

July 2016 (driver 8 – driver 13) before drive cycle 2. The training program was a static approach which aimed at urging drivers to apply eco-driving techniques after learning. Some of the advices given to the drivers include: driving at the speed limit, slow motion, decelerate smoothly, anticipate traffic flow, maintain a steady speed at low RPM (revolutions per minute) etc.

- Practical driver training - D2 (Drive cycle 2) – Drive cycle 2 combines the techniques learnt during the

classroom teachings, as well as the real-time guidance from the instructor during the drive cycles. This drive cycle was conducted on 6th July 2016 (driver 1 – driver 7) and on 13th July 2016 (driver 8 – driver 13) between 12 a.m. and 4 p.m. After the completion of drive cycle 2, the obtained results were presented to drivers in order to evaluate the effects and identify the key needs for future development. The logged parameters are as shown in Tab. 1.

Table 1 List of parameters logged for both drive cycles 1 and 2

Parameter	Unit	Description
Duration	hh:mm:ss	From start to end of the drive
Distance	km	Distance covered
Average speed	km/h	Vehicle speed for the distance travelled in a given period of time
Average speed – on the move	km/h	Vehicle speed for the distance travelled in a given period of time when the vehicle is in motion
Fuel consumption – on the move	L(litre)	Amount of fuel used while the vehicle is in motion
Total fuel consumption	L(litre)	Amount of fuel used during a specific drive
Average fuel consumption	L/100 km	Average amount of fuel used during a specific drive
Average CO ₂ emission	kg/100 km	Corresponding average CO ₂ emission for a specific drive
Average accelerator pedal position	%	Average accelerator pedal position ranges between 0% (not touching) and 100% (fully pushed)
Driving without accelerator pedal – moving time	mm:ss	Vehicle drive time when driving without using accelerator pedal
Brake time	mm:ss	Total duration of brake time per drive
Driving without accelerator pedal - total distance	km	Total distance when driving without accelerator pedal
Brake usage – total distance	km	Total distance with brake pedal usage per drive
Brake count	-	Total number of braking occurrences per drive
Stopping events count	-	Total number of events that affect the vehicle stop
Idling time	mm:ss	Total duration when vehicle's engine is running and the vehicle is not in motion
Gearshift count	-	Total number of gearshifts according to driving style
Average engine speed	rpm	Number of revolutions per minute at which the engine crankshaft turns

2.4 Data Collection

Data was collected after connecting CAN network with the software Key Driving Training System produced by Belgian company Key Driving Competence, using the diagnostic cable SAE J1939. Using two interfaces (Kvaser and Squarell) the data was translated into computable and readable data that could be used on a PC.

The data collected were statistically evaluated to measure the effectiveness of the Eco-driving training program. Statistical evaluation of the driving parameters was investigated using paired t-test (at 5% significance level) in statistical program MINITAB 17. Paired t-test was used to compare whether the results of driving parameters after the eco-driving training were significantly improved to the results before training.

3 RESULTS AND DISCUSSION

Analysis of the driving quality parameters before (D1) and after eco-driving training (D2) as per Tab. 2 show an average speed deceleration of nine drivers between range of 2,92% - 14,67% while four drivers increased the average speed after training between range of 0,73% – 23,70%. Similar values were obtained in the analysis of the average speed while the vehicle was in motion. The results among thirteen drivers revealed that there was no significant effect of the eco-driving training in both parameters, $p = 0,756$ and $p = 0,548$, respectively.

After completing the second Drive cycle (D2), and when compared to the test drive before the training (D1), almost all drivers reduced the fuel consumption while the vehicle was still in motion. Driver 2 achieved the least

savings in fuel consumption (0,99%), whereas Driver 11 achieved the most (20,95%). Driver 12 only achieved an increase of 0,30%. Also, a lower overall fuel consumption was determined for all the drivers after the training, with an average saving in fuel consumption by 8,61%. The results showed that eco-driving techniques contributed to reducing parameters FCM (fuel consumption – on the move), TFC (total fuel consumption) and AFC (average fuel consumption) considerably and values of these parameters before training were significantly greater than those after training, $p = 0,000$, $p = 0,001$ and $p = 0,001$, respectively. There are previous evidences which have also reported eco-driving training to result in an increase in fuel savings for bus drivers [9, 10, 23, 24, 25]. These researchers showed that eco-driving could increase the fuel economy up to 27%.

