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Measure Evaluation Results

TAL 7.1 Marking of Routes for Smooth Freight and City Logistics

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Executive Summary

As a significant harbour city, freight and passenger transport generate high traffic flow in Tallinn. Goods transport causes congestion and high volumes of exhaust gas emissions in the city centre. The measure 'Marking routes for smooth freight and city logistics' was aimed to review and manage the level of air pollution, especially during critical peak times of harbour activity. The objectives of the measure were to define freight traffic corridors in and out of the city, to deviate freight transport along these corridors and to raise truck drivers' awareness of the new freight traffic concept. To achieve its goals, the city of Tallinn decided to work out an optimal freight route from the Old City Harbour to the national road network by installing a new guidance sign system for the freight route, making freight routes for GPS car navigation systems available for free and disseminating the information among truck drivers with posters and booklets.

The measure was implemented in the following stages:

Stage 1: Preparation (2009-2010) Preliminary analysis of the current national freight traffic network and of the national and local legal frame related to freight traffic. At the same time, the GPS navigation system was drafted.

Stage 2: Implementation of the guidance sign system (2010) According to the preliminary analysis results, specific roads were selected and signs installed to guide freight traffic along these strategic corridors.

Stage 3: Creation of routes for GPS navigation systems (2011) Creating the routes for different navigation systems. The routes are compatible with GPS navigation devices and mobile applications from Garmin and TomTom and are downloadable from the Tallinn website free of charge.

Stage 4/5: Preparation and Dissemination of information (2011–2012) – To communicate on the new freight traffic concept, posters were designed and disseminated addressed to truck drivers and an information online page were drafted on the Tallinn website.

Impact and process evaluations were conducted during the implementation. For the impact evaluation, indicators were selected to measure truck drivers' awareness and acceptance on the solutions provided with the measure. A 14 days survey was conducted in July 2012 with the participation of 498 truck drivers. Additionally, the number of visitors to the new online page related to the concept and the amount of GPS routes downloaded were also used as indicators.

The **key results** from the evaluation showed a relatively low but positive degree of acceptance of the measure after only 6 months of implementation. Indeed, 40% of the truck drivers interviewed have noticed the new guidance sign system installed with the measure and 31% of them consider that the new guidance sign system is useful. There were 167 visits to the Estonian language page, 60 visits from the English language page and over 300 GPS routes were downloaded. These intermediate results highlighted that the concept was appropriate for freight traffic drivers but there is a clear need to continue to work on the topic and to cooperate with the Old City Harbour outside the scope of the measure.

The most important barrier encountered during the measure was the withdrawal of the construction of a new northern passage shortcut to the Old City Harbour, which led to changes in the scope of the measure and required additional time investment.

The most important driver encountered during the measure was the elaboration of accurate technical planning and analysis from the earliest stages of the measure, which contributed to identifying and determining requirements for the implementation and supported the successful implementation process.

From Tallinn's experience, some recommendations can be addressed to cities which would like to achieve similar freight traffic oriented measures. Firstly, it is recommended to start by implementing a sign system to guide freight traffic which is easy and affordable to apply, as it is based on the existing road network. Secondly, the creation of a GPS route system is also an affordable and efficient activity to implement and is therefore easily replicable in other cities. Thirdly, it is recommended to direct efforts to communicate the new concept to a large number of truck drivers in order to ensure a high degree of acceptance.

A Introduction

A1 Objectives

The measure objectives are:

- (A) High level / longer term:
 - Reduction of transport related pollution.
- (B) Strategic level:
 - Improving the smoothness of traffic in Tallinn city centre by better organisation of freight traffic in connection to city traffic;
 - Reduce freight traffic in the city centre;
 - Diminishing congestion and pollution in the city centre.
- (C) Measure level:
 - (1) Defining freight traffic corridors in and out of the city;
 - (2) Marking traffic corridors, installing traffic signs in order to guide freight transport;
 - (3) Awareness raising of truck drivers;
- (D) The *expected results* are:
 - (1) Number of instances of congestion initialized partly from the harbours has decreased along with time spent in traffic congestion at peak hours;
 - (2) The co-effect of the system would be decreasing the air pollution in peak hours.

A2 Description

The measure was aimed at reducing the impact of heavy freight transport connected to the Old City Harbour in the city centre of Tallinn. This was done by:

- Working out an optimal route (instead of several possible routes) from the Old City Harbour to the main motorways of the national road network;
- Installing a new guidance sign system guiding to and through the route (marked with arrows next to the streets on the figure 2);
- Creating routes for GPS car navigation systems and making them available for free download;
- Disseminating the information on the route and availability of the GPS navigation routes with posters and booklets.

For working out the one optimal route all possible routes to different directions were mapped and analyzed. After the optimal route was agreed, a new guidance sign system was designed and installed in Tallinn and on the Tallinn ring road. The system contained both guidance signs and advance guidance signs (figure 1). The route connecting the harbour to the main national road network (including international routes E20, E67 and E263) is presented on the figure 2.

available for free download from easily accessible links <http://www.tallinn.ee/heavytransport> and <http://www.tallinn.ee/rasketransport>. The formats are the most used for navigating devices and can also be used in other brand devices directly or after converting.

The dissemination was arranged with posters and booklets installed and shared on ferries, and harbour terminals. The front of the leaflet is shown on the figure 3 and the reverse on the figure 2.

Figure 3 Leaflet for truck drivers, front

The leaflet is divided into three vertical sections. The left section is titled 'HGV drivers' and provides instructions in English for downloading routes to GPS devices. The right section is titled 'Raskeveokijuhid!' and provides instructions in Estonian. The central section contains logos for CIVITAS, Tallinn Sadam, and Transpordiamet, along with images of a Garmin and a TomTom GPS device.

HGV drivers

If your destination is Tallinn's Old Port, A, B and D terminal, where the ferries depart for Helsinki and Stockholm, we can offer you help to get there or to leave the port terminals.

Below is the web address from where you can download routes to your GPS device (Garmin or TomTom for example) - for both normal heavy vehicles and over-sized heavy vehicles.

To load the route is simple and requires downloading one or more files.

But before you download the files, please make sure you know which terminal your ship arrives at or departs from.

