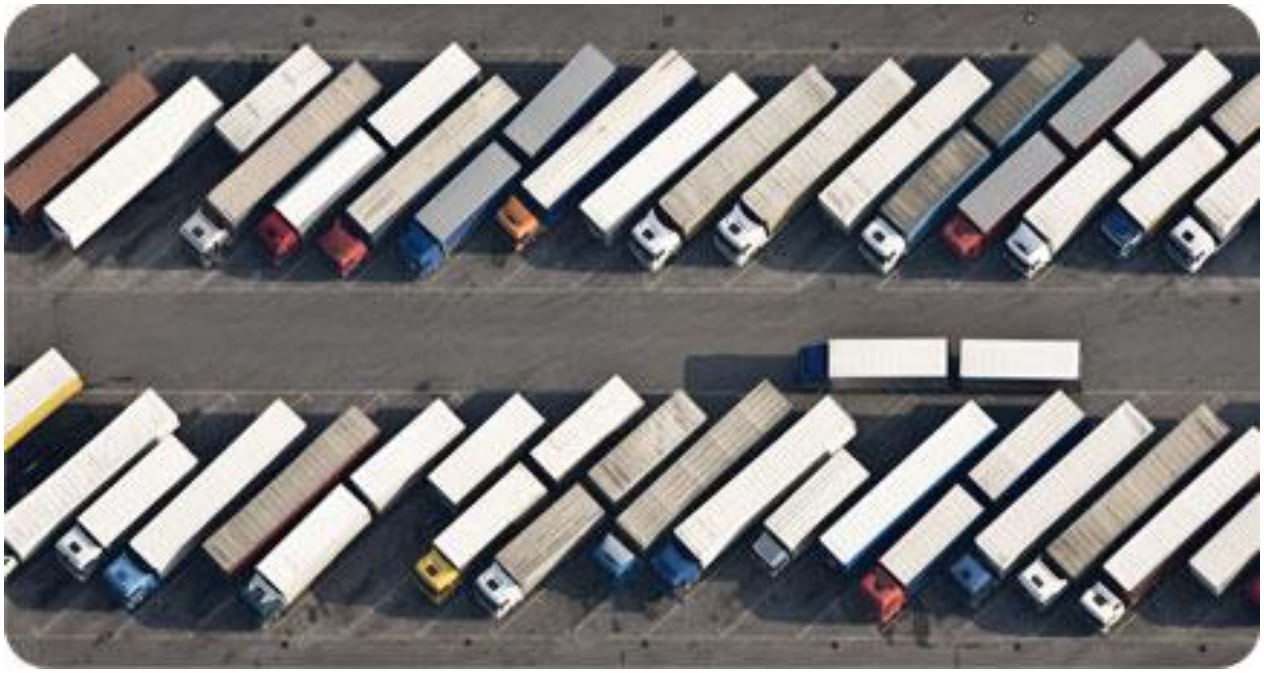
How can Secure Rest Places with high quality services and facilities in Denmark help to ensure truck drivers safety and security at their work?



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MSc. Urban Planning and Management

Master thesis

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Title: **How can Secure Rest Places with high quality services and facilities in Denmark help to ensure truck drivers safety and security at their work?**

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Executive summary

The aim of this project is to answer the question: How can Secure Rest Places with high quality services and facilities in Denmark help to ensure truck drivers safety and security at their work?

This project is conducted with the motivation to create a suggestion for Secure Rest Places with quality services and facilities in the existing Danish road transport infrastructure in order to improve truck drivers' safety and security and help to reduce freight crime. The Heinrich's Domino Theory (1959) and the Strategic Spatial Planning Theory (2004) construct creates the theoretical framework for the analysis part. Literature review, document analysis methods and semi-structured expert interviews are used to make investigation in this project. Both primary and secondary data were collected. Five interviews with truck drivers and three with people involved in parking areas development in Denmark were conducted to gain the knowledge about challenges of the truck drivers' work and their attitude to improve the existing situation of parking areas for trucks in Denmark.

The SRP is argued as a tool to create safe and secure environment for truck drivers and help to reduce losses form the freight crime. The author suggests having two types of SRPs in Denmark, using suggestions from the LABEL (2008) project: Level 2 in a distance of 25km along motorways and Level (3-5) in 7 Danish Transport and Logistics Centres. These SRPs would be integrated in the existing road infrastructure and provide quality services and facilities for truck drivers as well as improve their safety and security during the rest time. It is expected that Danish national transport authorities, insurance companies, services and logistics companies will support this idea and together with funding opportunities from European Commission will enable to implement SRPs in Denmark. It is evident SRPs can be used as a tool to ensure truck drivers' work conditions and safety and security in the freight transport sector.

Acknowledgement

This master thesis is special for me, because it summarizes two years of amazing experience that Aalborg University gave to me. I would like to express my gratitude to my supervisor, Professor Sven Kesserling, Department of Development and Planning, Aalborg University, for directing me and my research to the right path.

I so greatly appreciate the support of my family and friends, because your love, strength and encouragements have meant a lot to me.

I would also like to thank Mr. Kent Bentzen, President of FDT- Association of Danish Transport and Logistics Centres, Ph.D. Sisse Malene Frydendal Grøn, Hanne Christensen and 7 truck drivers for their time and valuable information which made my research special and unforgettable.

Aalborg, 02.06.2014

Laura Gabenyte

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List of Abbreviations

CEF – Connecting European Facility

FDT - Foreningen af Danske Transportcentre

EC – European Commission

EU – European Union

INEA – Innovation and Networks Executive Agency

SRP – Secure Rest Place

SETPOS – Secure European Truck Parking Operational Services

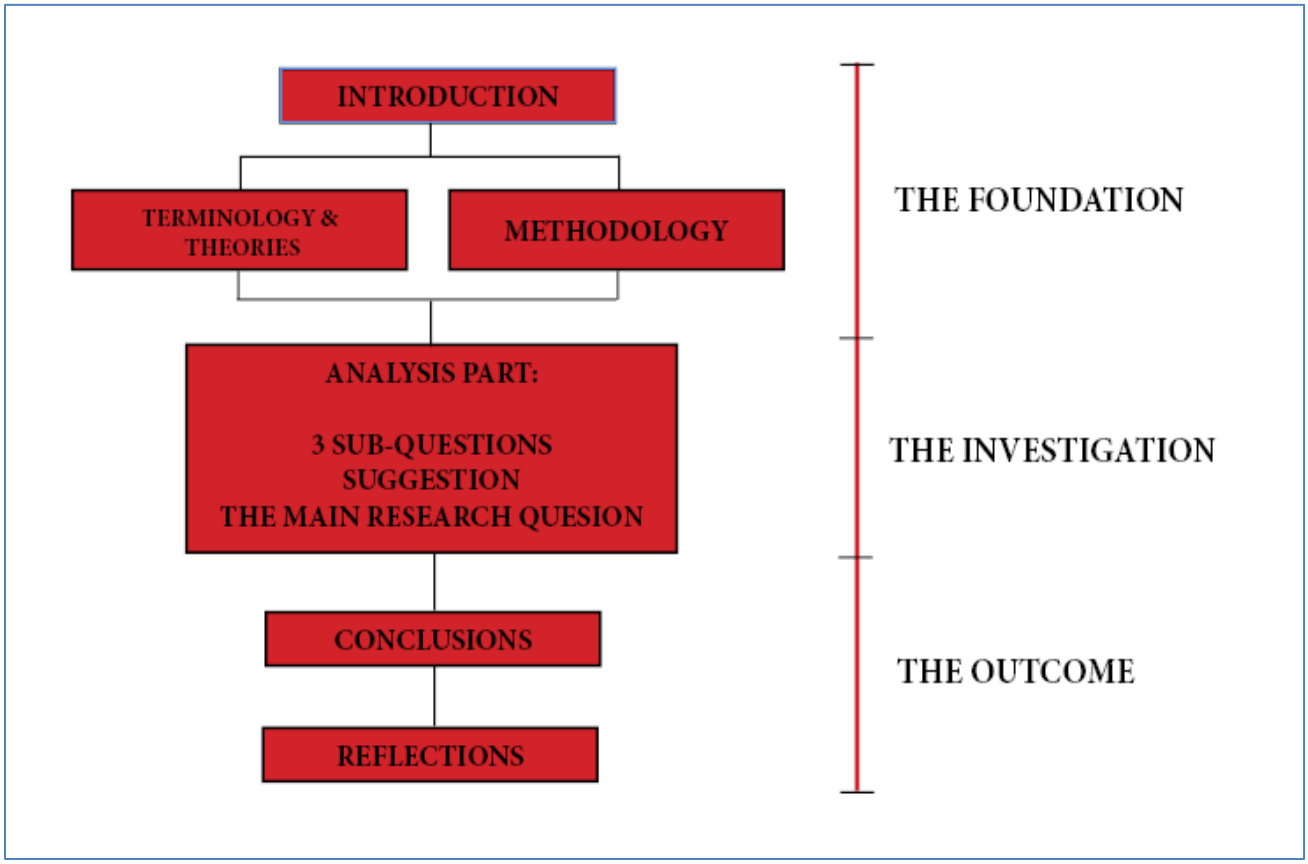
TEN-T – Trans-European Transport Network

TPA – Truck Parking Area

1. REPORT STRUCTURE

The project is divided in to three parts with different phases (see Figure 1). The first part (*the Foundation*) aims to introduce the reader to the main topic, where the background of existing freight crime problem, parking areas and Secure Rest Places (SRPs) is given in the context of the freight transport sector in Europe. After the literature is reviewed the main research question and sub-questions are formulated. Three sub-questions are constructed in order to collect the information needed to the research and to answer the main research question. All questions are constructed in a way to be explained by using knowledge from the theories, which frames the research.

Figure 1. Report structure.



(Source: own drawing)

Later, the necessary terminology and theories are introduced, which presents how understandings of safety, security, danger and risks have influenced truck drivers' work. The Domino Theory (Heinrich, 1959) introduces the reader to a concept of the accident causation factors and shortly describes each of it. Later, Albrecht's Spatial Planning Theory (2004) aims to show how significant the change from rational to strategic planning is and highlights the need to plan in a strategic way. Using chosen theories, the methodological approach and methods are chosen and explained in order to collect the data needed for the analysis and to answer three sub-question and the main research questions.

The second part (*the Investigation*) has an aim to answer three sub-questions. The first one is to understand truck drivers' job specific and conditions, safety and security perception and problems that they face at work. After that using the theoretical frame of the Heinrich's Domino Theory (1959) researcher explains how ancestry (training) and social environment, personal characteristics, and unsafe acts and unsafe conditions are perceived by truck drivers. The second purpose is to investigate about parking areas in Europe and how truck drivers choose where to stop and what facilities and services they get there. The information from semi-structured expert interviews is analysed in order to answer this part. The last purpose is to analyse what initiatives and events European Commission and Danish Transport Authorities took in order to develop safe parking areas and how it can be seen in Denmark. It is important to investigate how the parking areas are regulated and where potentially SRPs can be placed. After sub-questions the suggestion for SRPs in Denmark is given. This part contains both theoretical and practical approaches, and is based on literature studies, document analysis as well as qualitative semi-structured expert interviews.

The last part (*the Outcome*) discusses the results from the investigation part and summarizes the whole report. It aims to show the lessons learnt from the research, discusses about the impact for planning theories and what are this research's means for the future.

2. INTRODUCTION

2.1. Trends of the freight crime in Europe

In Europe 72% of the total land-based transport of freight is made by road (SETPOS, 2010, p. 5); therefore, there is a need to ensure that freight is transported safely. In the past decades freight transport thefts statistics show a severe problem in this sector (Burges, 2012). It can be reasoned that the amount of actions to deal with fright crime still does not reflect the scale of the problem. Looking from the financial side, freight crime is not beneficial for drivers, shippers, forwarders, carriers, insurance companies and public because the theft of freight and/or freight vehicles causes a loss of more than €8 billion per year for European economy (NEA, 2007). The security flaw has a negative impact on competitiveness and trade between Member States and neighbouring countries. Therefore, safety and security of transport is one of the major societal need indicators of European Union (EU) in the guiding objectives for 2030 (European Commission, 2012). Freight thefts are known as a "silent crime" (Burges, 2012). It is hard to measure the scale of freight thefts, because police and insurance companies in European countries do not show and report real statistics of these incidents. This is because insurance companies are not willing to reduce their reputation. Police not always count these accidents and event truck drivers avoid calling to police if the theft happened when the truck was left unattended. Due to this fact it can be claimed that the real number is even higher in most of the countries and it is evident that freight thefts are frequent (Burges, 2012). At the same time, available statistics show that the average value per theft rises every year in every Member State of EU. European Commission (EC) has a tough aim to improve safety and security on Europe's roads by reducing freight lost to theft and damage by 70%, based on the value transported and relative to a 2010 baseline (European Commission, 2012). One of the major tools to help fighting freight thefts is to make sure that truck drivers have all services and facilities needed during the whole trip and that they can choose to stay there is order to be safe and secure during the rest time.

2.1. Relevant projects and EU legislation related to SRPs in Europe

2.1.1. SETPOS Project (2007-2010)

8300 criminal incidents with a value of €300 million losses were counted in 2007 (SETPOS, 2010). Due to increasing crime rates of freight thefts, EC supported a pilot project SETPOS (Secure European Truck Parking Operational Services) cost a total of €10,390,000 of which €5,280,000 was financed by the EC. The main objectives of the SETPOS pilot project were to define and validate requirements for SRPs and agree on their labelling, inspection and evaluation scheme. Moreover, it has also involved a high number of stakeholders around the Europe, such as national authorities, law enforcement agencies, driver and transport operator associations and insurance agencies, who were active in improving freight transport security and safety. During this project the three main standards where invented (SETPOS, 2010, p. 13):

- **SETPOS Secure.** This standard provides minimum feasible physical for truck drivers to feel safe in the parking space more on the country level.
- **SETPOS High Security.** This type of secure parking space is offering access to truck drivers, which may arrive from different countries of Europe. They need to pay a certain fee to get the access to the parking space, which provides a high secure service for the freight transport.
- **Special - SETPOS Special Security**. This standard is a bit different from the SETPOS high security, because the special security aspect includes driver identification.

In 2010 the Best Practice Handbook was created as a result of the SETPOS project, which helped truck park operators to shape areas as it was required in industry security standards. It also contained the suggestion of an ICT (Information and Communications Technology) system development. It was a software platform called "Truckinform" and containing a unified, detailed and up to database of European truck parking areas. It provides three services:

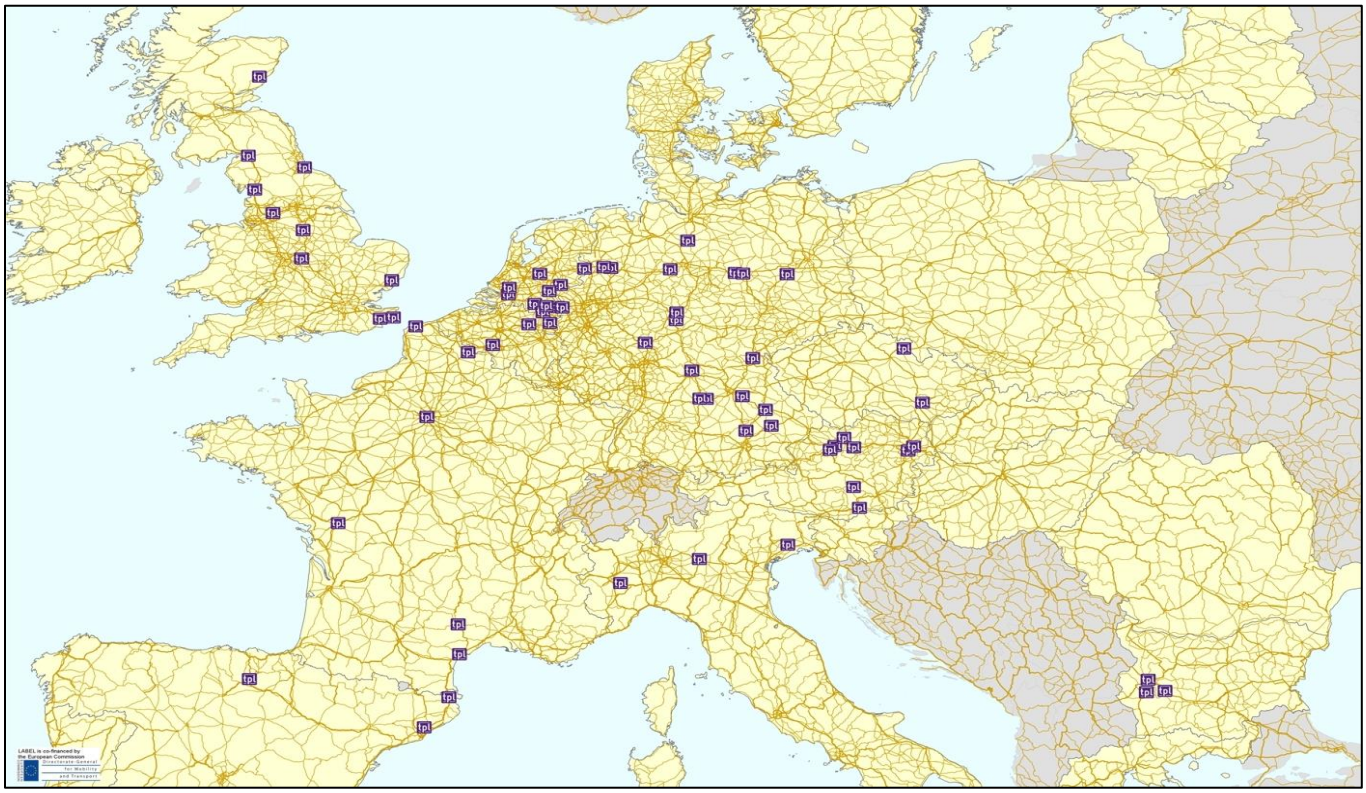
1. **Information** – a database of 2500 truck parking areas in EU.
2. **Availability and Guidance** – an occupation of truck parking area and other available places where users can be directed.
3. **Reservation** – an opportunity to book a truck parking space online in advance.

Moreover, this project highlighted that when truck drivers are crossing foreign countries they become vulnerable targets and the load at the rest time becomes a load at even more potential risks which shows that truck drivers' need to be more careful in other countries while choosing where to stop in Member States. To sum up, this project was a kick-start of labelling and standardizing the parking areas in Europe, taking into consideration involvement of stakeholders related to the freight transport in the analysis and workshops for the improvement of existing situation. It also made a frame for further research for taking the standardization from the EU to the national level in Member States.

2.1.2. LABEL Project (2008-2010)

LABEL project (Full name of the project: *Creating a Label for (Secured) Truck Parking Areas along the Trans-European Road Network and Defining a Certification Process. Including Online Information Facility*) is related to the SETPOS project, with a total budget of €2.7 million and which is partly funded European Commission, has provided a handbook for labelling the Truck Park Areas (TPAs) from SETPOS project in 2010 (see Figure 2) (LABEL, 2008). This project has tested and evaluated the information and findings based on European standard certification scheme that was observed by various stakeholders. This project also highlighted the need of information about reliable location for drivers to have a rest and provided a set of commonly recognised safety and security criteria for parking sites, that it would be possible to identify the appropriate classification level for them.

