Measure title: Safety and energy-efficient training for public transport drivers

City: **Debrecen** *Project:* **MOBILIS** *Measure number:* 8.5.D

A Introduction

A1 Objectives

The main objective of this measure is to improve the skills of public transport drivers, train them to drive in a more energy efficient way (which also meets environmental objectives as well), and thus to make public transport safer and more economical.

A2 Description

Public transport drivers usually have to participate in several training sessions, although these are mostly for the purposes of confirming their physical competences. This training, carried out in the framework of MOBILIS, focused on new technologies (ABS, ASR, ESP, ASC), driving methods in special environmental circumstances and energy-efficient ways of driving vehicles.

Abbreviations

ABS: Anti-lock Braking System

ASR: Anti-slip Regulation

ESP: Electronic Stability Program

ASC: Automatic Stability Centre

The training of PT drivers from Hajdú-Volán and also from DKV (the Municipal Transport Company) took place in *Mogyoród*, a special facility close to the capital, in August 2007 and January 2008 respectively. The training itself took one day, travelling included, and the drivers arrived in groups of five (10 groups all together) for Hajdú-Volán and in two groups of ten for DKV. The small number of trainees eased the transfer of knowledge since there was an opportunity to discuss all issues with the trainer; also, during the practical part, all drivers had enough time to put the skills obtained during the theoretical part into practice. The drivers used the companies' own vehicles (buses for Hajdú-Volán and trolleybuses for DKV).

B Measure implementation

B1 Innovative aspects

Use of new technology/ITS:
Drivers learnt about using new safety technologies (e.g. ABS, ASR, ESP, ASC) and energy-efficient driving methods that they previously did not apply.

B2 Situation before CIVITAS

Public transport drivers usually have to participate in several training sessions, although these are mostly for the purposes of confirming their physical competences. Wet or frosty roads especially during the winter months could be very dangerous for these relatively big vehicles. As opposed to cars passengers, public transport vehicles do not provide seat belts and most passengers stand in any case.

Accidents in Debrecen are not common, considering the number of vehicles and the lines operating on a daily basis, but some of these could nevertheless be avoided.

The economy and cost-effectiveness of public transport vehicles mainly depend on the driver's driving skills and habits. Vehicle consumption can also be reduced by an appropriate driving method. The current education system for drivers does not include the teaching of cost-effective driving, which is why the operators believe that additional training could be reasonable and useful for public transport drivers.

B3 Actual implementation of the measure

The measure was implemented in one go:

1. **Training session**: For PT drivers working at Hajdú-Volán, the training was organised in August 2007, and for DKV drivers in January 2008, in *Mogyoród*, at a special facility. Hajdú-Volán drivers arrived in groups of five, with 10 groups participating altogether, and DKV drivers arrived in two groups of five (20 employees altogether, which represents one third of all trolley-drivers of the company). Each group spent a day at the facility.
   Participants were PT drivers from Hajdú-Volán (organisation responsible for long-distance transport) and employees of DKV (responsible for local transport): drivers, a garage-maintainer and the traffic manager.
   DKV drivers used the trolleybuses and Hajdú-Volán drivers used the buses of the respective companies.
   The training included a theoretical and a practical part: the theory learnt could also be put into practice, with the supervision of a professional trainer. Due to the low number of participating drivers at a time, they had the opportunity to discuss all questions and everyday problems they face.

B4 Deviations from the original plan

The measure has been carried out according to plan, no deviations occurred.

B5 Inter-relationships with other measures

The measure is related to other measures as follows:

No.	Measure title	Relation
11.5.D	Sustainable city-traffic development plan	PT promotion

C Evaluation – methodology and results

C1 Measurement methodology

C1.1 Impacts and Indicators

No.	Impact	Indicator	Used	Etc.
	Public bus drivers learnt new technologies (ABS, etc)	Scale-based variables	X	
	Drivers learnt driving skills in special environmental circumstances	Scale-based variables	X	
	Drivers learnt energy-efficient driving methods	Variables in the survey	X	

Detailed description of the indicator methodologies:

