

Young Members Column

Determination of Peat Thickness in North Ayer Hitam State Forest Reserve, Muar, Johor by Using Non-Destructive Testing (NDT) for mitigation of peatland forest fire

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I'm Muhamad Firdaurs bin Abdullah, a PhD student of Faculty of Civil Engineering and Built Environment, Universiti Tun Hussein Onn Malaysia (UTHM). I have completed my Master's degree in Civil Engineering from UTHM back in 2017. As a graduate student researcher, the author worked under Dr. Nor Azizi Yusoff on a variety of research assignments. I was involved in research projects headed by Dr. Azizi such as green roof thermal performance, soil-roots reinforcement, vertical garden, compact soil extruder, silent piling technology and visiting many geotechnical project sites. Throughout my graduated study, the author has co-authored five papers in areas of Soil Bio- and Eco-engineering.

Currently, I am working on the project for water sustainability for peatland in North Ayer Hitam State Forest Reserve Muar, Johor, Malaysia. This project is funded by National Conservation Trust Fund for Natural Resources (NCTF), under the Ministry of Natural Resources and Environmental Sustainability. Malaysia contains about 3 million hectares peatland which cover 8% of its total land. The depth of peat varies depending on the area. It helps to maintain water levels, acts as a flood control and water supply system for communities as well as downstream ecosystem. The study is aimed to determine the thickness of peat in Ayer Hitam Utara Forest Reserve, Muar, Johor by using a Non-Destructive Testing (NDT). The survey data on peat thickness was collected at 10 sites located inside the forest. The resistivity data consisted of six-line wenner-schlumberger short arrays and were recorded in-situ using SAS 4000 ABEM Lund Imaging System, together with a relay switching unit (Electrode Selector ES 10-64), two multiconductor cables, steel rod electrodes and jumpers. The data, namely electrode spacing, depth of investigation, sub-surface resistivity, type of material and horizontal data coverage was used to assess the thickness of peat. The recorded data were then processed using RES2DINV software to obtain 2-D inversion model of the sub-surface. The data were also equipped with ten models of inverse resistivity section for all sites showed a varies thickness of peat in range between 5 to 15 m. The data obtained can be used by the government and stakeholders for peatland fire prevention program to mitigate haze in Malaysia and conservation of Ayer Hitam Utara reserve forest. The application of silent piling technology might be useful in order to sustain the water balance of the forest reserve by retaining huge amount of water from leaving the forest at fast rate. Thus, the prevention of peatland forest fire can be made more effectively.



Fig. 1. Resistivity line survey conducted of few locations inside North Ayer Hitam State Forest Reserve, Muar, Johor

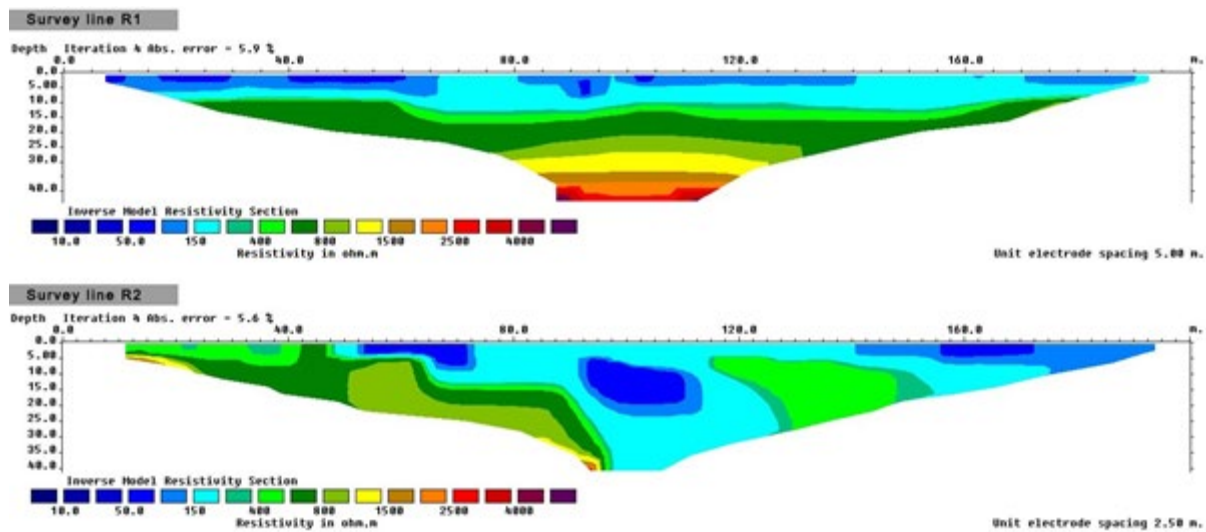


Fig. 2. Output image processed using RES2DINV software to obtain 2-D inversion model of the sub-surface of peatland



Fig. 3. An expedition by UTHM team to assess depth of peat in the forest (left) and the peat sampling made using a peat sampler during the expedition (right)