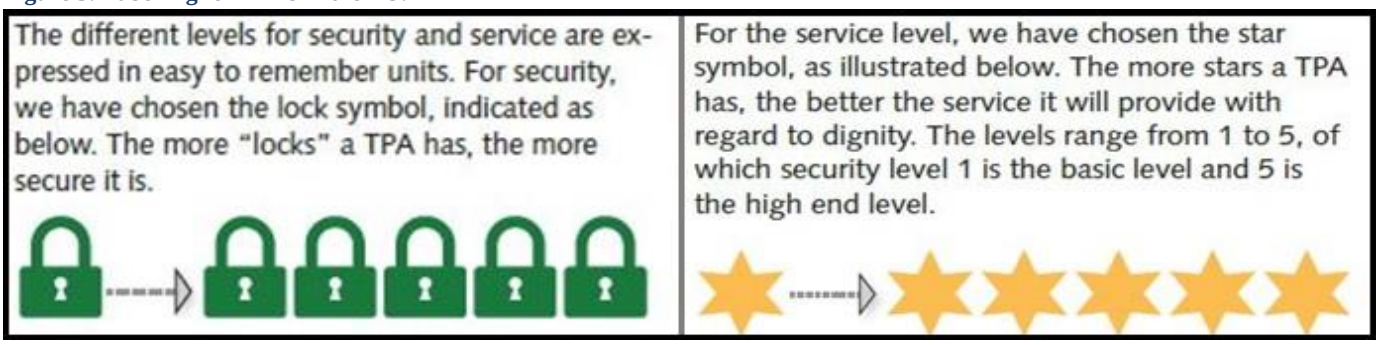
Figure 2. Truck Parking Areas (TPAs) in SETPOS project.



(Source: SETPOS report, 2007)

The main outcome of this project was a creation of the labelling system for secure truck parking areas along the Trans-European Transport Network (TEN-T) (see Figure 3). This system enabled truck drivers to get the information about the level of security and services provided in the truck parking areas in selected areas in Europe. Using this system, driver can easily plan the trip and decide what security level is needed for the load before they check them on the online system. The symbol of lock was chosen for security and start symbol for services.

Figure 3. Labelling for TPAs in the EU.



(Source: LABEL project)

This labelling gave standards on the European level, which further needed to be transferred on the national Member States transport infrastructure development. Despite that, not all Member States followed this standardisation, because it requires new investment and active stakeholders' collaboration which is hard establish. Nevertheless, the author will use the security and service level as an inspiration for the suggestion part.

2.1.3. Driving time and rest periods

In 2006, EC released the regulation which provides a common set of rules for minimum daily and weekly driving and rest time periods for all drivers of road haulage during day and night (European Commission, 2006). This regulation set the basis for truck drivers' work because it requires trip time planning in order to avoid road accidents, which can be caused by tired drivers and their inattentiveness due to the lack of sleep. It is regulated that daily driving period shall not exceed 9 hours and weekly - 56hours. Daily rest period shall be at least 11 hours, with an exception of possible 9 hours sleep, but only three times a week. During the trip, 45 minutes

breaks should be done at least after 4 ½ hours. This regulation has created a need for drivers to find a place because of mandatory rest periods. Moreover, it aims to improve social conditions for employees and generally improve road safety in Member States. It sets maximum driving times: per day, per week and the period of two consecutive weeks. Drivers are obliged to take a regular rest period weekly: minimum one time per two coherent weeks. The provision highlights that without any affecting conditions a daily rest period should be less than continuous period of nine hours. In 2008, EC released the regulation on road infrastructure safety management which has stressed that sufficient roadside parking areas are crucial not only for the crime prevention but also for the road safety (European Commission, 2008). The provision of sufficient, safe parking areas should, therefore, form an integral part of road infrastructure safety management. These two regulations are creating the main background for truck drivers' daily work and aim to ensure that they will have proper rest in areas with quality services and facilities.

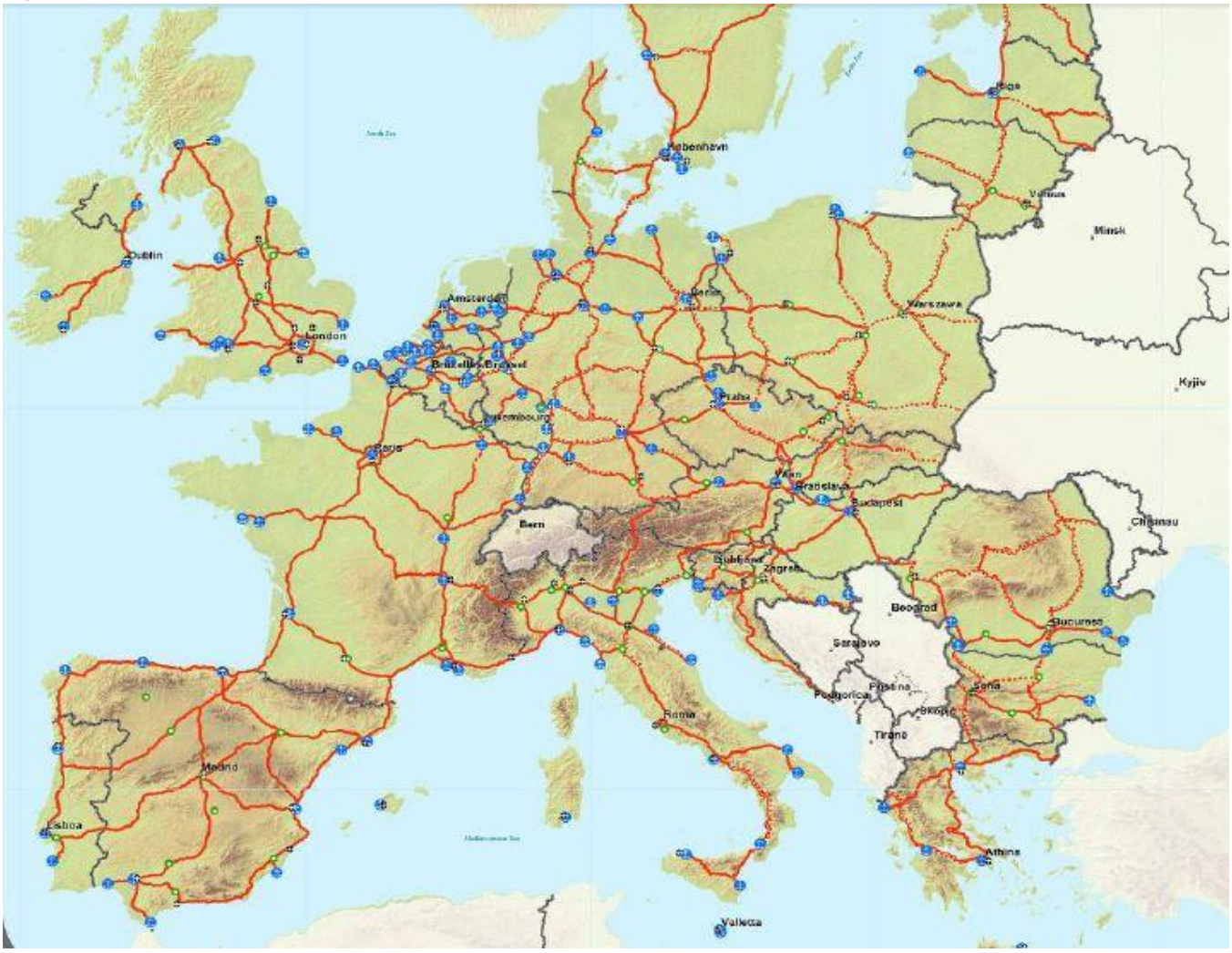
2.1.4. The need for SRPs in Europe

Truck drivers need to be aware about high risk areas, where the crime is the most expected, and to avoid stop by or take a rest there. Casella (2011) in his article notes that a vehicle becomes vulnerable when it stops. EC reports that around 40% of cases a theft happens when the vehicle is parked (NEA, 2007). Truck drivers have serious difficulties searching for a place to park a truck during the obligatory stop. It can be seen that both SETPOS and LABEL projects started in 2007-2008 after appearance of the driving and rest time regulation in 2006. These projects were initiated and supported by EC because lack of communication, services and facilities for truck drivers. EC initiated SETPOS and LABEL projects, which have investigated the type of secure rest places according to the security and services level that are needed for drivers. The SETPOS project statistics show that 44% of all truck journeys require at least one rest time looking at the international level of freight road transport market (SETPOS, 2010, p. 5). Moreover, there are shortages of safe and secure parking space for freight transport, lack of adequate facilities for the rest of drivers, attacks on high value freight and vehicles. Many countries in Europe recognize these problems, thus, the establishment of secure parking places and associated services has become increasingly important. Next section introduces the reader to these projects more in details.

2.1.5. SRPs in the TEN-T Network and EU legislation

Sufficient and secure parking areas along the TEN-T road network are needed to allow drivers to rest while they are crossing Member States. In 2011, EC mentioned the need for SRPs along the TEN-T road network for the first time. It has no indication how the improvement in this area can be done (TEN-T Guidelines, 2011). In 2013, Siim Kallas, the vice-president of EC, announced the new EU's Transport Policy with the special focus on TEN-T Core Networks using the new TEN-T Guidelines, including the road transport network (see Figure 4). TEN-T Network has a dual-layer approach (core and comprehensive layers) which focuses on comprehensive and core networks for all transport modes: rail, road, maritime, inland waterways and air.

Figure 4. TEN-T Core Road Network (2013).



Source (ec.europa.eu)

Safe and secure infrastructure, including safe and secure parking on the TEN-T Core Road Network is one of the key objectives in the new Transport Policy (2013). This new policy aims to promote effective and sustainable transport systems for business and people needs. It also focuses on the TEN-T Core and Comprehensive Network development which has a goal to strengthen economics and social cohesion. Parking areas enable drivers to take rest breaks in good time and continue their journey with full concentration. This special focus in TEN-T Guidelines shows that EC foresee a need to develop and integrate SRP in the TEN-T Core Road Network. These areas must be adapted to the needs of modern logistics in terms of capacity and must provide for a safe and secure environment with adequate rest facilities for drivers and their freight. Secure parking areas are included in the EU legislation on road safety Directive 2008/96/EC as well as Articles 17(b), 19(d) and 39 (2c'') (see Table 2) in the TEN-T Guidelines to provide for relevant common standards and procedures (TEN-T Guidelines, 2013).

Table 2. Covered areas in the new TEN-T Guidelines (2013).

Source	Covered area
Article 17 (b), p.13	Road transport infrastructure shall comprise, in particular, parking and rest areas.
Article 19 (d), p.14	Provision of appropriate parking space for commercial users offering an appropriate level of safety and security.
Article 39 (2c''), p.19	The development of rest areas on motorways approximately every 100 km in line with the needs of society, of the market and of the environment, in order inter alia to provide appropriate parking space for commercial road users with an appropriate level of safety and security.

The TEN-T Guidelines in Article 17(b) focuses on parking and rest areas which must be the part of TEN-T Core and Comprehensive Road Network and together with the Article 19(d) highlights the need for appropriate level of safety and security. The Article 39(2c'') and the Commission Delegated Regulation 885/2013[1] provide for the provision of appropriate parking space in line

[1] Commission Delegated Regulation (EU) No 885/2013 of 15 May 2013 supplementing ITS Directive 2010/40/EU with regard to the provision of information services for safe and secure parking places for trucks and commercial vehicles.

with needs of society, market and environment, offering an appropriate level of safety and security. For the construction or the upgrading purposes safe and secure parking areas on motorways of the core road network (including Information and Communication Technologies) are promoted in compliance with relevant European specifications and equipment based on available best practices.

2.1.6. Funding opportunities for SRPs in Member States

The new TEN-T Guidelines (2013) is a legal document which draws guidelines for Core and Comprehensive Networks' development in a long time perspective from 2014 to 2030 together with funding opportunities from the Connecting European Facility (CEF) (2013). In the field of transport, telecommunication and energy, EU funding for infrastructure projects is governed by the CEF. This combination creates a powerful tool for Member States to fight against freight crime and to improve truck drivers' safety and security along all Europe (CEF, 2013). The following table (see Table 3) shows CEF funding opportunities for upcoming annual and multi-annual calls in 2014:

Table 3. CEF funding opportunities for parking areas in Europe.

	Work Program 2014	
	Annual program	**Multi-annual program**
Total CEF Funding	EUR 930,000,000	EUR 11,000,000,000
Funding for optimising the integration and interconnection of transport modes and enhancing interoperability, safety and security of transport	EUR 100,000,000	EUR 750,000,000

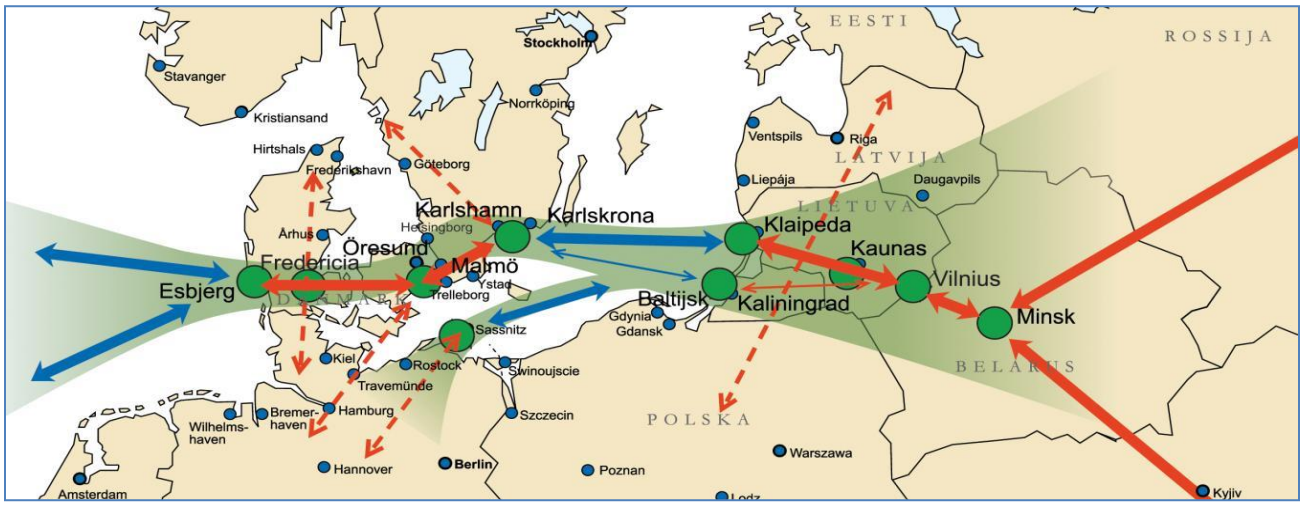
For the period 2014-2020 €350 million are allocated for the relating projects in all EU Member States and for all transport modes (European Commission, 2013). €50 million were given for promoting interoperability and continuity of real time traffic and travel information services and creating safer and more efficient road network across Europe. Due to this, it can be stated that lack of SRP in Europe is a problem to be solved in EC's agenda. TEN-T Network is important for both commercial and social reasons that authorities of parking areas. In the recent call under

the CEF for the 2014-2020, €100 million was given for the road safety and security improvement. The author highlights that these funding opportunities give interested stakeholders a chance to receive support for secure parking areas in Denmark. The support for EC has never been so strong, which also shows that SRPs are necessary in order to have safe and secure freight transport infrastructure.

2.1.7. Freight thefts and parking areas in Denmark

The special focus in this research is given to Denmark and its freight transport network. There are no secured areas for trucks in Denmark (NEA, 2007). It is interesting that this transit country has no SRPs because according to the recent study of east-west transport corridor (see Figure 5), truck stops in a close proximity to larger cities and ports and parking areas there are often overcrowded. Therefore, the transport industry and truck drivers are experiencing increased freight crime rates. Truck drivers are also missing information about possible areas to park the truck and the location of them. This lack of information results in daily loss of capacity and efficiency of freight transport sector. Denmark is so called "transit" country for truck drivers, which means that truck drivers can plan their trip in a way that they stay in the continent or stop at ferry and use all facilities and services there. This fact makes the development of SRPs more complicated and from the business perspective more impossible.

Figure 5. East-West Corridor.



(Source: ewtc2.eu)

Right now truck drivers can stop in "Infoteria" cafés near gasoline stations which provide fast food and are placed every 25km along motorways. The problem of these areas is that truck drivers are not the only ones who might stop there. These areas are not separated from public and this increases accident rates between trucks and other cars, passengers or bikes. More importantly, there are no security facilities and it not safe for a truck driver to stop there for a rest

because it becomes an easy target for thieves. Usually truck drivers are being robbed in such places and it is hard to identify them, because there are no cameras that can record the crime. There are also 7 Danish Transport and Logistics Centres (TLCs) which has facilities created for truck drivers which include: space for parking, sleeping rooms and toilets. There are no extra facilities for the security there as well. These two types of parking areas in Denmark can be identified as suitable for basic truck drivers' needs during the trip.

3. MOTIVATION FOR THIS MASTER THESIS

Freight transport crime is an international activity which often does not stop at the national borders of EU's Member States and is mentioned as a "silent crime" due to the lack of the real statistics from the police and insurance companies. Given that truck drivers' work is dangerous because of these thefts and, moreover, possibility of road accident it is crucial to understand and give a light to the improvement of their work conditions. More interestingly, the author is aiming to explain how truck drivers' perceive safety and security at their work and how it influences their decisions. In other words, to investigate freight transport problems in Europe and how they are perceived by truck drivers who deal with safe and secured parking, lack of services and facilities problems on a regular basis. Taking into consideration safety, security, quality services and facilities, SRPs are defined as a tool to fight with freight crime but in the academic literature it is a relatively new subject. EC considered SRPs as a solution not only to improve security and safety of freight transport but also to improve facilities and services for truck drivers in Member States. Despite EC's efforts to create common standards with SETPOS and LABEL projects, the same requirements and labelling system of parking areas are understood differently in each country. Taking into consideration that Denmark does not have SRPs, it is interesting to investigate what parking services and facilities can be found and what are their safety and security conditions for truck drivers. In Denmark secured parking areas were first mentioned in late 80's as a tool to improve truck drivers' services and facilities. Later it was also considered as a tool for reducing freight crime. It is interesting to develop a SRPs network according to security and services levels needed.

4. PROBLEM FORMULATION

4.1. The main research question and sub-questions

This section aims to introduce the reader to the problem formulation which is constructed based on interests of the author from the background information.

4.1.1. The main research question

How can Secure Rest Places with high quality services and facilities in Denmark help to ensure truck drivers safety and security at their work?

Following 3 sub-questions are formulated in order to analyse in-depth truck drivers' work conditions, their perception of safety and security, decision making where to stop and why, before the author can make a suggestion and arguments for SRPs for truck drivers in Denmark.

