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Article / Book Information

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Title(English)	EFFECTIVENESS OF ECODRIVING PROGRAM ON FUEL ECONOMY IN DEVELOPING COUNTRY REAL-WORLD APPLICATION
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Category(English)	Doctoral Thesis
種別(和文)	論文要旨
Type(English)	Summary

（博士課程）
Doctoral Program

論 文 要 旨
THESIS SUMMARY

専攻： Department of	Built Environment 専攻	申請学位（専攻分野）： Academic Degree Requested	博士 (Eng.) Doctor of
学籍番号： Student ID Number		指導教員（主）： Academic Advisor(main)	Muromachi Yasunori
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要旨（英文 800 語程度）
Thesis Summary (approx.800 English Words)

Because of the depleting reserves of fossil fuels and the concern on global warming and climate change due to increasing CO2 emissions, some developed and developing countries have made future plans for reducing CO2 emissions from transportation. While the introduction of hybrid and electric cars and provision of less carbon-intensive public transportation are common policy measures in these plans, the measures of Ecodriving or Ecodrive, are also suggested because the penetration of new cars takes time and the provision of public transportation might not be so effective in small or medium-sized cities.

In real-world application of Ecodriving, on-road fuel consumption and emission values are influenced by driving patterns which are in turn directly influenced by external factors such as: traffic characteristics, road characteristics, vehicle characteristics, driver's characteristics, trip characteristics and other possible variables. To capture all this factors will require intensive investigation of outcome before and after Ecodriving program. Thus, this study limited itself to investigate the outcome of Ecodriving program based on driver's characteristics and road characteristic. Specially, it focused on the similarities and differences observed from the results of the Ecodriving programs in developing (Manila) and developed (Tokyo) countries.

The general intent of this study was to develop and assess Ecodriving program for developing country application vis-à-vis developed country application in real-world as well as pre-defined test route settings. The general objective of this study was to promote and demonstrate Ecodriving program in developing country settings. To achieve this objective, the study specifically:

- evaluated the vehicle parameters on real-time and real-world driving operation;
- quantified and evaluate drivers' performance and fuel economy; and
- formulated program guidelines for policy recommendations.

First, this study was able to demonstrate that Ecodriving program significantly affected the overall fuel economy during the Ecodriving training day suggesting that drivers could adopt well the Ecodriving techniques in developing country as well as developed country settings. However, the results in terms of the drivers' driving operation (i.e., acceleration, cruising, and deceleration) or modes, the Ecodriving program needed to be improved to further advance the application of Ecodriving program in developing countries. With respect to the driver's psychological aspects, it was found that rough driving influenced the absolute fuel economy in Tokyo at 10% level of significance. If it is possible to know the psychological and non-psychological characteristics of the participants of the Ecodriving program in advance, it might be able to improve the program by incorporating those characteristics. However, significant characteristics of the participants in Manila drivers were not found fully.

Second, this study also focused on the effectiveness of Ecodriving program on the driver's driving style in real-world driving condition. The effect of the Ecodriving program before and after Ecodriving training in the case of the Manila drivers was investigated in relation to fuel economy, fuel consumption, engine speed and speed values during the acceleration, cruising and deceleration modes. The study was able to demonstrate that Ecodriving program significantly affected the outcome of the cruising and deceleration modes of the drivers' driving style in real-world driving operation. However, the starting acceleration mode of the driving operations was not significant.

Moreover, the results of idling-stop and gentle acceleration techniques of the Ecodriving program using both training and real-world data in the case of the Manila as well as Tokyo drivers further revealed that even as there were improvements in real-world driving, the results among some drivers were not significant, and that the relationship between the fuel economy during the Ecodriving training and that in the real-world was not necessarily related. Therefore, the Ecodriving program needed to examine how the guidelines for idling-stop and gentle acceleration could be improved or enhanced to further advance the real-world driving operation in developing as well as developed country applications.

In relation to the relationship between improvements in real-world driving and the characteristics of the drivers in Manila and Tokyo, it was found that female drivers practiced idling-stop better than male drivers, while male drivers practiced gentle start better than the females. Aside from gender, other socio-economic variables were found to affect the adoption of idling-stop and gentle acceleration in real-world driving.

Third, the discussion on the recommended modifications of Ecodriving program in developing country settings was conducted. For cruising and deceleration of Ecodriving program, the inclusion of cruising and deceleration into the program was considered to be reasonable even in developing country settings. The application of gentle acceleration of Ecodriving technique could be included if the drivers were not badly affected by peak hour congestion, and the implementation was eased by newer models with automatic transmission. In relation to the idling-stop technique, while the introduction of the idling-stop guideline needed carefulness, it might be too much to exclude it from the program.

備考 ： 論文要旨は、和文 2000 字と英文 300 語を 1 部ずつ提出するか、もしくは英文 800 語を 2 部提出してください。