Consequently, the average CO₂ emission in tested drivers was reduced from 0,13% to 19,95% in relation to the emission before training. Average reduction in CO₂ emission for all thirteen drivers was 8,61%. Results showed that Eco-driving program significantly affected the reduction of average CO₂ emission after training, $p = 0,001$. Barić, Zovak and Periša [26] showed it was possible to achieve even higher emission reduction, of up to 32%.

Result analysis after the eco-driving training in tested drivers (in Tab. 3) showed that nine drivers reduced the parameter APGP (the average accelerator pedal position) avoiding strong accelerations indicating that eco-driving training affected a significant improvement of this parameter after training, $p = 0,009$. Pushing the throttle not more than 50% can be beneficial for fuel economy [27]. After eco-driving training, nine drivers increased the time of driving without throttle while the vehicle was in motion.

The improvements are between range of 0,32% - 49,49% while four drivers decreased between range of 3,38% - 38,13%. Post-training improvements were no statistically

significant, $p = 0,155$. In addition, there was no significant effect of the eco-driving training on increasing total distance with driving without throttle, $p = 0,479$.

Table 2 Driving quality parameters before (D1) and after eco-driving training (D2)

		Parameters							
		D	Dis	AS	ASM	FCM	TFC	AFC	ACO ₂
		hh:mm:ss	km	km/h	km/h	L(litre)	L(litre)	L/100 km	kg/100 km
Driver 1	D1	0:25:00	14,34	34,42	37,08	7,89	8,13	56,7	150,7
	D2	0:25:50	14,35	33,33	35,85	7,81	8,12	56,63	150,5
	%	3,33	0,07	-3,17	-3,31	-1,01	-0,12	-0,12	-0,13
Driver 2	D1	0:25:52	14,39	33,38	35,09	8,04	8,25	57,3	152,5
	D2	0:30:19	14,39	28,48	30,25	7,96	8,23	57,16	152,2
	%	17,20	0,00	-14,67	-13,8	-0,99	-0,24	-0,24	-0,19
Driver 3	D1	0:26:55	14,34	31,98	35,01	7,9	8,28	57,7	153,6
	D2	0:29:27	14,34	29,21	32,1	7,58	7,81	57,43	144,9
	%	9,41	0,00	-8,66	-8,31	-4,05	-5,67	-0,47	-5,66
Driver 4	D1	0:28:46	14,38	30,00	32,35	8,82	9,09	63,2	168,1
	D2	0:26:42	14,33	32,19	33,11	7,42	7,53	52,36	139,7
	%	-7,18	-0,35	7,30	2,35	-15,87	-17,16	-17,16	-16,89
Driver 5	D1	0:27:18	14,35	31,53	33,57	7,92	8,16	56,9	151,3
	D2	0:28:39	14,33	30,00	32,88	7,33	7,73	53,9	143,5
	%	4,97	-0,11	-4,84	-2,03	-7,48	-5,31	-5,20	-5,20
Driver 6	D1	0:30:02	14,27	28,51	30,49	7,5	7,84	54,94	145,1
	D2	0:30:43	14,18	27,7	29,32	6,42	6,72	47,4	126,1
	%	2,30	-0,63	-2,92	-3,84	-14,39	-14,20	-15,91	-15,07
Driver 7	D1	0:27:47	14,54	31,41	33,80	6,61	6,78	46,6	124,0
	D2	0:27:35	14,55	31,64	32,81	6,47	6,57	45,2	120,2
	%	-0,54	0,03	0,73	-2,95	-2,25	-3,05	-3,08	-3,08
Driver 8	D1	0:31:26	14,33	27,36	29,11	8,44	8,70	60,7	161,4
	D2	0:25:27	14,36	33,85	36,14	7,25	7,37	51,3	136,5
	%	-19,03	0,20	23,70	24,18	-14,07	-15,23	-15,40	-15,40
Driver 9	D1	0:27:13	14,16	31,21	33,25	7,69	7,96	56,2	149,5
	D2	0:22:26	14,28	38,19	39,26	7,12	7,22	50,5	134,4
	%	-17,54	0,91	22,37	18,07	-7,40	-9,29	-10,14	-10,11
Driver 10	D1	0:24:17	14,40	35,57	37,84	8,91	9,09	63,1	167,9
	D2	0:25:49	14,40	33,47	35,10	7,43	7,63	53,0	141,0
	%	6,29	0,00	-5,90	-7,23	-16,66	-15,98	-15,99	-16,02
Driver 11	D1	0:24:40	14,37	34,95	36,06	9,30	9,39	65,4	173,8
	D2	0:27:33	14,33	31,21	32,21	7,35	7,50	52,3	139,2
	%	11,68	-0,29	-10,72	-10,68	-20,95	-20,18	-19,95	-19,95
Driver 12	D1	0:25:31	14,26	33,54	36,69	7,32	7,60	53,3	141,7
	D2	0:26:44	14,26	32,01	34,24	7,34	7,56	53,0	141,0
	%	4,78	0,00	-4,55	-6,68	0,30	-0,47	-0,48	-0,49
Driver 13	D1	0:33:15	14,29	25,79	28,95	8,43	8,81	61,7	164,1
	D2	0:35:19	14,29	24,27	28,24	7,82	8,36	58,5	155,6
	%	6,22	0,00	-5,87	-2,45	-7,25	-5,18	-5,16	-5,16