4.1.2. Sub-questions

1. ***What are the working conditions, safety and security problems in truck drivers' work?***

This sub-question provides the need for understanding of the truck drivers' work nature. Moreover, it helps to reveal social working environment and personal characteristics of truck drivers' and how they affect drivers' behaviour. This behaviour is also influenced by the safety and security feeling. This sub-question aims to investigate truck drivers on their daily basis and enable the author to give arguments about pros and cons of working in this field.

2. ***In what type of parking areas truck drivers choose to stop during the trip and why?***

The second sub-question aims to collect the information about the types of parking areas in which truck drivers are used to stop. The author aims to understand the perception of truck drivers' decisions and reasons behind. Moreover, SRPs are compared with other parking areas

taking into consideration facilities and services there. This section will provide the reader with information about truck drivers' preferences of parking areas and give arguments for having SRPs in Denmark.

3. **How parking areas were planned and regulated in Denmark and what services and facilities they should contain for coinciding to SRPs?**

The third sub-question aims to give the information about the sequence of events concerning parking areas development and planning in the road transport sector in Denmark and Europe. In this way the author will be able to discuss about the main planning mistakes that led to the stagnation of implementation of SRPs in Denmark. This sub-question also requires identifying service and security level that are needed for existing parking areas that they could comply with EU requirements. Moreover, the author will conclude with recommendations on services and facilities for truck drivers in SRPs in Denmark that can ensure their safety and security.

5. THEORETICAL APPROACH

This chapter focuses on the terminology of the danger, risk, safety and security which are necessary to understand in this project for gathering and analysing information for the research about unsafe truck drivers' perceptions of their work conditions. It explains how in literature human, as a part of society define safety, security, danger and risk and this understanding is helpful for analysing how truck drivers perceive safety and security and what factors may influence drivers' choices and decisions during the trip in order to avoid danger and risk of possible freight theft. The Domino Theory (Heinrich, 1959) identifies the social influence from drivers' background, personal characteristics and unsafe acts and unsafe conditions. The Strategic Spatial Planning Theory (Albrechts, 2004) aims to give an understanding about the shift from rational to strategic spatial parking areas planning and EC's and Danish Transport Authorities thinking about the SRP. The theoretical part enables researcher to structure the analysis part and choose the appropriate methods to collect the data needed in order to answer the problem formulation questions.

5.1. TERMINOLOGY

5.1.1. Dangers & Risks

Being a truck driver requires a person to be aware of possible dangers and risk all the time. Beck (1992) highlights that risks rise from negative images which are objectified from utopias of the modernization process. He defines risk as a systematic way of dealing with dangers and insecurities encouraged and introduced by modernization itself (Beck, 1992 , p. 21). It can be seen that in the academic literature danger and risk definitions are closely related. They both have the same meaning of possibility that something unexpected or unpleasant may happen. The danger is defined as *likely* to happen; therefore it is not so relevant for this research. Looking from freight thefts perspective safety and security levels in Member States may differ due to the positive conditions for thieves to steal. Truck drivers' perception of the existing world that they are working in also influences the sense of dangers and risks. The reason for this is that truck drivers are only aware of possible harms, but they cannot predict the future and be sure that they will be safe because the risk is defined as a prediction of possible harm that *may* happen. Lash & Wynne (1992) define risks as a chance of physical harms during technological or other kind of processes. Sociologists and anthropologists discuss the definitions of the risk in-depth and give three main observations for it (Beck, 1992 , p. 4):

1. Physical risks occur and are influenced by social systems.
2. The physical extent of the risk is directly dependent on social relationships and process quality.
3. The main risk also depends on social institutions and actors, which can also be vague and inaccessible to the majority of people, affected by the hazard in question.

The author agrees that there is no clear determination of the risk because it cannot be countable, fully predicted or understood rationally. In other words risk arises naturally from the social background, where it can be caused by people with different understanding and interests in the same situation. Moreover, it depends from the quality of communication between actors involved and the quality of enforceable operations in the institution. Truck drivers can be facing the risk in

two ways: one way when they know that there is a risk or a danger, and another way, when they are unaware about them. In the first situation, drivers must be informed about possible risks and dangers, imagine, presume them to be true and believe in their occurrence during the trip. Even though, they will be aware of possible hazards, in another sense, risks and dangers are invisible. Their appearance is always not fully predictable and is hard for truck drivers to fight with something that is neither visible, nor foreseeable.

Beck (1992) highlights the necessity to use some tools of science for making these possible risks more predictable and visible. For truck drivers two measuring instruments may be helpful: **work experience** and **freight theft statistics**. The first measurement is based on the working experience and events that driver has experienced during trips. The author believes that their own observations of areas where to stop and other drivers' experience may be more helpful than any statistical data about freight thefts. Of course, this data cannot be fully trustable, because it is based on individual awareness of the things that have happened for each truck driver individually. The statistical data about freight thefts might be helpful to identify where and what kind of risks truck driver might have. Some countries use the term of "hot spots" parking areas on the national level roads. In these areas there is a high level of freight crime comparing to others. In SETPOS project it was identified that these "hot spots" are most likely placed in urban areas or rest places near the borders or where there is a big concentration of trucks at one place (SETPOS, 2010). Despite that, and as it was mentioned in the introduction part, the freight theft is a "silent crime", so there are much more risky places that truck drivers need to be aware and not only those which are statistically counted. Using the knowledge gained from the literature on the risk in this research can be defined as ***a possibility that something unpredictably dangerous may happen for the truck driver or the load that he is carrying during the whole trip.***

5.1.2. Safety

In the recent years safety culture has become a focus of much attention in all industries (Choudhry et al., 2007). In this research there is a need to define what safety is and how it is understood in truck drivers work environment. The Concise Oxford Dictionary defines safety as "*the condition of being protected from or unlikely to cause danger, risk, or injury".* Reason (2010, p.5) identifies safety as an ability to deal with risks and hazards that we are aware of in order to avoid possible harms and still fulfil our goals. Reason (2010) also highlights that this safety definition does not reflect the real world and that we cannot choose to avoid the dangers that we are surrounded every day. Taking this fact, even though the person is aware of the possible dangers and risk there is no guaranty that it will be avoided. The author divides the safety definition to 4 different safety conditions:

a) The person is **aware** of possible harms and is **able** to deal with them;
b) The person is **aware** of possible harms and **unable** to deal with them;
c) The person **unaware** of possible harms and **is able** to deal with them;
d) The person **unaware** of possible harms and **unable** to deal with them.

These 4 conditions may be influenced by the social background and personal abilities of the human. Using these conditions the researcher will try to define truck drivers' safety condition from the data that will be collected. There is also a need not only to be aware of possible harms, but also to create as much safer situation as possible. Thus, it is not enough for truck drivers to be aware of possible harms, but they also need to choose as safer place as possible to stop for the rest. The safe environment can be created in order to help truck drivers avoid possible risks and hazards that they comprehend. Hudson (1999) stresses on the need to create such an environment that dangerous situation would not have chance to emerge and cause harm or damage. In this research the safety of the truck driver and the freight depends not only from the awareness of possible dangers and risks, but also from choices of truck drivers that are made during the trip. These choices are influenced my personal understanding of truck drivers' world, own experience, other truck drivers' knowledge, etc. It is also hard to define the safety level during the whole trip because it varies in each country that is crossed; therefore, it may require different

attention of the safety. Drivers can create their safety conditions themselves only by stopping at the places that they feel safe, or are told to expect to be safe. They can also care self-defence tools with themselves, which can make them feel safer. In this report safety is defined as ***a truck driver's ability to be aware of possible dangers and risks which may also be unknown and protect him and the freight during the whole trip.***

5.1.3. Security

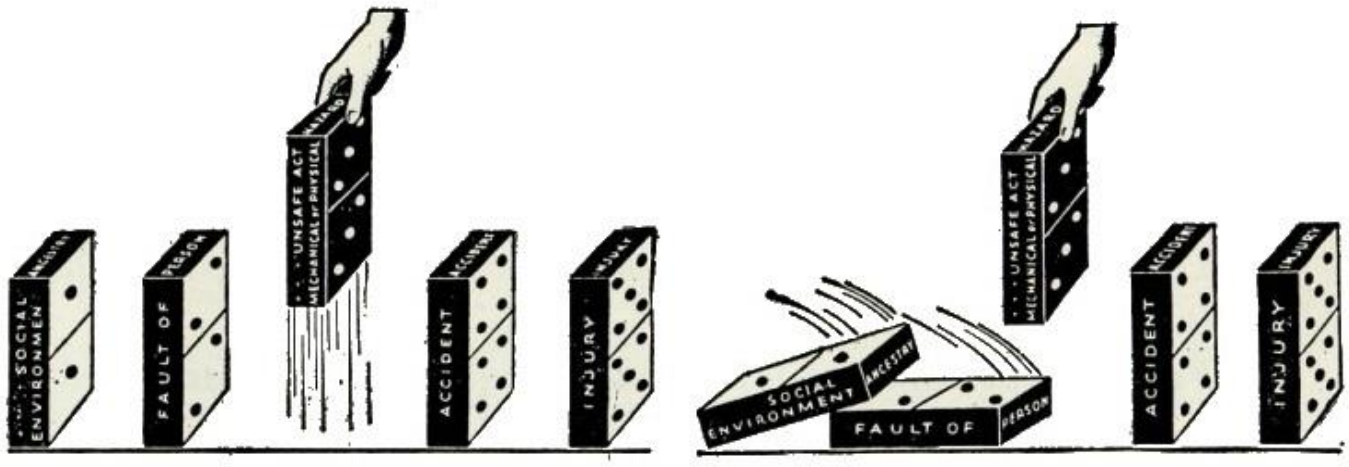
The security definition is often followed by the highlight of human factor and in the Oxford Dictionary is defined as "*the state of being free from danger or threat".* Wilde (1994) explains that the perception of security is inside the human being and it might be influenced by different factors. In any lifetime activity, people continuously consider the amount of risk that they feel vulnerable to. These factors usually concern mistakes made by people which cause security risk. For example, if the subjective understanding of the risk level for people is lower than acceptable, there is a huge possibility that they will try to engage in activities that increase their risk. But if it is higher than acceptable, they may behave more carefully. Wilde (1994) indicates that sometimes risk can be estimated and be ignored in order to benefit from the situation, depending from activities being performed. Grøn (2007) also stresses on the human factor in security conditions of Danish truck drivers' in her research, because human performance varies. In this research there are two types of security: **personal feeling of security** for truck driver and the **security level from the environment** during the trip. It means that truck driver's safety depends on his perception of situation and the level of subjective understanding. Truck drivers may choose to risk if they see that it is possible to get more financial benefits from it or come home sooner. This fact is important to mention in this research, because some of the truck drivers are also violating the regulations in order to transport goods faster (Grøn, 2007). By their subjective understanding safety is less important than the benefits that they might get. Another type of security concerns drivers' perception of security in places where they choose to stay for a rest. During the rest time security level may differ, because of different places that drivers stop. More importantly, the safety feeling depends from personal characteristics and own created security, for example, truck drivers can have personal defence tools, extra locks, cameras, etc. Security in this project can be defined as ***an ability of truck driver to maintain safety of himself and the freight, depending from subjective understanding of dangers and risks during the whole trip.***

6. THEORIES

6.1. Heinrich's Domino Theory (1959)

The Domino theory was firstly developed by pioneer H. W. Heinrich in 1930. In this theory he stresses on the need to understand what causes accidents in order to prevent them. It is argued that people are a fundamental reason of caused accident and that the management should provide workers with safety facilities to prevent the unsafe and unsecure environment (Heinrich, 1959). Heinrich posits five metaphorical dominoes: Social Environment and Ancestry, Fault of Person, Unsafe Acts and Unsafe Conditions, Accident, and Injury. Domino figures were chosen because of the similarity between the sequences of factors involved and toppling of dominoes. It can be demonstrated as if one of domino starts falling, other will fall too and this can only be avoided if the next domino after the falling one will be removed (see figure 6). Therefore, the accident occurs only if from a sequence of events and if it is a chain reaction.

Figure 6. Removing one domino to avoid the accident.



(Source: thesafetyblock.com)

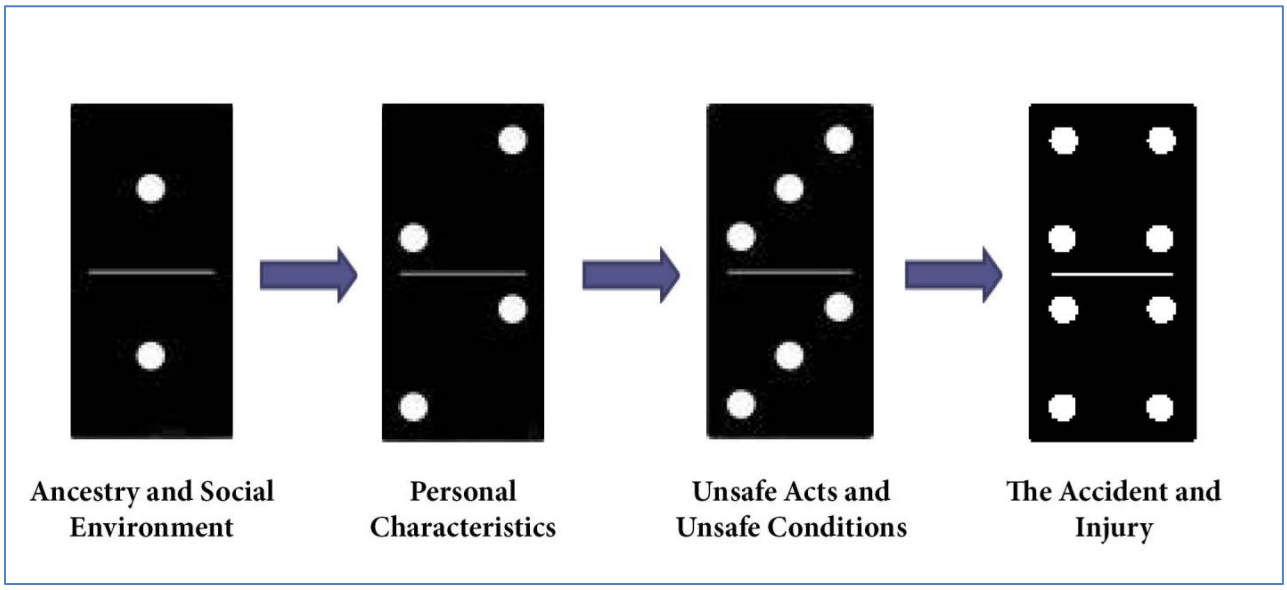
Abdelhamid et al. (2000) highlights that Heinrich received critics from Zeller in 1896, for making too simple control model of people behaviour in accident causation and giving on the contribution of unsafe acts versus unsafe conditions. Nevertheless, this theory was updated with an emphasis on management as a primary cause in accidents during since the year it was

developed, with resulting models which were labelled as management models or adapted domino models.

6.1.1. The Adopted Domino Theory

The author is using the Domino Theory to define and explain causation of the possible accidents on roads and freight thefts which can be enabled by inattentive actions of truck drivers. In this research this theory is also used to understand the background and social environment of truck drivers' work. Moreover, it helps to find out known and unknown dangers and preconditions of dangers that truck drivers' are aware of during the trip. Furthermore, it enables to explain the perception of truck drivers' safety and security. For purposes identified above, the author reduces the main five areas to four (see figure 7). The reason is to be more precise and last two dominos - accident and injury can be merged into one because the researcher is mainly concentrating on investigation of the background and conditions of truck drivers' work and the accident is already counted as an outcome of unsafe acts and unsafe conditions. Moreover, reducing five dominos to four gives an opportunity for the researcher to concentrate more on the specific data needed to collect from primary and secondary sources.

Figure 7. Adopted Domino Theory.



Source: (own drawing)

In this research it is assumed that if three following factors happen in described sequence the accident will occur:

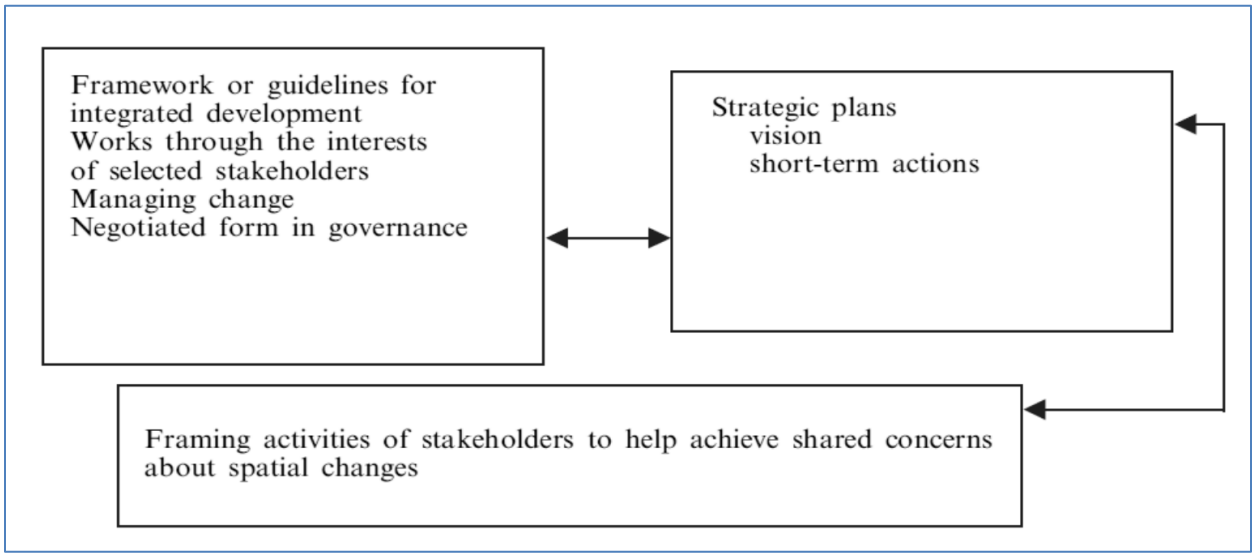
1. **Ancestry and Social Environment.** The first domino deals with drivers' personality and their social background. It is important to understand in what social environment they live and how they behave in different situation. Heinrich (1959) believes that undesirable personality features, such as obstinacy, covetousness and inattention can be inherited. In this research the inheritance meaning is the other drivers' training and experience, which they share with new drivers. So both inheritance and social background can affect faults of the driver during the trip.
2. **Personal Characteristics.** The second domino stresses on truck drivers' viewpoints, the level of knowledge, physical and mental conditions. It depends on what kind of a personality driver has and how he behaves in stressful situations. Each person can act in a different way, but all of them should follow the training knowledge that they were introduced at the beginning of the work. Heinrich (1595) explains that bad mood, hindsight, inaptitude and negligence can bring one step closer to the accident causation.
3. **Unsafe Acts and Unsafe Conditions.** This domino highlights the importance of identifying unsafe job conditions, which according to Heinrich is a direct cause of accidents. It is important for drivers to be aware of the possible unsafe acts and conditions at their work. This domino is the **central** one in order to prevent incidents because it usually causes the most amounts of accidents and injuries.
4. **The Accident and Injury.** This domino illustrates the unplanned event, which comes from other three dominoes in the row and may cause an injury for a driver eventually. It comes together with possible injury, if during the accident driver got hurt.

