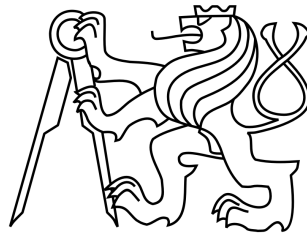


**CZECH TECHNICAL UNIVERSITY  
IN PRAGUE  
FAKULTY OF CIVIL ENGINEERING  
Department of Technology**



**MASTER THESIS**

**Comparison of Requirements for  
Occupational Health and Safety on the  
Construction site for the Czech Republic and  
Norway**

**Tomáš Zahradník**

**2017**

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## ZADÁNÍ DIPLOMOVÉ PRÁCE

### I. OSOBNÍ A STUDIJNÍ ÚDAJE

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### II. ÚDAJE K DIPLOMOVÉ PRÁCI

Název diplomové práce: Porovnání požadavků na bezpečnost a ochranu zdraví při práci na stavbách v České Republice a Norsku

Název diplomové práce anglicky: Comparison of Requirements for Occupational Health and Safety on the Construction site for the Czech Republic and Norway

Pokyny pro vypracování:

Cílem práce je analýza rozdílných požadavků na bezpečnost a ochranu zdraví při práci na stavbách. Porovnání požadavků ze stavebních norem a způsob předpisu jejich dodržování ve stavebních zákonech. Pro vypracování analýzy bude nutné důkladné prostudování legislativních systémů obou zemí pro obor stavitelství a vysvětlení jejich rozdílnosti a vlivu na realizaci staveb. Účelem této diplomové práce bude snaha o nalezení nových řešení pro bezpečnost a ochranu zdraví při práci na stavbách a posouzení jejich přínosu pro český systém stavitelství. Porovnání toho, jak se dodržují požadavky na bezpečnostní opatření a způsob jakým se může jejich nedodržování trestat.

Seznam doporučené literatury:

Zákon č. 183/2006 Sb. Zákon o územním plánování a stavebním řádu (stavební zákon)

Zákon č. 309/2006 Sb. Zákon, kterým se upravují další požadavky bezpečnosti a ochrany zdraví při práci v pracovněprávních vztazích a o zajištění bezpečnosti a ochrany zdraví při činnosti nebo poskytování služeb mimo pracovněprávní vztahy (zákon o zajištění dalších podmínek bezpečnosti a ochrany zdraví při práci)

Nařízení vlády č. 591/2006 Sb. Nařízení vlády o bližších minimálních požadavcích na bezpečnost a ochranu zdraví při práci na staveništích

Jméno vedoucího diplomové práce: Doc. Ing. Pavel Svoboda, CSc.

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*Údaj uveďte v souladu s datem v časovém plánu příslušného ak. roku*

Podpis vedoucího práce

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10.10.2017

Datum převzetí zadání

Podpis studenta(ky)

***Honorable declaration***

I declare that I have prepared this diploma thesis independently only with the help of consultants in Norway and the Czech Republic, with the help of people working in the construction industry, with whom I could do interviews, and with use of sources and literature mentioned in the list of cited literature.

**Prague, 12 January 2018**

.....

**Name**

### ***Acknowledgment***

I would like to express my thanks to Mr. Pavel Svoboda for his professional management supervision of the diploma thesis, his time during consultations and all the materials he has provided me with. My great thanks also belong to Olav Torp and Daniel Andre Danielsen of the NTNU University in Trondheim, who provided me with all the necessary materials for my research and were always willing to help and advise. Mainly in the beginning of my work they have? sent me in the right direction. Finally, I would like to thank my family and my loved ones, who have always been my support in my studies.

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## **Annotation**

This research compares requirements for Occupational Health and Safety on construction sites of the Czech Republic and Norway. It focuses on comparison of construction standards requirements and the way of their compliance with the Building law. This thesis furthermore compares the statistics of injuries on the construction sites in both countries.

The aim of this thesis is to find if there is anything which either of the countries can learn from the other one and potentially adapt to their OHS standards.

**Key words: Construction Industry; Construction site; Health, Safety and Environment(HSE); Occupational Health and Safety(OHS); Security measures; Regulations**

## **Anotace**

Tento výzkum porovnává požadavky na bezpečnost a ochranu zdraví při práci na stavbách v České Republice a Norsku. Zaměřuje se na porovnání stavebních předpisů a zákonů pro bezpečnost práce a jejich dodržování. Tato diplomová práce dále porovnává statistiky obou zemí pro úrazy na stavbách.

Cílem této diplomové práce je najít, zda-li je zde něco, co se mohou od sebe tyto dvě země naučit a adaptovat do svého stavebního systému.

## **Klíčová slova:**

**Stavební průmysl; Staveniště; Bezpečnost a ochrana zdraví při práci; Bezpečnostní opatření; BOZP Předpisy**

## **Preface**

This master thesis was written during exchange foreign study stay at the NTNU in Trondheim in fall 2017. The fact that master thesis was written abroad is also the reason why it is in English. It was mainly because of the better option to consult with the supervisors at the NTNU.

Master thesis compares Occupational Health and Safety(OHS) on construction sites of the Czech Republic and Norway. Comparison is done with use of three areas of data collection. Those three areas are:

- interviews with people who are responsible for OHS on construction sites;
- regulations for OHS;
- statistics of accidents on construction sites.

Those data enabled me to analyse and evaluate the situation in both countries. The aim ~~for~~ of this thesis is to find if there is anything which either of the countries can learn from the other one and potentially adapt to their OHS standards.

First part is introducing us to the background of the issue we are dealing with in this master thesis, i.e. to describe situation in construction industry and the importance of why we should be serious about this topic. The necessity of addressing this issue is documented here by statistical data on building incidents within the EU countries and Norway. Construction industry is one of the most dangerous branch of industry. There is a lot of workers in the construction industry who are killed or injured by accidents on construction site. This fact could have many reasons.

Second part deals with methodology and it indicates what approach and procedures we have chosen to process, analyse and evaluate this issue. The way of data collection is described in this section.

Third part explains legislation of both countries and also EU legislation which effects the Norwegian and Czech regulations. Furthermore I describe a short overview of legislation for HSE on construction sites. In general, it depicts both legislation systems and also stated EU regulations for HSE requirements on construction sites which have impact to Norwegian and Czech construction industry. In the fourth part I introduce the results of interviews which were done for the purpose of this master thesis with people who are dealing with HSE on the construction site. For the better

understanding of the situation I enclose the observations I experienced on the construction sites both in the Czech Republic and in Norway.

Last part analyses and evaluate data which were collected, also it introduces the results of the comparison. The analysis and evaluations are subjective to the author's point of view, therefore it is possible that the readers may have minor opinion discrepancies to author's findings.

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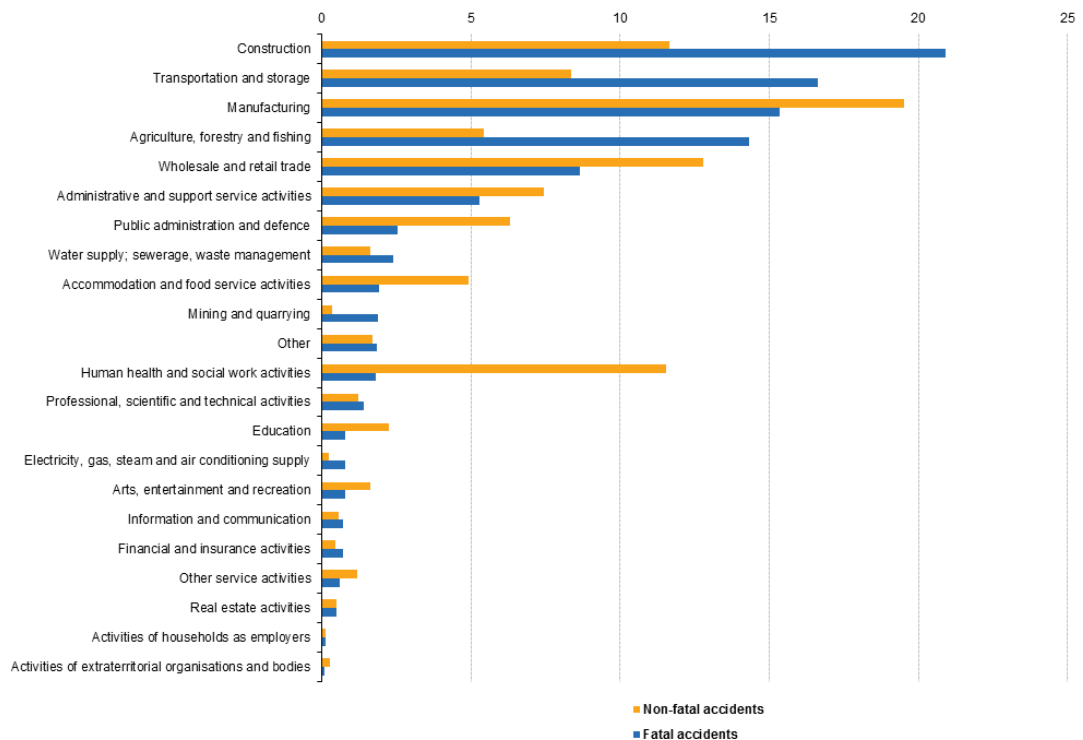
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# 1. Introduction

## 1.1 Background of research

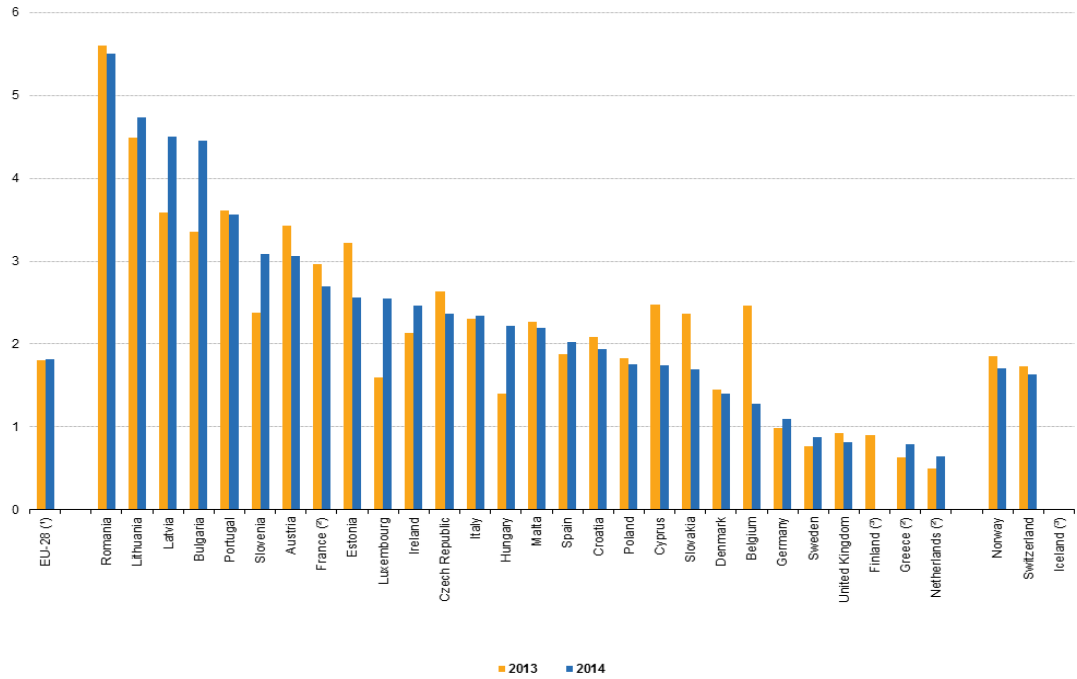
Construction industry is one of largest industries in every country. Unfortunately, it is also one of the most dangerous. There is a lot of workers in construction who are killed or injured by accidents. It could be caused by bad safety measures on the construction site or non-compliance of regulations by workers or builders.

For description of this situation, here are some statistics which can show, how many people are affected by an accident when working on construction sites and how many of them are very serious and fatal accidents.