Route files and instructions can be found at the Tallinn city website:

www.tallinn.ee/heavytransport

HAVE A GOOD TRIP!

CIVITAS THE CIVITAS INITIATIVE IS CO-FINANCED BY THE EUROPEAN UNION

TALLINNA SADAM Heade sõnumite sadam

Transpordiamet

Raskeveokijuhid!

Kui teie sihtpunkt või lähtekoht on Tallinna Vanasadam, A, B ja D terminal, kust väljuvad parvlaevad Helsingisse ja Stockholmi, siis pakume teile abi sinna jõudmiseks või sealt lahkumiseks.

Allpool on toodud veebiaadress, kust saate laadida marsruudid oma GPS seadmetesse (nt. Garmin või TomTom) - nii tavalistesse kui ka veoautodele mõeldud erimudelitesse. Kasutuselevõtt on lihtne ja piirdub ühe või mitme faili seadmesse kopeerimisega.

Enne failide allalaadimist palun veenduge, millisest terminalist Teie laev väljub või kuhu saabub.

Teekonnafailid ja juhendid leiate Tallinna kodulehe aadressilt:

www.tallinn.ee/rasketransport

HEAD REISI!

B Measure Implementation

B1 Innovative Aspects

The innovative aspects of the measure are:

- **New conceptual approach** - dealing with the general concept of freight transport route marking between national road network, urban street network and Old City Harbour.
- **Targeting specific user groups** – this measure is targeting freight transport with a number of different technical solutions to be used: starting with regular street and road signing, but including also digital mapping used in modern navigation in-vehicle systems and printed materials to be distributed on ferries and at harbours.
- **Use of new technology** – the measure is about finding new ways to get the routing data specifically to truck drivers' in-vehicle electronic GPS-based navigation systems.

B2 Research and Technology Development

- Research was carried out on existing route marking between Old City Harbour and the main national road network.
- Research was carried out on possibilities to add freight transport routing data in digital GPS-based navigation systems.

B3 Situation before CIVITAS

Traffic congestion in certain locations of Tallinn was considered (while planning the measure) to be highly dependent on freight transport connected to the Old City Harbour. Also non-local freight trucks were often seen in central locations of the city and residential areas where they are not suitable nor allowed. The routes for heavy traffic were regulated by the Tallinn city government but the guidance sign system was not effective and truck drivers relied often on their personal GPS-based navigation systems which guided them to fastest route regardless of restrictions.

The largest terminals for passenger and freight traffic in Tallinn city centre are located in the Old City Harbour and in harbours of northern Tallinn. Freight traffic from and to the harbours mainly uses the directions of Narva (E20, east), Tartu (E263, south-east) and Pärnu (E67, south-west). The amount of trucks in Old City Harbour has in recent years been up to 1000 per day, but the prognosis indicates that it can essentially grow in the future, even up to 2-3 times. Private cars also heavily use the same passages to get in and out of the city. Traffic congestion is dependent on the timetables of ferries and peak hours in city traffic, causing congestion and high volumes of exhaust gas emissions specially at these times. For Tallinn city, especially at these times, it is important to review and manage the level of air pollution.

The routes between the Old City Harbour and the national road network were defined by the Department of Transportation of Tallinn City and were also marked with system of guidance signs. However a study performed on the possible routes showed that several of the routes were passing residential areas and places in road network that were prone to congestions and even these possibilities were poorly marked. The system of guidance signs was not consistent throughout the existing routes; signs were missing or not easily noticeable. Even though guidance signs (at junctions) mostly existed, the advanced guidance signs (usually installed 200 to 400m before a junction) were mostly missing.

B4 Actual Implementation of the Measure

The measure was implemented in the following stages:

Stage 1: Preparation (2009 - June 2010) – Study on the existing routes from the national highway networks to the Old City Harbour and existing legislation on national and municipal level. Negotiations with mapping services providers for creating the route for vehicle navigation systems.

Stage 2: Implementation of the guidance sign system (June 2010 – December 2010) – Planning, designing and installation of the signs on the decided route. While most of the guidance sign system was installed by November 2010, an important advance guidance sign on the Tallinn ring road (the first sign guiding from the ring road to the new route) was installed in spring 2011.

Stage 3: Creation of routes for GPS navigation systems (April 2011 – June 2011) Creating the routes for different navigation systems.

Stage 4: Preparations for dissemination (July 2011 – March 2012) – Designing of the posters for truck drivers, creation of the webpage on the Tallinn website.

Stage 5: Dissemination of the information (March 2012 – June 2012) – Distribution of the posters for truck drivers.

B5 Inter-Relationships with Other Measures

This measure is interrelated to other measures which have been implemented in the scope of the overall Tallinn transport strategy. It aims at decreasing the motorized traffic in the city centre and at improving the social and the environmental impacts from transport in the city centre. This has been mentioned in a number of documents (Tallinn Transport Plan and Municipal Acts) which are aiming at the use of additional appropriate guidance signs on specified routes for heavy goods vehicles.

C Impact Evaluation Findings

C1 Measurement Methodology

C1.1 Impacts and Indicators

The most important measure impact to evaluate would have been the change of the amount of heavy traffic in the city centre and residential areas and as a secondary effect the impact of heavy traffic reduction on congestions, air quality and noise in the city centre and residential areas. However as predicted in the early stage of evaluation and confirmed by the survey among truck drivers, the impact of the measure is not so clear and easy to evaluate. The reasons are explained in the Table C1.2.

The most realistic impact of the measure that was possible to evaluate was the actual usefulness of the implemented measure to the truck drivers using the route. The impact was evaluated with awareness and acceptance of the truck drivers of the routes to the Old City Harbour.

The potential impact of the additional services of the measure in a form of web pages and downloadable GPS navigation routes were evaluated with web page visits and GPS navigation routes downloads.

Table C1.1: Indicators.

