Volume 30 - Issue 8 – April 2024

BOA
Building Operators Association of Canada

Official Publication of the Building Operators Association (Calgary)

April 2024

What's Inside?

Executive & Committees	3
Important Phone Numbers	3
Presidents Message	4
Test Your Operator IQ	6
Roof Failure: Effect & Cause	7
Utlizing an Active Harmonic Filter	11
Signs of Sealant Trouble	12
KenKen Puzzle	15
Evolution of the Building Systems MSI	17
Eco-Efficiency Meets Reliability	21
BOMA Course	25
Kenken Puzzle & Operator IQ Answers	26
April 2024 Guest Speaker	27
Advertising Rates & BOA Calgary Sponsors	28
Advertisers Directory	29

Important Phone Numbers

Emergency	911
Alberta Boiler Association	403 291 7070
Alberta Labour (Emergency)	403 297 2222
Buried Utility Locations	1 800 242 3447
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

President Les Anderson	president@boacalgary.com C: 403 921 0648
Vice President Mark Arton	chairman@boacalgary.com (c) 403-305-7029
Associate VP Vacant	associate.vice.president@boacalgary.com
Chairman Mark Arton	chairman@boacalgary.com (c) 403-305-7029
Treasurer Carrissa Speager	treasurer@boacalgary.com (c) 403-969-0329
Secretary Monika Bhandari	secretary@boacalgary.com (c) 403-470-4169
Education Committee Vacant	education@boacalgary.com
Membership Committee VACANT	membership@boacalgary.com
Promotions Committee VACANT	promotions@boacalgary.com
Activities Committee Samson Isowode	403-874-0850
Technical Concerns Kyle D'Agostino	chairman@boacalgary.com
Webmaster Les Anderson	webmaster@boacalgary.com

President's Message

BOA Building Operators Association of Canada

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

That spring is here, and we prepare staff for summer tasks it is important that we keep **workplace safety** in our thoughts for maintaining a healthy and productive work environment.

If the job has not been done for a while, evaluate the risks involved. If there are several steps to complete the task, review the "Safe Work Procedure" perhaps do a JSA prior the task. It is important to do risk assessment reviews for every task, prioritize the dangerous ones first, complacency can hurt.

It is also important to review the "Safe Work Procedures" using the safety team and senior staff, asking questions to assure they are still current, that health hazards are current, are the chemicals still up to date, can ergonomic considerations be improved. Do staff members need to be trained? If the processes have many steps or is not performed often perhaps a review is necessary.

The start of the summer season it is a good time to inspect the PPE we use, both personally and the common equipment we all use based on job roles and hazards. Nothing lasts forever (for example: hard hats are good for 5 years), don't wait for it to break before replacement. Ensure access to first aid kits, fire extinguishers, and emergency exits.

Are everyone's safety courses up to date? WHMIS, TDG, accident/incident investigation, near misses, First Aid/CPR, emergency tasks, emergency roles, conducting drills, and train employees on evacuation procedures, training with tabletop exercises?

Remember, workplace safety is everyone's responsibility. By prioritizing safety, we create a healthier and more productive work environment for all employees.

Enjoy the new season and have a safe summer!

SMILES))

With kind regards,

Les Anderson PE, RPA

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 26*

1. A The most common system installed in most residences where the furnace is located in the basement and provides conditioned air via ducts to each room is called a:

a. forced air system
b. single zone, constant air volume system
c. low velocity terminal reheat system
d. multi-zone system
e. unit ventilator

2. The unitary air conditioning system which uses a direct expansion refrigeration system to provide cooling and dehumidification in a local area without ductwork is called a:

a. unit ventilator
b. rooftop unit
c. window air conditioner
d. high velocity terminal reheat system
e. multi-zone system

3. To offset the heat gain through the building's exterior shell from solar radiation, the atmosphere surrounding the building, and from internal sources of heat, then one of the following is required:

a. a humidifier
b. a heat source
c. ventilation
d. a cooling source
e. a dehumidifier

4. The four properties of an interior environment that most affect thermal comfort are:

a. air temperature, dew point, relative humidity, solar radiation
b. air temperature, relative humidity, metabolism, clothing
c. air temperature, relative humidity, air speed, mean radiant temperature (MRT)
d. surface temperature, surface texture, air temperature, air cleanliness

5. **Preferred conditions for thermal comfort are usually presented in the form of a comfort "zone":**

a. because there is no single ideal comfort point for any group of people
b. as a means of including a safety factor to ensure good health
c. because no one in comfort research really knows what they are doing
d. so that designers can do whatever they want, while convincing clients they know what they are doing

Roof Failure: Effect and Cause

by Karen Warseck

Behind many common roof problems lie errors in design, materials and maintenance.

The way a roof wears — the bumps and wrinkles it bears — can show a lot about why it is failing. Each type of failure — blisters, splits and punctures, to name a few — typically results from a specific cause. Poor design, for example, can lead to splits, and debris can cause punctures. Understanding the causes of the most common types of roof problems can help facility executives prevent the errors that too often shorten the life of the roof.

Ten Reasons Roofs Fail

Blisters. Bubble-like or long, thin raised areas on the roof are called blisters. Blisters are the most common roofing problem. They occur when a gas, usually water vapor, is trapped within the roofing system either between the plies or between the plies and the insulation. The heat of the sun during the day causes the gas to expand. The expansion of the gas creates a pressure within the system that pushes the plies apart, resulting in the blister.

1. **Blisters** would not occur if there were not some reason for moisture in the membrane. Two common ones are applying the roof to a damp substrate, as during a re-cover, and applying wet materials, such as felts, that have absorbed dew or rain on the edges. The moisture that causes blisters can often be traced back to another problem: improper storage of insulation, which allows water to soak through holes in shrink wrap or at the bottom of the stack where shrink wrap doesn't cover. Moisture can also get into

a roof installed in the presence of rain, snow or dew.

2. Open laps. Open laps in the field membrane, but especially in the flashings, are another problem. Open laps are just carelessness on the part of the installer. Usually it means that the installer has failed to apply adhesive to the entire lap. Sometimes it is caused in built-up and modified-bitumen systems when the bitumen is applied too cold. The laps appear to be closed, but open up as the roof ages.

In single-ply membranes, open laps are usually caused by improper surface preparation, such as adhering to a dirty membrane, heat welding at too cold of a temperature, not allowing the adhesive to dry properly or applying too much or too little adhesive.

3. Splitting. The most common splits occur when a metal accessory is flashed with a membrane material. As the temperature changes, metals and membranes expand and contract at very different rates. Because the membrane generally cannot move as much as the metal, it will eventually fatigue and crack when it is adhered to metal. This problem is not as common with single -ply membranes with better expansion and contraction capabilities, but it is common in asphalt and coal tar systems.

