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Paper Title	Power System Analysis of Fujian Grid with Analog Simulator
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ABSTRACT

In Nov 2001, as one of the great interconnection projects in China, Fujian power grid was interconnected with Huadong Power Grid through the newly constructed 500kV interconnection line for the first time. This project is still progressing until the accomplishment of second interconnection line at the end of 2002. The new interconnection will contribute not only to economic power trading but also to improvement of the frequency stability in Fujian network.

On the other hand, new issues concerning system stability emerged. Large-scale thermal power plants were built contemporaneously at the southern extremity of Fujian network. Its power that flows to Huadong Power Grid along the long-distance transmission lines makes the system characteristics severe against transient system stability, frequency stability and overloading in case of contingencies. Therefore new System Preservation Scheme (SPS) that prevents system collapse by generator and/or load shedding was installed contemporaneously.

Thus Fujian Power Grid and its characteristics changed dramatically. Consequently Chubu Electric Power Company (CEPCO) carried out power system analysis of Fujian grid with analog simulator in collaboration with Fujian Electric Power Company and the manufacturer of SPS. Analog simulator owned by CEPCO was installed in 1993, and consists of several electric models that work with voltage rating of 50V and current rating of 0.0625-0.25A. Fujian power grid after the accomplishment of interconnection project was simulated with the models of 29 generators, 73 transmission lines, 33 transformers and 34 loads.

In the power system analysis, two patterns of power flow condition supposed to be severe against the system stability were simulated. Fault type considered on this simulation consists of 4 patterns, single-phase fault with successful re-closing, single-phase fault with unsuccessful re-closing, two-phase fault and three-phase fault. Fault location was simulated for 5 points of 500kV transmission lines and 2 points of 500kV buses. Consequently, 50 contingencies were simulated on analog simulator.

Through the system analysis with analog simulator, following results are confirmed.

- Analog simulation results show nearly equivalent to the computer simulation results using the program developed by china EPRI.

- The capacity of Fujian-Huadong Interconnection line is restricted by the system stability.
- System Preservation Scheme installed in Fujian grid contributes to expand the capacity of Fujian-Huadong Interconnection line.
- In case out of step happens, Fujian power grid behaves itself like one grouped generator against Huadong power grid, and this phenomenon can be sensed by the P-Q relay installed newly at the interconnection line.

Key Words: System stability, Analog simulator, Interconnection
System preservation scheme,