INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study	:	Ph.D.
Thesis Title:		Determination of Near Surface Hydraulic Conductivity from Infiltration Measurements
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Thesis Submitted to the Department/ Center	:	Civil Engineering
Date of completion of Thesis Viva-Voce Exam	:	20/1/2020
Key words for description of Thesis Work	:	Infiltration, field measurement, laboratory measurement, mini disc infiltrometer, tension infiltrometer, double ring infiltrometer, permeameter, hydraulic conductivity, spatial interpolation, infiltration equations

SHORT ABSTRACT

Infiltration characterize the water entry into the soil during rainfall and irrigation. It is an important parameter for the hydrological modelling of catchment. There are different methodologies adopted in the field that can induce variability in infiltration characterization. Such variabilities and the possible factors need to be studied in detail. There is a need for critical assessment of measurement variability associated with infiltrometer measurements under different field conditions, soil type and mathematical formulations. Not many studies exist in the literature that investigates the role of soil and infiltrometer related parameters on disc infiltrometer measurements. This is specifically true for the soil and field specific conditions of Indian subcontinent. There are no clear appraisals or there are contrasting findings in the literature on the variability induced in hydraulic characterization based on infiltrometer measurements. This research work deals with laboratory and field evaluation of disc infiltrometer for gaining more confidence in field infiltration measurements. To gain more confidence in portable and simple mini disc infiltrometer (MDI), the measurements were compared with the results of conventional infiltrometer and permeameters. The utility of disc infiltrometer for determining spatial and temporal variation of infiltration characteristics in the field were demonstrated. The influence of short-term and long-term MDI measurements on hydraulic characterization was investigated. The influence of initial soil compaction state on infiltration characteristics was studied to check the possibility of a correlation between soil specific parameters and infiltration. The moisture and pressure head variation that happens in the subsurface during infiltration beneath MDI was studied using controlled laboratory column set up. Based on the results from this study, the appropriateness of different infiltration equations for defining hydraulic characteristics based on MDI measurements were evaluated.