Splits occur frequently in expansion joints. Contractors rarely know how to properly terminate an expansion joint cover. They run it to the wall and stop it dead. Unfortunately, the movement in the building does not stop at the end of the expansion joint and, consequently, it rips open any attempt to seal that edge. Splits are also common at joints within the expansion joint cover itself.

Splits are not limited to flashings, however. As most roofs age, they become more brittle and less resilient. This means that they become less resistant to movement from common sources such as temperature changes, foot traffic and substrate movement. Because the roof cannot flex or stretch as well as it did when new, it cracks.

4. Punctures. The most preventable failure symptom, punctures usually occur because of carelessness on the part of people visiting the roof: HVAC technicians, window washers, painters, maintenance staff, smokers and tenants. Punctures can also occur because of debris left, blown or tossed on the roof. They may appear as tears or holes.

5 Penetrations. Another common failure location is penetrations. Of particular concern are pitch pans. There are three failures common to pitch pans: the sealer itself, the container in which it sits and the penetration to which the sealant is supposed to adhere.

Almost all sealers used in pitch pans will crack eventually due to loss of plasticizer or aging. If the penetration is not stabilized, vibration or movement of the penetration can cause the sealant to crack around the penetration. If a penetration is not thoroughly cleaned of asphalt before installing pourable sealers, the sealer will not adhere to the penetration.

Other types of penetration flashings also can fail. Concrete curbs filled with sealer will crack if not fully supported underneath. Metal pans eventually rust and lose adhesion to the sealer. Rubber and plastic boots will deteriorate with ultraviolet radiation exposure. The sealant used at metal penetration flashings eventually deteriorates with exposure and may not seal to the penetration if the penetration has not been properly cleaned before installation. The penetration flashing may also leak if the wrong diameter flashing is used or the cover is not correctly installed.

6. Wrinkles. Wrinkles can occur both in the flashings and within the membrane itself. When there is differential movement between the roof deck and the perimeter, the flashings will wrinkle on a 45-degree angle. When a wrinkle reaches the edge of a membrane or flashing, the opening left at the end of the wrinkle is called a fishmouth because of its bass-mouth-like appearance. Depending on the ply in which the wrinkle occurred, the fishmouth can be a tunnel for water to get down into the building.

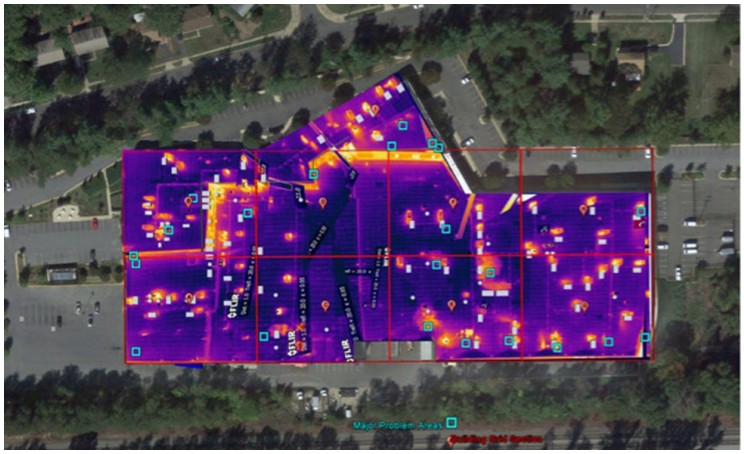
Wrinkles within the membrane will eventually fatigue and crack. Because they are raised above the surface of the roof, they are more prone to traffic damage, scuffing and surfacing loss than the rest of the roof.

7. Flashings. Flashings must be fastened at the top to prevent the membrane from slipping down the wall or curb, or to keep the membrane from creating a funnel into the building. A flashing normally terminates under a metal counterflashing. If it does, the counterflashing can create problems if the top is not properly sealed or the sealant has failed. If the metal counterflashing does not lap the membrane enough, it may fail to divert water from the flashing and instead funnel water into it

8. **Surfacings**. Surfacings on membranes may provide protection from ultraviolet radiation and damage from traffic on the roof. They also may be a component of the fire rating of the roof. In the case of ballasted roofs, surfacings may be the only thing keeping the roof in place other than gravity. When the surfacing gets displaced or worn off, either from foot traffic, repair persons, wind, etc., this protection no longer applies.

9. Fasteners. In mechanically attached roofing systems, movement from wind will cause fasteners to rock back and forth with the gusts. Eventually, this movement causes the hole in the deck around the fastener to enlarge and the fastener to back out. The fastener heads can eventually puncture the membrane from below. But fastener back-out is not limited to single-ply membranes. It is also a common occurrence in metal roofing and in metal accessories on membrane roofs. In these cases, the backed-out fasteners leave holes where water can directly enter the building. This is an especially serious problem when a coping —the metal cap on the top of a parapet — is fastened through the top of the horizontal portion and not through the vertical flanges.

10. Abuse and Neglect. When it comes to mistreating a roof, the most common culprits are air conditioning



and maintenance technicians, window washers, and sign installers. It is not unusual to see debris — ranging from screws and bits of sheet metal all the way up to empty refrigerant canisters and abandoned HVAC units —left on roofs after an air conditioning repair visit.

Small debris can cut into the roof if the debris is stepped on; large debris will work its way into the roof membrane during the hot months of the year. Sign installers routinely install conduit through the walls without properly sealing the penetrations. The water that gets into those penetrations works its way through the walls and into the building, disguised as a roof leak.

Window washers and painters hang access equipment over the side of the roof, kick flashings and damage parapets, allowing leaks to occur. All of these groups of people can wreak havoc on base flashings, which get kicked, punctured with tools and machinery, and have mechanical equipment run up against them.
Owners contribute to the early demise of their own roofs by not properly maintaining them and failing to repair small problems, before they become big ones.

Staying Out of Trouble
Preventing problems begins with the design of the roof and choice of materials. The roof membrane chosen should reflect the characteristics of the building. For instance, if there will be a lot of foot traffic, the facility executive should plan on using a system that will be resistant to such damage. If the roof is wide open and there will be a great deal of thermal movement in the structure, a stretchable material such as an EPDM membrane is a better choice than a system that has limited elongation capabilities.

Details must be carefully thought out prior to installation. For example, a transition from a gravel stop to a parapet is a poor building design that must be compensated for in the roof design. A metal transition piece can help alleviate problems that occur as a result of differential movement and different directional movement between the gravel-stop portion and the parapet portion. Correcting slope -to-drain problems should be determined at the design stage.

Second, the roof must be properly installed. This means using dry materials and installing them according to the design details or manufacturer's requirements. Expansion joints have to terminate in a way that the end of the joint will still compensate for building movement. This means that there should be no material crossing the joint — not gravel stops, not copings, not membrane and certainly not roofing cement — that cannot flex or move with the movement of the structure. Seams should be adhered.