NO.	EVALUATION	EVALUATION SUB-CATEGORY	IMPACT	INDICATOR	DESCRIPTION	DATA /UNITS
15	Society	Acceptance	Awareness	Awareness level of truck drivers	Awareness of truck drivers of routes to Old City Harbour and heavy transport route restrictions	Index, qualitative, collected, survey
16	Society	Acceptance	Acceptance	Acceptance level of truck drivers	Attitude survey of current acceptance of truck drivers on quality routes to Old City Harbour and heavy transport route restrictions	Index, qualitative, collected, survey
TAL 7.1-1	Transport	Usage of provided GPS tools	-	Download of GPS navigation routes	Number of downloads of the GPS navigation routes from the city webpage	Index, quantitative, collected, web page statistics
TAL 7.1-2	Transport	Usage heavy goods vehicles web pages	-	Visits to heavy goods vehicles web pages	Number of visits made to the heavy goods vehicles web pages	Index, quantitative, collected, web page statistics

Detailed description of the indicator methodologies:

- **15 awareness and 16 acceptance** – the awareness and acceptance levels of truck drivers on the changes of the freight traffic route were measured in a separate 14-day survey in June and July 2012. This was approximately 3 months after the booklets were made available for truck drivers in the harbour terminals and ferries. 498 drivers were interviewed in the truck parking places of all Old City Harbour terminals A (Helsinki) and D (Helsinki and Stockholm) with following questions:
 1. Are you aware of the booklets describing the route to the Old City Harbour?
 2. Have you noticed that since 2011 there is a new guidance sign system guiding to the Old City Harbour?
 3. Have the mentioned solutions helped you to plan the route to and from the Old City Harbour better?
 4. What was your aid on navigating the route to the Old City Harbour:
 - Road atlas
 - Booklet from a harbour terminal or a ferry
 - GPS/navigation device
 - guidance signs
 - Something else (specify)
 5. Please rate, if the quality of the guidance sign system has improved during the last year.
 6. Is it easier to navigate on leaving the harbour than arriving at the harbour?

The questionnaires were filled by truck drivers and initially the questionnaires were available in Estonian, English and Russian language. As the percentage of Polish truck drivers turned out to be large and most of them were not able to fill the survey in any other language, the questionnaire was translated into Polish language as well.

- **TAL 7.1-1 and TAL 7.1-2 Visits to heavy goods vehicles web pages and downloads of GPS navigation routes** – the number of visits and downloads were measured with statistics from the Tallinn web page. The page visits statistics were separated by the languages of the pages, but the files behind the links are the same, thus no download separation could be done by download language. Instead a separation by file format (Garmin or TomTom) was done. The indicators show partly awareness of the possibility to download the route but partly also acceptance – the possibility was actually used. However, not all the drivers aware of the possibility would download it – they might not have a GPS navigating system, it may be incompatible with their device or they just might consider the downloadable route not to be useful. Also, downloading the route does not guarantee it is used and accepted as a useful tool.

Table C1.2: List of potential effects that were not assessed

Impacts category	Indicator	How does it impact	Why it was not accessed
Economy	Capital costs	-	While the indicator was stated in the local evaluation plan, it is not relevant for the measure, since no cost benefit analysis was carried out for the measure.
Transport	Transport safety	When heavy freight transport is guided away from the city centre to a clearly marked and logical route, it should affect the number of injuries and deaths in some locations, also through reduction of congestions.	Even if the transit freight traffic was reduced from some locations, the change was minor compared to the overall traffic volumes and the number of deaths and injuries connected to heavy vehicles is so little, that no statistically meaningful change could be detected from the impact of the measure. Also, changes in accident statistics should be evaluated for at least 3 years to be statistically somewhat reliable and this was not possible in the scope of the measure.
Transport	Number of heavy vehicles in the city centre	The number of heavy vehicles in the city centre was most probably reduced as the result of the measure.	It is possible but laborious to evaluate how the measure implementation affected especially the traffic in the city centre connected to the Old City Harbour, because the changes in local heavy transport would have to be separated from the statistics. Since 26% of the total number of trucks had origin or destination in the districts of Tallinn which could not be accessed through the route marked with the measure and the share of harbour-connected traffic is minor compared to the local heavy traffic, the impact of the measure to the heavy traffic is negligible.
Transport	Freight movements	The percentage of heavy freight vehicles passing the new route compared to the number of heavy freight vehicles going through the Old City Harbour terminals should increase after alternative routes were closed by traffic signs.	The explanation is similar to the impact in the city centre: since 26% of the total number of trucks had origin or destination in the districts of Tallinn which could not be accessed through the route marked with the measure and the share of harbour-connected traffic is minor compared to the local heavy traffic, the impact of the measure to the heavy traffic is negligible.
Transport	Number of congestions	When heavy freight traffic is guided away from the city centre, it should reduce the amount of congestion in the city centre.	Congestion is largely affected by traffic volumes and other measures taken by the city, thus it is not possible to separate the effect of the current measure to the amount of congestion in the city centre. Also, ferry time schedules are planned in a way that the main heavy traffic volumes are created outside peak hours.

Transport	Time spent in traffic on peak hours	With the reduced amount of congestion the time spent in peak hour traffic should decrease.	Congestion is largely affected by traffic volumes and other measures taken by the city, thus it is not possible to separate the effect of the current measure to the number of hours spent in peak hour traffic in the city centre. Also, ferry time schedules are planned in a way that the main heavy traffic volumes are created outside peak hours.
Environment	Air quality	The reduction of heavy traffic in the city centre results most probably in better air quality, especially on peak hours.	While the air quality measurements in the city are available, it is difficult to connect the changes in air quality to the implementation of the measure since there are other sources of emission and even other transportation related measures contributing to the air quality in the city centre.
Environment	Noise	The reductions of heavy traffic in the city centre results most probably in reduced noise levels.	For accurately modelling the noise change in the city centre the effect of the measure would have to be separated in traffic volumes and composition. As explained earlier, the effect was minor.

C1.2 Establishing a Baseline

No baseline was created for the indicators used for evaluation. There were several reasons for not creating a baseline for the indicators that were assessed from the survey:

- The installation of the new guidance sign system was started simultaneously together with designing of system and the evaluation team was not informed about the beginning of installation. This effectively eliminated the possibility to evaluate the “Before” situation with a survey.
- The measure was still evolving before the design of the new guidance sign system started and it was somewhat unclear what exactly would be implemented and what should be evaluated with the “Before” survey. The changes in planning and implementation of the measure are explained under the chapter “D.1 Deviations from the original plan”.

