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City Of Calgary (All Departments)	311
Dangerous Goods Incidents	1 800 272 9600
Environmental Emergency	1 800 222 6514
Poison Centre	403 670 1414
Weather Information (24hr)	403 299 7878

Executive & Committees

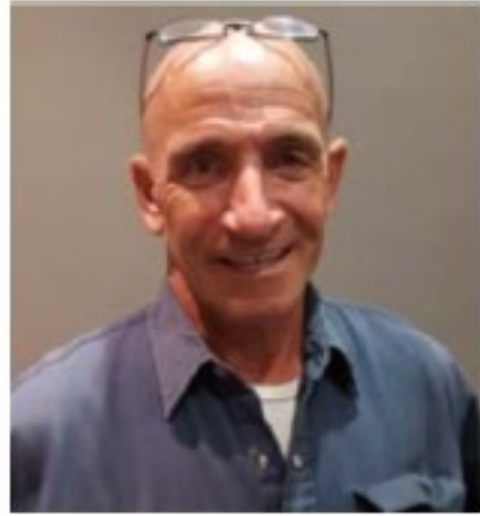
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President's Message



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I hope this message finds you and yours well and in good health

It is nice to see that BOMA Calgary has begun 5th Class Power Engineering classes again. I am not sure what happened as the demand for Operators is higher than ever yet there was an 18-month hiatus on classroom learning. It is nice that the lessons are done remotely as then it matters not where you live you can attend the classes. So, if you live in Medicine Hat or Red Deer or even Moose Jaw and plan on coming to Alberta eventually to work, the students can pass the BOMA course and take the Alberta government exam. Thanks to BOMA Calgary and the Government of Alberta.

There are several trades as well taking the 5th class course. Without certification, the operation and logging of boilers that are in operation presents a difficulty with out a "certificate of competency". ABSA is watching that all boilers under their jurisdiction are being logged daily. It is the law and the responsibility of Chief Engineers, Operators and Manager to see that it is done according to the Power Engineers Regulations.

Smiles))

With kind regards,

Les Anderson PE, RPA





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TEST YOUR OPERATOR IQ!



Are you equally adept at troubleshooting problems in the boardroom and the boiler room? As the resident facility guru, there's a lot riding on whether or not you know the difference between sounds control and a sound investment.

Try our monthly Operator IQ challenge...answers on page 21

1. **A way of increasing natural draft is to:**

- a. incorporate a forced draft fan
- b. have the outside air temperature increase
- c. install an induced draft fan
- d. increase stack height
- e. decrease the amount of excess air



2. **Adequate openings for combustion air must be provided in enclosed boiler rooms.**

These openings:

- a. may include doors and windows
- b. should be located at the top of the room near the ceiling
- c. should be located at the bottom of the room near the floor
- d. are a standard size for all boilers
- e. are only for high pressure boilers

3. **Induced draft fans:**

- a. is physically smaller than a forced draft fan
- b. has less expensive materials of construction than an FD fan
- c. handles only air
- d. discharges air to the windbox
- e. operates at much higher temperatures than an FD fan

4. **Balanced draft:**

- a. requires weights on the dampers to balance them
- b. requires a tall smoke stack
- c. may use a forced and an induced draft fan
- d. is used with cast iron heating boilers
- e. is used for furnaces with positive pressure

5. **Balanced draft:**

- a. means furnace pressure is maintained at some desired value
- b. means air flow is always constant
- c. requires an FD and ID fan, never just an FD fan
- d. can be accomplished with just a chimney
- e. means air and fuel quantities are the same per unit time



The Most Effective Way to Avoid Poor Indoor Air Quality is to Avoid Pollutants Coming into the Home Space

Cooking

- Avoid burning food.
- If you are replacing appliances, it can reduce NO₂ to choose electrical rather than gas powered appliances.

Some newer ovens have 'self-cleaning' functions; try to stay out of the kitchen if you are using this function.

Moisture

- High humidity is linked to damp and mould.
- Dry clothes outdoors if possible.
- If you are a tenant with persistent damp or mould in your home, contact your landlord or environmental health department.
- If you own your own home, find out what is causing any damp and get defects repaired..



Smoking and vaping

- Do not smoke or vape, or allow others to smoke or vape, in your home.
- E-cigarettes and vaping can cause irritant health effects such as cough and wheeze, especially in asthmatic children. Where nicotine is a vaping ingredient, there are known adverse health effects of exposure. Whilst the long-term health effects of are uncertain, it would be sensible to take a precautionary approach and avoid exposing children

to vaping and e-cigarettes indoors.

• Combustion

Avoid activities that involve burning indoors, such as burning candles or incense, or burning wood or coal for heat, if you have an alternative heating option.

Outdoor sources

- Control outdoor sources, for example do not use bonfires and report nuisance bonfires to the local council.
- Avoid using ventilation without filtration during periods when the air outside is polluted, for example keep windows closed during rush hour and open them at different times of day.