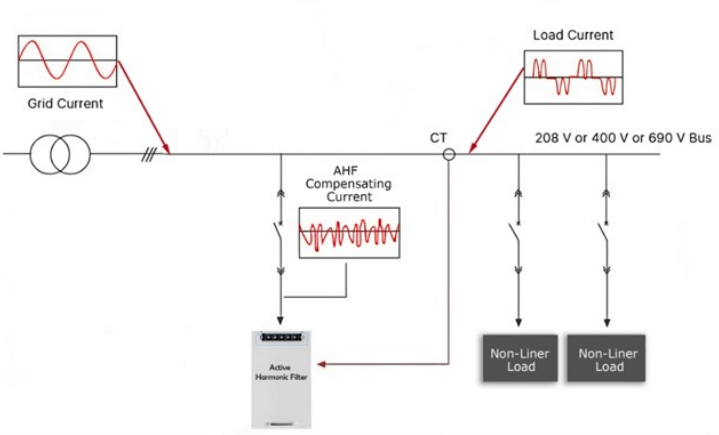
Finally, the roof must be maintained. Roof access should be limited to only those who need to be there. Keep smokers, lunches and sunbathers off the roof. Not only will the cigarettes burn holes in the membrane, the foot traffic will damage the surface and cause the roof to fail prematurely. Owners should monitor the activity of sign installers and window washers to be sure that they are not damaging the roof as they work. New HVAC installations should be flashed not by the mechanical contractor but by a competent roofing contractor to be sure that the penetrations are sealed.

The roof itself should be examined twice a year and drains cleared and roof debris removed. All small problems like punctures and sealant failures should be addressed at this time to be sure that they are not causing problems that will lead to failure. A roof's life is finite, but it doesn't have to be short lived. Some common sense when designing the roof, some attention to detail when installing it, and some care when using it will maximize its life.

Article reprinted with permission

Utilizing an active harmonic filter in our electrical facility offers several compelling benefits

Mohsen Abedi P.Eng, PSM.Eng



Active harmonic filters (AHFs) are power quality devices designed to mitigate harmonic distortions in electrical systems. These distortions are caused by nonlinear loads such as computers, variable speed drives, and other electronic equipment, which can lead to several issues in power systems. Here are some advantages of using active harmonic filters:

1- Harmonic mitigation: The primary advantage of AHFs is their ability to effectively mitigate harmonic currents and voltages in the electrical system. By injecting equal and opposite currents to the harmonic currents generated by nonlinear loads, AHFs cancel out the harmonic components, resulting in a cleaner and more stable power supply.

2- Improved power quality: Harmonic distortions can cause voltage fluctuations, flickering lights, overheating of equipment, and interference with sensitive electronic devices. The use of AHFs helps to maintain a high-quality power supply, reducing the risk of equipment failure and enhancing the reliability of the electrical system.

3- **Increased energy efficiency**: Harmonic distortions can lead to increased power losses and reduced energy efficiency in electrical systems. By reducing harmonic currents, AHFs help to optimize power factor and reduce energy consumption, leading to cost savings on electricity bills.

4- **Minimized overheating and equipment damage**: Harmonic currents can cause additional heating in transformers, cables, and other electrical components. Over time, this can lead to premature aging and damage. AHFs help to limit these currents, thus reducing the risk of overheating and extending the lifespan of electrical equipment.

5- Easy adaptability: Active harmonic filters are flexible and can be easily adapted to various loads and operating conditions. They can be programmed to target specific harmonic orders and adapt to changes in the system, making them suitable for a wide range of applications.

6- Compatibility with other power factor correction devices: AHFs can work in conjunction with other power factor correction devices, such as capacitors and static var compensators, to provide a comprehensive solution for power quality improvement.

7- Support for renewable energy integration: As the use of renewable energy sources like solar and wind power increases, AHFs can help manage the intermittent and variable nature of these sources by ensuring stable power supply and mitigating harmonic distortions caused by power electronics in renewable energy systems.

Overall, active harmonic filters offer significant advantages in maintaining power quality, complying with standards, reducing energy costs, and prolonging the life of electrical equipment in industrial and commercial applications.

Mohsen Abedi P.Eng, PSM.
Technical Consultant | Senior UPS Systems Specialist | Electrical engineering design | Power electronic systems design | Power quality systems & Harmonic

Signs of Sealant Trouble

Guidelines for finding potential trouble spots in building facades before they affect facility operations.

Sealants are a primary defense against water penetration and air infiltration in building facades. Their performance is critical to the overall performance of the entire building envelope. Problems related to sealants usually result from a range of conditions affecting performance, including inappropriate sealant selection, inherent problems in the sealant, and aging and deterioration.

Signs of failure.

Four general conditions usually evaluated in assessing sealant failure:

✦ Adhesion, or the bond of the sealant to the substrate. A loss of adhesion results in a separation of the sealant from the substrate. This usually is visible in openings along either side of the joint but may not be immediately obvious if the joint is compressed.

✦ Cohesion, or the internal integrity of the sealant. A loss of cohesion is indicated by cracking parallel to the joint interface.

✦ Elasticity. A loss of elasticity can contribute to adhesive or cohesive failure and is indicated by the inability of the sealant to recover after deformation and especially by an increased hardness of the material.

Weathering, which is indicated by chalking, discoloration, random or alligator cracking, wrinkling, erosion, or excessive softening of the surface region of the sealant.

Improper installation also can contribute to failure. For example, all sealants must be able to

accommodate movement of the joint. Sealants typically are installed with polyethylene bond breaker tape, compressible foam backer rod, or other means to prevent adherence of the sealant to the back, as well as to the sides of the joint. If the sealant is adhered to the back, as well as the sides, it cannot expand or contract without tearing.

If sealant is installed when the substrate or ambient temperature is too cold below 45 degrees — the joint may be at its widest dimension through contraction of adjacent materials. The sealant might not be able to accommodate the subsequent cyclic expansion of the joint upon heating.

Conversely, if the sealant is installed when the temperature is too high — above 90 degrees — the joint may be at its narrowest dimension, and the sealant may be unable to accommodate cyclic expansion of the joint upon the cooling of the substrate.

Low temperatures directly retard the cure of most sealants, and if installed at very cold temperatures, frost contamination on the surface likely will interfere with proper bonding. If installed at a very high temperature, the sealant may flow.

This is especially likely to occur with dark-colored sealants in locations exposed to direct sunlight. The durability of some polyurethane sealants can be seriously reduced by high-temperature curing.

Finding a cause

Joint sealant investigations rarely turn up a single cause of joint failures. Here are some of the common suspects in the search for suspects.

✦ **Mixing.** Although sealant manufacturers supply specific directions, many two-part sealants are mixed incorrectly. One example of this is a normal sealant bead that is interrupted by areas of uncured sealant. Sealant applicators should make sure to closely follow manufacturer directions for product use.

