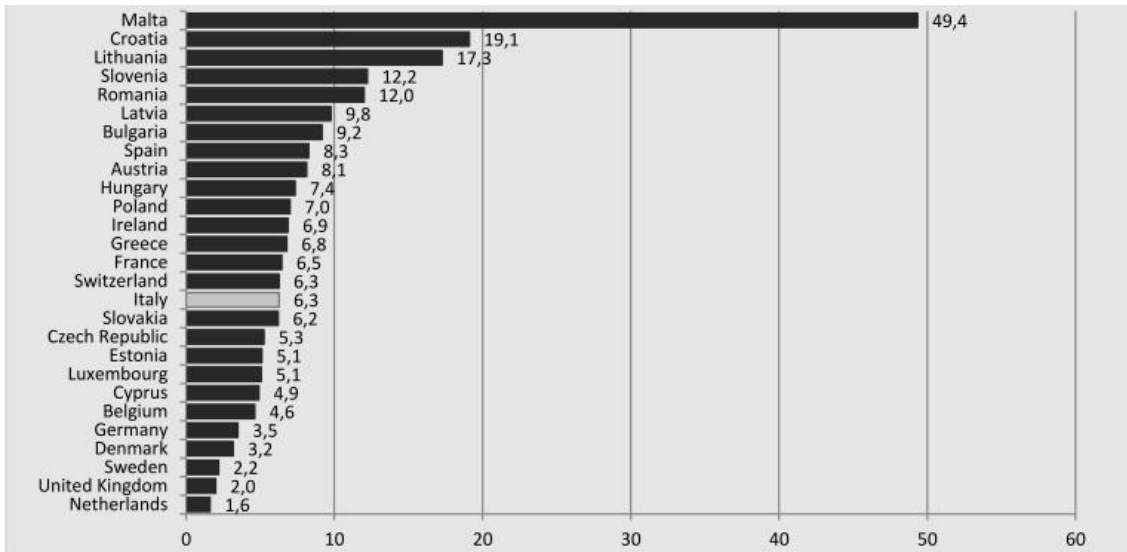


Figure 2: Deadly accidents per 100.000 workers in construction in 2012 (Cresme Ricerche spa, 2014)

The clear disparity in accidents that emerges from the European data, lead us to investigate the path that European directives have made at the moment of their implementation through national legislation. According to Capone et al. (2015), it is interesting to investigate how the European inspiring principles can be found in the texts of Member States laws.

In particular, the question we focus in this paper is on the relationship between the responsibility of the designers of the building and the project and health and safety management. This point of view comes from the importance that the European directives give to the design with respect to health and safety management in construction. EU directives clearly state the importance of the “safety awareness” during various stages of design and, for this reason, remark the Health and Safety Coordinator involvement in the design phase. Despite of it, in some European countries (i.e. Italy) the involvement of Safety Coordinator in design process is weak, even if national laws theoretically agree with EU directives. For this reason we examine how much national laws are in complete concordance with EU principles basing our analysis on the duties of Designer and Health and Safety Coordinator in Design phase. With the comparison we try to understand possible reasons for such differences in national legislations.

2. EU directive 92/57/CEE and UE Communication 06/11/08

2.1 EU directive 92/57/CEE

Directive 92/57/EEC concerning the minimum safety and health requirements at temporary or mobile constructions sites, since the initial considerations expresses the centrality of architectural choices in determining the safety during construction:

“[...] Whereas unsatisfactory architectural and/or organizational options or poor planning of the works at the project preparation stage have played a role in more than half of the occupational accidents occurring on construction sites in the Community [...] “

Right from the initial considerations, the Directive stipulates a direct relationship between the architectural choices and the occurrence of accidents in construction site. Stating that *“it is therefore necessary to improve coordination between the various parties concerned at the project preparation stage and also when the work is being carried out”*, it focuses on the design phase of the work.

Directive brings together again the connections between design and safety:

“Article 4 - Project preparation stage: general principles

The project supervisor, or where appropriate the client, shall take account of the general principles of prevention concerning safety and health [...] during the various stages of designing and preparing the project, in particular:

— when architectural, technical and/or organizational aspects are being decided [...]”.

The article 4 involves the client, empowering him, and asserts that he also must consider the principles of health and safety at the time of the architectural, technical and organizational choices. Complementing this, the article 5 stipulates the presence of specialized technicians in construction site safety (Health and Safety Coordinators), working since from the design stage.

All the European safety codes are therefore based on the above assumptions. It is interesting to investigate regulatory developments subsequent to 1992 to understand how the relationship between design and safety is inside in the current national standards.