The Domino Theory model enables author to perform in-depth analysis of truck drivers' work conditions, personal characteristics, unsafe acts, unsafe conditions and their perceptions of their job on a daily basis.

6.2. The Strategic Spatial Planning Theory (2004)

Over the last 10 to 15 years the rational and comprehensive type of planning in general has shifted to more strategic planning (Albrechts, 2004). This more modern way of thinking changed the perception of the long-term planning perspective for planners and enabled them to see the situation in more realistic way. This shift was influenced by many factors: the growing complexity; an increased concern over increased rapid development and in some cases random development; the growth of the environmental movement and concerns; the need for better communication and coordination both across levels and above and below levels of governance; a new or reemphasis on the need for long term planning and stress on the need for long-term thinking. The term "spatial" brings into focus of the creation and management of special places and sites; the interrelations between different activities in an area, and physically arranged nodes and intersections within an area (Healey, 2004). It shows a clear focus on change and involves planning as just one of the instruments that can be used in order to provoke or to manage change in the existing freight transport sector. Moreover, this way of planning gives a clear vision and logical sequential actions in order to focus on interested areas and shape them in the best way. The strategic spatial planning is described as involving, experiencing aspects of actions of different sectors of the built environment as a proven way of inspiring and creating new ideas. Albrechts (2005) also states that the strategic spatial planning is a transformative and integrative, public-sector-led planning; therefore, it creates opportunities for public-private sector to be highly involved and collaborate together with different governmental levels. These partnerships can bring positive results while looking in the parking areas situation in Europe and more specifically in Denmark. The following figure (see Figure 8) illustrates how the strategic spatial planning involves the identification and assemblage of main actors, their collaboration during the planning process while creating solid, workable long-term visions or perspectives and strategies at different levels while taking into account power/economic relations (Albrecths, 2005):

Figure 8. Steps of the Strategic Spatial Planning.



Source: (Albrechts, 2004:748)

That is what the author is looking at in this project is how SRPs would fit in the existing Danish road infrastructure in a long-time perspective. Understanding that the built environment is composed of diverse levels that include transport, demographics, business, production, services, standard of peoples living and that this environment is driven by various forces that are interconnected and interact in complex manner. Strategic spatial planning involves taking a critical view of the environment in terms of determining strengths and weaknesses in the context of opportunities and threats, and involves studying the external trends, forces and resources available (Albrecths, 2005). The Strategic Spatial Planning Theory gives an understanding that the municipality or the local government should not act alone but also private actors along with truck drivers' associations and political representatives must provide the essential input in the planning of better qualitative conditions. Another aim of using this theory is to describe how the involvement of different actors and well-defined plan with new innovative ideas can shape SRPs to be attractive for truck drivers and to provide them better safety and security conditions together with qualitative services and facilities.

7. METHODOLOGY

This chapter intends to identify and discuss the methodological considerations for answering main and sub-questions raised in the problem formulation section (see chapter 4). The choices of methodological approach and methods are influenced by the conceptualized foundation of the terminology, the Domino Theory, the Strategic Spatial Planning Theory and existing practices. Moreover, the data collection, reliability, validity and limitations of applied methods are discussed in this chapter.

7.1. Qualitative Research

Qualitative research gives a subjective interpretive approach to the social world (Denzin et al., 2005). This type of research enables to interpret the collected data and to see the reality in practice which makes the world more understandable and visible (Kvale, 2006). The qualitative research has more flexible methodological approach, because the data is not transformed to the numbers and is not statistically analysed as in the quantitative research. It can be collected through the observation and interaction with other people (interviews, focus groups). The main advantage of qualitative research is that they can capture the meaning and interpretation of the subtitles, which the numbers do not impart (Gray et al., 2007). The in-depth information from interviews concerning the topic can be recorded and reviewed many times and so that the experience of people could be understood by the deeper meaning. This enables to have a better insight into the human behaviour in different life situations and not in gathering data with a questionnaire where the results of it can be generalized and adopted to larger groups. The author uses the qualitative research in this project in order to understand, foresee and explain the environment and personally affected actions that truck drivers' do which would be harder to analyse in-depth if the quantitative research would be chosen.

7.2. Data collecting method

The data collection method is important for this research because it helps to define types of the methods that are needed to be used in order to gather information for the research. This section aims to explain two types of data collection which are used in this project: primary and secondary data and gives arguments why they were chosen.

7.2.1. Primary data collection

Primary data requires the researcher to collect the new information and analyse it, because it has not been done by others. Usually, this kind of data is needed to be collected due to the need for the specific investigation, because it is not available via other sources. Most frequently interviews and surveys are used in order to collect primary data (Louis et al., 2000, p. 161). One of the advantages of this data collection is that it can be used in both quantitative and qualitative research. The author chose to collect data from qualitative research that means primary data can be collected from focus groups, interviews and surveys. This enables the researcher to structure the investigation in the way to get the most beneficial information for the analysis while using quality methods. Despite the good quality of new data, it takes much time to conduct a survey or deal with questionnaires. It may also occur that there are not enough respondents or it takes more time than it is expected in the project timeline. Therefore, in some cases, the primary data collection is much more complicated than the secondary data collection method.

7.2.2. Secondary data collection

Secondary data collection method is perceived as a tool to gather the data, which was already collected by other researchers (Scott, 1990). Usually, this data is already analysed by others and prepared information can be used by the researcher to support his own arguments. Comparing primary and secondary data, the latest one does not take many efforts from researcher, because information is already collected, prepared and it can be taken from highly trustable sources. The main secondary data collection issue is that the information that is taken from even trustable sources is not familiar with the researcher, because it was gathered by other investigators for

different purposes. In this project the author use secondary data to understand the existing situation in freight transport sector problems. It can be said that during this type of data collection some quality issues of information collected during the investigation can be faced, nevertheless the fact that trustable sources are used and data has a high quality. The secondary data can be collected via books, articles, internet sources, projects, etc.

7.2.3. Data collection in this project

Both secondary and primary data will be used in this project. Secondary data is collected from existing EU projects and initiatives, such as SETPOS and LABEL reports, scientific articles, books and literature which are relevant to the theme of this master thesis. This information will enable the author to analyse the sequence of events and initiatives in Denmark concerning parking areas. Interviews with stakeholders related to freight transport will enable to collect the primary data for the analysis. The researcher chose to perform interviews for primary data collection due to the time limit, specific and in-depth information needed about truck drivers'. Interview guide was created and it contains questionnaires for each interviewee individually in order to collect essential data for the research.

7.3. Research methods

7.3.1. Qualitative interviews

In the qualitative research interviews, based on conversations led by researcher, enable to understand perception of interviewees and to reveal the meaning of their life experience (Kvale, 1996). This type of research may not gather objective information, but it can cover many subjective views on the certain topic. The author tends to use this approach because give participants a certain degree of freedom and permit spontaneity rather than forcing them to select from a set of predetermined responses (of which none might be appropriate or accurately describe the participant's thoughts, feelings, attitudes or behaviour) and to try to create the right atmosphere to enable people to express themselves. This may mean adopting a less formal and less rigid approach than that used in quantitative research. More specifically, the qualitative interview approach in this research is conducted using semi-structured questions with explorative elements. This means that some of the questions have intension to collect further information. Semi-structured interviews are an important phase into constructing an overall picture of why we need secured parking areas and how they can be helpful for improving truck drivers' work conditions, safety and security. It is evident that secured parking areas are relatively new topic and there is not so much literature about them. The aim of the qualitative interviews is to investigate the truck drivers' work conditions, their perception of safety and security problems and to understand how existing freight transport problems might be solved. This information is expected to be collected during semi-structured interviews with truck drivers, Danish transport authorities and researchers from the relevant projects related to secure parking areas.

7.3.2. Expert interview method

The author chose the expert interview method for this research in order to get the most relevant data from selected key persons due to the time limit and qualitative data needed. Meuser & Nagel (2001) identify "*The Expert*" as a person who has specific knowledge in the field and the access to the certain data. Moreover, interviewing experts gives more content related data than, for example, observation or quantitative survey. (Bogner et al., 2009) identify that expert interviews saves the time because of the rich data ("crystallization points") that is gained, comparing with surveying where many people have with different levels of knowledge about the topic. Furthermore, expert interviews also give an access to the information, which is not reachable form the particular social field and experts can also indicate other potential interviewees. The semi-structured type of interviews is helpful for creating the interview guide and deliberately set themes for interviews (Holstein, J.A. & Gubrium, J.F., 1995). Due to this fact, expert semi-structured interviews are selected for the project, because they provide more in-depth information than the survey or questionnaire. It is important to have interviews with truck drivers because usually they are driving alone and no other random person can tell about conditions and work on a daily basis. The author also has an aim to interview experts from the freight transport sector in Denmark and to collect specific data about planning and importance of SRP which can be only provided by the specialist working in this field. The researcher is also aware that the information for experts is subjective and it is based on their own interpretations and believes. Despite this, the data collected from semi-structured expert interviews is "crystallised" and more reliable than questionnaire or strictly structured interview. While using semi-structured interviews the broad themes to be covered are defined in the interview guide and there is openness to changes of sequence and forms of questions in order to follow up the answers given and the stories told by the subjects. In order to use collected data from expert interviews, researcher uses **7 following stages** (adopted from (Kvale, 1996, p. 88)):

1. Theme: Introduction to the topic of the research
2. Design: Preparation of the interview guide
3. Interview: Using interview guide for interviews
4. Transcription: The record of interview is made with specific highlights.

5. Analysis: Apply the necessary way to analyse the conducted data.
6. Verification: Finalizing the information with regards to validity and reliability. Reliability stresses on cohesion of results and validity ensures that interviews were conducted in the deliberative way.
7. Further reporting: Ensuring that the prepared information can be used in other researches.

The first step contains short introduction to the topic, which is used for searching interviewees and for the short presentation at the beginning of the interview. The background information gives the frame for preparing an interview guide together with semi-structured questionnaires. When interviews are arranged, they are conducted by using an interview guide and the semi-structured questionnaire. All interviews are recorder in order to review them again for using the collected data in the report. When the data is gathered it can be used in the analysis part while ensuring that it is reliable and valid.

7.3.3. Conducted semi-structured expert interviews

7 semi-structured expert interviews were conducted by telephone in this research: 3 with people related to the parking areas for transport areas and 5 truck drivers (one of the interviews was performed together with 2 drivers). The following table (see Table 1) describes the interviewees that agreed to be identified. It was agreed with truck drivers that their names will not be mentioned in the report. Therefore, in the analysis text they will be referenced as TD1, TD2, TD3, TD4 and TD5.

Table 1. The interviewees.

Nr.	Interviewee	Descrioption
1.	Hanne Christensen	Senior Consultant for Planning & Design in Grontmij A/S, Denmark
2.	Sisse Malene Frydendal Grøn	Ph.D. Ethnologist & Work environment researcher in TeamArbejdsliv, Denmark
3.	Kent Bentzen	The vice president of EUROPLATFORMS, the Director of FDT (Foreningen af Danske Transportcentre)

4.	Truck Driver 1	29 years old, worked as a truck driver for 2 years.
5.	Truck Driver 2	24 years old, working for 2 years.
6.	Truck Driver 3	30+, worked as a truck driver for 8 years.
7.	Truck Driver 4	27 years old, working as a truck driver for 2 years.
8.	Truck Driver 5	33 years old, working as a truck driver for 8 years.

The author chose to conduct telephone interviews due to the limited time of interviewees. Some of truck drivers' trips can take from two weeks to 6 months, thus, it is hard to find spare time for face-to-face interviews. It was also difficult to communicate with them and to take away their precious time from the family while they are at home. Due to semi-structured interview, the researcher had the opportunity to ask more questions where it was necessary to get more in-depth information or some clarifications.

The interview guide is use in this project because it indicates the main topics and their sequence in the interview (Bogner et al., 2009, p. 129)**.** It is made by 4 questionnaires in this research and each of them is different regarding the interviewee's profession and information needed for the researcher (see Appendix 2). It is helpful for creating a minimum order to the semi-structured interviews, which is needed to ensure that the main areas will be covered during the interview. Questions are formulated shortly, because it gives an opportunity for the interviewee to talk more on topics which they find themselves consider important. The interviewer ensured that the necessary areas would be covered without interruptions. Each interview takes approximately 45-60 minutes is recorded. All recorded interviews can be find the CD attached in the end of this report. The semi-structured expert interviews are used together with document analysis and literature review to go research the topic deeper and to gain information for the analysis part.

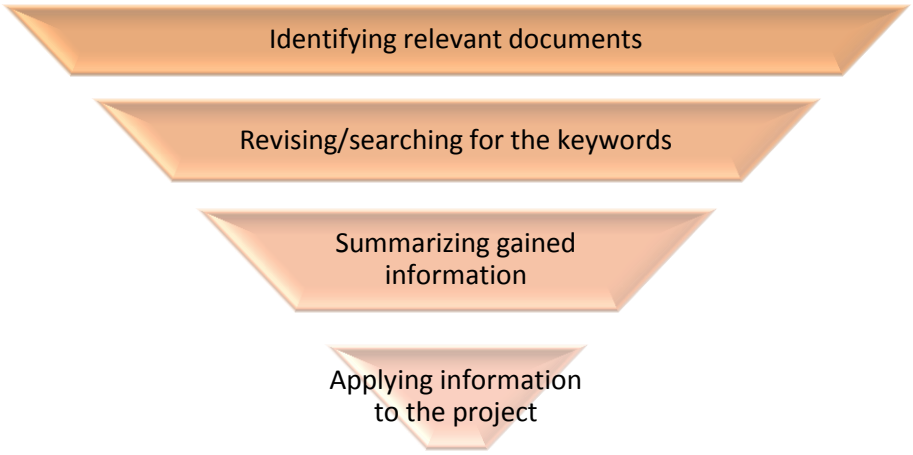
7.3.4. Literature review

The literature review method enables researcher to choose different theories and materials that are necessary for the best outcomes in relation to the research. Hart (1998, p.3) defines the literature review as a selection of published and unpublished available documents on the chosen topic, which provides necessary information about evidences, data and ideas. The work of other scholars related to the problem formulation in used to define terminology and choose theories. In this report the literature review purpose is to approach obtained knowledge from documents which are relevant to the project in order to formulate research question, sub-questions, define the case, selecting both theoretical and methodological frameworks. Researcher reviewed range of theoretical literature on safety and security, risk and dangers, strategic spatial planning in order to complement the review literature. It helped to define main characteristics of the Domino theory and Strategic Spatial planning theory and to get an overview how they address freight transport problems. This led researchers to create a theoretical framework for the analysis. The literature review method helps for the methodological part to define, select and conduct the information needed to answer the problem formulation questions.

7.3.5. Document analysis

In this project the document analysis method is used to review documents on EU level and Danish national level which are historically significant for the appearance and development of SRPs in Europe. Danish motorways are owned by the Ministry of Transport which is a national level authority; therefore, documents on the national level related to the development of parking areas are reviewed and analysed in order to create a timeline with the sequence of key events to show the development ideas from Danish national transport authorities. The document analysis method enables the author to identify experts for interviews, choose theoretical literature for creating a good research base, because it is easier to gain better overview of various sources. The analysis of these documents is performed in four steps (see Figure 9):

Figure 9. 4 steps of the performed document analysis.



(Source: own elaboration)

The author show main documents that are analysed on EU level and Danish national level the table below (see Table 2):

Table 2. Analysed documents on EU and Danish national levels.

Main documents on the EU level	Main Danish documents on the National level
The driving and rest time periods regulation 2006	Act No. 1048 of 03/11/2011. Act on Public Roads
SETPOS Project 2007-2010	Act. No. 937 of 24 September 2009. Planning Act
Road infrastructure safety management 2008	Transport Ministry and Road Directorate initiatives for development of parking areas in Denmark
LABEL Project 2008-2010	
The TEN-T Guidelines 2011	
The TEN-T Guidelines 2013	
The Connecting European Facility 2013	
EU's initiatives for secured parking areas	

The analysis of these documents gives crucial information about past and present events and to see the situation from the political point of view. Moreover, it enables to collect the information needed to prepare for expert interviews. Adding to the listed documents, other secondary data sources such as websites, articles in periodical, journal are also analysed in this project.

7.4. Validity and reliability

7.4.1. Validity

Validity is important in an academic research, especially in a project that applies the objectivist approach. It approves that the collected data is trustable, testable and can be referred to, in future researches. The constructed validity relies on summarizing how well the results that are obtained during research and how they fit with researchers' theoretical expectations (Vaus, 2001, p. 225). Lack of statistics and real numbers of freight thefts in Europe has minor influence to the results of the study, because the study relies on the problem of freight thefts in general, not comparing statistics of it. In this report it is assumed without comparing statistics in each country, that freight crime is a severe problem that needs to be solved. Author of the current research attempted to ensure that analyses performed are internally valid. Specific factors affecting freight crime are explained and discussed. In this report data gathered can be used for future researches concerning further development of secure parking areas in Denmark.

7.4.2. Reliability

Reliability is important for the research because it stresses on the data collection with making less errors and biases as possible (Yin, 2009, p. 45). The author was systematic during the time of research in order to collect reliable primary and secondary data. Primary data collection aims to ensure that information gained form the interviews could be used in future studies. Carefully selected interviewees have experience in transport and logistics field and their subjective knowledge is highly reliable to use for his project. Therefore, before each interview the questionnaire was made for each of the interviewee, interviews were recorded and later transcribed. Reliability also highlights the quality of secondary data which is used to create knowledge of the researcher. During literature review trustable sources were used from the European Commission, Danish authorities, reports, books and websites.

7.4.3. Limitations

The first limitation of this project is a lack of statistical data about the freight crime rates in Denmark and Europe. It is hard to find real numbers and it would be beneficial to compare how many and what type of freight crime is the most common and what goods are usually stolen. That would enable the researcher to create a "hot spot" map in Denmark and to suggest place SRPs there. Thus, expert interviews gave and overview where these areas might be, according to their knowledge and long working experience. Another limitation is that the researcher was not able to have interviews with people form Danish Transport Ministry and Road Directorate. Nevertheless, the interview with FDT's director Mr. Kent Bentzen was extremely helpful, because he was involved in all the activities related to the parking areas development in Denmark from the end of the 80's. This information enables to identify and support the idea of having the secured parking areas in Denmark. Further, more drivers were contacted, but due to the long travels it was hard to arrange the telephone interview with them. Thus, the information from interviewed drivers Hanne Christensen and Ph.D. Sisse Malene Frydendal Grøn were informative and gave a good insight in the truck drivers' work conditions, services and facilities needed.

