

# DEMAND FOR ENGINEERS FOR PREVENTIVE FIRE PROTECTION TO PROTECT BUILDINGS AND THEIR USERS

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## Abstract

In Germany it burns on average every 3 minutes. Fires endanger the health and lives of people and therefore a basic social need. They also generate high economic damages and endanger jobs. Since the existence of the Federal Republic of Germany, the legal requirements for fire prevention have not changed significantly. They were detailed in technical areas and special constructions. What has changed is the sense of justice, if persons and property damage occur due to defects in buildings. Similarly, the requirements of the clients have changed since defects and their correction result in significant additional costs. Deficiencies are not uncommon. They were detected by four analyzed scientific papers. In Germany, the 16 federal states are responsible for building and fire safety. Therefore, there are differences between the federal states in building codes and also in the requirements and approvals of the experts in this field. In all federal states are equal, that no studies in preventive fire protection are required, although these are offered. According to the high level of responsibility and liability in this area, this is incomprehensible. In order to assess the situation in Germany, analyses, comparisons and evaluations were conducted. These include importance, requirements, qualifications, studies and courses for preventive fire protection. Because of the number of building regulations many requirements for fire protection have been expected. The relevant state ministries must be assumed lack of awareness of actual importance for preventive fire protection. Their requirements are partly considerably below the building regulations. With the developed structure fire prevention planning and inspections can be carried out structured.

**Key words:** Fire safety training, fire protection engineer, fire protection expert, fire protection qualification, preventive fire protection.

**Classification JEL:** M53 – Training.

## 1. Introduction

### Preventive fire protection

According to the report No. 17 of CTIV<sup>1</sup> in Germany it burns about every 3 minutes, the GDV e.V.<sup>2</sup> [2] the fire damage in 2012 was in Germany about 3 billion euros, the trade magazine AssCompact<sup>3</sup> exist after major losses, larger 500,000 euros, 77% of companies after a few years no longer, the German death statistics<sup>4</sup> in 2012 the direct cause of death for 384 people was smoke, fire and flames. Of the European Union security<sup>5</sup> for buildings and their users is defined by requirements for construction. For thus employed persons are no requirements for the qualification. This is the responsibility of the Member States. In Germany the 16 federal states are responsible. Therefore, there are differences between the

<sup>1</sup> <http://www.ctif.org/ctif/world-fire-statistics>

<sup>2</sup> <http://jahrbuch.gdv.de/> Ifs: Institut für Schadenverhütung und Schadenforschung der öffentlichen Versicherer e.V.

<sup>3</sup> [http://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0CDkQFjAB&url=http%3A%2F%2Fwww.deutsche-versicherungsmakler.de%2Fwebsite%2Fuploads%2Fasscompact\\_brosch\\_brandschutz.pdf&ei=gHKHU7-cGYvP4QTvsIGYCQ&usq=AFQjCNGUiV4Cq6EPTe40p3KY7SqTvZnSYg&sig2=PmSZRIR91dqI8vPGYE sX4A&bvm=bv.67720277,d.bGE](http://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0CDkQFjAB&url=http%3A%2F%2Fwww.deutsche-versicherungsmakler.de%2Fwebsite%2Fuploads%2Fasscompact_brosch_brandschutz.pdf&ei=gHKHU7-cGYvP4QTvsIGYCQ&usq=AFQjCNGUiV4Cq6EPTe40p3KY7SqTvZnSYg&sig2=PmSZRIR91dqI8vPGYE sX4A&bvm=bv.67720277,d.bGE)

<sup>4</sup> Death statistics in 2012 Federal Office of Statistics (Germany)

<sup>5</sup> <http://www.beuth.de/de/verwaltungsvorschrift/89-106-ewgmittgrundldok2/3646572>

states in the requirements for fire prevention and recognition of professionals (*Chromek et al., 2010*).

Because of demographic changes, the number of elderly and disabled people will increase considerably in the future in residential buildings<sup>6</sup>. These people cannot or limited use the ladders of the fire brigade. Demographic change also results in structurally weak regions to a reduction in the efficiency of the fire department (*Becker, 1994*).

Object of research are building codes<sup>7</sup>, guidelines, recommendations, requirements for the qualification of professionals and their training. The results of the analysis of the requirements and the training will be different compared, analyzed and evaluated together. This work refers generally to Germany.

