Discovering Dam Crack Detection Equipment, Didiek Djarwadi Gained Doctoral Degree

Wednesday, 25 August 2010 WIB, By: Marwati

JOGJAKARTA (KU) - Geo-technical consultant, civil engineering graduate of Universitas Gadjah Mada, Ir. Didiek Djarwadi, MT, succeeded to gain doctoral degree after finding a special instrument to detect the hydraulic fracture in rock filled dams. This tool was deliberately designed to assist his research process in observing rate of cracks in six rock filled dams in Indonesia. Those dams were Batutegi in Lampung, Sermo in Yogyakarta, Kedungombo in Central Java, Wonorejo in East Java, Batu Bulan and Pelaparado in West South East Nusa.

"I made this tool for my research. Now I gave it to the Soil Mechanics Laboratory of Engineering Faculty. The new tool was firstly made in Indonesia," said Didiek after conducting doctoral promotion exam at the Faculty of Engineering UGM, Saturday (2/8).

The man born in Ambarawa, Central Java, December 24, 1954, said that the detector was in the form of cylinder with a hole in the middle (hollow cylinder), being tested on a test tool measuring 120 mm high, outer diameter 104 mm, while the diameter of the hole in the middle is 18 mm.

From the performance of the tool, it is known that the six dams did not experience hydraulic fractures. But he worried if the dam is elevated, cracking and collapsing will possibly happen. This is related to the main embankment material and design of dams. "The current trend is the dam is elevated to collect water as much as possible for electricity, the higher the water pressure the higher the risk of hydraulic fracture," he said.

According to the 1259th of UGM doctoral graduate, almost all types of existing dams in Indonesia are rock filled dams built by heaping soil and rock. The height and configuration are factors that influence the possibility of hydraulic fracture. Embankment material that is compacted on the wet side is more resistant to hydraulic fracture and reduces the possibility of hydraulic fracture. "Materials with fine grains over 60% did not experience hydraulic fracture. Material with less than 60% fine grains experienced a hydraulic fracture," said the dam expert.

The father of two children delivered that there is no ideal value for the height of the dam, because the dam is made based on the characteristics of the river and the ability of an area to retain water. However, making higher dam than the original size causes cracking and collapsing of the dam. He

mentioned several large dams that have collapsed such as the Teton Dam and Yard Creek in the United States, and Balderhead in England. Meanwhile, Hyttejuvet and Vidalsvatn dams in Norway experienced a large leak because of the same case, but they can be saved.

In the doctoral promotion exam, acting as promoter was Prof. Dr. Ir. Kabul Basah Suryolelono, Dip. HE., DEA., Co-promoters were Prof. Ir. Bambang Suhendro, M.Sc., Ph.D., and Dr. Ir. Hary Christady Hardiyatmo, M. Eng., DEA. Meanwhile, the examiners team included Prof. Ir. Suryo Hapsoro, Ph.D., Prof. Ir. Mansyhur Irsyam Adi, M.Sc., PhD., Dr. Ir. Ahmad Rifa'i, MT, Dr. Ir. I. Wayan Warmada, and Ir. Agus Darmawan, M.Sc., Ph.D.

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