

Technical building regulations in EU countries: a comparison of their organization and formulation

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Abstract

The purpose of this paper is to compare technical building regulations in European Union (EU) countries. Three research questions are addressed: what are the main differences and similarities? what are the main types of organization and formulation? what are the main trends and developments?

The following tasks were carried out in order to provide an answer to these questions: preparing a questionnaire and obtaining answers from experts of EU countries, collecting and analysing main building regulations, and comparing results.

The results are that, in the majority of the EU countries, central authorities are involved in setting technical building regulations, however the involvement of regional and local authorities varies. Technical building regulations can be set in one main document, a coordinated group of documents or separated legal documents. The formulation adopted for most subjects is performance based, combined with functional or prescriptive requirements for specific subjects. Only in England and Wales have technical building regulations a pure functional formulation. Few countries have official documents with deemed to satisfy solutions. The building regulations include the main subjects (i.e. safety, health, practicability and energy saving), but several countries have no requirements on environmental protection. In the majority of the EU countries, direct references to specific standards are made, but standards are not accessible free of charge. There is not a pattern in the way that building regulations apply to construction works in existing buildings.

The main conclusions drawn from the study were that there are five main types of organization and formulation of technical building regulations in the EU countries, as follows: 1) one document with functional requirements and a coordinated group of documents with deemed to satisfy solutions; 2) one document with performance requirements; 3) one document with prescriptive requirements and new performance regulations on specific subjects; 4) a set of coordinated documents with performance requirements; and, 5) separated legal documents mainly

with performance requirements combined with some prescriptive requirements. Although there are exceptions, a regional distribution was observed in the countries that adopt each type.

Keywords: Technical Building regulations, Comparative study, European Union

1. Introduction

In every European country, there is a building regulatory system encompassing the building regulations and the building control system. Building regulations set minimum quality requirements to ensure that buildings are safe, healthy, energy-efficient and accessible to everyone who lives and works in and around them. Building control aims to guarantee the application and enforcement of these minimum requirements.

The purpose and the subjects covered by the building regulations are identical in European Union (EU) countries. However, there are many differences between countries regarding who sets the building regulations, how the technical building regulations are organized and formulated, what is the role of national standards and how building regulations apply to existing buildings.

Studying the organization and formulation of the technical building regulations is important for three main reasons. Differences among the technical building regulations of EU countries represent a barrier to the freedom of movement of services in the construction industry. In recent years several EU countries have moved to shorter objective based technical buildings regulations, but the extent and form how each country implemented reforms varies. The Construction Products Directive and the EN Eurocodes lead to some harmonization of the technical building regulations of the EU countries.

The purpose of the paper is to compare technical building regulations in EU countries. The three research questions addressed are as follows: what are the main differences and similarities? what are the main types of organization and formulation of technical building regulations? what are the main trends and developments?

The following section explains the research methodology and section 3 presents the results of the comparative analysis. Section 4 describes and discusses the conclusions of the comparison.

2. Methodology

The research presented in this paper was conducted as part of a European comparative research project currently underway at OTB Research Institute for Housing, Urban and Mobility Studies (Meijer and Visscher, 2008). The project aims to describe and compare the building regulation system in 34 European countries. The main subjects addressed are as follows: the organization and formulation of technical building regulations, the tasks and responsibilities of actors involved in building control, the technical and administrative aspects of the building permit procedure and the quality demands imposed on building control bodies.

The analytical framework of the research project was build upon previous studies about the building regulations in Europe (Meijer, Visscher and Sheridan, 2002). The development of the research project was divided into two phases. In the first phase, the aim was to describe the building regulation system. National experts in each country received questionnaires about their building regulatory systems. Based on information obtained from the questionnaire and the analysis of major legal documents, a monograph was written for each country. In the second phase of the project, the aim was to compare the building regulation systems of the European countries in order to identify trends and developments.