Note: D – Duration; DIS – Distance; AS - Average speed; ASM - Average speed – on the move; FCM - Fuel consumption – on the move; TFC - Total fuel consumption; AFC - Average fuel consumption; ACO₂ - Average CO₂ emission

After applying advices on reducing the risky traffic situations the drivers were given during their training, ten drivers reduced their brake time during driving after eco-driving training from 3,53% to 70,15%. After the training these ten drivers used the brake less between range of 36,84% – 86,60% which consequently led to an increased fuel economy. Eco-driving program was effective in these two parameters, BT (brake time) and BC (brake count), so it was statistically shown that their values before training were greater than those of after training, $p = 0,004$ and $p = 0,003$, respectively. These findings were justified by

previous researches [5, 28], claiming that a large number of sudden brakings could be responsible for the increase of the fuel consumption by around 30-44% in comparison to vehicles that were driving smoothly and moderately.

After eco-driving training, the stopping events count reduced, as statistically demonstrated, $p = 0,007$. When faced with situations where the drivers had to stop (e.g. at intersections), these drivers anticipated the traffic situations enabling a more comfortable and safer drive without sudden braking.

Table 3 Analysis of results of the tested drivers before (D1) and after eco-driving training (D2)

		Parameters									
		APGP	DWTM	BT	DWTTD	BUTD	BC	SEC	IT	GC	AES
		%	mm:ss	mm:ss	km	km	#	#	mm:ss	#	rpm
Driver 1	D1	30,00	05:09	01:07	3,13	0,17	20	6	01:48	88	1077
	D2	26,00	05:10	01:51	2,85	0,13	20	8	01:49	89	1021
	%	-13,13	0,32	41,12	-8,94	-23,53	0,00	33,33	0,92	1,14	-5,19
Driver 2	D1	30,00	04:30	01:18	2,56	0,19	26	2	01:16	95	1072
	D2	25,00	06:18	01:49	3,28	0,15	34	3	01:46	104	1045
	%	-16,67	40,00	26,27	28,12	-21,05	30,77	50,00	39,47	9,47	-2,52
Driver 3	D1	28,00	04:13	03:18	2,36	0,22	19	9	02:20	96	1034
	D2	25,00	06:14	03:11	3,25	0,07	12	7	02:39	99	1015
	%	-10,71	47,83	-3,53	37,71	-68,18	-36,84	-22,22	13,57	3,12	-1,84
Driver 4	D1	28,00	07:39	03:21	4,5	0,17	26	9	02:05	144	1054
	D2	28,00	04:44	01:00	2,57	0,04	9	4	00:44	68	1046
	%	0,00	-38,13	-70,15	-42,89	-76,47	-65,38	-55,55	-64,80	-52,78	-0,76
Driver 5	D1	28,00	06:04	02:45	3,41	0,19	24	9	01:39	102	1038
	D2	25,00	05:17	02:06	2,77	0,13	14	6	02:31	71	1025
	%	-9,09	-12,91	-23,74	-18,79	-32,87	-43,75	-33,33	51,70	-30,39	-1,22
Driver 6	D1	23,00	08:56	02:01	5,32	0,28	51	11	01:57	125	1021
	D2	21,00	08:24	01:30	4,22	0,20	24	4	01:42	95	1002
	%	-9,73	-6,00	-25,38	-20,70	-29,01	-52,48	-63,64	-12,94	-24,00	-1,84
Driver 7	D1	24,00	05:04	01:09	2,74	0,10	13	6	01:58	86	1014
	D2	24,00	06:20	01:16	3,63	0,11	18	3	00:59	100	1014
	%	0,00	24,79	9,07	32,52	15,82	38,46	-50,00	-50,10	16,28	0,00
Driver 8	D1	26,00	04:45	02:57	2,39	0,18	28	10	01:53	130	1013
