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# Pore water pressure in slopes composed of multi-layer geological structure

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Increasing in pore water pressure in the slopes during heavy rainfall events is considered as an important factor induceing landslides. Sliding surface of many of these landslides locates on the boundary between different rock/soil strata. We need to know spatial distribution of the pore water pressure in slopes composed of multi-layer geological structure in order to explain occurrence mechanism of these landslides. Many of prior studies generally analyzed slope stability under condition that the pore water pressure is same as the hydrostatic pressure. These studies ignored influence of depth profile of hydraulic parameters on magnitude of the pore water pressure. We, therefore, tried to understand spatial distribution of the pore water pressure on the basis of the continuity equation and equation of motion for seepage flow in two-dimensional slopes with multi-layer soil structure. Our study clarified that the water velocity as well as the depth profile of the pore water pressure are affected by depth profile of the hydraulic conductivity in the saturated zone. Pore water pressure agrees with hydrostatic pressure in case that the saturated zone develops on the impermeable soil layer. Meanwhile, pore water pressure is smaller than hydrostatic pressure in case that bottom of the saturated zone contacts with unsaturated zone. In this case, magnitude of the pore water pressure depends on the difference in the hydraulic conductivity between upper and lower layers. In addition, pore water pressure is highest at a layer boundary. Our analysis results agree with the general landslide characteristic that the sliding surface locates on a layer boundary.

Keywords: landslide, pore water pressure, multi-layer soil structure, seepage flow