This paper presents results from the second phase of the research project. The focus is on the technical building regulations. The basis of the analysis is restricted to the 27 countries of the European Union. Due to the federal structures of Austria, Germany and Belgium, analyses of each of these countries focuses on a single province or region. With regard to the United Kingdom, information was collected for England and Wales.

Within the second phase of the research project, the tasks and responsibilities assigned to public and private parties that enforce the building control systems in EU countries have already been compared. The results were presented in a previous paper (Pedro, Meijer and Visscher, 2009).

The conclusions presented in this paper are not definitive, as the necessary information has not yet been gathered and validated for all countries.

3. Comparative analysis

3.1 Regulatory framework

In almost all EU countries, there is a building act that provides the legal framework for legislation concerning the content and implementation of building regulations (Table 1). The building act usually includes: main requirements for construction works; procedures for design, building and operation of construction works; competences of national and local authorities; and, tasks and responsibilities of persons participating in construction. The following are exceptions to the rule:

- 1) In Austria there is no building regulatory law established on a central level.
- 2) In Belgium, France and Portugal there is not a national law that directs the technical building regulations.

In some EU countries the Building Act is joined with the Planning Act and also sets the main goals and rules for the land-use and spatial planning (e.g. Bulgaria, Czech Republic, Finland, Germany and Sweden).

Table 1: Is there one law that provides the legal framework in the field of construction?

	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom
Yes			■	■	■	■	■	■		■		■	■	■	■	■		■	■	■		■		■	■	■	■
No	■	■							■												■						
No information											■						■						■				

3.2 Responsibility

In half of the EU countries, the technical building regulations are laid down by the federal or national authorities and there are no regional or local building regulations (Table 2). In these countries technical building regulations are uniform throughout the whole country. Due to their particular administrative divisions or legal traditions, in the other half of EU countries the responsibility to lay down the building regulations is divided differently. The following distributions of responsibilities were identified:

- 1) Central authorities set a model of technical building regulations that is adapted by regional authorities (e.g. Germany).
- 2) Regional authorities set the technical building regulations with functional requirements and refer to the central guidelines for technical requirements (e.g. Austria).
- 3) Central, regional and local of authority legislate over different requirements and types of buildings (e.g. Belgium).
- 4) Central authorities set the technical building regulations for some requirements (e.g. energy performance of buildings), and local authorities set building regulations for different requirements (e.g. Luxemburg).
- 5) Central authorities set technical building regulations, and regional and local authorities also set additional building regulations subordinated to national ones (e.g. Italy).
- 6) National authorities set technical building regulations, and regional authorities also set additional building regulations subordinated to national ones (e.g. Slovakia, and Spain).
- 7) National authorities set technical building regulations, and local authorities also set additional building regulations subordinated to national ones (e.g. Finland, Latvia, Lithuania, Portugal).
- 8) The regional authorities set technical building regulations (e.g. United Kingdom).

Building regulations set by different local authorities of one country are usually similar even if there is no model. Subordinated building regulations must comply with requirements set at a higher level and usually include additional or more demanding requirements.

Table 2: Who sets the technical building regulations?

	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom
Central authorities	■	■	■	■	■	■	■	■	■	■			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Regional authorit.	■	■								■				■									■		■		■
Local authorities		■						■						■	■	■	■				■						
No information											■	■															

3.3 Organization

There is no dominant approach to the organization of the technical building regulations in the EU countries (Table 3). Three main types of organization were identified:

- 1) One main document sets the technical requirements and sub-regulations may supplement with technical details some subjects of the main document.
- 2) Technical building regulations are set in a coordinated group of documents, usually organized by technical requirement and in some requirements a differentiation is made between types of buildings.
- 3) Separated legal documents contain technical building regulations for specific requirements and/or types of buildings.

In England and Wales, functional requirements are set in one document and deemed to satisfy solutions are organized in a coordinated group of documents. In Austria, each regional authority lays down functional requirements in one document that refers to a group of documents with technical requirements set at central level.