### Defects and problems

Missing, faulty or incorrect components built with requirements for fire and smoke protection are defects (*Mračková, 2014*). Most defects are no longer openly apparent after the completion of a building and result only in the event of fire, personal injury and property damage. Reasons for defects and measures to prevent were processed particularly extensive in four researched scientific work of Pallmer (*2011*):

*“Findings of this work (excerpt):*

- *The fire protection of building services is particularly deficient susceptible.*
- *Lack of interface planning for fire protection lead to most of defects.*
- *Lack of planning of fire protection in construction planning and allocation leads to non-implementable plan instructions for the execution.*

*Required improvement (excerpt):*

- *Fire safety is an engineering design element and not just a duty on module for building law requirements.*
- *Fire protection needs to be strengthened as a quality feature a property.*
- *Early involvement of a fire protection specialist planner in the detailed design planning prevents errors and avoids high costs”.*

From the dissertations of Stürmer (*2006*) flows following knowledge:

*“Results of the surveys to deficiency causes in the planning and construction (excerpt):*

- *Defects in the planning 33%: Lack of detail and scope in the planning and tend as well as lack of qualifications of the planner.*
- *Defects in construction 59%:*
- *Construction companies: Missing qualifications of performers, errors because ignorance and sloppiness and conscious acceptance of errors.*
- *Construction management: Inadequate monitoring, control, acceptance and lack of qualification<sup>8</sup>.*
- *For the remaining 8% are other defects.”*

In the FeuerTRUTZ Magazine May 2013 (*Rost, Kutz, 2013*) a bachelor and a master thesis was presented. In the studies of the two works a variety of fire protection planning was investigated. Of these, only 15% were approvable without restrictions and 15% not at all. The majority of 70% had Defects and was approvable only, sometimes with considerable restrictions<sup>9</sup>. What qualifications did the Creators have was not listed in this Report<sup>10</sup>. These

<sup>6</sup> <http://www.is-argebau.de/verzeichnis.aspx?id=991&o=75909860991>

<sup>7</sup> <http://dejure.org/gesetze/BGB>

<sup>8</sup> <http://www.bmvi.de/SharedDocs/DE/Artikel/B/GesetzeUndVerordnungen/eu-bauproduktenverordnung.html>

<sup>9</sup> German Basic Law: <http://dejure.org/gesetze/GG>

<sup>10</sup> German Criminal Code: <http://dejure.org/gesetze/StGB>

studies do not provide a representative analysis of all fire protection design in Germany. The results are still meaningful.

### **Legal significance**

The personal and property protection is legally linked to the liability for premises. There are risks to persons and property from the possession of a building. The owner of a building is required to eliminate or to protect hazard sources. Legal basis for the punishment of violations consist of the:

- German Basic Law: Right to life and physical integrity.
- Code of civil law: Contract work law, services without physical and legal defects.
- German Criminal Code: Punishment for personal injury and construction danger if acknowledged rules of technology are violated.

Legal consequences exist for each person responsible for defects<sup>11</sup>.

### **Building law evaluation**

From public law perspective, there are two building types, standard and special constructions. Standard buildings are evaluated according to the model building code and special constructions and special structures are evaluated according to one or more special model building codes. Special structures without special model building codes are not regulated buildings. For this a fire risk analysis shall be performed (*Kubasaková et al., 2014*). Based on all the necessary measures are derived to achieve the same level of protection as in a regulated building. Planned buildings are evaluated according to the plans. When modifying existing building first the inventory must be recorded and analyzed. Therefore, in the following order made increasing demands on the professional competence, responsibility and liability for the assessment of:

- New buildings without deviations.
- New buildings with deviations.
- Modification of existing buildings.
- Modification of existing historical buildings.

The number and quality of people in the building are not yet included. These have a significant impact on responsibility and liability (*Kachaňáková et al., 2012*).

### **Requirements for responsible professionals**

For all professionals for preventive fire protection in Germany no study is required in this field of study by the responsible authorities. For the qualification of employees of construction law authorities and fire services training of 2–4 weeks is sufficient. It still connects to an authority's internship of 2–4 months. In some states, the examination of fire protection from external specialists is carried out instead of authorities. These are appointed or recognized by state ministries. Private legal professionals often have minimal training in fire prevention or even appropriated expertise. Architects and Engineers chambers calling for the registration of professional planners and experts for preventive fire protection in their subject lists no studies in this field of study.