- **Indicator 1: Public bus drivers learnt new technologies (ABS, etc).** The survey included questions to assess to what extent drivers acquired new information regarding new technologies such as ABS, as well as questions to assess how much they can use this knowledge in their everyday work.
- **Indicator 2: Drivers learnt driving skills in special environmental circumstances.** The survey included questions to assess to what extent drivers acquired new information regarding driving skills in special environmental circumstances such as fog, etc , as well as questions to assess how much they can use this knowledge in their everyday work.
- **Indicator 3: Drivers learnt energy-efficient driving methods**. The survey included questions to assess to what extent drivers acquired new information regarding energy-efficient driving methods, as well as questions to assess how much they can use this knowledge in their everyday work.

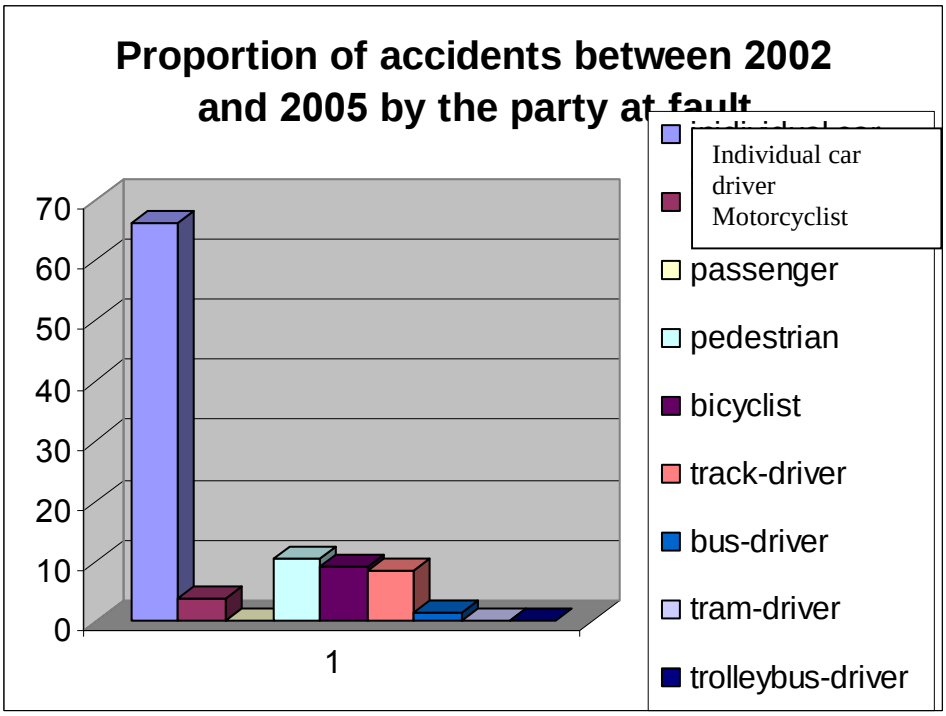
C1.2 Establishing a baseline

Between 16 and 25 June 2008, the Department of Sociology and Social Policy carried out evaluation research focusing on the results of the training. The survey was distributed among the employees of Hajdú-Volán, responsible for out-of-the city transportation (30 drivers), who filled it in. The shift leader of the drivers cooperated in collecting the completed surveys.

We should note that the evaluation team thought about conducting the research with the help of questioners, but the Hajdú-Volán shift leader informed the team that this method would meet serious barriers. The drivers can rarely be found at the Debrecen-office of the company, as they usually spend some free time between two drives at some other offices of the company in smaller settlements, and therefore questioners would have travel a lot to interview them. Thus, a self-completion method was chosen, and the Shift-leader took charge of collecting the surveys.

Also, the evaluation only represents the experiences of drivers of Hajdú-Volán. At the preparation phase, representatives of DKV had been asked if the participants were available for filling in a questionnaire, but because of the summer holidays, the one-week long survey could not be carried out. Because of the limited human resources the survey has not been repeated yet.