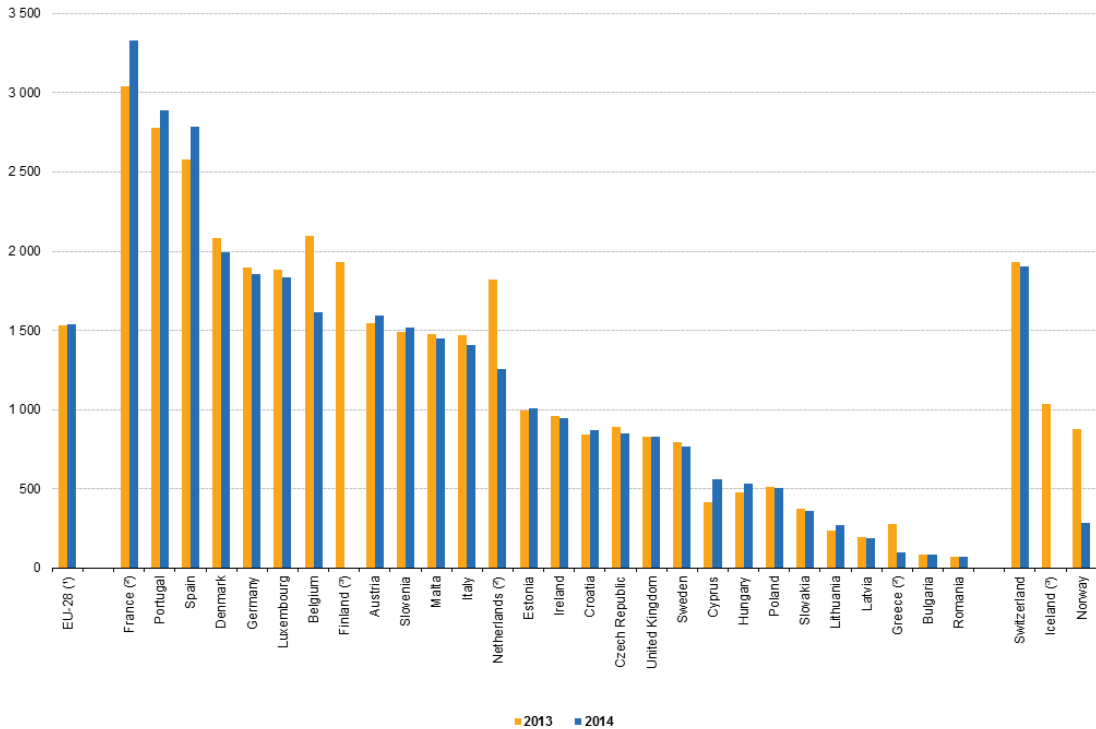
Note. Provisional.

Figure 1 - Fatal and non-fatal accidents at work, EU-28, 2014 in %



(\*) Provisional.  
 (\*) 2014: break in series.  
 (\*) 2014: not available.

Figure 2 - Fatal accidents at work in construction, 2013 and 2014 (per 100 000 persons)



Note. Non-fatal (serious) accidents reported in the framework of ESAW are accidents that imply at least four full calendar days of absence from work.  
 (\*) Provisional.  
 (\*) 2014: break in series.  
 (\*) 2014: not available.

Figure 3 - Non-fatal accidents at work in construction, 2013 and 2014 (per 100 000 persons)

Injuries can have long-term consequences for workers. Accidents can affect not only the worker himself, but also the construction company that is responsible for

construction safety. It is connected with second side of this issue and that is financial aspect. For construction industry, accidents and health consequences have a huge financial impact. So, if we want to successfully manage a company, we have to avoid these costs by properly managing of safety on construction sites.

Perfect work safety should be a fundamental requirement, respected by all participants in the construction process. Safeguarding of perfect work safety should be primarily due to the variety of work and working conditions difficulty in the construction industry. It must be respected individual threat risks to the life and health of workers during the preparation and execution of construction works.

In the case of individual entities operating in the construction sector (tradesmen, small, medium and large construction companies) it can be stated that only large construction companies pay attention to the safety of work properly, because they usually have the knowledge and resources to handle this complex issue systematically (*Bušina, 2014*).

The difficult financial situation and the effort to achieve the lowest possible price leads a number of construction companies to significant cost-saving measures, which, however, often affect to the safety of work itself. Therefore, there is a clear link between the financial situation, cost-saving measures and the safety of construction works. Savings can cause that risks may increase due to an attempt to circumvention or non-compliance of standards for work safety in order to maintain the profitability and competitiveness of construction companies (*Bušina, 2014*).

Risks in the construction industry are at every corner and are truly enormous. Due to the continuous development of the building, there are also new threats and risk factors. Building participants move to places where there is usually a high concentration of dust, noise, but they are also often near machines or electrical equipment and move at heights or at the places where there is a risk of fall to the depth. These factors do not pose risks just to workers themselves but also to the public who can move around the building site. Therefore, there is a need to continuously improving security measures and evaluate the risks involved in construction projects and learn to apply new knowledge to our future work.

## **1.2 Research description and aims**

The aim for this thesis is to find if there is something both countries can learn from each other and adapt to their building system.

This research compares the difference between requirements for Health, Safety and Environment on construction sites of the Czech Republic and Norway. It focuses on comparison of construction standards requirements and way of their compliance with the building law in practice. This thesis also compares statistics of what is the situation in the construction industry for accidents and injuries for both countries.

## **1.3 Research questions**

To address this issue there is defined three research questions (RQ):

- **RQ1: How are the regulations designed in these two countries?**
- **RQ2: How are the practice regarding HSE in these two countries?**
- **RQ3: What are the activities which poses the highest risk for accidents in these two countries?**

## **1.4 Delimitations**

Due to a very wide scope of researching subject, it is necessary to define the area of our interest in which we will move around.

This research focuses only on the comparison of requirements for Occupational Health and Safety on construction sites, so it is limited by Czech and Norwegian regulations in the field of civil engineering. This work will not be dealt with the general rules for Occupational Health and Safety in industry in general.

It will mainly deal with the construction phase and its impacts on Occupational Health and Safety during realization of project.

For the purpose of research, we will move around in the areas of buildings that are easier to compare for both countries, and it seems to be building structures such as houses, buildings, halls, and buildings that are mostly located above the earth's surface.

Comparing Occupational Health and Safety requirements for the construction of underground structures, bridges, tunnels, naval structures or chemical industry structures would require extensive knowledge in these fields and would be demanding in terms of accessibility to these construction sites. Therefore, this research will not deal with them.

We will deal with the comparison of Occupational Health and Safety requirements only in the Czech Republic and Norway.

## **1.5 Reading guidance**

### **Chapter 1 – Introduction**

The introductory chapter briefly discusses the content of the research subject – the questions to be answered and the problem background and delimitations that occurred during the research.

### **Chapter 2 – Research methodology**

This chapter presents the research method and approach to be used and ways how the necessary data were collected.

### **Chapter 3 – Theoretical framework**

This chapter introduce the key areas and the theoretical background of research. This is needed for discussion and solvation of research questions and following analysis.

### **Chapter 4 – Observation and interviews**

In this chapter, data gathered by observation and interviews with people responsible for HSE on construction sites are completed.

### **Chapter 5 – Findings, discussion and evaluations**

This chapter analyses the data that has been collected in the theoretical framework and from observation and interviews on construction sites.

## **2. Research methodology**

This chapter describes the methodological approach used to process this scientific work. There exist whole range of research methods that can be used for the gradual elaboration of a scientific study.

First of all, we will describe scientific research methods that can be used to process scientific work, and we will select those which will serve our research best. There will be shown the way of data collection, and it will give us a more detailed guide to a methodological approach to justify where and why we used the methods.

In the next part of this chapter we will describe individual methods, the way of their use, the advantages and disadvantages, which goes hand by hand with their use.

### **2.1 Research**

Scientific research is a systematically organized work aimed at acquiring new findings and knowledge, their evaluation and the subsequent suggestion of how the knowledge could be used in practice in the future.

We use it to achieve a confirmation or rebuttal of the hypothesis or research questions we asked in the beginning of scientific work. The findings and answers to the questions are the main goal of scientific research as well as the discovery of new possible solutions for investigated problems and putting these new solutions into practice (Olsson 2011).

#### **2.1.1 Quantitative and qualitative research methodology**

Quantitative and qualitative approaches are basic types of scientific research and both involve different research methods (Yin 2014).

Qualitative research can be defined as a research that focus on a detailed study of the problem that we investigate and which should lead to deeper understanding. This research does not rely on the collection of a large number of samples and analysis. Data collection takes place through a relatively small number of respondents or observations. Then the collected data are carefully examined, which assists for a complex understanding of research problem (Yin 2014).

Achieved results through the qualitative method are difficult to verify because the data are mostly collected using forms that are difficult to measure, such as observations, discussions, individual interviews or literature review.

The results of research using a qualitative method can be attackable because of the subjective point of view to research approach and the subjective way of analysing the results.

The quantitative method evaluates the data obtained through quantitative data collection. Typically, a wide range of research samples are included in the data collection, from which generalized information is later provided by standardization of results. This leads to a relatively large reduction of obtained information and low validity of results. Data can be collected through many different forms, such as online questionnaires, paper questionnaires, interviews, surveys, systematic observations, etc.

Data analysis results can be converted into numerical measurable formats. Such as numerical data, statistics, graphs, etc. The results obtained by the quantitative method are easily verifiable if the procedure is correctly followed by this method (Yin 2014).

In our study, we could use a combination of qualitative and quantitative approach. An example is the use of a quantitative method to confirm or rebut the statements and results we have obtained through qualitative research.

However, this procedure would require much more time and therefore we decided to follow just the qualitative approach in this study.

### **2.1.2 Choice of research methods**

This part presents the methodology tools which are use in this study. It gives an insight into the reasoning behind the methodological approach and the methods for collecting data.

#### **2.1.1 Research sample**

As the choice of this research sample is use the method of purposeful selection. This method is one of the most use methods in the qualitative research. The idea is to very specifically choose the research sample which is the researcher going to work with. The way of selection is focus on the attributes which the researcher of the study wants to focus on. In this case the focus was on persons in the building department which are working with HSE in Czech Republic and Norway. The final sample is made from eight interviews. Four interviewed is from the Czech side and four from the Norwegian side.



### **2.1.1 Method of data collection**

As the most suitable way of collection data from the sample was semi-structured interview well known also as in-depth interview. This method is one of the most popular methods in interviews. We can talk about the middle way between the fully structured and non-structured interview. It means that the researcher has a structured plan for conducting the interview, but also focuses on promoting dialogue. The big advantage of this kind of interview is the possibility of the adjusting the structure during the interview, so that it better adapts to the interviewees (Holme and Solvang 1991). Additionally, it allows follow-up questions. An interview guide is used to ensure reliable and comparable data.

The in-depth interview was used in this study by using a schema of twenty questions which were questioned in the order suitable for the interviewer. Four of the interviews were conducted in Czech language and four of them in English. The data were recorded on the voice recorder and rewritten to the written English version for the analytical part of research.

### **2.1.1 Analyses and interpretations of the data**

For better understanding of this problematic, a tree main groups were developed for evaluation of interviews which are named: Workers and Accidents, Costs and Controls, Strength and weaknesses of HSE.

Each of these groups is described from the Czech side and Norwegian side and compared with each other. Legislation of each country is also compared between themselves and with EU legislation. As another supporting point, added observations from the site and some illustrative photos.

In the end is a summarization of all findings in this master thesis and is done an analysis and evaluation.

## **3. Theoretical framework**

### **3.1 Introduction**

Occupational Health and Safety (OHS) is an interdisciplinary field that can also be defined as legislation or rules designed to prevent threats or damage to human health in the work process. At present, however, there is no official definition, so you can find different definitions in the professional literature depending on the point of view of ensuring occupational safety (eg: a set of measures prescribed by law and by the employer to prevent threats or damage to human health in the work process - source Wikipedia).

Occupational Health and Safety is a summary of all measures by the employer that are designed to prevent the occurrence of threats or health damage or loss of life for workers. Measures can be in form of a technological, technical, legal, organizational or administrative measures. A set of these measures is generally called risk prevention.

### **3.2 Key words**

**Industry** – A group of productive enterprises or organizations that produce or supply goods, services, or sources of income. (Britannica.com)

**Construction Industry** - Sector of national economy engaged in preparation of land and construction, alteration, and repair of buildings, structures, and other real property. (Businessdictionary.com)

**Construction** - The erection or assembly of large structures. The term construction is to a significant degree synonymous with building, but in common usage it most often is applied to such major works as buildings, ships, aircraft, and public works such as roads, dams, and bridges. (Britannica.com)

**Construction site** - Is a place where construction or maintenance work is carried out; includes a building plot, or a built-up area of building plot or his part. (CZ Act No. 183/2006 Coll. – Building Act)

**Legislation** - Title for the rule of law for certain state. Collection of currently applicable laws and regulations.

**Health, Safety and Environment(HSE)** – Study and practical use of aspects of the construction process in order to protect the environment and to ensure safety of work. What must be done to make the building safe for the people in it and for its surroundings.

**Occupational Health and Safety(OHS)** – The field concerned with the safety, health, and welfare of people at work.

**Security measures** – Measures that are implemented to ensure the safe execution of the construction.

**Building standards** - Legislative requirements and building regulations. Requirements for building structures and requirements for rules that must be observed during construction for the purpose of the desired product quality.

**Regulations** - Rule or mechanism that limits, steers, or otherwise controls process of construction.

**HSE Manager** – Represents the company that execute the construction, he is responsible for the observance of the OSH. His work is to control that the OHS rules are complied with requirements, design systematic OSH programs, evaluate risks assessments and plan preventive measures to eliminate possible risks.

**Safety Coordinator** – A person designated by an investor for purpose of control strict observance of OSH at the construction site. He prepares the plan for safety, health and work environment, proposes protective measures and controls their compliance.

