

Consultant's Corner: Load Bank Testing

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New load banks improve gen set installation testing

New load bank technology allows off-line gen set installation tests to more closely emulate characteristics of the intended load. This helps verify proper operation of the entire system - from fuel line through transfer switch - before connecting to the main distribution bus. Consulting engineers can now specify tests that include reactive loads, computer-controlled load sequencing and online data recording.

Basic tests

While brine tanks and older heater-socket-style load banks are perfectly capable of basic gen set installation testing, newer models offer more precise control. Older load banks are usually limited to resistive load tests in the 100 kW to 750 kW range. Now load banks are being built to handle any voltage at power levels up to several megawatts. Special reactive load banks test kVA load effects of low power factor loads on generator current and voltage capabilities.

Brine tanks can be used to test any installation, but load control is never precise. Block loads cannot be dropped on a cold-started engine to closely simulate start-up load acceptance. Rather, the gen set is gradually brought up to the specified load, briefly disconnected at the generator circuit breaker and then reconnected. Reactive loads cannot be simulated.

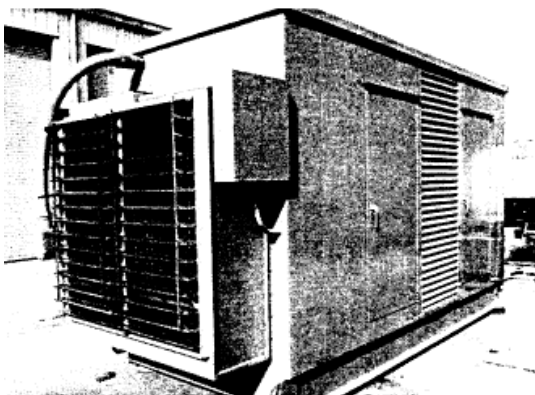
Of course, the advantage of relatively basic installation tests is cost. Many installations don't need more elaborate, expensive testing. Basic load banks are perfectly capable of testing kW, voltage, frequency and current capacity. In some cases it might be sufficient to simply ensure that the gen set will start up and accept a specified load. A variety of other client concerns, such as transient response, noise, vibration and fuel-use rates can be reviewed during the test.

Precision tests

For some large, sophisticated or critical installations, the added cost of new testing technology is dwarfed by the consequences of a system that doesn't operate as designed. Reactive load banks and programmable, computer-controlled load banks let you specify tests that will mimic real-life operating conditions. Some units can continuously record power quality and other factors to provide baseline operation data.

The best test simulates the intended load. There's little point in proving that a gen set can handle a 100 percent block load or run continuously for 24 hours unless these are characteristics of the anticipated load. While some government and military specifications require 18- to 24- hour duration tests, eight-hour tests are sufficient for most standby installations. Large installations with multiple transfer switches should be step-loaded to accurately reflect system demands and ensure proper transfer switch sequencing.

Installations with critical large motor loads might warrant a reactive load test. These are done by paralleling new reactive load banks with the primary resistive load bank. Power factor meters monitor and control the percentage of reactive load, to give a much more accurate test for distribution systems with high-kVA/low-power-factor loads.



This standby gen set for sewer pump back-up has a load bank built into its enclosure. The gen set fan cools both the radiator and the load bank. Load testing doesn't interfere with the on-site electrical system.

Computer-controlled duration tests may be appropriate for a critically sophisticated installation with multiple gen sets and/or distribution systems. In these tests, the computer can be programmed to do everything from starting the gen set to testing operation under a variety of system failure conditions. The computer activates relays to add specified loads at appropriate intervals for precise step-loading.

The ultimate computer-controlled test includes continuous print-outs for careful review after the test. This gives engineers unable to witness the test an opportunity to confirm that the installation performs as specified.