✦ **Joint substrate.** It can be difficult for a building sealant to adhere properly to this type of a surface. In some types of concrete panel construction, the exposed aggregate can create a very irregular surface. The aggregate in the concrete panels is often loosely bonded to the

panels. Thermal strains imposed by the sealant or freeze/thaw cycles cause the aggregate to detach from the panels. This can leave a void that lets water pass into the building.

Primer problems. Another common sealant adhesion problem involves primers. New metal finishes and glass coatings often make sealant adhesion difficult. In the most complicated installations, one type of primer is specified for one side of a joint, while another is specified for the other side. This specification almost guarantees the two primers will contaminate each other within the joint.

Checking out sealants

The goals of should be to determine the condition of the existing sealant, causes of deterioration or failure, whether problems with the substrate or adjacent materials are related to a sealant problem, and whether the sealant can be selectively replaced or requires complete replacement.

The investigator should understand different sealant types and the wall or paving system being investigated. It may be useful for the investigator to review original construction documents and those for repairs to determine what sealants and primers were specified, to what substrates the sealants bond, the location of weeps or sources of water, whether backer rod and bond breaker tape were specified, and the extent of repairs performed since the installation.

Mixing to Match

Certain types of sealants cannot bond to certain other sealants. It is generally desirable to avoid installing a sealant over an existing sealant, as this usually results in poor geometry for the new sealant joint and limited adhesion to the substrate.

For all sealants, improper priming or cleaning of the substrate can lead to adhesive failure. Solvent-based sealants placed over thermoplastic coatings, such as certain breathable masonry paints, can soften or partially dissolve the coating, causing partial failure within the paint or at the paint/substrate interface as the sealant shrinks.

Urethane sealants

Problems with multi-component urethanes usually are related to incomplete or improper mixing. If mixing is incomplete, portions of the sealant will be fluid or uncured. Incomplete curing also can be the result of using materials beyond their shelf life or, under certain circumstances, from improper formulation.

To evaluate problems that may be related to incomplete curing, it is best to sample sealant that has cured properly for comparison with sample that has cured improperly. Also, it is possible to purposely incorrectly proportion components in the laboratory for comparison with samples taken from the building. Curing at high temperatures — around 120 degrees — can make some urethanes vulnerable to premature degradation in ultraviolet light, leading to severe reversion.

Silicone sealants

The most often observed problem with silicone sealants is staining. Staining can be indicated by dirt accumulation on the sealant itself or by migration of the sealant plasticizer in the adjacent substrate.

Stone substrates are particularly vulnerable to migration and staining from silicone sealants with a high percentage of fluids. Silicone sealants installed on glazing are susceptible to poor adhesion if there are contaminants on the glass surface, and the sealant itself may leave deposits on the glazing if improperly cured.

The information for this article was provided by Wiss Janney Elstner Associates Inc., an architectural, engineering and materials science firm based in Northbrook, Ill. specializing in investigation, repair and preservation services for historic and contemporary buildings and structures.

KenKen Puzzle

How to solve the Kenken puzzle:

(Answers on page 23)

- 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

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

Evolution of the Building Systems MSI

Brian Turner

Buckle in. This is going to cover a lot. It will seem like I am going off topic, and in some ways, I am, intentionally. This is not a chatbot driven article with a ton of referenced research support these opinions. Rather, I am sharing my insights based on 25 years in this industry that has given me so much. The disruption to the short-term economic uncertainty of a lot of the built environment is very real, but there are plenty of opportunities as well. The tumultuous market we have experienced since 2020 has exposed so many things that were easy to ignore or dismiss when times were great. It seems as though Black Swan events do that once in a while, so let's dive in.

The acronym MSI carries so many definitions in the building systems market today that it is difficult to have any expectation of what to expect from an MSI. The fact is that the role of an MSI in the building systems has evolved so much over the last 20 years, that it has become largely unrecognizable, even to the organizations who consider themselves to be MSIs. Strange, but true.

Definitions are key to understanding

At the most basic level, the MSI (Master Systems Integrator) is the company who will design and integrate building systems into a common network, database, IDL (Independent Data Layer), workflow, and/or user experience. Sounds simple enough until you stat to unpack each of these and follow the rabbit hole that each will take you down. Understanding the why, what, and how for each system is extremely important when deciding what data is required, how it is integrated, managed, and utilized. The MSI will continue to engage with the client over the life of the building to continue the evolution of the what it means to operate a smart building. Too much, too soon? Let's take a step back in the evolution…

The Building Systems MSI has evolved from HVAC controls contractors, who are also commonly referred to as system integrators. This term was updated when it become practice to integrate communication protocols like Lonworks, BACnet, Modbus, OPC, and others into a common platform. Tridium launched in 1998 and quickly simplified what had been a highly complex exercise. It also allowed for controls contractors of various size and skill levels to characterize themselves as System Integrators. The most common systems to be integrated into a common platform, like the Niagara Framework™ by Tridium, since 1998 are HVAC controls, energy metering, and lighting controls. They are not necessarily concerned with the Why for any specific project as it is typically specified in the project documents. They are there to install the systems contracted and move on, ideally with an annual service contract to maintain the installed systems.

There are other contractors in the building vying for the MSI role as well. The list of possible MSIs includes the lighting controls contractors, access control and security contractors, IT contractors, electrical contractors, irrigation contractors, plumbing contractors, etc. I like to refer to these different contractors generically as Building System Contractors (BSC). Each of them is installing a system that may of may not have data that is interesting to the use case the owner or operator is interested in. Most modern systems in each of these categories include intelligent devices that can deliver data, will sit on a network, and must be managed.

The motivations for the Master System Integrator and Building System Contractor are wildly different.

Obvious truths are sometime difficult to acknowledge and challenging to accept.

What happens next is where a lot of the confusion starts to take shape. The creation of the Internet of Things (IoT). This new paradigm created IoT solutions for every industry that turned sensors into systems and pushed internet connectivity to edge. The thirst for data became the leading reason "why" which ultimately drove a need for another level of provider. But let's not get ahead of ourselves. The desire for data has exposed so many other questions and concerns that need to be addressed. Some of the questions to be answered:

- How do we secure our data?
- What is the network architecture?
- Who will manage the network(s)
- Are the building systems operating properly?
- Do we have accurate energy meter data?
- Who are the service providers? What is their skillset?
- Independent Data (Access) Layer ... What is that?
- Many...many more

The quick answer was to develop a new acronym for the system integrators with the skill level and interest in connecting these new sensor clouds, that used to be part of a higher level system, into the building management system. The protocols required started to look more like APIs rather than field bus protocols that are so common in building systems. Although this network change caused some angst, **the delivered outcomes are still very much the same as they have been for more than 20 years.** In an effort to further distance this new role from the system integrator, many added expertise in IT and networking. New products were introduced to the market to make it easier for non -IT contractors to install and manage these new OT networks. And now, we have the **first definition of the MSI** for building systems. This has caused another budding conflict with cyber-security, network security, network ownership, network design that is best left for another day.