### **3.3 Legislation for HSE**

Here will be made a small overview of legislation for HSE on construction sites. In general, describe both legislation systems and also stated EU regulations for HSE requirements on construction sites which have impact to Norwegian and Czech construction industry.

### **3.3.1 EU regulations influencing Czech and Norwegian legislation for HSE**

The need to improve working conditions is a collective concern, prompted by both humanitarian and economic considerations. Create more jobs and of better quality is one of the main objectives of the EU social policy. A safe and healthy working environment is an essential element of the quality of work (EUROSTAT).

The first European directives on safety and health at work were adopted on the basis of general provisions on market harmonization. This was due to the fact that, until the mid-1980s, the Treaty did not establish explicit legislative powers in the field of health and safety at work. Previously, health and safety at work was seen as a complement to market harmonization and economic policies of the European Economic Community. On this basis, for example, Directive 77/576 / EEC on the harmonization of national provisions on safety labels in the workplace or Directive 78/610 / EEC on the harmonization of exposure limits for vinyl-chloride monomers in workplaces was adopted (EU-OSHA).

The Single European Act of 1987 was a major step forward in introducing new legal provisions on social policy into the Treaty with a goal to achieve improvements, particularly in the working environment, in terms of worker safety and health protection. By inserting this provision into the Treaty, the importance of safe working conditions has become evident (EU-OSHA).

The EU action in health and safety at work has its legal basis in Article 153 of the EU Treaty. Community action is not limited to legislation. The Commission has widened the scope of its activities, in favour of information, guidance and promotion of a healthy working environment by paying particular attention to small and medium-size enterprises (EUROSTAT).

Article 153 of the Treaty on the Functioning of the European Union empowers the European Union to adopt directives on occupational safety and health. The Framework Directive, with its broad scope, as well as other directives on specific aspects of occupational safety and health, are the basis of European health and safety legislation.

Member States may, in the interest of protecting workers, adopt stricter rules when transposing EU directives into national law. Legislative requirements for health and safety at work may vary from one EU Member State to another(EU-OSHA).

The European Framework Directive on Safety and Health at Work (Directive 89/391 / EEC), adopted in 1989, has been a major milestone in improving safety and health at work. It guarantees minimum health and safety requirements across Europe, although Member States can maintain or adopt more stringent measures(EU-OSHA).

### **Directive 89/391 - Framework Directive on OSH**

of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work.

In 1989, the provision of the Framework Directive brought considerable innovation including the following aspects:

- The term "working environment" has been defined in accordance with the ILO Convention No. 155 and defines a modern approach that takes account of technical security as well as general prevention of health damage.
- The aim of the Directive is to establish the same level of safety and health protection for all workers (with the only exception being domestic workers and some parts of public and military service).
- According to the Directive, employers are required to take appropriate preventive measures to make work safer and healthier.
- The Directive establishes the principle of risk assessment as a key element and defines its main elements (eg risk identification, worker participation, implementation of appropriate measures with the priority to eliminate risks at source, documentation and periodic reassessment of risks at the workplace).
- The new duty to implement preventive measures implicitly emphasizes the importance of new forms of health and safety management as part of the general management processes(EU-OSHA).

### **Selected EU Directives for OHS:**

#### **Directive 2009/104/EC – use of work equipment**

of 16 September 2009 concerning the minimum safety and health requirements for the use of work equipment by workers at work (second individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC)

#### **Directive 99/92/EC - risks from explosive atmospheres**

of 16 December 1999 on the minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres (15th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC).

#### **Directive 92/58/EEC - safety and/or health signs**

of 24 June 1992 on the minimum requirements for the provision of safety and/or health signs at work (ninth individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC)

#### **Directive 89/656/EEC - use of personal protective equipment**

of 30 November 1989 on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace (third individual directive within the meaning of Article 16 (1) of Directive 89/391/EEC)

#### **Directive 89/654/EEC - workplace requirements**

of 30 November 1989 concerning the minimum safety and health requirements for the workplace (first individual directive within the meaning of Article 16 (1) of Directive 89/391/EEC)

### **3.3.2 HSE regulations for the Czech Republic**

With the accession to the European Union, there has been a lot of change in the Czech Republic, so there were many changes in the field of health and safety at work too. For all members of the EU, Council Directive 89/391 / EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work is binding. A very wide range of legislation and standards has been enforced with this directive. The original technical approach has been replaced by the

system approach. Occupational health and safety begins to be the concern of every worker, the senior employee becomes more responsible. The aim is again to improve the quality of OHS.

The legislative system in the Czech Republic for HSE on construction sites has a lot of legally binding laws and regulations.

Some of them will be introduced here and the most important of them will be described.

**Selection of regulations for HSE:**

- 1) **Act No. 262/2006 Coll.** - Labour Code
- 2) **Act No. 309/2006 Coll.** o Providing additional health and safety conditions at work
- 3) **Government Regulation No. 101/2005 Coll.** on more detailed workplace and workplace requirements
- 4) **Government Decree No. 361/2007 Coll.**, Laying down the conditions for the protection of health at work
- 5) **Act No. 258/2000 Coll.** on the Protection of Public Health and on Amendments to Certain Related Acts
- 6) **Act No. 251/2005 Coll.** about work inspection
- 7) **Act No. 174/1968 Coll.** on state professional oversight of safety at work
- 8) **Decree No. 180/2015 Coll.** about work and workplaces that are banned by pregnant workers ...
- 9) **Act No. 372/2011 Coll.** on health services and the conditions for their provision
- 10) **Decree No. 104/2012 Coll.** laying down more detailed requirements for the procedure for the assessment and recognition of occupational diseases
- 11) **Government Regulation No. 201/2010 Coll.** about the way of recording injuries, reporting and sending an alert record
- 12) **Act No. 205/2015 Coll.**, Amending the Labour Code and repealing the Act on Accident Insurance for Employees
- 13) **Government Regulation No. 375/2017 Coll.** on the appearance, location and implementation of safety signs and marking and signal insertion
- 14) **Decree No. 432/2003 Coll.**, Laying down the conditions for classifying work into categories, ...

- 15) **Government Decree No. 495/2001 Coll.**, Laying down the scope and detailed conditions for the provision of ...
- 16) **Government Decree No. 21/2003 Coll.** Laying down technical requirements for personal protective equipment
- 17) **Government Regulation No. 272/2011 Coll.** on the protection of health from the adverse effects of noise and vibrations
- 18) **Government Regulation No. 291/2015 Coll.** on the protection of health from non-ionizing radiation
- 19) **Government Regulation No. 406/2004 Coll.** on more detailed health and safety requirements at work in potentially explosive environments
- 20) **Government Regulation No. 362/2005 Coll.** on more detailed requirements for occupational health and safety when working in workplaces with the danger of falling from a height or depth
- 21) **Government Regulation No. 591/2006 Coll.** on more detailed minimum safety and health requirements for worksite construction sites
- 22) **Government Decree No. 28/2002 Coll.**, Laying down the method of organizing work and working practices in forest work
- 23) **Government Regulation No. 378/2001 Coll.**, Laying down more detailed requirements for the safe operation and use of machinery, technical equipment, instruments and tools
- 24) **Decree No. 50/1978 Coll.** The Czech Office for Occupational Safety and the Czech Mining Office for Professional Qualification in Electrical Engineering
- 25) **Decree No. 85/1978 Coll.** Of the Czech Office for Occupational Safety and Health, on inspections, inspections and tests of gas equipment
- 26) **Decree No. 18/1979 Coll.** The Czech Office for Occupational Safety and the Czech Mining Authority, which designates dedicated pressure equipment, ...
- 27) **Decree No. 19/1979 Coll.** The Czech Office for Occupational Safety and the Czech Mining Authority, which designates dedicated lifting equipment, ...
- 28) **Decree No. 73/2010 Coll.** on the designation of dedicated electrical technical equipment, their inclusion in classes and groups and on more detailed conditions of their safety, ...



- 29) **Decree No. 21/1979 Coll.** The Czech Labor Office and the Czech Mining Authority, which designate dedicated gas facilities, ...
- 30) **Decree No. 48/1982 Coll.** Of the Czech Office for Occupational Safety and Health, laying down the basic requirements for the safety of work and technical equipment

### **The most important regulations for HSE in the Czech Republic**

#### ***1) Act No. 262/2006 Coll. – Labour Code***

This law

- a) regulates the legal relations arising from the performance of dependent work between employees and employers; these relationships are labour-law,
- (b) also governs legal relationships of a collective nature and the promotion of mutual negotiations between trade unions and employers' organizations. Legal relationships of a collective nature related to the performance of dependent employment are labour-law,
- c) incorporates the relevant European Union regulations,
- d) it also regulates certain legal relationships before the creation of labour relations under (a),
- e) regulates certain rights and obligations of employers and employees in compliance with the temporary insurance scheme for insured under the Sickness Insurance Act and some sanctions for breach.

#### § 1a

- (1) The purpose and purpose of the provisions of this Act are also expressed by the basic principles of labour relations, which are, in particular, the basic principles
- (a) special statutory protection of the status of employee,
- (b) satisfactory and safe working conditions,
- (c) fair remuneration of the employee,
- (d) the proper performance of the work by an employee in accordance with the legitimate interests of the employer,
- (e) equal treatment of employees and the prohibition of discrimination against them.
- (2) The principles of special statutory protection, the status of employee, satisfactory and safe working conditions for the performance of work, fair remuneration of the employee, equal treatment of employees and the prohibition of their discrimination, express values that protect public order. (*Act No. 262/2006 Coll.*)

**2) Act No. 309/2006 Coll. - on Other Occupational Health and Safety Conditions**

This Act incorporates the relevant European Union regulations, in accordance with Act No. 262/2006 Coll., The Labour Code, other health and safety requirements in labour relations and the provision of health and safety at work or services outside the labour law relations under Section 3 of the Labour Code. (*Act No. 309/2006 Coll.*)

**3) Government Regulation No. 101/2005 Coll. - on more detailed workplace and workplace requirements**

This regulation incorporates the relevant European Community regulations and provides for more detailed requirements to ensure occupational safety and health protection at the workplace and in the working environment. (*GR No. 101/2005 Coll.*)

**4) Government Regulation No. 361/2007 Coll. - laying down the conditions for the protection of health at work**

(1) This Regulation incorporates the relevant European Union regulations and, following the directly applicable European Union rules

(a) risk factors of working conditions, their breakdown, methods and method of their detection, hygiene limits,

(b) a method of assessing risk factors for the protection of the health of workers (hereinafter referred to as "health risk assessment"),

(c) the minimum scope of measures to protect the health of workers,

(d) conditions for the provision of personal protective equipment and its maintenance during work with lead, chemicals or mixtures which are absorbed by the skin or mucous membranes, and chemicals, mixtures or dust which have skin irritating effects, carcinogens, mutagens and substances toxic to reproduction, with asbestos, biological agents and in cold or heat load,

(e) more detailed conditions for the provision of protective beverages,

(f) closer hygiene requirements for the workplace and work environment,

(g) more detailed requirements for the organization of work and work procedures for heat or cold loads, for working with chemicals, mixtures, dust, lead, asbestos, biological agents and physical loads,

(h) Closer requirements for working with imaging units,

(i) some emergency response measures that increase exposure to a level that may lead to an immediate threat to the health or life ("overexposure") of an employee exposed to a chemical, mixture or dust,

(j) the scope of information on the protection of health at work with lead, excessive exposure to chemical carcinogens, mutagens or substances toxic to reproduction, biological agents and physical activity,

(k) minimum requirements for the training content of the employee at work which is or may be the source of exposure to asbestos or dust from asbestos-containing material.

(2) Work performed in a workplace which is not or only partially protected from outside influences (hereinafter referred to as "outdoor workplace") shall not be subject to the conditions set out in Articles 36 to 38, 41, 42, 47, 51, 52 and Annex No 1 to this Regulation, Part C. An outdoor workplace is also considered to be an underground workplace.

(3) Works performed as artistic activities, with the exception of works of art, shall not be subject to the conditions set out in Articles 13 to 21, Sections 36 to 39, Sections 43, 48, 49, 51, 52, Annex 1 to this Regulation, Part C and in Annexes 2, 4, 7 and 9 to this Regulation.

(4) This regulation applies to legal relations regarding health activities or services outside labour relations to the extent provided by law to ensure other conditions for occupational safety and health.

(5) This Regulation assesses the conditions of health protection of secondary school pupils in practical training, students of tertiary vocational schools in practical training and students of higher education institutions in practical training and practice.

(6) This Regulation is without prejudice to the general technical requirements for construction. This Regulation does not apply if special requirements for the working environment and workplace and procedures for the identification and assessment of risk factors of working conditions are regulated by a special legal regulation or a directly applicable European Union regulation. **(GR No. 361/2007 Coll.)**

**5) Government Regulation No. 591/2006 Coll. - on Closer Minimum Requirements for Safety and Health at Work at Site Buildings**

(1) This Regulation incorporates the relevant European Union regulations and regulates it

(a) more detailed minimum requirements for occupational health and safety at work sites,

(b) the details of the notice of commencement of work,

(c) work and activities exposing an individual to an increased threat to life or injury to health; and

d) other activities, which the coordinator of occupational health and safety at work (hereinafter referred to as the "coordinator") is obliged to carry out during the preparation and implementation of the construction,

(e) more detailed requirements for the content and scope of the occupational safety and health plan (hereinafter referred to as the "plan").