	D2	28,00	04:54	01:08	2,86	0,09	10	3	01:37	76	1056
	%	8,45	3,14	-61,48	19,86	-49,10	-64,29	-70,00	-14,07	-41,54	4,25
Driver 9	D1	27,00	04:26	02:04	2,56	0,05	10	6	01:40	76	1032
	D2	30,00	04:58	00:57	3,06	0,07	6	2	00:37	65	1088
	%	9,57	12,00	-53,55	19,79	43,82	-40,00	-66,67	-63,35	-14,47	5,39
Driver 10	D1	36,00	06:45	02:50	4,52	0,48	49	6	01:27	101	1116
	D2	29,00	06:32	01:24	3,68	0,02	7	3	01:12	86	1069
	%	-19,98	-3,38	-50,77	-18,57	-94,99	-86,60	-50,00	-17,59	-14,85	-4,16
Driver 11	D1	36,00	07:14	02:07	4,72	0,26	25	5	00:45	106	1109
	D2	26,00	07:21	00:45	3,97	0,03	4	3	00:51	84	1056
	%	-27,93	1,76	-64,46	-16,00	-88,78	-85,71	-40,00	13,37	-20,75	-4,73
Driver 12	D1	28,00	04:23	02:24	2,53	0,12	27	4	02:12	82	1036
	D2	25,00	06:33	01:58	3,70	0,12	16	7	01:44	104	1041
	%	-8,62	49,49	-17,91	46,12	0,00	-39,62	75,00	-20,66	26,83	0,49
Driver 13	D1	24,00	04:47	05:30	2,26	0,25	48	13	03:38	113	1005
	D2	21,00	06:06	04:19	3,35	0,07	19	11	04:58	106	954
	%	-13,60	27,84	-21,60	48,27	-72,76	-60,00	-15,38	36,60	-6,19	-5,05

Note: APGP – Average position of gas pedal; DWTM – Driving without throttle – moving time; BT – Brake time; DWTTD - Driving without throttle – total distance; BUTD – Brake usage – total distance; BC – Brake count; SEC – Stopping events count; IT – Idling time; GSC – Gearshift count; AES – Average engine speed

A number of gear changes after the training reduced by eight drivers between range of 6,19% - 52,78% while the five drivers increased between range of 1,14% - 26,83%. After eco-driving training, smoother driving was achieved as statistically demonstrated, $p = 0,036$. Symmons, Rose & van Doorn [29] claim that a decrease in the number of gear changes and the use of brake not only has a positive effect on reduction of risky situations, but also has a positive effect on the vehicle repair and maintenance expenses. Basarić et al. [10] moreover showed that a lower number of gear changes and smoother drive reduced the vehicle's wear and tear.

Although the improvements of the average engine speed were achieved to nine drivers when compared to the drive before the training, between range of 0,76% - 5,19%,

the results among thirteen drivers revealed that there was no significant effect of the eco-driving training, $p = 0,080$.

After eco-driving training seven drivers reduced the idling time from 12,94% to 64,80% while six drivers increased between range of 0,92% - 51,70%. The result among the thirteen drivers showed that there was no significant effect of the eco-driving training on reducing the vehicle's idle time, $p = 0,300$. Researchers have shown that idling time is the most inefficient use of fuel [12]. Natural Resources Canada [30] have concluded that the idling time of the vehicle of more than 10 seconds has a higher fuel consumption than turning the engine off and starting it again.

