

MASTER THESIS

VOB - JCT - FIDIC

Analysis and evaluation of civil work contracts in international projects

FH Joanneum GmbH - University of Applied Sciences
Construction Management and Engineering

submitted by

JOHANNES AUER, BSc

Mühlweg 22

A-6441 Umhausen

Supervisors:

Dipl. Ing. Dr. techn. Timur Uzunoglu

FH Joanneum Graz

Prof. Barry Jones PhD, FASCE, FCIQB

California Polytechnic State University, San Luis Obispo

Dipl. Ing. Adolf Beisser

FH Joanneum Graz

Graz, February 9th, 2009

.....
Johannes Auer

This master's thesis is dedicated to Julia Flunger (1966-2008)

Abstract

This master's thesis provides an insight into international construction contracts from the German construction industry point of view. This thesis is divided into two main parts: The first part describes three important international standard forms of civil works contracts. Selected contract clauses of each contract are analysed, assessed and compared with each other. The second part focuses on the description and critical comparison of the German and British/Anglo-American contract awarding procedure. The unit rate contract is analysed in detail. The description of such a unit is investigated with the German StLB-Bau (Standardleistungsbuch-Bau) and the British SMM7 (Standard Method of Measurement of Building Works, 7th Edition). In the case study, the civil works contract of a power plant project in Romania was analysed at the end of this master's thesis.

Zusammenfassung

Diese englischsprachige Diplomarbeit gibt einen Einblick in die vertragliche Gestaltung von internationalen Bauprojekten aus dem Blickfeld der deutschen Bauindustrie. Nach anfänglicher Erläuterung der Gesamtinvestitionen in die europäische Bauindustrie und der aktuellen Auftragslage bzw. des Umsatzes der deutschen Bauindustrie im internationalen Ausland, gliedert sich diese Diplomarbeit in zwei Hauptteile. Erstens werden drei ausgewählte, für die deutsche Bauindustrie wichtige, international standardisierte Bauvertragsmuster erläutert. Dabei werden ausgewählte Vertragsklauseln der jeweiligen Verträge analysiert und miteinander verglichen. Der zweite Teil dieser Arbeit befasst sich mit der internationalen Vergabe von Bauleistungen. Beschrieben und verglichen wird die Bauvergabe im deutschen und im britisch/angloamerikanischen Raum. Anschließend wird die Beschreibung einer einzelnen Bauleistung nach dem deutschen StLB-Bau (Standardleistungsbuch-Bau) mit der britischen SMM7 (Standard Method of Measurement of Building Works, 7th Edition) diskutiert. Abgeschlossen wird diese Diplomarbeit mit einer Analyse eines Bauvertrages für ein Kraftwerksprojekt in Rumänien.

Declaration

“I declare that this paper is my own work and was written without literature other than the sources indicated in the bibliography. Information used from the published or unpublished work of others has been acknowledged in the text and has been explicitly referred to in the given list of references. This paper has not been submitted in any form for another degree or diploma at any university or other institute of tertiary education.”

Graz, February 9th, 2009

.....
Johannes Auer

Acknowledgements

In the following words, I want to thank all the people who encouraged me during my academic studies and gave me support while writing my master's thesis.

First of all, I would like to thank my parents who provided me the necessary support during my education. It would not have been possible to complete my degree without the confidence and financial support they have given me.

Furthermore, I would like to thank Mr. Dr. Timur Uzunoglu for his inspiration and critical approach during my research for the master's thesis. Through his support and helpful advice I was able to complete this paper with a high level of quality.

I am also highly thankful to the *Department of Construction Management* of the *California Polytechnic State University*, for the chance to write my master's thesis abroad. Additionally, I would like to offer special thanks to Mr. Prof. Barry Jones PhD, FASCE, FCIOB.

"A goal without a plan is just a wish."

Antoine de Saint-Exupery, *French writer (1900 - 1944)*

Contents

1	PREFACE	1-1
2	GENERAL ASPECTS	2-2
2.1	CONTRACTING	2-2
2.1.1	Influence to a contract.....	2-2
2.1.2	Realization	2-2
2.1.3	Types of contract.....	2-3
2.1.4	Structure of a civil works contract.....	2-3
2.2	TURNOVER OF CONSTRUCTION INDUSTRY IN THE EUROPEAN UNION.....	2-4
2.3	ANNUAL ABROAD INCOMING ORDERS FOR GERMAN CONSTRUCTION INDUSTRY	2-8
2.4	FIELD OF EVALUATION	2-12
3	INTERNATIONAL STANDARD FORMS OF CONTRACT	3-13
3.1	VOB – GERMAN CONSTRUCTION CONTRACT PROCEDURE	3-13
3.1.1	General aspects.....	3-13
3.1.2	VOB – Part A	3-14
3.1.3	VOB – Part B	3-16
3.1.4	VOB – Part C	3-23
3.1.5	The type of employer.....	3-23
3.1.6	The type of contractor	3-24
3.1.7	Scope of services.....	3-25
3.1.8	Reimbursement/ Settlement of accounts.....	3-28
3.2	BRITISH & ANGLO-AMERICAN CONTRACTS	3-30
3.2.1	General aspects.....	3-30
3.2.2	Joint Contract Tribunal	3-30
3.2.3	Institution of Civil Engineers	3-31
3.2.4	Types of contract.....	3-32
3.2.5	The JCT98 family of forms	3-33

3.2.6	JCT98 – Private with quantities 1998 edition	3-34
3.2.7	The type of employer	3-36
3.2.8	The type of contractor	3-38
3.2.9	The engineer	3-39
3.2.10	Scope of services	3-40
3.2.11	Reimbursement/ Settlement of accounts	3-43
3.3	FIDIC – INTERNATIONAL CONTRACTS	3-46
3.3.1	General aspects	3-46
3.3.2	International federation of consulting engineers	3-46
3.3.3	Types of contract.....	3-47
3.3.4	Selection of the appropriate book/contract	3-49
3.3.5	Structure of contracts in general.....	3-50
3.3.6	Structure of Red Book 1999	3-50
3.3.7	Relationship employer – engineer - contractor	3-54
3.3.8	The type of employer.....	3-54
3.3.9	The engineer.....	3-55
3.3.10	The type of contractor.....	3-56
3.3.11	Scope of services	3-57
3.3.12	Reimbursement/ Settlement of accounts	3-58
3.4	SUMMARY AND COMPARISON OF ALL CONTRACTS	3-59
3.4.1	Summary of the contracts content.....	3-59
3.4.2	Comparison of contracts	3-60
4	PRICE PER UNIT - UNIT RATE CONTRACT	4-61
4.1	INTRODUCTION	4-61
4.2	GERMANY	4-61
4.2.1	Introduction	4-61
4.2.2	Quantity description	4-62

4.2.3	StLB - Standard construction service manual.....	4-65
4.2.4	Analysis of main issues and enquire problems.....	4-67
4.3	UK/ INTERNATIONAL.....	4-68
4.3.1	Introduction	4-68
4.3.2	Quantity description	4-68
4.3.3	SMM7 - Standard Method of Measurement of Building Works, 7 th Edition..	4-69
4.3.4	Analysis of main issues and enquire problems.....	4-74
4.4	OUTCOME AND PRESENTATION OF RESULTS	4-75
5	CASE STUDY	5-77
5.1	THE CONTRACT	5-77
5.1.1	General information.....	5-77
5.1.2	Contract's content	5-77
5.2	ANALYSIS AND EVALUATION	5-79
6	CONCLUSION.....	6-81
7	ABBREVIATIONS	7-82
8	LIST OF FIGURES AND TABLES	8-84
8.1	FIGURES	8-84
8.2	TABLES	8-85
9	BIBLIOGRAPHY	9-86
	APPENDIX	9-89

1 PREFACE

In this master's thesis, focus is laid on common international building and construction standard contracts in Germany, the UK and the ones by the international association FID-IC. It points out the major differences with a focus on unit rate contracts (price per unit contracts). The analysis of the unit rate contracts will be primarily done by answering the questions: What are the chief differences between those model contracts and how can I describe such a unit in foreign countries?

This thesis is structured into nine chapters. The first chapter presents a general introduction about the topic. Chapter two provides useful information about the field of evaluation, the economic importance of the building and construction industry and historical facts about international construction. Chapter three explains three important international standard forms of contract in the building and construction industry and describes them in detail. Chapter four deals with one of the main issues of this thesis, it is about the performance of unit rate contracts within the three types of the standard forms of contract. A civil works contract of an industrial project in Romania will be analysed in chapter five. Finally, a conclusion of this thesis will be given in chapter six.

The sources used for writing this thesis were found in the library of the Technical University of Graz (TU Graz, Austria), in the library of the California Polytechnic State University in San Luis Obispo (CalPoly San Luis Obispo, CA) or in the library of the FH Joanneum Graz (University of Applied Sciences Graz, Austria). To guarantee a high level of quality, the chosen literature is written by accredited authors, and national governmental papers or reports from official European associations.

2 GENERAL ASPECTS

2.1 Contracting

In nearly every part of human life there are contracts amongst individuals or parties. Those contracts could be written down (e.g. rental fee for an apartment) or just oral agreements (e.g. order in a restaurant). Both or more parties in a contract are bound to each other for certain duration of time. It is a unique relationship and is created with free choice for their mutual benefits. The contractual relationship starts by signing the contract and gives all parties specific obligations and responsibilities. Because of the relatively high cost of construction work, contracts in the construction industry are usually written down. Contracting is one of the most important issues within the construction industry. The following subchapters describe the most important terms in a civil works contract, an analysis of international standard forms of contracts will be found in chapter 3.

2.1.1 Influence to a contract

When setting up a contractual agreement for construction work, an almost innumerable number of factors are influential. A construction project has to be built in abidance by law and regulations. Such laws and regulations could be a regional planning program, national building codes, national laws and international regulations (e.g. EU-directive). The general terms and conditions, part of each predefined standard form of contract, has to be included in a construction contract. They are applicable to every construction project. Commonly, a project is not comparable with other projects. Each project has different surroundings in regards to location (e.g. soil conditions), environment (e.g. protected animals), type of construction (e.g. residential building, industrial plant) and the employer (e.g. private/public, financial power, quality standard).

In summary all this factors could be categorized into three parts:

- Influenced by law
- Influenced by the general terms and conditions
- Influenced by the individual project

2.1.2 Realization

Every contract has the same overall idea. There has to be an offer and the acceptance. In a two-party-relationship, the first party provides an offer (e.g. a product, performance of work, service) and the second party has to accept it. A similar scheme is in the construction industry. The contractor has to submit an offer regarding to specific terms and conditions (e.g. bill of quantities, quantity description, codes and drawings); the employer has to accept the offer. A civil works contract is activated after signing or by the dates which

would have been fixed in the agreement. With signing, the genuine intention of both (or all parties) to be bound by the contractual terms, comes into force. The object of contract must be lawful, i.e. it has to be legal business.

2.1.3 Types of contract

In the construction industry, there are endless types of contracts possible. Depending on the type of employer (public, private) and the type of the project organization, following types of contracts could be in a construction project:

- Financing contract (employer ↔ outside investor)
- Consulting contract (employer ↔ external company)
- Design contract (employer ↔ designer)
- Civil works contract (employer ↔ contractor)
- Subcontract (contractor ↔ subcontractor)
- Delivery contract (contractor/subcontractor ↔ supplier)

2.1.4 Structure of a civil works contract

Each individual or standard form of contract has a similar content. A civil works contract is divided into two different parts, a legal part (general, additional and specific conditions) and a technical part (general specifications, technical specification, additional technical specifications). All conditions and specifications summarized should be clear structured. Following terms should not be missed in a civil works contract, an exact specification of each of them is necessary:

- Information about the project & contractual parties
- Duties and responsibilities of the employer
- Duties and responsibilities of the contractor
- Specification of work – Scope of services
- Reimbursement
- Liability
- Distribution of risks
- Terms and deadlines
- Change of order/ interruption of work
- Acceptance of work
- Payment
- Guarantee/Warranty
- Termination of contract
- Disputes, conflicts, adjudication & arbitration

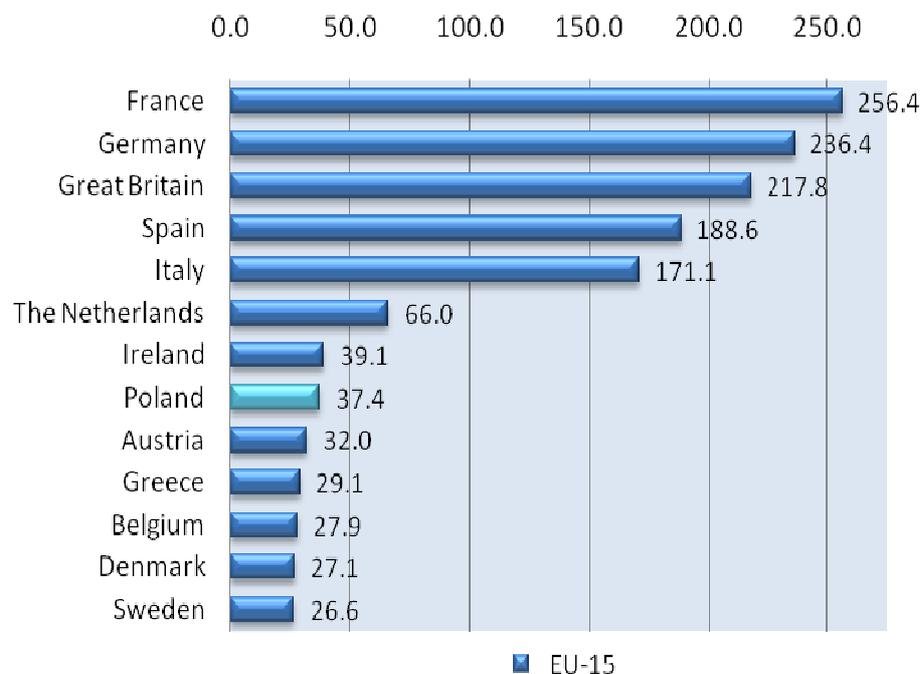
2.2 Turnover of construction industry in the European Union

The construction industry is one of the most important economic sectors in the European Union with an enormous amount of investment each year. The following graphs (Figure 1-3) show the total European turnover of construction industry before the worldwide economic crises in 2007. One graph shows the total turnover attributed to each country, the other shows the total turnover per inhabitant per country. The third graph shows the total turnover of construction industry proportional to the national GDP (Gross Demand Product).

The Leader is France with a total turnover to year of over € 256 billion, followed by Germany (€ 236 billion) and Great Britain (€ 218 billion). Malta, Luxembourg and the Baltic states Latvia, Estonia and Lithuania have a total turnover less than € 5.0 billion at the end. Total turnover in the construction industry within the European Union gives following amount:¹

- EU-15: € 1.363 billion
- EU-25: € 1.454 billion
- EU-27: € 1.475 billion

Figure 1 below shows the total turnover in the construction industry (in € billion) within the EU-25 per country in 2007.



¹ Source: <http://www.bauindustrie.de/index.php?page=44> from July 6th, 2009

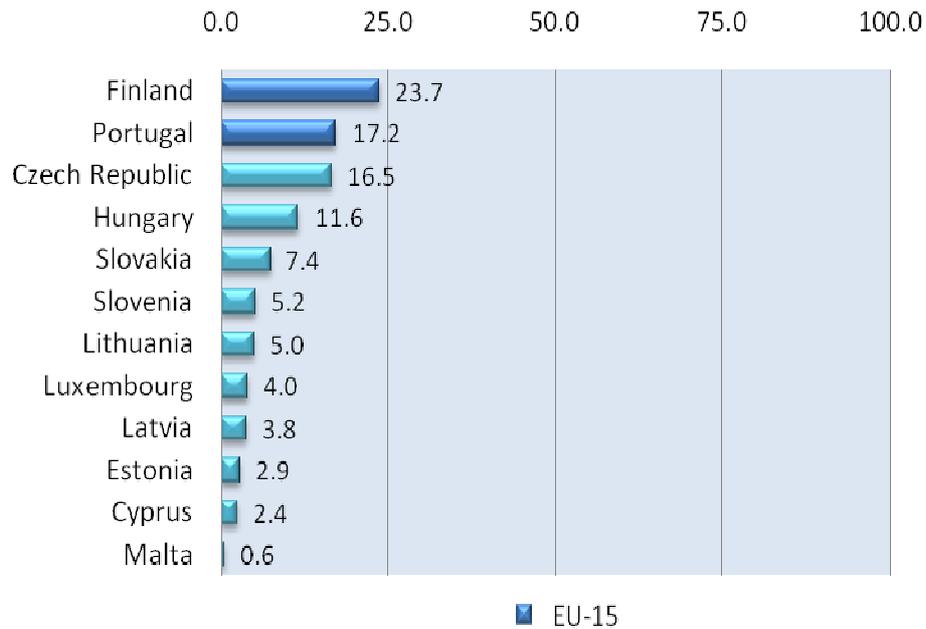


Figure 1: Total turnover in the construction industry [€ billion] in the EU-25 in 2007 per country ²

The value of total turnover depends on each country and not on the population. So it is not that astonishing, that the small state, Malta is within the lower range of value and the influential large states France, Germany and Great Britain are at the higher end of that range of value. Reaching a more expressive result, it is necessary to allocate the turnover of the construction industry to one inhabitant per country. The basis for this additional graph (Figure 2) is an in 2008 published paper of the Eurostat, which shows the population of all European states in the beginning of 2007 and 2008.³

The leader in the following graph (Figure 2) is Ireland with € 8.969 per inhabitant, followed by Luxembourg (€ 8.365 per inhabitant) and Denmark with approximately € 5.000 per inhabitant. The allocated turnover of construction industry in Poland is roughly 10% of those in Ireland. So Poland has a total turnover of € 981 per inhabitant at the very end of the chart. The average amount of the EU-15 states is € 4,132 per inhabitant and those of the EU-25 states is € 3.180 per inhabitant.

² Data Source: <http://www.bauindustrie.de/index.php?page=44> from July 6th, 2009

³ Data Source: EUROSTAT . (2008). Population in Europe 2007: First results, P.4.
http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-08-081/EN/KS-SF-08-081-EN.PDF

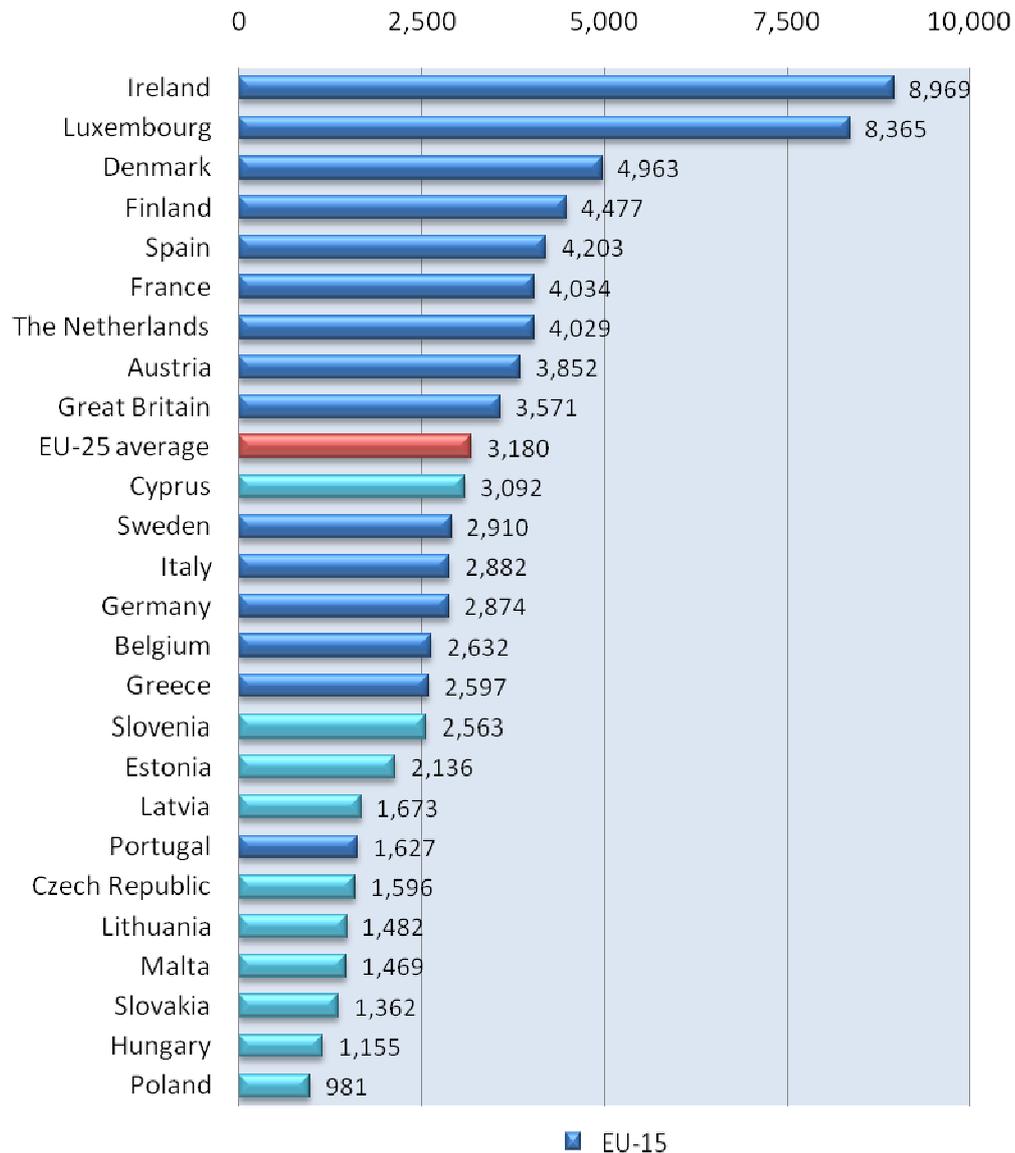


Figure 2: Total turnover in the construction industry [€] in the EU-25 in 2007 per inhabitant ⁴

Figure 3 shows the total turnover in the construction industry in the EU-25 countries proportional to the GDP in 2007. Data basis of this chart will be found on the homepage of the IWS (Institut für Wachstumsstudien - Institute of Growth Research).⁵ The leader is Ireland with an amount of over 20%, followed by the Baltic states Estonia and Latvia (approximately 18%). Belgium and Sweden are at the end of the chart (approximately 8%).