### **Research question**

What steps are required to integrate qualified professionals binding for preventive fire protection in all phases of construction? Detailed questions here are:

- What is the importance of fire prevention?

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<sup>11</sup> <http://www.baufachinformation.de/zeitschriftenartikel.jsp?z=1994039002155>

- Which contents include preventive fire protection?
- What training and qualifications are in preventive fire protection?
- Are the training and curricula for preventive fire protection for ensuring the EU basic requirements and national protection objectives adequate?
- What qualifications are required for specialists responsible for preventive fire protection?

### **Limits and restrictions**

The 16 federal states are responsible for building in Germany. Each has its own building codes. These are partly different. For the approximation in the states of the Conference of Minister of Construction developed uniform laws (model rules). Due to the different requirements in the states of a selection of the 12 most commonly used model rules is used for this work exclusively. The analysis of regulations of other EU Member States is not possible due to insufficient knowledge.

## **2. Methodology**

### **Qualitative Content Analysis**

The results of the analyses should provide useful statements to the detailed questions of the research question. Therefore, they must meet the requirement of systematics and traceability. In order to make the different test materials comparable, first a common basis had to be worked out. For this purpose, extensive qualitative content analyzes were performed for systems, components, concepts and other topics for preventive fire protection. The results of this qualitative content analysis lead to a collection and evaluation structure. On the basis of this structure, further qualitative content analysis was carried out. These include analysis of building codes, programs of study, education and training for preventive fire protection.

### **Quantitative content analysis**

The use of quantitative content analysis should lead to measurable statements of investigation characteristics. They were also carried out on the basis of the collection and evaluation structure. The criterion for the evaluation of the individual points is the detail of requirements or content. These are described in detail (5 points), generally described (2 points) and not described (0 points). Quantitative content analysis was carried out with EU basic document, model building codes in the set of 12 individual regulations and fire protection guidelines for government buildings.

## **3. Data collection**

### **3.1. Structure of preventive fire protection**

For answering specific questions, the research question analyzes, evaluations and interpretations are required. To compare the various areas, a comprehensive and structured detection and measurement basis with all aspects of preventive fire protection is required. This was created by qualitative content analysis of European standards, national building codes and standards for planning, construction, testing and use of buildings. In structuring the topics are grouped in a category system. It includes 6 main categories and 40 sub-groups with 230 individual points and forms the structure of preventive fire protection.

*Situation determination:* Object geometry, usage and users, building law classification, legal requirements, protection objectives, fire risk analysis, responsible fire department, firefighter areas, fire water supply, fire water retention.

*Structural fire protection:* Section definition, space-enclosing components, fire flash-overs, flames spreading, load-bearing components, non-load-bearing components, cladding, insulation, flooring, escape/evacuation routes, elevators, doors and closers.

*Fire protection of building services:* Technical rooms, electrical cables, pipes, gas pipes, shafts and ducts, heating, fuel storage, ventilation systems, carry out different lines through components

*Fire protection of plant engineering:* Fire alarm system, smoke removal, smoke control, fire extinguishing systems, fire auxiliary devices, lightning protection systems, gas detection systems, leak detection systems, building radio equipment, explosion protection systems

*Organizational fire protection:* Fire protection in construction work, responsibilities, company organization, fire protection representative, building documentation, fire extinguisher, special extinguishing medium, acceptance testing, repeat testing, servicing, maintenance, hazardous materials

*Fire protection engineering methods:* Smoke removal, smoke control, fire load calculation, evacuation time, evacuation calculation, flue gas temperatures, component detection, structural evidence, visibility, flue gas components.

### 3.2. Public requirements

The EU basic document No. 2, fire protection, for concrete construction products and systems definitions, performance levels and the documents to meet the basic requirements.

The 12 most common German model building codes were analyzed with state of 12.2012 in its entirety. This is done by considering the maximum score per single point from all 12 building codes.

Additionally the proportion of fire protection requirements within the 12 model building codes was determined with a qualitative content analysis. For this purpose, paragraphs without subparagraphs and each subparagraph were recorded.