No data is available on the reduced number of accidents; the statistics for the 2008 period have not yet been drawn up, which means no comparison can be made between the "before" and "after" situation. There are some charts referring to the period between 2002 and 2005, but in general there has been a slight increase (5% per year) in accidents in Debrecen. The next chart shows that only 1.7% of all accidents have been caused by PT users: 0.1 by trolley-drivers, 0.2 by tram-drivers and 1.4% by bus-drivers.



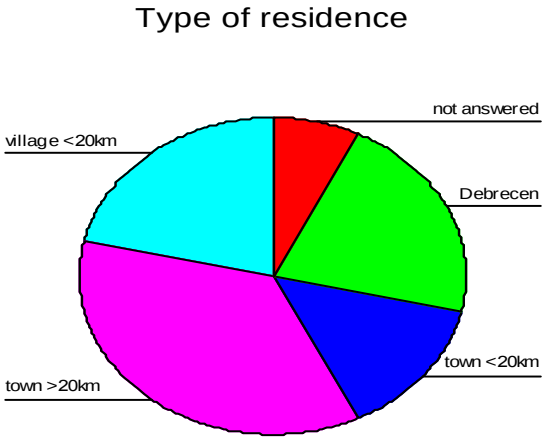
1. Description of the participating drivers

Since the "hard variables" such as age and place of residence were assumed to have some influence on the drivers' perception of the knowledge transferred during the training, related information has been gathered.

The participating drivers are between the age of 27 and 56, with an average age of 33 years, which means in average the drivers belong to a relatively young age cohort.

Two-thirds of participating drivers live in a small town or village no more than 30km away from Debrecen, while the rest live in Debrecen – this fact is understandable and reasonable if one takes account of the time-scheme of the drivers: it is frequent that drivers finish their day in a smaller settlement, and instead of driving back to

Debrecen, they leave the vehicle at the office of their town or village, and early the next day, their first drive takes them back to the county town, Debrecen.



As for their marital status, more than 80% of the drivers are married or live with a partner, only 17% live alone.

2. Overall evaluation of operational issues

57% of the drivers had never participated in any similar training, the rest had already been invited to additional sessions organised by Hajdú-Volán. This meant that **for the majority of drivers, the training has been a real novelty and a good team-building opportunity**. 40% of the drivers were appointed to participate, while 60% applied voluntarily. There is agreement among them concerning the reasonability of participation: those who needed these skills the most had the chance to take part. In case of older drivers (age 50+), appointment for participation is more frequent; while in case of younger ones, voluntary application is more frequent.

The extent to which the drivers were motivated to participate is important: on a scale (where 1=not at all, 7=to an absolute extent) the average was 6.36 point, which shows that the drivers saw the opportunity to participate as something positive and felt proud of being appointed or approved. As for organisational issues, they were very content with travelling (average of 6.43 point) and slightly less content with catering (5.79 point).

C1.3 Building the business-as-usual scenario

Since the training included traditional driving techniques as well – already known by the drivers – the added value is the competences related to new instruments and unusual environments (mountain-drive).

C2 Measure results

C2.1 Savings

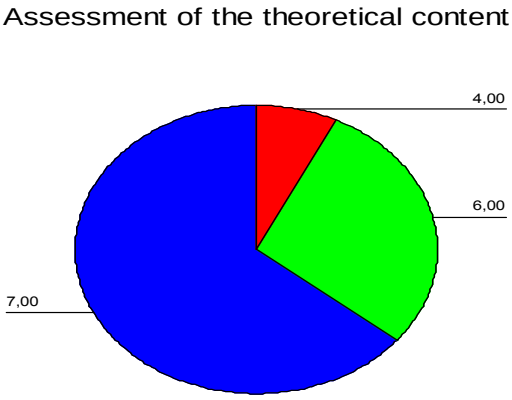
The rate of fuel consumption before and after the training has not been measured, although it is highly probable that only a slight decrease could be pointed out.