(2) The Regulation does not apply to work on a site which are carried out underground like underground mining and mining activities and to earthworks carried out using machinery and explosives if more than 100 000 m<sup>3</sup> of rock is transferred on one site, with the exception of the foundation of buildings. **(GR No. 591/2006 Coll.)**

***6) Government Regulation No. 362/2005 Coll. - on Closer Requirements for Safety and Health at Work in Workplaces with Danger of Fall from Height or to the Depth***

§ 1

This Regulation incorporates the relevant regulations of the European Communities 1 ) and regulates the way in which work is organized and the working procedures which the employer is obliged to ensure when working in workplaces in which workers are exposed to the danger of dropping or falling into free depth (hereafter referred to as " above free depth "), and more detailed requirements for the safe operation and use of technical equipment provided to employees for working at heights and above free depth.

§ 2

(1) This Regulation does not apply to work at heights and above free water level at work

(a) mining activities and activities carried out in a mining manner in workplaces subject to top supervision under a special legal regulation;

(b) operation of seagoing vessels pursuant to a special legal regulation;

c) implementation of the rescue and disposal works of the integrated rescue system,

d) preparation and training of components of the integrated rescue system for the implementation of rescue and disposal works.

(2) This Regulation is without prejudice to other workplace and workplace requirements laid down by special legal regulations. *(GR No. 362/2005 Coll.)*

### **3.3.3 HSE regulations for Norway**

Norway also adopts European legislation as it is a member of many European economic and industrial organizations.

The cornerstone of relations between Norway and the EU is The Agreement on the European Economic Area (EEA). It brings together the 28 EU member states and the three EEA Efta states Norway, Iceland and Liechtenstein in the internal market governed by the same basic rules.

Norway has regulations for the area of HSE divided into three main parts. Working Environment Act, Internal Control Regulations, Building regulations.

The Norwegian Working Environment Act is intended to ensure secure conditions of employment, a safe working environment and a meaningful work situation for all employees. Enterprises themselves are responsible for the preventing work-related accidents and harm to health. Employers have a duty to ensure that the working environment and level of safety are appropriate and satisfactory. The authorities help by ensuring that enterprises carry out systematic work in relation to health, safety and the environment (HSE). The Norwegian Labour Inspection Authority, the Petroleum Safety Authority Norway and the National Institute of Occupational Health (STAMI) research organisation come under the auspices of the Ministry of Labour. In addition, the Norwegian Labour Inspection Authority is a government agency. The authority is charged with supervising enterprises to ensure that they comply with the requirements of the Working Environment Act.

#### ***Regulations on the working environment***

The regulations elaborate provisions in the Working Environment Act. Some regulations provide more detailed provisions on special areas of work that the law regulates, while others are more general and apply to most people covered by the Working Environment Act. A regulation is as binding as the law itself (Arbeidstilsynet).

### ***Working regulations***

The six working environment regulations have a systematic system that follows the business from planning activities until they are in full operation - both before an activity starts and while it is in progress.

*A step by step approach to this work is:*

- First, the business must enter into regulations on organization, management and participation.
- Then, the business must follow up requirements for designing the workplace in the workplace regulations.
- Then, the business must comply with the requirements for the safe implementation of the work in the regulations governing the execution of work.
- The business must also comply with limit values and values of action in regulations on action and limit values(Arbeidstilsynet).

The six working environment regulations are:

- 1) *Regulations on organization, management and participation*
- 2) *Workplace regulations*
- 3) *Regulation on work performance*
- 4) *Regulations on action and limit values*
- 5) *Manufacturer Regulations*
- 6) *Regulations on administrative arrangements*

The Labour Inspectorate also enforces regulations outside the Working Environment Regulations.

Some key regulations are:

- 1) *Internal Control Regulations*
- 2) *Client Regulations*
- 3) *Personal protection regulations*
- 4) *Regulations on approval of cleaning companies, etc.*
- 5) *Regulations on HSE cards on construction sites*
- 6) *Machinery Regulations*

## **The most important regulations for HSE in Norway**

### ***1) Act on working environment, working hours and employment protection etc.***

#### ***(Working Act) - LOV-2005-06-17-62***

The purpose of the Act is:

- a) to ensure a working environment that provides the basis for a health-promoting and meaningful work situation that provides complete protection against physical and mental harm and with a welfare standard that is always consistent with the technological and social development of society,
- b) to ensure safe employment and equal treatment in working life,
- c) to facilitate adaptations in the employment relationship related to the individual worker's assumptions and life situation,
- d) to provide grounds for the employer and employees in the businesses themselves to safeguard and develop their working environment in cooperation with the social partners and with the necessary guidance and control from the public authority,
- e) to contribute to an inclusive working life. (*LOV-2005-06-17-62*)

### ***2) Regulations on systematic health, environmental and safety work in enterprises (Internal Control Regulations) - FOR-1996-12-06-1127***

Through requirements for systematic implementation of measures, this regulation shall promote improvement work in the activities within:

- work environment
- Safety
- prevention of health damage or environmental disturbance from products or consumer services
- protection of the external environment from contamination and better treatment of waste
- accident prevention and accidents associated with their own legal activity
- prevention of unwanted intended events

so that the objectives of health, environmental and safety legislation are achieved.

***(FOR-1996-12-06-1127)***

### ***3) Regulations on safety, health and working environment at construction sites (building regulations) - FOR-2009-08-03-1028***

The purpose of the regulation is to protect workers against hazards by taking account of safety, health and working environment at construction sites in connection with planning, engineering and construction work. (*FOR-2009-08-03-1028*)



## 4. Observation and interviews on construction sites

For a better imagination of the situation for HSE on the construction sites in this chapter will be summarized interviews that have been done with people who are in some way touching HSE on construction sites. Situation will be than also documented with a few pictures taken in Czech a Norwegian construction sites.

Summarization of interviews will be divided into 2 groups of Czech and Norwegian interviewed person. And each group will be divided into 3 areas of questions.

Summary is results of subjective views of respondents on the given issue and also subjective view of processor to those answers.

### 4.1 Interviews with Czech respondents

#### 1. Area: Workers and Accidents

- They coincide that on the construction sites there are the riskiest “works in heights” and “earthworks in excavations” from which arise most of dangers.
- Most of the accidents are due to human inattentiveness or because they are not doing their work in the proper way.
- The most common are minor injuries like scratches, cuts or bruises. But very common are twisted ankles.
- On the construction site is usually more common that foreign workers have some more serious injuries more often. It could be due to language barrier and their inability to understand the instructions.
- Most of the companies have their own way how to learn from accidents. They usually analyse findings from accidents and then they implement results into their future work or into internal company regulation for HSE.

#### 2. Area: Costs and Controls

- Companies usually do not have any rules for appraisalment of HSE security measures and their price is involved in items of the project budget.
- Costs for security measures are divided into two groups: “collective” a “personal” security measures. Collective safety usually provide main contractor and personal protection is duty of every subcontractor himself.

- Controls by LIA are very random and few. Effort of labour inspection in general is not to impose a fine, but they are trying to alert deficiencies and they want their correction. If the violations are not corrected after that there will come penalization.
- Especially those responsible for compliance of HSE and contractor are fined.

### 3. Area: Strength and weaknesses of HSE

#### **Positives:**

- The sophistication and content of safety regulations is positively evaluated. Regulations are on the top level and processed in detail.
- The presence of foreign investors who place greater emphasis on compliance of OSH.

#### **Negatives:**

- Bad communication between participants of construction processes.
- Low financing into security measures.
- Bad approach of companies to work safety, which should not be taken like a burden but as tool how to ensure a safe working environment and tool for limiting accidents and injuries on the construction site.
- Too many legislative regulations.

## 4.2 Interviews with Norwegian respondents

### 1. Area: Workers and Accidents

- The most dangerous activities are “works at heights” with risk of falling objects or person, then it is “lifting operations” and “working around machines”.
- Most common accidents are falls from small heights, hits or fall of objects from scaffolding.
- Most common are minor injuries like cuts, scratches, etc.
- Foreign workers have accidents 50% more often than Norwegians. It is influenced by language barrier and by culture aspects. It is also influenced

by fact that foreign workers are doing “non-popular works” like demolition or maintaining works which poses higher risk of accident.

- Companies have their own learn program how to improve security measures. If there happened accident they analyse it and implement findings into their future work and internal regulations.
- There is existing big cooperation between large companies and LIA in which they are still trying to improve the safety of work on construction sites.

## 2. Area: Costs and controls

- There is no precise rule how companies are appraising security measures. But very often large companies are willing to financing work safety more because they are also working on major projects.
- Security measures are always part of project budget. So, contractors and subcontractors have to have them involved in items of budget.
- Controls by LIA are very rare and if there is some it is more like cooperation with LIA about how to improve HSE security measures in construction industry. There is no effort to penalize company.

## 3. Area: Strength and weaknesses of HSE

### **Positives:**

- Involvement and cooperation of people in HSE and their effort to improve.
- Communication between participants of construction processes.

### **Negatives:**

- Small companies are not taking care of HSE that strictly like they should.
- Bad early planning.

### 4.3 Observations from the construction sites

Pictures are included just to show the most common OSH deficiencies on construction sites. But there are also pictures of the right solutions that should be used to improve security measures.

*Norway:* Pictures was taken at the construction sites of company Veidekke.



*Picture 1 - secure of edges by removable railing*



*Picture 2 - secure of edges by removable railing*



*Picture 3 - well planned waste disposal*



*Picture 4 - broken floor of scaffolding*



*Picture 5 - dangerous foldable stepladders*



*Pictures 6 - stepladders with railing and upper desk*



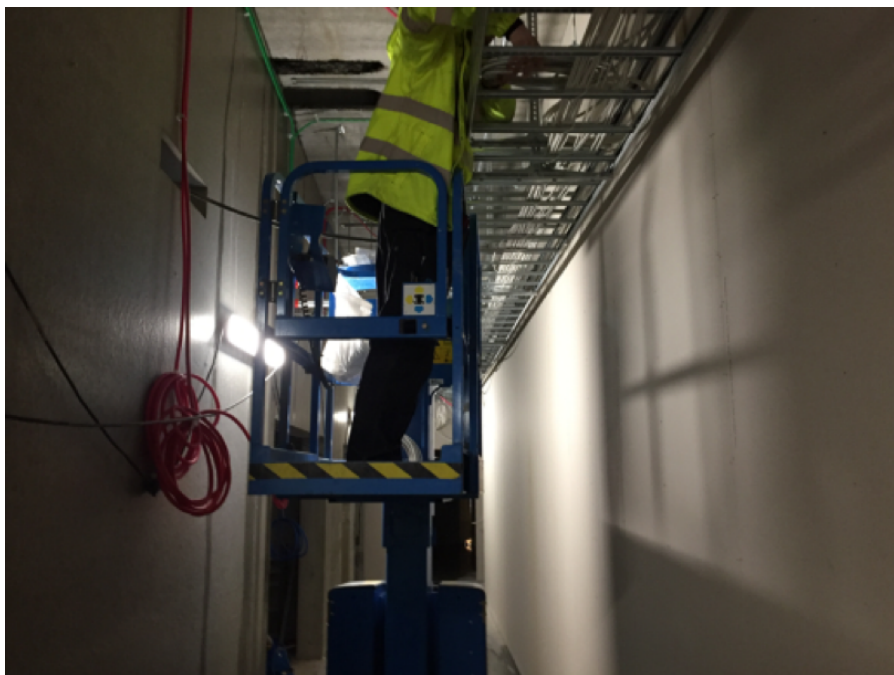
*Picture 7 - proper edge protection*



*Picture 8 - worker walking on the roof without security against the fall*



*Picture 9 – poor security of work in height*



*Picture 10 - right security of work in height*





*Picture 11 – possible form of scaffolding*

*Czech Republic:*

Pictures are taken from a different construction sites.



*Picture 12 - poor protection of edge with risk of fall*



*Picture 13 - scaffolding?!*



*Picture 14 - unsecured building pit*



*Picture 15 - messy working environment*



*Picture 16 - part of safe work is rest*



*Picture 17 - working in excavation under the working machine*



*Picture 18 - uncovered hole*



*Picture 19 - poor security of the elevator shaft*

## **5. Findings, discussion and evaluation**

### **5.1 Comparison of legislation**

Many regulations in both countries are influenced by EU standards and regulations, and therefore there are many basic requirements for construction industry in the Czech Republic and Norway similar or based on a similar basis. Of course, there are differences that arise from the development of the construction industry and the specific conditions and needs of the country. There are aspects of climatic conditions acting in environmental geographical location or aspects of cultural historical development of the country and many more.