Reduce use of products indoors

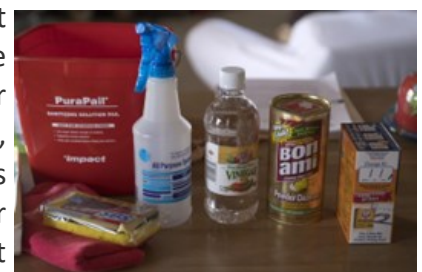
Some sources of pollutants cannot be avoided completely. Instead you can try to reduce their use to reduce the number and quantity of pollutants released indoors.

Cleaning

- Use fewer cleaning products or one 'multi-purpose' cleaner to reduce the number of different ingredients or pollutants.
 - Use liquid rather than spray products.
- Make sure you remove cleaning products from surfaces completely after cleaning.

Personal care products and cosmetics

- Without clearer labels, it will be hard to know all the different properties of the products in our homes. If available, choose products labelled with clear information about



their contents and instructions for use.

- Avoid spray products.

Reduce the number of personal care and cosmetic products used to avoid them mixing in the air.

DIY

- Try to only redecorate or replace furniture when necessary.
- Increase the ventilation after painting, decorating, or having new furniture and check manufacturer's guidance on products, for example 'use in a well-ventilated space'.



Remove pollutants indoors

Some pollutant generating activities are unavoidable indoors. In these circumstances you can take steps to improve the indoor air, often by using ventilation to dilute the pollutant concentrations.

Cleaning

- Regularly clean and vacuum to reduce dust, remove mould spores and reduce food sources for house dust mites.
- Regularly clean high touch surfaces such as door handles to reduce spread of coronavirus and other infections within the home.
- Clean off any visible mould.

Allergen Avoidance

Taking steps to reduce exposure to inhaled allergens (from



house dust mites, moulds and pets) is recommended to reduce symptoms and exacerbations. Depending on the allergy, measures which can help include:

- Reducing dust and dampness in the home.
- Reducing items which collect dust such as soft toys and, if possible, replacing carpets with hard flooring.
- Washing bedding and covers (at 60°C every two weeks) or using allergen impermeable covers.

Avoiding direct exposure to furry pets if the child is sensitised.

Ventilation

Increase ventilation during and after activities that produce pollutants or moisture, especially when using cleaning or personal care products, cooking, bathing, and painting, decorating or buying new furniture. Try to avoid these activities, and hence the need to ventilate, when the outdoor air is polluted (such as at rush hour).



Cooking

Use ventilation in the kitchen when you cook and, if possible, continue to use it for around 10 minutes after cooking. This ventilation could be a cooker hood or extractor fan if you have one or open a window if not.

If you have a cooker hood:

- Use the highest fan setting.
- Cook on the back rings or burners if possible, especially during frying, to help the cooker hood capture as many pollutants as possible.
- Consider using other appliances, such as toasters, under the hood.

If purchasing a new cooker hood, you should choose one that extends over all the rings or burners, and it



should extract the air to outdoors.

Close internal doors during cooking to reduce the spread of pollutants to other rooms. Cover pans with lids and increase ventilation when boiling the kettle to control moisture levels.

Know how to use and maintain equipment

Cleaning

Vacuum cleaning is one of the simplest methods for clearing dust and is particularly important for those who suffer from asthma. It is important that the bag or dust collection chamber retains the dust efficiently and is replaced or emptied regularly.

Ventilation

- Learn how your home is ventilated. Most homes are naturally ventilated using windows, but some use mechanical ventilation systems to supply air through ducts.
- If your home has a mechanical ventilation system, make sure you know how to use and maintain it.
- Many windows have small, built-in vents;



keep these 'trickle vents' open if you have them.

- Your bathroom and kitchen may be fitted with an extractor fan or cooker hood. Learn how it works and use it during and after pollutant or moisture generating activities.

Other equipment

If you have persistent damp that is not solved using ventilation, contact your landlord or environmental health department. You can also use a dehumidifier to reduce damp. If you do, empty it regularly to prevent stagnant water from encouraging mould growth.

Some air purifiers and monitors are commercially available. There is wide variation in the performance of air cleaning devices, so we cannot currently provide specific recommendations. Some can be effective at reducing particle concentrations, but some can be a source of pollutants such as ozone. If you do have one, it is important to maintain it according to the manufacturer instructions.

A note about humidifiers: humidifiers may be useful to prevent dryness that can irritate some parts of the body. If you are recommended to use a humidifier to alleviate symptoms, be aware that increasing the humidity can cause other problems including increasing formaldehyde emissions from building materials, and an increased likelihood of damp and mould.



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THE BENEFITS OF SMART TECHNOLOGY FOR ENERGY MANAGEMENT

Rising energy prices, stringent climate change targets and an increasing awareness of the need to be environmentally responsible mean the way businesses consume energy is under the spotlight in a way it never has been before.

Regardless of the size of the business, the issue of energy management is on everyone's radar right now. But how easy is it to make changes? And where do you start?