⁴ Data Source: <http://www.bauindustrie.de/index.php?page=44> from July 6th, 2009

⁵ Data Source: <http://www.economic-growth.eu/Seiten/AktuelleDaten/Daten2007.html#> from January 19th, 2010

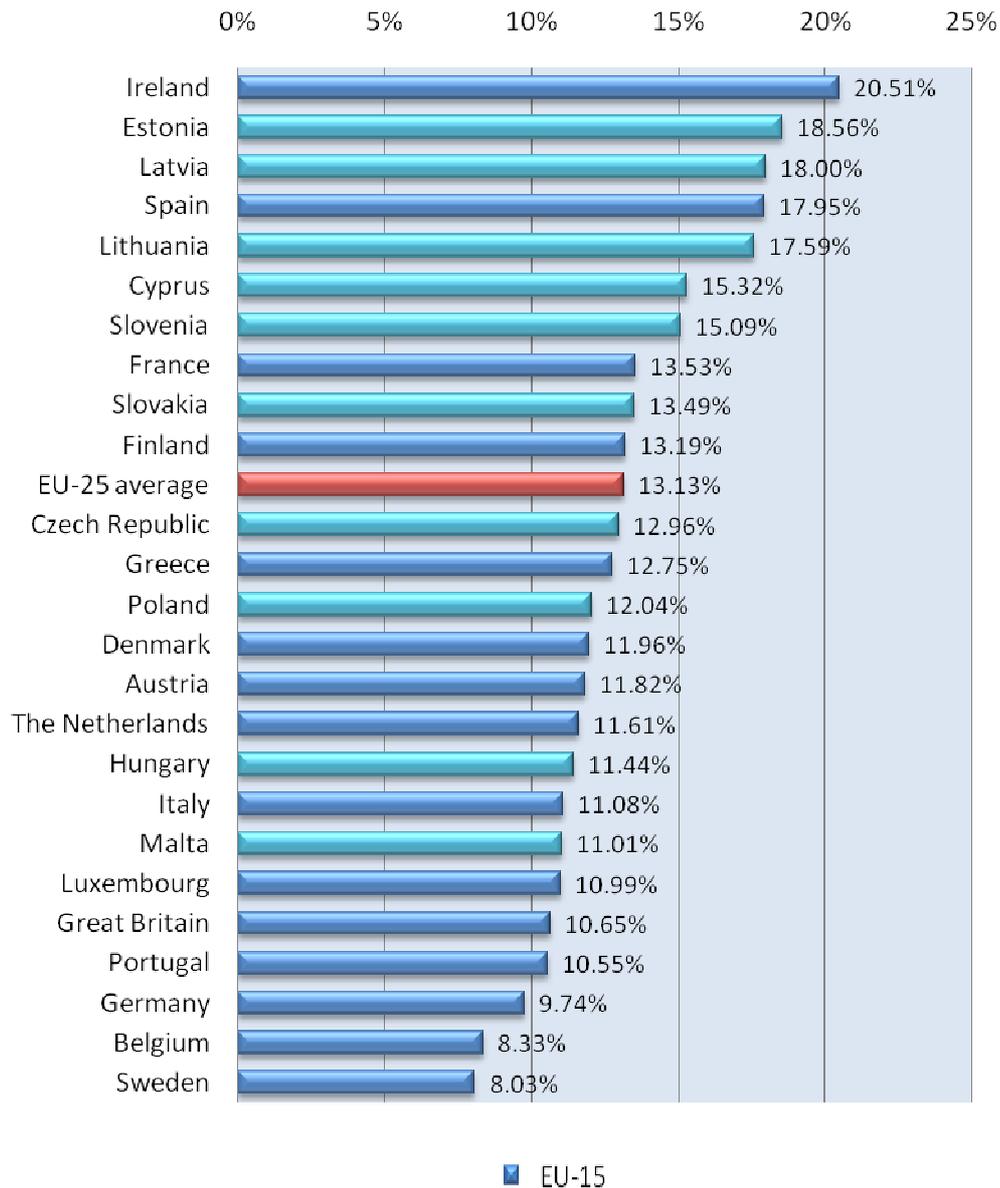


Figure 3: Total turnover in the construction industry [%] proportional to the GDP in 2007

After the beginning of the global financial crises in 2008, there had been an enormous decrease of investment in each economic sector in the EU.

Ireland, the country with the highest total turnover in the construction industry in the European Union, saw a 21% decrease of the value of construction in 12 months (2007-2008).⁶ The prime reason was the collapse of the new housing market with a reduction in total of 33% (2007-2008).

⁶ Data Source: <http://www.irishconstruction.com/page/2082> from January 19th, 2010

2.3 Annual abroad incoming orders for German construction industry

The German construction industry has a fine tradition of construction work abroad. All over the world, there has been construction work by German companies in almost all sectors of construction industry; such as:

- Grain store in the port of Genoa, Italy (1899-1901) ⁷
- Hauenstein-Basistunnel, 8km, Switzerland (1912-1916) ⁸
- Footing for “Brücke über den kleinen Belt”, Denmark (1929-1931) ⁸
- Nile bridge at Mansourah, Egypt (1951-1952) ⁷
- Maracaibo-lake bridge, 9km, Venezuela (1958-1962) ⁸
- Sydney opera house, Australia* (1962-1973) ⁷
- Bush Memorial Stadium St. Louis, USA* (1964-1966) ⁸
- Eko-Bridge Lagos, Nigeria (1965-1968) ⁸
- Airport Jeddah, Saudi Arabia (1974-1981) ⁷
- Tin-Can-Island Port, Lagos, Nigeria (1976-1977) ⁸
- Masonry dam Oymapinar, Turkey (1977-1982) ⁸

*operated by subsidiary firm

With regard to the construction work abroad, there was usually a typical and classic structure for construction sequences till the 1970s. Nearly each construction work abroad was a classical export transaction (e.g. necessary equipment, technique, know-how). The reason for this export transaction was a low standard of quality and know-how in those particular countries. In the last 30 years, the countries have reached an adequate local standard of quality. Therefore, it was possible to take over local companies to launch subsidiary companies abroad. An enormous economic boom of incoming abroad orders for the construction industry was started in the mid 1990s (Figure 4). Shown is a general trend between direct orders and subsidiary companies between 1990 and 2007. Expressed in percent, the amount of direct incoming orders was at about 27% and orders for subsidiary firms at about 73% in 1990. Compared with 2007, the amount of directly incoming orders was at about 6%, those of subsidiary firms at about 94%.

⁷ Source: <http://www.hochtief.de> from July 22nd, 2009

⁸ Source: <http://www.bilfingerberger.de> from July 24th, 2009

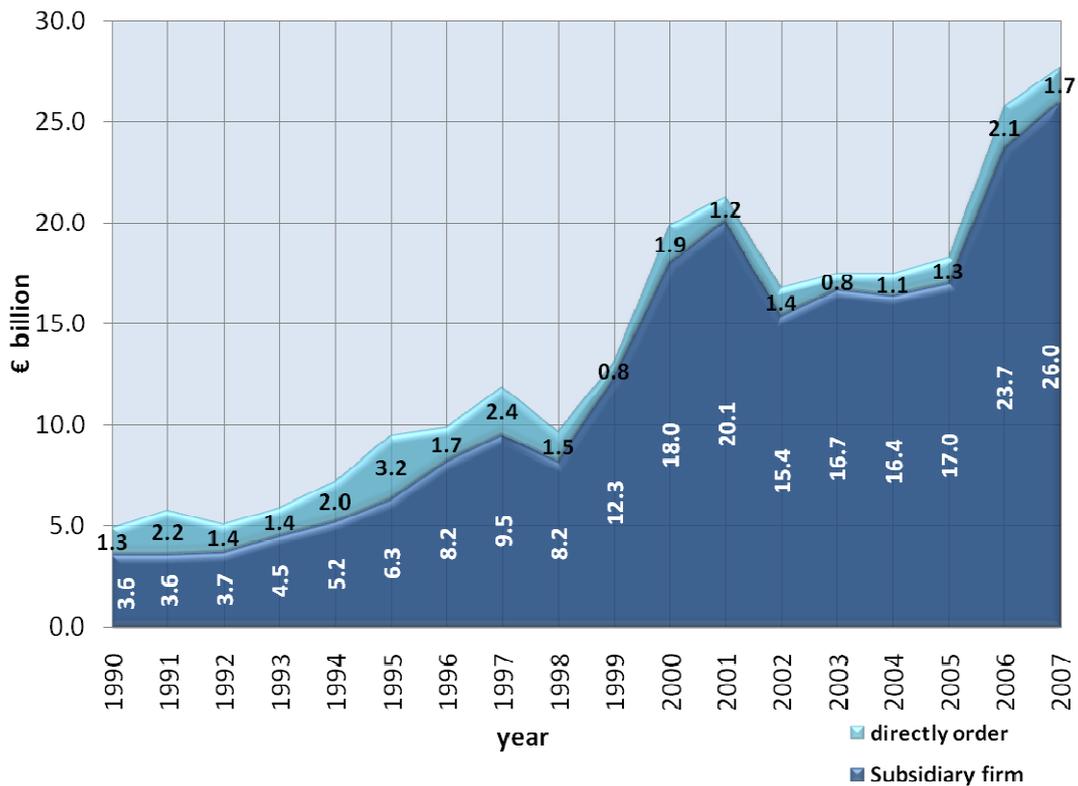


Figure 4: Annual incoming orders from abroad for the German construction industry 1999-2007 [€ billion] ⁹

As it can be seen from Figure 4, the amount of incoming orders from abroad for German construction industry was in total at about € 4.9 billion in 1990. After a slow rise till 1994 (€ 7.2 billion), a distinctive increase up to approximately € 11.9 billion in 1997 followed. There was a short decrease of € 1.2 billion down to € 9.7 billion in 1998. In the years 1999-2001, there was a rapid boost up to € 21.3 billion (+220%) and reached a momentary peak for the further years. In 2002 was a heavy decrease (€ 4.5 billion) of abroad incoming orders went down to € 16.8 billion, followed by a steady development until 2005 (€ 18.3 billion). After an enormous jump (€ 7.5 billion) up to € 25.8 billion in 2006, a steady increase in the following year followed. In 2007, the amount of incoming orders from abroad for German construction industry, were in total approximately € 27.7 billion.

Now, after becoming aware of annual incoming orders, it brings a new question about the regional provenance of those amounts. The following bar-chart (Figure 5) should give an overview of annual incoming orders from abroad for the German construction industry in the years 1990 till 2007. Each bar is subdivided into the five continents: Asia, Africa, Europe, Australia and America.

⁹ Data Source: <http://www.eicontractors.de/seiten/facts/ics.php> from July 10th, 2009

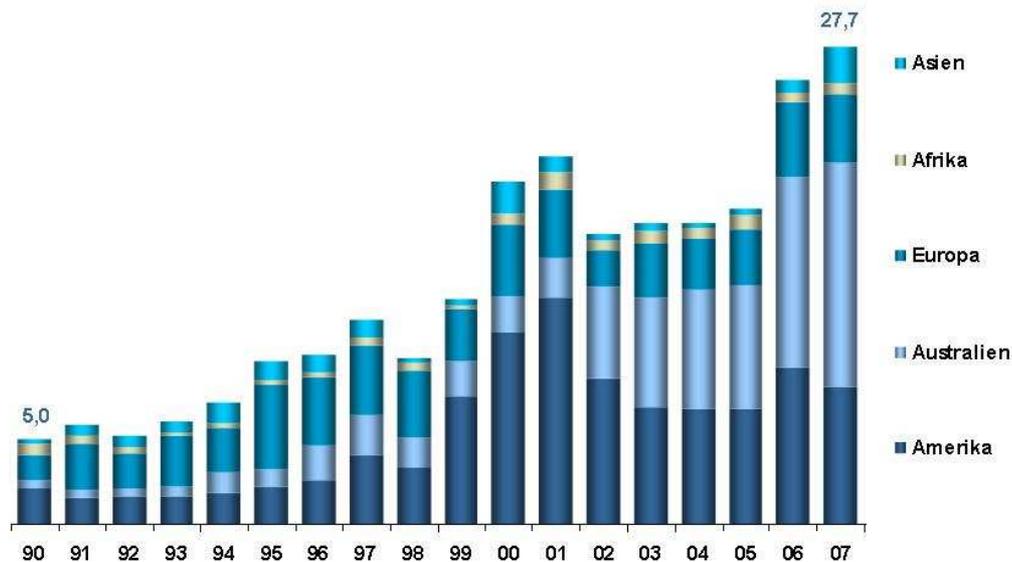


Figure 5: Annual incoming orders from abroad for the German construction industry in 1990-2007, divided into different regions [€ billion] ¹⁰

For further information regarding the detailed amount of each subdivision assists Figure 6 below. The chart is divided into the worldwide regions Europe (without Germany), North America, Central America, Oceania/Australia, Asia, Middle East and Africa. The increase of incoming orders for the German construction industry of each region between the years 2004-2007 are as follows:

- Middle East: + € 1.7 billion
- Africa: ± € 0.0 billion
- Asia: + € 0.1 billion
- Oceania/ Australia: + € 6.0 billion
- Central/ South America: + € 0.3 billion
- North America: + € 1.0 billion
- Europe: + € 1.1 billion

¹⁰ Source: <http://www.bauindustrie.de/index.php?page=44> from July 6th, 2009

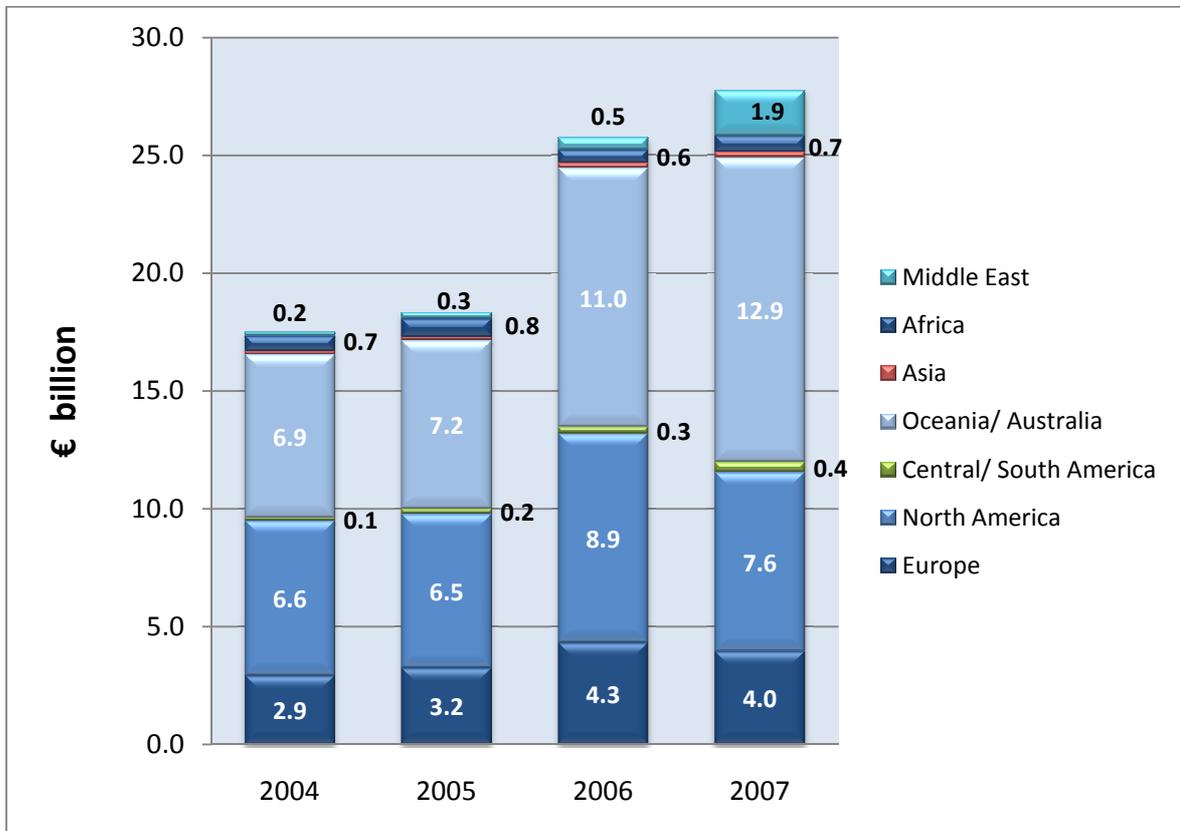


Figure 6: Annual incoming orders from abroad for the German construction industry in 2004-2007, divided into different regions [€ billion] ¹¹

¹¹ Data Source: <http://www.eicontractors.de/seiten/facts/ics.php> from July 10th, 2009

2.4 Field of evaluation

Many German construction companies have a global business (Figure 6), it is not practical to analyse all worldwide regions. The investigation covers only three important contracts for the German construction industry. This paper evaluates construction contracts in the regions of middle Europe, Great Britain/ Anglo-America and an internationally used standard form.

The procedure will be a comparison of the three civil works contracts (chapter 3) and a detailed analysis of a specific type of contract in Chapter 4 (unit rate contract). In general, the structure for the investigation in the chapters 3 & 4 will be divided into:

- Contracts after regions
- Contracts after type

Chapter 3.1 deals with the German construction standard form contract, the VOB (Vergabe und Vertragsordnung für Bauleistungen - the German regulation for construction contracts and execution of construction works).

Chapter 3.2 will give an overview of common construction standard form contracts in the UK. There will be found a detailed description of the JCT98 (Joint Contract Tribunal), the standard form of building contracts, 1998 edition.

Furthermore, there will be a description of one of the most common used standard forms of construction contracts for international projects, the FIDIC-contracts (Fédération Internationale des Ingénieurs-Conseils - the International Federation of Consulting Engineers). Similar to the description of the VOB and the JCT, the description of the FIDIC should provide a large basis of knowledge for chapter 4.

3 INTERNATIONAL STANDARD FORMS OF CONTRACT

3.1 VOB – German construction contract procedure

3.1.1 General aspects

The VOB is named “*Vergabe und Vertragsordnung für Bauleistungen*” and is the German regulation for construction contracts and execution of construction works. It is named after “*VerdingungsOrdnung für Bauleistungen*” and is a predefined common standard form of contract. The VOB is not common law either ordinance and has been adapted several times over the years, most recently in 2006.

*Implementation of the VOB standard form within an individual construction contract has to be stated explicitly in contractual agreement.*¹²

A description of the VOB (i.e. VOB/B) in one of the publications of Hogan & Hartson, an internationally active law company from the US, says as follows:

*VOB/B is not an act nor an ordinance but rather a standard becoming part of a construction contract by simple reference without the necessity to repeat its text. The standard is privileged by German civil law in several ways: As long as VOB/B is agreed upon as a whole it is not subject the statutory restrictions of the German Civil Code on general terms and standard conditions, even if the principal/ owner is a consumer. As private construction projects with substantial volume in Germany are concluded based on VOB/B almost without exception, this standard is of relevance and concern to international investors.*¹³

The VOB is divided into following three different parts:¹⁴

- **VOB / A:**
General directions of contract letting for building works
- **VOB / B:**
General conditions of contract for execution of building work
- **VOB / C:**
General technical specifications of contract for building works

¹² Compare with: Prange, H., Leimböck, E., & Klaus, U. R. (1995). *Baukalkulation unter Berücksichtigung der KLR Bau und der VOB. (9. Auflage)*. Wiesbaden-Berlin: Bauverlag, P.6

¹³ Source: Hogan&Hartson. (2008). *The Construction Contract Procedures Part B (VOB/B) in German and English languages.* <http://www.hhlaw.com/>

¹⁴ Source: <http://www.vob-online.de/> from July 13th, 2009

3.1.2 VOB – Part A ¹⁵

The VOB - Part A deals with general regulations for the awarding procedure of building and construction work contracts. The major differences are in the fields of the different types of employers and the estimated overall cost for the project. It is used to differ between public and private employers. A full explanation of the type of employers, were given in chapter 3.1.5.

The VOB-Part A is divided into following four equal sections:

Section 1:

Paragraphs for general conditions

Section 2:

Paragraphs for general conditions with additional regulations after EU-directive “2004/18/EU”

Section 3:

Paragraphs for general conditions with additional regulations after EU-directive “2004/17/EU”

Section 4:

Conditions and regulations for order lettings after EU-directive “2004/17/EU”

Following three factors are essential for using the right section:

- Estimated project overall cost with a threshold value of € 5 million
- Type of construction (water supply, energy supply, infrastructure)
- Type of client (public, private)

Choosing the right section of VOB-Part A is essential for the awarding procedures. It is the basis for the standard terms of the contract. Figure 7 shows how to choose the right section.

¹⁵ Source: DIN1960. (2006-05). VOB/A - Allgemeine Bestimmungen fuer die Vergabe von Bauleistungen. Berlin.

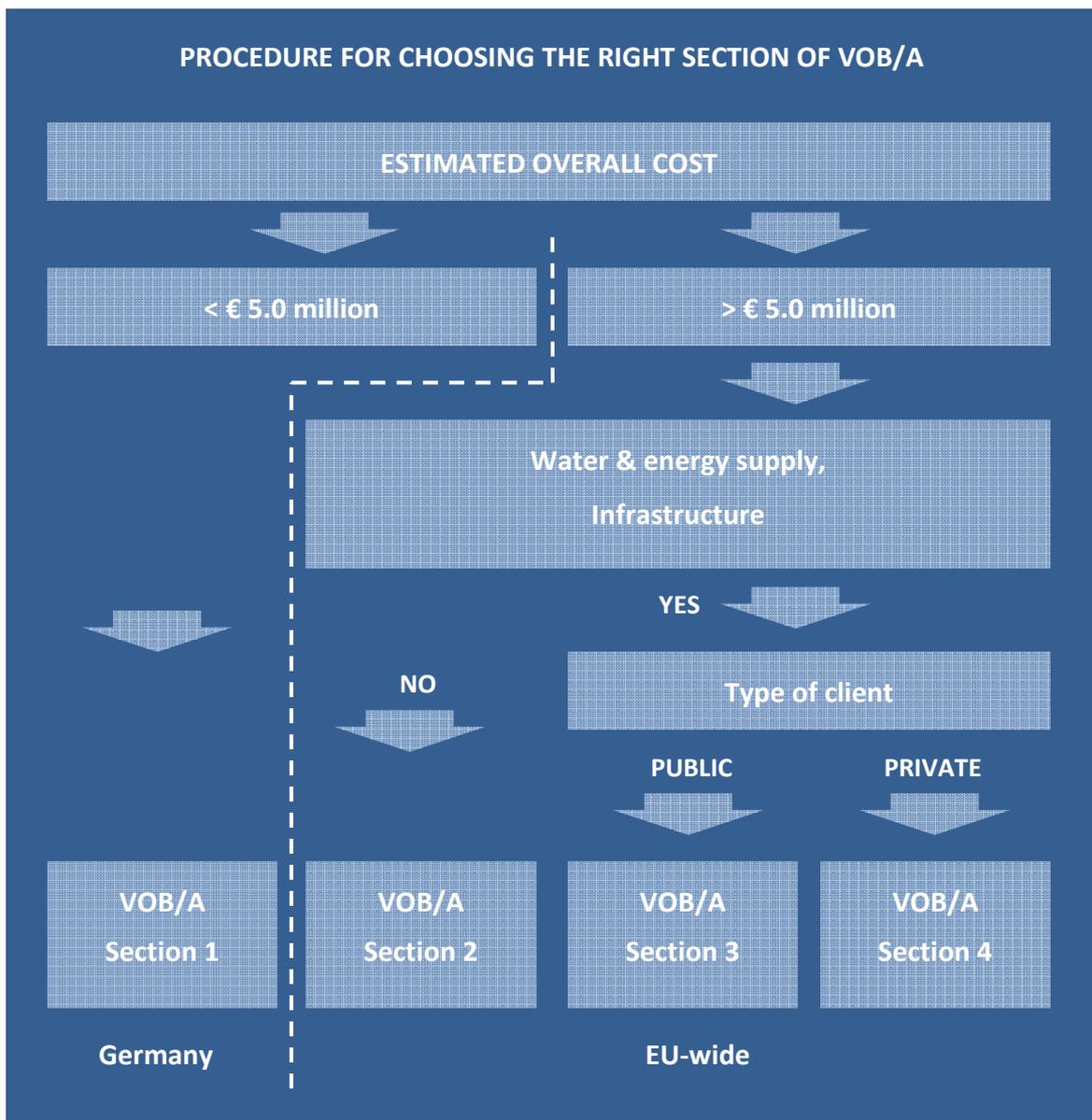


Figure 7: Procedure for choosing the right section of VOB-Part A ¹⁶

Therefore, the awarding procedure of section 1 is applicable just in Germany, those of the sections 2-4 are applicable EU-wide.