Tab. 4 summarized the outcome of the eco-driving training and it disclosed that there was a general improvement in the driver's manner of driving.

Table 4 The driving before (D1) and after eco-driving (D2) statistics

Driving Parameters	Units	Mean	SD	P-value	T-value
D (D1) - D (D2)	h	-0,0058	0,0498	0,680	-0,42
AS (D1) - AS (D2)	km/h	0,315	3,574	0,756	0,32
ASM (D1) - ASM (D2)	km/h	0,598	3,494	0,548	0,62
FCM (D1) - FCM (D2)	L(litre)	0,758	0,609	0,000**	4,49
TFC (D1) - TFC (D2)	L(litre)	0,748	0,651	0,001**	4,15
AFC (D1) - AFC (D2)	L/100 km	5,00	4,70	0,001**	3,84
ACO ₂ (D1) - ACO ₂ (D2)	kg/100 km	13,76	11,90	0,001**	4,17
APGP (D1) - APGP (D2)	%	2,692	3,521	0,009**	2,76
DWTM (D1) - DWTM (D2)	h	-0,00675	0,02294	0,155	-1,06
BT (D1) - BT (D2)	h	0,01327	0,01533	0,004**	3,12
DWTTD (D1) - DWTTD (D2)	km	-0,015	0,992	0,479	-0,05
BUTD (D1) - BUTD (D2)	km	0,1100	0,1294	0,005**	3,07
BC (D1) - BC (D2)	#	13,31	14,32	0,003**	3,35
SEC (D1) - SEC (D2)	#	2,462	3,072	0,007**	2,89
IT (D1) - IT (D2)	h	0,00190	0,01275	0,300	0,54
GC (D1) - GC (D2)	#	15,15	27,72	0,036**	1,97
AES (D1) - AES (D2)	rpm	14,54	35,00	0,080	1,50

Note: Driving parameters were calculated as (D1) minus (D2); **significant P-value at 5% level; SD: Standard Deviation

3.1 Eco-Driving

Assessment of the fuel economy provides the calculation of the economic benefits for the public transport company "JGSP Belgrade", from implementing eco-driving education among its drivers. In this company, the overall structure costs of 32% go to fuel expenses. Every bus consumes around 22 829 l of diesel annually, which indicates that an average fuel saving of 8,61% results in an annual saving of 1966 l of diesel fuel per bus. If an average price for 1l of diesel fuel is €0,90, than an annual saving for each bus would be €1769 amounting to €1 487 729 for the 841 bus fleet. Symmons et al. [29] established that if a car fleet consuming around 1,5 million liters of diesel fuel per year saved just 1%, it would made the savings of \$15 000 per annum.

4 CONCLUSIONS

In this paper, the effectiveness of Eco-driving training in the public transport company "JGSP Belgrade", Serbia, was investigated. The results confirm the findings of the previous researches that Eco-driving training reduces fuel consumption, CO₂ emissions, and improves driver behaviour short-term. In the present pilot program fuel economy was enhanced on average by 8,61% after the training and hence the average CO₂ emission was reduced by 8,61%. Furthermore, the findings of this pilot program also demonstrated that eco-driving training has the potential to significantly reduce fuel-related costs for transport companies.

Eco-driving effects have shown a general improvement in the driver's manner of driving. However, some driving parameters (D, AS, ASM, DWTM, DWTTD, IT, AES) were not significantly improved after training indicating a driver's slow adaptation and application of new driving techniques. Therefore, eco-driving program needs to examine how the guidelines for these driving parameters could be improved.

Although our results were enticed under realistic conditions with potentially a great validity, this study had limitations that should be accepted in the context of the results. One limitation was the small sample size ($N = 13$) and it may not be possible to generalize the findings to other companies without restrictions. However, these

findings can provide a preliminary access into what level of influence an eco-driving training and education can have on bus drivers' fuel efficiency. Furthermore, the primary goal of drivers is not to save fuel but to take passengers to the destination site; drivers might not react to the interventions as drivers with other primary goals in different settings. There may be other external influences outside of our control which may distract the effects.