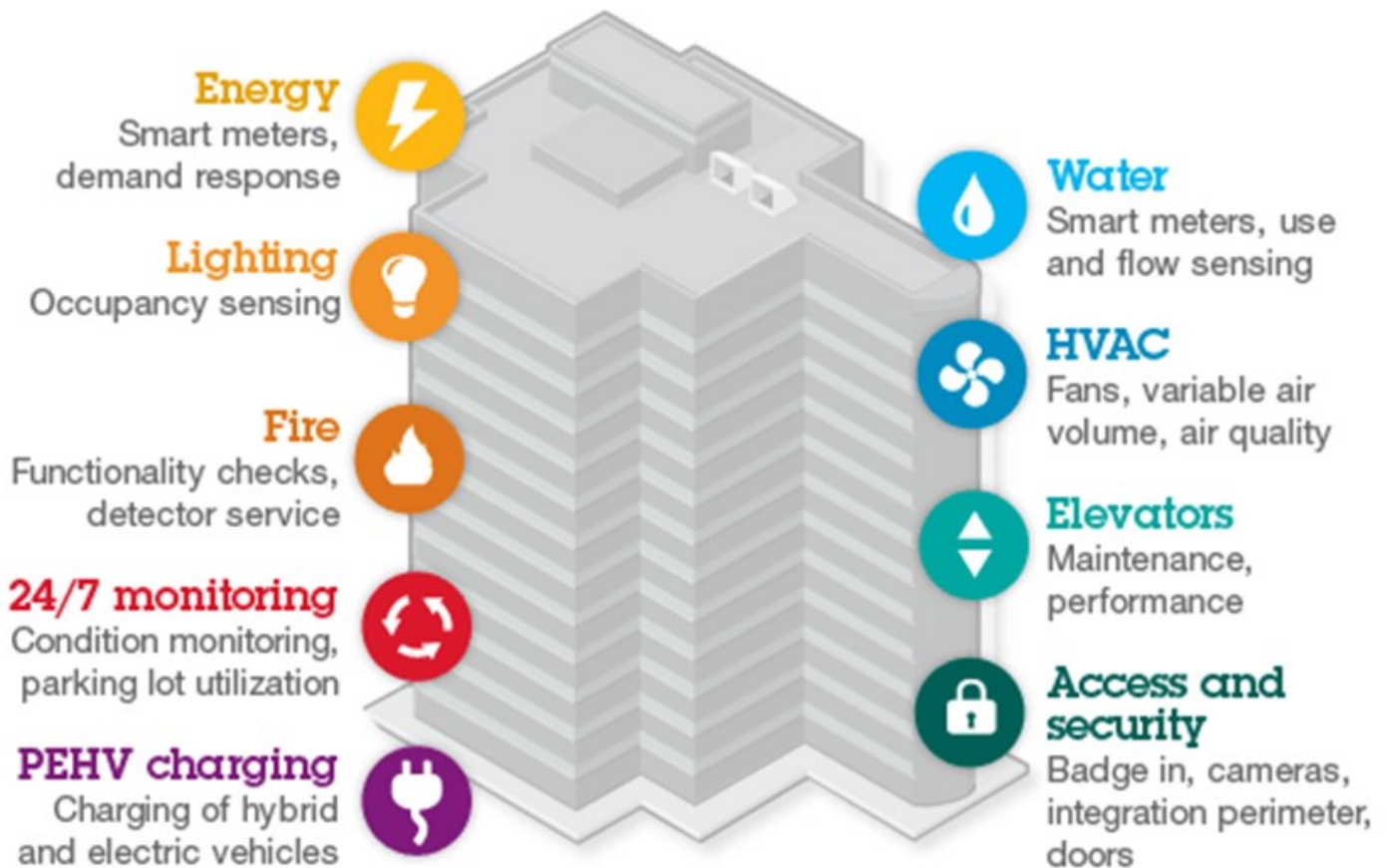
What is smart technology?

Smart technology is the name for devices connected to the internet that can collect and transmit data to a centrally-stored hub. It typically comes in the form of sensors and receivers and can show how

much energy is being used in specific areas of a building or by certain pieces of machinery.

Much like smart meters which are being installed in homes across the country, the smart technology available to businesses enables you to see what and where the most energy is being used, allowing you to make changes accordingly. Smart technology can be used in several areas of business energy management. Two of the most common are:

- The management of power supplies and machinery: CT clamps or current sensors can be placed on cables to assess how much power is running to and through them, measuring energy consumption at a circuit, zone or machine level,



while temperature sensors can give an indication how much energy they are generating.

- The environmental management of buildings: Sensors, which can be attached to doors, walls, desks and windows, monitor variables like temperature, humidity and CO2 levels, helping businesses to identify areas that are being over-heated or over-cooled.

What are the benefits of using smart technology to monitor energy use?