¹⁶ Compare with: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag, P.70.

3.1.3 VOB – Part B ¹⁷

The VOB - Part B deals with general conditions of contract for execution of building work and is subdivided into following 18 paragraphs: ¹⁸

- §1 Nature and extent of work
- §2 Remuneration
- §3 Documentation
- §4 Execution of work
- §5 Terms set for execution of work
- §6 Obstruction and interruption of work
- §7 Distribution of risks
- §8 Termination by employer
- §9 Termination by contractor
- §10 Liabilities of contracting parties
- §11 Penalty
- §12 Acceptance
- §13 Guarantee
- §14 Settlement of accounts
- §15 Hourly wage work
- §16 Payment
- §17 Furnishing of security
- §18 Disputes and conflicts

The following description of the 18 paragraphs should give an overview of the VOB/B. The focus is laid on outlining all necessary issues.

§1 – Nature and extent of work

All execution of building work is defined by the scope of services, which is a main part of the contractual agreement. The general technical specifications of contract for building works (VOB-C) are highly influential components to the contract. If there are contradictions within the contract, it is of importance using this hierarchy:

- a) Quantity description
- b) Special conditions of contract
- c) Supplementary general specifications of contract
- d) Supplementary technical specifications of contract

¹⁷ Source: DIN 1961. (2006-10). *VOB/B - Allgemeine Vertragsbestimmungen für die Ausführung von Bauleistungen*. Berlin.

¹⁸ See also: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag, P.119.

- e) General technical specifications of contract for building works
- f) General conditions of contract for execution of building work

§2 – Remuneration

Remuneration of the performance of work is a central element of each civil works contract. Differences between the contractual agreement and the real amount of work are in many cases of construction works. In this paragraph focus is laid on how to handle those differences on the basis of lump sum contracts and unit rate contracts. Specified is an unforeseen decrease or increase of quantity of more than 10% each unit (§2.3 (1)). A further main issue within this paragraph is how to handle additional, not listed and well-defined work in the contractual agreement.

§2. 3. (1) The contractual unit price shall apply provided the volume of executed performance or partial performance encompassed by a unit price does not vary from the scope foreseen in the contract by more than 10%.

§2. 6. (1) If work not foreseen in the contract is requested, the contractor shall have a claim to separate compensation. However, the contractor must notify the claim to the principal before the contractor begins to execute the work.

(2) The compensation shall be determined in accordance with the principal used to calculate the price of the contractual performance and the separate costs of the requested work. Preferably, the compensation is to be agreed upon before commencement of the work.

§2. 7. (1) If a lump sum is stipulated as compensation for the performance, the compensation shall remain unchanged. However, if the performance executed varies from the contractually foreseen performance so substantially that it is no longer reasonable to adhere to the lump sum (§ 313 of the Civil Code), recompensation must be granted upon request with due regard to the additional or reduced costs. The price calculation principles are to be assumed as the basis for the recompensation.^{19,20}

§3 – Documentation

Within an adequate time slot, all necessary documents (e.g. specification, drawings etc.) have to be handed out by the employer. The contractor is invited to check those documents for plausibility. If additional documents are required (e.g. static calculations), the contractor has to hand them out by an adequate time period.

¹⁹ Source: Hogan&Hartson. (2008). The Construction Contract Procedures Part B (VOB/B) in German and English languages, P.4. <http://www.hhlaw.com/>

²⁰ Compare with: DIN 1961. (2006-10). VOB/B - Allgemeine Vertragsbestimmungen für die Ausführung von Bauleistungen. Berlin.

*Drawings, calculations, subsequent checks of calculations or other documents, which the contractor must procure in accordance with the contract, the technical terms and conditions of contract or industry practices or at the special request of the principal (§ 2 No. 9) are to be presented to the principal in due time upon request.*²¹

§4 – Execution of work

All rights and duties for a contractor and an employer (§4.1 (1)) are listed within this paragraph. **The employer** is engaged for official approvals (e.g. permits), the construction road and all other equipment for construction site infrastructure. He has to coordinate all on construction site operating companies to maintain order. The employer is entitled to control the contractors work for correctness to the contractual agreement (compare with §4.1 (2), (3), (4)). **The contractor** is engaged for realization of the contractual agreement. Arising expenses for water, energy and gas must be paid by the contractor.

§4. 7. (1) The principal must assure the general order on the construction site and the interaction of the various contractors. The principal must obtain the necessary public-law permits and approvals (e.g. in accordance with building law, roadway law, water management law and trade law).^{21,22}

A description for agreements with subcontractors (§4.8) and possible warranty for defects (§4.7) will be read in this chapter also:

§4. 8. Performances acknowledged during the execution of the work to be defective or in breach of contract must be replaced by the contractor at its cost with defect-free performances. If the contractor is responsible for the defect or the breach of contract, the contractor must also compensate the resulting damage. If the contractor fails to fulfill its duty to remedy the defect, the principal may establish a reasonable period for it to remedy the defect, declaring that it will withdraw the assignment if the period expires unproductively (§ 8 No. 3)^{21,22}

§5 – Terms set for execution of work

Deadlines for completion of works (e.g. milestones) are a central part of a civil works contract. It will be described how important they are. Special focus is on delays, it is of utmost importance to observe deadlines.

§5. 1. The execution of work is to be commenced, adequately advanced and completed in accordance with the binding deadlines (contractual deadlines). Any spe-

²¹ Source: Hogan&Hartson. (2008). The Construction Contract Procedures Part B (VOB/B) in German and English languages,P.7-9. <http://www.hhlaw.com/>

²² Compare with: DIN 1961. (2006-10). VOB/B - Allgemeine Vertragsbestimmungen für die Ausführung von Bauleistungen. Berlin.

cific deadlines contained in a construction schedule shall only apply as contractual deadlines if expressly agreed in the contract.^{23,24}

§6 – Obstruction and interruption of work

Interruption of work as a result of constraints is always an enormous problem during the realization of a project. An interruption is usually connected with additional charges towards the contractor or employer. This paragraph is a guideline dealing with that specific problem. How to handle extension of deadlines as a result of interruption (§6.2 (1)) and resuming work after interruption (§6.3) is described in this paragraph. There is also an extensive description about how to deal with long term obstructions and the possibility of the termination of contract (§6.5-7). How to handle with *Force Majeure* is not explicit defined in this paragraph.

§6. 5. *If the work is likely to be interrupted for an extended period of time, though the performance is not permanently impossible, the work executed is to be settled in accordance with the contractual prices; moreover, the costs already incurred by the contractor that are contained in the contractual prices for the unexecuted portion of the work must also be compensated.*^{23,24}

§7 – Distribution of risks

This paragraph deals with distribution of risks with a special focus on *Force Majeure*. Force majeure (superior force), also named “act by god“, is a common clause in construction contracts, which set all parties free of liabilities (e.g. in case of earthquake, volcanic activity, war, flooding). In general, the distribution of risks to both parties should be exactly defined in each civil works contract.

§8 – Termination by employer

A termination by employer has to be written down and could be any time prior or during the performance of work. The employer has to pay stipulated compensation of the contractor’s realized work so far. Reasons for termination are listed within this paragraph, some examples are as follows:

- Contractor don’t keep appointments
- Contractor don’t fulfil the contractual agreements

§9 – Termination by contractor

A termination by the contractor has to be written down and could be a result of following reasons:

²³ Source: Hogan&Hartson. (2008). The Construction Contract Procedures Part B (VOB/B) in German and English languages,P.11-12. <http://www.hhlaw.com/>

²⁴ Compare with: DIN 1961. (2006-10). *VOB/B - Allgemeine Vertragsbestimmungen für die Ausführung von Bauleistungen*. Berlin.

- Default of the employer's payment
- Contractor is not able to perform the realization of work as a result of non-fulfilment of the employer's liabilities (§9. 1. (a))

§9. 1. (a). *The contractor may terminate the contract if the principal fails to perform any act incumbent upon it, thus making it impossible for the contractor to execute the work (default in acceptance in accordance with §§ 293 et seqq. of the Civil Code).*^{25,26}

§10 – Liabilities of contracting parties

Liability for damage is an important issue in the construction industry. This paragraph describes the regulation in which case a contractor or employer (§10.2 (2)) is responsible for liability (§10.1). There is also an explanation about which party is to be in charge in case of damage to a third person (§10.2 (1), §10.3).

§10. 1. *The parties shall be liable to each other for their own fault and for the fault of their legal agents and persons of which they avail themselves to fulfill their obligations (§§ 276 and 278 of the Civil Code).*^{25,26}

§11 – Penalty

Key issue within this paragraph is the definition of penalties. The total amount of each penalty (percentage amount of the total construction sum) has to be explicitly defined in the contractual agreement. If a penalty is fixed within the contract, the paragraphs 339 till 345 of the BGB (Bürgerliches Gesetzbuch - German code of civil law) come into force. Two different types of penalties are possible: a daily penalty or a weekly penalty. Penalties can be applied until the employer has accepted the take-over certificate (§11.4).

§12 – Acceptance

The TOC (Taking-Over-Certificate) is the key issue of the acceptance by employer. The acceptance is an elementary part of the civil works contract with respect to risks and liability. The guarantee by contractor starts with the TOC. The performance for acceptance must start 12 days after invitation by contractor (§12.1). A negative acceptance by employer could be a result of defects (§12.3). Two different types of acceptance are to differ, a **formal acceptance** and a **formless acceptance** (§12.4 (1); §12.5 (1), (2)).

§12. 6. *To the extent the principal does not already bear the risk in accordance with § 7, all risk shall pass to the principal upon acceptance.*^{25,26}

²⁵ Source: Hogan&Hartson. (2008). The Construction Contract Procedures Part B (VOB/B) in German and English languages, P.15-16. <http://www.hhlaw.com/>

²⁶ Compare with: DIN 1961. (2006-10). *VOB/B - Allgemeine Vertragsbestimmungen für die Ausführung von Bauleistungen*. Berlin.

§13 – Guarantee

The guarantee of facilities is fixed over a period for four years (§13.4 (1)); those of electrical equipment is for two years (§13.4 (2)). Further main issue of this paragraph is the reimbursement of defects as a result of culpability and/or grossly negligent work. How to deal with not fixing defects by the contractor (§13.6) will be found in this paragraph.

§13. 5. (1) *The contractor shall be obligated to remedy at its own cost all defects appearing during the limitation period that are attributable to performance in breach of contract, if the principal so requests in writing prior to the expiration of the period.*

§13. 7. (1) *The contractor shall be liable in the case defects for damage resulting from injury to life, limb or health caused by its fault.*^{27,28}

§14 – Settlement of accounts

The contractors invoice has to be verifiable and comprehensible by the employer. Otherwise, he is allowed to call for a new invoice or to calculate the estimated effort by an external building and construction expert (§14.4). The final invoice has to be handed out in a period between 12 days and 3 months after finishing work.

§14. 1. *The contractor shall present accounts for its performances in a verifiable fashion. The contractor must prepare the invoices in a comprehensible fashion and observe the order of the items and use the designations contained in the components of contract. The volume calculations, drawings and other vouchers necessary to document the type and scope of performance must be enclosed. Any modifications of or additions to the contract must be identified separately in the invoice, and must be settled separately upon request.*^{27,28}

§15 – Hourly wage work

Hourly wage work is a main part of a “cost-plus-fee” and a “schedule of rates” contract. It highly influences the settlement of accounts for those contracts (chapter 3.1.8). Before starting work on the basis of hourly wage, the employer has to be informed about that type of work/reimbursement. The charge of work should be at latest four weeks after finishing work (§15.4). Reimbursement and payment has to be executed after VOB/B, §16.

§15. 1. (2) *If no arrangements have been reached for compensation, the normal local compensation shall apply. If such compensation cannot be computed, the expenses of the contractor for wage and salary costs at the construction site, ancil-*

²⁷ Source: Hogan&Hartson. (2008). The Construction Contract Procedures Part B (VOB/B) in German and English languages, P.19-22. <http://www.hhlaw.com/>

²⁸ Compare with: DIN 1961. (2006-10). *VOB/B - Allgemeine Vertragsbestimmungen für die Ausführung von Bauleistungen*. Berlin.

lary wage and salary costs at the construction site, material costs of the construction site, costs of installations, equipment and machinery at the construction site, freight, carriage and loading costs, social security insurance contributions and special costs arising from efficient management shall be compensated with adequate mark-ups for overhead costs and profit (including for general entrepreneurial risk) plus value-added tax.^{29, 30}

§16 – Payment

Payment is the most important issue in a civil works contract. Types of payment are listed within this paragraph. Tenor (e.g. deadlines, acceptance, the handout) of the different types of payment will be found in following subparagraphs:

- Partial payment (§16.1 (1),(3),(4))
- Counterclaims (§16.1 (2))
- Advance payment (§16.2)
- Final payment (§16.3)
- Maturity & late payment charge (§16.5 (3),(4))

Following exemplary paragraphs are extracted out of [A02] and [B02]:

§16. 2. (1) *Advance payments may also be agreed upon after conclusion of the contract, though sufficient security must be provided at the request of the principal.*

§16. 3. (2) *The unconditional acceptance of the final payment shall preclude subsequent claims if the contractor was informed about the final payment in writing and reference was made to this preclusive effect.*

§16. 4. *Self-contained parts of a work may be definitively approved and paid for after a partial acceptance without consideration to the completion of the other work.^{29,30}*

§17 – Furnishing of security

The furnishing of security deals with all kinds of essential indemnities for the employer and contractor. It is necessary to guarantee completion of work as specified in the contract. Following types of indemnities are read in the German general conditions of contract for execution of building work (VOB/B):

- Bonds (§17.4)
- Money deposit (§17.5)
- Deduction of payment amount (§17.6 (1))

²⁹ Source: Hogan&Hartson. (2008). The Construction Contract Procedures Part B (VOB/B) in German and English languages, P.23,25-26. <http://www.hhlaw.com/>

³⁰ Compare with: DIN 1961. (2006-10). *VOB/B - Allgemeine Vertragsbestimmungen für die Ausführung von Bauleistungen*. Berlin.

- Deadlines (§17.7)
- Acceptance free from defects – Restoration of indemnities (§17.8 (1),(2))

§17. 5. *If security is provided in the form of a money deposit, the contractor must deposit the money with a bank to be agreed upon on a blocked account over which both parties are only authorized to dispose jointly. The contractor shall be entitled to any interest.*^{31, 32}

§18 – Disputes

Disputes and conflicts between the parties are part of a contractual partnership. They are unavoidable in each project. The main part of disputes is an agreement for jurisdiction of all conflicts (§18.1). An agreement on how to handle potential conflicts and settlement of disputes is preferable (§18.1).

*Disputes shall not entitle the contractor to suspend the work.*³¹

3.1.4 VOB – Part C

Third part of the VOB are the general technical specifications of contract for building works (VOB/C). It is the technical part of a civil works contract (Figure 16) and a collection of technical codes. Focus is laid on the performance of work (e.g. erection, measurement). The following itemization is an abstract out of the content of the VOB/C:

- DIN 18299 – General regulations for construction works
- DIN 18300 – Earthwork
- DIN 18301 – Boring work
- DIN 18330 – Masonry
- DIN 18331 – Concrete work
- DIN 18338 – Roofing work

3.1.5 The type of employer

In general, it is discerned between a public and private employer. The **public employer** is compelled by law using the VOB. The **private employer** is free to choice, using the VOB or not. The fundamental idea of the VOB-Part A is to guarantee the competition between all tenderers. Following three types of tenderers are differed in the VOB-Part A, Section 1:

- Open tendering
- Selective tendering
- Negotiated tendering

³¹ Source: Hogan&Hartson. (2008). The Construction Contract Procedures Part B (VOB/B) in German and English languages,P.28,31. <http://www.hhlaw.com/>

³² Compare with: DIN 1961. (2006-10). *VOB/B - Allgemeine Vertragsbestimmungen für die Ausführung von Bauleistungen*. Berlin.

Following three different types for order lettings are to differentiate in the VOB-Part A, Section 2-4:

- Open procedure
- Restricted procedure
- Negotiated procedure

Public employer:

Open tendering or open procedure will be used in normal cases. However, selective tendering or restricted procedure will be used rarely, negotiated tendering or negotiated procedure will be used hardly ever.

Private employer:

Selective tendering or restricted procedure will be used in normal cases. However, all other procedures will be used rarely.

3.1.6 The type of contractor

A project could be realized by single order lettings, by a general contractor or by a full service general contractor included design costs. The role of contractor ranges from erecting a part of the construction (single order letting) to managing/erection the whole construction (general & full service general contractor). A further development is that contractors are also involved in financing the project. This could be a BOT-project (Build-Operate Transfer) or PPP-project (Private-Public-Partnership) Focus on those project types is laid on managing of erection, financing and operation after completion. An extensive and detailed explanation of the different types for scope of services will be given in chapter 3.1.7. Depending on the individual project, there are three different types of contractors to discern:

Individual contractor

An individual contractor is an independent, legitimate company and is responsible for the performance of contract (e.g. erection of construction). There could be a partial or complete transfer of work to subcontractors. The individual contractor is responsible for liability to the employer. An additional contract between the individual contractor and his subcontractors is essential.

Joint Venture

A joint venture is a partnership between two or more companies to undertake economic activity together. They are creating a new entity by contributing equity. All expenses, revenues and control of the enterprise will be shared. In the construction industry, a joint venture is formed just for an individual project. For realization of a project, there are two different types of contract required. The first one is a construction contract between the employer and the joint venture. The second one is a joint venture contract of all involved

companies within the venture. So, there is an external and internal legal relationship and all involved companies have their business in the same field (e.g. main building trades). Each company is responsible for the whole project (e.g. with special focus on liability); profit or loss of the overall result will be divided amongst all participants in same parts.

*Joint venture will be used to describe a relationship in which the parties have agreed to undertake the contract on an integrated basis in which each provides staff and resources which are combined together, and no one party is separately responsible for any individual section.*³³

Consortium

The contractual agreements are similar to a joint venture. There is also an external and internal legal relationship between consortium/ employer and the involved companies within the consortium. All involved companies have various businesses and are responsible just for their individual scope of work. Profit or loss of the overall result will be divided proportionally to the individual order of each company.

Reasons of placing building work to a voluntary association are:³⁴

- High financial effort at the beginning of large constructions, maybe a tight liquidity position could be followed.
- Necessary capacity could be higher than the available capacity of one company.
- Risk value: many medium size risks of many smaller constructions are better than one high level risk of one tall construction.
- Continuously utilization is easier to reach with lots of smaller projects instead of just one large project.

3.1.7 Scope of services

This section will describe different types of the scope of services an employer can choose from within the German construction industry.

Single order letting

Single order letting is the oldest and was the most common work placing method in Germany. The employer commissions an architect and consultants for the lay-out and drawings. After designing, the employer commissions different trades to erect the facility. Therefore, the employer has to manage lots of essential individual contracts. As a result of increasing complexity of large facilities, single order lettings will be adopted just in small projects or for single-storey houses.

³³ Source: Marsh, P. (2000). Contracting for Engineering and Construction Projects. *Fifth edition*. Burlington: Gower, P.56.

³⁴ See also: Pohl, R., Keil, W., & Schumann, U. (2001). Rechts- und Versicherungsfragen im Baubetrieb. (3. Auflage) . Düsseldorf: Werner Verlag.

General Contractor

A further development of single order lettings is to commission execution of work to a general contractor. There is just one contract of all trades for the employer. The same type of contract could be for design as well. In that case, there are just two contact persons for the employer, one for the erection and one for the design. The positive aspect of that is less coordination work for the employer. A negative aspect is that the employer has to pay a higher price (extra fee for higher management effort, i.e. coordination work for trades).

The following enumeration should give an explanation and an easier understanding of general contractors:

- During the design phase the employer's demands can be considered.
- Contractual connection with one construction company who is responsible for all other trades.
- Less coordination work for employer: the coordination of the work packages is done by the construction company
- The project design has to be finished by the tendering stage.
- Risks of costs, schedules, intersection are transferred to the company.
- Construction process: the construction company is able to use their conversant subcontractors, i.e. better prices.
- Employer is responsible for coordination of the designers.
- Higher price - coordination work has to be paid for.

Design-build

The next step is a design and build contract. This contract is comparable with a further development of a general contractor, it combines design and construction. There is just one contract between employer and contractor. Coordination work for design and trades is in the field of one company. A positive aspect is that there is hardly any coordination work for the employer, a negative aspect is the higher price (extra fee for higher management effort, i.e. coordination work for all designers and trades).

At first sight, design-build may appear to alleviate the potential problem of locating and dividing responsibility for any faults and deficiencies in work. However, the potential problem not only extends to design-build; a design –build project may make the potential problem for an owner even larger because contractor and designer now are together in seeking to share the same profit.³⁵

Another definition for a design and build contractor could be a full service general contractor. Following listing gives an additional explanation for design-build contracts:

³⁵ Source: Keith, C. (2001). Construction Contracts. *Third edition*. New Jersey: Prentice-Hall Inc.P.188.