2.2 EU Communication on the practical implementation of Health and Safety at Work Directives 92/57/EEC – 06/11/08

Communication is a European report about the practical implementation of Directive 92/57/EEC in the Member States; it is dated 06/11/08 and represents the state of the art 16 years after the enactment of the directive. Communication follows a Commission undertaking to assess the implementation of the regulatory framework with a view to improve it. It is based mainly on the national reports supplied by the Member States and an independent experts' report analysing implementation of the Directive 92/57/EEC.

The practical implementation of Directive 92/57/EEC

The implementation of the Directive is a complex issue in terms of technical and administrative staff. Member States regularly revise and update their legislation. This explains why in some States the directive has been transposed in a very fragmented of legislation that make it more difficult to assess. It is then revealed differences in national legislation deriving from the previous regulatory framework and from the fact that the Directive lays down minimum

requirements and leaves the Member States free to maintain or establish higher levels of protection.

Since the Directive gives all those active on a construction site key roles in prevention, its implementation was therefore assessed in terms of the influence that each group has on prevention of and protection from occupational risks. While the Directive does not refer explicitly to architects, engineers or consultancy firms, this group was evaluated because the designer plays a key role in the project preparation stage, and is so important in preventing occupational risks on construction sites.

It is clear from the report that architects and engineers know the health and safety requirements but do not totally agree with the measures imposed. Some designers are not in favour of the client appointing a coordinator for the design stage as, in their view, this hampers their creative freedom.

While stressing, in some ways, a lack of safety culture in the designers, on the other side it also notes that, when architects and engineers act as coordinators at the design stage, the working conditions on construction sites considerably improve. A specific education in the field of building design is a condition of absolute advantage for the health and safety coordinators. Communication also underlines that preventive health and safety is often not integrated into the project at the design stage because safety conditions during construction and subsequent use and maintenance are not a major factor in design/architectural choices. The designers are thus not adequately involved in health and safety process from national codes.

“There is a long way to go in all the Member States before the culture of prevention effectively takes root at the design stage” (EU Communication 06/11/08).

According to the Communication, it is important in this context that the competent national authorities make an effort to train designers at schools and at university, making prevention a key part of the curriculum

Roles of Health and Safety Coordinators

The Directive does not define the competencies required to act as coordinator, so there are big differences from one Member State to another. Some states have defined the competences and/or skills of coordinators in great detail, sometimes even requiring that they have specific training or a combination of training and experience (i.e. in Italy). The competencies required of coordinators by the Member States to fulfil their duties differ greatly, and so the standard of coordination varies from one Member State to another.

EU communication states that, because project preparation does not take prevention of occupational risks into account before the design is finalised, the lack of planning for prevention has to be remedied at the execution stage. It is to hope a change of attitude in construction industry; if national legislation made it a requirement for prevention measures linked to the

subject-matter of the contract to be systematically incorporated into the technical specifications for invitations to tender and in the contract performance clauses and quality contract management by the contracting authorities, this could help to change attitudes in this area.

The communication surveys that a lack of coordination in design affects the quality of the coordinator's work at the execution stage. The result is that on-site coordinators often encounter health and safety problems that are difficult to solve because they are generated from the design itself, because of its morphology and construction techniques. This underlines that safety should be considered a design property which affects itself.

3. European comparison

Here it might be helpful to tell briefly the theme of the relationship between design and safety in the European regulatory framework. The considerations, drawn from Bergagnin et al (2012 and 2013), resulted from a project of the Safety Commission of the Federation of Associations of Engineers of Emilia Romagna in 2012, then continued in 2013. Starting from the comparison between the various national laws transposing the Directive yards 92/57/EEC, aspects related to the main figures involved in the member states Germany, UK, Spain, France and Sweden (Aulin and Capone, 2010) have been analysed. Only these few European countries have been selected because in the academic detailed studies Sweden have been added to the work of Bergagnin et al (2012 and 2013).

Italy is our reference country since in the Italian construction system there is actually a weak position of the Health and Safety Coordinators with respect to the designer position in defining principal stages of the design. The study found that the role and requirements of professional technicians who deal with health and safety vary greatly in European countries. In particular, it was noted that while some EU countries have an approach to the issue very similar to the Italian one (i.e. Germany and Spain), other members (such as France and especially Britain) are significantly different, especially as concerns the design and construction management.

The research method was to deepen investigate the Italian legislation with respect to the EU directives, then, basing on literature studies (Bergagnin et al, Bragadin, Capone), other national legislations have been analysed in order to underline the research theme.