The legislative system in the Czech Republic for HSE on construction sites has a lot of legally binding laws and regulations. The most important law in the field of health and safety at work is Act No. 262/2006 Coll. The Labour Code, which sets out the basic requirements for the relationship between the employee and the employer. Other fundamental regulations include Act No. 309/2006 Coll. Providing additional health and safety conditions. The OSH field is further regulated by other laws, regulations and regulations that are aimed at specific activities and actions in the organization. Just for the idea, there is currently more than 100 laws and decrees (unless we do not count standards).

The Czech Republic is at a similar level with other EU Member States. The Czech Republic has implemented few EU directives and in many areas, it has harmonized the requirements for occupational safety. Czech legislation is often stricter than

Norway also adopts European legislation as it is a member of many European economic and industrial organizations.

Effort to implement European legislation are particularly advantageous for Norway by opening doors to the European market, and some standardization of regulations allows foreign companies to enter the market and enables Norwegian companies to participate better in the European market.

Norway has regulations for the area of HSE divided into three main parts. Working Environment Act, Internal Control Regulations, Building regulations which are later divided into more detailed form by other rules and standards.

### *Evaluation*

Regulations for the area of HSE on construction sites are based on the same foundations for both countries, so that means that the differences in them are minimal.

Norwegian regulations are not processed in such detail as Czech but Norwegian building companies usually process these rules and implement them into their internal regulations in much higher level.

Norwegian system of regulations is orderly organized and there is much easier orientation in this legislation system. In the Czech Republic, there is very big number of laws, regulations and standards which companies must follow and it is sometimes for them quite hard even more if Government issue new decree or law that companies must follow every year.

## 5.2 Comparison and evaluation of interviews

1. Area: Workers and Accidents
<b>Comparison</b>
<ul style="list-style-type: none"><li>• In the area of work accidents had respondents similar opinion on what are the most dangerous activities (works at heights), most common injuries (minor injuries – cuts, scratches or bruises) on construction sites. Another thing they agreed on is that accidents are mainly caused by human inattention.</li><li>• The interviews shown that both countries have a problem with foreign workers and their compliance of safety work rules. It is mostly caused by the language barrier. Norwegians are trying to improve this fact with effort to translate instructions into workers language and use mainly pictograms for instruction on construction sites.</li><li>• In both countries, mostly large companies have their own system how to learn from accidents and improve internal regulations and security measures for HSE. Norwegian building company also often cooperate with LIA on improvement of HSE regulations.</li></ul>
<b>Evaluation</b>
<p>From the collected data, it is possible to say that the situation on construction sites related to worker's accidents is very similar and there are only slight differences. Non-compliance of regulations due to the language barrier is often problem of foreign workers from what arise higher risk of accidents.</p>

## 2. Area: Costs and controls

### **Comparison**

- Companies in both countries usually do not have any rules for appraisalment of HSE security measures and their price is involved in items of the project budget. Just in case if there are some special requirements of investor. In that case contractor make special price just for those requirements.
- In both countries are LIA controls very rare. It seems like in CR controls are more strict, whereas in NO it is more like cooperation for improvement of HSE on construction site.

### **Evaluation**

Main difference in this area seems to be approach of the LIA to controls and detected deficiencies. In NO there is effort to cooperate with building companies and improving situation in HSE on construction sites.



### 3. Area: Strengths and weaknesses

#### Comparison

##### Czech Republic

###### Positives:

- The sophistication and content of safety regulations is positively evaluated. Regulations are on the top level and processed in detail.
- The presence of foreign investors who place greater emphasis on compliance of OSH.

###### Negatives:

- Bad communication between participants of construction processes.
- Low financing into security measures.
- Bad approach of companies to work safety, which should not be taken like a burden but as tool how to ensure a safe working environment and tool for limiting accidents and injuries on the construction site.
- Too many legislative regulations.

##### Norway

###### Positives:

- Involvement and cooperation of people in HSE and their effort to improve.
- Communication between participants of construction processes.

###### Negatives:

- Small companies are not taking care of HSE that strictly like they should.
- Bad early planning.

#### Evaluation

From the collected data, it follows that the greatest difference is in the communication and cooperation on the constructions between the participants in the construction process. While there is a very high level of communication in Norway, the respondents have poor experience with communication and cooperation in the Czech Republic.

### 5.3 Statistical comparison

2015	CR	NO
Number of workers	369,283	229,392

Numbers of fatal accidents

	2012	2013	2014	2015	2016
CR	26	24	33	33	23
NO	7	9	11	6	8

### 5.4 Summary of findings

#### *Summary of the findings from the interviews*

By studying of Czech and Norwegian legislation of OHS for construction industry, we could create an idea of the way they are designed. From this point of view, we came to the conclusion that both OSH legislations are at very high level and very similar in content because it is based on the same foundations of legislation for the EU and the European organizations for OSH.

Norwegian regulations are not processed in such detail as Czech but Norwegian building companies usually process these rules and implement them into their internal regulations in much higher level.

Norwegian system of regulations is orderly organized and there is much easier orientation in this legislation system. In the Czech Republic, there is very big number of laws, regulations and standards which companies must follow and it is sometimes for them quite hard even more if Government issue new decree or law that companies must follow every year.

#### *Summary of the findings from the interviews*

The interviews were very beneficial and gave us a better insight into the issue of OSH in construction in both countries.

From the collected data, it is possible to say that the situation on construction sites related to worker's accidents is very similar and there are only slight differences. Non-compliance of regulations due to the language barrier is often problem of foreign workers from what arise higher risk of accidents. Norwegians are trying to improve

this fact with effort to translate instructions into workers language and use mainly pictograms for instruction on construction sites. And they also have rule that in every group of foreign workers have to be at least one who can speak Norwegian and can explain instruction to his fellow workers. This situation that foreign workers have more accidents can be caused by fact that they are usually doing harder and more dangerous works (demolitions, maintaining works, etc.).

Main difference in controls seems to be approach of the LIA to controls and detected deficiencies. There is effort to cooperate with building companies and improving situation in HSE on construction sites.

From the collected data, it follows that the greatest difference is in the communication and cooperation on the constructions between the participants in the construction process. While there is a very high level of communication in Norway, the respondents have poor experience with communication and cooperation in the Czech Republic.

#### *Summary of the findings from statistic data*

The statistics of fatal accidents in the construction industry shows that fatal accidents in the Czech Republic are three times more frequent than in Norway. This, in terms of persons employed in the construction industry, shows that fatal accidents are approximately 30% more frequent in the Czech Republic. This may mark the worse conditions of OSH on construction sites.

## **5.5 Results and possible improvement**

The biggest differences are not in legislation, it is in the approach to OHS, communication and compliance with OHS regulations. It may vary according to the size of companies.

Budgets of construction projects is often very low in the Czech Republic and there is a big effort by investor to reduce a cost to a minimum, which often leads to reduced standards of OHS on site.

Another attribute that significantly affects the construction projects in both countries is the attribute of time. Investors are pushing to the shortest possible construction time, so the construction companies are in time pressure and do not care much about security measures, but they are only interested in deadlines and to achieve the best possible financial profit.

In the Czech Republic the most common criteria for tender is usually solely the price, nothing more. Investors should incline more to attributes of ensuring work safety on construction sites and protect human lives, but for which they must be willing to pay more. In most cases, foreign investors from Western Europe, where the culture of human life protection is rooted deeper, are willing to invest more into their projects for increasing of protection.

There should be an effort to change the approach of Czech construction companies to the work safety. It should not be taken as a burden, but rather as a tool for ensuring a safe working environment, as well as a tool for limiting accidents and injuries on construction sites. They should take the rule "Safety First" more seriously.

Quality of communication between participants of building process, mainly between subcontractors, is on a very low level in the Czech Republic. Subcontractors usually ignore the work of other parties on site and their effort is just to achieve their profit by delivering within the deadlines. From that there are many dangerous situations arising. Based on the research, there is existing better culture of communications on construction sites in Norway.

To improve the situation in the Czech Republic, in particular, it would be necessary to change approach to OHS, improve early planning, risk assessment and mainly to increase the financing of construction projects and security measures.

## **Conclusion**

This master thesis is outlining my findings of the situation of Occupational Health and Safety on construction sites in the Czech Republic compared to one of the Europe's most developed countries, i.e. Norway.

The first part of this master thesis elaborates on the way in which the topic is dealt with and describes the theoretical framework for OHS in the Czech Republic, Norway and the EU. In this section, I look into the definition of occupational health and safety. e.g. what are its limits and why it is important to deal with it.

The second part of the thesis contains data collected through construction sites visits and interviews with persons dealing with OSH on construction sites. Collected data are analysed and evaluated. Then, there follows a summarization of results and proposition of possible improvements.

Fulfilment of aims was achieved in the scope that was designed at the beginning of the work.

Recommendations for future research are: For a greater weight of this research, it would be necessary to collect much more data, visit more construction sites and make interviews with a larger number of respondents. This would, however, require a much longer time frame and more extensive scope than this research requires for the master thesis.

Why should we deal with this issue? Often, the importance of OSH is underestimated and built into an inferior position compared to other business management activities. This is a great problem in the area of health protection, which unluckily always occurs mainly in the case of accident and a serious or fatal injuries. Underestimating employment security policy shows poor management leadership of enterprise and will certainly not remain unanswered. Last but not least, serious and fatal accident consequences have major financial implications for businesses, which often exceeds the price the company would pay for the right security measures. Proper management of construction projects therefore goes hand in hand with the proper management of OHS on construction sites.

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## **Regulations**

### ***Czech***

- 1) *Act No. 262/2006 Coll. - Labour Code*
- 2) *Act No. 183/2006 Coll. - Building Act*
- 3) *Act No. 309/2006 Coll. – act on insurance of other HSE conditions*
- 4) *Act 88/2016 Coll. – act which modify Act No. 309/2006 Coll. according to European regulations*
- 5) *GR No. 591/2006 Coll. – government regulation for closer minimum requirements for HSE*
- 6) *GR No. 101/2005 Coll. – government regulation for more detailed workplace requirements and workplace environment*
- 7) *GR No. 362/2005 Coll. – government regulation for danger of fall from the height or to the depth*

### ***Norwegian***

- 1) *Working Environment Act*
- 2) *The internal control regulation*
- 3) *Client regulation on safety, health and working environment on construction sites*

### ***EU***

- 1) *Directive 89/391 - Framework Directive on OSH*
- 2) *Directive 2009/104/EC - use of work equipment*
- 3) *Directive 99/92/EC - risks from explosive atmospheres*
- 4) *Directive 92/58/EEC - safety and/or health signs*
- 5) *Directive 89/656/EEC - use of personal protective equipment*
- 6) *Directive 89/654/EEC - workplace requirements*

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## Explanations:

### Shortcuts:

<b>OHS</b>	Occupational Health and Safety
<b>HSE</b>	Health, safety and environment
<b>GR</b>	Government regulation
<b>Coll.</b>	Collection
<b>OSHA</b>	Occupational Safety and Health Agency
<b>LIA</b>	Labour Inspection Authority
<b>NO</b>	Norway
<b>CR</b>	Czech Republic
<b>EU</b>	European Union
<b>ILO</b>	International Labour Organization
<b>EEC</b>	European Economic Community
<b>EEA</b>	The European Economic Area

### Explanation:

<b>Worker</b>	person who is working on construction site
<b>Developer (Investor)</b>	person or company that ordered the construction of the project
<b>Builder (Contractor)</b>	company that manage the project
<b>Subcontractor</b>	company which working for contractor

# Appendixes

## Interview guide

### Information about person who is answering:

**Name:**

**Company/organization:**

**Position:**

**Job description:**

### Questions:

- 1) What are the most dangerous activities or works on the construction site?
- 2) What are the most common accidents on the construction site?
- 3) What are the most common injuries on the construction site?
- 4) Is there common, that foreign workers have accidents more often?
- 5) How do you implement findings from accidents to your future work? (and to your internal company regulations for HSE?)
- 6) How much does security measures usually cost for building companies?
  - Is there any rule for appraisal of security measures?
- 7) How are the costs for security measures covered? (Project owner, main contractor, subcontractor...?)
- 8) How are the controls and inspections carried out by Labour Inspection Authority?
  - How often are controls?
  - What is the main focus of inspection?
  - What are the biggest deficiencies that are usually detected by inspections?
  - How it works, when there is detected violation of regulations?
  - What are the sanctions for non-compliance of OHS regulations?
  - Who is penalized? Person responsible for compliance of OHS regulations or company that manage construction or an investor, who ordered that company?
  - How is it with punishment/penalization in the case of accident?
- 9) Who is investigating accidents on construction sites?
- 10) How is it with coordinators of HSE?
  - When must be designed?

- What are duties, responsibilities and powers?
- Plan of HSE? Project designing? Maintaining?

11) How is it in the case when you don't have a coordinator?

Do you then have person for risk prevention?

12) What you think could be improved in HSE on construction sites?  
(measures, regulation,..)