- One main contractor: only one interface for the employer.
- Better optimisation of the project, i.e. better coordination between design and construction.
- Inexperienced employer: the contractor is able to take over the whole process.
- Construction company is able to place their know-how to the project at an earlier stage, i.e. project benefits from the contractors experience.
- Low influence of employer over design and construction.
- Quality level may be lowered, i.e. contracting company works towards achieving higher profit margins instead of quality.

Build-Operate-Transfer

BOT (Build-Operate-Transfer) is a type of project financing, wherein a private entity receives an order to realize a facility. The order comes mostly from the public sector, to finance, design, erect, and operate a facility. After refunding the project (e.g. toll for a bridge or tunnel), the ownership changes to the public authority (=Transfer).

Public projects for infrastructure, water and energy supplying can be realized by BOT-models. Further information about BOT will be found in chapter 3.2.10.

Private-Public-Partnership

Analogical to a BOT-model, a PPP (Private-Public-Partnership) is a type of project financing, wherein a private entity receives an order to realize a facility. Major differences are in the field of financing.

Examples of actual and finished international PPP-projects, realized with German or Austrian involvements are:

- Tunnel San Cristóbal, Santiago de Chile, Chile ³⁶
- Motorway Vespucio Norte Express, Santiago de Chile, Chile ³⁶
- Motorway M6 Duna, Hungary ³⁷
- Hungerburgbahn, Innsbruck, Austria ³⁸
- A 5 Nord Autobahn, Austria ³⁹
- S 1 Wiener Außenring Schnellstraße, Vienna, Austria ³⁹
- S 2 Wiener Nordrand Schnellstraße, Vienna, Austria ³⁹
- A 22 Donauufer Autobahn, Verlängerung Kaisermühlen – A 4, Vienna, Austria ³⁹

³⁶ Source: <http://www.hochtief-pppsolutions.de> from August 5th, 2009

³⁷ Source: <http://www.porr-solutions.com> from August 5th, 2009

³⁸ Source: <http://www.strabag.com> from August 5th, 2009

³⁹ Source: <http://www.asfinag.at/index.php?idtopic=407> from August 5th, 2009

3.1.8 Reimbursement/ Settlement of accounts

Reimbursement is one of the major issues within a contractual agreement. An employer can lose or win money with a wrong or an accurate elected type of reimbursement.

The VOB/A, §5 vary between the following four different types of contracts:

- Unit rates contract/ Bill of quantities contract
- Lump sum contract
- Schedule of rates contract
- Cost plus fee contract

In general, there are two different types to differentiate between: price based contracts (Unit rate contract, Lump sum contract) and cost based contracts (Schedule of rates contract, Cost plus fee contract). In a price based contract, the effort for erecting a unit or facility is known. That means, the tendered price with the included amount of work (personal hours, material and all additional other costs) is fixed. Central element in a price based contract is the tendered price. In a cost based contract, the exactly effort for erecting a unit is not known. That means, there is a fluctuating amount of personal hours, material and additional costs. Central elements in a cost based contract are the remaining costs to completion.

Unit rates contract

A unit rates contract (also called bill of quantities contract) is based on a bill of quantities and an additional description of those quantities. A unit rates contract is divided into different items for work with individual prices for each unit (=unit prices). In general, the tendered price could differ from the real price as a result of an increase in quantity of each unit. Those risks are in the field of the employer. If there are differences between the contractual agreement and real amount of work, a normative reference to VOB/B, §2 (see also chapter 3.1.3) will help to solve them. An exact description of main issues and an extensive analysis about that type of contract will be found in chapter 4.

§2. 2. The compensation shall be calculated in accordance with the contractual unit prices and the work actually executed, unless a different type of calculation is agreed upon (e.g. lump sum, hourly rates, cost prices).⁴⁰

Lump sum contract

A lump sum contract (also called all-inclusive-contract) is based on a fix priced tender. According to the scale of benefits and the quality, it is not preferable calling for tenders in a too early project stage. There are two different types of lump sum contracts, a detailed

⁴⁰ Source: Hogan&Hartson. (2008). The Construction Contract Procedures Part B (VOB/B) in German and English languages,P.3. <http://www.hhlaw.com/>

lump sum contract (work will be described by a bill of quantities) and a global lump sum contract (specifications are written to require certain functional characteristics).⁴¹

Schedule of rates contract

In the normal case, this type of contract will be used if there is any additional work done to an existing contract. A schedule of rates contract is to be used if there are mainly personnel costs for work. Additional to those personnel costs, costs for material/utensils, plus a fee for coordination has to be paid. The real output for personal hours should be under control of an employer's construction supervisor (see also chapter 3.2.11).

Cost plus fee contract

This type of contract is necessary if there is an incalculable amount of work. Reimbursement depends on the contractor's expense plus a percentaged fee. The real output for personal hours, material and utensil should be under control of an employer's construction supervision. This is to differ between a percentaged cost-plus-fee-contract and a fixed-fee-contract.

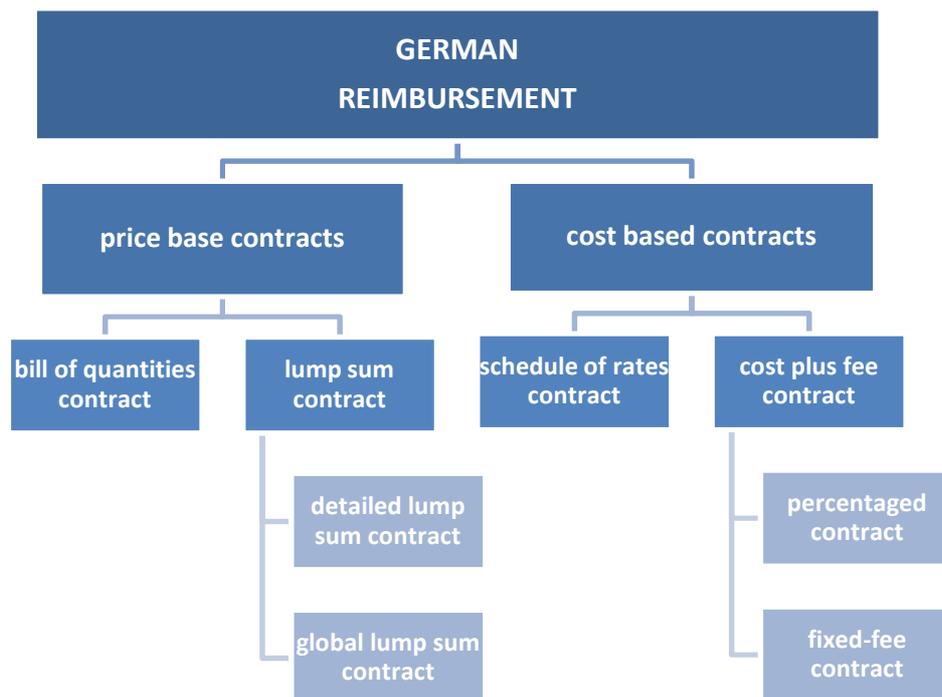


Figure 8: Structure of reimbursement in the German construction industry⁴²

⁴¹ Compare with: Leimböck, E., & Iding, A. (2005). *Bauwirtschaft - Grundlagen und Methoden. (2. Auflage)*. Wiesbaden: Teubner Verlag, P.80.

⁴² Compare with: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag, P107.

3.2 British & Anglo-American contracts

3.2.1 General aspects

In contrast to Germany (VOB), there is not only one standard form of contract for construction works predefined in the UK. There are over 30 different contracts available. It is to be caused by the fact that the regulations for order lettings of public construction works came into force by law first in 1972.⁴³ The British government missed to define one of the contracts in their standard form.

All those standard form contracts have been published by official associations and federations of construction engineers (chapters 3.2.2/3.2.3) or national governmental organizations. Depending on the scope of application there are main standard form contracts available.

Similar to Germany, the contracts are just predefined common standard form contracts and not common law. Both ordinances have been adapted several times over the years (e.g. JCT last in 2005).

3.2.2 Joint Contract Tribunal^{44,45}

The **Joint Contract Tribunal Limited**, commonly called **JCT** is one of the most prolific procedures of construction contract forms for the building industry in the UK.

*The constituent members are representative bodies of various commercial interests in the building industry, who settle the terms of the JCT stable of contract form. Over the years the JCT expanded to include various organizations in addition to its original constituent bodies.*⁴⁶

Actual nameable members are the *British Property Ltd.*, the *Construction Confederation*, the *Local Government Association*, the *National Specialist Contractors Council Ltd.* and the *Royal Institute of British Architects (RIBA)*.

*The Joint Contracts Tribunal was established in 1931 and has for 78 years produced standard forms of contracts, guidance notes and other standard documentation for use in the construction industry.*⁴⁶

⁴³ Compare with: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag, P.73.

⁴⁴ See also: Ndekugri, I., & Rycroft, M. (2009). *The JCT 05 Standard Building Contract. Second edition*. London: Elsevier. P.3.

⁴⁵ See also: Speaight, A., & Stone, G. (2004). *Architect's Legal Handbook - The Law for Architects. Eighth edition*. Amsterdam: Elsevier. P.59.

⁴⁶ Source: <http://www.jctltd.co.uk/> from October 13th, 2009

The JCT published their first major standard form of construction contracts in 1939 by revising the earlier RIBA (Royal Institute of British Architects) form. JCT standard forms were revised again by further editions in 1963 and 1977.

In 1980 a substantial new edition, called the Standard Form of Building Contract 1980 Edition (JCT80), was published in several Private and Local Authority versions – With Quantities (Q), Without Quantities (WQ), and With Approximate Quantities (AQ).⁴⁵

A new edition of the JCT 80 was published in 1998 under the title *Standard form of Building Contract 1998 Edition*, commonly called as JCT98, and was published as private and local authorities versions.

In July 2005, the JCT amended and republished the Standard Form again, this time under the title Standard Building Contract (SBC 2005), as part of a large suite of standard forms. The new 2005 edition, the subject of this book, is published in With Quantities, With Approximate Quantities, and Without Quantities versions. Each version is suitable for either Private or Local Authorities use.⁴⁵

For information: The SBC 2005 is also known as the JCT05.

3.2.3 Institution of Civil Engineers⁴⁷

The Institution of **Civil Engineers**, commonly called **ICE** is a global membership organisation in the field of civil engineering.

Our purpose is to qualify professionals engaged in civil engineering, exchange knowledge and best practice, and promote their contribution to society.⁴⁸

One of their major tasks is to publish standard forms of construction contracts for the British and the international market (e.g. ICE, NEC/ECC).

The ICE (together with the *Association of Consulting Engineers* and the *Federation of Civil Engineering Contractors*) produces and publishes the *ICE Construction Contracts*. The ICE Construction Contracts is a family of standard conditions with the forms *ICE Conditions of Contract*, the *ICE Design and Construct Conditions of Contract* and the *ICE Conditions of Contract for Minor Works*. Their first major standard form of construction contracts was published in 1945. The latest version is the ICE Construction Contracts, 7th edition 1999.

The label ICE Construction Contracts is just an abridged version of ICE Conditions of Contract and Forms of Tender, Agreement and Bond for Use in Connection with Works of Civil Engineering Construction.

⁴⁷ Compare with: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag, P.123.

⁴⁸ Source: ICE - Institution of Civil Engineers. (1996). Infofolder ICE. London.; <http://www.ice.org.uk/>

The *NEC Engineering and Construction Contract*, a standard form contract for the British and the international market, is published by the ICE as well. It is a newly standard form in the third edition (NEC3, 2005) and was primary published in 1993.

*NEC3 is a family of contracts that facilitates the implementation of sound project management principles and practices as well as defining legal relationships. It is suitable for procuring a diverse range of - Works, Services and Supply spanning major framework projects through to minor works and purchasing of supplies and goods.*⁴⁹

NEC3 consists of the following different forms:

- Engineering and construction contract
- Engineering and construction subcontract
- Engineering and construction short contract
- Engineering and construction short subcontract
- Professional services contract
- Adjudicators contract
- Term service contract
- Framework contract
- Procurement and contract strategies

3.2.4 Types of contract

Depending on the scope of application there are main standard form contracts in the field of building works, civil engineering works and the combination of both. As stated in chapter 3.2.3, the ICE and the JCT publish their standard form contracts by time. The following listed contracts are the most common used standard form contracts for construction industry in the UK:

- **JCT80** - *Standard form of building contract 1980 edition*
- **JCT98** - *Standard form of building contract 1998 edition*
- **JCT05** - *Standard building contract (SBC 2005)*
- **ICE - Conditions of contract**, Seventh edition 1999
Conditions of contract and forms of tender, agreement and bond for use in connection with works of civil engineering construction
- **NEC/ECC** - *New engineering contract/ Engineering and construction contract, Third edition 2005*

⁴⁹ Source: <http://www.neccontract.com/> from October 14th, 2009

- **GC/Works** - *General conditions of government contract of the building and civil engineering works, 1998*

3.2.5 The JCT98 family of forms

This chapter gives a description about the JCT98 family of forms. It is a family of standard conditions of contract for building works and is designed to standardise the duties of contractors, employers and engineers, and to distribute the risks inherent in building works to those best able to manage them. Figure 9 ahead shows the JCT98 family of forms with their three different categories and six types of contract.

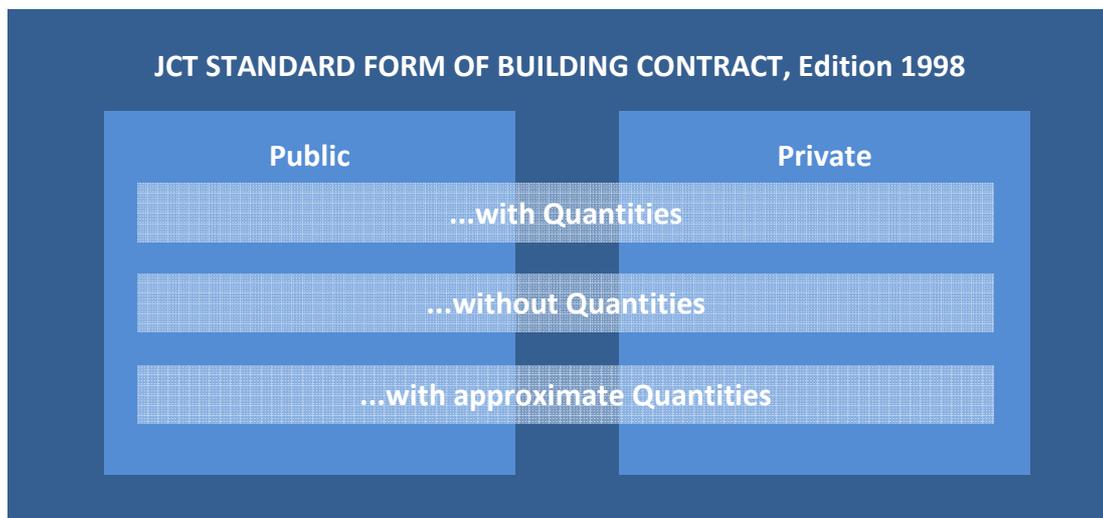


Figure 9: The JCT98 family of forms

Each category has two types of standard forms, one for public and one for private employers. The structure of both contracts is similarly, the main differences are in the field of reimbursement.⁵⁰

The JCT98 standard form of building contract...

- ...with quantities,
is comparable to the German lump sum contract with bill of quantities
- ...without quantities,
is comparable to the German lump sum contract with schedule of work
- ...with approximate quantities,
is comparable to the German bill of quantities contract

For better understanding, there is given a description of the JCT98 standard form of building contract with quantities in the following chapter 3.2.6.

⁵⁰ Compare with: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag, P.121.

3.2.6 JCT98 – Private with quantities 1998 edition

As stated in chapter 3.2.5, the JCT standard forms of building contract with quantities is one of the six available types of contract within the JCT98 family of forms.

The JCT98 is itemized into following parts and clauses: ⁵¹

- Articles of agreement
- Part 1 Conditions: General (35 clauses)
- Part 2 Conditions: Nominated subcontractors and nominated suppliers (2 clauses)
- Part 3 Conditions: Fluctuations (4 clauses)
- Part 4 Conditions: Settlement of disputes – adjudication – arbitration – legal proceedings (3 clauses)
- Part 5 Conditions: Performance Specified works (1 clause)
- Appendix

Articles of agreement

The Articles of agreement, first part of the JCT98 form, is a standard form of an escrow and has three major elements: The front page, the recitals and the articles.

Their purpose is to narrate the fundamental terms of the contract.....The front page, when filled in, identifies the parties and the date upon which the contract is made. The recitals (the statements which commence with 'Whereas') record the nature of the intended works, identify the documents in which those works are described (the bill of quantities and contract drawings) and name the person who has prepared those document.....The articles state shortly the substance of the parties agreement.⁵¹

Part 1 Conditions: General

This part deals with the general conditions of the contract. 35 clauses are within this part and are listed ahead (there are no clauses 32 & 33 in this contract).

An extensive narration of the clauses can be found in [C09].

- Clause 1: Interpretation, definitions, etc.
- Clause 2: Contractor's obligations
- Clause 3: Contract sum – additions or deductions – adjustment – interim certificates
- Clause 4: Architect's instructions
- Clause 5: Contract documents – other documents – issue of certificates
- Clause 6: Statutory obligations, notice, fees and charges
- Clause 6A: Provisions for use where the appendix states that all the CDM regulations apply

⁵¹ Source: Speaight, A., & Stone, G. (2004). Architect's Legal Handbook - The Law for Architects. *Eighth edition*. Amsterdam: Elsevier, P.65-167.

- Clause 7: Levels and setting out of the work
- Clause 8: Work, materials and goods
- Clause 9: Royalties and patent rights
- Clause 10: Person-in-charge
- Clause 11: Access for architect to the works
- Clause 12: Clerk of works
- Clause 13: Variations and provisional sums
- Clause 13A: Variation instruction – contractor’s quotation in compliance with the instruction
- Clause 14: Contract sum
- Clause 15: Value added tax – supplemental provisions
- Clause 16: Materials and goods unfixed or off-site
- Clause 17: Practical completion and defects liability
- Clause 18: Partial possession by employer
- Clause 19: Assignment and sub-contracts
- Clause 20: Injury to persons and property and indemnity to employer
- Clause 21: Insurance against injury to person or property
- Clause 22: Insurance of the work
- Clause 23: Date of possession, completion and postponement
- Clause 24: Damages for non-completion
- Clause 25: Extension of time
- Clause 26: Loss and expense caused by matters materially affecting regular progress of the works
- Clause 27: Determination by employer
- Clause 28: Determination by contractor
- Clause 28A: Determination by employer or contractor
- Clause 29: Works by employer or person employed or engaged by the employer
- Clause 30: Certificates and payments
- Clause 31: Statutory tax deduction scheme
- Clause 34: Antiquities

Part 2 Conditions: Nominated subcontractors and nominated suppliers

There are two named clauses (nominated sub-contractors, nominated suppliers) within part two. Both clauses primarily concern the procedure of nomination, the payment and final-payment to the nominated sub-contractors and suppliers. Further main issues are the failure to complete work, their consequences and the extension of time. There is also given a description as how to handle a possible determination of the nominated sub-contractor.

Clause 35: Nominated sub-contractors

Clause 36: Nominated suppliers

Part 3 Conditions: Fluctuations

Part 3 deals with all kinds of fluctuations and provides a description of how to handle this. A fluctuation in the construction industry means the change of costs by time. This could be an increase/decrease for the price of a material between buying and accounting. It is important especially for long-term constructions.

Clause 37: Fluctuations

Clause 38: Contribution, levy and tax fluctuations

Clause 39: Labour and materials cost and tax fluctuations

Clause 40: Use of price adjustment formulae

Part 4 Conditions: Settlement of disputes – adjudication – arbitration – legal proceedings

The three clauses in this part are dealing with disputes between the contractual parties and how to handle them with or without a court of justice.

Clause 41A: Adjudication

Clause 41B: Arbitration

Clause 41C: Litigation/ Legal proceedings

Part 5 Conditions: Performance Specified works

Performance specific work must be identified as such in the appendix, and will normally comprise materials and components or assemblies or a kind or standard to satisfy design requirements given in the tender documents for the contract.⁵²

Clause 42: Performance specified works

Appendix

Additional to the general conditions, the appendix is to be made up of different pre-divined example forms to specify the individual terms of each contract.

3.2.7 The type of employer⁵³

In the UK, the awarding procedure of construction works is basically discerned among public and private employers. The **public employer** is compelled by law using national regulations. The **private employer** is free of choice to use the national regulations or not.

⁵² Source: Speaight, A., & Stone, G. (2004). Architect's Legal Handbook - The Law for Architects. *Eighth edition*. Amsterdam: Elsevier, P.157.

⁵³ Compare with: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag, P.73-77.

There are optional letters of recommendation from national associations (e.g. ICE) in the field of civil engineering and building works for private employers available.

Similar to Germany, the awarding procedure of construction works of public employers depends on the estimated overall costs of each project. It is to discern between an estimated project overall cost lower or higher than the fixed threshold value of € 5.0 million. The *Local Government Act 1988* has to be followed if the overall project costs are lower than € 5.0 million. The procedure for order lettings after the *Public Works Contracts Regulations 1991* has to be followed if the overall project cost are higher (Figure 10). The fundamental idea of those regulations is to guarantee the competition between all tenderers.

The most common letters of recommendation for private employers in the UK are as follows:

- **Civil Engineering:**
 - *Tendering for Civil Engineering Contracts recommended for use with the ICE Conditions of Contract in the UK*
- **Building works:**
 - *Code of procedure for Single Stage Selective Tendering (provided by JCT)*
 - *Code of Procedure for Two Stage Selective Tendering*

Well-established types for placing of orders under the threshold value are open tendering, selective tendering and negotiated tendering. The types over the threshold value are the open procedure, the restricted procedure and the negotiated procedure. The procedure for those types is similar to those in Germany.

Options of public placing of orders with overall project costs < € 5.0 million are:

- Open tendering
- Selective tendering
- Negotiated tendering

Options of public placing of orders with overall project costs > € 5.0 million are:

- Open procedure
- Restricted procedure
- Negotiated procedure

As said about German order letting in chapter 3.1.5, the open tendering/ open procedure will be used in normal cases, the selective tendering/ restricted tendering will be used rarely and the negotiated procedure/ tendering almost never. In contrast to Germany, the selective tendering/ restricted procedure will be used in normal cases in the UK.