Italy

In Italy the first legislation on health and safety in construction sites declared after the EU directive 92/57/EEC was that the Decree 494/96. With subsequent amendments and additions it was in force until 2008, when it was replaced with Decree 81/08. Health and Safety Coordinator at the Design stage is central in the relationship between design and safety, bond never directly explained.

While in the European Directive are cultural recommendation related to the role and to the operative tools of the Health and Safety Coordinators in Design phase, in the national code

specific legal duties and responsibility are assigned to Health and Safety Coordinator at the Design stage. This lead to a strength definition of the Health and Safety Coordinators role in the Decree 81/08 with respect to the EU Directive.

In the following there is a synthesis of the evolution of Italian laws related to the Health and Safety Coordinator at the Design stage:

- Decree 494/96: no substantial differences from the EU Directive about the Health and Safety Coordinator at the Design stage duties. It is important to underline that Health and Safety Coordinator at the Design stage intervention is postponed in the executive design phase.
- Decree 528/99, modify to the Decree 494/96: Health and Safety Coordinator at the Design stage intervene in the generic “design phase”.
- Decree 81/08: not sensible differences from the previous law, except for the coordination of architectural, technical and/or organizational aspects.

At the same time, contents of the Health and Safety Plan evolved; analysing the specific contents of these documents allows us to detect the real competences a Safety Coordinator in Design phase must have with respect to the design. According to Bragadin and Giusti (2015) Health and Safety Coordinator can be seen as a specialized Project Manager and it is important for him to have real designer skills in order to intervene in the whole project.

Article 98 of Decree 81/08 indicates the requirements to be a coordinator: university graduation is not the only requirement, also graduates (surveyor, industrial or agricultural) are in fact admitted to the profession of coordinator. We are so distant from the auspices of the 2008 EU communication in which explicitly refers, as described above, to the design skills of engineers and architects who can assume the role of Health and Safety Coordinator at the Design stage. The debate is as a technician can objectively, without specific design skills, participate in the design phase of the work in relation to the issues of health and safety.

In this context, the stronger link, extremely general and as such address the cultural, is in Article 22 of Decree 81/08, "Obligations of the designers": designers of workplaces should comply with the general principles of prevention in health and safety at the time of design choices. Read extensively, this reminder of the responsibility of the designers – both designers of the building and of the construction site as a workplace - is the strongest bond that the Italian code, only in 2008, re-established with the directive of European origin.

United Kingdom

First aspect of the peculiarity is seen in the great importance that is reserved by the UK Regulations to the concept of design in safety. British standards provide binding obligations of the designer with respect to the safety of the building. In practice, in the UK the designer is required to design the safety of the work for all the people who come in contact with it, by those who realize, the future users and to future maintainers, according to a concept of global security that extends the entire life of the work itself. UK legislation comes to accurately define some technical aspects that the designer has to consider in the design phase, such as the future

maintenance of facilities and structures, or cleaning the windows or translucent walls, or how access to areas where there is the risk of falling.

The coordinator is responsible, on behalf of the client, to monitor the work of the designer, making sure that he complies with the safety provisions in order to receive full cooperation on the preparation of the Health and Safety File. The drafting of Health and Safety File, according to EU directives, is charged to the same coordinator.

Health and Safety Coordinator at the Design stage appointment comes even in the process of definition of the levels of design: once prepared the preliminary draft, is not allowed to proceed in the further steps of the design Health and Safety Coordinator at the Design stage is not appointed. Under these conditions, it is clear that the interaction between designer and coordinator proves effective and not fictitious.

Many clear differences are found between the United Kingdom legislation and other European countries including Italy, about the drafting of Health and Safety Plans. In Britain the customer directly provides information in a pre-construction stage, in order inform the designer, the principal contractor and the contracting companies, about the interesting elements regarding the future building, its construction and the construction site.

In UK Health and Safety Coordinator acts decisively and mainly managerial; he is in charge of ensuring the transfer of information between the various parties and the constant updating of proper documents relating to it. Recognizing the importance of the design in the future realization of the building, the UK code make the Health and Safety Coordinator at the Design stage to take a role of "safety consultant" designer and as such works with designer in a nearly equal ratio.

According Bragadin (2011), it can be said that countries like UK, with greater business culture and social sensitivity, while adopting apparently less strict rules have on their side a positive response statistical accident.

Germany

German legislation is very similar to the contents of Title IV of Italian Decree 81/08. On the design phase they are detected small differences from the provisions of Title IV, although it is clear more attention to the verification of the early interaction between the coordinator and designer, with a strong focus also on the contents of the technical dossier ("Document for Future Work").

