For business continuity, prompt resolution of a fault and its correction are vitally important. But fault tolerance is far better

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This article illustrates why HSBC, JP MorganChase and others now use high reliability Triplex Systems for control of Critical Supplies.
The old and proven Murphy's Law says "What can go wrong, will go wrong." But experienced engineers work to the Advanced Murphy's Law; "What cannot possibly go wrong, still goes wrong."

When things go wrong in building power control systems, it usually costs the business concerned serious money. It is vital therefore to ensure that site personnel are able to diagnose an unexpected problem and put it right - quickly. Sounds sensible. But is it achievable? Experience over many years says; no.

In a large modern building with an automatic generator change-over and load-shed system, the obvious concern is that when a mains failure occurs, the system may not respond correctly. Unfortunately, there is the added (and greater) risk, present every day, that power may be unexpectedly lost to critical equipment even when the normal supply remains healthy. Either event can cause disaster for the business concerned. The cause can be one of many; failed auxiliary power supplies, bad connections, blown fuses, or of course faulty components such as auxiliary contacts, phase failure relays, etc. (Note that these problems are not in any way avoided by the use of "back-up" PLC systems, which deal only with a total failure of the default PLC; a fairly rare occurrence).

When any operational failure occurs, locating and identifying it is more than a tall order for staff on site, especially when under pressure to do something quickly. But even when the fault is finally identified, consider the restrictions on actually fixing it quickly, such as conformance to health and safety demands which restrict access to live areas, production of risk assessments for any remedial work or investigation, etc.

To give just one example of correcting a fairly common problem: few buildings exist where staff can replace a faulty Phase Failure Relay (which causes the supply to change to generators unnecessarily), without isolation of the supply concerned, with all the delays and inconvenience that this causes to the client.

At present, the business continuity industry places much emphasis on Service Level Agreements (SLAs) - usually assumed to be the major factor for system reliability - but it is just that; an assumption.

For an automatic electrical power control in a building, the reality is that more regular testing (not maintenance), not only costs money, but actually lowers the overall reliability. This is because in such electrical systems, the vast majority of individual components such as relays, transducers, PLCs, are non-serviceable, and many are only used when the system is tested. If one considers the mean time between failures (MTBF) of the normally dormant items, then it is clear that the more times they are used, the higher the chances of failure become, whereas long periods of inactivity are far less likely to cause failure.

Clear testing procedures and checks may look very convincing in the building services documentation, but they fog the reality of system fault vulnerability. To go further, it is obvious that, although the biggest factor in the overall reliability of any control system is good engineering design of the system in the first place, there is no way that this can be taken into account in reliability calculations without an in-depth knowledge of control systems. Conversely, all the paperwork and maintenance in the world cannot begin to solve latent problems caused by inappropriate design, and it is rare indeed for the detailed design of a building control system to be focused on the avoidance of single points of failure.

Now consider how reliability is achieved with a fault-tolerant system, which is focused on the avoidance of single points of failure.

When a fault develops, correct operation is not affected.

Ideally, such a system would also identify and log the fault automatically, so that it can be corrected later at a convenient time. Ideally, staff would be able to carry out that correction safely and with no down-time at all.

But this is no pipe-dream; there are such power management systems, in current use, and proven by major financial businesses such as HSBC, JP MorganChase, and others.

The benefits they enjoy in overall reliability are enormous; indeed it can be shown that in most cases, the initial cost of a Triplex installation is far less than the cost of just one system failure of a "normal" power control system.

Triplex Power Control Ltd pioneered the first fully fault-tolerant automatic power control system in a large City Bank over 8 years ago. This first application had an added complication; the building was already fully occupied, and it needed to be installed as an "upgrade" to the existing and unreliable power control. This was achieved with only one weekend shutdown, using special techniques for proving tests that are still used with present-day designs of Triplex Power Controls.

The system has been constantly refined and developed since then, and is now fully PLC based, and proven to be fully capable of fault-tolerant control for the most complex power management of multiple generators, ATS units, all types of switchboard, and many other items. Less critical supply items can be prioritised, so that available power is used to the best effect for any situation, and measurements of actual load can be constantly logged by the system, so that when a power failure occurs, it is able to predict load patterns for when the generators are needed, such as in a recent application at ABN AMRO in Bishopsgate.

Information on the status of selected items, spare generator capacity, and any component faults is given clearly to staff on a colour graphics screen, and even here, an incorrect indication to the system does not cause erroneous information to appear on the screen, although as before, that input fault is logged and notified to building operators.

To summarise, the huge increase in reliability of a Triplicated system over all others is perhaps best illustrated by its use over many years for aircraft blind-landing equipment, where the dire consequences of any failure of the complex control systems are very obvious indeed. Building control systems from Triplex Power Control Ltd have that same reliability.

For a modern financial business, that makes sense.

More information can be obtained from http://www.triplexpower.com

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