

**FEASIBILITY STUDY OF USE OF BOTTOM ASH,
BY PRODUCT OF NOROCHCHOLI COAL POWER
PLANT IN HOT MIX ASPHALT CONCRETE IN
SRI LANKA**

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Department of Civil Engineering

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Thesis/Dissertation submitted in partial fulfilment of the requirements for the degree
Master of Engineering

Department of Civil Engineering

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Abstract

A review of recent research on bottom ash seems to indicate it has the capability to improve asphalt pavement performance when used to replace a portion of the aggregate in asphalt mixes. Bottom ash can be used as an aggregate replacement, providing a substantial savings to both highway agencies and utility companies. Bottom ash has been used as fine aggregates in asphalt paving mixtures since the early 1970's. The American Coal Ash Association reported that, over 17,200 metric tons of bottom ash was used in asphalt paving during 2006.

The research is focused on investigation of properties of bottom ash, which is the byproduct of Norochcholai coal power plant and feasibility study of use of bottom ash in hot mix asphalt concrete in Sri Lankan roads. According to the results obtained, the best mixtures are produced by blending bottom ash with well-graded, angular, rough-textured aggregate and limiting the percentage of bottom ash to 25% for wearing and 16% for binder course. Marshall Stability and flow values have been found to decrease as the percentage of Wet bottom ash is increased in the mixture.

Further, high percentage of bottom ash replacement increases optimum bitumen content, which mainly affects to high production cost. Although the cost per 1 Mt of bottom ash blended mix is higher than the conventional mix for both surface courses, its low density increases overlay area. Because of that the cost per 1 m² is lower than the conventional mix. The successful use of bottom ash in asphalt pavements in Sri Lanka would provide not only significant economic savings but also an environmental friendly solution for a waste material.



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LIST OF ABBREVIATIONS

Abbreviation Description

AASHTO	American Association of State Highway and Transportation Officials
AIV	Aggregate Impact Value
ASTM	American Society for Testing and Materials
BC	Binder Course
FGD	Flue Gas Desulfurization
FI	Flakiness Index
HMA	Hot Mix Asphalt
HSR	Highway Rate of Schedule
LAAB	Los Angeles Abrasion Value
SCR	Selective Catalytic Reduction
SSCM	Standard Specifications of Construction Materials
USA	United State of America
VIM	Voids in Mixture
VMA	Voids in Mineral Aggregates
WC	Wearing Course



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