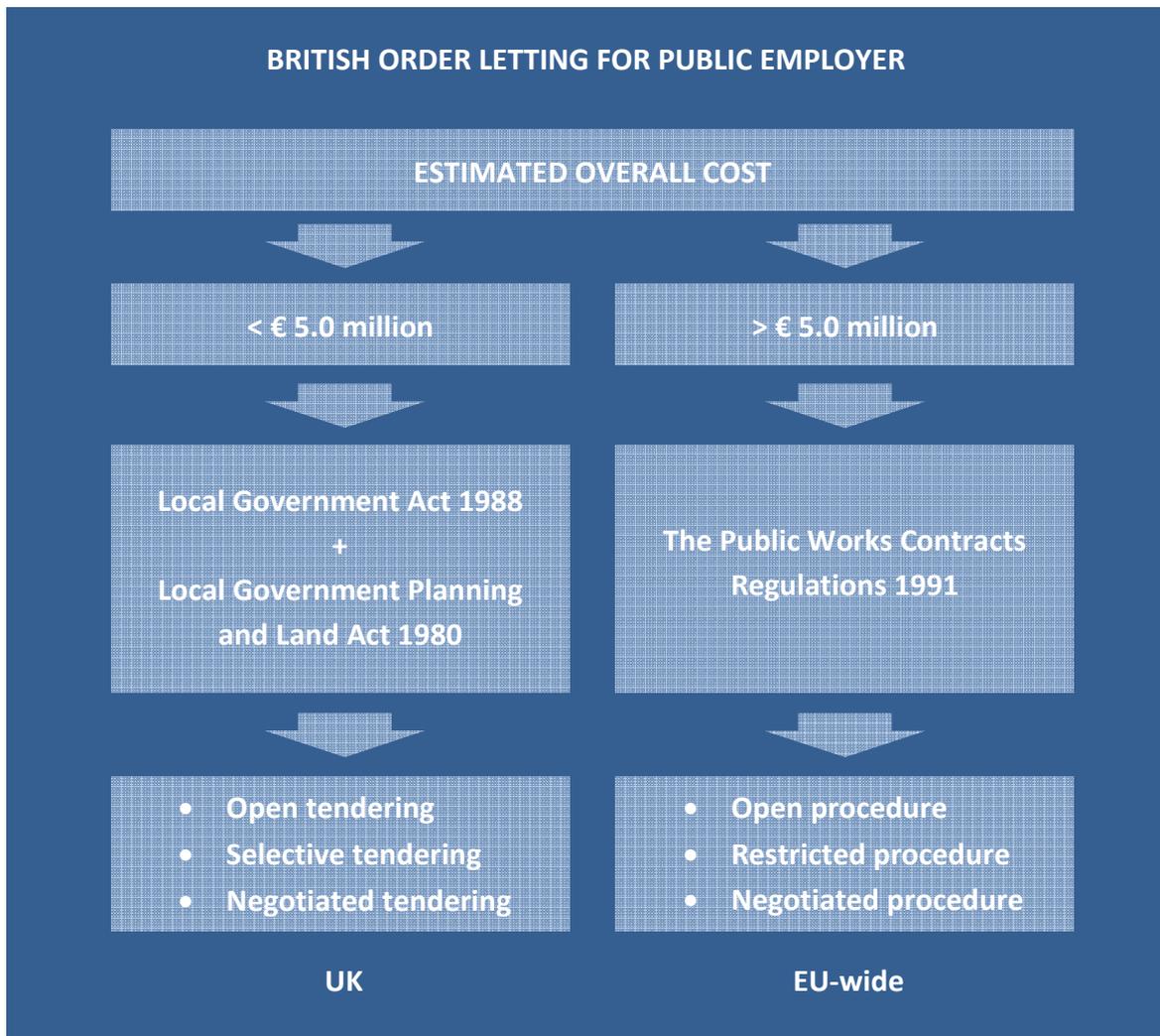


Figure 10: Order lettings for public employers in the British construction Industry ⁵⁴

3.2.8 The type of contractor

An adequate definition for the contractor is given in [C08]:

*The contractor is the second party to construction contract, and is the second person to be identified in the agreement, after the owner. A contractor agrees to do the work shown and described in the contract documents in return for payment by the owner of the contract sum stated in the agreement.*⁵⁵

⁵⁴ Compare with: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag, P74.

⁵⁵ Source: Keith, C. (2001). *Construction Contracts. Third edition*. New Jersey: Prentice-Hall Inc. P.28.

The contractor is responsible for erecting the construction and for the acts of subcontractors. He confirms the execution of completion of works and remedies any defects in conformity to the scope of the contract. The contractor may issue the engineer's instructions for realization (compare with paragraph 3.2.9) and modify drawings which may be necessary for the execution of the work (and the remedying of any defects), all in accordance with the Contract.

*2.1 The contractor shall upon and subject to the Conditions carry out and complete the Works in compliance with the Contract Documents, using materials and workmanship of the quality and standards therein specified, provided that where and to the extent that approval of the quality of materials or of the standards of workmanship*⁵⁶

Similar to Germany (chapter 3.1.6), the role of contractor within a project depends on the employer's chosen type for scope of services. In the UK a project could be realized with traditional procedure contracts, with design-build contracts/ design-construction contracts (=package deal), with a BOT-contract or with a management-type contract. An extensive description will be given in chapter 3.2.10.

Depending on the project, there are three different types of contractor to discern:

- Individual contractor
- Joint venture
- Consortium

There are no essential differences between those types of contractor for British, International or German projects, all of them are closely similar. Refer to chapter 3.1.6 for a detailed description of those types. In some countries, the terms of joint venture and consortium could be different to the description in chapter 3.1.6. It is always required to clear the definitions of joint venture and consortium.

3.2.9 The engineer

The role of an engineer in the British construction industry has a specific status and is not directly comparable to the German construction industry. There is usually a three-party-relationship between the employer, the contractor and the engineer (Figure 13) for construction projects in the UK (compare with chapter 3.3.7).

The engineer has a big amount of duties and authority, the three main tasks are:

⁵⁶ Compare with: JCT - Joint Contract Tribunal. (1998). JCT Standard Form of Building Contract. 1998 edition. London.

- **Power of attorney/ employer's representative** (e.g. decisions concerning design, coordination of tenders and awarding procedure, management of construction in the field of variations and adjustments, supervision)
- **Certifier** of work and inspection of defects
- **Arbitrator** of disputes between employer and contractor.

The following phrase is an example for the engineer's power of attorney, found in the JCT98 and JCT05 regulations:

Under the contract, the Employer acquired a right to terminate the Contractor's employment if the Engineer certified that the Contractor had committed certain defaults. The Engineer issued such a certificate and the Employer notified the Contractor of his intention to expel the Contractor from the site.⁵⁷

The ICE Conditions of Contracts assign the following definitions to the engineer's power of attorney:⁵⁸

*...the engineer shall decide...
...in accordance with the engineer's instructions...
...as determined by the engineer...
...submit to the engineer may consider necessary...
...to the satisfaction of the engineer...*

Further definitions and examples regarding to the engineer's duties and responsibilities will be found in chapter 3.3.9.

3.2.10 Scope of services

The scope of services for British or Anglo-American projects are similar to those for international projects. The employer or his representative can decide between following four common used types of contract:⁵⁹

- Traditional procured contracts
- Design-build contracts/ Design-construct contract (=package deal)
- BOT contracts
- Management-type contracts

⁵⁷ Source: Ndekugri, I., & Rycroft, M. (2009). The JCT 05 Standard Building Contract. *Second edition*. London: Elsevier, P.454.

⁵⁸ Source: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag, P.42.

⁵⁹ Compare with: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag, P.93.

Traditional procured contracts

Traditional procured contracts is defined as a single order letting or an order letting for general contractor. An extensive description of both types will also be found in chapter 3.1.7. Commissioning the execution of construction work to a general contractor is the most common way in the British construction industry; single order letting will be rarely considered.

Design-build contracts/ Design-construct contract (=package deal)

This type of contract is comparable with a further developed general contractor, it combines design and construction. An extended description about design-build contracts will be given in chapter 3.1.7.

BOT contracts

The basic idea for BOT-projects came from the British and Anglo-American region. In their early ages up to the 1980, BOT-projects were mostly in the field of infrastructure (e.g. highways in the US). All sections of the British construction industry registered an increase of BOT-projects in the last thirty years. For running a BOT-project, there is a huge amount of different types available depending on the project's form of financing. Some of those types are listed as follows:

BOL:	Build-Operate-Lease
BOO:	Build-Own-Operate
BOOT:	Build-Own-Operate-Transfer
BROT:	Build-Rent-Operate-Transfer
DBFO:	Design-Build-Finance-Operate
DBOM:	Design-Build-Operate-Maintain
PFI:	Private-Finance-Initiative

Further information about BOT will be found in chapter 3.1.7.

Management-type contracts

This type of a construction contract is a specific feature of the British and Anglo-American construction industry. The management-type contracts are not comparable to any contract in the German construction industry. The fundamental idea is based on management and the coordination of design and construction to abate the amount for the employer's contracts. As follows are two types to discern:

- Construction management contract (CM-contract)
- Management contract (MC)

A **construction manager** (CM), also named agency construction management, manages one or more construction contracts for an employer (or maybe a contractor). His primary function is to manage construction work after the design phase.

The title construction manager usually is given to an individual or to a company expert in construction, construction management, and construction economics; and is employed as an agent of an owner to work in conjunction with the owner's other agent, the designer, in designing and constructing the work require by the owner.⁶⁰

A **management contract** (MC) is a further development of a CM-contract. Depending on the project, the area of responsibility of a manager (or project-team) in a MC is much higher than in a CM-contract. His primary function is to manage contracts for construction work and the design phase. The MC's area of responsibility ranges up to those of a design-build-contract.

Construction management contracts are a well-used alternative to the more straightforward principal/contractor/sub-contractor building arrangement. Rather than a principal employing one contractor as one point of reference for the carrying out of all the works (or the design and construction of the works in the case of a design and construction contract), a construction management contract has the construction manager, for a fee, acting as the principal's agent in employing subcontractors (called trade contractors).⁶¹

Advantages of a CM-contract are:

- Design and construction overlapped (rapid procurement)
- Contractor's expertise influence design (potentially cost savings)
- Contractor in team reduces adversarial nature of the process
- Employer retain control over entire procurement process
- Possible late changes in design

Disadvantages of a CM-contract are:

- Employer share even bigger risks
- Very high employer's involvement (commitment vs. resources, experiences)
- Possible time pressure on design (incomplete design)

Advantages of a MC are:

- Design and construction overlapped (rapid procurement)
- Contractor's expertise influence design (potentially cost savings)
- Contractor in team reduces adversarial nature of the process
- Employer retains the control of the design process
- Possible late changes in design

⁶⁰ Source: Keith, C. (2001). Construction Contracts. *Third edition*. New Jersey: Prentice-Hall Inc.P.39.

⁶¹ Source: <http://www.findlaw.com.au/articles/default.asp?task=read&id=464&site=LE>, from October 22nd

Disadvantages of a MC are:

- Employer assumes high level of performance risks
- High client involvement (commitment vs. resources, experiences)
- Possible time pressure on design (incomplete design)

3.2.11 Reimbursement/ Settlement of accounts ⁶²

Similar to the reimbursement for the construction works in international projects, there are two main types of contracts differentiating between a price based contract and a cost based contract. A description of the differences of a price based contract to a cost based contract is given in chapter 3.1.8.

Price based contracts:

For a price based contract, there are two types:

- Unit rate contract (bill of quantities contract)
- Lump sum contract

A **unit rates contract** is based on a bill of quantities and an additional description of those quantities. A unit rates contract is divided into different items for work with individual prices each unit (=unit prices). In general, the tendered price could be different from the real price as a result of an increase in quantity of each unit. Those risks are in the field of employer.

A **lump sum contract** (also called all-inclusive-contract or package deal) is based on a fix priced tender.

According to the scale of benefits, the quality of the finished development has to be defined prior, so it is not preferable to call for tenders in an earlier project stage. There are two different types of lump sum contracts available. There is a lump sum contract with a bill of quantity, and a lump sum contract with a schedule of works. Both types are comparable to those of the German construction industry.

Cost based contracts:

For using a cost based contract, there are three types of contracts:

- Schedule of rates contract
- Cost reimbursement contract (cost plus fee contract)
- Target contracts

A **schedule of rates contract** will be used mostly if there is any additional work added to an existing contract. This type of contract is to be used if there are mainly personnel costs for work necessary. In addition to those personnel costs, costs for material and utensil

⁶² Compare with: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag.P.105.

plus a fee for coordination have to be paid. The real output for personal hours should be to control of an employer's construction supervisor. This type of contract is comparable the German schedule of rates contract (chapter 3.1.8).

A **cost reimbursement contract**, also called cost plus fee contract (CPF), is necessary if there is an incalculable amount of work. Reimbursement depends on the contractor's expense plus a percentaged fee.

The title cost-plus-fee contract is descriptive and comes from the fact that in such a contract the owner pays the contractor all the costs of the work, plus a fee to cover the contractor's overhead and profit.⁶³

The real output for personal hours, material and utensil should be under control of an employer's construction supervision. This type of contract is comparable with the German cost reimbursement contract (chapter 3.1.8). Within that type of contract, there is a cost-plus-percentage-contract, a cost-plus-fixed-fee-contract and a cost plus fluctuating fee contract (compare with Figure 11). The employer does not know what the final costs will be (e.g. in a simple CPF). The main contractor's advantage belonging to that type of contract is that he has to take relatively small risks. For the contractor, it is sometimes difficult to plan workmanship (e.g. less design information). A further development of that type of contract will be the following target contract.

There is no direct counterpart of the international (and British) **target contract** to one of the German contracts. A target contract is equitable to the cost reimbursement contract above. The fundamental idea of a target contract is that the contractor should have a profitable incentive to underbid his tender (e.g. underbid the construction sum by more efficient workmanship). Such a profitable incentive could be a GMP (Guaranteed Maximum Price).

There are the following three types of a target contract to differ:

- Cost target contract (=guaranteed maximum cost-plus-fee contract, GMCPF)
- Time target contract
- Performance target contract

⁶³ Source: Keith, C. (2001). Construction Contracts. *Third edition*. New Jersey: Prentice-Hall Inc, P.75.

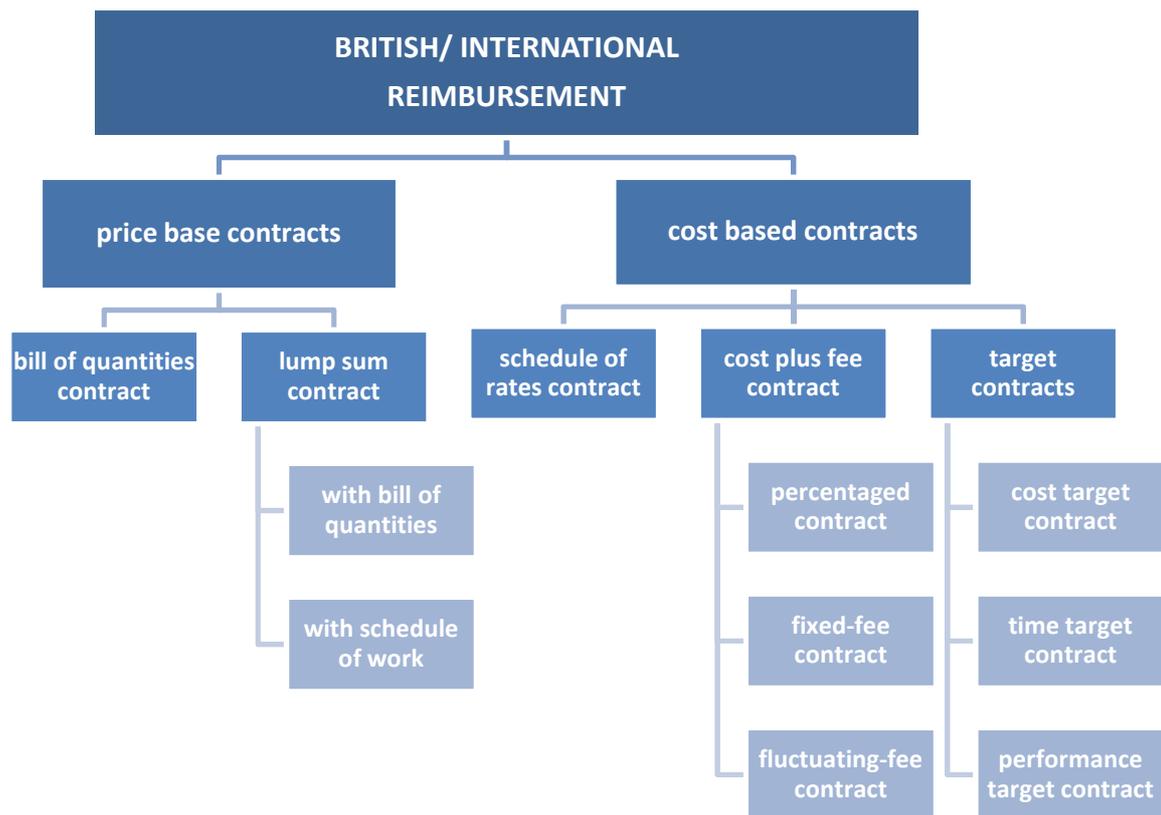


Figure 11: Structure of reimbursement for British and international projects ⁶⁴

⁶⁴ Compare with: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag, P107.

3.3 FIDIC – International contracts

3.3.1 General aspects

As a result of non defined common European standard regulations for construction works, it is of importance to know about the particular national building and construction laws and regulations for realizing an international construction project. As described in chapters 3.1 and 3.2, the VOB and the Anglo-American regulations JCT, ICE, NEC/ECC are examples of those national building and construction regulations. Following further associations are providing such regulations in their countries:

- AFNOR (*Association Française de Normalization*), France
- SIA (*Semiconductor Industry Association*), Switzerland
- AIA (*Application Integration Architecture*), USA

International construction projects on the basis of national building and construction regulation could reach a high level of risk and disputes between all contractual parties. So, it is recommended to use standard model contracts, like the FIDIC. The FIDIC tendering procedure is not at the same stage as a common national regulation or law, it is just a suggestion of the international federation of consulting engineers to realize an international project in a fair way for all parties. The World Bank as the largest global investor in the construction industry recommends the use of FIDIC contracts. The FIDIC regulations are part of the World Bank standard contracts.⁶⁵

3.3.2 International federation of consulting engineers

FIDIC is a French acronym and stands for *Fédération Internationale des Ingénieurs-Conseils*, that is the *International Federation of Consulting Engineers*. The organization was founded in 1913 by national associations of consulting engineers of the European countries France, Belgium and Switzerland. The headquarters is located in Geneva, Switzerland.

*The objectives of forming the federation were to promote in common the professional interests of the member associations and to disseminate information of interests to member of its component national associations.*⁶⁶

Actually there are national associations in over 78 countries⁶⁷ member of the international federation of consulting engineers all over the world.

⁶⁵ Source: <http://www.worldbank.org>, from August 18th, 2009

⁶⁶ Source: FIDIC. (2000). *The FIDIC Contracts Guide. (First Edition)*. Geneva.

⁶⁷ Source: <http://www1.fidic.org/about/members/#Member%20Association>, from September 23rd, 2009

The official objectives of the FIDIC are: ⁶⁸

- Represent the consulting engineering industry globally
- Enhance the image of consulting engineers
- Be the authority on issues relating to business practice
- Promote the development of a global and viable consulting engineering industry
- Promote quality
- Actively promote conformance to a code of ethics and to business integrity
- Promote commitment to sustainable development

3.3.3 Types of contract

New Series, 1999

- **The Short Form (Green Book 1999)**
Short form of contract
- **“CONS”: The Construction Contract (Red Book 1999)**
Conditions of contract for construction for building and engineering works designed by the employer
- **“P&DB”: The Plant and Design/Build Contract (Yellow Book 1999)**
Conditions of contract for plant and design/build for electrical and mechanical plant and for building and engineering works designed by the contractor
- **“EPCT”: The EPC/Turnkey Contract (Silver Book)**
Conditions of contract for EPC/Turnkey projects

Old Series

- **Red Book 1987**
Conditions of contract for works of civil engineering construction
- **Yellow Book 1987**
Conditions of contract for electrical and mechanical works including erection on site
- **Orange Book 1995**
Conditions of contract for design-build and turnkey

⁶⁸ Source: FIDIC. (2007). FIDIC Statutes and BY-Laws. Geneva, P.2.



Figure 12: Layout FIDIC-contracts, new series 1999

Following definitions for “CONS”, “P&DB” and “EPCT” were found:⁶⁹

Conditions of contract for construction, which are recommended for building or engineering works designed by employer or by his representative, the engineer. However, the works may include some elements of contractor-designed civil, mechanical and/or construction works.

Conditions of contract for plant and design-build, which are recommended for the provision of electrical and/or mechanical plant, and for building or engineering works designed by the contractor.

Conditions of contract for EPC/Turnkey projects, which may be suitable, where (i) a higher degree of certainty of final price and time is required, and (ii) the contractor takes total responsibility for the design and execution of the project, with little involvement of the employer.

⁶⁹ Source: FIDIC. (2007). FIDIC Statutes and BY-Laws. Geneva, P.5

3.3.4 Selection of the appropriate book/contract

By describing different kind of issues, following aspects should give a rough overview to those contracts and provide support by choosing the right book.

Green Book:

- Relatively small value of contract (< \$500.000).
- Short time of construction (< 6 month).
- Involving simple and/or repetitive work.

Red Book:

- Larger and/or more complex projects.
- Unit rates contract, performance as a lump sum contract possible.
- Most/all works will be designed by employer (or the employer's representative)
- Administering of contract by the engineer.
- Contract becomes legally effective when employer issues the letter of acceptance to the contractor.
- Contractor designs performance of work (in accordance with contract).
- Final payments are determined by measurement of the actual quantities of the work.
- General conditions allocate the risks between all parties in a fair and adequate way.

Yellow Book:

- Larger and/or more complex projects.
- Pre-prepared outline specification by employer.
- Majority of design will be done by contractor.
- Design has to fulfil the specifications by the employer.
- Administering of contract by engineer (or employer's representative).
- In general, payment after achieved milestones on basis of lump sum contract (determined by reference to a schedule of payment).
- Contract becomes legally effective when employer issues the letter of acceptance to the contractor.
- Possibility to apply the rates and prices on basis of a measurement of the actual quantities of work in itemized particular conditions.
- General conditions to allocate the risks between all parties in a fair and adequate way.

Silver Book:

- Large privately and/or public financed projects (BOT/ PPP).
- Concessionaire (i.e. the employer) takes total responsibility for the financing.

- Contractor takes total responsibility for design, construction and execution of the project.
- Employer is not involved in the day-to-day progress of construction work.
- Employer wishes a two-party approach (i.e. one contact person).
- Employer is willing to pay more for construction (e.g. higher fees: more coordination work & risks for contractor).
- Contract becomes legally effective with the contract agreement
- Contract administered by the employer.
- Payment is typically determined by reference to a schedule of payments.
- Possibility to apply the rates and prices on basis of a measurement of the actual quantities of work in itemized particular conditions.
- More risks are allocated to the contractor.

