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Determination of the Hydraulic Conductivity of Aquifer by Geoprobe System

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To evaluate the permeability of coastal aquifer in the seawater (saltwater) intrusion area, pneumatic slug tests were implemented with Geoprobe system at different plane position, layered slug test were also carried out at several test sites. The aquifer type, test well structure, and property of water level recovery should be analyzed simultaneously to choose a reasonable slug test solution model, and generate useful type curves for matching normalized water level recovery curves. The KGS model and Butler model derived with the flow theory of partially penetrating well were used to analyze the overdamped oscillation and underdamped oscillation water level recovery curves of field slug tests respectively, and the hydraulic conductivity parameters of aquifer were determined. While the test target aquifer is confined aquifer, the good calculation results can be obtained by analyzing the overdamped oscillation with the KGS model, and analyzing the underdamped oscillation slug tests with the Butler model. While the test target aquifer is aquitard, the Butler model is not applicable, but the KGS model can be used to analyze the overdamped oscillation slug tests. The calculation results will be disturbed by the existence of adjacent aquifer with high hydraulic conductivity and accuracy of borehole logging.