Attending to the complexity of technical buildings regulations set in separated documents, in several countries different solutions were adopted to assist identifying the applicable requirements:

- 1) In France, the regulations concerning a certain subject are combined in codes. A code contains all regulations, recent amendments and changes, jurisprudence, etc., but not the whole contents of these documents. The main texts will be found in the codes, but not all the technical details. Codes are updated by changes to the individual laws, decrees and implementing orders of which they are composed.
- 2) In Portugal, by law a ministerial order must be published every year with a list of the legal provisions to be observed when developing building designs and executing constructions.
- 3) In Slovenia, a web application was developed by the central authorities to assist in identifying the relevant requirements.

Table 3: How are technical building regulations organized?

	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom
One document	<input type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>									<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Set of documents	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>												<input type="checkbox"/>
Separated doc.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
No information											<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>							

In the last 10 to 15 years, the developments in the organization of the technical building regulations were towards the centralization of the technical building regulations into fewer legal documents (Table 4). This reduction aimed mainly at simplifying the building regulations. However, in some countries there was decentralization mainly due to the approval of new regulations for requirements or types of buildings that were not previously covered and the approval of building regulations by regional and local authorities. In many countries there were no developments in this respect.

Table 4: What were the developments in the organization of technical building regulations in the last 10 to 15 years?

	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom
Centralization	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>		
Decentralization		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>														<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>						
No developments									<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
No information							<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>												<input checked="" type="checkbox"/>			

3.4 Formulation

The formulation of the requirements in the technical building regulations can be classified in three categories:

- 1) Functional – requirements define the main objectives, but there is no determination method, no performance level, and no reference to solutions or materials.
- 2) Performance – requirements express the level of performance in quantitative terms and define the determination method.

3) Prescriptive – requirements lay down a specific design or construction solution.

In most EU countries, there is an inconsistency in the formulation of the technical requirements for different subjects. The formulation of the requirements is mainly performance based combined with functional or prescriptive requirements (Table 5). The following situations were identified:

- 1) Technical building regulations have a pure functional formulation (e.g. England and Wales).
- 2) Technical building regulations adopt a performance formulation, with the exception of some requirements that are prescriptive (e.g. Czech Republic, Denmark, Germany, Finland, Ireland, The Netherlands, Romania, Spain and Sweden). The requirements with a prescriptive formulation usually concern dimensions (e.g. heights, distances, floor area).
- 3) Technical building regulations adopt a formulation that combines performance and prescriptive requirements. Recent technical building regulations are usually performance-based, but existing ones still adopt a prescriptive formulation (e.g. Austria, Belgium, Bulgaria, France, Italy, Latvia and Portugal).
- 4) Technical building regulations are mainly prescriptive, but some new regulations (e.g. energy performance of buildings) adopt a performance formulation (Cyprus, Luxembourg and Malta).
- 5) Technical building regulations include functional, performance and prescriptive requirements for different subjects (e.g. Lithuania and Slovenia).

In Austria, regional authorities lay down provisions that are purely functional requirements. Subsequently the technical requirements are established in a group of guidelines set at a central level. These technical requirements are predominantly formulated in a prescriptive way but some requirements are performance-based.

Table 5: How are the technical building regulations formulated?

	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom
Functional	□															■								■			■
Performance	■	■	■	□	■	■		■	■	■			■	■	■	■	□	□	■		■	■		■	■	■	
Prescriptive	■	■	■	■					■					■	■	■	■	■			■		■				
No information							■					■								■			■				

In the majority of EU countries there are no official documents with deemed to satisfy solutions (Table 6). However the following exceptions were identified:

- 1) In Czech Republic, France, Slovakia, Slovenia, England and Wales there are official documents that intended to provide guidance to the application of the technical building regulations. These documents elaborate the requirements, discuss the underlying issues, and

describe strategies that can be used to comply with the requirements. However, there may be alternative ways of achieving compliance, thus there is no obligation to adopt any particular solution contained in these documents. In England and Wales, the approved documents (i.e. official documents with deemed to satisfy solutions) are particularly relevant, since the technical building regulations have a pure functional formulation. In fact, if it is preferred to meet the relevant requirement of the building regulations in some other way than the one presented in the approved documents there has to be a demonstration that the alternative complies with the functional requirements of the regulations.

