

**IDENTIFICATION OF HYDROPLANING RISK AREAS
IN EXPRESSWAYS: A CASE STUDY ON SOUTHERN
EXPRESSWAY, SRI LANKA**

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September2019

DECLARATION OF THE CANDIDATE AND SUPERVISOR

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ABSTRACT

Safety is one of the main functional requirements of expressways which are designed to operate at 100km/h. One of the key considerations in providing safety is ensuring adequate frictional performance especially during wet weather. Hydroplaning is a phenomenon that occurs on wet pavements which poses a serious safety risk to vehicles especially on high speed roadways. Vehicles subjected to hydroplaning are likely to be involved in fatal or grievous accidents. There are several roadways, vehicular and environmental causal factors that contribute to the hydroplaning. A speed at which a vehicle hydroplaning is dependent on its tire pressure, wheel load, tire thread pattern, pavement micro texture and the water film depth generated during the rainfall among several other parameters. For expressways where vehicles generally travel at high speeds controlling development of Water Film Thickness is particularly important. The road alignment and longitudinal cross sectional profile play an important role in affecting water film thickness generated during the rainfall event. Depending on the water film thickness generated on road segment, the hydroplaning risk for a given operational speed, vehicle characteristic will vary. This methodology is applied on the Southern Expressway-Sri Lanka to identify road segments that have higher hydroplaning risk.

Several locations were observed as water stagnating areas and one of them was used in the study. Gallaway formula and Road Research laboratory (RRL) method were used to find the estimated water film thickness and the contour maps of flow depths for different rainfall intensities were developed for the road segment. Based on the water film thickness, contour maps and the hydroplaning speed derived for the water film thickness and hydroplaning risk prone areas were identified.

This will be useful for further study of these areas and to propose possible design or repair mechanisms. Further such a study will be helpful for the design of new expressways covering the whole island in the future.

ACKNOWLEDGEMENT

It is with great pleasure and satisfaction I present this research report for the partial fulfillment of requirements of the Degree of Master of Engineering in Highway and Traffic Engineering in Faculty of Engineering, University of Moratuwa.

I first wish to thank the Transport Engineering Division of Department of Civil Engineering, Faculty of Engineering, University of Moratuwa for selecting me to follow this master's course of highway and traffic engineering.

I do thank Road Development Authority my employer for the sponsorship I received to follow this course as well as for releasing me to study for this degree on part time basis.

My heartfelt gratitude goes to Dr.H.R.Pasindu for his kind guidance, valuable comments and continuous support throughout this research. The knowledge I had from him apart this research work but in the lecture room level was also invaluable and greatly helped me to be shaped into an academically sound Engineer in my work place.

Next I wish to thank to Eng.D.Ganesan, former Director for Highway Designs Division of RDA and Mrs.R.A.S.K.Kaluarachchi, Director for Highway Designs Division for the enormous contribution of making the necessary provisions for this study.

Next I do thank my colleagues in the lecture room and the work place for their invaluable assistance in following this course.

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LIST OF ABBREVIATIONS

Abbreviation	Description
RRL	Road Research Laboratory
NASSRA	National Association of Australian State Road Authorities
AASHTO	American Association of State and Highway Transportation Officials
WFD	Water Film Depth
WFT	Water Film Thickness
RDA	Road Development Authority
VMS	Variable Message Sign
ER	Exceedance Ratio
MTD	Mean Texture Depth