3.3.5 Structure of contracts in general

The analysis and description of the FIDIC-contracts will be done by the new series of 1999. The general structure of all books is nearly similar and each of them is divided into the following three parts: ⁷⁰

- **Part 1 - General conditions** of construction is the part of contract which is intended to be incorporated into each contract.
- **Part 2 - GPPC** is an instruction and guidance for the preparation of the particular conditions for individual projects. There is a big amount of clauses on over 29 pages which has to be chosen and furthermore prepared for each individual contract.
- **Forms of tender and agreement** is an 8 page guide of pre-divined example forms of letter of tender, contract agreements and dispute adjustment agreements.

3.3.6 Structure of Red Book 1999 ⁷¹

As described in chapter 3.3.4, the construction contract is based on unit-rates. Final payments are determined by measurement of the actual quantities of work. The following description of the Red Book should give a rough overview of the contract.

General conditions:

The general conditions of the construction contract, prospectively called "CONS", are divided into following 20 clauses:

- 1) General Provisions
- 2) The Employer

⁷⁰ Source: FIDIC. (2000). The FIDIC Contracts Guide. (*First edition*) . Geneva, P.2.

⁷¹ Compare with: FIDIC. (1999). Construction Contract (1999 Red Book). *First edition*. Geneva.

- 3) The Engineer
- 4) The Contractor
- 5) Nominated Subcontractors
- 6) Staff and Labour
- 7) Plant, Materials and Workmanship
- 8) Commencement, Delays and Suspension
- 9) Tests on Completion
- 10) Employer's Taking Over
- 11) Defects Liability
- 12) Measurement and Evaluation
- 13) Variations and Adjustments
- 14) Contract Price and Payment
- 15) Termination by Employer
- 16) Suspension and Termination by Contractor
- 17) Risk and Responsibility
- 18) Insurance
- 19) Force Majeure
- 20) Claims, Disputes and Arbitration

Clause 1 deals with the basic information regarding to the contractual agreement (e.g. definitions of the contract, parties, dates etc; law and language; documents and their priority). All the employer's rights and duties belonging to site access, claims, his personnel, permits and financial arrangements (e.g. submission within 28 days after receiving any request from contractor) will be found in **clause 2**. The main part of **clause 3** is about the engineer's rights, duties and his authority within the project (e.g. instructions to the contractor). **Clause 4** deals with one of the key issues within the contract. It is about the contractor and all his rights, duties and obligations to the contractual agreement (e.g. sufficiency of the accepted contract amount (4.11)) including the construction site (e.g. unforeseeable physical conditions (4.12)), the responsibility for subcontractors (4.4/4.5) and quality assurance (4.9). An explicit description of the exceptional relationship between the employer, the engineer and the contractor will be found in chapter 3.3.7. **Clause 5** is named "Nominated Subcontractors" and administers objection to the nomination of a subcontractor and their payment. All kind of general agreements belonging to workmanship, material, staff and labourer (e.g. working hours, health and safety, quality of material) will be found in the **clauses 6 & 7**. Contractual agreements regarding to the sequence of construction (e.g. commencement of work & time for completion, milestones, delays & suspension of work) are within **clause 8**. The **Clauses 9 & 10** deal with the testing on completion (clause 9) and the employer's taking-over (clause 10). The employer can take over the whole work, sections (10.1), or a part of the work (10.2). The defect liability starts with the employer's taking over. All contrac-

tual agreements belonging to those defect liabilities (e.g. completion of outstanding work (11.1), removal of defective work (11.5), cost of remedying defects (11.2), performance certificate (11.9)) will be found in **clause 11**. All terms belonging to the evaluation of measurement (clause 12) and their adjustment for variations (clause 13) will be found in **clauses 12 & 13**. They will describe the methods of measurement (e.g. measurement shall be in accordance with the bill of quantities (12.2)) and work which has to be measured (acceptance as accurate by contractor). Part of clause 13 is the right to vary: “Variations may be initiated by the Engineer at any time prior to issuing the taking-over certificate for the works, either by an instruction or by a request for the contractor to submit a proposal”⁷² and the procedure and payment of variations (e.g. adjustment for change in cost (13.8)). **Clause 14** deals with the contract price and payment, one of the key issues of a contractual partnership.

*14.7. (a) The employer shall pay to the contractor the first instalment of the advance payment within 42 days after issuing the letter of acceptance or within 21 days after receiving the documents in accordance with sub-clause 4.2 [performance security] and sub-clause 14.2 [advance payment], whichever is later*⁷²

*14.7. (c) The employer shall pay to the contractor the amount certified in the final payment certificate within 56 days after the employer receives this payment certificate.*⁷³

Further constituent parts within this clause are the schedule of payment (14.4), the delay of payment (14.8), discharge (14.12) and currencies of payment (14.15). The **clauses 15 & 16** administer the suspension and termination of the contract. There could be a termination by the employer (clause 15) or by the contractor (clause 16).

*15.2 (a) The employer shall be entitled to terminate the contract if the contractor fails to comply with sub-clause 4.2 (performance security) or with a notice under sub-clause 15.1 (notice to correct)*⁷²

*15.2. (b) (ii) The employer shall be entitled to terminate the contract without reasonable excuse fails to comply with a notice issued under sub-clause 7.5 (rejection) or sub-clause 7.6. (remedial work) within 28 days after receiving it.*⁷²

*16.2. (a) The contractor shall be entitled to terminate the contract if the contractor doesn't receive the reasonable evidence within 42 days after giving notice under sub-clause 16.1 (contractor's entitlement to suspend work) in respect of a failure to comply with sub-clause 2.4 (employer's financial arrangement).*⁷²

16.2. (c) The contractor shall be entitled to terminate the contract if the contractor doesn't receive the amount due under an interim payment certificate within 42 days after

⁷² Source: FIDIC. (1999). Construction Contract (1999 Red Book). First edition. Geneva.

the expiry of the time stated in sub-clause 14.7 (payment) within which payment is to be made (except for deductions in accordance with sub-clause 2.5 (employer's claims)).⁷³

The **clauses 17 & 18** deals with risk, responsibility (e.g. contractors care of work (17.2)) and insurance (clause 18) of a construction. Employer's risks range from war, hostilities (17.3 (a)) and terrorism (17.3 (b)) to unforeseeable forces of nature (17.3 (h)). The consequences of employer's risks and the limitation of liability will be found in clause 17 as well.

All information belonging to the insurance for work & contractor's equipment (18.2), damage to property (18.3) or persons and the insurance for the contractor's personnel (18.4) will be found in clause 18. All contractual agreements belonging to force majeure are described in **clause 19**. Listed is the definition of force majeure, the notice of force majeure and the duty to minimise delay as a result of force majeure. The last clause deals with claims and the settlement of disputes. Content of **clause 20** is about a general description of the contractor's claims (20.1), the dispute adjudication board (20.2, 20.3, 20.4, 20.7), amicable settlement (20.5) and the procedure of arbitration (20.6).

Guidance for the preparation of particular conditions (GPPC)

As described in chapter 3.3.5, there is a huge amount of additional clauses for preparation of an individual contract. Those clauses have to be taken, the open spaces filled out, and attached to the general conditions. The structure is with 20 clauses similar to the general conditions. The books are structure vary especially in part two, the guidance for the preparation of particular conditions.

Although these conditions allow for the possibility that the contractor may be required to design parts of the permanent works, they are not intended for use where most of the works are designed by the contractor. For these works, it would be more appropriate to utilise FIDIC's conditions of contract for plant and design-build or conditions of contract for EPC/Turnkey projects.⁷³

Forms of tender and agreement

As stated in chapter 3.3.5, the forms of tender and agreement is a guide of pre-divined example forms of the letter of tender, contract agreements and dispute adjustment agreements.

The FIDIC provides also lots of different example forms, some of them are listed as follow:

- Example form of parent company guarantee
- Example form of tender security
- Example form of performance security – demand security
- Example form of performance security – surety bond
- Example form of advance payment guarantee
- Example form of retention money guarantee

⁷³ Source: FIDIC. (1999). Construction Contract (1999 Red Book). *First edition*. Geneva.

- Example form of payment guarantee by employer

3.3.7 Relationship employer - engineer - contractor

The contractual relationship between the three parties - employer, engineer and contractor - is a result back to the early ages of FIDIC. The first contracts were comparable to the British construction contracts. Guideline of the 1st edition of FIDIC contract was the British ICE (Institute of Civil Engineers) in 1957. As a result of that, the engineer was involved in the FIDIC regulations from beginning on. The duties and responsibilities of the engineer (a detailed description of the engineer will be found in chapter 3.3.9) have changed in time with the publishing of further editions of FIDIC-contracts.

As given in Figure 13, there are two different types of contract within this relationship. There is a common contractual agreement between the employer and engineer and there is a FIDIC contract between the employer and contractor.

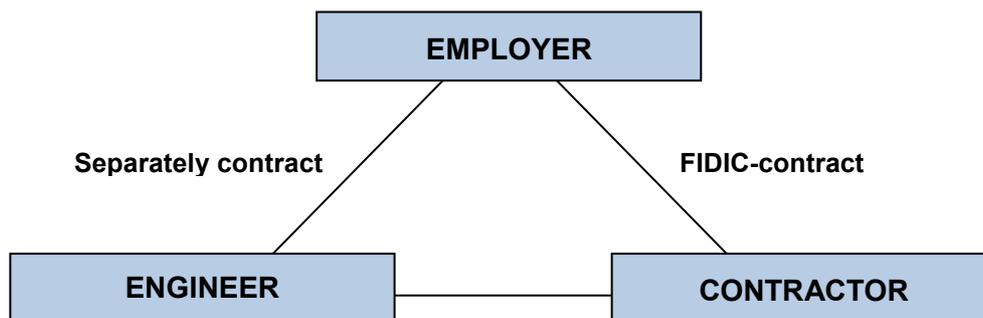


Figure 13: Relationship employer-engineer-contractor on a FIDIC-Red Book based project

3.3.8 The type of employer

The FIDIC contract does not differentiate between public or private employer. Using the FIDIC regulations (e.g. the FIDIC tendering procedure) is free of choice unless the World Bank (or a similar financier) is to be adamant on using the FIDIC regulations. Only the national building regulations in most of the countries in the European Union with a fixed threshold value (e.g. € 5 million in Germany) for public employers have an additional influence to the awarding procedure.

*The FIDIC tendering procedure presents a systematic approach to the selection of tenderers and the obtaining and evaluation of tenders.*⁷⁴

⁷⁴ Source: FIDIC. (1999). Construction Contract (1999 Red Book). First edition. Geneva.

There are three different types of awarding procedures that will be mostly used for international projects:⁷⁵

- **International competitive bidding**
Comparable with the German open procedure
- **Limited competitive bidding**
Comparable with the German restricted procedure
- **Negotiation approach**
Comparable with the German negotiated procedure

The limited competitive bidding is the most common used type of awarding procedure for international projects. The prequalification of companies within the pre-tender phase is one of the major benefits.

3.3.9 The engineer

As stated in chapter 3.3.7, the significant influence of the engineer within a project began in the early ages of the FIDIC contract in 1957. The engineer had a huge amount of duties and authorities, the three main tasks were:

- **Power of attorney/ employer's representative** (e.g. decisions about design, coordination of tenders and awarding procedure, management of construction in the field of variations and adjustments, supervising the site)
- **Certifier** of work and inspection of defects
- **Arbitrator** of disputes between employer and contractor.

In the FIDIC-regulations (paragraph 1.1), the engineer is named as a person or company. If the engineer is a company, so the company has to designate an individual to carry out the role of the engineer. Alternatively, the engineer may be an individual or a member of the employer's own staff.

*The engineer has an extremely important role in the administration of the contract and the way in which he carries out his duties will have a major impact on the work of the contractor and the success of the project.*⁷⁶

Whenever the engineer's carrying out duties or/and exercising authority implied by the contract he shall be deemed to act in the name of and for the employer. The definition of the engineer after FIDIC Red Book 1999 is as follows:

⁷⁵ See also: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag, P.78.

⁷⁶ Source: Totterdill, B. W. (2006). *FIDIC users' guide - A practical guide to the 1999 red and yellow books*. London: Thomas Telford, P.112.

"Engineer" means the person appointed by the employer to act as the engineer for the purposes of the contract and named in the appendix to tender, or other person appointed from time to time by the employer and notified to the contractor under sub-clause 3.4 (replacement of the engineer).⁷⁷

The status of the engineer differs within the FIDIC-contracts. As stated in chapter 3.3.7, there is a three party relationship in the red, the yellow and green book are similar. There is just a two party relationship in the silver book between the employer and the contractor. In that case, the position of the engineer is defined as an employer's representative.

Regarding the third point, there is a significant potential for conflict concerning the engineer's role as an arbitrator. The engineer will be commissioned by the employer to be his representative while he has to be the arbitrator of disputes between employer and contractor by law (and contract).

In the new series 1999 (red & yellow book), the definition for the engineer's duties and authorities in the field of arbitration has changed. The engineer lost his authority as an arbitrator. He (after consultation with the employer) has to award a DAB (Dispute Adjudication Board of one or three persons) for arbitration.

20.2 Disputes shall be adjudicated by a DAB in accordance with sub-clause 20.4 (obtaining dispute adjudication board's decision). The parties shall jointly appoint a DAB by the date stated in the appendix to tender.⁷⁷

3.3.10 The type of contractor

The contractor is responsible for erecting the construction, for the acts of subcontractors and to execute and complete the works and remedy any defects in conformity to the scope of the contract. The contractor may follow the engineer's instructions for realization (compare with paragraph 3.3.9), modify drawings (which may be necessary for the execution of the work) and the remedying of any defects.

3.3. The Contractor shall only take instructions from the Engineer, or from an assistant to whom the appropriate authority has been delegated under this Clause

4.4. The contractor shall be responsible for the acts or defaults of any subcontractor, his agents or employees as if they were the acts or defaults of the contractor⁷⁸

The role of the contractor within an international project depends on the employer's chosen type for scope of services i.e. chosen type of FIDIC-contract (see chapter 3.3.11). A project could be realized with simple single order lettings, with a general contractor, with a full service general contractor, as a BOT-project or PPP-project. The role of contractor

⁷⁷ Source: FIDIC. (1999). Construction Contract (1999 Red Book). First edition. Geneva.

⁷⁸ Source: FIDIC. (1999). Construction Contract (1999 Red Book). First edition. Geneva, P.11.

ranges from erecting a part of the construction (single order letting) to managing the erection of the whole construction (general & full service general contractor). A further development to realize a project is BOT and PPP. Focus on those projects is laid on managing of erection, financing and operation the project after completion. An extensive and detailed explanation of the different types of scope of services will be given in chapter 3.3.11.

Depending on the project, there are the following three different types of contractor:

- Individual contractor
- Joint venture
- Consortium

A detailed description of those types of contractor will be found in chapter 3.1.6. A Joint venture and a consortium are the most common types of contractor for international projects. In some countries, the terms of a joint venture and a consortium could be different to the given description in this thesis (chapter 3.1.6). It is always necessary to clear the definitions of joint venture and consortium prior.

3.3.11 Scope of services

The scope of services for international projects are similar to those for British contracts, the employer has to choose between following types:

- Single order letting
- General contractor
- Design-build contractor
- BOT – Build-Operate Transfer
- PPP – Private Public Partnership

The FIEC (*Fédération de l'Industrie Européenne de la Construction*), a federation for the European construction industry defines the following three types of a general contractor as the most common ones for international projects:⁷⁹

General contractor for “execution”

A general contractor for execution is comparable with the German general contractor. He is responsible for the execution of work. An extensive description will be found in chapter 3.1.7.

General contractor for “design, engineering & execution”

A general contractor for design, engineering and execution is comparable with the German design-build contractor and is responsible for the whole project.

⁷⁹ See also: <http://www.fiec.org/> , <http://www.bauindustrie.de/>

General contractor for “engineering & execution”

The responsibilities and duties of a general contractor for engineering and execution are placed between the two general contractors above. A general contractor for engineering and execution is cognizant to the erection of construction and has additional responsibilities for design.

3.3.12 Reimbursement/ Settlement of accounts

Similar to the reimbursement for the construction works in the British construction industry, there are two main types of contracts. There is a price based contract and a cost based contract. In a price based contract, the effort for erecting a unit or facility is known. That means, the tendered price with the included amount of work (personal hours, material and all additional other costs) is fixed. Central element in a price based contract is the tendered price. In a cost based contract, the exact effort for erecting a unit is not known. That means, there is a fluctuating amount of personal hours, material and additional costs. Central elements in a cost based contract are the remaining costs to completion.

Price based contracts:

- Unit rates contract (bill of quantities contract)
- Lump sum contract

Cost based contracts:

- Schedule of rates contract
- Cost reimbursement contract (cost plus fee contract)
- Target contracts

3.4 Summary and comparison of all contracts

The following summary (Figure 14) of the contract's content is outlining the main issues and should give a better overview of the different types. Additionally, a comparison of the contract's structure of the VOB-, JCT- and the FIDIC-contract is given in Figure 15.

3.4.1 Summary of the contracts content

This table is divided into the three types of contract (VOB, JCT, FIDIC) and their main affecting parameters to the contracts. The table shows possible applications of parameters, the white written phrases are the ones most used in practice.⁸⁰

SUMMARY OF VOB, JCT & FIDIC			
	VOB	JCT	FIDIC
Possible type of employer	<ul style="list-style-type: none"> Public client Private client 	<ul style="list-style-type: none"> Public client Private client 	<ul style="list-style-type: none"> Public client Private client
Possible type of contractor	<ul style="list-style-type: none"> Individual contractor Joint venture Consortium 	<ul style="list-style-type: none"> Individual contractor Joint venture Consortium 	<ul style="list-style-type: none"> Individual contractor Joint venture Consortium
Possible type for scope of services	<ul style="list-style-type: none"> Single order letting General contractor Design-build BOT & PPP 	<ul style="list-style-type: none"> Traditional procured contracts General contractor Design-build BOT & PPP CM-contract Management contract 	<ul style="list-style-type: none"> Single order letting General contractor Design-build BOT & PPP CM-contract Management contract
Possible types of reimbursement	<ul style="list-style-type: none"> Bill of quantities Lump sum Schedule of rates Cost-plus-fee 	<ul style="list-style-type: none"> Bill of quantities Lump sum Schedule of rates Cost-plus-fee Target contracts 	<ul style="list-style-type: none"> Bill of quantities Lump sum Schedule of rates Cost plus fee Target contracts

Figure 14: Summary of the VOB-, JCT- & FIDIC-contract

⁸⁰ See also: Kulick, R. (2003). *Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands*. Wiesbaden: Teubner Verlag.

3.4.2 Comparison of contracts

STRUCTURES OF THE VOB, JCT & FIDIC		
VOB	JCT	FIDIC
Letter of acceptance/ Contract agreement	Article of agreement	Letter of Acceptance
Tender	Contract drawings + Bills of quantities + specifications	Letter of tender
Description of works/Specifications	Contract drawings + Bills of quantities + specifications	Specifications + Drawings + Schedules (Bill of Quantities)
Specific conditions of contract	Appendix	Particular conditions
Additional conditions of contract	Appendix	Particular conditions
Additional technical specifications of contract	Contract drawings + Bill of quantities + specifications	Specifications + Drawings + Schedules (Bill of Quantities)
General technical specifications of contract (VOB/C)	Contract drawings + Bill of quantities + specifications	Specifications + Drawings + Schedules (Bill of Quantities)
VOB/B General conditions of contract	JCT Standard form of building contract	FIDIC Conditions of contract

Figure 15: Comparison of the VOB-, JCT- & FIDIC-contract ⁸¹

⁸¹ Compare with: Hök, G. S. (2005). Handbuch des internationalen und ausländischen Baurechts. Berlin: Springer, P.190.

4 PRICE PER UNIT - UNIT RATE CONTRACT

4.1 Introduction

This chapter is about the unit rate contract in the German and British construction industry and gives a detailed description about the structure of the contracts and the way how to describe such a unit. The subchapters describe the German and British type of contract; the unit rate contract of an international project, similar to those in the UK and is not separately described.

4.2 GERMANY

4.2.1 Introduction

The VOB-Part A (especially §9) deals with the general regulations for the awarding procedure of building and construction works and is the central document for the calling for tenders in the German construction industry. Basically, the VOB/A §9 vary between technical specifications of work:⁸²

- with a bill of quantities
- with a program of performance

In both types, a description of the technical specifications of works and the general conditions of contract for execution of building work has to be included in a construction contract (compare with Figure 16).



Figure 16: Essential documents for a German construction contract

⁸² Compare with: DIN1960. (2006-05). VOB/A - Allgemeine Bestimmungen fuer die Vergabe von Bauleistungen. Berlin.

4.2.2 Quantity description

After VOB/A §9, the description of the performance of works has to be explicit under following conditions: ⁸³

- Description of the project by using the specifications of construction (§9.11).
- A bill of quantities has to be structured into partial performance (§9.11).
- The description of work has to be done by using drawings and sketches and/or prime-examples (§9.12).
- Technical specifications shall be used: (§9.6)
 - National and/or European codes and regulations
 - European approvals for technical specifications
 - International codes provided by a German standardisation committee
- Technical specifications has to be accessible for all bidder/tenderer in the same way, it has to support the challenge between all bidder (§9.5).
- A technical language shall be used (§9.1).

By keeping this conditions, the structure for the description of works with a bill of quantity is divided into a *Title page*, the *Specifications of Construction*, *Drawings, Attachments* and the *Bill of Quantities* (Figure 17).