13) What you think is on the highest level in HSE on construction site?

## Interviews with Czech respondents

### 1. Interview

#### Information about person who is answering:

Name: *JP*

Company/organization: *Skanska*

Position: *Senior EHS specialist*

#### Questions:

1) What are the most dangerous activities or works on the construction site?

*Manipulation with big prefabricated clocks, earthworks, pilots, work in heights.*

2) What are the most common accidents on the construction site?

*Most often the accidents are due to inattentiveness of people or because they are in a place where they have nothing to do.*

3) What are the most common injuries on the construction site?

*Twisted ankle, cuts, scratches, bruise.*

4) What are the activities when there is the biggest amount of serious accidents?

*Lifting operations, clash with the machine, night works.*

5) Do you have a lot foreign workers?

*Yes, we have a lot of workers from Eastern Europe. Maybe*

6) Is there common, that foreign workers have accidents more often?

*We did not notice a bigger number of foreign workers injuries, but this is probably due to the fact that foreign workers do not report minor accidents and injuries.*

*But probably they are in the bigger risk of accidents because there is big language barrier and sometimes they don't understand to our instructions.*

*That is why we have learned to use picture markings on construction sites to make the instructions more understandable for everyone.*

7) How do you implement findings from accidents to your future work? (and to your internal company regulations for HSE?)

*All accidents are being investigated, analysed and evaluated and their results are then provided to all branches of Skanska across Europe.*

8) How much does security measures usually cost for building companies?

○ Is here any rule for appraisalment of security measures?

*It is always part of project budget items. But we have an estimation that our security measures cost us approximately 3% of project budget.*

- 9) How are the costs for security measures covered? (Project owner, main contractor, subcontractor...?)

*Collective protection we provide ourselves and personal protective equipment must every contractor ensure himself.*

- 10) How are the controls and inspections carried out by Labour Inspection Authority?

- How often are controls?

*I had control 3 times in my projects in last 2 years. Once because of injury, once randomly and once because someone report to LIA.*

- What is the main focus of inspection?

*It is different. Every inspector is focused for other area.*

- What are the biggest deficiencies that are usually detected by inspections?

*Usually some paper work.*

- How it works, when there is detected violation of regulations?

*They will suggest how the errors should be fixed and then they come to check if everything is okay.*

- What are the sanctions for non-compliance of OHS regulations?

*Usually without sanctions. Just warning.*

- How is it with punishment/penalization in the case of accident?

- 11) Who is investigating accidents on construction sites?

*Police, LIA and we have our own investigating of accidents.*

- 12) What you think could be improved in HSE on construction sites? (measures, regulation,..)

*Contractors and investors sometimes don't understand to regulations clearly and from that there comes a lot of mistakes.*

*Too complicated system of laws and regulations. Too many of them.*

*Approach of contractors and workers who have HSE like burden and not like tool how to make better and safer work condition on construction sites.*

*The criteria for choosing of contractors only affect the price and other attributes are not important.*

- 13) What you think is on the highest level in HSE on construction site?

*That there is a lot of foreign investors who are investing here in construction project and they are rising level of work and level of HSE because their standards are much higher than in Czech regulations.*

*Good elaborated regulations.*

Extra answers: *We have anti-collision system for cranes in every construction site and now we will install cameras to driving head on cranes, so than every crane operator can see to the places that are overshadowed for his field of view.*

*We have special system for security of holes in ceilings called "Izolet". It is reinforced polystyrene which is after finishing of other works removed.*

*We use special equipment for works in small heights called "podium steps".*

## **2. Interview**

### **Information about person who is answering:**

Name: **ZR**

Company/organization: **Gemo Olomouc**

Position: **HSE manager**

Job description:

### **Questions:**

1) What are the most dangerous activities or works on the construction site?

*Works in heights with risk of fall, works in excavations, works close to the power line.*

2) What are the most common accidents on the construction site?

*Leg injuries when carrying loads.*

3) What are the most common injuries on the construction site?

*Twisted ankle.*

4) Is there common, that foreign workers have accidents more often?

*In our statistics, it is not obvious because foreign workers do not usually report minor injuries and thus do not show higher rates of injuries to these workers.*

*But we have a larger number of more serious injuries to these workers.*

5) Do you have a lot of foreign workers?

*Yes, it is approximately 50% of workers on the construction site. It is mostly Ukrainians, Bulgarians, Moldovans.*

6) How do you implement findings from accidents to your future work? (and to your internal company regulations for HSE?)

*We write down the report and then present the records at the coordination meetings and try to choose a solution to prevent the incident from happening again.*

*Than every year we have a meeting for HSE managers and there we present reports from accidents a try to find solution how to avoid those situations in the future.*

7) How much does security measures usually cost for building companies?

○ Is here any rule for appraisalment of security measures?

*We do not have any rule for it.*

8) How are the controls and inspections carried out by Labour Inspection Authority?

- How often are controls?

*Very randomly and not so often.*

- What is the main focus of inspection?

*This is different for each control.*

- What are the biggest deficiencies that are usually detected by inspections?

*This is different for each control.*

- How it works, when there is detected violation of regulations?

**They will suggest how the errors should be fixed and then they come to check if everything is okay. In the event of serious findings, they may be penalized or stop the construction.**

- What are the sanctions for non-compliance of OHS regulations?

*Could be in monetary form in the range 1000-10 000 CZK.*

- Who is penalized? Person responsible for compliance of OHS regulations or company that manage construction or an investor, who ordered that company?

*Depends on the type of violation and who was responsible for that.*

9) Who is investigating accidents on construction sites?

*Police, LIA*

10) What you think could be improved in HSE on construction sites?  
(measures, regulation,...)

*Communication between investor and contractor. Prevention of HSE. Financing of HSE measures. Czech investors are not willing to pay more for better HSE.*

11) What you think is on the highest level in HSE on construction site?

*Regulations are at a good level.*

*Since we have adopted European legislation, work safety has improved in good direction and is constantly improving.*

Extra answers: *Everyone in our company has to go through first aid training.*



### **3. Interview**

#### **Information about person who is answering:**

Name: **IR**

Company/organization: **Self-employed person**

Position: **Coordinator of HSE**

Job description: **Coordinator for phase of preparation and realization**

#### **Questions:**

- 1) What are the most dangerous situations, activities or works on the construction site?

***Works in heights, works in excavations, uncovered holes in ceiling, demolitions.***

- 2) What are the most common accidents on the construction site?

***Fall into uncovered holes or tripping over barrier, slicing in mud.***

- 3) What are the most common injuries on the construction site?

***Cuts, scratches, twisted ankle, falls from small height.***

- 4) Is there common, that foreign workers have accidents more often?

***Yes, it is more common, because they usually don't understand to instructions. There is big language barrier.***

- 5) How do you implement findings from accidents to your future work?

***Mainly in the case when I am designing HSE Plan I very often use my knowledge and experience in risk assessment. I also implement findings to my future tutorials for workers in other projects.***

- 6) How much does security measures usually cost for building companies?

- Is here any rule for appraisalment of security measures?

***It is always just part of items in project budget. But once I came into contact with project where investor had in tender documentation that security measures have to be at least 3,5% of all project budget.***

- 7) How are the controls and inspections carried out by Labour Inspection Authority?

- How often are controls?

***Controls are carried out randomly and irregularly. Usually every project have control once a year.***

- What is the main focus of inspection?

*It differs depending on what the controls are in the that year focus on. For example, last year it was focused on lifting machines or equipment.*

- What are the biggest deficiencies that are usually detected by inspections?

*Poor construction site fencing, poorly secured edges with the risk of falling.*

- How it works, when there is detected violation of regulations?
- What are the sanctions for non-compliance of OHS regulations?

*It depends on severity of violation of regulations.*

- Who is penalized? Person responsible for compliance of OHS regulations or company that manage construction or an investor, who ordered that company?

*It could be everyone who is participating in building process.*

- How is it with punishment/penalization in the case of accident?

*Have no experience with this situation in my 10-year practice.*

- 8) Who is investigating accidents on construction sites?

*LIA, Police and sometimes just companies try to analyse incidents and learn from it.*

- 9) What you think could be improved in HSE on construction sites? (measures, regulation,..)

*Change the approach of companies to work safety, which should not be taken as a burden, but as a tool for ensuring a safe working environment and a tool for limiting accidents and injuries on construction sites. They should rule "Safety First" take more serious.*

*Communication between workers is not proper. If one gets instructions and advice on how to better secure or how to move around the construction site to avoid dangers, then he should also provide this information to his colleagues.*

*Communication between subcontractors.*

- 10) What you think is on the highest level in HSE on construction site?

*Regulations are on the top level and processed in detail.*

Extra answers: *Foreign investors have more specific requirements and are willing to invest more money to security measures than Czech investors.*

*Large companies observe HSE regulations in much bigger scope.*

#### **4. Interview**

##### **Information about person who is answering:**

**Name:** JL

**Company/organization:** VCES

**Position:** Project manager

**Job description:** Building management

##### **Questions:**

1) What are the most dangerous activities or works on the construction site?

*Clearly, it is work in heights.*

2) What are the most common accidents on the construction site?

*Fault of human factor (90% of cases on site).*

3) What are the most common injuries on the construction site?

*Minor injuries (cutting and stabbing).*

4) Is there common, that foreign workers have accidents more often?

*At this time, yes.*

5) How do you implement findings from accidents to your future work? (and to your internal company regulations for HSE?)

*An instruction sheet is issued, all workers are familiarized and findings are integrated into internal OSH standards.*

6) How much does security measures usually cost for building companies?

*These are tens to hundreds of thousands, depending on the size and complexity of the project.*

○ Is there any rule for appraisal of security measures?

*It is the percentage of the total contract price (according to the company standard and investor requirements).*

7) How are the costs for security measures covered? (Project owner, main contractor, subcontractor...?)

*The biggest part is for the main contractor, the smaller part for the subcontractor and the least for the investor.*

8) How are the controls and inspections carried out by Labour Inspection Authority?

*Mostly, controls are carried out on larger projects, on indication or when a serious accident occurs on the site.*

- How often are controls?

*Minimal.*

- What is the main focus of inspection?

*Complex control, in case of an accident, will focus on the legislative requirements for the accident.*

- What are the biggest deficiencies that are usually detected by inspections?

*If everything works according to the internal guidelines, these are mostly small deficiencies that we will prove by return.*

- How it works, when there is detected violation of regulations?

*Usually, we will get a deadline for removal (length is based on the severity of the deficiency). If the deadline is not met, we are subject to an LIA penalty.*

- What are the sanctions for non-compliance of OHS regulations?

*From LIA, the sanctions begin from 10,000 CZK.*

*According to the internal regulations from 1,000, CZK above depends on the case.*

- Who is penalized? Person responsible for compliance of OHS regulations or company that manage construction or an investor, who ordered that company?

*The one who violated the health and safety regulations.*

- 9) Who is investigating accidents on construction sites?

*Person responsible for HSE in the company.*

- 10) What you think could be improved in HSE on construction sites?  
(measures, regulation,..)

*From a legislative point of view, the state is sufficient, the main problem is the financing for these measures (the current situation is underfinancing) and then the attitude of people to compliance with the health and safety regulations.*

- 11) What you think is on the highest level in HSE on construction site?

*State of the technical equipment and options (many variants and ways) to do the job safely.*

## **Interviews with Norwegian respondents**

### **1. Interview**

#### **Person information:**

Name: **VMF**

Company/organization: **Veidekke**

Position: **Project manager/Building manager**

Job description: **Project managing**

#### **Interview:**

1) What are the most dangerous activities or works on the construction site?

*Fall from height (scaffolding, small bridges)*

*Lifting and moving the load using a crane*

2) What are the most common accidents on the construction site?

*Falls from small heights due to inattention or because someone forget put the railing back to scaffolding after he finishes work where he needed to put away the railing.*

*Next is falls of things from a height when one worker works above the other.*

*Injury of the foot when carrying the load over the construction.*

3) What are the most common injuries on the construction site?

*Small injuries – cuts, scratches, twisted ankles*

4) Have you ever experienced a fatal accident?

*No, I didn't in my 20 year of practice. Just one there was a serious injury when worker felt down from scaffolding.*

5) Is there common, that foreign workers have accidents more often?

*Not my knowledge. When they come to our construction they have to go through work safety training and confirm that they understood to our safety rules. We have instructions also in Polish and in every working group there always have to be at least one who can understand Norwegian or speak English. Next thing is that we don't have too many foreign workers.*

6) How do you implement findings from accidents to your future work? (and to your internal company regulations for HSE?)

*We report every accident and near misses in our database where are statistics with every incident in our company. And from more serious accidents we make a*

*report called “Lear of the accident”, in which is described why the incident happened, what was wrong and how to learn from the incident and avoid that in the future. This report is than sanded to all persons who are responsible for safety and health on the construction site.*

7) Who is responsible for HSE?

***Building manager. He is HSE manager for construction.***

8) How much does security measures usually cost for building companies?