Also, no baseline was created for the indicator of GPS navigation route download since the possibility to download was introduced with the measure and thus there was no meaning of evaluating the situation “Before”.

C1.3 Building the Business-As-Usual Scenario

Since no baseline was created for the indicators used for the evaluation of the impact, there could not be any BAU scenario. The reasons for not creating baselines are explained in the chapter C1.2.

C2 Measure Results

C2.1 Economy

Not applicable

C2.2 Energy

Not applicable

C2.3 Environment

Not applicable

C2.4 Transport

The indicator TAL 7.1-1 and TAL 7.1-2 were used for evaluating the usage of the web pages created on Tallinn website for truck drivers and possibility to download routes to/from the Old City Harbour for GPS navigation systems. The results are presented in figure 4 and figure 5 instead of a table, because evaluating a change from nothing to some value is not reasonable and thus there are no “Before”, “After” or “BAU” results or their differences.

Figure 4 Number of page visits to the heavy goods vehicles drivers webpages on the Tallinn website

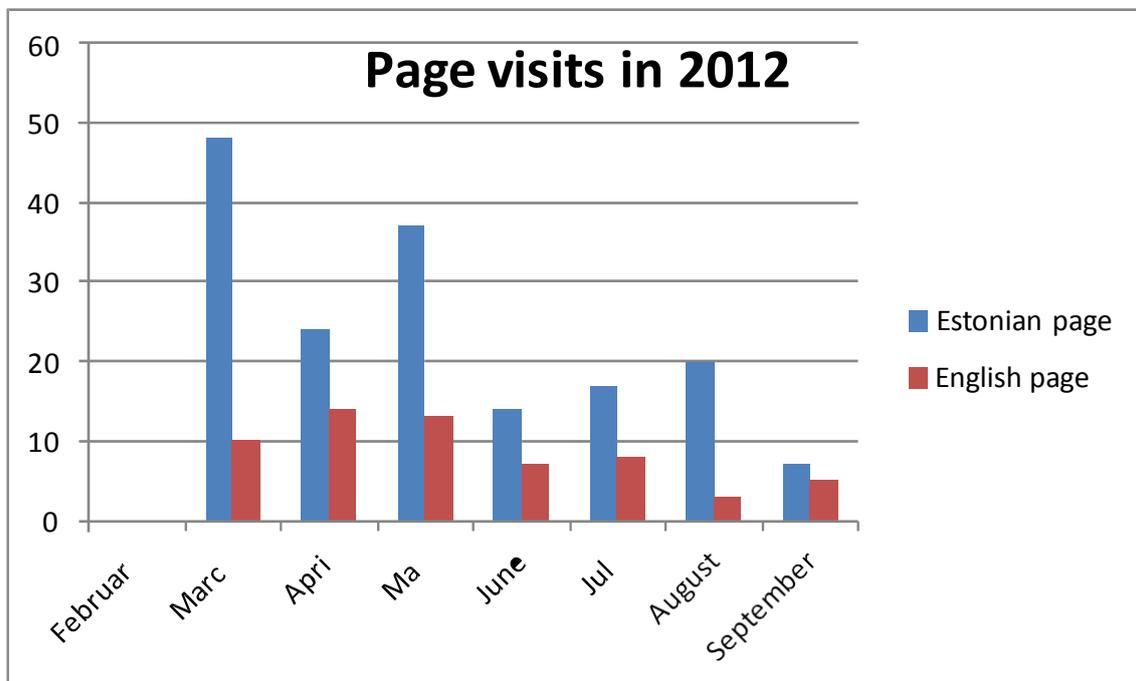
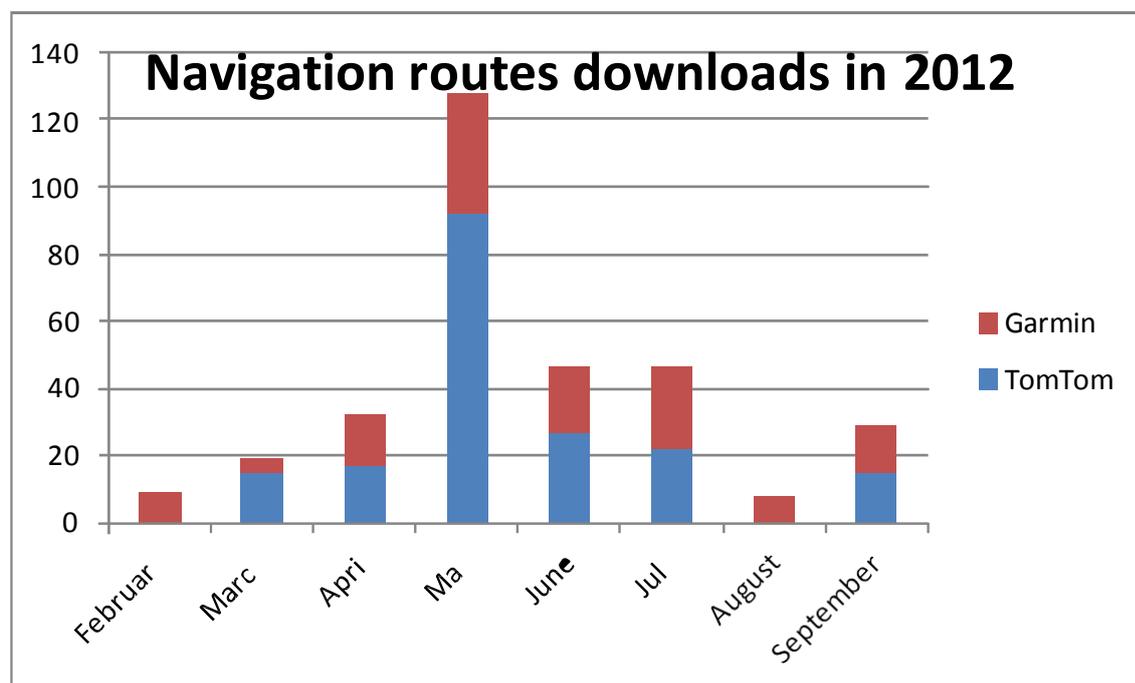


Figure 5 Number of GPS navigation routes downloads from the heavy goods vehicles drivers webpages on the Tallinn website



The results on figure 4 and figure 5 show a modest number of visits to the pages and usage of page, the download possibility. The reason for the number of downloads exceeding the number of visits to the web pages is explained by the fact that there are all together 16 files available for download – routes from different locations (2) to different terminals (2) and both directions (2) and in different formats (2) makes together 16 files to choose from.

