

**UTILIZATION OF FLUSHING YIELD
TO DETERMINE HYDRAULIC PARAMETERS
OF HARD ROCK AQUIFERS**

A PROJECT REPORT PRESENTED BY

A.M.A.I.K.ADIKARI

to the Board of Study in Earth Sciences of the
POSTGRADUATE INSTITUTE OF SCIENCE

*in partial fulfillment of the requirement
for the award of degree of*

**MASTER OF SCIENCE IN ENGINEERING GEOLOGY
AND HYDROGEOLOGY**

of the

UNIVERSITY OF PERADENIYA

SRI LANKA

2004

590974

C
550
ADU

UTILIZATION OF FLUSHING YIELD TO DETERMINE HYDRAULIC PARAMETERS OF HARDROCK AQUIFERS

A.M.A.I.K.Adikari

Postgraduate Institute of Science

University of Peradeniya

Peradeniya

Sri Lanka

Abstract.

Extraction of ground water through deep tube wells has been vastly increased during last few decades in Sri Lanka, especially in the dry zone. There are about 25000 deep tube wells all over the island. The majority of the tube wells are fitted with hand pumps, and about ten percent with submersible pumps. The wells with submersible pumps are used in community water supply schemes and as industrial water supply wells. The Anuradhapura district, which is in the dry zone, has about 3000 hand pump fitted tube wells and about 200 wells fitted with submersible pumps. Although a large numbers of boreholes exist, the available information on the hydraulic properties such as Transmissivity, Storage coefficient and Specific capacity is very limited. This is mainly because of the fact that the collection of hydraulic data is not an official or legal requirement in most drilling or ground water development programmes. The drilling technique used in the hard rock area is down the hole hammer method. In this method the development of the drilled well and subsequent yield measurements are done in one operation by air flushing, This method does not allow for water level measurements during flushing. Therefore, the only available information on the aquifer performance after drilling is flushing yield.

The assessment of groundwater resources is very essential in future development activities, especially to maintain development activities in environmental friendly atmosphere. Therefore, developing a low cost method of assessing hydraulic parameters using flushing yield was tried under the present study.

Seventy-two boreholes were selected representing different hydrogeological settings and covering a broad range of flushing yields. The transmissivity of the aquifer and the specific capacity of the well were calculated using the results of constant discharge pumping tests, carried out in the boreholes.

For utilizing the flushing yield in aquifer evaluation, the relationship and correlation between transmissivity and specific capacity against flushing yield was tested. The three parameters were plotted against each other on double logarithmic graphs and it was noticed that all three parameters display a fair degree of correlation with each other.

The consistent correlation of flushing yield with both transmissivity and specific capacity revealed that this could be used to make an initial estimate of transmissivity and specific capacity from the readily available flushing yields in any water supply boreholes.

The correlation model generated by the results from the Anuradhapura district was tested with the available flushing yield, transmissivity and specific capacity data from Polonnaruwa district. A good match was obtained indicating that the model can be used for obtaining Transmissivity and Specific Capacity values from the available flushing yield data of boreholes in the hard rock aquifers elsewhere.