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In-house development of neutron moisture gauge for field measurement

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The measurement of moisture content in soil is based on the principle of neutron back scattering. In this principle, when fast neutrons emitted from a radioactive source collide with hydrogen atoms their energies are much greater reduced than colliding with other atoms. The number of slowed down neutrons, hence, represents the number of hydrogen atoms present in the vicinity of the source. As water is the main contributor of hydrogen atoms in a soil medium, the moisture content in soil, therefore, can be measured based on this principle. An in-house developed probe containing a source of fast neutrons and a slow neutron detector was inserted into soil at different depths under the ground level. The probe was made of high density polyethylene and connected to a suitably calibrated detection system by a single cable. The moisture content was determined from the slow neutron count rate. The results of field measurement tests were reported and discussed.

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