While the usage of the download possibilities has been modest, creation of the files in the other hand was relatively inexpensive and the cost of having the tiny files (16 files, file sizes between 300B and 80kB) on the server of Tallinn is negligible. It is reasonable to have the possibility for truck drivers to update the files according to changes in the traffic arrangements until the principles of navigation change with some next generation navigation solutions.

The modest number of GPS navigation route downloads can be explained with little need for the service or the habit of the drivers to manage without such service. The result cannot be a result of low awareness of the possibility since 41% of all 498 interviewed truck drivers were aware of the possibility and 45% of all drivers use GPS navigation system. While the sets of aware drivers and GPS navigation using drivers do not coincide, the number of potential software downloaders in 9 months is still considerably higher than number of downloads.

C2.5 Society

The evaluation was concentrated on finding out truck drivers' awareness and acceptance on the solutions provided with the measure. Again, as no changes were directly measured, the results are presented on the figures instead of the usual table with Before, After and BAU scenario differences.

The survey results were all analysed across different driver groups, different terminals and even different origins-destinations from the terminals but they are mostly presented here as a

total because of readability of the results and possible limited interest level of an outside reader on specific local details.

53% of the trucks were of Estonian origin, 31% was Polish origin and the rest of the countries had minor percentages, Lithuania (4%) and Latvia (3%) being the biggest among others. 10% of the total number of truck drivers passing the harbour were interviewed the average number of trucks passing the terminals during the survey period was 414 per day.

40% of the interviewed truck drivers have noticed the new guidance sign system and 31% of the truck drivers interviewed had the opinion that the new guidance sign system is useful for them. Two thirds of the positive answers on the usefulness came from the drivers with Estonian origin and 1/3 from the drivers with a foreign origin.

The usage of different aids for navigation was following (figure 6 and Figure 7):

- 45% of all drivers use GPS navigation system;
- 46% of all drivers use the guidance signs;
- 53% of the drivers with Estonian origin use their memory as the only aid, only 7% of the drivers with foreign origin do the same;
- The usage of GPS navigation systems among drivers with foreign origin was 69% and the usage of the guidance signs was 65%.
- 29% of all drivers use both GPS navigation system and the guidance signs simultaneously;

The low usage of the booklets for navigation was anticipated, because the booklets were not designed for that purpose but as a source of information. The fact they were used as a navigation aid can be considered positive.

Figure 6 Usage of different aids for navigation, Estonian drivers

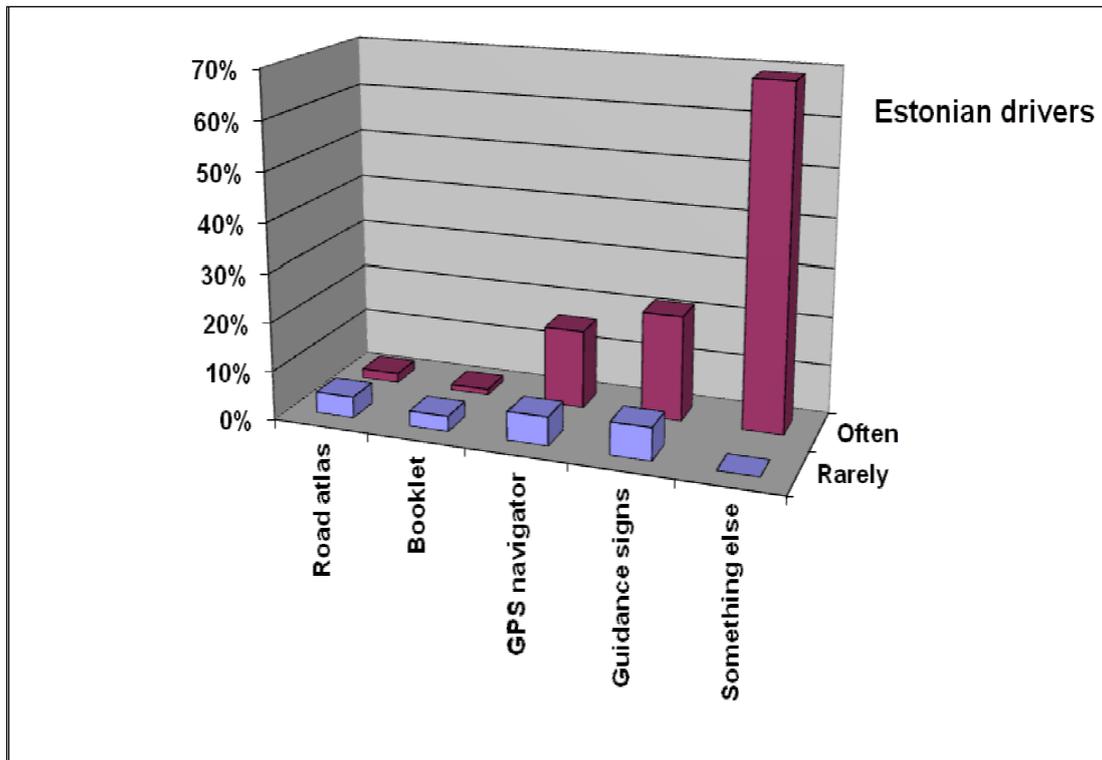
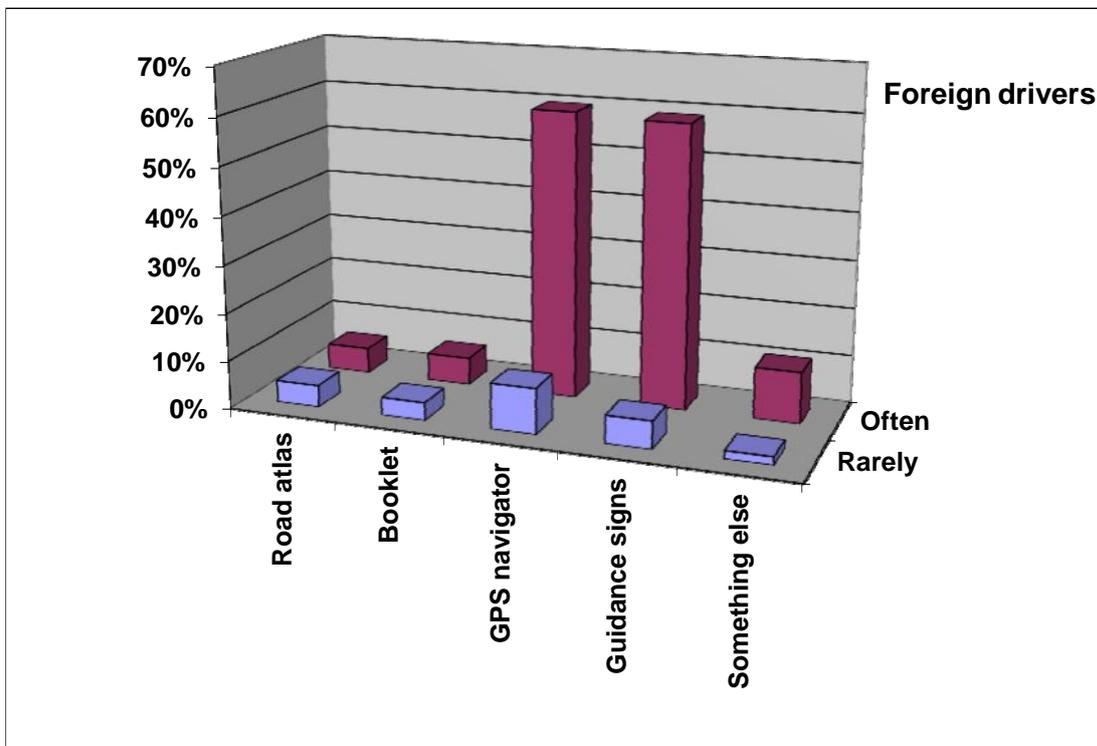