8. ANALYSIS

This chapter analyses data gathered from the literature review, document analysis and semi-structured expert interviews. In order to answer the main research question, the analysis part will start with answering each sub-question. For the first sub-question the author uses Heinrich's (1959) Domino Theory where the three main dominos: ancestry and social environment, personal characteristics, unsafe acts and unsafe conditions and expert interviews to analyse truck drivers' work conditions and their perception of safety and security problems. The fourth domino is considered as an outcome of three previous ones. The second sub-question uses expert interviews in order to define where truck drivers choose to stop for the rest and gives preconditions for their choices. The last sub-question aims to create the timeline of key events and initiatives from EU and more specifically from Denmark national transport authorities using the data gathered from the literature review, document analysis and expert interviews. After in-depth analysis of three sub-questions, the author has the knowledge to give the suggestion for SRPs in Denmark and the main research question will give arguments and benefits of the need to have them in the existing road transport infrastructure.

8.1. Ancestry and Social Environment

The first domino adopted from the Heinrich's Domino Theory deals with drivers' training and the social environment. It is important to analyse a process of the new employees' training and the social environment where they start and continue working. The following section is divided into 2 themes: ancestry (training) and social environment. First theme analyses drivers' preparation for the work and the specific training that truck drivers have before they can start working alone. Second section provides the information about the atmosphere at work and relationships between truck drivers'.

8.1.1. Ancestry (Training)

Setting a good background of the work knowledge is crucial for the truck driver in the beginning of the work. In most cases logistics companies have safety and security instructions for new employees that they need to read and sign. Usually the safety rules are long and it takes a lot of time to read; therefore, the author got impression that drivers just skip them without reading because they are too long and it takes a lot of time to read them: *"When the company gives you a "catalogue" you can read it the whole week. Nonsense! You just take the papers and you sign them"* (TD5, Interview). Truck drivers prefer travelling with senior drivers rather than reading safety instructions because it is a better way to learn faster and more. The author agrees with truck drivers that the senior driver can teach more about safety then books. Newly employed truck drivers travel together with senior drivers and they are introduced with specific work situations which sometimes are not even included in the training book. The supervision may last from one to few trips according to the personal abilities to assimilate information. Senior truck drivers share the long work experience, give advises and tips about safe and unsafe places where to stop and take the rest, where to eat, how to behave in stressful situations, how to use the electronic equipment, etc. The training information gives the new truck driver awareness of the existing situation on European roads, the feeling of driving and rest periods, the best solutions for handling stressful or dangerous situations. The training practice in the beginning of the work gives a certain level of the basic knowledge which enables truck drivers to deal with work tasks

and possible harms until they obtain more experienced. The psychological preparation to be fearless and ignore unsafety feeling is one of the core things that the senior driver needs to convince the new driver: *"He is training us not to think about dangers in our work"* (TD2, Interview). The risk to be robbed is always high, despite this, truck drivers are trained not to think about it because continuous thinking will start disturbing them and they can even make more mistakes or simply quit the job.

Nevertheless good training benefits from senior drivers, there were some interviewed drivers who were sceptical about being taught by senior truck drivers, because they are not so efficient and in some situations not so careful anymore: *"After one trip which was one week long, me and the senior driver decided that I am learning better on my own and I started driving alone"* (TD1, Interview). The author thinks that best way to learn is to experience things by yourself or asking other drivers with experience because each person in individual and advises from senior truck drivers may not always be beneficial for all. It can be summarized that the ancestry (training) is important for new truck drivers to consolidate the background and specific things of the work and to prepare mentally for possible obstacle and dangers but on the other had there is also a need to read carefully safety and security instructions.

8.1.2. Social environment

Truck drivers spend a lot of time alone in the truck because they work, sleep and in many cases spend their leisure time there. As it was mentioned during interviews with truck drivers they most commonly talk with each other through the radio communication. This radio communication is beneficial for truck drivers because they stay updated about the situation on the roads, free parking areas along the road, etc.: *"We try not to stop in particular parking if we hear from other drivers that someone has been robbed, you know how the men talk things out, anyways we have nothing to do"* (TD4, Interview). It also seems that truck drivers are friendly to each other, especially those drivers who are working in the same company or are from same country. It creates the social environment that is needed for the driver not to feel lonely or abandoned from the real life. In the parking areas some truck drivers sit together, chat, drink and making food. Due to the comfort that they have in their cabins (computer, TV, coffee maker, refrigerator) drivers are used to stay in the cabin and not go out: *"Earlier all the drivers were*

sitting together in the evening, now when they have computers, they just sit in the cabin and do not go out" (TD3, Interview). Compared the situation 8 years ago and now it is changing and it is hard to force the drivers to communicate, language barrier is even deeper problem (TD3, Interview). Truck drivers from Western Europe are usually more careful and in some cases afraid of drivers from Eastern Europe. This is because the latest are known as thieves by themselves and they do not speak English. During the interview with Sisse Malene Frydendal Grøn language problem was mentioned as an issue keeping drivers to stay in their trucks: "Danish truck drivers cannot talk with Eastern European drivers - they don't know English" (Grøn, Interview). The author identifies the lack of trust and language barrier as a severe problem for truck drivers' social environment in the parking areas which force them to stay in truck cabins. It can be summarized that truck drivers have good social environment with their colleagues and drivers from the same country because it is easier to communicate, spend time with them and share the experience.

8.2. Personal Characteristics

The second Heinrich's domino identifies personal characteristics of the person needed at work in order to cope with possible risks and dangers. The following section with analyse personal characteristics of truck driver that are necessary in order to deal with problems and stressat their work.

Truck driver spend almost all time in the truck cabin because it is his working place. The author argues that this space become like a home for them: *"I create my own world here"* (TD4, Interview). This sense of home can be influenced by the stay in one place for a long time. Usually the trip takes from few weeks to 3 or more months and if the truck driver is travelling alone, he spends a lot of time without close interactions with family and friends. The only thing that they can do is to talk family on the phone or to communicate through radio with other truck drivers who are on the road. The author sees this distant communication as a possible harm that can cause problems for relationship with family and friends. During interviews with truck drivers have identified this problem as the toughest for them mentally and moreover sometimes it can even separate families of relationships. One of the major reasons why truck drivers usually quit their job is being far away from their family and friends (TD3, Interview). It is evident that this problem also touches the home environment of truck drivers' because while they are always in the uncertainty about the things that might happen. Moreover, family members also live alone and create their world without truck drivers which makes things even more complicated when they come home and meet each other again: *"When I come back after 2 months, my wife is already got used to her own routine; I am with in my separate one… It takes time and my wife understands that"* (TD4, Interview). Despite the negative factors, truck drivers who are working for a long time are optimistic at this point and they are sure that after such a long working experience and things that happened their family got used to that: *"Family supports me, they know that when I will come back we will do something together and you are taking things for granted and you think about the future not the presence"* (TD5, Interview). It means that family and friends motivates and support truck drivers. Furthermore, as long as the driver is capable to deal with the personal problems and emotions it is not affecting his decisions, this aspect can be treated as not important to the accident causation in the Heinrich's second domino.

Looking from the professional side, abilities that the driver has are important for the safety reasons at work. A truck driver needs to be aware of possible dangers and risks which may also be unknown during the whole trip and to maintain safety of the freight, depending from subjective understanding of dangers and risks during the whole trip. When truck drivers where asked about personal characteristics that are necessary for being a truck driver, the most common answer was **patience:** "*if you have not had patience, you will soon lose your nerves and you will quite the job after the first trip"* (TD5, Interview). It was obvious for the author that truck drivers' work is stressful and the patience is important because they can face many problems during the work: traffic jams, waiting for a new load, bad parking service conditions, messy roads, etc. Therefore, the truck driver should be patient as much as possible in order to avoid troubles and make right decisions. Other personal characteristics that truck drivers identified as also necessary were: equanimity, quick reaction, fast decision-making, stubbornness, patience and cleverness. It can be seen that the person should be vigilant and prepared for unexpected situations all the time because in these situation truck driver should behave in a way to ensure his own safety. The author noticed that after some years of experience a truck driver disregards and looks to possible harms more relaxed: *"After some time you get used to this, in some situations you need to look more through the fingers"* (TD5, Interview). Furthermore, during interviews drivers' optimism could be felt which, according to the author's view, came mostly from the training part from the first Heinrich's domino. Naturally, drivers cannot ignore harms and be positive all the time; therefore, negative personal characteristics such as obstinacy, covetousness and inattention are very dangerous in driving situations. Heinrich (1959) believes that these characteristics are undesirable personality features that can be inherited, because they may cause injuries, damage of other people or vehicles, financial damage, etc. The stress during this work is unavoidable: unknown routes, searching parking places for the rest, mechanical or electronic problems, dealing with police and fear to be robbed. Inability to cope with the stress may end up with critical errors that may bring risk and danger. It can be sum up that the most important personal characteristic is patience and strong personality. Therefore, each truck drivers' decision should be considered wisely and they must know how to deal with stressful and unpredicted situations. Truck drivers feel supported not only by other truck drivers in their social

environment, but also by family and friends. It gives an impression to author that the second Heinrich's domino may cause some problems if the truck driver is not mentally strong and unprepared for the worst that can happen. Moreover, it is evident that the support from family gives extra confidence and motivation to work in this field.

8.3. Unsafe Acts and Unsafe Conditions

This section analyse unsafe acts and unsafe conditions in truck drivers' work. Heinrich (1959) stresses that unsafe acts and unsafe conditions of the work is a direct cause of an accident. Analysing these helps the author to understand the main cause of accidents and decisions made that can create the conditions for the freight crime during the trip. The knowledge of main accident causes helps the author to identify unsafe acts and unsafe conditions that create core problems and to give suggestions in later analysis solutions for them. This section is divided into 4 paragraphs under different themes which contain crucial information about unsafe drivers' acts and unsafe conditions at work; perception of safety and security; advantages and disadvantages of truck drivers' work. After the analysis of these themes the author will be able to answer the first sub-question of the problem formulation.

8.3.1. Unsafe drivers' acts

Unsafe drivers' acts can emerge from different situations because their job is full of unexpected events as it was mentioned in the previous sections. The author agrees with truck drivers that unsafe acts and decisions of them are the most dangerous and can cause problems or accidents on roads. The most common unsafe act is the violation of driving and rest time periods regulation. Sisse Malene Frydendal Grøn performed the research on truck drivers' behaviour at their daily work and during the interview she clearly stressed on this: *"They are always violating the driving and rest time regulation"* (Grøn, Interview). From the researcher's point of view the most dangerous violation is faking the rest time. Truck drivers identify that the regulation is violated because the lack of time or unexpected accidents on roads and when the driver is behind the deadline to deliver goods to a certain point. It the truck driver is caught he is the one who is responsible for that and needs to pay. Usually the amount of money for violating this regulation depends from the infringement's strength and in which European country truck driver was caught. For example, if a truck driver is driving 30 minutes over the allowed driving time he would be punished with €200-300 fine in Germany, €600 in Scandinavian countries (TD4, Interview). Another possible violation of the driving and rest time regulation is showing that the

driving is sleeping but in the meanwhile he is still driving. This situation can be created by putting the strong magnet on the device that fixes driving and rest time and blocks numbers. For example, you may get 30.000 zloty (7173 Euro) fine in Poland and you can easily lose your driving license in Germany (TD2, Interview). Fines for violating regulations using the magnet are 2-3 times bigger comparing with the salary that truck drivers get for one trip. From interviews with truck drivers it can be summarized that the usage of the magnet is the most often in Eastern European Countries where regulations are not so strictly followed by police and truck drivers can "pay off". Truck drivers identify that it is harder to do it in Europe than in Russia or Belarus, because they are being checked more and regulations cannot be easily ignord (TD5, Interview). There are some countries where police officers take "black money" as in Russia or Belarus: *"You can pay off until the border with Germany"* (TD2, Interview). In other cases, driver is fully responsible for the acts that he did and he is the one who pays the fine for it. It was interesting to investigate why truck drivers are violating regulations and who force them to push themselves into the risk of being punished. The main reason is: ***"Nobody pays for standing"*** (TD1, Interview). For the author it is evident that the aim of earning more money forces truck drivers to take the risk. Nevertheless, it is obvious that fines can make drivers follow the rules and take a rest if they have been caught: *"When I got 500 Euros fine, I was standing calm and still"* (TD1, Interview). From the analysis of this section the author identified that there is a trend to violate the driving and rest time regulation and fines can be identified as a good tool for reducing the number of them.

8.3.2. Unsafe conditions

From the training and social environment section it became evident that truck drivers are trained to ignore thoughts about unsafe conditions during the trip: freight crime, road accidents, unexpected mechanical failures, etc. Nevertheless, the social environment of a truck driver is good because drivers are sharing the information about unsafe conditions that present and in this way help to avoid possible harms. Freight thefts can even happen when the truck driver stops for a short time; therefore, the truck cannot be left unattended at any time: *"They needed to keep their eye for the load"* (Grøn, Interview). Usually, the most attractive booty to thieves from truck cabin are fuel cards which truck drivers take together with themselves to fill tanks with dieseline for the trip which are provided by logistics company (TD1, Interview). Because the difference of fuel prices there are separate fuel cards for each country. Usually, the truck driver has 500 Euros in it: *"You fill the tank where the fuel is the cheapest"* (TD4, Interview). There is a security code on each card but when there are many of them, driver cannot memorize all of them and keep the codes together with cards; therefore: *"If the driver is so stupid to leave the pin codes together with the card, then worse for them"* (TD5, Interview). The author stresses that drivers cannot protect themselves from being robbed, but they should prevent to lose money and be aware of possible thefts. The perfect condition for thieves to steal arises when the truck is standing and the driver is sleeping. Usually, if the truck is standing near the road side lane it creates perfect conditions for thieves at night because the one side of the truck stays in the shadow and thieves can easily cut the tent cloth and take the load away or to pump the gasoline out. In order to get into the cabin they can use sleeping gas which paralyses the body but leaves the driver conscious. The worst thing is that the insurance company insures only the goods but not the driver (TD3, Interview). It can be seen that truck driver's work is unpredictable and dangerous, thus there is a need to have some security tools in the truck. In order to increase the security of themselves and the truck, truck drivers identified that they also carry some extra safety tools, such as knifes, iron bars, etc. Some of them put extra locks on fuel tanks and doors. In order to prevent gas inlet to the cabin, drivers stick extra stripes to isolate the door. If the driver is conscious there is also an option to use the radio connection and ask other drivers to help in the critical situation if they are nearby (TD3, Interview). The analysis of this part has shown that truck drivers' work is dangerous and even though drivers are aware of that, they cannot change

anything just to be more precautious. From the authors point of the best security tool is the awareness where you stop for the rest and how you perceive the security and safety in this place.

8.3.3. Drivers' perception of safety and security during the trip

This section analyses the perception of truck drivers' security and safety, according to the risk and dangers during the trip. During the interview with Sisse Malene Frydendal Grøn it was clearly stated that the safety was not an issue for truck drivers: *"They felt secured and without danger"* (Grøn, Interview). The author using the information gained from interviews with truck drivers identified that the level of driver's safety and security during the trip depends from the 4 following conditions:

1. If the truck is empty and driver is going home.
2. If the truck is empty and driver is waiting for another load.
3. If the truck is loaded with not expensive load (perishables, peat, construction materials, etc.)
4. If the truck is loaded with expensive load (cigarettes, electronics, etc.)

Looking from the crime perspective the first conditions enables driver to feel safe and relax. More often the accident might happen due to spontaneous and careless truck drivers' decisions if they are too eager to come home: *"When you are going home, you do not think about something else"* (TD1, Interview). For the second condition truck drivers feel totally safe and secure, because they have free time until the new load will be ready and there is an opportunity for them to go near the sea or sightseeing if there are any nearby (TD2, Interview). It is obvious for the author that the last thing that they willing to do is to stay in the cabin for the whole time if the truck is empty. The situation is different if the truck is full of goods and they are expensive: *"Sometimes you drive with a load for millions of Euros, with that kind of load you are willing not to stop anywhere even for a minute"* (TD5, Interview). It can be seen that the high value of the truck causes tension and increases the danger to get hurt. Thus, if the load is not expensive but it can be sold in a long term, e.g. muesli, it is also can be in the thieves' target. After the analysis of the drivers' perception of the safety and security and using Reason's (2000) four safety conditions the most relevant ones are that **drivers are aware of possible harms**. When truck drivers were asked to rate their safety sense during the trip from 1 to 10 (1-lowest, 10-

highest), the unanimous answer was 8. It means that drivers feel safe during the 80% of their trip, and 20% they feel unsafely: "*If you will start thinking about the things that can happen, the safety level would be 0"* (TD5, Interview). The unsafety feeling also comes from the bad work experience of other truck drivers and road accidents. Even though the driver is driving safely there is always a possibility for an accident: *"We drive at least 700 kilometres per day and it really does not matter if you drive carefully because another person can make a mistake and you will be injured or even dead"* (TD5, Interview). The author agrees with truck drivers that these events are unpredictable and at that point nothing can be done, but truck drivers can choose to avoid these unsafe conditions and stop to rest in the secured parking areas and take a decent rest, in order to be attentive and concentrated on the road 24/7.

8.3.4. Advantages and disadvantages of being a truck driver

Truck drivers were asked to name advantages and disadvantages of their work in order to understand their perception of the work and why they chose this profession. The main advantage of being a truck driver is a **good salary**. The salary that the truck driver earns is 3 times bigger than the average wage in Lithuania: *"you need to work more than one month to get 2000 Euros"* (TD1, Interview). The wage difference has an influence to driver in choosing job, regardless other disadvantages of this work, such as: unsafe and unsecure conditions during the trip, risk and danger to the health, long working hours, being away from home: *"You do your job and you do not search for extra problems even though you do not like many things"* (TD4, Interview). Another advantage of being a truck driver is a complete freedom to your actions. During the trip drivers are directors for themselves because companies are not constantly controlling them during the trip: *"Sometimes you do not even feel like working"* (TD5, Interview). The flexible work graphic enables truck drivers to stay as much as they want home or go on vacation after one or two months of working. They have a freedom of choice when and how much to work. Year by year this freedom and flexibility changes the perception of truck drivers about the work conditions; therefore, for some of them it is hard to quit and start working somewhere else even though they would like to do it. The author sees that the one of the disadvantages in this work is being far away from home and family, but it seems that financial benefits pay off the problem: *"You know when you will come back; you will be able to buy something to yourself or to wife"*

(TD4, Interview). Another disadvantage of this work is lack of physical activities which may cause problems for truck drivers' health in the future: *"Now it is ok, but when we will be 40-45 years old heart and blood circulation problems will appear"* (TD5, Interview). In 2011 there was a project initiated by the Danish Health Association (Forebyggelsesfonden) about creating sport facilities for truck drivers (Christensen, Interview). This suggestion contained creating areas for the basketball or badminton but from interviews the author got a negative impression from truck drivers: *"Work and leisure is incompatible"* (TD3, Interview). It can be said that truck drivers are concentrated on making more money and they even put themselves into the risk; therefore, extra activities after long ride is not an option to improve their working conditions. To conclude, the majority of truck drivers have admitted to the author that if there would be the job with same salary available they would stop working as truck drivers.