While many businesses will be aware of their energy costs and have plans to make savings, this is often based purely on total energy consumption and totted up when monthly or quarterly bills come through. Smart technology gives you the granular detail needed to make real change. These are just some of the benefits:

- **Continuous monitoring in real-time:** Using smart technology means you have a continuous view of the energy use within your building. Data collected by the sensors is fed back to a central dashboard and, at any given point in time, you can see the energy usage picture across your building or organisation, without having to wait for energy bills to come through.
- **Ability to make instant changes, enabling greater cost-savings:** Being able to see everything that is happening in one central display means you can react instantly and implement changes to reduce energy usage. This could range from simple things like closing blinds in areas that get too hot at certain times of day and shutting off machines that are left running when they shouldn't be, to more complicated issues like identifying outdated equipment that is not performing as well as it should.
- **Helps ensure a consistent, reliable power supply:** By monitoring the energy flowing into and out of machinery you can spot potential issues before they arise, for example surges in demand at

particular times, and put plans in place to change these. This can help to prevent sudden fluctuations in demand and power surges, and ensure you always have power when you most need it.

- **Decreased downtime due to maintenance issues:** According to Deloitte, downtime costs industrial manufacturers \$50 billion a year, with 42% of that caused by equipment failure. Current sensors and CT clamps can help improve predictive maintenance, highlighting potential issues with machinery before it fails altogether. This helps to minimise equipment downtime and keep production up and running.
- **Helps plan for the future:** Being able to monitor power usage trends means you can develop realistic targets for future energy management. The detailed data means you can look at specific machinery, rooms or offices and develop action plans for energy reduction. The data can also be a helpful way of driving staff engagement. Being able to see exactly how and why what they do has an effect is a really useful tool in making sure everyone in the business plays their part in reducing energy use – a key part of any successful energy management strategy.
- **Helps reduce carbon emissions and improve compliance:** The government is currently working towards a target of reducing carbon emissions by at least 100% of 1990 levels (net zero) by 2050, meaning businesses will certainly be coming under increased scrutiny over the coming years. Your company may also already be working towards complying with regulations. Businesses that have installed smart technology to help them with their energy management are better placed to meet these, and any new legislation, as they will have a much greater understanding of their energy use and the areas where reductions can be made.

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ELECTRONIC LOG BOOKS

from [ABSA](#) "Pressure News", June 2005

A log book is a legal document that is required by Regulation to record such activities as maintenance work, inspections, tests, repairs and other pertinent data. The Power Engineers Regulation requires that a logbook be updated and maintained for power plants, heating plants and thermal liquid heating systems. The log book must be a permanent record that cannot be altered.

As technology has advanced, so have the methods of recording information. An electronic log can be acceptable if and only if it can be shown to be a permanent accurate record.

An Electronic Log must be secured in such a way as to:

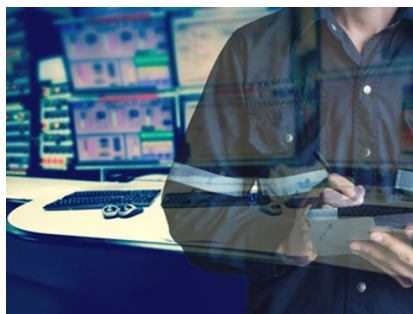
- prevent revisions, additions, or deletions to data which has been previously logged.
- provide a means for other operators, within the organization, to review the log entries as required.
- include a provision for signatures by a PIN or other secure means for the operator and the Chief Engineer to acknowledge his/her reading/writing of the log.

Note: There must be a unique log-in procedure to provide security so that the entry may be traced to a particular engineer. There can be no question that anyone other than the person who logged on entered the information.

Here is a list of items that ABSA would require for an Electronic Log.

- Indicate in the Electronic Log the names of the persons fulfilling the roles of Shift Engineer, Assistant Engineers, etc., on the shift.
- All entries should be time/date stamped for each log entry.
- Establish a Policy and Procedure for the electronic log. The policy must clearly state that the Electronic Log is intended to satisfy the logbook requirements of the current Power Engineers Regulation and that tampering with a log is an offence under the Act.

The Policy and Procedures and the final Electronic Log is to be reviewed and accepted by ABSA. No changes are to be made to the system without ABSA's acceptance.



Lighting Controls: Reducing Cost Saving Energy

by John L. Fetters

Properly specified and installed, occupancy sensors can produce improved lighting, occupant comfort, and bottom-line benefits

The most effective way to reduce lighting costs is to turn lights off, and both manual and automatic lighting controls enable managers in institutional and commercial facilities to accomplish this goal. Controls also can reduce lighting costs, but deciding which controls to use can be challenging.

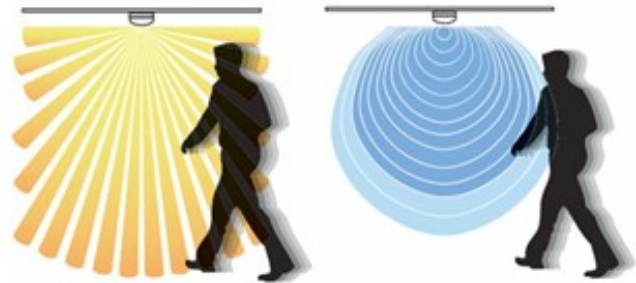
Manual lighting controls are most effective in occupied work areas. Occupants in areas with such applications usually are more responsible about controlling their lighting. Research at the Lighting Research Center shows that in areas featuring manual or individual control, occupants are more responsible about controlling their lighting. At one test site with individual control, occupants used 40 percent less lighting energy.