- 2) In Denmark, Finland and Sweden the building regulations comprise mandatory performance requirements and guidelines for their implementation. Guidelines are not mandatory and may contain: examples of provisions satisfying requirements; sketches, explanations and comments to aid interpreting the requirements; and references to standards, instructions and other material which provides more detailed information.
- 3) In Spain, there are technical documents, recognized by the authorities, which are not mandatory but contain complementary information to the technical building regulations. These documents include: technical guides for design, quantification, maintenance and conservation procedures; evaluation methods and computer programs; comments about application of Building Code; and, other documents that assist in the application of the Building Code.

Table 6: Are there official documents with deemed to satisfy solutions?

	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom
Yes					■	□		□	■														■	■	□	□	■
No	■	■	■	■			■			■				■	■		■	■	■	■	■	■					
No information											■	■	■			■											

In the last 10 to 15 years, there was a general trend towards performance-based requirements in most of the EU countries (Table 7). Only in United Kingdom there was an increase of functional requirements. In some countries there were no developments.

Table 7: What were the developments in the organization of the technical building regulations in the last 10 to 15 years?

	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom
More functional																											■
More performance	■	■	■	■		■		■	■					■	■				■	■	■		■	■		■	
No developments										■						■	■	■				■					
No information					■		■				■	■	■												■		

3.5 Subjects included in technical building regulations

In most EU countries all main requirements are included in the technical building regulations (Table 8). The requirements on the building and plot are usually set or complemented at a local level. The requirements on safety, health, practicability (e.g. dimensions of rooms, ceiling height, accessibility, number of shower/basin/toilets) and energy saving are mainly set at a central level. Several countries have no requirements on environmental protection.

Table 8: What are the subjects included in the technical building regulations?
C – central; R – regional; L – local; X – no information; – not included.

	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom	
Building and plot	C R	L	C	C	C L	C	C L	L	L	R	X	X	-	L	L	C L	L	C	L	C	C L	L	X	X	X	X	L	L
Safety	C R	C	C	C	C	C	C	C	C	R	X	X	C	C R	C	C	L	X	C	C	C	C	X	C	X	C	C	
Health	C R	C	C	C	C	C	C	C	C	C	X	X	C	C R	C L	C L	L	C	C	C	C	C	X	C	X	C	C	
Practicability	C R	R	C	C	C	C	C	C L	C	C	X	X	C	C R L	C	C L	L	C	C	C	C L	C	X	C	X	C	C	
Energy saving	C R	R	C	C	C	C	C	C	C	C	X	X	C	C R L	C	C	C	C	C	C	C	C	X	C	X	C	C	
Envir. protection	C R	L	C	-	C	-	C	C L	C	C	X	X	C	L	C	C L	-	-	-	C	-	-	X	C	X	C L	C	

3.6 Standards

In the majority of the EU countries the technical building regulations include direct references to specific standards (Table 9). If the references are made in the mandatory requirements of the building regulations the standards become mandatory. In some countries there is only a general reference in the building regulations that defines the meaning of standards. In almost all EU countries, the standards are accessible for everyone, but are not free of charge. Only in Germany and Latvia a part of the standards is accessible free of charge.

Table 9: In which way are national standards referred to?

	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom
General reference				■	■		■	■					■							■			■				
Direct reference	■	■	■			■			■	■				■	■					■		■		■		■	■
No information											■	■				■	■	■				■		■			

3.7 Regulations for existing buildings

In more than half of the EU countries there are no specific technical building regulations for existing buildings (Table 10). When there are building regulations for existing buildings, they usually apply to a particular scope (e.g. reconversion of illegal urban areas) or concern specific requirements (e.g. up-grade of technical equipments).

