IMPROVEMENT OF SECONDARY PERMEABILITY IN HARD ROCKS USING HYDRO FRACTURING TECHNIQUES A CASE STUDY FROM HARD ROCK TERRAIN OF SRI LANKA

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IMPROVEMENT OF SECONDARY PERMEABILITY IN HARD ROCK AQUIFERS USING HYDROFRACTURING TECHNIQUES: A CASE STUDY FROM SRI LANKA

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Ninety percent of the Island of Sri Lanka land mass consists of crystalline hard rocks. The scarcity of surface water resources, especially in dry zone areas tends to extract groundwater from hard rocks for domestic and industrial purposes. Over 20000 wells have been constructed in hard rock for domestic purposes over the last few decades. Twenty percent of these constructions have failed according to the drilling records. Majority of the failures have been as identified due to the result of low permeability in hard rocks. Annually lost due to encountering dry and unsuccessful wells in the island is very high. Hydrofracturing technique is an environmentally friendly and more economical hard rock permeability developing method which it has not been successfully experimented in Sri Lanka, other than methods of horizontal drilling and blasting etc.

The present study is an attempt to the secondary permeability improvement in hard rock aquifers through yield improvement of boreholes by the hydro fracturing technique. Sixteen boreholes were selected for applying hydrofracturing technique where only ten percent of them had indicated higher yields grater than 3to5 l/min before hydro fracturing. This percentage increased up to sixty-five after applying hydrofracturing technique. Present study has evaluated the capability of applying hydrofracturing technique for successful implementation of groundwater supply schemes in the hard rocks of Sri Lanka. The study also reveals that there is a possibility of constructing successful wells closer to locations of high demand (e.g. human settlements, public institutions etc.) even though when local fracture patterns and permeability in the hard rock formations are not well developed.