Future researches should test if, and to what extent, these results could be sustainable over a longer period, and whether they could be transferred to other domains of energy-efficiency behaviour.

5 REFERENCES

- [1] Dhaou, I. B. (2011). Fuel Estimation Model for ECO-Driving and ECO-Routing. *IEEE Intelligent Vehicles Symposium (IV)*, Baden-Baden, Germany, 37-42.
- [2] Zhou, M., Jin, H., & Wang, W. (2016). A review of vehicle fuel consumption models to evaluate eco-driving and eco-routing. *Transportation Research Part D: Transport and Environment*, 49, 203-218. <https://doi.org/10.1016/j.trd.2016.09.008>
- [3] Lee, I. M., Lee, S., Park, J. S., & Do Kim, S. (2012). Area Wide Calculation of Traffic Induced CO₂ Emission in Seoul. *KSCE Journal of Civil Engineering*, 16(3), 450-456. <https://doi.org/10.1007/s12205-012-1525-5>
- [4] McKinnon, A. C. & Pieczyk, M. I. (2009). Measurement of CO₂ emissions from road freight transport: A review of UK experience. *Energy Policy*, 37, 3733-3742. <https://doi.org/10.1016/j.enpol.2009.07.007>
- [5] Ericsson, E. (2001). Independent driving pattern factors and their influence on fuel use and exhaust emission factors. *Transportation Research Part D: Transport and Environment*, 6(5), 325-345. [https://doi.org/10.1016/S1361-9209\(01\)00003-7](https://doi.org/10.1016/S1361-9209(01)00003-7)
- [6] Van Mierlo, J., Maggetto, G., van de Burgwal, E., & Gense, R. (2004). Driving style and traffic measures – Influence on vehicle emissions and fuel consumption. *Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering*, 218(1), 43-50. <https://doi.org/10.1243/095440704322829155>
- [7] Larusdottir, E. B. & Ulfarsson, G. F. (2015). Effect of Driving behavior and Vehicle Characteristics on Energy Consumption of Road Vehicles Running on Alternative Energy Sources Effect of Driving behavior and Vehicle Characteristics on Energy Consumption of Road Vehicles