France

In France there is an insurance system that is mandatory for public procurement and optional (but very useful) for private procurement; this is the so-called "ten year policy posthumously". Insurance institutions have their own technical specialists of the construction industry to grant

the insurance. The insurance technicians analyse the whole design and can request changes, improvements and any kind of depth, otherwise the denial of insurance coverage. The same procedure is applied to the technicians (from design to construction and safety) that must all be covered by insurance. Once implemented, the insurance thus guaranteed the technical quality of the work.

Furthermore, Health and Safety Coordinator in France cannot carry out any other type of appointment within the same building process.

Spain

In Spain Health and Safety Coordinator at the Design stage is appointed only in the case where there are more designers who do not have corporate links between them, or more professionals, or more member firms, or engineering companies. In practice this implies that Health and Safety Coordinator at the Design stage is not almost appointed in the bigger works because often they are carried out by big engineering companies or professional offices.

This law determines an obvious latency in design and programming of safety, in sharp contrast with the objectives of the European Directive, which provides for a special attention to safety since the embryonic stages of the development of design. Since in many cases the Health and Safety Coordinator at the Design stage is not appointed, it is possible that health and safety of the construction is entirely in the hands of designers work.

Sweden

In Sweden Health and Safety Coordinator at the Design stage participates in the planning and lead the preparation and design of project. Health and Safety Coordinator at the Design stage coordinates the preparation and design of project with regard to health and safety to allow participants involved during this stage to take into consideration each other planning and solutions. The coordination should lead to the execution of different parts of the project together with the construction, installation and others that occurs at different time and stage of the project where the risk of ill-health and accident could arise. Health and Safety Coordinator at the Design stage draws up a Health and Safety Plan if it is required before the construction site is set-up.

In table 1 a synthetic comparison among the countries is reported; in the table can be found the Designer Role in Health and Safety in construction and the Health and safety Coordinator involvement in design stages, with respect to the EU principles.

Table 1: A synthetic comparison among the analysed national legislations.

<i>Criterion</i> <i>Countries</i>	<i>Designer Role in Health and Safety in construction</i>	<i>Health and safety Coordinator involvement in design stages</i>
<i>Italy</i>	<i>weak, not specific duties or responsibility</i>	<i>quite strong but not efficient</i>
<i>United Kingdom</i>	<i>very strong</i>	<i>weak, only duties of control</i>
<i>Germany</i>	<i>weak</i>	<i>quite strong</i>
<i>France</i>	<i>weak, insurance system</i>	<i>weak, insurance system</i>
<i>Spain</i>	<i>weak</i>	<i>weak</i>
<i>Sweden</i>	<i>weak</i>	<i>strong</i>

4. Conclusions

It is clear in this discussion that, despite the common origin (Directive 92/57/EEC), the transposition of the European standard in the different countries was characterized by different hints and in some cases, UK among them, an approach substantially different.

A first objective fact that emerges from the research is the earlier and more intense involvement of the coordinator in the design stage during the project preparation; this takes place in the main European Union countries such as Germany and UK. Especially in UK, the function of Health and Safety Coordinator is purely managerial, having him responsible not only to draw up the Health and Safety Plan but also to control and monitor the activities of the designer. The designer is in fact the main subject invested from the obligation to respect the safety design choices and to provide all necessary information to the coordinator to compile the technical file (Health and Safety File).

An important consequence of the different approach to the safety of European countries, is found in the important role that Health and Safety Coordinator at the Design stage assumes: it has a guiding role to proper design of safety. The Health and Safety Coordinator at the Design stage is given this task with the knowledge that this will translate into lower cost of the work, both during its construction and during its future use.

The comparison shows another obvious fact: the diversity of skills that Health and Safety Coordinator at the Design stage must have. In the main countries is in fact required a high specialization of this figure and some of it expressly forbid to overlap the function of the coordinator with other positions within the same project or construction site. The main EU countries are in fact oriented towards the high specialization of Health and Safety Coordinator.

In conclusion we can say that, from the cross-reading of the rules of the Member States in relation to the European directive, the connection between design and safety has been transposed into national standards in very different ways. This is certainly due to the difference

social reality of the construction industry, made by the technicians who work there and by the fabric of businesses, widely variable from state to state.

Starting from the same EU directives, in some countries relationship between duties of the Designers and the duties of Health and Safety Coordinator is strong, in some other is actually very weak. Sometimes the Designer is not even mentioned in the legislation.

In our view and in accordance with the European community indications, the solution to bring the design to the centre of the construction site safety system is to act on the education of the designers, rather than on that of safety specialists. Only through a cultural awareness of the designers on the issues of health and safety we will tend to the actual achievement of one of the objectives of Directive 92/57/EEC: the reduction of architectural and organizational inadequate choices as a cause of accidents on construction site.

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