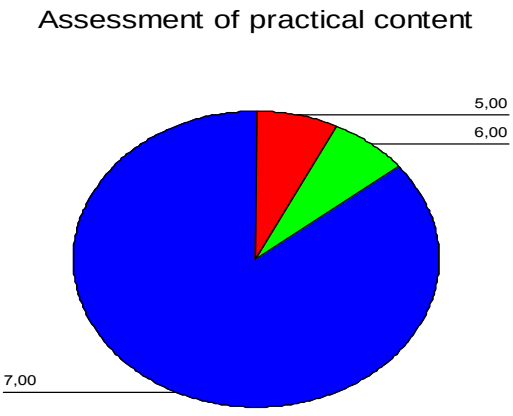
C2.4 Transport

Thanks to the training, the drivers participating acquired up-to-date knowledge and skills regarding safe driving, learning the use of both new technologies and driving skills in special environmental circumstances. This training has greatly contributed to increasing the safety of public transport both in and out of the city.

Taking into account **the general assessment of the theoretical and practical part** of the training, the participants are highly satisfied with the following issues.

- as for day-to-day applicability of the knowledge gained, the average point is 6.0 (1=not at all applicable, 7= applicable to an absolute extent), which shows that the training could fulfil the needs of a highly diverse group of drivers.
- As for the general assessment of the two separate parts, the practical part received a slightly higher average score (6.8) than the theoretical part (6.5) but both scores represent a high level of satisfaction regarding the composition of the training material.





As for the **separate elements** of the training, the average points vary a bit more, but the variations can be interpreted if we take into account the particularities of the company and the region. For all the elements included in the training, drivers were asked about the **novelty** of the given element as well as **its applicability** in everyday work.

The elements of the theoretical part were the following:

- Reasons for unsafe traffic situations occurring
- The role of adhesion in vehicle-driving
- The role of under- and over-steering during driving
- The role of break-road [T1]during driving
- Operation, use and impact of new safety technologies (AB, ABS, ARS, and RETARDER)

The elements of the practical part were as follows:

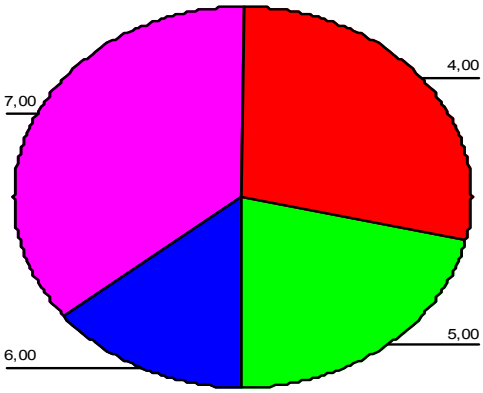
- Emergency braking
- Braking and evading
- Entrance into a slippery curve
- Sudden getting out of the way without braking
- Slalom
- Uphill and downhill on a road with a 9% slope
- Energy-saving driving methods

The elements representing the highest novelty were also rated as the most applicable:

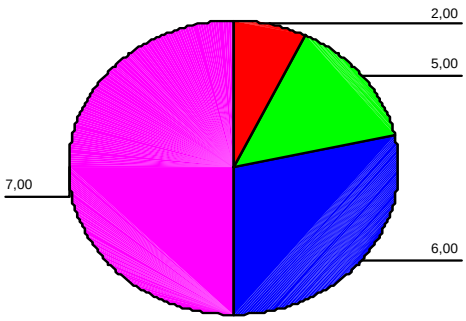
1. **Reasons of unsafe transport circumstances occurring** (Novelty: 5.57, applicability: 6.07)
2. **Emergency braking** (Novelty: 5.0, applicability: 6.0)
3. **Entrance into slippery curve** (Novelty: 5.64, applicability: 6.7)