○ Is here any rule for appraisalment of security measures?

***No there is no rule for appraisalment. Security measures are part of budget items. So, it differs building from building.***

9) How are the costs for security measures covered? (Project owner, main contractor, subcontractor...?)

***It is always part of the calculated price from contractor or subcontractor.***

10) What experience do you have with compliance of HSE regulations in other construction companies?

***Often it depends on the size of the company. Small companies usually do not follow the regulations as strict as they should and they don't have that strict internal control regulations. They often try to save money with low security measures.***

11) How are the controls and inspections carried out by Labour Inspection Authority?

○ How often are controls?

***In my 20 years in Veidekke I had control 3 times on the construction.***

○ What is the main focus of inspection?

***Often just paper work if there is everything ok and clear.***

○ What are the biggest deficiencies that are usually detected by inspections?

***It is often just something is missing in documents.***

○ How it works, when there is detected violation of regulations?

***They will suggest how the errors should be fixed and then they come to check if everything is okay. In the event of serious findings, they may penalized or stop the construction.***

○ What are the sanctions for non-compliance of OHS regulations?

***It depends on seriousness of the offense and on company size, because the fine is assessed by company size.***

- Who is penalized? Person responsible for compliance of OHS regulations or company that manage construction or an investor, who ordered that company?

*Usually investor and the contractor. Depends on what has happened.*

- 12) Who is investigating accidents on construction sites?

*Police, Labour inspection and our company has his own investigate team.*

- 13) How is it with coordinators of HSE?

*Same regulations like in CR.*

- 14) What you think could be improved in HSE on construction sites?

(measures, regulation,..)

*Improve security in the case of moving loads with cranes. Every crane should have camera on the sliding head, because there is often situation when crane operator could not see to places where he is moving the loads and that is very risky work than.*

- 15) What you think is on the highest level in HSE on construction site?

*We try to build a culture where everyone can feel good on the construction site and say when he thinks, that something is doing in dangerous way. Than he can just raise his hand and say that something is wrong. We try to guide our workers to pay attention to one another and to observe the work of others and thus prevent dangerous situations. I think this is a great success here and we do not have many accidents on the construction sites.*

## **2. Interview**

### **Person information:**

Name: **HJ**

Company/organization: **Statsbygg**

Position: **Senior engineer**

Job description: **Project managing**

### **Interview:**

- 1) What are the most dangerous activities or works on the construction site?

*Working at heights*

*Lifting operations (falling objects)*

*Temporary constructions. Constructions that fail*

*Working around big machines / vehicles*

*Blasting operations - explosion*

*Contact with electrical voltage*

- 2) What are the most common accidents on the construction site?

*Slips, trips and falls*

*Falls from different heights (low more common)*

*Cuts / crush – Hand tools*

*Electrical voltage*

*Eye damage due to chemicals or use of cutting tools*

- 3) What are the most common injuries on the construction site?

*Cut / fingers*

*Eye*

*Sprained ankle / foot*

*Broken arm, leg and rib (rupture)*

- 4) Is there common, that foreign workers have accidents more often?

*Unfortunately, yes.*

- 5) How do you implement findings from accidents to your future work? (and to your internal company regulations for HSE?)

*We put regulations in our contracts, and closely follow them up.*

*a plan for language management. How to handle different languages.*

*Use of ladders, scaffolding etc*



- 6) How much does security measures usually cost for building companies?
- Is there any rule for appraisal of security measures?

***Good HSE pays off. Accidents are expensive. An orderly and structured workplace is more efficient, so overall there are no bigger costs.***

***We want to describe security measures in our price request to the contractors, so that everyone concurs on equal terms.***

- 7) How are the costs for security measures covered? (Project owner, main contractor, subcontractor...?)

***The contractors (main and sub) includes their safety measures in their offer and work.***

- 8) How are the controls and inspections carried out by Labour Inspection Authority?

- How often are controls?

***Maybe 1/30 of our projects***

- What is the main focus of inspection?

***Out on the site, and some documentation. Sometimes a focus area as f.eg. chemicals or working at heights.***

- What are the biggest deficiencies that are usually detected by inspections?

***Working at heights, scaffolding etc***

- How it works, when there is detected violation of regulations?

***Often the contractor receives written instructions to correct the deviation***

- What are the sanctions for non-compliance of OHS regulations?

***Close the workplace, or notice of fines.***

- Who is penalized? Person responsible for compliance of OHS regulations or company that manage construction or an investor, who ordered that company?

***Often company / contractor***

- How is it with punishment/penalization in the case of accident?

***Serious accidents often end up with a fine to the contractor.***

- 9) Who is investigating accidents on construction sites?

***Serious accidents are investigated by police and/or Labour Inspection Authority.***

10) How is it with coordinators of HSE?

- When must be designed?

*We have one coordinator for the design phase, and another one for the construction phase.*

- What are duties, responsibilities and powers?

**(from the Client legislation)**

**Coordination in the design phase includes:**

*a) coordinate the design so that consideration for safety, health and work environment is ensured.*

*b) to provide for the preparation of the plan for safety, health and work environment.*

**Coordination in the construction phase includes:**

*a) following up the risk situation in the building's plan for safety, health and working environment.*

*b) to follow up that timetables are prepared to ensure that there is sufficient time to perform the various work operations.*

*c) to follow up that employers and single-person companies implement the plan for safety, health and work environment.*

*d) to coordinate employers work that may interfere with each other in terms of safety, health and work environment, including the cooperation between employers.*

- Plan of HSE? Project designing? Maintaining?

*The legislation describes that the client has to draw up a plan for HSE. This plan has to include measures based on a risk assessment. Client shall ensure that the contractor follows up the plan during the construction period.*

11) How is it in the case when you don't have a coordinator?

Do you then have person for risk prevention?

***Due to legislation, we always have a coordinator***

12) How are roofing capture systems designed? How do you perform safe maintenance at heights?

***Many different solutions, but we strive to use collective protection (handrails, scaffolding), rather than personal protection (fall protection / rope)***

13) What you think could be improved in HSE on construction sites?  
(measures, regulation,..)

***Early planning, logistics, safe unloading and lifting operations.***

***Follow-up of laws, rules and regulations on site.***

14) What you think is on the highest level in HSE on construction site?

***When they start early planning based on a thorough risk analysis.***

### **3. Interview**

#### **Information about person who is answering:**

Name: SW

Company/organization: Arbeidstilsynet

Position: Inspector for evaluation of accident statistics

Job description: Statistics, analysis, developing strategies for avoid of accidents

#### **Questions:**

- 1) What are the most dangerous activities or works on the construction site?

*Work in heights with risk of fall*

- 2) What are the most common accidents on the construction site?

*Fall of objects, cuts by sharp objects, falls*

- 3) What are the most common injuries on the construction site?

*Cuts, fall of objects*

- 4) Is there common, that foreign workers have accidents more often?

*Yes, there is higher risk of accidents for foreign workers, because sometimes they don't understand to all instructions for work and for OHS.*

*There is a statistic which saying that foreign workers have 50 percent more accidents. It also could be caused by the fact, that foreign workers are doing harder and more dangerous work like demolitions or maintaining works. Norwegians are usually in some leading positions.*

- 5) How do you implement findings from accidents to your future work? (and to your internal company regulations for HSE?)

*Accidents are reported and evaluated. From evaluation there rise suggestions for improvement of the situation on the construction site. We collect a lot of data from accidents.*

*The government and Labour Inspection Authority has a good relationship with large companies with which they work together to improve strategy, the building conditions and improve measures for OSH on construction sites.*

- 6) How much does security measures usually cost for building companies?
  - o Is here any rule for appraisalment of security measures?

*There is no precise rule to how many companies are leaving for security measures. But it is often that big companies have more space in the budget to ensure a high level of work safety at construction sites.*

*It is hand by hand with size of the projects that are those companies working on, because big company are usually working on large state projects or contracts of foreign investors wishing to have a perfectly secured OSH on site and are willing to pay much more for it!*

- 7) How are the costs for security measures covered? (Project owner, main contractor, subcontractor...?)

*It is contained in the budget of project.*

- 8) How are the controls and inspections carried out by Labour Inspection Authority?
- How often are controls?
  - What is the main focus of inspection?
  - What are the biggest deficiencies that are usually detected by inspections?
  - How it works, when there is detected violation of regulations?
  - What are the sanctions for non-compliance of OHS regulations?
  - Who is penalized? Person responsible for compliance of OHS regulations or company that manage construction or an investor, who ordered that company?
  - How is it with punishment/penalization in the case of accident?

- 9) Who is investigating accidents on construction sites?

*That always depends on the severity of the accident. In the case of serious accident there will investigate police and the Labour Inspection Authority*

- 10) How is it with coordinators of HSE?

*Same rules like in CR.*

- 11) What you think could be improved in HSE on construction sites? (measures, regulation,..)

*Sometimes exaggerated pressure on deadlines and saving money on construction sites can lead to situations where safety is not the on first place and it may lead to different hazards on construction sites.*

*The other thing is that good health and safety are mainly taken care of by big companies, but small ones, who do not appear in big projects and are not so in their eyes, do not worry too hard about compliance of OSH.*

*I think that accident often happens because of lack of guidance for workers. So maybe sometimes just improve instructions for workers on the construction sites.*

12) What you think is on the highest level in HSE on construction site?

*Cooperation of large companies with LIA to improve work safety on construction sites and an effort to continually evolving in this area.*

*Laws and regulations are on the good level.*

## **4. Interview**

### **Information about person who is answering:**

Name: SS

Company/organization: Veidekke Entreprenør AS

Position: Head of Health and Safety

Job description: Making of strategic action plans for HSE

### **Questions:**

1) What are the most dangerous activities or works on the construction site?

*Work in heights, manipulation with machines, falling objects, explosives*

2) What are the most common accidents on the construction site?

*From falling and hits*

3) What are the most common injuries on the construction site?

*Bruise and minor injury like scratches*

4) Is there common, that foreign workers have accidents more often?

*Yes, it seems like the frequency of accidents for foreign workers is more often than Norwegian workers.*

5) What are you doing to improve this fact?

*We have requirement to understand the language. In every team of foreign workers have to be at least one who can understand Norwegian instructions and can explain it to his fellow workers.*

6) How do you implement findings from accidents to your future work? (and to your internal company regulations for HSE?)

*In the case of serious accident: we analyse it, then we bring it to a company management where we suggest solution for this situation and then we create a new standard which we implement to our internal company regulations.*

*We also cooperate with other companies and we provide each other analysis and experience of accidents and we try to help each other to improve in the field of occupational safety.*

7) How much does security measures usually cost for building companies?

○ Is there any rule for appraisalment of security measures?

*Security measures are always part of project budget and there is no rule of how much does it cost.*

8) How are the costs for security measures covered? (Project owner, main contractor, subcontractor...?)

9) How are the controls and inspections carried out by Labour Inspection Authority?

- How often are controls?

***We can say, very few. Maybe every tenth project is controlled every year.***

- What is the main focus of inspection?

***It always depends on campaign they have. So, they usually focus every year on something else.***

- What are the biggest deficiencies that are usually detected by inspections?

***It may vary. It is always more about improving but not about to try to find something what is missing or effort to penalize company.***

- How it works, when there is detected violation of regulations?

***In the case of a violation, the office sends us notice of what needs to be corrected and gives us a time limit to fix these deficiencies.***

- What are the sanctions for non-compliance of OHS regulations?
- Who is penalized? Person responsible for compliance of OHS regulations or company that manage construction or an investor, who ordered that company?
- How is it with punishment/penalization in the case of accident?

***We have good relationships with Authorities, because we cooperate with them to improve situation on the construction sites in every area.***

10) Who is investigating accidents on construction sites?

***LIA, Police and we also have our own investigating team. Sometimes also customer have a try to know why and what happened on his project.***

11) Did you ever have to deal with consequences of fatal accident?

***Yes, since 1998 till 2017 we had 6 fatal accidents, because we have approx. 7000 workers.***

12) What you think could be improved in HSE on construction sites?  
(measures, regulation,..)

***Planning, competence, learning from accidents.***

13) What you think is on the highest level in HSE on construction sites?

***Involvement of people in HSE and effort to improve.***



## Veidekke report about accidents

System of learning from accidents and near misses and implementing into a future work.

### SMART – Lær av ulykker

04.20 Forskaling

Plattendekke bristet under støp

#### Beskrivelse

Dekke over trappesjakt skulle støpes. Det ble lagt plattendekke(PD) og armering i forkant av støp. Underveis i støpen (etter ca. 2 tonn betong) observerer betongarbeidere et søkk i betongen og ser at PD brister/delvis knekker. De stopper støpen umiddelbart. PD kollapser ikke, men det dannes glippe mellom PD slik at mye betong renner nedover i trappesjakten.

#### Skadeomfang/konsekvens

Ingen personskade (trappesjakt og etasje under var avsperrert). Skadet/medbøying i PD. Betongen i trappesjakten og oppretting av PD medførte stort opprydningsarbeid. Flere timer ble brukt i etterkant som medførte forsinkninger og forsinkelser i planlagt fremdrift.