Figure 7 Usage of different aids for navigation, foreign drivers

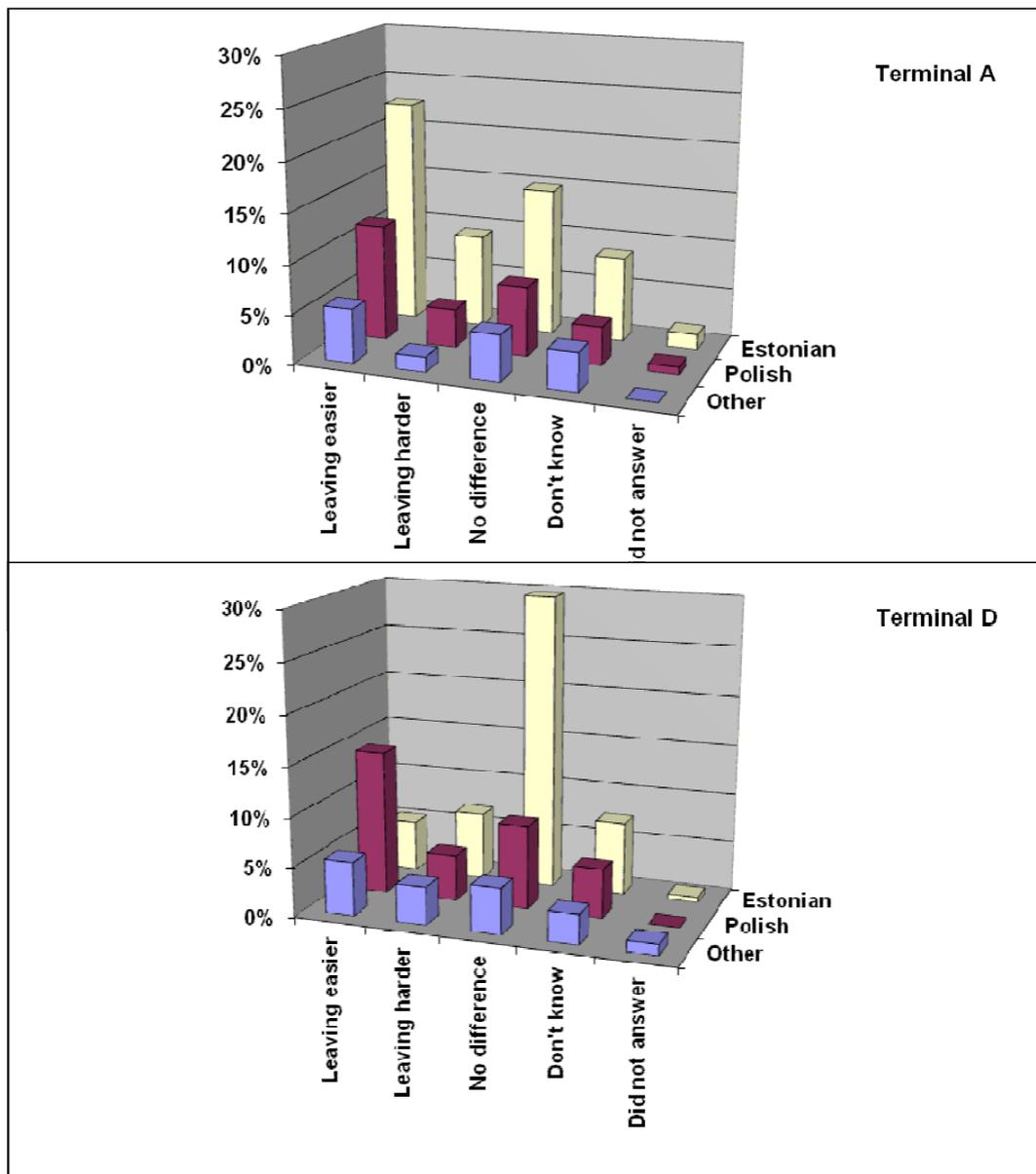


Awareness of the booklets among all truck drivers was 41%. The awareness of the possibility to download the GPS navigation routes was exactly the same (41%) as the information is given on the booklet.