Element No 1: Reasons of unsafe transport circumstances occurring

Innovative value of element No 1

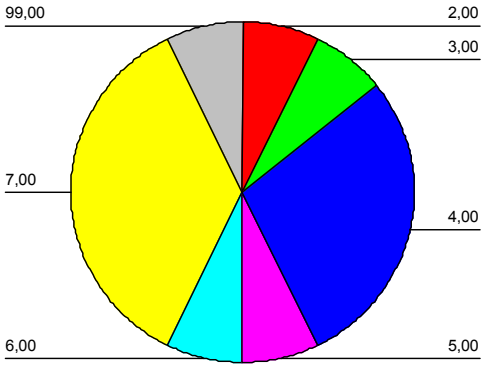


Everyday applicability of element No 1

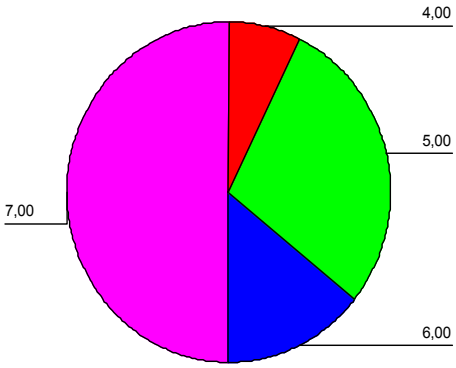


Element No 2: Emergency braking

Innovative value of element No 2

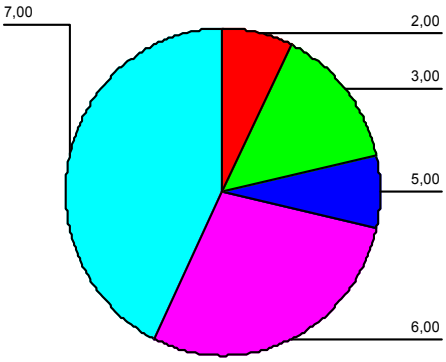


Everyday applicability of element No 2

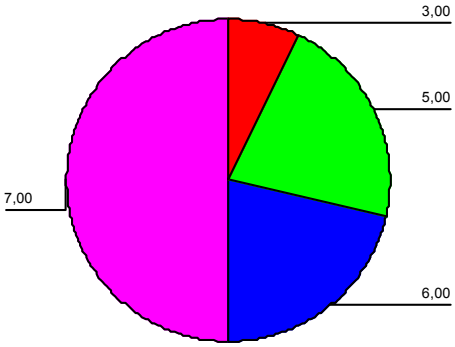


Element No 3: Entrance into slippery curve

Innovative value of element No 3



Eveyday applicability of element No 3



Due to geographical ?layout and driving attitudes, these three elements are seen as the most important ones that support drivers in their daily work.

There were some elements in the training material that were more or less known by the drivers, therefore both the level of novelty, and applicability, received respectively lower scores.

1. **Role of under- and over steering** (Novelty: 4.76, applicability: 5.71)
2. **Role of break-road** (Novelty: 4.28, applicability: 5.23)
3. **Sudden turn without braking** (Novelty: 4.78, applicability: 5.71)
4. **Slalom** (Novelty: 4.92, applicability: 5.78)

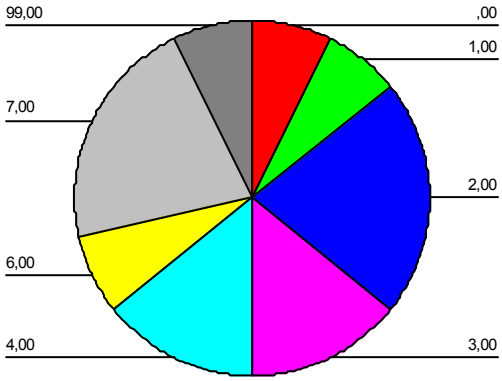
One element has been assessed as known, although drivers liked the opportunity of upgrading their knowledge.

1. **Role of adherence** (Novelty: 5.14, applicability: 5.78)

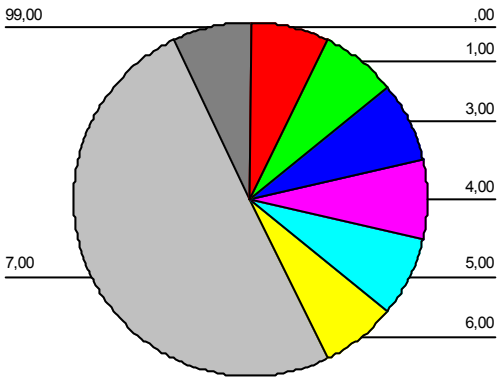
The drivers assessed the new technologies as the newest information (ABS among others), although they don't have enough opportunity to work with these innovative instruments because the company's current vehicles are either not yet or only partly equipped with them.