Construction works in existing buildings are treated differently by the general technical building regulations of the EU countries. The following two main approaches were identified:

- 1) General building regulations apply to all construction works, but for existing buildings relaxations of the provisions are possible (e.g. Austria, Cyprus, France, Latvia and The Netherlands).
- 2) General building regulations apply to new buildings (e.g. Ireland, Portugal, Slovenia, England and Wales), and to reconstruction, extension, extensive renovation or change in use of existing buildings. Small renovations and maintenance works are usually excluded from complying with building regulations for new buildings. In these situations it is not necessary to raise the standard, only to avoid making it worse.

The general technical building regulations of some EU countries include specifications that apply specifically to existing buildings (e.g. Belgium, Denmark, France, Luxembourg, Malta, The Netherlands, Portugal and Sweden). These specifications are usually less restrictive provisions.

The building regulations for existing buildings can be used passively or actively. Passively, if the building has to comply with the regulations when construction works are carried out. Actively, if the authorities can summon the owner to carry out quality improvement of buildings that do not comply with the building regulations.

Table 10: Are there technical building regulations specific for existing buildings?

	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom
Yes				■				■			■			■	■						■	■		■			□
No	■	■	■		■	■	■		■	■							■		■	■							■
No information												■	■			■								■			

4. Conclusions and discussion

Main differences and similarities between EU countries regarding technical building regulations

In the majority of the EU countries there is a building act that provides the legal framework for legislation concerning the content and implementation of building regulations. Central authorities are involved in setting technical building regulations. The building regulations include the main subjects (i.e. safety, health, practicability and energy saving). The formulation of the requirements is performance based, combined with functional or prescriptive requirements for some subjects. There is a common pattern of verification by reference to specific national standards, but standards are not accessible free of charge.

However there are several differences regarding the organization and formulation of technical building regulations. The involvement of regional and local authorities in setting technical building regulations varies. Technical building regulations can be set in one main document, a coordinated group of documents or separated legal documents. Some countries have official documents with deemed to satisfy solutions. There is not a pattern in the way that building regulations apply to construction works in existing buildings. Only England and Wales adopt pure functional formulation of the technical building regulations.

Main types of organization and formulation of technical building regulations in EU countries

Five main types of organization and formulation of technical building regulations were identified:

- 1) One document with functional requirements and a coordinated group of documents with deemed to satisfy solutions (e.g. England and Wales).
- 2) One document with performance requirements (e.g. Denmark, Finland, Netherlands, Spain and Sweden).

- 3) One main document with prescriptive requirements and new performance regulations on specific subjects (e.g. Cyprus, Luxembourg and Malta).
- 4) Set of coordinated documents with performance requirements (Austria, Czech Republic, Germany, Ireland and Latvia).
- 5) Separated legal documents with performance requirements combined with prescriptive requirements for some subjects (e.g. Belgium, Bulgaria, France, Italy, Portugal, Romania, Slovakia and Slovenia).

Although there are exceptions, a regional distribution can be observed in the countries that adopt each type: Scandinavian countries in type 2), small countries in type 3); central Europe countries in type 4), southern Europe countries in type 5). England and Wales stands alone in type 1).

Trends and developments in technical building regulations of the EU countries

In the last 10 to 15 years, the dominant trend in the organization and formulation of technical building regulations was their centralization into fewer legal documents and the increase of performance-based requirements. However, in many countries there were no developments or, contrary to the general trend, there was decentralization mainly due to the approval of regulations on new requirements.

Lessons to be learned from the technical building regulations of the EU countries

In an overall analysis, many differences were identified in the organization and formulation of the technical building regulations of the EU countries. These differences constitute a barrier to the free circulation of people and services. Additional uniformity among building regulations would contribute to the establishment and functioning of a single market for services in the construction industry, in which architects, developers and builders are no longer limited to working in national markets.

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