

**APPLICATION OF WATER REPELLENT CONCRETE
INFRASTRUCTURE**

By

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This report is submitted as a
Partial requirement for the degree of
Bachelor of Engineering (Hons) Civil (Infrastructure)

UNIVERSITI TEKNOLOGI MARA

JANUARY 2018

DECLARATION BY THE CANDIDATE

I declare that the work in this thesis was carried out accordance with the regulation of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledge as referenced work. This topic has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulation for Under Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Flood affected the strength of structure and infrastructure of the building. It is due to that concrete is a porous material which water can easily penetrate into the concrete causing the decrement of durability of the concrete. It is a need to improve concrete to repel water. The modified silanes/siloxanes (SP50) react as protective agent is needed for water repellent for concrete added to fresh concrete during its production process as an integral water repellent. The aim of this study is to determine the physical performance of the concrete mix with the SP50 as a water repellent agent. SP50 is added to other concrete mixed until a homogenous formulation is obtained. The physical properties of SP50 are in white powder and inorganic. The concrete cube were prepared by using 100mm X 100mm X 100mm dimension and about 32 cubes prepared for the physical test. Visual test, capillary test, rebound hammer test, Ultrasonic Pulse velocity (UPV) test, cube compression test and water penetration test have been carried out. In this study, the result for visual test is not available for SP50 mixed. A better capillary test result shown in SP50 mixed than the control samples. The rate of water absorption in control samples were higher compared with the SP50 mix which is 1.36% and 0.67% respectively. For rebound hammer test, the results show that the compressive strength for SP50 mixed is higher compared with the control samples. The result of SP50 mixed are 30.33 N/mm² and 30 N/mm² for the control samples. There is no reduction in strength for the SP50 mixed concrete cube. In UPV test, average velocity for the SP50 mix is higher with the control samples which is 3.83 Km/s and 3.79 Km/s respectively. SP50 mixed were categorized as good grading concrete and it had been observed that UPV is not influent by the SP50 mixed samples. For the destructive test of cube compression and water penetration, both of the result produced a better result compared with the control samples. The average strength for the 28th day for SP50 mixed and control samples are 34.82 N/mm² and 33.97 N/mm² respectively. The percentage of concrete strength between SP50 mixed and control samples is 16.07% and 13.23% respectively higher from the target concrete strength which is 30 N/mm². It had been observed that the result of SP50 mixed did not affected the concrete strength of the cube. Water penetration result in SP50 mixed is lower compared with the control samples which is 3.5 cm and 4.5 cm respectively. SP50 mixed improved the ability of concrete to repel water. This can be concluded that SP50 mixed is suitable for water repellent for concrete.

ACKNOWLEDGEMENT

Firstly, I would like to say Alhamdulillah and all praises to Allah for the strength and blessing in completing my final year project in this semester. A special appreciation goes to my supervisor, associates Prof Madya Ir. Dr. Yee Hooi Min for her supervision and support. I also very thankful to them for all her positive attitude that she have showed to my work and always allowing me to question them and giving prompt replies for my uncertainties in all the fields including theories, laboratory work and others. She also have given invaluable help of constructive comment and suggestion for my final year project.

Next, I would like to express my appreciation to Universiti Teknologi MARA (UiTM) and all lecturers of Faculty of Civil Engineering for their co-operation and their sincere guidance I received and also giving me this opportunity to completing my final year project. I also express my special thanks to Mr. Habibullah Mahmud, technician of structure laboratory who has been helped a lot during my laboratory work and for spending his valuable time with all students in completing the work.

Lastly, I would like to give my appreciation to my family who always given me support and love from the beginning of this final year project until the ending and thanks to my partner friends were fully gave me full support directly or indirectly contribute to my final year project including all UiTM Civil Engineering student for co-operation and guiding for my study.

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