There is real value in Building System Contractors and Master System Integrators. It is extremely RARE that the two competencies exist in the same organization, especially amongst many disciplines.

Let's start by taking a look in the advancing technology in the building systems. Each domain specific building system is increasingly more intelligent. Analytics are running at the edge. Communication amongst devices is increasingly peer to peer and decisions are being made without the need of supervisory controllers. The systems also are being designed to be good citizens in the emerging architectures for connected grid solutions and enterprise applications. The expertise required to be employed by the BSC to implement these new solutions is far greater than it was just a few years ago. The expertise to maintain each of these systems generally requires manufacturer specific knowledge as well as specific domain knowledge. We are witnessing increased complexity and required depth of knowledge as we pursue improved overall building performance.

The MSI is also being challenged to step into a new world of complexity as well, though the path is much

less clear. Many requests are first time requests, or have been executed sparingly in the market such that there is no obvious or well-traveled path to a repeatable solution. Many of the solutions are provided case by case, which is not scalable for any business, much less an entire industry.

Now, let's take a look at the evolution of the use cases being requested from building owners and operators.

- Allow tenants to specify temperature and lighting preferences for conference room booking.
- Combine the utility data with near-real-time occupancy and comfort data to ensure we are not over-conditioning, or under-conditioning, a space.

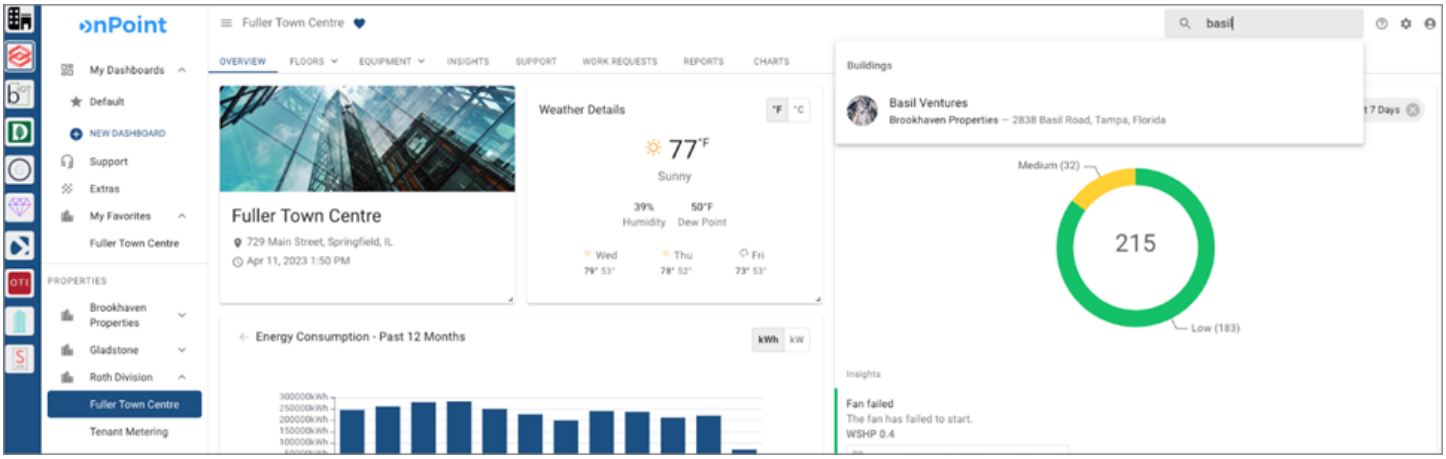
Integrate near-real-time data in each building system with the corporate asset management system, ensuring the corporate asset management system is the source of truth for all meta data and asset information.

I could go on and on, but I think this starts to illustrate a bit of the expertise required for the MSI, but not necessarily for the BSC. The MSI is expected to combine some aspects of consulting, cyber-security, software development, data management, user experience, system integration, platform deployment, building performance, grid connectivity, business system integration as well as interacting with IT and business operations on security, privacy and work flows. In many projects, the role of the MSI is being executed by a team of experts, many times from different companies to deliver the desired results. The expertise require is multi-disciplinary and requires in depth knowledge in several of these disciplines.

The MSI is also expected to deliver and deploy one or more platforms to solve the variety of use cases for the client. In many cases today, the MSI is the creator of at least one of the platforms being delivered, but this is not a requirement of an MSI. This is the case much of the time today given the adoption stage of the industry as a whole, but it is expected the number of platforms will reduce over the next several years and the number of MSIs will increase. The platforms are evolving as well, and the use cases that create the most value for users of the platforms are driving the innovation and roadmaps of the platform companies.

Gaining a clear understanding of the user profile is important to the overall success of the MSI. There are many potential users of the platforms being deployed, and many of them do not cross over in skillset. For example, the energy manager has different goals than the mechanical service provider and the Regional VP is focused on well informed reporting, but is not necessarily interested in the minutia of the systems creating the data. Many times, the eventual stakeholders that will determine the overall success of the platform deployment are not part of the decisions making or selection process. You read that right...stated differently: many of the users of the platform are not in the room when the decision is made. This can work out well, but can also lead to internal conflict and underutilization of the platform post deployment.

Not all platforms are created equal and every platform is not necessarily a fit for your building or portfolio. In some cases, it may make sense to have multiple



platforms in the portfolio working together to achieve the corporate goals. It is easy to see the obvious alignment between platforms like Measurable, Planon, and onPoint, but it may be less obvious to see Clockworks and onPoint in the same building or portfolio. The truth is that each building, campus, or portfolio will have its own journey and will make use of multiple tools. Technology is not slowing down for us to pause and reflect for very long. We will start seeing language user interfaces (LUI) enter the smart building space very soon and we will need to be ready to deploy LUI based solutions consistent with the cyber-security, privacy, safety, efficiency, comfort, and ESG performance policies that form the foundations of success today.

The right team of Smart Building Consultant, Master System Integrator, and Building System Contractors will create the best overall chance for success.

Changing the conversation again...we start to explore the desired outcomes which are moving from energy savings to ESG performance. Sometimes these two are aligned, but in many cases, these two things are in direct conflict. The return on investment is morphing into a different kind of return, which is not always easy to track directly to the bottom line. We have often spoken internally about adding a dial to give the operator the ability to control buildings systems based on priority ranging from human comfort, safety and security, energy efficiency, and ESG performance. There can also be a balanced approach, but each of these will have an impact on the financial ROI. This topic is again, for another day, but it is key to getting the conversation moved to action.

Brian TurnerBrian Turner
CEO @ Buildings IOT | LEED AP, AutomationCEO @ Buildings IOT | LEED AP, Automation
Published • 11mo

Article reprinted with permission

Eco-Efficiency Meets Reliability: Generators Transforming Condo Energy Use

Condominium buildings often feature a suite of amenities, security systems, lighting, elevators, and other critical infrastructure that require a constant supply of power to function effectively. The loss of electricity can bring inconvenience, financial loss, and even safety risks to residents. To mitigate these risks, installation of standby generators, prime power generators, and combined heat and power (CHP) systems is a common practice.

