Physical-Mechanical Characteristics of Limestone and Underground Rivers Mapping to Support the Development of Micro-Hydro Installation in Karst Land Forms Case Study: Cave Seropan, Gunung Kidul, Indonesia

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SUMMARY

Water is a basic requirement for human life, such as eating, drinking and other needs. At the area composed of limestone, especially in karst areas, water availability measly that is insufficient for the needs of everyday life. In karst areas, the conditions on the surface are generally very barren and dry, especially during the dry season. But nevertheless, under the surface actually stored plenty of water. Availability of subsurface water can even be a river flowing along the underground cave. Gunung Kidul region is a karst area. This region has the potential of water resources a lot so it is possible to be used by the surrounding community. Currently, developed a way to raise underground river water that effectively and efficiently so that community can get water easily and cheaply. One way to do is making of subsurface dam in the cave. Underground river need to be dammed to take advantage of the kinetic energy of water to drive a turbine of micro hydro power plant in the cave. The electricity generated is then used to pump water from underground rivers rise to the top in order to be used for the needs of everyday life and to agriculture. For the construction of the installation, it is necessary to know the physical-mechanical characteristics of the rock which is planned to be footstool for micro-hydro installations. Various research methods used to determine the characteristics of the rock, whether in the studio or in the field. One of them uses resistivity geoelectrical method. Measurement of resistivity at surface of the Cave Seropan conducted on four extensions. Qualitative and quantitative approach applied to obtain near-perfect results. The results showed that the resistivity of rock under the surface that is above the Seropan Cave vary greatly. Generally, subsurface conditions at the top of the cave not solid and massive, but there are cavities. The phenomena are caused by the the dissolution process that occurs in limestone. These conditions resulted in physical and mechanical properties of limestone is very heterogeneous. Resistivity value for each cavity also varies. If the cavity is filled with water, then a small resistivity values. So that happened in the Cave Seropan. If there is an underground river, the small resistivity value, otherwise if conditions dry cave so large resistivity values. Cavities are at varying depths, with a

distribution of about 10% to 15%. Schlumberger configuration geoelectrical method can be relied on to determine the existence of an underground cavity and mapping of underground river.