#### Direkte utløsende årsaker

PD var ikke stemplet under og var ikke tilstrekkelig tilleggsarmert til å tåle betongen. I følge tegning skulle det vært stemplet.

#### Bakenforliggende årsaker

##### Menneskelig

- ❑ Thomas Betong leverte ikke tilleggsarmert PD på de tre siste som bestilt.
- ❑ Stemplings-/montasjeplan ble ikke sjekket godt nok.
- ❑ Tok for gitt at det ikke skulle stemples. De to første PD til trappesjaktene ble levert som bestilt og trengte ikke stempeling, de tre resterende ble levert uten tilleggsarmert og trengte stempeling.
- ❑ Observerte ikke at elementet ikke var tilleggsarmert som det skal i slike tilfeller.

##### Teknisk

- ❑ Iht bestilling ble PD ikke tilstrekkelig armert til å tåle støp uten reis

##### Organisatorisk

- ❑ Manglende sjekkliste for arbeidsoperasjonen

#### Tiltak/læring

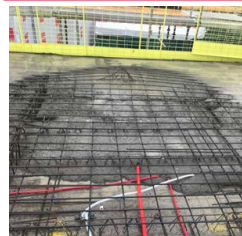
- ❑ Vær sikker på hva som er bestilt og hva som blir levert. Sørg for å kvalitetssikre leveransene.
- ❑ Sjekk stemplings-/montasjeplan iht tegning.
- ❑ Inn på sjekklister: sjekk at det skal være stempeling og evt sjekk om elementet er ekstra forsterket dersom stempeling ikke forekommer.
- ❑ Unngå å stå på PD som du støper, i tilfelle kollaps.
- ❑ Sperr av hele trappesjakt og underliggende etasje.

Sylve ID: 148035

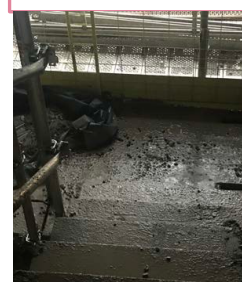
Riss på underside av element. Stempeling satt opp i etterkant for sikring



Bristet element fra oversiden



Rennende betong i hele trappen



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Kontaktperson: Mathias Lødding

Tlf.: 986 26 217





# European statistic of the number of persons employed in the various industries in 2014

## Persons employed by NACE Rev. 2 2014

geo	nace_2	Administrative and support service activities	Professional, scientific and technical activities	Real estate activities	Information and communication	Accommodation and food service activities	Transportation and storage	Wholesale and retail trade, repair of motor vehicles and motorcycles	Construction	Water supply, sewerage, waste management and remediation activities	Electricity, gas, steam and air conditioning supply	Manufacturing and quarrying	Mining
EU (28 countries)	14,195,640	12,121,100	2,841,981	6,315,880	10,807,887	10,491,057	32,680,601	12,655,252	1,480,000 (4a)			29,900,000 (6a)	(e)
EU (27 countries)													
Euro area (19 countries)													
Belgium	367,434	289,156	66,284	122,960	179,653	209,822	629,881	323,140	22,608		20,907	504,879	2,911
Bulgaria	106,240	96,056	34,863	79,414	136,459	157,297	499,958	147,163	32,656		32,573	536,216	24,066
Czech Republic	216,573	255,395	60,824	119,593	162,276	284,532	705,211	368,547	52,872		33,849	1,230,099	30,854
Denmark	111,155	161,008	34,985	115,562	72,812	160,003	417,756	169,288	12,415		14,308	360,983	4,456
Germany	3,176,395	2,453,401	615,005	1,180,261	2,085,047	2,193,690	6,139,638	2,262,152	227,396		228,179	7,289,135	60,841
Estonia	35,062	25,956	10,704	20,424	22,981	38,452	89,683	43,937	3,158		5,097	107,870	4,875
Ireland	112,448	120,244	22,775	82,010	161,097	91,995	336,866	99,660	8,025		8,496	189,966	4,058
Greece	120,680	212,490	8,864	70,965	172,061	172,061	792,102	196,024	10,534		21,598	283,215	6,037
Spain	1,247,455	938,616	189,709	408,882	1,210,730	822,509	2,882,233	991,202	149,305		38,514	1,724,072	20,082
France	1,975,927 (b)	1,354,292 (b)	316,177 (b)	840,487 (b)	1,027,310 (b)	1,289,522 (b)	3,455,212 (b)	1,813,280 (b)	166,854 (b)		180,297 (b)	3,014,251 (b)	21,523 (b)
Croatia	47,463	74,682	11,852	38,409	97,649	84,712	232,648	102,296	22,951		14,739	254,850	13,278
Italy	1,120,393	1,166,817	267,508	531,567	1,295,868	1,073,322	3,302,311	1,356,571	183,011		86,476	3,654,887	31,222
Cyprus	9,413	22,153	1,654	9,132	37,880	17,071	59,636	18,514	1,653		2,220	27,660	436
Latvia	34,123	43,888	31,009	27,023	32,804	77,932	159,415	68,027	7,658		10,624	121,746	3,213
Lithuania	52,464	59,177	22,327	28,504	40,572	111,692	251,633	103,200	13,242		13,912	207,060	2,723
Luxembourg	29,434	31,306	3,668	16,932	19,073	20,776	49,890	41,694	1,266		1,470	33,311	252
Hungary	207,932	221,782	65,290	118,359	127,946	226,351	551,980	194,532	40,747		24,792	678,247	4,288
Malta	14,075	10,984	1,218	6,907	17,482	9,865	30,377	9,992	(e)		(e)	(e)	(e)
Netherlands	901,502	638,893	75,199	275,488	408,720	399,011	1,446,650	429,255	33,262		27,153	673,456	11,326
Austria	219,660	236,342	50,207	108,628	291,003	194,132	651,401	288,074	20,314		29,297	620,993	6,265
Poland	470,999	578,787	181,042	309,269	238,257	733,273	2,183,013	831,226	130,543		136,068	2,425,350	164,037
Portugal	387,549	224,668	46,701	85,508	273,338	150,874	719,005	294,458	29,896		8,703	650,628	9,355
Romania	284,794	196,376	44,199	157,362	157,874	338,775	888,089	365,320	85,466		76,016	1,180,038	47,223
Slovenia	32,774	54,355	4,568	24,307	34,215	43,668	112,220	60,690	9,833		9,069	188,697	2,410
Slovakia	89,279	120,950	28,702	56,767	55,940	105,696	333,952	151,015	21,221		18,023	453,048	6,991
Finland	143,664	121,457	22,887	91,487	71,210	149,871	302,380	189,792	8,841		13,645	347,713	6,318
Sweden	294,520	300,029	80,978	204,557	189,299	265,832	653,082	363,866	20,789		31,811	622,950	10,847
United Kingdom	2,363,878	2,095,257	529,817	1,188,804	2,043,426	1,183,112	4,837,210	1,337,324	163,738		129,335	2,491,437	66,637
Iceland													
Liechtenstein													
Norway	134,120	130,892 (d)	27,864	82,832	97,591	155,394 (d)	369,940	225,776	8,389		15,947	237,472	71,316
Switzerland	246,347 (d)	281,372 (d)	38,685 (d)	139,937 (d)	211,940 (d)	212,606 (d)	596,327 (d)	329,758 (d)	14,188 (d)		29,126 (d)	679,619 (d)	4,284 (d)
Montenegro													
Former Yugoslav Republic of Macedonia, the													
Albania													
Serbia													
Turkey													
Bosnia and Herzegovina	9,995 (e)	(e)	2,682 (e)	18,006 (e)	(e)	36,270 (e)	130,171 (e)	35,139 (e)	12,718 (e)		17,104 (e)	139,999 (e)	19,040 (e)

\*not available    c=confidential    p=provisional    u=low reliability    d=definition differs (see metadata)    e=estimated    i=see metadata (phased out)    b=break in time series    r=revised

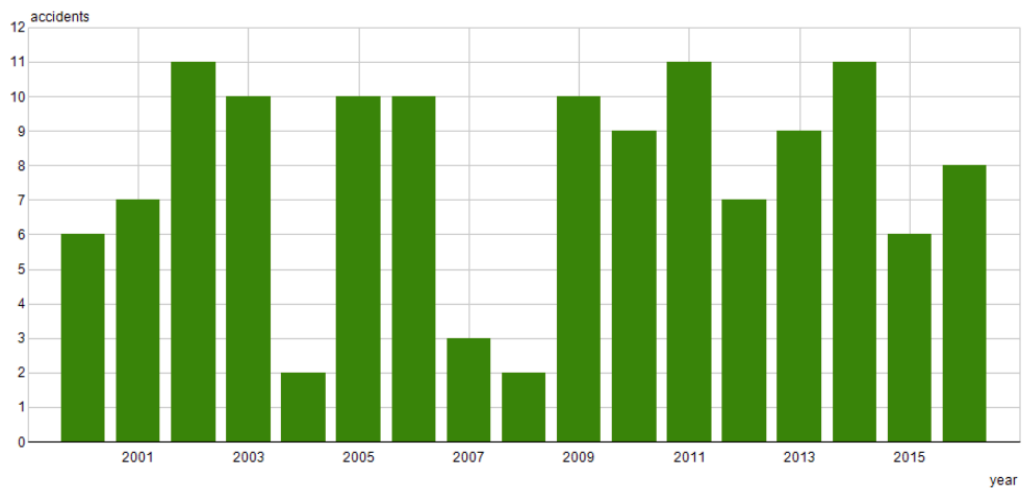
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## Norwegian statistics for accidents in construction in Norway

	Reported accidents at work	
	2015	2016
41-43 Construction		
Type of accident unknown	632	377
Struck by object	477	552
Collision	49	70
Overturn	47	44
Trapped, crushed	162	149
Fall	516	633
Cut by sharp og pointed object	346	373
Electrical voltage	135	164
High/low temperature	10	10
Chemicals	33	19
Explosion, fire	19	13
Aggression. violent threats	4	16
Physical violence	2	4
Other	284	288

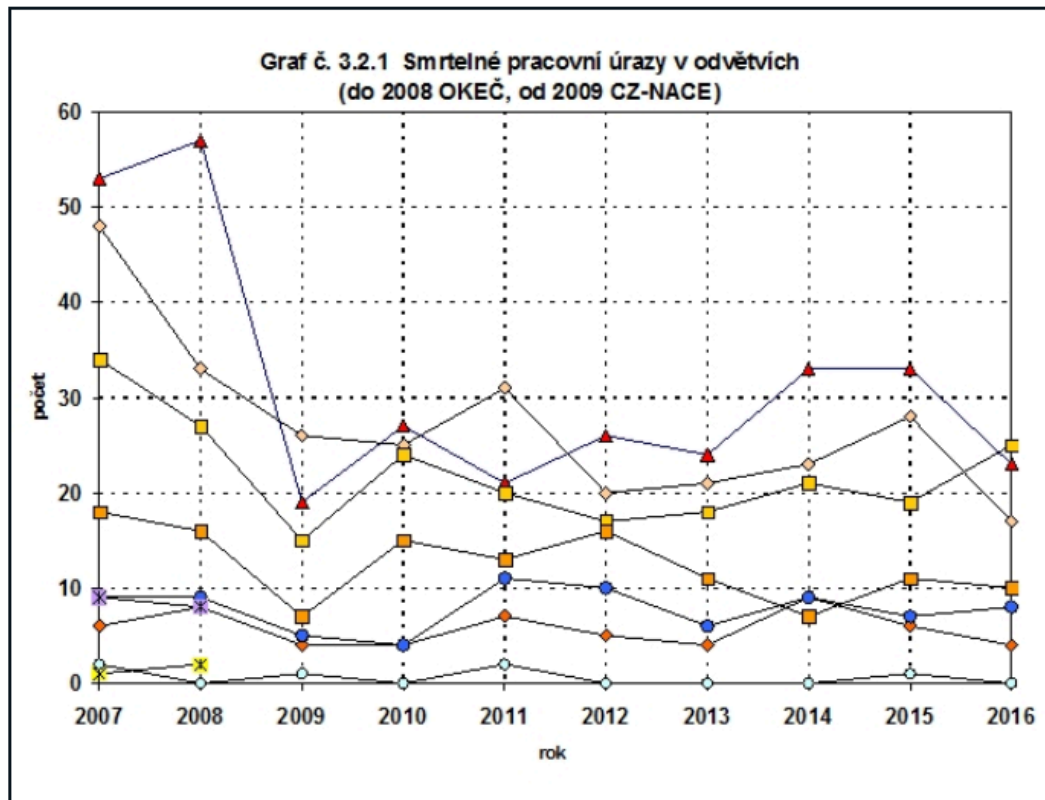
## Norwegian statistics for fatal accidents in construction in Norway

Fatal accidents at work (SIC2007), by industry, contents and year



Source: Statistics Norway

Czech statistics for fatal accidents in construction in CR



Statistics of most common injuries in construction EU