Standby generators provide a reliable power supply in the event of a main grid failure, ensuring essential services remain operational. Prime power generators are used in situations where the grid is unavailable or unreliable, functioning as the primary source of power for prolonged periods. Lastly, CHP generators not only produce electricity but also utilize the heat produced in the generation process for heating spaces and water, leading to increased energy efficiency.

Importance of Generators in Condominium Buildings

Generators in condominium buildings serve vital roles, from providing an uninterrupted power supply to ensuring safety during emergencies. They are a critical infrastructure component in modern residential complexes.

Ensuring Continuous Power Supply

A standby generator is essential in condominiums for maintaining electricity during utility outages. It kicks in automatically, minimizing disruption by powering essential functions such as elevators, lighting, and water systems. For instance, units in a condominium may rely on a standby generator when the main power source fails, ensuring residents are not left in the dark.

Meeting Peak Power Demand

Prime power generators support condominiums during periods of peak power demand, which can occur during extreme weather conditions or when the grid is overtaxed. These generators can operate continuously without runtime restrictions, catering to variable loads as needed. They are especially useful in condominiums without access to ample grid power or in developing areas where the energy infrastructure is still evolving.

Safety and Emergency Preparedness

For safety and emergency preparedness, condominiums must have reliable backup systems. These include generators specifically designed for emergencies, which may power security systems, fire alarms, and communication networks. Toronto's condo backup power generators, for instance, are mandated to ensure resident safety during grid failures precipitated by events like ice storms.

Types of Generators for Condominiums

Condominium buildings require reliable power sources to ensure uninterrupted electricity for residents and to maintain essential building services. Different generators are used to meet varying needs, from emergency power to daily energy supply.

Standby Generators

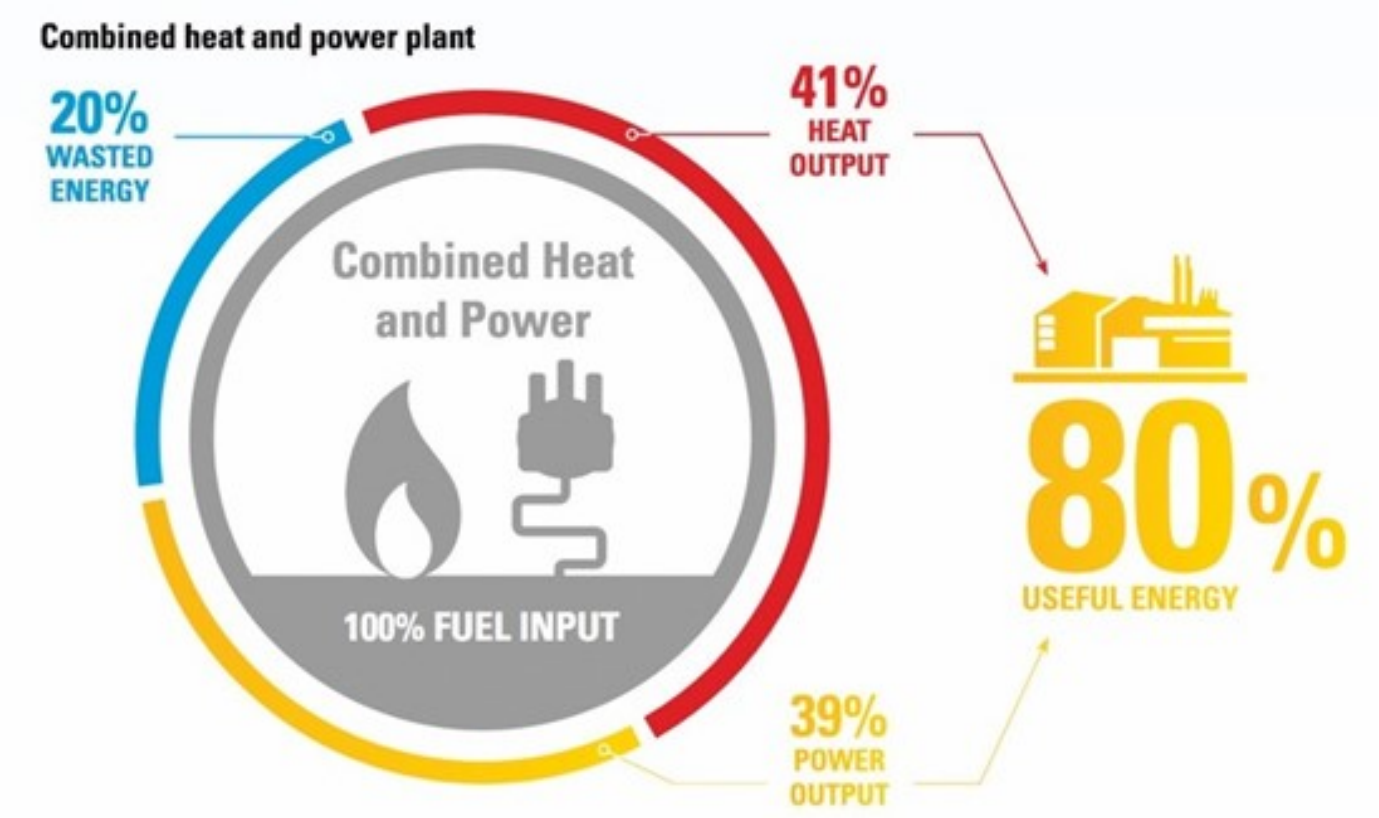
Standby generators are critical for condominiums, providing emergency power during outages and preventing the inconvenience and safety hazards of a blackout. They automatically engage when the utility power fails to provide power to the services and equipment tied into the emergency panel, like elevators and lighting. These generators are typically quieter and are designed as a permanent installation, positioned to seamlessly supply electricity to the entire building or critical systems.

Prime Power Generators

Prime power generators serve as the main power source in the absence of a reliable local grid or where a constant power supply is a priority. These generators are robust and can run continuously to keep a condominium powered at all times. They may be used in remote locations or in buildings where power is critical, such as in complexes with numerous residents relying heavily on electrically powered medical equipment.

Combined Heat and Power Generators

Combined Heat and Power (CHP) generators, also known as cogeneration systems, simultaneously produce electricity and thermal energy from a single fuel source. They are extremely efficient and reduce overall energy costs. For condominiums looking to maximize energy usage, CHP systems can provide not only electricity but also heating and hot water, capitalizing on the fuel source to its



full potential and resulting in lower environmental impact.

Considerations When Choosing Generators

When selecting generators for condominium buildings, administrators must evaluate specific factors to ensure a match between the power infrastructure and the building's demands. These considerations directly impact the generator's efficiency, compatibility, and environmental footprint.