The requirements of the federal states and associations are small with a circumference from 1 to 49 pages for the evaluation of fire protection. These include:

- Fire protection guide for building the federation (Bund);
- vfdb Guideline 01.01, fire protection concept (vfdb);
- Nordrhein-Westfalen (NRW) BauPrüfVO §9 fire protection concept;
- Baden-Württemberg (Ba-Wü) administrative regulation a fire protection control.

To get the EU document No. 2 and the model building codes comparability were performed for this qualitative content analysis.

### 3.3. Training in preventive fire protection

For the analyses of training, the quality of the training cannot be valued. The qualitative analysis of the training are valued according to the offered subjects and their temporal extent. The assignment of subjects to structure Preventive fire protection was sometimes difficult. Detailed training plans were not available for all courses. An assignment to the individual points has not been possible, but only to the subgroups. Subjects that could not be unambiguously assigned were spread across several subgroups. Additional training subjects, which are not part of preventive fire protection, were summarized in a separate main group.

#### Study degree programs for fire protection

There were two part-time programs and two full-time programs analyzed (June 2012).

Part-time degree programs:

- European Institute for Postgraduate Education (EIPOS)/University of Applied Sciences and Technology in Dresden, M. Eng.
- Technical Academy Southwest e.V. (TAS)/University of Applied Sciences Kaiserslautern, M. Eng.

Full-time degree programs:

- University Wuppertal, B. Sc. und M. Sc.

- University and University of Applied Sciences Magdeburg, B. Sc. und M. Sc.

At the Technical University of Kaiserslautern, a master's degree is offered as a correspondence degree course of study. This study includes only short-face meetings with exams per semester. Therefore it was not further analyzed.

### **Study degree programs architecture, Civil Engineering and Building Services**

The analyses of these fields of study curricula were examined by study subjects for preventive fire protection. For this purpose, an Internet search was carried out in June 2012. Only in a few courses individual lesson units were detected in each semester. Some of these are only offered as an optional course. These courses were not examined further.

### **Education and training for preventive fire protection**

The following courses are carried out by universities of Applied Sciences or educational institutions in cooperation with universities of Applied Sciences. They make a middle education level between the study degree programs and the many short courses or training only for parts of the preventive fire protection. The short courses were not investigated.

- University of Applied Sciences Cologne (FH Köln) Certificate: Technical planning and construction management in preventive fire protection.
- International Security Academy (ISA) in cooperation with universities in Berlin, Bochum, Esslingen and Mainz, Certificate: Planner and expert for preventive fire protection.
- European Institute for Postgraduate Education (EIPOS): In the analysis of planner and expert for preventive fire protection is summarized.

In addition, the Directive 100 of the German Institute for Preventive Fire Protection Association (DIvB) is analyzed, which recommends minimum standards in the training of planners and experts.

## **4. Data Interpretation**

### **4.1. Interpretation of the basics**

The number of fire deaths per year is low by international standards. This does not mean that the requirements can be reduced to the preventive fire protection. Trends for this consist of ignorance or ignorance of the risks involved. These tendencies must be avoided.

### **Demographic Change**

Because of demographic changes, the fire department has to save more and more elderly and disabled persons in residential buildings. This means a need for more time and personnel, which significantly reduces the efficiency. But within the fire-resistance time of the components firefighters can save only a certain number of people. Demographic change reduces in depressed areas and the performance of the fire department. Therefore, the rescue of all building occupants may in future not be guaranteed at all times in these areas. To compensate this deficit are professional firefighters in these regions necessary or the requirements for fire prevention must be increased. However, both measures can be implemented only with substantial financial resources.

### **Interpretation of defects**

In both analyzed dissertations two primary problems were detected in the planning. These are the late Consult by qualified professionals and the lack of qualification of the architect and the construction manager for preventive fire protection. If the fire protection is not recognized until the end of the planning, re-planning are usually necessary, which result in

time delay and cost increases. Preventive fire protection must be taken into account in a variety of trades and includes most of the interfaces. Therefore, qualified professionals must be involved from planning to construction. In the construction the qualification in fire protection of the construction companies is the lowest. This is mostly due to the award of partial services to cheap subcontractors. Therefore, the involvement of a professional construction manager for preventive fire protection is particularly important in practice but very rarely.

In the contribution of FeuerTRUTZ (*Schmitz, 2011*) magazine with a Bachelor's and a Master's thesis on the quality of fire protection plans following causes were identified:

- Underestimation of the preventive fire protection.
- Inadequate training.
- Problems of continuing education.
- Underestimation of the engineering discipline of preventive fire protection (*Kutz, 2012*).