- Running on Alternative Energy. *International Journal of Sustainable Transportation*, 9, 592-601. <https://doi.org/10.1080/15568318.2013.843737>
- [8] Barkenbus, J. N. (2010). Eco-driving: An overlooked climate change initiative. *Energy Policy*, 38(2), 762-769. <https://doi.org/10.1016/j.enpol.2009.10.021>
- [9] Zarkadoula, M., Zoidis, G., & Tritopoulou, E. (2007). Training urban bus drivers to promote smart driving: A note on a Greek eco-driving pilot program. *Transportation Research Part D: Transport and Environment*, 12(6), 449-451. <https://doi.org/10.1016/j.trd.2007.05.002>
- [10] Basarić, V., Jambrović, M., Miličić, M., Savković, T., Basarić, Đ., & Bogdanović, V. (2017). Positive Effects of Eco-Driving in Public Transport - A Case Study of the City Novi Sad. *Thermal Science*, 21(1B), 683-692. <https://doi.org/10.2298/TSCI150219160B>
- [11] Ho, S., Wong, Y., & Chang, V. W. (2015). What can eco-driving do for sustainable road transport? Perspectives from a city (Singapore) eco-driving programme. *Sustainable Cities and Society*, 14, 82-88. <https://doi.org/10.1016/j.scs.2014.08.002>
- [12] Ruddy, M., Matthews, L., Andrey, J., & Del Matto, T. (2013). Eco-driver training within the City of Calgary's municipal fleet: Monitoring the impact. *Transportation Research Part D: Transport and Environment*, 24, 44-51. <https://doi.org/10.1016/j.trd.2013.05.006>
- [13] Haworth, N. & Symmons, M. (2001). The Relationship between Fuel Economy and Safety Outcomes. *Report No. 188*, Monash University Accident Research Centre, Australia.
- [14] SenterNovem. (2005). Ecodriving: The smart driving style. *TRENTISE project*, pp. 31. Utrecht.
- [15] Beusen, B., Broekx, S., Denys, T., Beckx, C., Degraeuwe, B., Gijssbers, M., et al. (2009). Using on-board logging devices to study the long-term impact of an eco-driving course. *Transportation Research Part D: Transport and Environment*, 14(7), 514-520. <https://doi.org/10.1016/j.trd.2009.05.009>
- [16] Siero, S., Boon, M., Kok, G., & Siero, F. (1989). Modification of driving behavior in a large transport organization: A field experiment. *Journal of Applied Psychology*, 74(3), 417-423. <https://doi.org/10.1037/0021-9010.74.3.417>
- [17] Dogan, E., Steg, L., & Delhomme, P. (2011). The influence of multiple goals on driving behavior: The case of safety, time saving, and fuel saving. *Accident Analysis and Prevention*, 43(5), 1635-1643. <https://doi.org/10.1016/j.aap.2011.03.002>
- [18] Delhomme, P., Paran, F., & Nikolas, P. A. (2010). Eco-driving with Eco-cognition: development of cognitive indicators, Experimental design. *Report on the Convention with the KOTSA Institute*. Korea.
- [19] Yang, X. Y., Li, D. & Zheng, P. J. (2012). Effects of Eco-driving on Driving Performance. *Applied Mechanics and Materials*, 178-181, 2859-2862. <https://doi.org/10.4028/www.scientific.net/AMM.178-181.2859>
- [20] Sullman, M. J. M., Dorn, L., & Niemi, P. (2015). Eco-driving training of professional bus drivers - Does it work? *Transportation Research Part C: Emerging Technologies*, 58, 749-759. <https://doi.org/10.1016/j.trc.2015.04.010>
- [21] Van den Hoed, R., Harmelink, M., & Joosen, S. (2006). *Evaluation of the Dutch Eco-Driving Programme, in frame of AID-EE project-Active Implementation of the European Directive on Energy Efficiency*, European Commission, Retrieved June 10, 2018, from: <https://www.ecofys.com/files/files/aid-ee-2006-evaluation-ecodrive-netherlands.pdf>
- [22] International Energy Agency, IEA. (2008). Energy Policies of IEA Countries. *Review*, Japan.
- [23] Carrese, S., Gemma, A., & La Spada, S. (2013). Impacts of Driving Behaviours, Slope and Vehicle Load Factor on Bus Fuel Consumption and Emissions: A Real Case Study in the City of Rome. *Procedia - Social and Behavioral Sciences*, 87(10), 211-221. <https://doi.org/10.1016/j.sbspro.2013.10.605>
- [24] Huertas, J. I., Díaz, J., Giraldo, M., Cordero, D., & Tabares, L. M. (2018). Eco-driving by replicating best driving practices. *International Journal of Sustainable Transportation*, 12(2), 107-116. <https://doi.org/10.1080/15568318.2017.1334107>
- [25] Strömberg, H. K. & Karlsson, M. A. (2013). Comparative effects of eco-driving initiatives aimed at urban bus drivers – Results from a field trial. *Transport Research Part D: Transport and Environment*, 22, 28-33. <https://doi.org/10.1016/j.trd.2013.02.011>
- [26] Barić, D., Zovak, G., & Periša, M. (2013). Effects of eco-drive education on the reduction of fuel consumption and CO₂ emissions. *Promet – Traffic & Transportation*, 25(3), 265-272. <https://doi.org/10.7307/ptt.v25i3.1260>
- [27] Johansson, H. (1999). Impact of Eco-driving on emissions and fuel consumption: A pre study. *Publication No. 1999:169E*. Swedish Road Administration. Borlänge, Sweden.
- [28] Saboohi, Y. & Farzaneh, H. (2009). Model for developing an eco-driving strategy of a passenger vehicle based on the least fuel consumption. *Applied Energy*, 86(10), 1925-1932. <https://doi.org/10.1016/j.apenergy.2008.12.017>
- [29] Symmons, M. A., Rose, G., & Van Doorn, G. H. (2008). The effectiveness of an ecodrive course for heavy vehicle drivers. *Australasian Road Safety Research, Policing and Education Conference*, Adelaide, South Australia, 87-194.
- [30] Natural Resources Canada. (2009). *Idling Wastes Fuel and Money*, Retrieved June 10, 2018, <http://oee.nrcan.gc.ca/transportation/idling/wastes.cfm?attr=8>.

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