The positive acceptance towards the implemented solution was prevailing in most groups of truck drivers. The figure 6 shows acceptance of the truck drivers who were leaving the terminals A and D (as opposed to arriving at the terminals). It is especially important that the drivers who actually were stating that they were using the guidance sign system gave also positive appraisal to the new system.

The graphs on the figure 8 present drivers' assessment on the impact of the new guidance sign system on navigating out from the harbour terminals A and D. While the results were mainly positive e.g. reflecting improvement of the guidance sign system, there were differences between the terminals and also by the nationalities of the interviewed drivers. The difference between the terminals is explainable by the fact that the Old City Harbour had implemented recommendations given outside the scope of the MIMOSA project but did not do the same for the terminal D. The negative assessment on different terminals came mostly from the local Estonian drivers who at the same time stated in the survey that they don't use guidance sign system. Thus the result is contradictory and not reliable.

Figure 8 Assessment on improvement of the guidance sign system when leaving the terminals A and D



C3 Achievement of Quantifiable Targets and Objectives

Not applicable

C4 Up-Scaling of Results

The results and experiences from the measure can be used in several different ways:

- The guidance sign systems and GPS navigation routes can be created for the other harbours in Tallinn and other city harbours in Estonia;
- The heavy traffic routes and guidance principles can be applied to any businesses or locations that need freight transport and are located in cities;
- The lessons learned from reaching the truck drivers and from their navigation habits are useful for planning the future freight related activities in Tallinn and other cities.

C5 Appraisal of Evaluation Approach

The original approach in the planning phase of the measure was to evaluate the impact of the measure on traffic, traffic safety and the environment but it turned out not to be realistic in the early phase of preliminary studies. The influence of freight traffic was actually relatively small and well distributed, the majority of the international freight transit already used the current (new) route, the ferry timetables were arranged in a way that arriving ferries brought heavy freight traffic to the periods outside peak hours and the freight traffic was commonly not the cause for congestion.

The second approach was evaluating the awareness and acceptance of truck drivers on the implemented solutions. It turned out to be somewhat incomplete, because there was no possibility to set a baseline and therefore also the BAU scenario. The reasons for this were that the installation of the guidance signs was started without letting the evaluation team know about it and without knowing fully what and when will be actually implemented in the scope of the measure. However the problems with the second approach did not prevent getting a detailed, valid and positive result on the usefulness of the measure results. The second approach was complemented with statistics on the GPS navigation routes download, a solution that was included to the measure later.

The structure of the survey questionnaire made it possible to evaluate the awareness and acceptance of truck drivers in detail, analysing differences between user groups selected by trucks origin, trip origin/destination, usage of different navigating aids, and usage of different terminals, weight of the truck and frequency of driving through the Old City Harbour. Only the results highly relevant to the measure are presented in this document. The results of the evaluation show the effect of the measure on truck drivers' possibility to select a rational route between the Estonian national road network and Tallinn Old City Harbour.

C6 Summary of Evaluation Results

The key results from the measure were following:

- **Awareness on the measure** - 40% of the interviewed truck drivers have noticed the new guidance sign system installed with the measure;
- **Acceptance on the measure** - 31% of the interviewed truck drivers consider that the new guidance sign system has been useful for them. 2/3 of the positive answers on the

usefulness came from the drivers with Estonian origin and 1/3 from the drivers with a foreign origin.

- **Number of page visits to the Tallinn heavy goods vehicles web pages:** The number of visits (February 2012 - September 2012) was 167 times from the Estonian language page and 60 times from the English language page.
- **Number of downloads of GPS navigation routes** (February 2012 - September 2012): was 188 times for TomTom format and 129 times for Garmin format.

C7 Future Activities Relating to the Measure

As of September 2012 no future measure-related activities have been planned.

D Process Evaluation Findings

D1 Deviations from the Original Plan

The deviations from the original plan comprised:

- **Change of the main solution** – Originally an ITS solution - electronic traffic system - was considered as a main solution together with construction of a new northern passage, which is a planned shortcut on the main freight traffic route. Since the construction of the northern passage was postponed for an unknown period of time, the ITS solution was rejected and a traditional guidance sign system implemented on the current route.
- **Change in evaluation approach** – The initial evaluation approach was created by a private company not fully familiar with the traffic situation in Tallinn generally and especially with the situation of freight transport connected to the Old City Harbour. Therefore the approach had to be changed by the MIMOSA evaluation team.
- **Adding of the GPS navigation routes and leaflets** – After dropping the ITS solution it was decided to find a way to utilize the fact that truck drivers are often using a GPS device for navigating. The solution was found in negotiations with local mapping companies.
- **Fast installation of guidance signs** – When the route was fixed by the preliminary study the design and installation was directed to separate private companies that often work together on designing traffic solutions in Tallinn. As a result the workflow was organized so that every guidance sign that was designed was also quickly installed instead of designing the whole sign system and installing it after reviewing. This workflow came as a surprise for the evaluation team and since it was discovered while several signs were already installed, there was no possibility for the evaluation team to prepare and carry out a “Before” survey.
- **Delays in implementing the measure** – The GPS navigation route solution was added to the measure later together with the idea of sharing the files on the Tallinn website. Finding a suitable solution to the GPS, deciding the pages with short URL ([uniform resource locator](#), link to a website) names on the website, preparing and distribution of the posters and leaflets all took additional time for implementing, thus instead of planned operational status on June 2012 the measure became operational in March 2012. The situation was amplified with the measure leader leaving the Tallinn Transport Department in December 2012 and the fact that only a temporary deputy measure leader was assigned to the measure. As a result the “After” evaluation was carried out in June and July 2012 instead of August 2011.

D2 Barriers and Drivers

D2.1 Barriers

Preparation phase

- **Problem related barrier** - Cancelling the plans to construct a northern passage shortcut to the Old City Harbour led to changes in the scope of the measure. Finding and implementing new solutions took additional time;
- **Organizational barrier** - Insufficient partnership arrangements, insufficient communication on design and implementation of the measure. This has led to delays in planning of implementation of the measure.