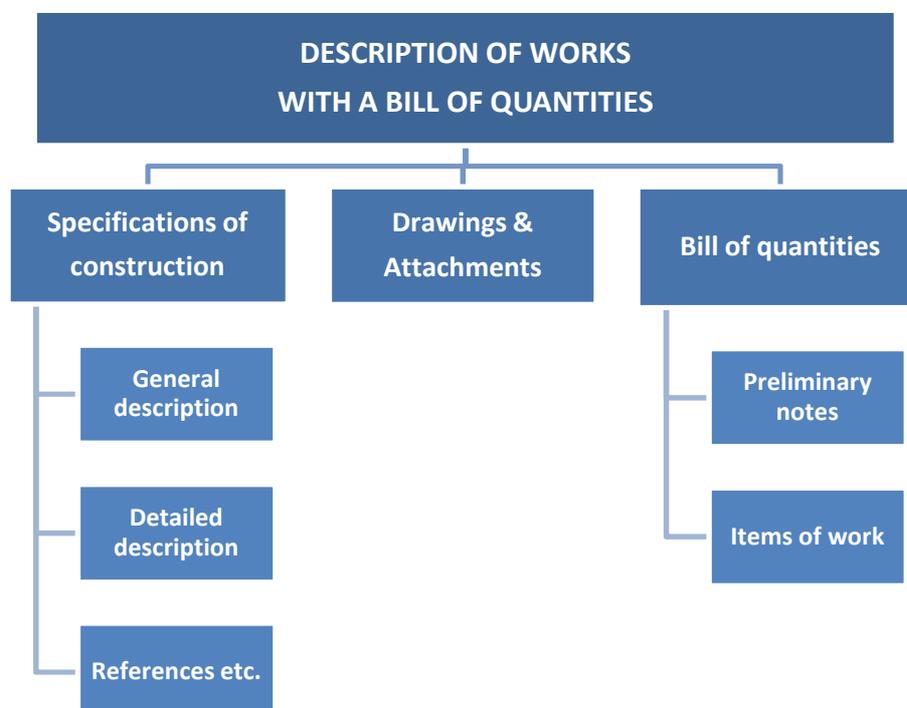


Figure 17: Structure for the German type of description of works with a bill of quantities

⁸³ Compare with: DIN1960. (2006-05). VOB/A - Allgemeine Bestimmungen fuer die Vergabe von Bauleistungen. Berlin.

Specifications of construction

The specifications of the construction are necessary for getting an overview to the project. A description of the project in general (e.g. type of use, extent of construction, description of site,...) is part of the specifications of construction. In addition to the general description, there shall be also given a detailed description of the construction (e.g. type and colour of cladding and roof, type of structure, used materials, drainage of site,...). Possible references to drawings, sketches, codes and/or other regulations are further parts of the specifications of construction.

Drawings & attachments

Drawings and attachments are an important part within the description of the performance of works. The drawings should support the specifications of construction i.e. the given descriptions of construction. Regarding to the bill of quantities, the given amount of quantities should match to the drawings. Attachments could be sundry drawings, specifications, codes or regulations belonging to the project.

Bill of quantities

The basic concept for the bill of quantities is that every part of the construction has to be defined by the amount, quality and the description of work. An exact given amount of quantity is necessary for getting the real overall costs.

Bills of quantities comprise a list of items of work which are briefly described. The bills also provide a measure of the extent of work and this allows the work to be priced. The work included in the item is defined in detail by the rules in the method of measurement. The item descriptions are therefore a shorthand to allow the relevant rules of the method to be identified. The measure may be a single item or number, dimension (linear metre, square metre, cubic metre), time (hours, weeks) or weight.⁸⁴

As a result of that huge amount of defined items, it is required to have a predefined structure to follow. Such an exemplary structure of a German BoQ could be:

⁸⁴ Source: http://www.atkinson-law.com/cases/CasesArticles/Articles/Bills_of_Quantities.htm#FIDIC%201998%20Forms from November 17th, 2009



Figure 18: Exemplary structure of the German type of the bill of quantity

Figure 18 is a standard form of a structure on a construction project in the German construction industry. Common practice for the partition of the subsections is analogous to the structure of the VOB/C. The following itemization is an abstract out of the content of the VOB/C:

- DIN 18299 – General regulations for construction works
- DIN 18300 – Earthwork
- DIN 18301 – Boring work
- DIN 18330 – Masonry
- DIN 18331 – Concrete work
- DIN 18338 – Roofing work

The exact definition of each necessary item of work is the basic idea behind a bill of quantities contract. The content for each item is given as follows (compare with Figure 19):

- Item number
- Quantity
- Description of item (long- & short text)
- Unit price
- Total price

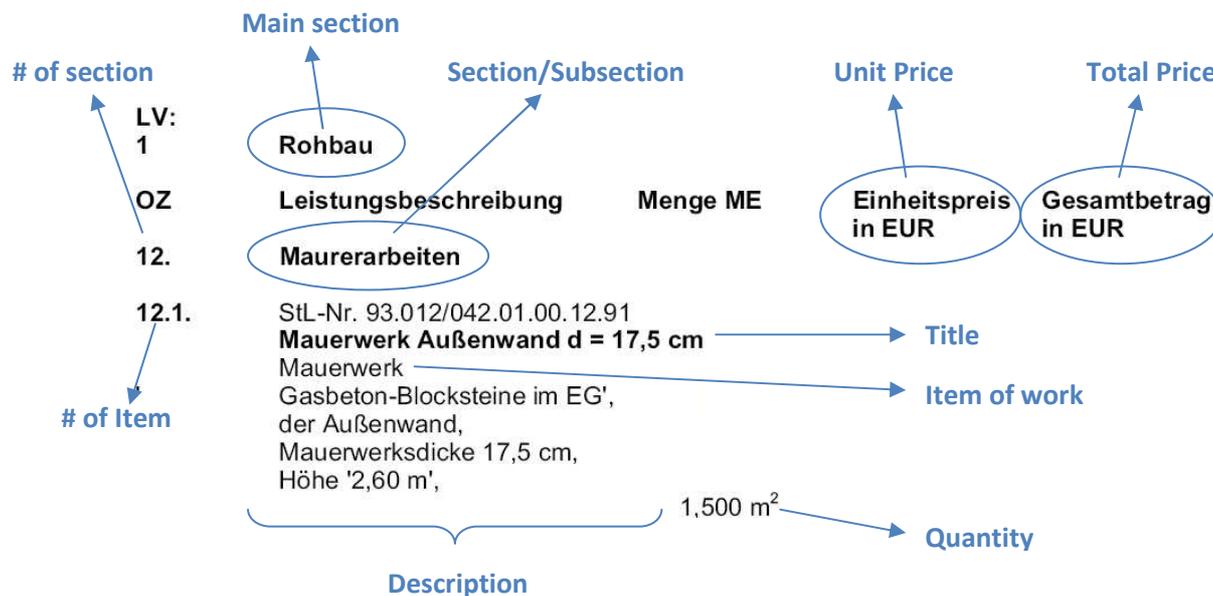


Figure 19: Exemplary illustration of an item of work within a German type of the bill of quantities contract

Regarding to the complexity of such projects, there could be an enormous amount of effort for preparing such bidding documents. Hence, standardised text for the description of the performance of works are used. Such a predefined standardised text will be found in the standard construction service manual (StLB-Bau) which is available as fee-based software. A free of charge demo-version of the StLB-Bau is available under http://www.stlb-bau-online.de/index.php?mid=was_ist_stlbbau⁸⁵

4.2.3 StLB - Standard construction service manual

The standard construction service manual for construction (StLB-Bau) is a database with a big amount of predefined standard texts. There are 77 different types of ranges for performance to choose. Each of this standardise texts will strictly adhere to the German law, regulations, and codes.

How to describe an item of work with the StLB-Bau?

The basic idea behind this software is that each item has to be defined with a maximum of five different standardised texts, taken out of a datapool. Each of the texts describes a different property of the item. Furthermore, it is possible to create an individual item of work.

⁸⁵ Source: http://www.stlb-bau-online.de/index.php?mid=was_ist_stlbbau from November 18th, 2009

The following itemization is a short abstract out of the StLB-Bau's content for the ranges of performance:⁸⁶

- 001 Scaffolding
- 002 Earthwork
- 010 Drainage works
- 012 Masonry
- 013 Concrete work
- 016 Timberwork
- 017 Steelwork
- 021 Roof sealing works
- 022 Plumber's work
- 039 Dry construction work
- 069 Elevator
- 084 Wrecking work

Table 1 is an example form out of the StLB-Bau and should show how to describe an item of work. In this case, there is shown an abstract out of concrete work (#013). First step is to choose an adequate number (item) out of T1 (060, 061, 062,...). Further steps are to take additional items out of T2 (0,1, 2,...), T3,T4 and T5. Everything together describes an individual property of work.

T1	T2	T3	T4	T5	Einh.	Langtext	K-Nr.	Kurztext
						3.2 Aufgehende Bauteile		
						<i>Hinweis:</i>		
						<i>Der Leistungsbeschreibung sind die....</i>		
060						Ortbeton der Wände		Wand
061						——— Schachtwände,		Schachtwand
062						——— Kanalwände,		Kanalwand
.....					
	0							
	1					eine Seitenfläche geneigt, Neigung	21	
	2					beide Seitenflächen geneigt, Neigung	21	
	...							
	0							
	1					Obere Betonfläche geneigt, Neigung	22	
	...							
		1				aus unbewehrtem Beton		Beton
		2				aus Stahlbeton		Stahlbeton
	
		0						
		1				als Normalbeton DIN 1045		

Table 1: Example form how to describe an item of work after StLB-Bau⁸⁷

⁸⁶ Source: <http://www.stlb-bau-online.de/> from November 18th, 2009

4.2.4 Analysis of main issues and enquire problems

Advantages of the quantity description of a German unit rate contract are:

- + Design-phase must not be finished but in an adequate stage
- + Modifications of drawings are afterwards possible
- + Easily price comparison for the employer
- + Change, additional amount of quantity or modification of each item is easy to indicate afterwards (target-performance comparison)
- + Relatively easy structure of the description of works
- + Relatively easy structure of the bill of quantities
- + Easy preparation of the bill of quantities with the *StLB-Bau*
- + Data transfer to other software possible
- + An exact description of each item of work possible
- + Everything will be described in the BoQ, additional references to drawings and/or specifications are possible but not common

Disadvantages of the quantity description of a German unit rate contract are:

- All kind of the amount and quality of each item of work has to be defined prior
- Big increase of the overall cost possible (increase of quantities, claims)
- Additional claims of contractor are possible and common
- Regarding to the exactly description of each item -> less flexibility for contractor, higher tender price possible

⁸⁷ Source: Bubenik, A. (2003). Script Construction Economics. University of Applied Sciences Darmstadt.

4.3 UK/ International

4.3.1 Introduction

As stated in chapter 3.2.11, the British and the International construction industry differ between price-based and cost-based contracts. Such price-based contracts are either unit rate contracts or lump sum contracts (Figure 11). The focus in this chapter is laid on a unit rates contract with a bill of quantities. The structure for a description of works with a bill of quantities is not similar to those in Germany. A description of the British and the International structure will be given in the following subchapters.

4.3.2 Quantity description

As described in chapter 4.2.2, the description of works with a bill of quantities in the German construction industry is divided into the specifications of construction, the drawings & attachments and the bill of quantities. In the British & International construction industry, the description of work with a bill of quantities will be primary done by the BoQ (Bill of Quantities) and additional drawings (Figure 20). In contrast to the German structure, the BoQ itself assumes all duties and responsibilities of the German description of works.

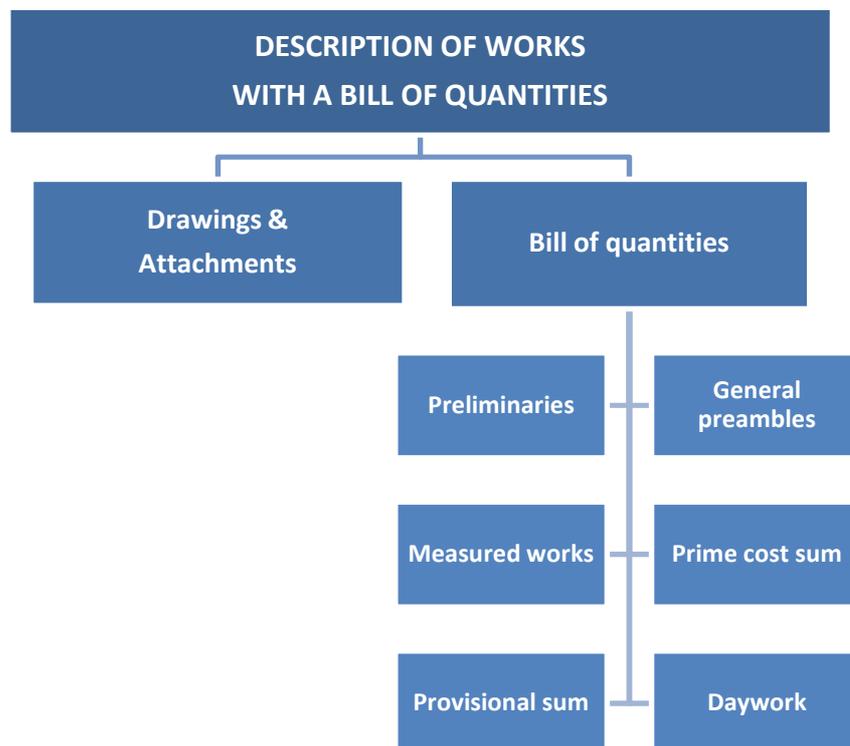


Figure 20: Structure for the British/International type of the description of works with a bill of quantities⁸⁸

⁸⁸ See also: Hok, G. S. (2005). Handbuch des internationalen und auslandischen Baurechts. Berlin: Springer, P.149.

Preliminaries

The Preliminaries are dealing with general descriptions of the project and are comparable with the German specifications for construction. In addition to those general descriptions, there could also be items of work (which belong to the whole construction) integrated in this document (e.g. site installation).

General preambles

The main issue within the general preambles is the definition of quality for used material and the finished construction. Those quality requirements could be defined by references to regulations and codes or by the technical specifications. Basically, the general preambles are comparable with the German general technical specifications and the additional technical specifications. For large constructions, those specifications will be described in a separate document (which will be named as “specifications”)

Measured works

The document measured works is the central document of the bill of quantities. The measured works is structured into sections, parts and items with a given description about quality and quantity and is comparable with the German bill of quantities. For the preparation of this document, the SMM7 (*Standard Method of Measurement of Building Works, 7th Edition*) or the CESMM3 (*Civil Engineering Standard Method of Measurement, 3rd Edition*) will be commonly used.

Prime cost sum

The prime cost sum is an additional cost of several nominated subcontractors plus a charge for main contractor (management fee).

Provisional sum

A provisional sum is an amount of money (=additional cost) additional to the overall cost for miscellaneous works.

Daywork

The costs for daywork are similar to those of the provisional sum. It is an additional amount of money for unforeseen and not included work.

4.3.3 SMM7 - Standard Method of Measurement of Building Works, 7th Edition

In the British construction industry, there are mainly two different standard methods of measurement. On the one hand, there is the SMM7 (*Standard Method of Measurement of Building Works, 7th Edition*) which is used for building works. The JCT-contracts refer to this document. On the other hand, there is the CESMM3 (*Civil Engineering Standard Method of Measurement, 3rd Edition*) which is used for civil engineering works. The ICE-contracts refer to the CESMM3. The SMM7 is a document for the procedure for measurement of building works and is provided by the *Royal Institution of Chartered Sur-*

veyors and the *Building Employers Confederation*. The standard method of measurement is actually in the 7th edition and was first published in 1922.

The SMM7 consists of two different documents, the *Standard Method of Measurement of Building Works* itself and the *Measurement Code*.

The SMM7 is divided into three parts: ⁸⁹

- General rules
- Tabulated rules
- Additional rules (work to existing buildings)

The general rules are advice on application of the SMM7. The tabulated rules are the center document of the SMM7; it is comparable with (but not similar to) the German StLB-Bau.

For clarification: Both documents (SMM7, CESMM3) are not the BoQ itself, they are just a guideline how to prepare the BoQ.

How to describe an item of work with the SMM7?

Within the tabulated rules, there is to choose between 22 workgroups: ⁹⁰

- A Preliminaries/ General Conditions
- B Existing site/ Buildings/ Services
- D Groundwork
- E In situ concrete/ Large precast concrete
- F Masonry
- G Structural/ Carcassing metal/ Timber
- H Cladding/ Covering
- J Waterproofing
- K Linings/ Sheathing/ Dry partitioning
- L Windows/ Doors/Stairs
- M Surface finishes
- N Furniture/ Equipment
- P Building fabric sundries
- Q Paving/ Planting/ Fencing/ Site furniture
- R Disposal systems
- S Piped supply systems
- T Mechanical heating/ Cooling/ Refrigeration systems
- U Ventilation/ Air conditioning systems

⁸⁹ Compare with: Hök, G. S. (2005). *Handbuch des internationalen und ausländischen Baurechts*. Berlin: Springer, P.150.

⁹⁰ Source: The Royal Institution of Chartered Surveyors. (1988). *SMM7 - Standard Method of Measurement of Building Works. Seventh Edition*.

V	Electrical supply/ Power/ Lightning systems
W	Communications/ Security/ Control systems
X	Transport systems
Y	Mechanical and electrical services measurement

Each workgroup is divided further into work-sections. For example, the work-sections of group E (In situ concrete/Large precast concrete) are listed:

E10	In-situ-concrete
E11	Gun applied concrete
E20	Formwork for in-situ-concrete
E30	Reinforcement for in-situ-concrete
E31	Post tensioned reinforcement for in-situ-concrete
E40	Designed joints in in-situ-concrete
E41	Worked finishes/ Cutting to in-situ-concrete
E42	Accessories cast into in-situ-concrete
E50	Precast concrete large units
E60	Precast/ Composite concrete decking

Each work-section is divided into three main parts:

- Part A - Information provided
- Part B - Classification table
- Part C - Supplementary rules

Table 2 is an abstract out of the SMM7 and should give a rough overview of the structure of this document. Highlighted are the three main parts (Information provided, Classification table, Supplementary rules).

A readable version of this abstract will be found in the Appendix.

E In situ concrete/Large precast concrete

E10 In situ concrete

INFORMATION PROVIDED		MEASUREMENT RULES	DEFINITION RULES	COVERAGE RULES	SUPPLEMENTARY INFORMATION
P1. The following information is shown either on location drawings under A Preliminaries/General conditions or on further drawings which accompany the bills of quantities: (a) the relative positions of concrete members (b) the size of members (c) the thickness of slabs (d) the permissible loads in relation to casting times		M1. Concrete volume is measured net except that deductions are not made for the following: (a) reinforcement (b) steel sections of area $\leq 0.50 \text{ m}^2$ (c) cast in accessories (d) voids $\leq 0.05 \text{ m}^3$ in volume (except voids in troughed and coffered slabs)	C1	C2	S1. Kind and quality of materials and mix details S2. Tests of materials and finished work S3. Measures to achieve watertightness S4. Limitations on method, sequence, speed or size of pouring S5. Methods of compaction and curing
CLASSIFICATION TABLE		M2. The thickness range stated in descriptions excludes projections and recesses M3. The thickness range stated of coffered and troughed slabs is measured overall			D1. Foundations include attached column bases and attached pile caps D2. Isolated foundations include isolated column bases, isolated pile caps and machine bases D3. Beds include: (a) blinding beds (b) pinnings (c) thickenings of beds D4. Slabs include: (a) attached beams and beam casings whose depth is \leq three times their width (depth measured below the slab) (b) column drop heads D5. Coffered and troughed slabs include margins whose width is $\leq 500 \text{ mm}$. Wider margins are included with ordinary slabs D6. Walls include attached columns and piers
1 Foundations 2 Ground beams 3 Isolated foundations 4 Beds 5 Slabs 6 Coffered and troughed slabs 7 Walls 8 Filling hollow walls 9 Beams 10 Beam casings	1 Thickness $\leq 150 \text{ mm}$ 2 Thickness $150 - 450 \text{ mm}$ 3 Thickness $> 450 \text{ mm}$ 1 Isolated 2 Isolated deep 3 Attached deep	m ³ 1 Reinforced 2 Reinforced $> 5\%$ 3 Sloping $\leq 15^\circ$ 4 Sloping $> 15^\circ$ 5 Poured on or against earth or unblinded hardcore 1 Reinforced 2 Reinforced $> 5\%$	B	C1 C2	
Classification table					

Table 2: Overview to a work section (E10) of the SMM7 ⁹¹

Information provided

The given information which will be listed in this part, contains necessary briefings (e.g. with regard to design) belonging to the general part of the work-section. For example, the thickness of a concrete-slab can be defined. (Table 2, # P1-c: the thickness of slabs).

Classification table

The classification table is the main part of the description of each item and consists five different columns. Step one is to choose an item out of the leftmost column. Further properties of the chosen item have to be added out of the columns 2, 3 & 5. All properties are given numbers, all together creating a code. (compare with Figure 21).

There has to be taken a 0 (zero), if no property matches to the item. More than one properties each column are possible, it has to be filled in *.

The code is just a cross reference within the SMM7, it is not a reference from the BoQ to the SMM7 or backwards. Furthermore, it gives just a description of what kinds of item are used, it does not describe those items.

⁹¹ Source: The Royal Institution of Chartered Surveyors. (1988). SMM7 - Standard Method of Measurement of Building Works. *Seventh Edition*, P.43.

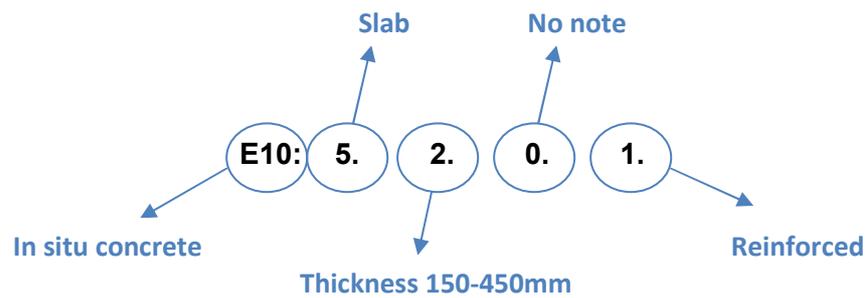


Figure 21: Description of an exemplary code of work section within the SMM7⁹²

Supplementary rules

All the given information which will be listed are complementary regulations to the work-section. The supplementary rules are divided into four parts (columns) with two different sections (C_1 , C_2). Those parts are:

- Measurement rules
- Definition rules
- Coverage rules
- Supplementary information

All the information within section C_1 is additional to the *Information provided* and belongs to the whole work section. The given information of C_2 belongs to each particular counterpart in the *Classification table*. The *Definition rules* deal with the general description of the terms and concepts, the *Coverage rules* with fringe benefits (i.e. work which would not be explicit written down), and the *Supplementary information* are additional briefings to the classification table.

⁹² Compare with Appendix

4.3.4 Analysis of main issues and enquire problems

Advantages of the quantity description of a British/ International unit rate contract are:

- + Design-phase must not be finished but in an adequate stage
- + Modifications of drawings are afterwards possible
- + Easily price comparison for the employer
- + The change of additional amount of quantity or the modification of each item is easy to indicate afterwards (target-performance comparison)
- + SMM7 (CESMM3) is just a guideline or checklist; high flexibility of the BoQ
- + Easy structured bill of quantities
- + An exactly description of each item of works possible but unusual

Disadvantages of the quantity description of a British/ International unit rate contract are:

- All kind of the amount and quality of each item of work has to be defined prior
- Additional work for the preparing of the BoQ, SMM7 (CESMM3) is just a guideline
- Additional claims of contractor possible but not usual -> claims get covered by the *Provisional sum & Daywork*
- SMM7 and CESMM3 are guidelines or checklists and not standard forms for the BoQ
- SMM7/CESMM3: in-note-form description of items; flexibility for the preparation of BoQ
- Regarding to the exactly description of each item -> flexibility for contractor possible
- Big amount of references to drawings and/or specifications possible and usual

4.4 Outcome and presentation of results

The following conclusive enumeration should give an overview of the main differences between the StLB-Bau and the SMM7. Focus is laid on the comparison of specific items between both contracts.

