



# Every Three Months or 3,000 Miles

BY STEVEN HARRIS

**Oil and lube, tire rotations, new wiper blades, washes and waxes ... we all know the rules of thumb related to good automobile maintenance. But how many data center owners and operators know and follow the rules of thumb (read: best practices) related to the proper maintenance of our data center “engines”—i.e. the building-systems-infrastructure machinery?**

In order to minimize data center outages and their associated impacts upon an organization, the environment for critical business applications must support the objectives of scalability, security, disaster avoidance and recovery, and—most important—high availability. The operating condition of your data center facility is part of what enables high availability. And the only way to ensure operating condition—and thus high availability—is through good maintenance practices.

When you think about the cost of the building's infrastructure components and systems, not to mention the cost of the IT equipment, and the business value of the data supported, the cost of proper building-systems-infrastructure maintenance is small. And yet too many data center owners and operators fall short when it comes to good maintenance practices, opting for the least costly, lowest-service-level contract, or attempting to perform certain maintenance tasks in-house. With the possible exception of filter changes, most other building-systems maintenance duties are best left to the professionals. Not only is the equipment expensive to

repair should something go wrong during your maintenance attempt, but more important, the equipment can be dangerous and even pose a life/safety risk—either during maintenance attempts, or over time—if maintenance is not properly performed.

Professional maintenance programs encompass a variety of offerings and are available not only from manufacturers' representatives, but also from certified third-party vendors, some of whom are certified on multiple manufacturers' systems. A maintenance program should be tailored to your business needs, your client requirements, and the mission-critical nature of your data center. Most maintenance vendors offer services that range from immediate response (on-site within 2–4 hours, 365 days a year) to best efforts.

In many cases, it is financially advantageous to negotiate a maintenance contract along with the original equipment purchase. Don't just accept a one-year new equipment warranty as is. The warranty can often be negotiated to include routine maintenance and even to extend beyond the first year. As with a car, maintenance

costs are minimal when the equipment is new, and repair costs should be zero during the initial years of operation. Thus, a manufacturer or vendor confident in the quality of their product should view extending the warranty and/or including initial routine maintenance as a very small concession toward securing your order—especially a large order.

While building-systems-infrastructure maintenance procedures can vary based upon climate, manufacturer, system size, age, and other considerations, there are several prevailing best practices. These include monthly generator and HVAC maintenance, and quarterly maintenance of most other equipment. (See next page for a detailed maintenance schedule.) Small things can also make a big difference. Filters, fluid checks, and vacuuming are three of the easiest preventative maintenance tasks to tackle. Having a preventative maintenance contract in place will ensure that these and other maintenance tasks are accomplished in a timely manner. Failure to conduct proper preventative maintenance will significantly reduce the efficiency and life expectancy of your

building-systems-infrastructure components. Case in point: batteries are commonplace items; they run our children's toys, power our cell phones, and start our cars. But we tend to take batteries for granted ... until they fail. The same holds true in our data centers. A few bad battery cells and the UPS can't handle the IT load; a weak generator battery and the generator fails to start. Both scenarios produce the same outcome: a crashed data center with little or no ability to re-start and restore until the primary power is re-established.

On the upper end of the preventative maintenance scale are infrared thermography scans. These heat-detecting (temperature-gradient) photographs can quickly detect weak circuits, relays, fuses, bus bars, breakers, cable connections, transformer coils, etc. By proactively replacing these weak, worn, or defective components during a scheduled maintenance window, you may avoid an unplanned data center outage, along with the associated headaches and costs.

Some helpful hints ... if your data

center's air conditioners seem to require filter changes too frequently, consider vacuuming your under-floor air-plenum. This is an annual best practice. Dirt, dust, and debris, which collect in and are blown through raised-floor cavities, will eventually make their way into the A/C filters. Likewise, change fissured ceiling tiles for clean-room type tiles. Fissured tiles continuously flake, giving off microscopic (and larger) particulates, which also end up in the A/C filters—not to mention on circuit boards, on disk surfaces, and in IT equipment filters.

Finally, spend time with your maintenance contractor when they're on-site. There are a thousand excuses for not monitoring your maintenance vendor—everything from "I'm too busy" to "I trust them." It's usually not a question of honesty, or time management, but one of relationship building. This maintenance contract will likely be in effect for years and you'll probably see the same maintenance technician several times each year. If the technician sees you and believes you're interested in the well-being of your data

center and its building systems infrastructure, that technician is more likely to spend an extra few minutes and make an additional effort on your behalf. Go ahead, ask a couple of questions too. You might learn something about the equipment that supports your IT environment—and that added knowledge might one day serve you well.

The old saying, "Every 3,000 miles, or three months, whichever comes first," has extended the operating life and increased the value and efficiency of many an automobile. Isn't your data center at least as important as your car?

This article was featured in the July/August issue of *Data Center Management*.



As director of data center planning for Forsythe, **Steven Harris** helps clients with data center planning and design issues including facility assessment and optimization, floor plan design, site selection, disaster recovery planning, and project management.

Maintenance Schedule					
Equipment Type	Monthly	Quarterly	Semi-Annual	Annual	Climate Concerns
Switchgear		Perform physical inspection		Perform infrared scanning test, vacuum	
Generator	Perform monthly start-up (not to exceed 30 minutes)	Check fluid levels, lube, check filters (change if required)	Perform load transfer test	Check belts, perform 100%-load bank test w/infrared scan	Check block heater in cold climates, perform monthly filter replacement in desert climates
Diesel Fuel			Perform sample analysis and additives check	Replace unused fuel	Perform additives check in cold climates
Uninterrupted Power Source (UPS)		Perform physical inspection, confirm operating parameters, check display screens, check loads	Check capacitors and input trap, perform sine wave capture test, check filters	Perform 100%-load bank test w/infrared scan, perform battery discharge test, conduct sensor calibration, vacuum	
Batteries		Perform physical inspection, conduct random cell voltage measurements and system-level measurements, perform charger verification		Perform individual cell voltage measurements and equalized charge measurements, conduct post and connection maintenance, obtain IEEE certification	
Power Distribution Unit (PDU)			Perform physical inspection, check display screens	Perform infrared scan, circuit and breaker test, conduct sensor calibration, vacuum	
Heating, Ventilation, and Air Conditioning (HVAC)	Perform physical inspection, check filters (change if required)	Perform filter change, check compressors, confirm that humidification and reheat functions are working		Check compressor motors, belts and condensate pump, check leak detectors, conduct sensor calibration, vacuum	