But managers and designers often overlook common building areas, such as corridors, restrooms and conference rooms, when considering savings with lighting systems. Automatic controls, such as sensors, can provide benefits when properly specified for these areas.

The technology of choice

Occupancy sensors have become the lighting control of choice for reducing wasted lighting energy in common-area applications. Occupancy sensors in new construction can provide the automatic shutoff required for state energy codes



based on ASHRAE/IESNA 90.1, and they can fulfill the requirements to qualify for the commercial building tax deduction related to lighting projects.

When used properly, sensors can save energy and extend the life of lamps and ballasts. Using occupancy sensors lowers energy use by reducing:

- kilowatt hours of use
 - power used during the peak demand period, either by automatically dimming lights or turning them off when they're not needed
- a building's internal heat gains; cutting lighting use lowers the building's cooling needs.

Occupancy sensors are most cost-effective either when lighted spaces are unoccupied for two or more hours a day or in spaces where the lights commonly are left on when the space is unoccupied. Offices, classrooms, copy rooms, restrooms, storage areas, conference rooms, warehouses, break rooms, corridors and filing areas are ideal candidates such applications of occupancy sensors.

Successfully implementing a control scheme requires proper sensor location. For example, sensors must be located so they will not detect movement outside the desired coverage area, such as through an open doorway. Ultrasonic sensors are sensitive to air movement and should not be placed near an HVAC diffuser, where air movement also might trigger operation.

Many different mounting configurations and

coverage patterns are possible for occupancy sensors. Sensor manufacturers provide coverage diagrams based on levels of activity and the sensitivities of each type of sensor. Managers can download this information from manufacturer web sites.

Application strategies

The challenge of effectively employing occupancy sensors involves selecting the right sensor technology — ultrasonic, passive infrared, sound, or a combination dual technology. Standard occupancy sensors require manual adjustment of their sensitivity and time delay to avoid false triggering.

Short time delays increase savings, but unless the application uses programmed-start ballasts, time delays of less than 15 minutes usually will reduce lamp life. For many applications, delays of 15 minutes or more are specified in switching instant-start ballasts. Codes often require a delay setting of 30 minutes or less.

Sensitivity controls determine the level of movement that will cause the sensor to activate the lighting system. Setting the sensitivity too high increases potential false-on triggering, while setting the sensitivity too low increases the possibility for false-off triggering.

Changing the sensitivity control also results in changes to the coverage pattern. Sensors are shipped with a factory-set sensitivity setting, and installers are expected to adjust them to meet individual application requirements. In this way, they are more likely to respond properly to the tasks in the space at the correct distance, while taking into account potential sources of nuisance switching, such as airflow.

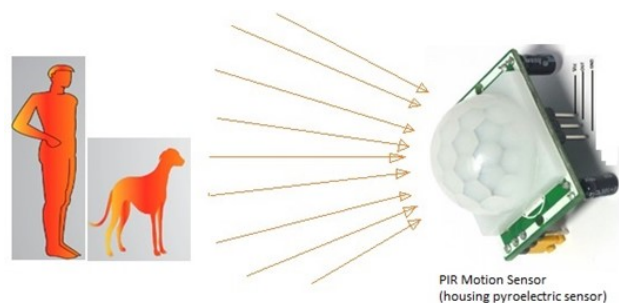
To avoid these installation hassles and prevent false operations, sensor manufacturers now provide designs that use advanced detection capabilities called self-adaptive technology. These new-generation sensors continuously analyze real-time occupancy patterns and automatically adjust their sensitivity and delay settings to

accommodate the current space activity. They can learn from their mistakes and adjust accordingly, resulting in true plug-and-play operation requiring no adjustments.

For some applications, such as open-plan offices and laboratories, managers should consider setting the light level lower, rather than turning lights off. This control scheme might be appropriate when occupancy sensors control separate zones of fixtures in larger spaces, such as in open-office areas or laboratories. In these applications, the lighting systems can be dimmed to a preset level in individual areas when the spaces are unoccupied.

Managers can achieve this control strategy by using either multi-level switching with split-ballast schemes or bi-level ballasts that provide a choice of light levels. The main advantages of switching include lower initial cost and simpler design and commissioning.

The bottom line? Using sensors to turn down or turn off lighting systems can reduce energy costs. And when applied correctly, they can improve working conditions and comfort in the spaces in which they are installed.



Shedding Light on Daylighting

Occupancy controls can combine with daylight-harvesting controls to keep lights dimmed when enough daylight is present and the room is occupied. Managers can specify automatic, self-adjusting dimming ballasts to provide cost-effective daylight-harvesting solutions in small spaces with windows, such as individual offices.

These ballasts are equipped with individual photosensors that automatically and continuously adjust lamp output to take advantage of available

daylight. Installers can adjust the initial light level, and the ballasts will compensate for lamp-lumen depreciation.