Implementation phase

- **Organizational barrier** - The level of organizing different tasks in the measure has been insufficient in the implementation phase of the measure;
- **Organizational barrier** - The measure leader left the Tallinn Transportation department in December 2011 and no substitute was found to take over the task. This led to loss of information and communication and to delays in the final implementation phase.

Operation phase

- **Involvement, communication related barrier** - The most important aspect to take into account from the open answers to the survey is concerning the guidance sign systems on the terminal territories. Several answers brought out that there were no guidance signs on the terminal territories and although it was not considered to be in the scope of this measure, it is an integral part of the whole guidance system and should be addressed accordingly.

D2.2 Drivers

Overall Drivers

- The measure concerned is part of a city program and a consequence of the implementation of a sustainable vision. This made the process of decision-making on principles of the solutions easier and quicker;

Implementation phase

- Accurate technical planning and analysis to determine requirements of measure implementation. This helped the implementation process;

Operation phase

- Change of one important junction on the route from unregulated to regulated type (independent decision due to large scale junction reconstruction nearby). This supported the chosen freight route, because it was one of the most loaded junctions on it.

D2.3 Activities

Preparation phase

- After cancelling the plans to construct a northern passage shortcut to the Old City Harbour new solutions (guidance sign system, downloadable GPS navigation routes) were worked out for implementation.

D3 Participation

D3.1 Measure Partners

- **Tallinn City Government** – Leading role in the measure organized by the Transportation Department;
- **Tallinn University of Technology** – A principal partner, responsible for preliminary studies and evaluation of the measure;
- **Port of Tallinn** – Occasional partner, consulting the solutions, providing information and helping with dissemination of the results;
- **K-Projekt AS** - Occasional partner, responsible for the design of the design of the guidance sign system;
- **Signal AS** - Occasional partner, responsible for the production and installation of the guidance sign system;
- **Regio AS** - Occasional partner, responsible for the design of the GPS navigation routes;
- **Estonian Road Administration** – Occasional partner, the solutions of the measure were consulted and coordinated with and the signs on the Tallinn ring road were installed by the Estonian Road Administration.

D3.2 Stakeholders

- **Truck drivers** – The measure was directly aimed to them;
- **General public** – As the measure was aimed at reducing the negative impact of the freight transport, general public is on the beneficiary side;
- **Freight transport operators and logistics companies** – the measure impacted their activities through truck drivers and changed conditions.

D4 Recommendations

D4.1 Recommendations: Measure Replication

- **The traditional part of the measure is easily replicable** – the traditional guidance sign system can be improved in any city, if there are suitable routes to guide to;
- **The GPS route part of the measure is easily replicable** – GPS navigation routes can easily be created, they are inexpensive to create and have virtually no expenses for holding them on a website.

D4.2 Recommendations: Process (Related to Barrier-, Driver- and Action Fields)

- It is important to have detailed and clear overview of the existing routes. A study report containing photos of all junctions and signs along all possible routes from city borders to the harbour terminals was created. This helped to decide the new freight route and contributed to the design process of the new guidance sign system.
- **Reaching the truck drivers** – the plan for reaching the truck drivers with the information should be considered thoroughly to maximize the dissemination. Language barriers and the locations/ways for reaching the drivers are the most important factors.

RTD Fact Sheet Template

Marking routes for smooth freight and city logistics	
Reference Measure	TAL 7.1 Marking routes for smooth freight and city logistics
Date of Submission	30/01/2012
Date of Review (ISIS)	04/2012
Date of Approval	04/2012
Author(s)	Marek Rannala
Editor(s)	Loredana Marmora (by ISIS)

Context and Purpose

Traffic congestions in certain locations of Tallinn are highly dependant on freight transport connected to Old City Harbour, which is located in the center of the city. Also heavy trucks can often be seen in central locations of the city and residential areas where they are not suitable nor allowed. The routs for heavy traffic are regulated by Tallinn city government but guidance system is not effective and truck drivers rely often on their personal GPS-based navigation systems which guide them fastest route regardless of restrictions. The measure is aimed at improving the traditional guidance systems consisting of signs and advance signs and finding ways to update truck drivers navigations systems with heavy traffic restritions. The aim is to create one well-marked (both physically and digitally) in-and-out route for freight transport connected to Old City Harbour. In addition booklets will be printed for truck drivers with information on route restrictions and upcoming in-car navigation systems update.

For improving the situation it was important to get detailed overview of the possible routes for heavy traffic and then find solutions for implementing. This was done by a study.

Description of RTD Activity

A study was performed on all possible existing routes from and to the harbour from all directions of Tallinn. All routes were documented with photos and analyzed. The solution was found in discussion with Tallinn Department of Transportation. The decision was made to leave only one route from eastern side of Tallinn to reach the harbour for heavy traffic. Since the harbour is located in the centre of the city, it was the only possibility to get heavy freight traffic out of the city centre. The second part of the study concentrated on finding ways to get the new routing information to truck drivers GPS-navigation systems.

Outputs and Results

The first output from the study was a route description with references to problems with existing signage on the new route. The second output was recommendations for software companies for creating routes for GPS-navigation systems.

Resulting Decision-making

The design of new signs on the new route was started already while the study had pointed out first results. As the study was finished, first signs were already installed. A software company was chosen for creating the routes for GPS-navigation system. Leaflets with freight traffic routing information were printed for truck drivers. The leaflet has a map showing the appropriate route and a direct link to download free routes for GPS-navigation systems from Tallinn homepage <http://www.tallinn.ee/heavytransport> (working from 02.2012).

Lessons Learnt

If possible, the design and installation of traffic signs should be started after finishing the study which they are based on. Also, design and installation should not be parallel tasks. This is important for getting overview of the whole system before it will be installed. Otherwise the system as whole might turn out to be inconsistent.

Cost-effectiveness

The study was important prerequisite for making decisions and finding solutions for freight traffic in Tallinn. The recommendations from study were fully implemented and are in use since December 2011.

Dissemination and Exploitation

Dissemination of the measure is about to begin in February 2012 with handing out leaflets for truck drivers through harbour check-in, gas stations, driver resting areas and Tallinn website. The results from impact evaluation will be available for all interested parties.