This section aimed to answer the first sub-question: ***What are the working conditions, safety and security problems at truck drivers' work?***

In Heinrich's Domino Theory (1959) three dominoes (ancestry and social background, personal characteristics, unsafe acts and unsafe conditions) are the key conditions that can causes the accident and injury or to create the perfect conditions for freight crime. The analysis of the ancestry and social background gave an impression to the researcher that truck drivers are well trained before they start working and it is the strong precondition to avoid accidents and injuries. In authors point of view the training time and type is not important comparing with the knowledge that truck driver gains. Moreover, the social background in this work helps truck drivers to keep learning all the time and stay mentally strong because of other drivers support. The analysis of personal characteristics of truck drivers has made an expression for the author that it is mentally hard for truck drivers to be away from the family and friends but the money aspect redeems this. Furthermore, family understands that and support truck driver because they understand that this job will bring financial benefits for them as well. The analysis based on the second Heinrich's domino made it evident to the author that truck driver must have strong personally and be patient. Nevertheless, it can be said that even though the driver does not have this characteristic at the beginning of the work, he will adapt to stressful and unpredictable work

situations and learn patience over time. As Heinrich (1959) explains in his Domino Theory the third domino concerning unsafe act and unsafe conditions is the most important one. From the analysis of truck drivers' behaviour and unsafe conditions at their work the author can highlight and agree with Heinrich's statement. The main reason is that truck drivers are willing to violate the driving and rest time regulation and money are more important than the safety. The author stresses the need to train drivers to follow the regulations and think about their and other people safety and security on the roads. Moreover, unsafe conditions can be avoided if the truck driver decides to pick the secure and safe parking area and take a proper rest. In this section the author tried to measure if there are more advantages or disadvantages at truck drivers' work. Main advantages of being a truck driver are a good salary and freedom and it is evident that these two advantages completely overcome all disadvantages such as unsafe and unsecure conditions during the trip, risk and danger to the health, long working hours, being away from home and lack of physical activities.

8.4. Truck drivers' preferences for parking areas

This section aims to indicate possible choices of truck drivers for parking areas during the trip. It gives information about the factors that influence truck drivers' decision to stop in each type of parking area. Moreover, the author will give advantages of SRPs that truck drivers have identified during interviews.

8.4.1. Types of identified parking areas

The driving and rest time regulation (2006) indicates that the weekly driving time would not be more than 56 hours. After eight hours of driving the driver should stop to have a rest. It is evident that during the rest time when the truck is standing the freight crime rates are the highest; therefore, truck drivers need to be aware of possible dangers and risks and choose the area where they can rest calmly. The author highlights that it is easier for the truck driver who is travelling not the first time to choose safer place because during years of practice he has preferable parking areas where to stop. Usually, it depends from facilities and services that the parking area has and the distance from the main road. Truck drivers omitted that the lack of quality parking spaces is a huge problem in Europe. If drivers do not have a certain place, they start paying attention to the road sings 2-3 hours before the stop, because there are no free parking areas left, especially at night time (TD1, Interview). Moreover, it is hard to find a place where facilities and services can satisfy their needs and there is always a danger for being robbed (Grøn, Interview). In Scandinavian countries because the parking situation is better that in Western or Southern Europe and freight flows are less intensive (TD4, Interview). Drivers indicated Denmark and Norway as ***the safest in Europe*** regarding safety and security in any parking areas. They stressed that there are no specially secured areas and they stop in "Infoteria" cafés near the motorway which are called *"little pockets"*. It was also mentioned that Southern part is more overcrowded and if drivers go to the north, they can find the parking area easier. Due to the geographical position and lack of quality facilities and services, Denmark is known as a transit country: "*We try to plan our trip in the way that we should not stop in Denmark and it is better to stay on the ferry, which has all facilities needed*" (TD4, Interview). Truck drivers identified toilet, shower,

cooking place or shop for food and gasoline station as the most important services and facilities that they need during the trip. These facilities and services can found more or less in each parking area along the main roads but the quality level is bad: *"It is difficult to walk around and the food is always unhealthy"* (Grøn, Interview). It is obvious from interviews with truck drivers and researchers that the parking situation in Europe is bad and that there are no facilities and services created. The author argues that truck drivers' can decide where to stop and what facilities and services the parking area must have. Truck drivers identified 5 main places that they choose for the rest:

1. Stop areas along the roads;
2. Small parking lots without other trucks;
3. Parking lots with other trucks;
4. Gasoline stations;
5. Secured rest places.

The choice of truck driver to stay in parking places identified above can be divided into two types of truck drivers. The first type tries to avoid other truck drivers and another type cluster with them. The first type drivers are usually unexperienced and newly employed; therefore, they choose to stop along the roads that they are driving to avoid going to the unknown city or overcrowded parking lots. This choice ensures that they will not get lost and definitely will have a place where to park the truck. Drivers also choose to stay in the remote places, where the risk of theft is the lowest: *"As the quieter place, the better"* (TD2, Interview). These parking spaces can be placed near the woods or in the living areas and truck drivers can be sure that they are safe because the place is not often visited by other trucks and it reduces the possibility to be robbed. Actually, these kinds of areas may also be critical because in the case of emergency there is no one around. The second type of parking places where truck drivers can choose to stop for a rest can be gasoline stations or big parking lots. Usually these parking areas are full of other trucks and sometimes it is even hard to find a free place to park the truck there. The author assumes that some of truck drivers cluster in order to feel safer and help to prevent freight crime if needed. Stopping in these parking areas also gives an extra social benefit, because drivers gather and talk with each other in the evening, making dinner or play games (TD3, Interview). On the other hand, this cluster is a perfect target for thieves because all trucks are in one place.

There is also a possibility that a truck driver will not reach the planned parking area due to the obstacles on roads or other unpredicted factors. The parking space also may be chosen if the driver has a must to stop according to the law and there is no other option: *"Sometimes you are forced to stop at the place which is almost impossible for other drivers to pass through because of the time limit and you do not want to violate the regulation"* (TD5, Interview). At this point the truck driver must accept the situation as it is as take some extra safety tools. For extra safety reasons drivers usually put extra chains and locks or park trucks very close to each other during the night time. This section analysed choices of truck drivers where to stop during the trip. Nevertheless, staying in remote places, using extra security tools or being together with other drivers in unsecured parking areas does not ensure that truck driver and the load will be safe. The author argues that random parking lots are not suitable for truck drivers because these areas need to be secured and contain adequate facilities as services.

8.4.2. Drivers perception about SPRs in Europe

In the previous section the author found out that truck drivers are staying in remote areas or unsecured parking lots together with other drivers to ensure the security. The SRP as a choice where to stop was not mentioned almost at all. EC has financed SETPOS and LABEL projects to make a good categorizing and labelling system for SRPs in Europe that truck drivers would know that there are places where they can have quality facilities as services. Nevertheless these efforts, truck drivers still choose to stay in unsecured parking areas. The author sees safety and security benefits for logistics companies if truck drivers stay in SRPs. There are all quality facilities and services needed and truck drivers would feel safe and secure. It would lower the freight crime risk and help to avoid the losses. The problem is that the stay in SRP cost money and truck drivers are normally not willing to pay. In Germany one night in the secured parking area (only with the guard and camera, without the fence) costs 5-10 Euros with food or drink included. In Poland it is around 3-5 Euros (TD1, Interview). The most expensive country that was mentioned during interviews was United Kingdom – 25 Euros per night. Logistics companies usually give money for truck drivers to stop in SRPs but they prefer to keep them: *"The money we get for parking is ours and we can choose to spend them or keep it"* (TD3, Interview). Due to this, truck drivers have all conditions created for choosing the secured parking

place. Nevertheless, their preference is to keep the money for themselves and take a risk to have freight losses. Comparing unsecured parking areas with SRPs in Europe, the last-mentioned were identified as better for truck drivers: *"You feel safe in SRP"* (TD1, Interview). Looking from the design side Sisse Malene Frydendal Grøn was more sceptical about her perception of SRPs: *"Feels like in the jail"* (Grøn, Interview). It can be said that the fence gives more confidence to drivers and they can feel safer, but looking from the psychological side of a random person, the design of SRP can look a bit too harsh. Taking into consideration the data collected from expert interviews the author lists the main advantages of the SRP:

1. Enough space to park the truck.
2. The area has a fence and CCTV (Closed-Circuit Television) cameras which record the truck all the time and it created the safety and security feeling.
3. There are facilities and services that truck drivers need: shower, cafeteria, small kitchen, the internet connection.
4. Sometimes it contains healthy food canteen or have some good offers for food or beverages, included in the parking price.
5. Information relevant for truck drivers, such as maps, brochures, etc.

Comparing SRPs with other parking areas it can be said that drivers feel way much better in the secured place, because it has all main services and facilities that they need and where their expectations both physical and mental are fulfilled. On the other hand the strong argument why truck drivers should not stop in the SRP is that drivers feel uncertain about safety not only in unprotected areas but also in secured ones:

> ***"Even though the rest place is highly secured, you pay for the place, not for the security. Nobody can totally secure you… Camera? It will film the silhouette of the person and that is it. If trucks get inside of the parking area; thieves will find the way to get there too."*** (TD5, Interview)

This statement shows again that drivers are aware of possible harms and high security and safety problems during the trip and they prefer to stop in the free parking areas because they are not sure if they will be 100% safe there and it is just a waste of money.

The section aims to answer the second sub-question: ***In what type of parking areas truck drivers choose to stop during the trip and why?***

The analysis of this section showed that there is a need for better quality parking areas in all Europe; nevertheless, northern countries seem to have less intense freight flows and problems with parking then the central and southern countries. The research showed that truck drivers choose places for a rest before the trip and it is usually based on other truck drivers advises or own experience. They can pick plan to stay in a free parking area in which other drivers will stay too and have a good company with them or to choose a remote place to not be disturbed. SRPs are not popular choice for truck drivers because the price too high. Moreover, some truck drivers do not feel guaranteed that they will be safe and secure even though they will stop in the SRP and it becomes just a waste of money; therefore, truck drivers choose and search for free parking areas. Taking this into account the author agrees with truck drivers that SRPs are too costly and there is a need to find ways how to reduce the price. Services and facilities that truck drivers need can be found almost in every gasoline station or cafeteria among the motorway but the quality is significantly different not even mentioning the security level. Comparing SRPs with other parking areas it can be seen that there are way more benefits for truck drivers to stay in SRPs. Nevertheless better safety conditions and quality facilities and services in SRPs, drivers usually choose to stay in the unsecured parking areas to save money that they get from company. From the analysis of this part for the author it is evident that drivers will not pay extra money for staying in SRPs even though it provides quality services and facilities and at the same time ensures their security.

8.5. Timeline of the parking areas development in Denmark

This section aims to show the sequence of events that are related to the development of parking areas in Denmark. The author aims to get information about initiatives and regulations that Danish Transport Authority took in order to promote and have SRPs in the Danish road transport infrastructure. The timeline will also highlight the shift between rational and comprehensive type of planning to more strategic planning concerning the development of secured parking areas in Denmark described in the Strategic Spatial Planning Theory section (see chapter 6.2). The author's idea is to show this shift with the timeline containing with tree periods (1988-2005, 2006-2011 and 2012 – present) and explain efforts and expectations from EC and Danish National Transport Authorities and how it shaped parking areas in Denmark. Every period contains the relevant information from literature review, document analysis and materials received from expert interviews.

8.5.1. 1988-2005

This section gives the sequence of key events from the first time that the initiative for improving truck drivers' conditions was made in 1988 until when the EC released the driving and rest time regulation in 2006. In the end of the 80's there was no attention for fighting the freight crime from Danish Transport Authorities because the main freight transport issue was a lack of efficiency and the main goal was to optimize logistics in order to receive more money and save time (Bentzen, Interview). The "Smuggling system" was working strongly in Denmark until the 1st of January 1993 before Denmark has joined the EU. Its high tax rates led to a limited amount of cross border purchase and smuggling, because it was easy to control the situation with border checks. It meant that truck drivers could not easily go through the boarder and earn money from the difference of tax rates of European countries. After 1993, the free trade problem itself was that Danish truck drivers drove empty to take the lead from one place to another because they were facing concurrence with European drivers. Therefore, there was a need to establish better supply chain together with appropriate facilities and services for both Danish and European drivers. At that time looking from the freight transport perspective Danish Transport and Logistics Centres (TLCs) were the perfect solution for this idea (Bentzen, Interview). In the

beginning of 1995 facilities for truck drivers in Logistics Centres and were well established by spatial planners in Denmark. The general plan was to improve parking area which would contain: short-time storage, long-time storage, gasoline station, services for drivers, etc. It was used by Danish planners for the Nordic Transport Centre, Vejle Transport Centre and later in Køge Transport Centre in 1996. This is how the rational planning idea was strongly influencing the selected areas. The focus was on the final outcome, but not the process of it. Nevertheless, the background for truck drivers' services and facilities was created, integrated together with other elements needed in the TLCs, for example, the area for the dangerous cargo which needs to be separated and isolated from other trucks. After some time, it became as an element of supply chain, because it was not only the beginning but also the end point of the trip: *"It was already an element that we can use in order to change drivers' attitude"* (Bentzen, Interview). In 2002 the Danish Presidency in the European Parliament got a letter from Anne E. Jensen concerning the improvement of truck drivers' safety in Denmark: *"It was important to make sure that the EU will be involved if we start it"* (Bentzen, Interview). I was a kick-start debate in the European Parliament with Anne Jensen who later on negotiated with the Danish Presidency to initiate a joint delegation to investigate truck drivers' safety problem and to involve Member States to take initiatives to combat crime. This initiative was taken, because it was obvious that the rational planning was not working properly and there was a need for a clear vision and logical sequential actions in order to focus on interested areas and shape them in the best way for SRPs, because in 2004 truck drivers' work was defined as the 3rd worst occupation regarding safety and security (Grøn, Interview). FDT was invited to participate in the joint workshop together with other experts and Danish Authority members because they already had experience of creating services for truck drivers in three TLCs. The aim of this workshop was to create a Danish model for truck drivers' services and in 2005 the European Commission gave €5.5 million (about 41 million Danish kroner) support for a pilot project on "Safe Rest Areas for Truck Drivers" (Jensen, 2007). Looking from the planning perspective, it can be said that during the period from 1988 to 2005 the background for basic facilities and services were created in the few TLCs. Because National Transport Authorities and planners were focused on the final result to have these facilities but not to promote them, it ended up with the lack of interest of relevant stakeholders and lack of communication with responsible transport infrastructure authorities.

8.5.2. 2006-2011

This period starts with the key event on the 15th of May 2006, when the EC adopted the regulation concerning truck drivers' driving and rest time periods. The aim of this regulation was to fight with accidents on the roads, caused by tired and inattentive truck drivers. Moreover, the manual report about SRP (at that time so called "Safe Parking Sites") was published in 2007, which contained the description of parking areas in TLCs and what facilities for truck drivers' it might contain. This paper can be identified as the first document for promoting secured parking areas in Denmark (Jensen, 2007). It gave crucial information for relevant actors (logistics and transportation companies, shippers, forwarders, service and insurance companies, etc.). Due to the conflicts between stakeholders, this project was not implemented, which again shows the outcome of the rational planning. The same year the EC funded SETPOS project and a year later the LABEL project. These projects aimed to standardize the parking areas in Europe and to increase them in a higher level. For the Danish transport these projects looked like: *"SETPOS and LABEL projects had too much focus on the end point: black and white"* (Bentzen, Interview). It means ultimatum - either you have the SRP or you have nothing. This ultimatum became a huge problem for the old part of the transport industry due to the facilities that they had which are not high enough to reach the standards. Some of them rented or sold the areas, others were interested in improving the situation while offering food: *"In the middle of nowhere"* (Bentzen, Interview). It caused many security and safety problems, because truck drivers stopped there and usually got robbed. For having the highest level of the parking areas in SETPOS and LABEL projects you need to have a basis investment, but it was not visible in Denmark at that time: *"Standardization was partly solved, but the access to information question was still missing"* (Bentzen, Interview). As a reflection to these projects a full day meeting about improvement of truck drivers' conditions in Europe was initiated between the European Commission and EUROPLATFORMS members in 2008: *"We ended up with conclusion that there is a need to have **multi-areas**"* (Bentzen, Interview). It means that it was decided to have mixed facilities in the parking areas that both service companies and truck drivers' would benefit from them. It can be said that the political top-down approach started in order to have the quality transport in Europe. Moreover, it can be seen that at that time how relevant stakeholders saw

useless rational planning outcomes and were aiming to have a change for planning and started thinking in a broader sense. It can be said that in 2009 the situation has started to become more strategic in spatial planning also in Denmark, when the Danish welfare organisation "Forebyggelsesfond" invested 5 million Danish kroner to the project which had an idea to develop the concept of a SRP in the South of Denmark near the border with Germany (Christensen, 2011). The goal of the project was to create the design for SRP according to existing EU's regulations and examples from other countries (Christensen, Interview). The information for this project about truck drivers' conditions and lack of good facilities was given by the Union of Danish Truck Drivers. During the project on of the visited high-secured rest place with electronic security in the northern France left negative impression to the planners: *"It looked like a prison: iron gates, no green areas, not even a question about having a nice time but staying in the car"* (Christensen, Interview). This project contained the proposal of having: sports house (badminton, football, etc.), inside facilities (shower, toilets, wash machines, etc.), healthy food services and meeting places for drivers, green areas between the parking spaces, bicycle rentals. It was also suggested to have an intelligent system via Bluetooth: *"10-15km before drivers reaches a place; there they could make an appointment to play with someone football or badminton"* (Christensen, Interview). Unfortunately, this project was stopped in 2009 due to the bankruptcy of the Danish truck company showing typical problem of the lack of communication which was still highly influenced by the usual rational planning. Later this year the Danish Road Directorate has made an analysis about the "Rest stops along motorways: Route Analysis", showing the attention to existing resources (Pedersen, 2009). After one year the Presidency proposal for a Council resolution on preventing and combating road freight crime and providing secure truck parks *12083/4/10* was adopted on the 8-9th of November 2010. EU's resolution *12083/4/10* influenced decisions of a National Interdisciplinary Transportation Security Council in Denmark, which started looking deeper into the freight crime problems on Danish roads. Nevertheless all the efforts from the EU and National Transport Authorities in Denmark, the SRP projects were not implemented due to financing and tendering problems. In 2011 October thefts from vehicles were committed in Denmark 25 times a day on average (Klok, 2011). Later this year, Danish Road Directorate initiated the expansion of two parking areas on

the E45 southbound: on Ustrup West a total of 35 additional parking spaces and on Hylkedal West a total of 15 additional parking spaces for trucks (Transportnyhederne, 2011).

The period from 2006 to 2011 show the slight shift from the rational to strategic spatial planning in both EU's and Danish decisions and initiatives. Strict rules on driving/rest times, increased volumes of foreign trucks on the Danish motorways ended up into overcrowded parking areas. This problem forced truck drivers to illegality and violation of the regulations. This was followed by the higher attention from the EU and Denmark to the freight crime problem and searches for the safety and security on the roads solutions and the improvement for services and facilities in the existing parking areas.