### **Interpretation of legal significance and building law reviewed**

Deviations of public law regulations represent defects. This can only be balanced with equivalent compensation. In existing buildings there are regular variations in construction. This is especially true in historical buildings. The regular inspection of special buildings by building authorities represents an independent safety testing. However this level is lowered in Germany in individual states. The preventive fire protection is audited by other authorities of the federal states, who were not qualified. However, these authorities represent the interests of the owner. For reasons of cost they will do the defect rectification not with the same need to carry out as the building authorities.

### **Interpretation of responsibility**

For activities in building authorities and fire protection authorities a official minimum training is sufficient. In practice, only a small proportion of these employees completed studies in preventive fire protection. Many government employees have appropriated after the minimal training in their professional practice knowledge and experience through a lot of commitment. This deserves respect and recognition. The minimum training and Qualification requirements are, however, no relation to the responsibility and liability.

They decide on the safety of hundreds or thousands of people or to material assets of many millions of euros. In comparison, much more extended training is necessary for administrative activities without an only approximately comparable responsibility and liability. Therefore we have to put the responsibility of the competent ministries states in question.

Architects and Engineers chambers want to present a high quality level of their members. Therefore, they request for registration in the subject lists in principle a study in this subject area. However, this requirement does not apply to specialists for preventive fire protection. Neither professional planners still experts must demonstrate a degree of fire protection. This suggests a false level of quality.

Many professionals for preventive fire protection cannot prove a closed fire protection study. Therefore, the majority of these professionals keep this study is not necessary. They regard the self-appropriated knowledge or a minimal training to be sufficient. With this view, however, they damage the image and acceptance for preventive fire protection in Germany and their own recognition.

## Interpretation of the requirements

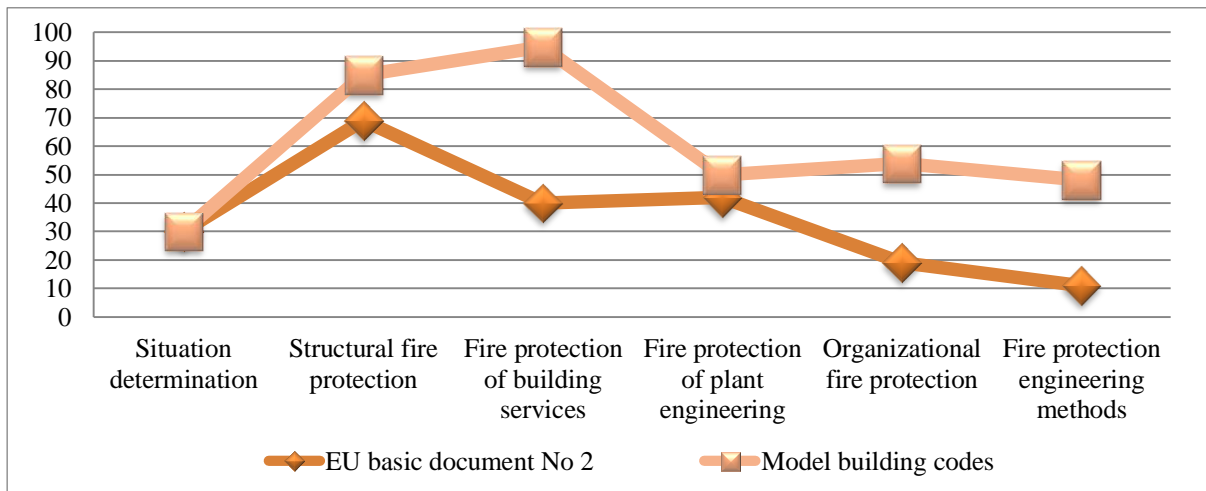


Figure 1: Comparison of pattern building codes and basic document No. 2 (own illustration)

In the EU basic document No. 2 fire protection, the focus is the constructional fire protection. The priorities in the model building codes are the constructional and the building services fire protection. The share of fire protection requirements on 252 pages of the 12 most common model building codes with 1,041 sections and paragraphs is 75%. This is very high and the fire protection is therefore a legal application.

