



**RAINWATER HARVESTING POTENTIAL
OF BUILT ENVIRONMENTS
WITH DISASTER RESISTANT FEATURES**

BY

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SUPERVISED

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THESIS SUBMITTED TO THE DEPARTMENT OF CIVIL ENGINEERING
IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR
THE DEGREE OF MASTER OF ENGINEERING IN
STRUCTURAL ENGINEERING DESIGN

DEPARTMENT OF CIVIL ENGINEERING
UNIVERSITY OF MORATUWA
SRI LANKA

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Abstract

Large scale and medium scale housing projects are actively promoted by investors in many part of Sri Lanka due to the high demand for good quality housing in well planned neighbourhoods. These housing projects will be located at a radius of 15 km from the main urban centers due to lack of large buildable land.

One of the constraints for such projects is the provision of adequate water supply. One solution is the provision of deep tube wells with treatment plants when the National Water Supply & Drainage Board (N W S & D B) supply is not available. The impact of pumping water from deep strata can be minimized by supplementing at least part of the non - portable water demand by rain water harvesting.

The use of rain water as a supplement to pipe borne water to full fill non-portable water demand will be an attractive for the water problem in Colombo metropolitan area.

A typical house in a housing scheme can be either single storey or two storey. Recent surveys have found that majority of the Sri Lankans prefer to live in two story houses. They also provide an ideal opportunity for rainwater harvesting by using the rainwater tank located at first floor level. This water can be easily used for flushing the toilet located at the ground floor level, gardening and even to have a bath with chlorine free water.

This will need structural solution for mounting the tank and rainwater harvesting solutions that can provide water while assuring that these tank supported system will not be damaged during a natural disaster such as an earthquake. It is also useful to ensure that the rainwater is in par with the quality supplied from tube wells or N W S & D B supply. The structural solutions required are developed so that it would be adopted from the building planning stage.



This research explains the structural aspects that could be coupled with rainwater harvesting system, so that they could be included in houses planned with disaster resistant features. Since the capacity of the tank is of significant importance, detailed studies have been carried out under this research to determine the optimum tank capacities for various climatic zones of Sri Lanka. The structural solution were coupled with these tank capacities to come up with alternative solution for mounting the tanks. The cost effectiveness of rainwater harvesting in long run with current tariff of NWS&DB is also presented.

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UNIVERSITY OF MORATUWA
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DECLARATION

I, Ajith Krisantha Kapuruge, hereby declare that the contents of this thesis is the output of the original research work carried out at the Department of Civil Engineering, University of Moratuwa. Whenever others' work is included in this thesis, it is appropriately acknowledged as a reference.



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ABSTRACT

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