	Germany (StLB-Bau)	UK/ International (SMM7)
general comparison	extensive description of items with the StLB-Bau	in-note-form description of items with the SMM7 (or CESMM3)
	precise description of items	imprecise description of items
	77 different ranges of performance are available	22 different ranges of performance are available
	the given code-number shows an explicit description of the items and what kind of items are used	the given code-number is a cross reference within the SMM7; it is a description what kind of items are used, it does not describe the items
	StLB-Bau is a guideline and a standard form for the BoQ	SMM7 is a checklist and not a standard form for the BoQ
	Public employer: computer-aided software for the BoQ not essential	Public employer: non computer-aided software for the BoQ possible
	easy preparation of the BoQ with the computer-aided-software	additional work for the preparation of the BoQ - SMM7 is just a checklist

Table 3: General comparison of the StLB-Bau and the SMM7

	Germany (StLB-Bau)	UK/ International (SMM7)
comparison of selected choices	references to drawings and/or specifications are possible but not usual	big amount of references to drawings and/or specifications are possible and usual
	the BoQ itself is without drawings, attachments and specifications of construction	the BoQ itself includes the specifications of construction
	the description of work with a BoQ will be structured into the Bill of quantities, the specifications of construction and the drawings & attachments	the description of work with a BoQ will be structured into the Bill of quantities and the drawings and attachments
	claims are common	claims are not common, the <i>Provisional sum</i> and <i>daywork</i> should cover those claims
	the amount of costs for unforeseen risks will be included in each individual item of work	a global amount of costs for unforeseen risks will be added in the <i>Provisional sum</i>
	the general technical specifications and the additional technical specifications are separate documents to the BoQ	the general technical specifications and the additional technical specifications are usually listed within the <i>General Preambles</i> of the BoQ
	an exact description of each item of work is possible and usual	an exact description of each item of work is possible but not usual
	additional costs of subcontractors could be charged as a lump sum in a separately item or allocated to the individual items	additional costs of several nominated subcontractors plus a charge for the main contractor will be listed in the <i>Prime cost sum</i>
	general quality requirements are defined in the <i>Preliminary notes</i> ; quality requirements in detail are listed up in each item of work	quality requirements belonging to material and finishing are listed up in the <i>General Preambles</i> of each item

Table 4: Selected comparison of the StLB-Bau and the SMM7

5 CASE STUDY

In the last chapters, focus was laid on the theoretical description of construction contracts. This case study marks the practical part of this master's thesis. A construction contract of an industrial project in Eastern Europe is described, analysed and evaluated. It starts with a general description about the contract and the content. A further analysis and evaluation of the clauses will be followed. The contractual strengths and weaknesses will be discussed.

5.1 The contract

5.1.1 General information

It is a civil works contract of a thermal power plant pollution abatement project in Romania. The contractual agreement is a two-party-partnership and was signed in 2008. The type of contract is a consortium contract between an accredited supplier of pollution abatement systems and an internationally active construction company. It is a 16 pages contract, written in German. For further analysis, the supplier for pollution abatement systems will be named as partner 1, the internationally active construction company as partner 2.

5.1.2 Contract's content

The contract is structured into four parts:

- Title page
- Table of content
- Clauses
- Signatures

As usual in each contract, the headline of the contract (=definition of contract) and the two contractual parties with their registered business address are specified on the first page, followed by the table of content on the second. There are 27 clauses listed and explained on 14 pages. The contract is complete with the signatures.

Following 27 clauses are listed in the contract's content:

- | | |
|-----------------------------------|---------------------------|
| 1) <i>Vertragsgegenstand</i> | (Subject of the contract) |
| 2) <i>Leistungsaufteilung</i> | (Partition of services) |
| 3) <i>Arbeitszeitplan</i> | (Time schedule) |
| 4) <i>Technische Planung</i> | (Engineering) |
| 5) <i>Konsortialbesprechungen</i> | (Consortium meetings) |
| 6) <i>Federführung</i> | (Chairmanship) |
| 7) <i>Federführungsgebühr</i> | (Fee for chairmanship) |
| 8) <i>Vertragsverhandlungen</i> | (Contract negotiations) |

9) <i>Nachträgliche Änderungen</i>	(Change of order)
10) <i>Pflichten der Partner</i>	(The partner's duties)
11) <i>Informationspflicht</i>	(Reporting requirements)
12) <i>Exklusivität</i>	(Exclusiveness)
13) <i>Zulieferung bzw. Untervergabe</i>	(Subcontracting)
14) <i>Kosten</i>	(Expenses)
15) <i>Fakturierung, Sicherheiten</i>	(Billings & Bonds)
16) <i>Geheimhaltung</i>	(Confidentiality)
17) <i>Veröffentlichungen</i>	(Publication)
18) <i>Haftung gegenüber dem Auftraggeber</i>	(Liability to employer)
19) <i>Haftung der Partner untereinander</i>	(Liability between partners)
20) <i>Pönale</i>	(Penalties)
21) <i>Versicherung</i>	(Insurance)
22) <i>Dauer des Konsortiums</i>	(Duration of contract)
23) <i>Schiedsgericht/ Anwendbares Recht</i>	(Arbitration)
24) <i>Vertragssprache</i>	(Contractual language)
25) <i>Teilunwirksamkeit</i>	(Partial invalidity)
26) <i>Vertragsausfertigungen/ Allgemeines</i>	(General information)
27) <i>Beilagen</i>	(Attachments)

Clause 1 describes the subject of the contract. The project describes the employer and the obligation of both parties to fulfil all contractual clauses. The partition of services between both parties is defined in **clause 2**. Focus is laid on reimbursement for additional services. **Clause 3** deals with the management of time, a time schedule with the definition of essential terms and deadlines are found in attachment six. **Clause 4** deals with engineering. Each party has to prepare necessary documents (e.g. drawings, calculations) for the performance of work. The sequence for meetings in the consortium is defined in **clause 5**. Such meetings have to be every half a year. **Clause 6** defines the party which is responsible for the chairmanship in the consortium; it will be performed by partner 1. Main functions are the representation of the consortium, contract negotiations with the employer (**clause 8**) and the organisation of internal business. Fees for the performance of chairmanship will be paid by partner 1 (**clause 7**). An employer's change of order has to be accepted by both parties (**clause 9**). **Clause 10** deals with the partner's duties to the contractual agreement. Both parties have to work together (**clause 12**) and to support each other. A transfer of contractual duties to a third party has to be accepted by the partner (clause 10). **Clause 11** is named "*Informationspflicht*", that means reporting requirements for a party. Necessary information has to be reported to the other partner immediately. Focus is laid on reports before and after delays. **Clause 13** deals with subcontracting, the

transfer of all services to a subcontractor has to be accepted by both parties. Additional expenses for a partner and a possible partition of costs to both parties are regulated in **clause 14**. Contractual agreements regarding to billings and bonds are within **clause 15**. Specified is the transfer of money in the consortium. Received money has to be transferred from partner 1 to partner 2 immediately (<5 workdays). Partner 2 has the eligibility to stop work after a delay of 10 workdays. A maximum amount of money per annum is defined, a payment schedule has to be specified additional to this contract. The essential bonds for this contractual agreement are listed. Contractual agreements regarding to confidentiality and the publication of internal information will be found in **clauses 16 & 17**. The **clauses 18 & 19** are dealing with liability. There is to differ between a liability of the consortium to the employer and internal liability of the partners, a strict separation of the liability between the partners is defined. The liability is not separated, if both parties are involved in a liability claim. Each partner is responsible for his delays and penalties which are specified in **clause 20**. Contractual agreements belonging to insurances will be found in **clause 21**, a third party insurance for each partner is essential. The duration of the contract is defined in **clause 22**. In **clause 23**, Vienna is defined as the location for arbitration, the contractual language is defined in English and German (**clause 24**). The **clauses 25 & 26** are dealing with partial invalidity of the contract clauses (clause 25) and general information to the contract (clause 26). Such general information is that all agreements have to be written down. Finally, six attachments are listed in **clause 27**.

5.2 Analysis and evaluation

The described consortium contract is comparable with the VOB. There is a clear analogical structure of clauses between the VOB and the analysed contract. Four clauses (§6, §12, §13, §15) of the VOB/B are not covered by the contract:

VOB/B - §1	→	Attachment 1+2
VOB/B - §2	→	Clause 2
VOB/B - §3	→	Clause 4
VOB/B - §4	→	Clause 10
VOB/B - §5	→	Clauses 3+22
VOB/B - §7	→	Clause 2 + Attachment 2
VOB/B - §8	→	Clause 22
VOB/B - §9	→	Clause 22
VOB/B - §10	→	Clauses 18+19
VOB/B - §11	→	Clause 22
VOB/B - §14	→	Clause 15
VOB/B - §16	→	Clause 15
VOB/B - §17	→	Clause 15

VOB/B - §18 → Clause 23

Strengths of the consortium contract

- Clear structured contract, comparable with the VOB/B.
- Individual contract with additional specifications (Clauses: 1, 5-9, 11-13, 16, 17, 24, 25).
- Strict separation of the partner's duties (liability, penalty, guarantee).
- Clause 10: Transfer of contractual duties to a third party has to be accepted by both parties.
- Clause 13: Transfer of all services to a subcontractor has to be accepted by both parties.
- Clause 15: Clear specification in case of insolvency of a party.
- Clause 15: The parent company of partner 2 has to serve an additional bond.
- Clause 18: Liability to a third person is not separated, if both parties are involved in a liability claim.
- Clause 18: In case of claims against the consortium, both partners have to act jointly.
- Clause 18: Each partner is responsible for his (and his subcontractors) delays and penalties.
- Clause 19, last paragraph: Partition of the payment of compensation.
- Clause 26: Clear definition that all contractual specifications have to be written down.

Weaknesses of the consortium contract

- Missing specifications in case of interruption of work.
- Shallow specifications in case of delay.
- Missing specifications of the termination of contract.
- Clause 14, second paragraph: shallow definition, potential for disputes.

6 CONCLUSION

There are three important international civil works contracts for the construction industry available, the German VOB (German regulations for construction contracts and execution of construction works), the British JCT98 (*Standard form of building contract 1998 edition*) and the FIDIC, an internationally used standard form. The VOB is mostly used in the regions of middle Europe, the JCT98 in the regions of the UK/Anglo-American and the FIDIC for international construction projects. The main differences of the three standard forms of contracts are in the structure itself, in the provided scope of services and in the types of reimbursement.

The unit rate contract, central part of the VOB and the JCT98, is one of the ones most used in practice. There is a different way how to describe such a unit in Germany and in the UK. In Germany, the description of an item of building work will be usually done with the StLB-Bau (Standard construction service manual for construction). In the UK, there will be commonly used the SMM7 (*Standard Method of Measurement of Building Works, 7th Edition*). The major differences are in the exactness of the description of each item, the handling of claims, and the involvement for unforeseen risks. In general, the StLB-Bau is a guideline, the SMM7 is a checklist.

The current situation of international construction projects is that the use of the FIDIC-contracts is common standard. All projects with an involvement of the World Bank and/or companies and ventures from different countries with different languages will be operated by the FIDIC regulations. The World Bank as the largest global investor in the construction industry recommends the use of FIDIC contracts, they are part of their standard contracts. As a result of the internationalisation of construction markets, the key-factor for future construction projects will be the successful application of the FIDIC-regulations with English as the contractual language.

7 ABBREVIATIONS

AFNOR	Association Française de Normalization, France
AIA	Application Integration Architecture, USA
BGB	„Bürgerliches Gesetzbuch“ (German code of civil law)
BOT	Build-Operate Transfer
BOL	Build-Operate-Lease
BOO	Build-Own-Operate
BOOT	Build-Own-Operate-Transfer
BoQ	Bill of Quantities
BVB	„Besondere Vertragsbedingungen“ (Specific conditions of contract)
CESMM3	Civil Engineering Standard Method of Measurement, 3 rd Edition
CM	Construction Management
CPF	Cost-plus-fee-contract
DAB	Dispute Adjudication Board
DBFO	Design-Build-Finance-Operate
DBOM	Design-Build-Operate-Maintain
DIN	„Deutsches Institut für Normung“ (German Institute for Standardization)
e.g.	For example (Latin: „exempli gratia“)
ECC	Engineering and construction contract
EIC	European International Contractors
EU-15	Countries within the European Union till April 30 th , 2004
EU-25	Countries within the European Union till December 31 st , 2006
EU-27	Countries within the European Union by December 31 st , 2009
Eurostat	Official agency for European statistical information
FIDIC	Fédération Internationale des Ingénieurs-Conseils (International Federation of Consulting Engineers)
FIEC	Fédération de l'Industrie Européenne de la Construction (European construction industry federation)
GDP	Gross Domestic Product

GMCPF	Guaranteed maximum cost-plus-fee-contract
GPPC	Guidance for the Preparation of the Particular Conditions
i.e.	That is (Latin: „id est“)
ICE	Institution of civil engineers
JCT	Joint Contract Tribunal
JCT 98	Standard form of building contract 1998 edition
JCT 05	Standard form of building contract 2005 edition
JCT-AQ	JCT Standard form of building contract with approximate Quantities
JCT-Q	JCT Standard form of building contract with Quantities
JCT-WQ	JCT Standard form of building contract without Quantities
MC	Management Contract
NEC	New engineering contract
PPP	Private-Public-Partnership
RIBA	Royal Institute of British Architects
SBC 2005	Standard Building Contract, edition 2005; also named JCT 05
SIA	Semiconductor Industry Association, Switzerland
SMM7	Standard Method of Measurement, 7 th Edition
StLB-Bau	„Standard-Leistungs-Buch für das Bauwesen“ (Standard construction service manual)
TOC	Taking-Over-Certificate
vs.	versus
VOB	„Vergabe und Vertragsordnung für Bauleistungen“ (German regulations for contracts and execution of construction works)
UK	United Kingdom
US	United States
ZTV	„Zusätzliche technische Vertragsbedingungen“ (Additional technical specifications of contract)
ZVB	„Zusätzliche Vertragsbedingungen“ (Additional conditions of contract)

8 LIST OF FIGURES AND TABLES

8.1 Figures

Figure 1: Total turnover in the construction industry in the EU-25 in 2007 per country ..	2-5
Figure 2: Total turnover in the construction industry in the EU-25 in 2007 per inhabitant	2-6
Figure 3: Total turnover in the construction industry proportional to the GPD in 2007	2-7
Figure 4: Annual incoming orders from abroad for the German construction industry 1999-2007	2-9
Figure 5: Annual incoming orders from abroad for the German construction industry in 1990-2007, divided into different regions	2-10
Figure 6: Annual incoming orders from abroad for the German construction industry in 2004-2007, divided into different regions	2-11
Figure 7: Procedure for choosing the right section of VOB-Part A	3-15
Figure 8: Structure of reimbursement in the German construction industry	3-29
Figure 9: The JCT98 family of forms	3-33
Figure 10: Order lettings for public employers in the British construction Industry	3-38
Figure 11: Structure of reimbursement for British and international projects	3-45
Figure 12: Layout FIDIC-contracts, new series 1999.....	3-48
Figure 13: Relationship employer-engineer-contractor.....	3-54
Figure 14: Summary of the VOB-, JCT- & FIDIC-contract	3-59
Figure 15: Comparison of the VOB-, JCT- & FIDIC-contract	3-60
Figure 16: Essential documents for a German construction contract.....	4-61
Figure 17: Structure for the German type of description of works with a bill of quantities .	4-62
Figure 18: Exemplary structure of the German type of the bill of quantity.....	4-64
Figure 19: Exemplary illustration of an item of work within a German type of the bill of quantities contract.....	4-65
Figure 20: Structure for the British/International type of the description of works with a bill of quantities	4-68
Figure 21: Description of an exemplary code of work section within the SMM7.....	4-73

8.2 Tables

Table 1: Example form how to describe an item of work	4-66
Table 2: Overview to a work section of the SMM7	4-72
Table 3: Comparison of the StLB-Bau and the SMM7 in general	4-75
Table 4: Comparison of the StLB-Bau and the SMM7 of selected choices.....	4-76

9 BIBLIOGRAPHY

BOOKLETS

- [A01] FIDIC. (2007). FIDIC Statutes and BY-Laws. Geneva.
- [A02] Hogan&Hartson. (2008). The Construction Contract Procedures Part B (VOB/B) in German and English languages.
- [A03] ICE - Institution of Civil Engineers. (1996). Infofolder ICE. London
- [A04] EUROSTAT . (2008). Population in Europe 2007: First results.

http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-08-081/EN/KS-SF-08-081-EN.PDF

- [A05] Bubenik, A. (2003). Script Construction Economics. University of Applied Sciences Darmstadt.

CODES

- [B01] DIN1960. (2006-05). VOB/A - Allgemeine Bestimmungen fuer die Vergabe von Bauleistungen. Berlin.
- [B02] DIN1961. (2006-10). VOB/B - Allgemeine Vertragsbestimmungen für die Ausführung von Bauleistungen. Berlin.
- [B03] FIDIC. (1999). Construction Contract (1999 Red Book). First edition. Geneva.
- [B04] JCT – Joint Contract Tribunal. (1998) JCT Standard Form of Building Contract. 1998 edition.London
- [B05] The Royal Institution of Chartered Surveyors. (1988). SMM7 - Standard Method of Measurement of Building Works. Seventh edition.

BOOKS**German lectures:**

- [C01] Leimböck, E., & Iding, A. (2005). Bauwirtschaft - Grundlagen und Methoden. (2. Auflage) . Wiesbaden: Teubner Verlag.
- [C02] Kulick, R. (2003). Auslandsbau - Internationales Bauen innerhalb und ausserhalb Deutschlands. Wiesbaden: Teubner Verlag.
- [C03] Pohl, R., Keil, W., & Schumann, U. (2001). Rechts- und Versicherungsfragen im Baubetrieb. (3. Auflage) . Düsseldorf: Werner Verlag.
- [C04] Prange, H., Leimböck, E., & Klaus, U. R. (1995). Baukalkulation unter Berücksichtigung der KLR Bau und der VOB. (9. Auflage) . Wiesbaden-Berlin: Bauverlag.
- [C05] Hök, G. S. (2005). Handbuch des internationalen und ausländischen Baurechts. Berlin: Springer.

English lectures:

- [C06] FIDIC. (2000). The FIDIC Contracts Guide. (First edition) . Geneva: FIDIC.
- [C07] Totterdill, B. W. (2006). FIDIC users' guide - A practical guide to the 1999 red and yellow books. London: Thomas Telford
- [C08] Keith, C. (2001). Construction Contracts. Third edition. New Jersey: Prentice-Hall
- [C09] Ndekugri, I., & Rycroft, M. (2009). The JCT 05 Standard Building Contract. Second edition. London: Elsevier. .
- [C10] Speaight, A., & Stone, G. (2004). Architect's Legal Handbook - The Law for Architects. Eighth edition. Amsterdam: Elsevier.
- [C11] Marsh, P. (2000). Contracting for Engineering and Construction Projects. Fifth edition. Burlington: Gower.

INTERNET

- [D01] <http://www.bauindustrie.de>
- [D02] <http://www.eicontractors.de>
- [D03] <http://www.vob-online.de>
- [D04] <http://www.hochtief.de>
- [D05] <http://www.bilfingerberger.de>
- [D06] <http://www.hochtief-pppsolutions.de>
- [D07] <http://www.porr-solutions.com>
- [D08] <http://www.strabag.com>
- [D09] <http://www.asfinag.at>
- [D10] <http://www.worldbank.org>
- [D11] <http://www1.fidic.org>
- [D12] <http://www.fiec.org/>
- [D13] <http://www.bauindustrie.de>
- [D14] <http://www.hhlaw.com>
- [D15] <http://www.ictltd.co.uk>
- [D16] <http://www.ice.org.uk>
- [D17] <http://www.neccontract.com>
- [D18] <http://epp.eurostat.ec.europa.eu>
- [D19] <http://www.atkinson-law.com>
- [D20] <http://www.stlb-bau-online.de>

APPENDIX

E In situ concrete/Large precast concrete

E10 In situ concrete

INFORMATION PROVIDED		MEASUREMENT RULES	DEFINITION RULES	COVERAGE RULES	SUPPLEMENTARY INFORMATION
<p>P1 The following information is shown either on location drawings under A Preliminaries/General conditions or on further drawings which accompany the bills of quantities:</p> <ol style="list-style-type: none"> the relative positions of concrete members the size of members the thickness of slabs the permissible loads in relation to casting times 		<p>M1 Concrete volume is measured net except that deductions are not made for the following:</p> <ol style="list-style-type: none"> reinforcement steel sections of area $\leq 0.50 \text{ m}^2$ cast in accessories voids $\leq 0.05 \text{ m}^3$ in volume (except voids in troughed and coffered slabs) 		<p>C1 Concrete is deemed to include finishing as struck from basic finish formwork or with a non-mechanical tamped finish unless otherwise required under worked finishes</p>	<p>S1 Kind and quality of materials and mix details S2 Tests of materials and finished work S3 Measures to achieve watertightness S4 Limitations on method, sequence, speed or size of pouring S5 Methods of compaction and curing S6 Requirement for beds to be laid in bays</p>
CLASSIFICATION TABLE					
1 Foundations					
2 Ground beams					
3 Isolated foundations					
4 Beds					
5 Slabs					
6 Coffered and troughed slabs					
7 Walls					
8 Filling hollow walls					
9 Beams					
10 Beam casings					
		<p>1 Reinforced 2 Reinforced > 5% 3 Sloping $\leq 15^\circ$ 4 Sloping > 15° 5 Poured on or against earth or unblinded hardcore</p>	<p>M2 The thickness range stated in descriptions excludes projections and recesses M3 The thickness range stated of coffered and troughed slabs is measured overall</p>	<p>D1 Foundations include attached column bases and attached pile caps D2 Isolated foundations include isolated column bases, isolated pile caps and machine bases D3 Beds include: (a) blinding beds (b) plinths (c) thickenings of beds D4 Slabs include: (a) attached beams and beam casings whose depth is \leq three times their width (depth measured below the slab) (b) column drop heads D5 Coffered and troughed slabs include margins whose width is $\leq 500\text{mm}$. Wider margins are included with ordinary slabs D6 Walls include attached columns and piers</p>	
		<p>1 Reinforced 2 Reinforced > 5%</p>			