## Requirements of states and associations

These documents are to be considered in planning, construction and maintenance of buildings. They described the content and implementation of fire protection concepts. They also serve as guidance for fire protection statements. The model building codes were supplemented with the contents of the EU basic document No. 2 fire protection (GLD).

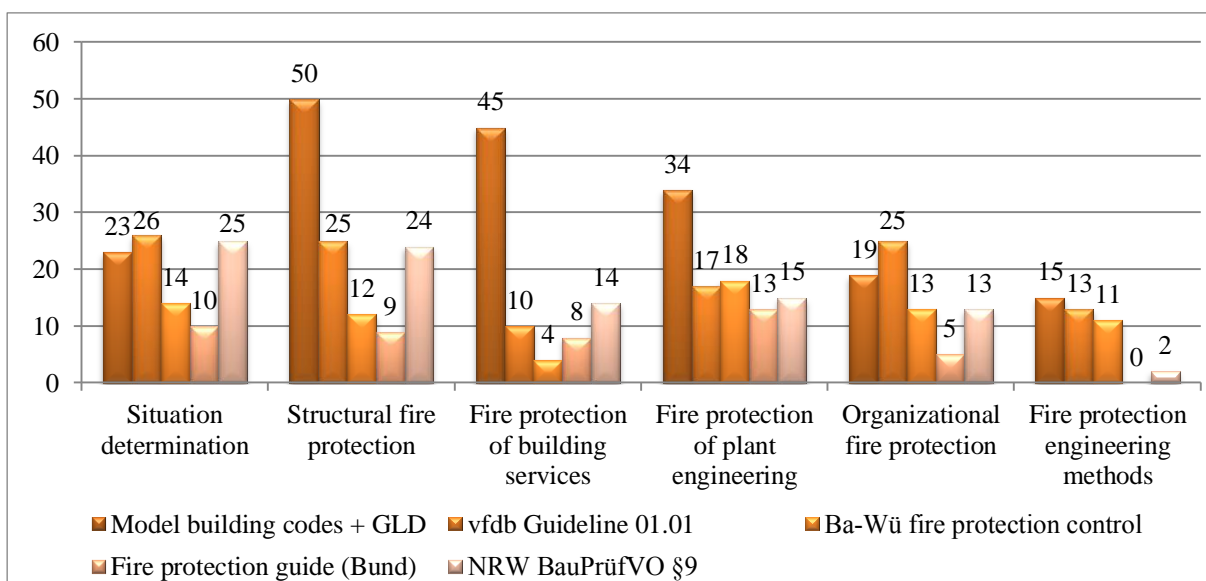


Figure 2: Comparison qualitative analysis of the fire protection requirements (own illustration)



## 4.2. Interpretation of training

### Study degree programs

For the comparison the model building codes were added with the contents of the EU basic document No. 2 fire protection (GLD).