Occupancy sensors can control power to these ballasts and the rest of the fixtures located away from windows to minimize lighting energy use.

For larger spaces with larger window areas, installers can wire a separate photosensor daisy-chain fashion to the 0-10 volt control leads of the dimming ballasts in the fixtures located in the window row. The photosensor is mounted in the ceiling so the sensor “sees” the combination of daylight coming through the windows and the electric lighting. The control leads allow a control zone to be independent of the power zone, which can be controlled by occupancy sensors.

Many early daylight harvesting control projects have failed. To discover the reasons, The Weidt Group — which provides energy-design assistance, including daylighting as an energy-conservation strategy — reviewed the design intent, met with the project team, and made additional site visits to eight projects.

The team concluded that savings from automatic daylighting control systems often are not fully realized when a building is turned over to users. One major reason daylight harvesting control projects fail, according to the group, is that “users are not educated about the installed control systems; when something doesn’t work, users often disable the system instead of getting it fixed.”

The study cited several specific reasons daylight-harvesting projects fail:

- A lack of coordination or understanding exists between the design disciplines concerning the daylighting-control system.
- Daylighting sensors are located improperly.
- Controls systems, component parameters and sequence of operations are specified inadequately.
- Contractors’ shop drawings detailing the system are not checked, or the lighting designer does not know what to check.
- Field changes to adjust a system are not documented and taken back to the designer to complete the feedback loop.

KenKen Puzzle

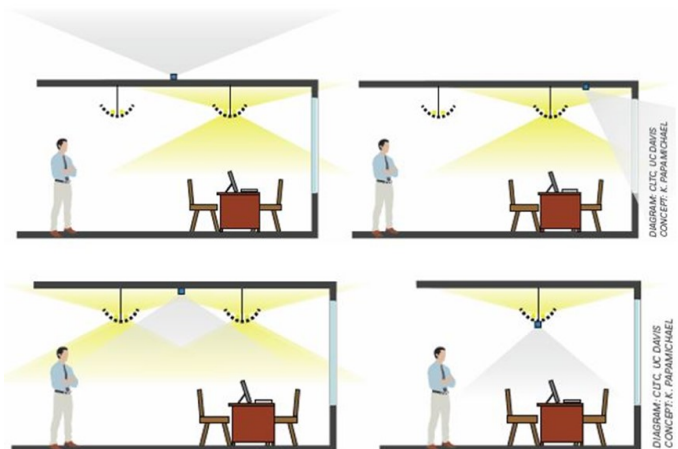
How to solve the KenKen puzzle:

(Answers on page 21)

- Fill in the numbers from 1 –6
- Do not repeat the number in any row or column
- The numbers in each heavily outlined set of squares, called cages, must combine (in any order) to produce the target number in the top corner using the mathematical operation indicated
- Cages with just one square should be filled in with the target number in the top corner
- A number can be repeated within a cage as long as it in the same or column

1	2	4 7	3 6
8	4	1	2
	5	9	8
	8	3 1	
4		8 1	9
3 1		7	6 5
	9	5	2
6		9 2	1 5
5	7 1		4

Managers can use these examples to learn how to better use daylight-harvesting controls more effectively. Help also is available from the Lighting Research Center — www.lrc.rpi.edu — and sensor manufacturers’ web sites.



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Taking Maintenance In Hand

by James Piper

New diagnostic equipment gives managers and technicians the upper hand in diagnosing and solving problems.

Today's maintenance and engineering managers



have a range of new-generation, handheld test equipment at their disposal to help them in diagnosing and correcting maintenance problems. The word handheld, however, no longer refers to equipment with limited features or low quality.

Today's handheld test equipment offers managers and technicians unprecedented diagnostic capabilities, features and accuracy. These essential pieces of equipment are particularly useful when it comes to detecting and diagnosing problems related to two critical areas in the operation and maintenance of facilities — indoor air quality (IAQ) and electrical distribution systems.

One common feature in many new pieces of handheld test equipment is the microprocessor. This technology has greatly simplified the use and operation of test equipment by reducing the number of calculations that must be performed by maintenance engineers and technicians.

But simplified operation does not necessarily mean that they are easy to use properly. It would be a mistake for managers to assume users will develop the necessary skills and techniques

without proper training. Collecting data is the first step. Users must be able to understand the data they are collecting and what it means. Training and written procedures help ensure test equipment is used properly and to its maximum capabilities.

Electrical receptacle analyzers

One of the least expensive, most useful pieces of handheld test equipment is the electrical receptacle analyzer. The analyzer plugs into three-pronged wall outlets and uses a series of LEDs to indicate outlet operation.

Most units identify common defects, such as neutral ground reversals, bad or missing neutral wires, and dead circuits. Some units can test the operation of GFI-protected outlets.

Defects in the neutral and ground connections in wall outlets are a major contributor to power problems related to personal computers, and the electrical receptacle analyzer has proven itself invaluable in identifying and correcting these problems.