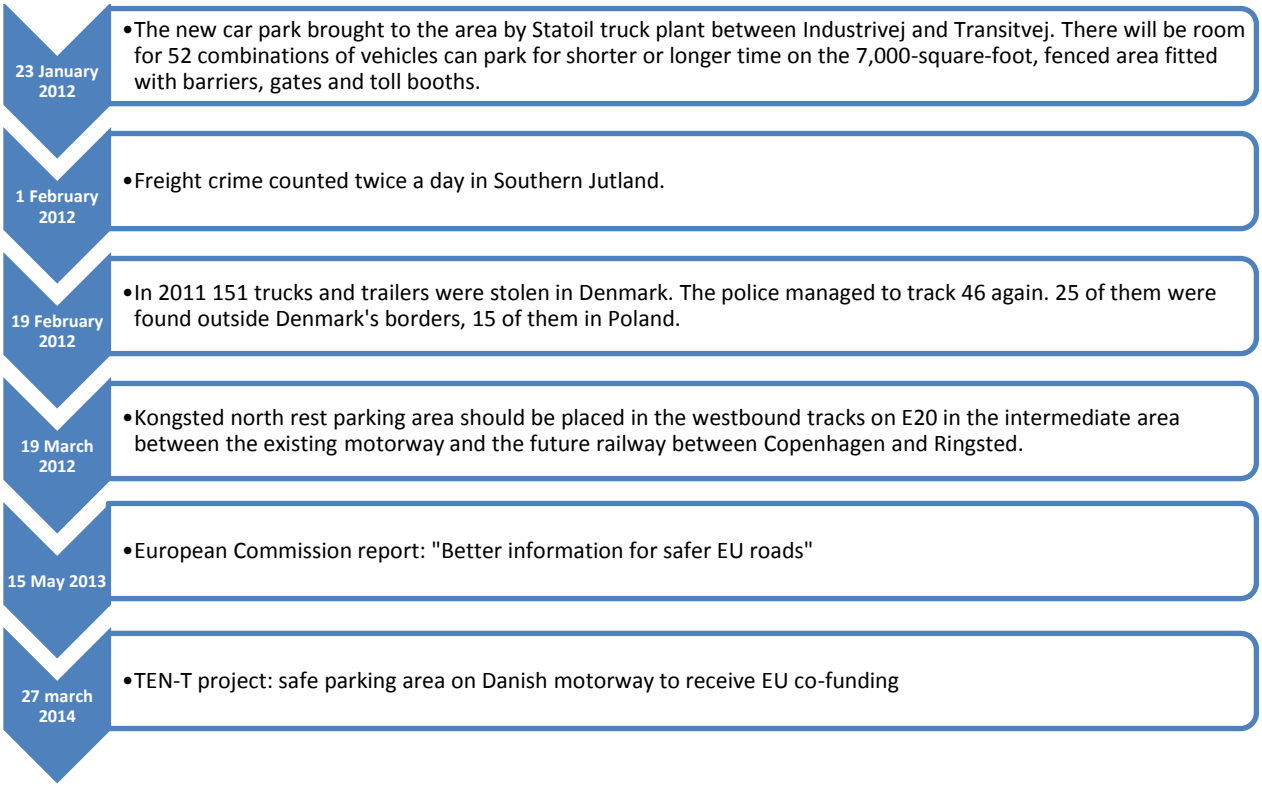
Figure 10. Key events from 2006 to 2011.

8.5.3. 2012 – Present

In 2012, the freight crime rates were high in Europe. In the South of Denmark the freight crime was fixed two times per day (Transportnyhederne, 2012). There was a need to change from the result thinking of rational planning and to shift completely to the new strategic spatial way, where the problematic area can be shaped in a better way, taking into consideration that the built environment is composed of diverse levels that include transport, demographics, business, production, services, standard of peoples living and that this environment is driven by various forces that are interconnected and interact in complex manner. As an outcome of this new planning perspective "Statoil" company started construction work on the first supervised, secured parking area for large vans and trucks around the station in Padborg in Southern Denmark near the German border (Danmarks Transport Tidende, 2012). The fenced parking area of 7,000m² with barriers, gates and toll booths was planned to contain 52 parking areas for short or long time stops, together with 20 CCTV cameras and license plates front and rear of the car scanned at entry and exit. It was expected to cost from 3 EURO/1 hour to 24 EURO/a day. Later the existing rest area in Kongsted between the Ringsted and Copenhagen was decided to be expanded for 35 trucks as a continuation of the development in Southern parking areas (Vejdirektoratet, 2012). This project was 10%supported by the EC from the Innovation and Networks Executive Agency (INEA) (INEA, 2012). In 2013, the new Transport Policy (2013) together with Connecting European Facility (CEF) (2013) funding opportunities for the Member States in the European Union show a high interest in improving truck drivers' safety and security: *"We have never seen such a positive situation"* (Bentzen, Interview). Mr. Kent Bentzen highlighted that the Article 4 in TEN-T Guidelines (2013) has now covered four areas, while in the old paper the focus was on the only one. This new policy covers more elements and is not so "black and white" as were SETPOS and LABEL projects which shows the strong aim to shift from the rational to the strategic spatial planning. This period has shown the number of positive decisions of Danish National Transport Authorities and EC. The new Transport policy has a strategic spatial planning perspective and it seems to be successful for creating SRPs in Member States in the future. Looking from the long-time perspective in freight transport sector, it is expected that the freight flows in Denmark will increase even more, because secured parking areas will be a precondition for rail network as well, because the new combined rail-road

terminal (5000m²) will be placed in Taaulov (Denmark) in 2020 (Bentzen, Interview). In order to avoid monopoly and to create business environment Danish Government gave right to run this terminal to the "Banedanmark" (Bentzen, Interview). This decision also shows the positive strategic spatial planning aspect that all relevant stakeholders will be involved in this the planning process of shaping the parking areas as better places for truck drivers.

Figure 11. Key events from 2012 to the present.



In this section the author aimed to show the shift from rational to strategic spatial planning and how this change can be seen on the existing parking areas in Denmark. Moreover, the specific focus was given to EC regulations and key events that enable Danish Transport Authorities to be aware of European-wide freight problems and guidelines how to solve them.

8.5.4. National Danish regulations for parking areas

The previous section highlighted the change of thinking about the necessity of SRPs in Denmark; therefore, this section aims to show how parking areas are regulated in Denmark. Author only concentrates on the national level regulations because in Denmark motorways are public and belong to the Danish Transport Ministry which is national level authority. The author suggest to place SRPs near motorways because they are also a part of TEN-T Core Road Network in order to get financial support and to be successful. Regional level is not considered because regions are weak compared with other Member States and they are responsible only for the development of the health sector. Existing and valid National Danish Act. No. 937 and 1048 create a background for the implementation of new parking areas or developing new existing ones (see Table 4). Usually the cooperation from the municipality is needed to prepare the local plan which later is approved by both national and municipal level authorities.

Table 4. Danish national legislation on parking areas.

Document	Source	Covered area
Act. No. 937 of 24 September 2009. Planning Act.	Chapter 5, §13 (7.2, 7.3, 7.4)	A local plan must be provided before undertaken major subdivisions or major construction or civil engineering works, including demolition of buildings, or whenever it is necessary to ensure the municipal achievement. If a development or construction etc. as mentioned in paragraph. 2 is consistent with the local plan, the municipal council shall immediately preparing a draft local plan and then promote matter most. The local authority may in such cases require the owner or developer shall provide the municipality assistance to its elaboration. When the owner wants an area transferred from rural areas to urban areas for the performance of a building or construction work, the local authority may require the owner of the land makes one of the municipality approved assurance that the municipality if work is not done, can recover the cost of providing local plan and municipal as well, unless the owner waives the right to demand land taken over by the municipality in accordance with § 47 A, the cost of acquisition of the land in accordance with § 47 A. The cost to the local work may be required to pay if the building or construction work is not commenced within four years after the area was transferred to an urban area.

Act No. 1048 of 03/11/2011. Act on Public Roads	Chapter 11, §107	For the use of specially designated public parking and facilities for vehicles to road administration let charge a fee to cover the costs of implementation and operation, including the exercise of supervision of the parked vehicles. Moreover, the road administration in consultation with the police decide that in places where limiting access to park motor vehicles is desirable, charged a parking fee that may be related to the period during which the vehicles are kept on hold.

Even though motorways in Denmark are public, parking areas can be specially designated together with police and other authorities' consultations. From these regulations it can be seen that the different type of parking areas are possible and legal. There are no clear requirements how the secure rest place for truck drivers should look like and what facilities it should contain in Denmark. It can be said that the Danish National law allows creating a parking area with land use permission from the municipality. As an example how the SRP should look like could be taken from SETPOS and LABEL projects but it also depends on what king of security level is needed and what facilities and services it should contain. It is evident for the author that Danish regulations are too vague and only describes the parking areas with different kind of use; therefore, taking examples from the EC initiatives and regulations, Danish National Authorities should put more focus on shaping regulations for SRPs in Denmark.

8.5.5. Security and services levels of SPRs in Europe

Services and security levels of SRPs in Europe are defined by the labelling system created in the LABEL project (LABEL, 2008). The following section gives an understanding about what facilities, services and safety tools are typical for 5 SRP's levels. This information gives a background for the suggestion that the author will give for SRPs in Denmark.

The Level 1 SRP should be recognizable as the parking space for trucks and driving as well as pedestrian areas must be well-lit all the time. For security reasons this parking area should be surrounded by fence or some other alternative barriers and contain a sign that this area is regularly checked by the police or external guards. Moreover, it must contain phone numbers to emergency services. Services provided in this level SRP are toilets, water taps which are available and working properly. There must be enough waste bins and their number must depend from the size of the parking area. There should be also the sign that informs truck drivers about the availability of services and working hours.

The Level 2 SRP supplements Level 1 requirements and adds additional safety facilities. The parking area must be surrounded by the continuous fence. The CCTV (Closed-Circuit Television) system must cover and record activities in all area. Recordings must be stored for the minimum of 30 days period. There should be a limited amount of trees or other visibility barriers in the parking area that people and trucks could be clearly seen all the time. Cameras near entrances and exits should fix the movement of people and trucks 24/7. The parking area is safer from the Level 1 because it contains the deceleration at entrances. Services in Level 2 SRP are oriented for a longer stay and it can be seen from the laundry facilities and shower available. There are also picnic tables, benches or in some places restaurants or snack-bars can be placed.

The Level 3 SRP contains the fence which is covering all space and is constantly checked by guards to remain in a good condition. The CCTV system should be placed along all fence and record clearly all movements near the fence. There is a need to have a secondary physical barrier and it must be a clear zone between fence and vehicles on the inner side of the SRP. The parking area must be also monitored and there have to be admission requirements for stuff and drivers to

enter the area. This procedure should be checked with the entrance control. If there is no entrance control there should be a sign saying that the area is forbidden for random people. Services in Level 3 SRP are more quality oriented: toilets, showers and washing facilities are clean and checked at regular intervals. There is a shelter placed near the parking area which prevents from rain and sun. Contacts to the doctor, fire brigade, police are available 24/7 and the fuel station is close or integrated in the parking area. There is also fax and copy machines, cash automates and the restaurant (working during the daytime).

SRP with security Level 4 requires only the professional stuff which should be trained to react quickly to alarm system and critical situations. Moreover, gates to the parking space are always closed and registration procedures must contain at least license plate number of truck, vehicle name and the picture of the driver. These actions must be performed before and after the truck is entering/leaving the SRP. Pictures and recording from the CCTV system should be kept at least for 3 months. Pre-booking services should also be available in this level of parking area. Level 4 SRP provides full services for driver and truck. Comparing to the Level 3 it offers more spare parts shops and leisure facilities and the food is expected to be healthier. Moreover, the internet connection is provided by the SRP operator. In case of truck damage the emergency assistance can be provided.

Level 5 SRP provides the highest security facilities because it has an anti-intrusion system which protects breaking in the area from the outside and this system can contain electrified topping, trembler or passive infra-red detector (PIR). Moreover, the CCTV system is recording clearly all activities inside and outside the fence. The entrance is guarded by professional staff and they allow entering only authorized vehicles and truck drivers. The site is guarded around the clock and stuff is checking the SRP's area during opening hours and at closing times. The communication system between guards and control room is always available. There is also the highest level of comfort in this SRP. It contains a restaurant which offers breakfast, lunch and dinner. Moreover, truck wash, snow/ice removal equipment and electricity for truck with fridges are always available. Furthermore, this parking area separates trucks with dangerous goods in order to ensure safety of other drivers.

From the different levels of security and services it can be seen that SRPs can be adjusted to each road transport infrastructure in Member States. The hardest task is to build up facilities and services needed for parking areas. The author argues that there are still no SRPs in Denmark not because there are no demands or places for them. On the contrary, the timeline has shown that the demand is huge, especially in the southern part of Denmark. Therefore, in the next section the author tries to investigate where and with what facilities SRP can be implemented in Denmark.

8.5.6. Danish Transport and Logistics Centres for SRPs

This part aims to identify places where SRPs could be integrated in the existing Danish road transport infrastructure. The author agrees with experts' idea to place SRPs in Danish Transport and Logistics Centres (TLCs). TLCs are also highly integrated in the main transport corridors of the TEN-T Core Road Network and follow EU regulations. EU regulations concerning TLCs are adapted to national Member States levels which means that these regulations are included in their transport strategies which identify the TLC as a part of national road infrastructure. TLC contains many aspects while being planned (FDT, 2003, p. 192): local connections and transport networks, storage facilities, accesses to TLC, utilities, future expansion possibilities, telecommunication infrastructure. Then more detailed plans for shaping the selected area are made concerning the location, size, number of accesses and facilities. The author sees that TLC has key factors for the SRP to become successful: openness and flexibility. In the local plan there is always a consideration about the flexibility of the area where the TLC will be placed. Therefore, there are always opportunities to increase the capacity for truck parking or to place the new facilities and services of interested companies. Looking from the finance perspective, national or regional authorities use public-private-partnerships (PPP) in order to implement the TLC concept and to fulfil the requirements for the public sector. This partnership enables to increase the attractiveness of future-oriented business and to be competitive in the existing transport and logistics sector. Flexibility aspect comes from the economic part where the TLC has common facilities and there is a possibility to have cost sharing between companies within the area and in this way to reduce price for truck drivers' parking. Moreover, the network of TLCs can help to improve the quality of logistics services and use of ITC technology for the freight transport. The scheme of possible facilities, buildings and activities in TLC can be seen in the following figure (see Figure 10):

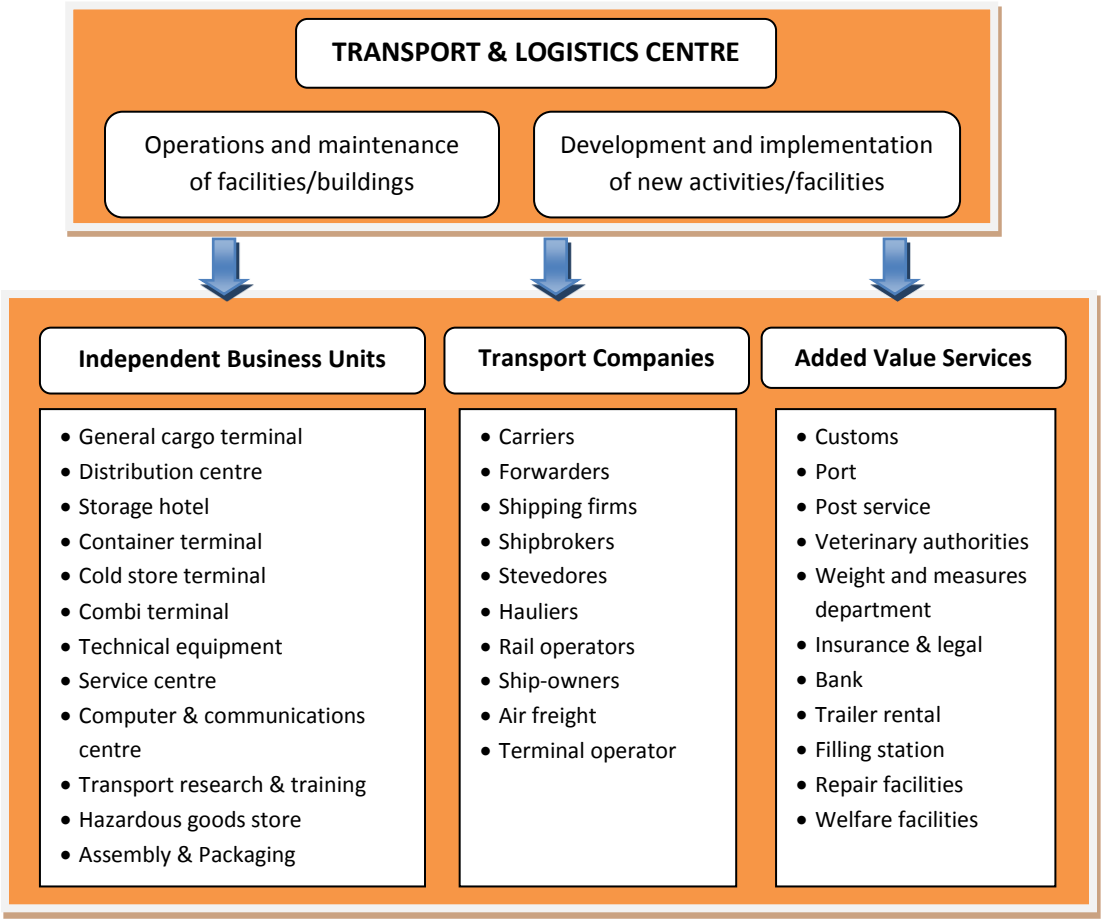


Figure 10. Scheme of the available activities, buildings and facilities in the TLC .
Source: (FDT, 2003)

The analysis of key events has shown that the lack of communication and negotiations between interested actors led to the stagnation of implementing SRPs in Denmark after the study performed in 2007. Taking into account these aspects identified above, Danish TLCs can be seen as a good option for SRPs where truck drivers would aim to stop and ensure their safety and security. The added-value services and independent business units can make the SRP attractive and free-charge. Mixed-use area would bring benefits for all stakeholders from truck drivers. In Denmark there are 7 TLCs which are located in the different, carefully selected areas in order to handle freight cargo flows and increase the capacity of existing facilities (see Figure 11). All TLCs are directly linked to the motorway and 6 of them (except Herning Transport Centre) are placed on the Core Road Network looking from the TEN-T perspective.

Figure 11. The map of 7 TLCs and the Core Road Network in Denmark.
Source: (own elaboration)

All TLCs are members of the FDT association (Foreningen af Danske Transportcentre) which works as a network and aims to improve quality services and facilities and to increase their capacity. Right now Danish TLCs are seen as a part of the existing transport infrastructure for the freight transport and provide facilities for truck parking, trailers, dangerous cargo, containers, etc. Danish TLCs need to attract new companies and services in order to lower the cost for the parking. Security and service levels can be adjusted to the Danish road transport infrastructure depending from the need. For truck drivers there are only facilities to sleep and use a toilet (see Hirtshals Transport Centre in Figure 12).

