

Micro-Hydropower Generating System for Lao People’s Democratic Republic

In Southeast Asian countries, demand for electric power is rapidly inflating year by year and construction of thermal and hydro power stations is constantly promoted. Under such circumstances, Meiden Group delivered last year a set of micro-hydropower generating systems to Lao People’s Democratic Republic where abundance of water resources is available.

In October 1958, the Government of Japan commenced Overseas Development Aid (ODA) for Laos. In 1991 and thereafter, Japan has been the world-first donor country for this country in terms of bilateral assistance. The micro-hydropower station being constructed for this project is based on the ODA program. This power station is indispensable for the development of Lao economy and society and considered to contribute to the expansion of power supply.

The construction site is situated in Phongsali near the borderline with China. The electrification rate in this area is about 23% (as of June 2012) and this figure is the lowest of 17 areas in Laos. Consequently, people in this area are buying expensive electricity from China and the suppression of electricity purchase rate has been challenges for this country.

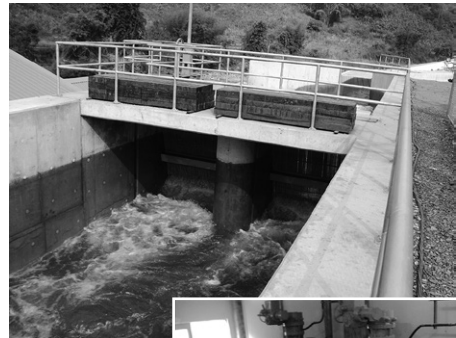
The micro-hydropower station titled above was constructed as a solution to this subject. (The support fund from the Government of Japan: 1,775,000,000 yen) The project was carried on for 16 months, from November 2013 to February 2015.

Meiden Group delivered complete installations of electrical facilities including micro-hydropower generating systems. The delivered equipment consists mainly of three units of underwater turbine generators, each being a combination of Meiden Permanent Magnet Generator (PMG) and an underwater turbine that is a featured product of EAML Engineering, Ltd., plant monitoring equipment, and a 22kV substation facility used to transmit the generated electricity to the utility system.

At this micro-hydropower station, the effective head is 8.8 meters, the required water volume for three units in full operation is 7.02m³/s (2.34m³/s per unit), and the maximum output is 450kW at that time. The number of machines

in operation is controlled according to changes in water flow.

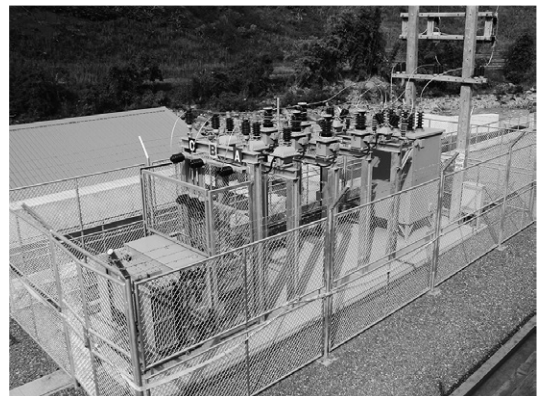
Since the underwater turbine is directly coupled with the PMG to establish a speed control system (a system to enable constant speed control at any turbine speed) where a converter system is applied to micro-hydropower generation, it is possible to attain optimal water turbine performance at the specified speed, compared with conventional constant speed control system that works in compliance with power frequency. This expertise results in the improvement of generation output. The completion ceremony was held on February 27, 2015, and the power station is currently running fine.



Upper Water Tank



Underwater Turbine Generator (Applied PMG)



Outdoor Substation