Digital multimeters

A new generation of digital multimeters has replaced the age-old volt-ohm meter.

New multimeters offer LCD display, auto-ranging, a data-hold button, data recording, voltage and current peak and average readings, and frequency counting.

One important feature of new multimeters is their ability to process voltage and current waveforms as

true rms signals rather than average signals. Non-linear electrical loads distort voltage and current waveforms. This distortion causes significant errors in readings taken with meters that do not measure true rms signals.

New digital multimeters also offer a range of add-on accessories — including temperature probes, humidity sensors, sound level monitors and current transformers — that can be used in diagnosing both power and IAQ problems. Some models include an interface that connects to a computer so users can store and process data. Several models offer a flexible clamp-on current sensor that can be wrapped around bus bars or bundled cables — something that is difficult to do with standard, rigid clamp-on sensors.



Digital multimeters are useful in tracking down causes of overheating motors, excessive voltage drop in circuits, momentary voltage sags, under voltages and over voltages.

Air balancing hoods

One of the most common causes for IAQ complaints in facilities is inadequate airflow. Even if ventilation systems are properly balanced when installed, changes in the occupied space and changes within the HVAC system itself can result in improper airflow and complaints from building occupants. One of the best tools for checking proper airflow is the air balancing hood.



New designs are lighter and smaller, allowing technicians to use them in areas that previously were inaccessible. One person may use

many of the new units. Although these units are smaller, they do not sacrifice performance. Hoods are available that can measure airflow of 25-2,000 cfm, and units are available with mechanical or electronic readouts.

Carbon dioxide monitors

The concentration of carbon dioxide in a given area has become a key parameter in evaluating IAQ. As a rule of thumb, the higher the concentration, the lower the perceived IAQ. The major factors that influence the concentration include:

- the activities performed in the space
- adequate air circulation system
- the rate at which outdoor ventilation air is introduced into the space.

Handheld Carbon dioxide monitors can help technicians both monitor IAQ conditions and diagnose HVAC system problems. Low readings maybe indicate that a space is receiving too much outdoor ventilation air, thus increasing energy use. High readings often indicate that space is receiving too little outdoor ventilation air. High readings also can indicate other problems in the system, such as:

- supply air or outdoor air leaking into the return plenum
- reentrainment of building exhaust air into the building's air intakes
- the introduction of a high-level of pollutants, such as vehicle exhaust, into the building air intake.



Power analyzers

Power analyzers are effective for troubleshooting and tracking performance in a circuit. In the past, power analyzers often were difficult-to-use, bulky units.

Today, a number of handheld units perform



different tests and measurements on both single- and three-phase circuits, including power, power factor, true rms voltage, true rms current, frequency, demand, transients and harmonic distortion. Some analyzers record and store waveforms for later viewing or uploading.

Infrared scanners

Loose connections, corroded contacts, deteriorated splices and overloaded conductors all generate heat that can damage or destroy wiring and contacts. In HVAC system motors, excessive heat can damage bearings and windings, leading to failure and system downtime. Infrared scanners can be used to identify hot spots in electrical distribution systems and HVAC system electrical equipment.

Infrared scanners offer technicians several advantages when used to identify maintenance problems in electrical distribution and HVAC systems. No shutdown of the system or the component is required. Technicians can avoid physical contact and connection with the item being scanned, and they can perform scanning tests quickly.

The latest generation of handheld infrared scanners include two basic types of instruments. The simpler and less expensive instruments produce a direct temperature readout when pointed at a source. More complex units produce a thermal image of the source that can be displayed on an LCD screen or stored for uploading.

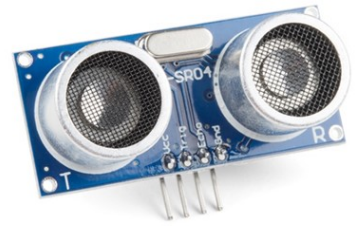
Ultrasonic detectors

Two types of handheld ultrasonic detectors are now on the market, one to detect refrigerant leaks and the other to detect electrical problems.

Ultrasonic refrigerant leak detectors sense high-frequency vibrations produced by refrigerant escaping from the system. They are most useful in applications where electronic refrigerant sniffers cannot be used.

In electrical circuits, workers can use ultrasonic detectors to identify problems that generate faint sparks, such as loose connections. Their main advantage is they require no physical contact with the component tested, nor does the component have to be shut off.

These instruments will help managers and technicians detect, diagnose and correct the most common electrical distribution and IAQ problems. As demands on building systems continue to rise, these instruments will play an important role in facility maintenance and operation. A maintenance and testing program that makes regular use of these devices will help avoid or correct tough problems.



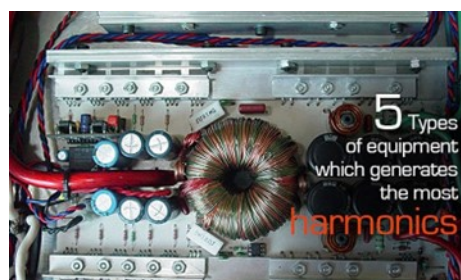
An Upper Hand on Harmonics

Non-linear electrical loads, such as electronic equipment, generate harmonics in the building's electrical system. These harmonics produce an electrical current in the circuit's neutral wire that can cause it to overheat.