Figures 11. Facilities for truck drivers in Hirtshals Transport Centre (HTC).
Source: (own picture)

EC also stresses on the need to improve Information and Communication Technologies (ICT) in order for Member States to be competitive and innovative. Apparently, this is also a problem in Danish transport sector: *"…no intelligence in the transport sector at all"* (Bentzen, Interview). It means that there is no information about parking areas, services, facilities along motorways and truck drivers cannot book/reserve facilities as it can be done in other Member States. ICT solutions would enable truck drivers to know where and how far possible parking areas are. It is important to provide information not only for Danish truck drivers, but also to the international drivers: *"Now we have only 50% of Danish drivers on our roads"* (Bentzen, Interview). TLC already has the ICT system and it can be improved more in order to make reservations for a parking space or to cancel it in SRPs.

In this section the author has gained information about TLCs and synergies that they have with SRPs in EU. There is still no clear business case for upgrading TLCs to SRPs but is evident that they can be a perfect place for creating SRPs in Denmark. If Danish TLCs plan to invest in future security measures they need to be in line with EU-standards/requirements, develop and implement new facilities according to the new market and policy demands.

The section aims to answer the third sub-question: ***How parking areas were planned and regulates in Denmark and what facilities and services they should contain for coinciding to SRPs?***

In Europe initiatives for developing SRPs were vague and unclear until 2013; therefore, it was hard for Member States to create and regulate parking areas according to EU law. The analysis of different documents showed that the first idea for improving truck drivers' conditions in Denmark emerged in the late 80's when there was a need to solve road accidents' problems caused by truck drivers. The rational planning solution for this was to create facilities in 3 TLCs for truck drivers in 1997 but this idea remained undeveloped because lack of communication between Danish Transport Authorities and services providers. After this, initiatives to combat freight crime and improve truck drivers safety and security start appearing and the driving and rest time periods regulation in 2006 can be called as a kick-start from creating SRPs in Member States. Just after this regulation EC financed SETPOS and LABEL projects in 2007 and 2008 to help countries lift up their parking areas requirements to certain level of safety and security, but apparently it was too costly for many of Member States. The "black and white" thinking was still led by rational planning ideas and it can be seen that services providers were struggling with this differentiation. The author argues that until 2012 the rational planning was an obstacle to create SRPs in Denmark because it concentrated only on the final result. It led to a chaos and misunderstandings between Danish Transport Authorities and relevant stakeholders. It can be seen that the situation started changing from initiatives to increase the capacity in Konsgted, Ringsted and Padborg parking areas in 2012. The researcher found sees 7 Danish TLCs as perfect locations for SRPs. From the analysis of drivers' perception of safety and security it can be seen that they rather stay in the free parking areas than pay money for secured parking areas. It can be seen that right now it is a perfect time to get funding from CEF upcoming calls for improving parking areas for truck drivers in Denmark. The new TEN-T Guidelines (2013) also focus on the secure parking areas which have lower requirements for safety and security. Moreover, the added-value services and business companies can be places in the TLCs area and in this way lower the cost for truck parking. The parking area needs to be seen as a spatial unit that can be used not only for SRP but also for short or long time stops. The parking area

becomes more attractive because of multi-functionality. The driver can have a place to park a car but also eat healthy food or take a shower. It is important to suggest high quality facilities and services to truck drivers that they would come to stay there. It is evident to the author that in the existing road transport infrastructure TLC is the best choice to develop the SRP looking from the operational and maintenance of facilities/buildings and the development and implementation of new activities/facilities side because it is flexible, cost-friendly, well-facilitated and easy-accessible. There is a need for Danish Transport Authorities to keep collaborating with interested stakeholders in order to improve and develop secured parking areas in Denmark and seek for funding from CEF in order to have SRPs in the existing road transport infrastructure.

Nevertheless, the research showed that truck drivers feel safe when they stop in a place where people are coming 24/7, because the areas are always well-lit and there is always a movement. The author highlights the need to improve these areas or to build new ones in order to reduce the amount of accidents and improve facilities for truck drivers.

Information gained from the analysis part and sub-questions enable the author to answer the main research question: ***How can Secure Rest Places for trucks help to reduce freight crime and ensure safety, security together with high quality services and facilities in the Danish road transport infrastructure?*** This section provides a suggestion and argues for two types of SRPs in Denmark.

The research has shown that most of truck drivers need four main services from the parking area: toilet, shower, food and gasoline station. There is no such place in Danish road transport infrastructure where all these services can be found at one place. It is evident that unsafe acts from drivers cause road safety problems. The main purpose of the SRP in Denmark is to provide good facilities and services that truck drivers need after 700km driving per day during the rest time. Most freight crime happens when the truck is standing; therefore, improved existing parking areas in Denmark will be safer and less accessible to thieves. SRPs would help to ensure security and safety of truck drivers as well as to protect transports goods and prevent the freight crime. It is important to understand that SRPs cannot be the only one solution for reducing the "silent crime" but it can help to reduce it. On the other hand, truck drivers are aware of safer and better conditions in SRPs then in other parking areas. Even though it was obvious from the research truck drivers fell 80% safe at work, the author see it as a training consequence and in the reality truck drivers feel unsafe. SRPs can be a solution for them to improve quality of their work. The new Transport Policy (2013) together with CEF (2013) funding open new opportunities for Member States to improve their parking areas in the Core Road Network transport infrastructure. All national authorities and relevant stakeholders need to work together and create a safer place for truck drivers.

The first type of SRPs can be integrated in the existing "Inforteria" cafés areas. The area must be separated from other users that trucks could enter the area separately to ensure that there will be no harmful interactions between trucks and passengers or bikes. If there is no possibility to integrate the SRP to "Inforteria" café, the new SRP with Level 2 services and safety should be considered. These not highly secured and free of charge SRPs would ensure truck drivers' safety while they use services because of police checks, fence around the area, CCTV system which is

working 24/7 and keep the records for minimum 30 days. Moreover, the area is well-lit which also can help to reduce crime in these areas. Taking into consideration services for truck drivers, not only food, shower and toilet, but also laundry facilities would be available in these places. There would be also picnic tables, benches or in some places restaurants or snack-bars. The author supports the idea from expert interviews that it would be nice to stop in the area where are the clean environment and quality services.

"Inforteria" cafés are not suitable for higher security and services level of SRPs because they do not have capacity to build facilities and services. The author suggests integrating SRPs with a level from 3 to 5 in all seven Danish TLCs. The research has shown that Danish TLC could be right places to implement such SRPs. Taking into account that they are directly placed on TEN-T Core Network, they can be seen as attracting not only Danish but also international truck drivers. They have the capacity to expand the area and lift up to EU's requirements for SRPs. TLC has key factors for the SRP to become successful: openness and flexibility. In the local plan there is always a consideration about the flexibility of the area where the TLC will be placed. Public-private-partnerships (PPP) partnership enables to increase the attractiveness of future-oriented business and to be competitive in the existing transport and logistics sector. Flexibility aspect comes from the economic part where the TLC has common facilities and there is a possibility to have cost sharing between companies within the area and in this way to reduce price for truck drivers' parking. Moreover, the network of TLCs can help to improve the quality of logistics services and use of ITC technology for the freight transport. Moreover, each TLC already has gasoline stations and some basic services and can be certified and audited for the maintenance of the approval. The second type of SRPs in TLCs would have the CCTV system covering the whole area – these may not be covered or removed and the site would be fenced. Pictures and recording from the CCTV system should be kept at least for 3 months. There would also be a secondary physical barrier and it must be a clear zone between fence and vehicles on the inner side. In this Type of SRPs the gates would be closed and license plate number of truck, vehicle name and the picture of the driver would be taken before and after entering/leaving the SRP. Taking into consideration truck drivers' security inside the area trucks with dangerous good would be also separated from the rest. Furthermore, only a professional stuff would work there in

order to perform good registration procedures and ensure safety as security for truck drivers. Clean and checked at regular intervals toilets, showers and washing facilities must be provided. There can be also some shopping facilities and healthy food restaurants. Looking from the ICT technologies perspective all SRPs should be connected and be able to provide information about location and distance between each other. Internet connection should be available and be provided by SRP's operator. This would enable to make truck reservation and to cancel the reserved space.

During the research police was also mentioned as a part of the chaotic situation in the past, because they were paying no attention to the crime few decades ago: *"At that time there was police on horses in Copenhagen running around"* (Bentzen, Interview). Therefore, a formalized cooperation with police authorities should be ensured in all SRPs because some truck drivers identified the need for the police to come more often to parking areas and check the situation. It can be said that police is the authority which plays a huge role in preventing freight crime and enabling drivers to feel safe and secure. To conclude, it can be said that SRPs for trucks in Danish road transport infrastructure can help to reduce freight crime and to improve truck drivers' safety and security as well as to provide quality services and facilities.

Other recommendations

SRPs are not the only tool to prevent the freight crime. The research has shown that truck drivers are not used to stop in other places than SRP so the author aims to give some recommendations that she agrees on and which arose during exerts interviews.

Interviewees mentioned technical solutions that can be applied in order to prevent the freight crime. One of it is a tracking system which is more popular for big logistics companies. It can be useful if there is a possibility that the truck will be hijacked and if there will be a need to track it. Another simpler tool that can be used by all logistics companies regardless their size is an alarm system together with extra cameras integrated in the truck. It can be helpful if truck drivers also possible but it cost additional money to logistics companies. On the other hand, the security level would be higher and it would be easier to avoid the crime or to recognise thieves more easily. The high attention should also be paid for improving the truck constructions. Usually it is easy for thieves to break in the truck when it is covered with tent cloth. This material can be easily cut with the knife when the truck is standing. One of the solutions could be to improve the quality of the material that is covering the load and make it hard to access for thieves. The training and education of truck drivers about the behaviour at work is also important. Truck drivers need to rest and follow driving and rest time regulations. Even though they cannot predict other drivers' behaviour but in certain critical situation they can avoid the accident if they will be properly rested. Other suggestion for improving the freight safety is to raise police awareness of possible thefts. Truck drivers highlighted that police checks are good crime prevention because they come to parking areas and it that way increase safety and security.

9. CONCLUSIONS

The answer of the main research question in this project is about how the integration of Secure Rest Places in Danish road transport infrastructure can help to reduce freight crime and to improve truck drivers' safety and security as well as provide high quality services and facilities is broader than three sub-questions. This is because sub-questions contain specific information about truck drivers' perception of security, safety, risks and dangers; places where truck drivers prefer to stay and why; development of parking areas in Denmark and existing SRP in Europe. The main research question is overwhelming and it covers all these sub-questions, gives arguments and suggestions for having SRP in Denmark.

The first sub-question reflects in theory and practice on how truck drivers' social environment, work conditions and perceptions of safety and security are influencing their decisions. For this answer terminology, adopted Heinrich's Domino Theory (1959) and expert interviews with truck drivers are used. The author had a special focus on the terminology of safety, security, risk and dangers. These definitions created a certain level of understanding about truck drivers' work environment and conditions. The safety perception focused on truck driver's ability to maintain safety of him and the freight, depending from subjective understanding of the dangers and risks during the whole trip. It was needed for the later analysis of truck drivers' perception about personal conditions needed and unsafe acts that they perform at work. The research investigated that truck drivers are aware of possible dangers and risks which may also be unknown during the whole trip and are able to protect themselves and the freight. The ancestry (training) analysis gave and impression that at the beginning of their work truck drivers' are informed about work conditions and that something unpredictably dangerous may happen for the truck driver or the load that he is carrying during the whole trip. In the Domino Theory ancestry (training) and social environment as well as personal characteristics are identified as factors that can possibly causes an accident or create a perfect conditions for theft. The author agrees that these factors are the most important ones for identifying and getting insight into the truck drivers' work. The research showed that training and social environment strengthen truck drivers' is a strong background for the driver's future actions and work specific. Moreover, social environment is

helping them in stressful and unprepared situations. Truck drivers identified that they feel 80% safe and secure during the trip. Furthermore, some of them identified their safety 0%. This is because there is a number of dangerous factors that can happen for a driver who drivers approximately 700km a day and if he would constantly think about them there would be simply no safety feeling left. In author's opinion after training truck drivers are used not to think about safety and security problems and at the same time they put themselves into the risk of being robbed because they became fearless and do not consider possible harms carefully. The special focus was given to unsafe act and unsafe conditions from the third Heinrich's Domino which he identified as the most essential domino because unsafe environment and truck drivers' behaviour is the straight path to an accident or an injury to emerge. The author also agrees that drivers behave irresponsibly if they violate the driving and rest time period regulation and that patience is as a key personal characteristic for working as a truck driver. After this section it became clear that truck drivers' work environment is unsafe, unpredictable and stressful. It is evident that until the thinking of drivers and unsafe conditions will not be changed the amount of accidents on roads and freight crime rates will not decrease. Nevertheless, these dangers and risk are compensated by money they get and at some point truck drivers cannot imagine themselves working other type of work. This project showed that there are more negative than positive factors to be a truck driver but the salary and a flexible work timetable gives drivers mental strength to be without family and overcome the unsafety feeling. The author identifies money as a strong tool which keeps truck drivers working in unsafe conditions even though they are aware of possible harms.

The second sub-question is answered in practice and explores where and how truck drivers choose a place for the rest. Moreover, it investigates services and facilities they need in the parking area and their opinion about SRPs. For its answer expert interviews and the first sub-question information are used to identify parking areas and to understand drivers' choices. The identification is based on truck drivers' experience while travelling through Europe and places that they have stopped for a rest. The author agrees with truck drivers that there is hard to find parking areas with quality services and facilities. The main services that truck drivers need are toilet, shower and food. There are different places where drivers choose to stay before they start

the trip. The selection is usually made by other truck drivers' recommendations. Two types of drivers were identified according to their choices for the parking area. The first type tries to rest in remote areas with no other trucks or people: parking spaces near the road, woods and residential areas. The second type stops in gasoline stations as the most popular parking areas together with other truck drivers. The author assumes that it also gives security feeling for truck driver but on the other hand it is a perfect target to thieves. SRPs were also identified as places were drivers stop from time to time because if they carry expensive load they feel safer and more secured because of the area is recorded by CCTV cameras. The research results highly distinguished SRPs from other parking areas because facilities and services in a SRP are higher quality and more comfortable. Another important factor for truck drivers' choice of the parking area is the money. Truck drivers are not willing to pay money for a parking area which is secured because they can keep this money for themselves and earn more. All interviewees agreed that if a truck driver needs to pay for secured parking area they will rather stay in a free parking lot.

The third sub-question reflects in theory and practice on how parking areas are defined, developed and regulated in Denmark. Moreover, security and service levels of SRP in EU are described. For this answer the Strategic Spatial Planning Theory (2004), expert interviews, document analysis and literature review are used. Information for the timeline with key events was collected while using primary and secondary data which shows the development of parking areas in Denmark. The timeline enabled the reader to see how rational planning ideas of having parking areas have shifted to strategic special planning. It is evident that the rational planning made SRPs development in Denmark not possible because it was oriented in the final result and had no future vision. The author agrees that EU initiatives and regulations have huge impact on Member States and their road transport development. It can be highly seen on the new Transport Policy and TEN-T guidelines, where the road safety and secure parking areas are in the main objectives. The strategic spatial planning features can be seen in national Danish planning after EC strategic ideas for the safety and security of truck drivers' improvement and reducing freight crime emerged. As a result, Ringsted, Kongsted and Padborg areas were expanded in Denmark.

Using the existing Danish road transport infrastructure analysis, it can be said that "Infoteria" cafés along motorways can be used for integrating SRPs (Level 2 according to the LABEL

project). The suggestion is that the area should be separated from the public transport in order to avoid accidents with pedestrians, bikes or other cars. Truck drivers safety would be improved by police checks, fence around the area, CCTV system which is working 24/7 and keep the records for minimum 30 days. The healthy food, shower, laundry facilities, internet, toilet and picnic area would be placed there in area in order to create quality conditions to attract truck drivers.

7 Danish TLCs directly placed on TEN-T Core Network can be also seen as good places for integrating SRPs (Level 3-5 according to the LABEL project). The author agrees with experts that they can be seen as attracting not only Danish but also international truck drivers. Literature review showed that TLCs have the capacity to expand the area and lift up to EU's requirements for SRPs. The second type of SRPs in Denmark would have the CCTV system covering the whole area with gates which would be closed. In the entrance the license plate number of truck, vehicle name and the picture of the driver would be taken before and after entering/leaving the SRP. The pictures and recording from the CCTV system should be kept at least for 3 months. Clean and checked at regular intervals toilets, showers and washing facilities would be provided together with healthy food restaurant, emergency calls and rest rooms.

As to the answer of the main research question which is about the need of SRPs in Danish road transport infrastructure for reducing freight crime and ensuring truck drivers' safety, security as well as improving quality facilities and services it can that two types of SRPs - Level 2 and Level 3-5 (according to LABEL project) are seen as a good solution that can also be supported by Danish Transport authorities and financed by European Commission. However, a lot depends on SRPs ability to attract businesses and create added-value services which could help to reduce the fee for parking that truck drivers would stop there.

10. REFLECTIONS

In the process of the writing the project few challenges appeared. The first one was related to the decision of how to gain in-depth understanding of type and necessity of SRPs in Denmark. A secure rest place is a quite new topic in the literature and it is hard to find relevant theories. It was overcome through analysis of Heinrich's Domino and Strategic Planning theories looking for how freight crime, lack of quality services and facilities and justifications how these problems can be solved by adding SRPs in the existing Danish road transport infrastructure.

The second challenge was how to choose and reach the respondents for expert interviews. It was evident that truck drivers are the most important ones, but they were travelling a lot and it was hard to get in touch with them. Experts from the spatial planning and road transport infrastructure development sectors were not reachable, but it was overcome by choosing Mr. Kent Bentzen, the president of FDT (Foreningen af Danske Transportcentre) and vice-president of EUROPLATFORMS because this person was involved in development of SRP from the late 80's. His importance was justified through the ability to remember key events and to explain why SRPs are needed in Denmark and more specifically in Danish Transport as Logistics Centres. The third challenge was how to give a suggestion for the existing road transport infrastructure where there are no studies performed and lack of statistics about where the freight crime is the most severe. It was overcome through considering that the most suitable places for long stay and high security are TLCs and for short-term and basic facilities small SPRs along Danish motorways can be developed or integrated in the network of cafés "Infoteria".

There are several actions that were not performed in the project. The first two include the realization of the execution and tracking part of the extended brand identity planning model. The reason for that is that the implementation and monitoring of the newly created SRP require long period of time and a lot of resources which the author of the project do not possess. The other action that was not performed is expert interviews with all stakeholders that influence the creation of strong brand. This was not done since the researcher identified two researchers, FDT's president and truck drivers as the most important to the aim of the project.

Therefore, it is necessary to discuss how the results would change if suggested SRPs be integrated in the existing road transport infrastructure and what business it would attract. Moreover, what kind of added-value services these SRP could offer and for what price. If interviews with planners and national authorities were made they would bring additional perspectives of the role of planner for the creation of SRPs in Denmark. This would influence the geographical position of placing SRPs and adding more than the author suggested. The EU interest of secure rest places shows that there are high future possibilities for success of SRPs and that the model of integrating them in TLC or in parking areas near motorways can be used in general in all Member States.

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