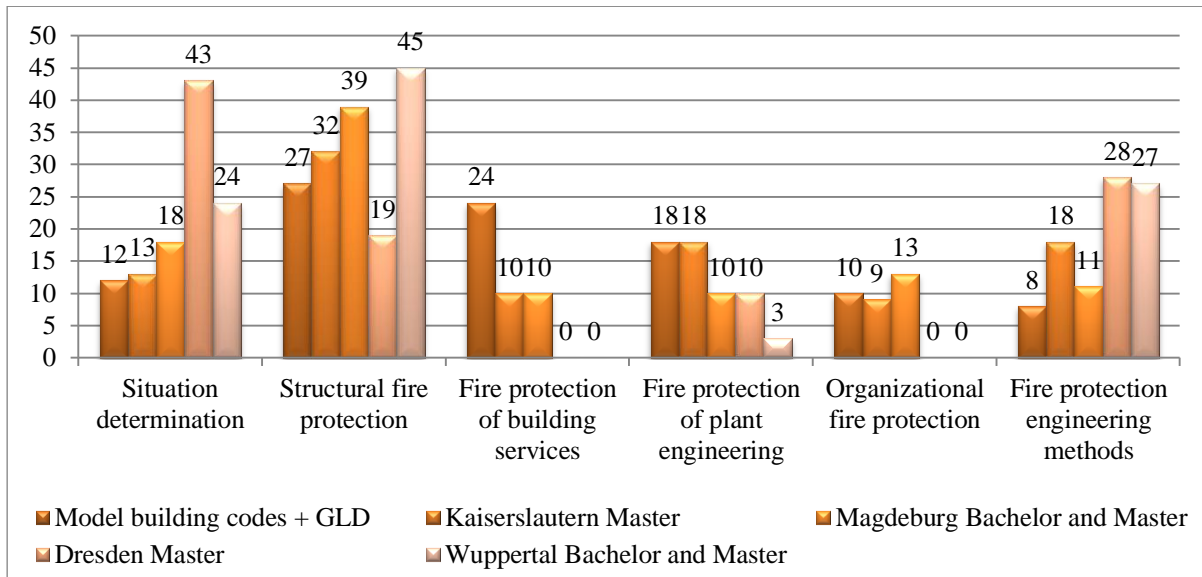


Figure 3: Comparison of the German study programs with the main groups (own illustration)

Part-time degree programs in Dresden and Kaiserslautern:

- They are oriented on the public-law requirements;
- Deficiencies exist in the fire protection of building services;
- Graduates are suitable for the design and execution of preventive fire protection for buildings.

Full-time degree programs in Wuppertal and Magdeburg:

- Scientific foundations and engineering methods are taught extensively;
- Building services and organizational fire protection are completely missing;
- Graduates are specialists for fire protection engineering methods.

### Education and training for preventive fire protection

There are three basic and advanced training and a private education guideline interpreted:

- The training at the FH Köln is located close to the public-law requirements.
- By the ISA the organizational fire protection is offered above average, but the building services fire protection and the fire protection engineering methods are completely missing.
- Deficits in building services fire protection exist for all other providers.
- The directive of the DİvB calls the fire protection engineering methods at the most extensive.

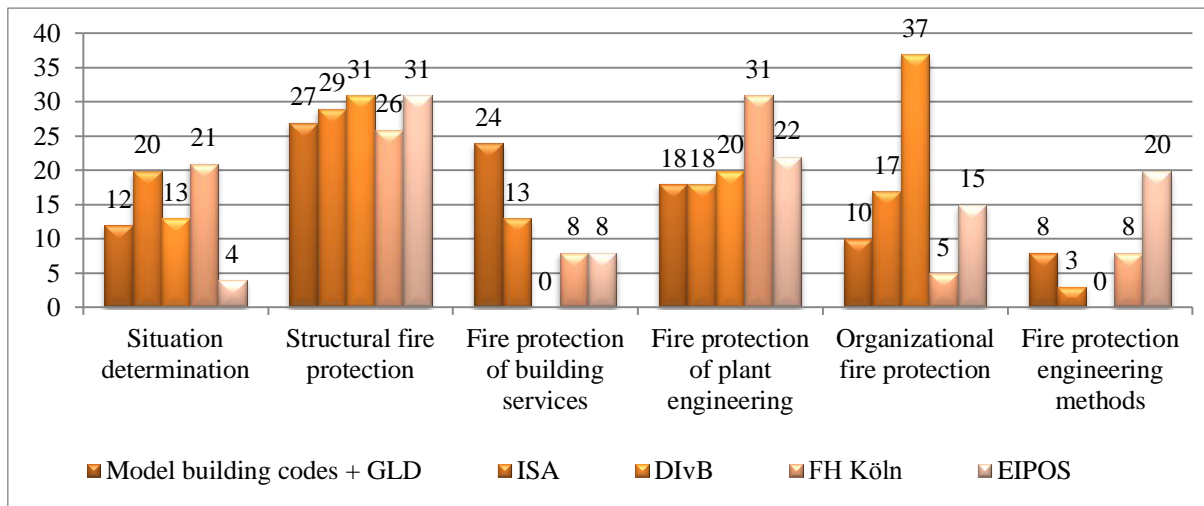


Figure 4: Comparison analysis of education and training (own illustration)

## 5. Summary

All involved in construction are responsible for ensuring that the public building codes are complied with. But it is unrealistic that all involved in construction are following educational courses. The required qualification for this depends on the risk potential of the building, its use and its users. Three levels can be distinguished:

- Level 1: regulated standard buildings without deviations.
- Level 2: regulated standard and special buildings with deviations that affect personal safety only insignificantly.
- Level 3: regulated standard and special buildings with critical and extensive deviations, special requirements and unregulated special buildings.