A high-level of harmonics can shorten the life of electric motors and transformers by generating heat in their windings. With more non-linear electrical loads being introduced into buildings, harmonics and its effect on power quality is a major concern.

Easy-to-use, handheld harmonic analyzers allow maintenance technicians to accurately determine the total harmonic distortion within a circuit. These units provide a direct readout of true rms values for both current and voltage, total harmonic distortion (percent THD), crest-factor, apparent power (kVA), active power (watts), and power factor. Most units include a computer interface for uploading data.

Several models have a built-in battery operated oscilloscope that allows users to view the waveshape of the current and the voltage in a circuit.



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The 'call for abstracts' is live for the National Conference on Building and Facility Operations' June 2023 building conference. building owners and operators are being targeted as well as consultants who are involved in making buildings more energy efficient. A list of anticipated topics to have presented at the conference is included and speakers are being sought.

Please click on the link for further information:

<https://ncbfo.ca/western/events/ncbfo-2023/>

Kenken Puzzle Answer

1	9	2	8	4	7	5	3	6
8	6	4	3	1	5	9	7	2
3	7	5	2	6	9	4	8	1
7	5	8	6	9	3	1	2	4
2	4	6	5	8	1	3	9	7
9	3	1	4	7	2	6	5	8
4	1	9	7	5	8	2	6	3
6	8	3	9	2	4	7	1	5
5	2	7	1	3	6	8	4	9

TEST YOUR OPERATOR IQ ANSWERS

Answers: 1) d 2) c 3) e 4) c 5) a



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ROUND TABLE WITH MARK ARTON

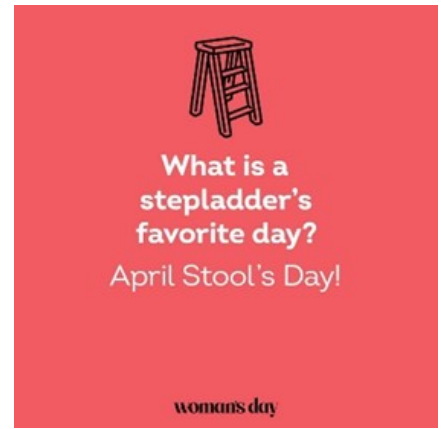
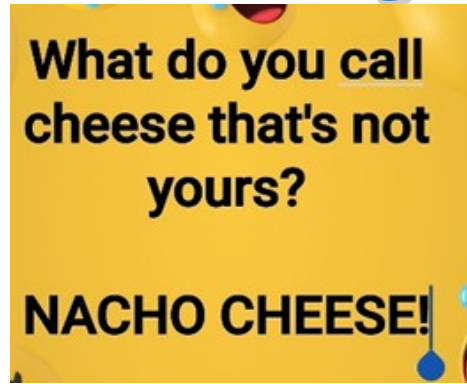
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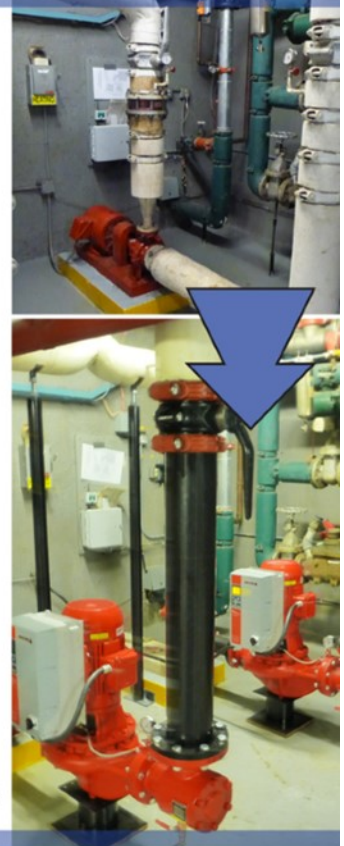
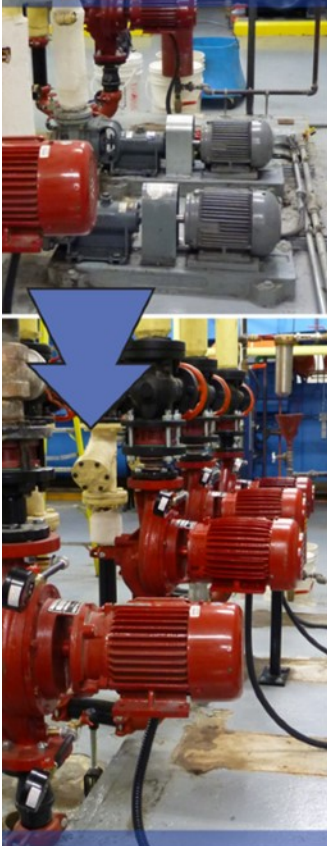
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