

**IMPROVING PROPERTIES OF CEMENT BASED SKIM  
COAT THROUGH CONTROLLING WATER  
ABSORPTION USING A VINYL ACETATE-ETHYLENE  
COPOLYMER**

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Degree of Master of Science

Department of Chemical and Process Engineering

University of Moratuwa

Sri Lanka

February 2020

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This thesis submitted in partial fulfillment of the requirements for the  
degree Master of Science in Polymer Technology

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## DECLARATION

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Signature of the co-supervisor: Date:

## ABSTRACT

### **Improving properties of cement-based skim coat through controlling water absorption using a Vinyl Acetate-Ethylene copolymer**

This study aims to describe and complement the existing knowledge on the effect of re-dispersible polymer powder (RDP) on water absorption (capillary and surface), application and mechanical properties of cement-based skim coat. The skim coat is a mixture of cement (binder), dolomite powder (filler), cellulose thickener (water retention agent) and re-dispersible polymer powder as a performance-enhancing additive. In this study, commercially available white cement with CEM 42.5 N strength class, Methyl Hydroxyl Ethyl Cellulose (MHEC), Vinyl acetate-ethylene copolymer (RDP) and locally available dolomite powder with particle size below 150 microns have been used. The dosage of RDP was changed from 0% to 2.5 % by the total weight of the formulations.

Furthermore, to evaluate the effect of MHEC on the application and final properties of the cement-based skim coat, the MHEC amount was changed from 0 % to 0.4% by the total weight of the formulation. Three white cement-based skim coat products from the market were used to compare the effect of the RDP addition.

Water to skim coat mixing ratio was kept constant at 35:100 throughout the experiment. It was found that RDP improved the mechanical properties of the dried skim coat and application properties of the fresh skim coat paste. Adhesive strength and flexural strength were increased with RDP dosage while compressive strength had an optimum RDP level between 1%-1.5%. Open time and setting times were positively affected by RDP dosage and optimum flow properties were achieved at 1.5% of RDP. Both capillary and surface water absorption were reduced with the addition of RDP and reached the lowest at 1.5 % wt. All the application and final performance of the skim coat were improved from 0% to 0.4% with the addition of MHEC.

**Keywords** – *Skim coat, Cellulose thickener, Re-dispersible polymer powder.*

**DEDICATION**

To

*MY FAMILY MEMBERS*

THIS BOOK

Is

**AFFECTIONATELY DEDICATED**

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## **List of Abbreviations**

ASTM	American Society for Testing and Materials
RDP	Re-dispersible polymer
HPMC	Hydroxy Propyl Methyl Cellulose
MHEC	Methyl Hydroxy Ethyl Cellulose
CE	Cellulose Ether
BS	British Standard
WOPC	White Ordinary Portland Cement
XRF	X-ray fluorescence
UV-VIS	Ultraviolet and visible absorption
Sqft	square foot