Power Capacity Needs

Condominiums vary greatly in size and power consumption, necessitating a tailored approach to determining the ideal generator capacity. For standby generators, which provide emergency power, it is vital to calculate the load based on critical systems such as lighting, elevators, and security. Prime power generators, on the other hand, are intended for continuous operation and their power output must be assessed to handle the full load during extended outages or when utility power is consistently unreliable. Any surplus power supplied by one or more prime power generators can be sold into Distributed Energy Resources (DER's) that are becoming increasingly common.

Space and Location Constraints

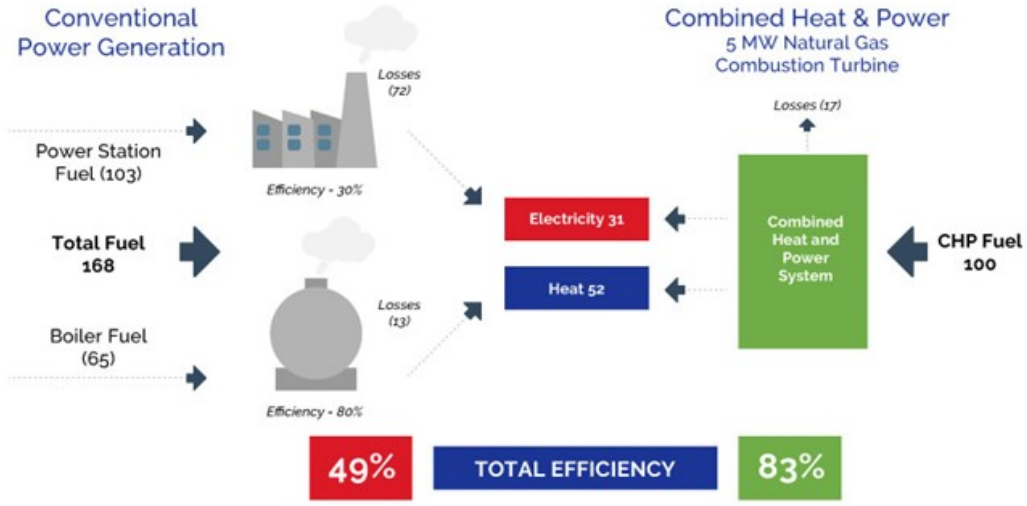
The physical placement of generators is dictated by the building's architecture and available space. Standby generators often require less space and can be sited outdoors if necessary. Prime power units might be larger due to increased capacity demands and a corresponding need for proper ventilation and fuel storage. Thus, careful measurement and planning must ensure the generator fits the allocated area, with ample clearance for maintenance and adherence to life safety standards.

Environmental Considerations

Generators' environmental impact is a significant factor, especially for condominiums in urban areas where regulations may be stringent. Standby and prime power generators must adhere to emissions standards, necessitating the selection of models with the latest technology to reduce pollutants. Noise pollution also plays a role; units should possess acoustic treatments to minimize disruption to residents. Furthermore, **combined heat and power (CHP) generators** offer an efficient solution by capturing and repurposing waste heat for the building's heating needs, thus optimizing energy use and reducing greenhouse gas emissions.

Examples of Generator Usage in Condominiums

Understanding the specific application of different generators can exemplify their necessity in condominiums. Each type serves a distinct function, ensuring that residential needs and emergencies are competently managed.



Standby Generators in Action

In condominiums, standby generators are crucial for providing uninterrupted power during outages. For example, a condominium may utilize a standby generator to maintain essential services like elevators, security systems, and lighting in common areas. These generators typically operate automatically, activating within seconds of a power interruption and are known for being quieter than portable models, equating the noise level to that of a central air unit.

Prime Power Generators at Work

Prime power generators play a vital role when reliable utility power is not available. In a condominium building undergoing construction or renovation where the power supply is not yet stable, or in areas with frequent power cuts, a prime power generator can serve as the main power source, operational for a preset number of hours annually under a non-variable load selling surplus power to a Distributed Energy Resource (DER).

Benefits of Combined Heat and Power

Combined Heat and Power (CHP) systems in condominiums not only provide electricity but also utilize the waste heat from electricity generation for heating and hot water, increasing energy efficiency. Building swimming pool heating costs are usually nullified after installing a CHP. A condominium utilizing CHP can significantly reduce energy costs and carbon footprint by harnessing thermal energy that would otherwise be wasted, making it an eco-friendly power solution.

Generators play an indispensable role in condominium complexes, ensuring a continuous power supply, safety during emergencies, and enhanced energy efficiency. Standby generators offer a safety net during power outages, prime power generators fulfill the demand for reliable electricity where grid power is lacking, and combined heat and power (CHP) systems optimize energy use by producing both electricity and heat from a single fuel source.

This multifaceted approach to power generation ensures that condominium residents enjoy uninterrupted access to essential services and the comfort of their homes, underscoring the importance of integrating robust power solutions in modern residential designs. By prioritizing these systems, condominiums can significantly improve their resilience to power disruptions, contribute to environmental sustainability, and offer a higher standard of living to their inhabitants.

National Business Development Manager @ T&T Power Group | Business Development National Business Development Manager @ T&T Power Group | Business Development

Article reprinted with permission

Kickstart your career as a Building Operator

BOMA Calgary's Building Operator Training Course is designed for those wanting to gain more knowledge on commercial building operations and taught by industry veterans.

If you are looking to begin your career in building operations or are currently employed in the industry but want to further your own professional development, this course is for you.

It teaches to the 5th Class Power Engineering standard, allowing you to take the ABSA exam when the course is complete.

Click Here to Register

The 5th Class power Engineering Course will begin on Thursday February 23, 2023 and will take place every Tuesday and Thursday evenings from 5-8pm
The course will be held online only using Zoom.
The fee for enrollment will cover the cost of the 150 hour course, textbooks, and BOMA certificate upon completion
please note this does not include the ABSA exam
The total cost including GST is $2,199.75
Questions? Email Lloyd Suchet at lloyd.suchet@boma.ca for more details.