In the Level 1 knowledge of building codes is required. For this purpose, a training of at least 60 hours is required. This requirement also applies to architects and construction managers. In Level 2, the risk potential is higher. The scope of training must be at least 250 to 300 hours. In the two-stage training with professional planners and experts both stages are required. In Level 3, the risk potential is much higher. For this purpose, the qualifications listed above are not sufficient; there is a qualifying study degree for preventive fire protection required. This is necessary especially for the professionals responsible for planning and construction. Who bears the responsibility and liability for the building level 3 and sign for it, must have this qualification.

### Demand for engineers for fire prevention fire protection

This engineer for preventive fire protection must be able to assess the preventive fire protection taking into account the performance of the averting fire protection holistically. Similarly, the public law requirements are critically questioned. This is to ensure that not only complied with the protection targets, but also uneconomical measures be prevented. Buildings with the potential risk of stage 3 include:

- Buildings with significant deviations (for example, escape routes).
- Buildings with large numbers of people (e.g. Places of Assembly).
- Buildings with persons in case of fire cannot save themselves or their rescue is critically or very expensive (for example, hospital and nursing homes).
- Buildings with a high degree of technology (for example, high rise buildings).
- Historic buildings with significant deviations in the load-bearing or space-enclosing components and the escape routes.

### **Curricula for studies preventive fire protection**

The curriculum must include preventive fire protection holistically and build on the basic requirements of the EU and the national protection targets. The contents of the structure preventive fire protection are the basis for this. The temporal scope of study full-time or part-time studies should be on the periphery of study programs such as Architecture, civil engineering or building services oriented. The analyzed programs offer this as a guide. There are many professionals for preventive fire protection without fire protection study however they already have a job for several years. For this group is also a correspondence degree course of study, as it is offered at the Technical University of Kaiserslautern.

After studying experience must be gained in professional practice before it can be carried out the sole responsibility projects. In the various professions with security tasks and testing activities this is between 3 and 5 years. The experience should be certified by an examination of submitted own works and an oral technical discussion at a professional association or a higher authority. The condition is that this Institution has at least equally qualified members.

As with all professions, the one-time finishing an education and the later certification to ensure the quality over a longer period are not sufficient. There are regular continuing educations and further qualifying measures required, need to be proven. To this end, advanced trainings and seminars are suitable and congresses additionally recommended. In the area of fire prevention, they should include at least 5–10 days per year.

## **6. Conclusion**

The importance of preventive fire protection and its necessity has been shown extensively in the chapters basics, data interpretation, and public requirements (*Mračková & Chromek, 2014*). The content of preventive fire protection was worked out in detail in the structure Preventive fire protection. However, it is not exhaustive and may be updated by qualified professionals further.

Education and qualifications in preventive fire protection are offered in Germany with different temporal extent. They should correspond to the three different levels of difficulty. Education and training for the Level 1 are offered numerous but usually not comprehensive for preventive fire protection. They were therefore not analyzed. The training and further training (no Studies) at universities and their institutes which are suitable for the level of difficulty 2 – the deficits of this educations and trainings in the area of the building services fire protection must be supplemented by a special further training. The part-time degree programs meet the requirement to ensure the basic requirements and protection targets. Here are also deficits in the building services fire protection. These have to be also compensated by further training. In the full-time degree programs the proportion of preventive fire protection is small. Because of the high proportion of the scientific foundations and engineering methods, the graduates are particularly suitable as specialists in fire protection engineering methods. For preventive fire prevention on the basis of public requirements there are deficits. They have to be compensated by further training.

In Germany, preventive fire protection from outsiders is viewed as an unnecessary additional expense in building. Regulations and fire brigade are considered sufficient. Unfortunately, the reality is quite different. Defects in design and construction are very extensive. However, these are usually only detected during fires. Therefore, there is a huge risk in case of fire, that personal injury and damage may be extensive. The reason for this is the lack of qualifications of the personnel involved in the construction. There is no other profession with such high responsibility and liability for which such minimum qualification is required. In other professions with similar security duties study is required in this discipline

principle. Therefore, a rethinking of the relevant state ministries and a reform of the requirements are urgent need for preventive fire protection. Similarly, the differences between the requirements of the federal states on the qualifications of the professionals responsible for preventive fire protection should be repealed. The relevant state ministries must demand qualifications for preventive fire protection in accordance with the three levels of difficulty in all phases binding.

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