Element No 4: Operation, use and impact of new safety technologies (AB, ABS, ARS, and RETARDER. *99= no answer)

Innovative value of element No 4



Everyday applicability of element No 4



Although it was expected that hard variables (e.g. age) have an impact on the drivers' appreciation of the training elements, no statistically significant deviations can be observed.

C2.5 Society

The upgrading of drivers' skills may result in safer public transport, therefore inhabitants of Debrecen and its surroundings may travel more safely as well.

C3 Achievement of quantifiable targets

No.	Target	Rating
1	Drivers obtained skills which help them to drive in a safer way	**
2	Drivers learnt the operation and impact of new technologies	**
3	As a result, they learnt to drive in a more energy-efficient way.	**
NA = Not Assessed	* = Not achieved	**= Achieved in full	***= Exceeded

C4 Upscaling of results

The training basically could be extended to all drivers of the two transport companies, which would result in a considerable and measurable impact on energy and the environment too.

C5 Appraisal of evaluation approach

The evaluation methodology focused on using a survey, so that all drivers employed by Hajdú-Volán could be asked about the training and its results concerning everyday work. This method helped to gather easily comparable data, ready for statistical analysis, which was suitable and reasonable to evaluate the theoretical and practical content of the training session.

C6 Summary of evaluation results

The key result of the measure is that participating drivers have learnt a great deal about energy-efficient driving and the use of instruments that are to increase the safety of everyday driving. This knowledge of high novelty and everyday application can be used and transferred to other colleagues as well.

The training participants mostly came from the younger generation, although some older drivers (age 50+) were also invited. Generally, the older drivers were appointed to participate, and the younger generation voluntarily applied. The drivers mostly agree that the opportunity to participate and to gain new knowledge on the training was given to those who needed it the most. The participants also found themselves fortunate to have this occasion to upgrade their knowledge.

The drivers were also satisfied with the organisational issues: more with travelling and slightly less with catering.

They found both the theoretical and practical aspects to be new information and mostly applicable in their everyday work, although the assessment of the practical part received somewhat higher scores.

As for specific elements of the training (including theory and practice as well), those representing the highest novelty were also rated as the most applicable. These referred mostly to given geographical circumstances:

- Reasons of unsafe transport circumstances occurring
- Emergency braking
- Entrance into slippery curve

There were some elements in the training material that were more or less known by the drivers, therefore both the level of novelty, and applicability, received respectively lower scores.

- Role of under- and over steering
- Role of break-road
- Sudden turn without braking
- Slalom

One element has been assessed as known, although drivers liked the opportunity of upgrading their knowledge: this is the role of adherence.

The drivers assessed the new technologies as the newest information.

D Lessons learned

D1 Barriers and positive features

D1.1 Barriers

D1.2 Positive features

Driver 1 – Hajdú-Volán's and DKV's support of the training activity proved to be very important in the organisation of the training.

Driver 2 – The drivers were appointed to attend (for those who lacked this kind of knowledge) or applied voluntarily, which ensured that all interested drivers had the opportunity to participate, increasing their motivation to learn new skills.

Driver 3 – The content of the training was designed in a way that ensured the drivers had the opportunity to practise all theoretical knowledge, and this fact is essential, especially regarding the new, and in some cases unfamiliar, technologies.

Driver 4 – Splitting the drivers into groups of five proved to a key decision regarding the efficiency of the training, because this small number of participating drivers made it possible to practise and have a real discussion.

D2 Participation of stakeholders

During the preparation, organisation and implementation of the measure, the experts of Hajdú-Volán played a key role. In the course of the training session itself, the drivers had the opportunity to discuss all issues related to the knowledge learnt and their everyday problems, this way their full participation was ensured.

D3 Recommendations

It would be important to ensure that all drivers (especially new recruits) have the opportunity to take part in training, so that they can obtain all the information about professional and safe driving skills and about new technologies, which hopefully will be available in all company vehicles.

D4 Future activities relating to the measure

No further activities are planned regarding the measure for the time being.