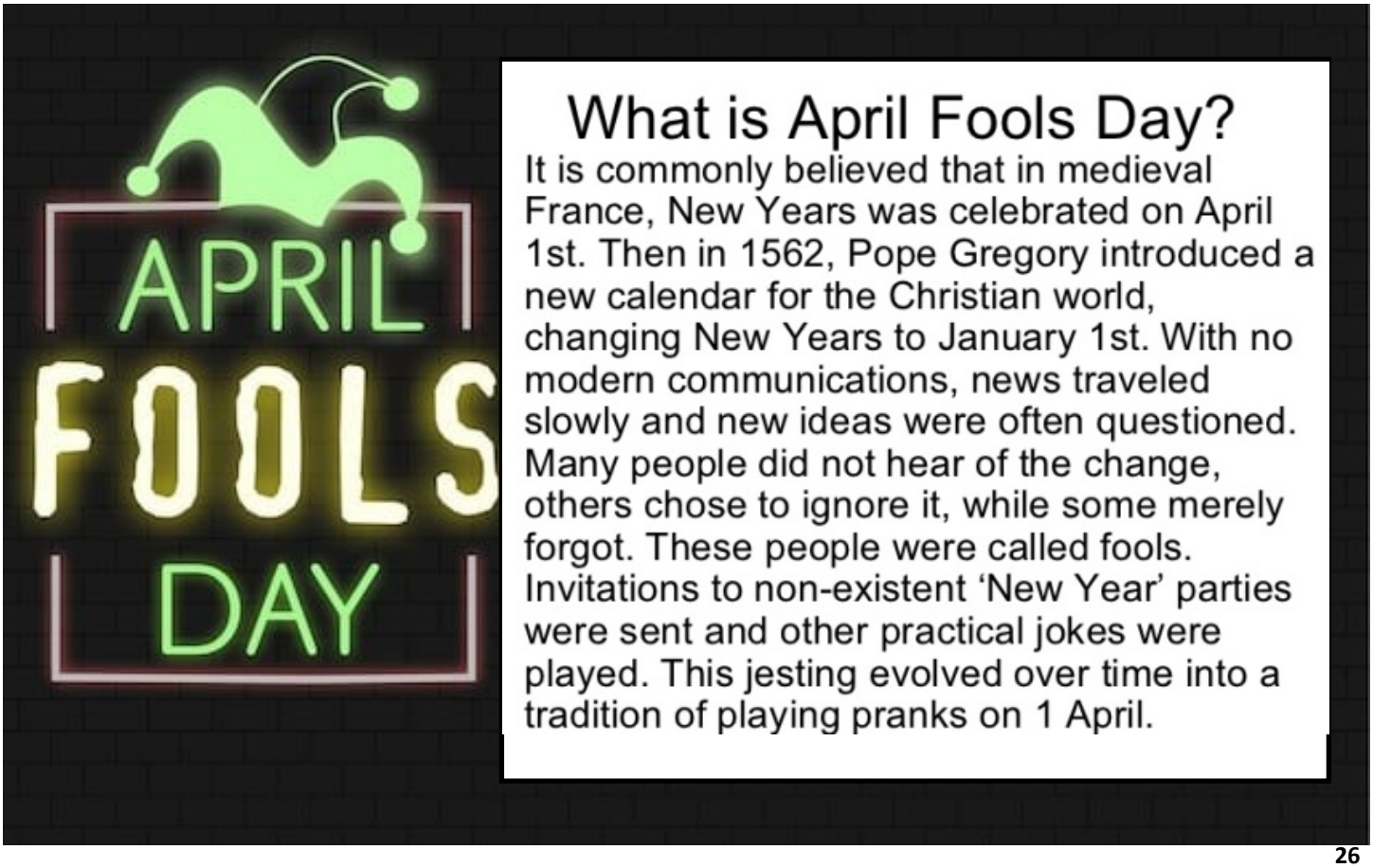
BOMA Calgary | Suite 225, 550 11th Ave SW, Calgary, AB T2R 1M7 | info@boma.ca | www.boma.ca

Kenken Puzzle Answer

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

TEST YOUR OPERATOR IQ ANSWERS

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



What is April Fools Day?

It is commonly believed that in medieval France, New Years was celebrated on April 1st. Then in 1562, Pope Gregory introduced a new calendar for the Christian world, changing New Years to January 1st. With no modern communications, news traveled slowly and new ideas were often questioned. Many people did not hear of the change, others chose to ignore it, while some merely forgot. These people were called fools. Invitations to non-existent 'New Year' parties were sent and other practical jokes were played. This jesting evolved over time into a tradition of playing pranks on 1 April.

JOIN US:
TUESDAY APRIL 9, 2024 AT 5PM FOR OUR IN-PERSON MONTHLY MEETING

Title: The Benefits of Integration with your Buildings Security System

What will impact you the most for analytical features that comes with a fully integrated Security system. How do you leverage this to your benefit?

Presenter: Caleb Pothier – Protech Integrations – Owner and C.T.O

Location: Danish Canadian Club, 727 11 Ave SW, Calgary, AB T2R 0E3

Bio: Caleb has 10+ years in the industry and has seen it evolve and has been part of some of the evolutions that we see now. With a full network administration degree and always thinking outside the box, he has made a name for himself in industry. He is backed by some of the largest security manufacturers in the world to help come up with solutions for all your needs.

Just for laughs!

BOA CALGARY OPERATOR MAGAZINE ADVERTISING RATES:

1/8 page	$200	**Premium Locations:**	
1/4 page	$400	1/2 page inside/outside cover	$850
1/2 page	$775	1/2 page outside cover	$900
Full page	$1000		

Deadline for ads is the 10th of each month. For any questions, please email: advertising@boacalgary.com.

BOA Building Operators Association of Canada

Thank you to our incredible sponsors! Your support of the Building Operators Association is invaluable!!

GOLD LEVEL SPONSORS

Hallmark Housekeeping Services Inc. · REV Engineering Ltd. · James Electric All the parts. All the time. · REGGIN Technical Services Ltd. · Solutions Water Management Ltd · TMP · AINSWORTH · SERVPRO Fire & Water - Cleanup & Restoration

SILVER LEVEL SPONSORS

GWL Realty Advisors · CBRE · CCIS · Morguard · Bee-Clean Building Maintenance · ARPI's Industries Ltd.

BRONZE LEVEL SPONSORS

BentallGreenOak · Tamas Hydronic Systems Inc. · Heat Seeking · Life Is On Schneider Electric

Advertisers Directory

Boiler Services **Black & McDonald**	**403-235-0331**
Drain Services Revive Pipes	403-903-4445
Engineering Services Building Envelope Engineering	403-287-0888
Filtration BGE Air Quality Solutions Ltd.	403-243-5941
Fire Protection Services Constant Fire Protection	403-279-7973
HVAC & Electrical Services Black & McDonald	403-235-0331
Indoor Air Quality Services Gasonic Instrument Inc,	403-276-2201
Motor Services James Electric Motor Services	403-252-5477
Power Systems Custom Power Products	855-948-8810
Supply Services DC Sales Corporation	403-253-6808

Support those that support YOU!

Next time you are looking for a product or a service provider, please consider connecting with one of our advertisers & members of the Building Operators Association of Calgary

Alberta Certified Power Engineers Online Directory

Check to see when your power engineer certificate is due for renewal!

www.absa.ca/directories/alberta-certified-power-engineers-directory/

We look forward to seeing you in-person for our meeting at the Danish Canadian Club (727 11 Ave SW) on Tuesday April 9, 2024 @ 5pm

Please visit the Building Operators Association of Canada YouTube Channel to watch the Speakers.

BOA Building Operators Association of Canada