Volume 28 - Issue 4

BOA

Building Operators Association of Canada

Official Publication of the Building Operators Association (Calgary)

December 2021

What's Inside?

Important Phone Numbers

Emergency	911
Alberta Boiler Association	403 291 7070
Alberta Labour (Emergency)	403 297 2222
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Dangerous Goods Incidents	1 800 272 9600
Environmental Emergency	1 800 222 6514
Poison Centre	403 670 1414
Weather Information (24hr)	403 299 7878

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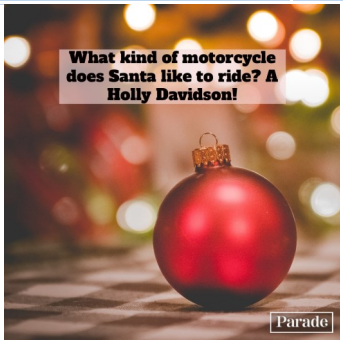
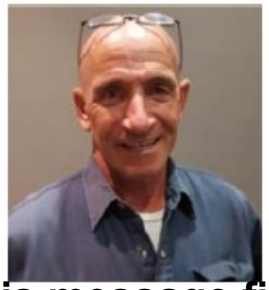


President's Message



BOA
Building Operators Association of Canada
Building Operators Association
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I hope this message finds you and yours well and in good health

The building staff is under stress again from variants of the COVID-19 virus. To run our facilities safely ASHRAE have investigated and made recommendations that all managers and staff need to read, understand and put actions into place in their buildings. Not all buildings operate the same, so it is critical to pick a method that works for your facility. A good understanding of how the virus travels within the buildings and their systems is important. ASHRAE have done a lot of research and has made some important recommendations. The website to go to is in your search engine, ASHRAE COVID. From there many links that will guide you through operational strategies that will fit your building. This situation will be with us into the future and the more we understand the safer we can keep our customers, buildings and co-workers. ASHRAE has written many articles and for the most part is understandable for the average operator.

We have as a speaker at the next meeting on December 14th Harry Wollin. Harry is a principal at TMP Consulting Engineers here in Calgary. Harry has been around this city for many years and has designed many systems here in Alberta and worked on many that needed to be redesigned to work in our northern climate. The single most important strategy we can apply to our buildings and the systems within, and it matters not what building we are running, is to have it operating as intended. Harry will talk of some operating fundamentals that we can apply to our unique building, to get it back on track. Harry will share with us his thoughts and some methods used in getting our building back on point.

It is great if you can attend the virtual meeting when the guest speaker can answer any questions you might have on the topic. We do however record and place all our meetings on the BOA website to view at your leisure.

BOMA Calgary is putting on another 5th class course beginning the 3rd of February. It will again be a virtual event there will have a limited number of students in so space will fill up early, BOMA had great success with the classes done with the students' in homes or remote settings.

So, take care of yourselves and please, be kind to one another.
Smiles))

With kind regards,

Les Anderson PE, RPA

JOIN US!

FOR OUR VIRTUAL BOA MONTHLY MEETING ON TUESDAY DECEMBER 14 2021 AT 5PM

zoom

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 18

1. A thermostat, which is sometimes installed in the return air duct, serves primarily to:

a. limit temperature of the heated outside air
b. control the throttle of the steam in the tubes
c. sense the temperature of the steam in the coils
d. minimize temperature fluctuations in discharge air
e. heat recirculated air

2. Air vents are:

a. not required when an inverted bucket steam trap is used
b. not required on the steam mains if an inverted bucket steam trap is used at the steam coil
c. not required at the steam coil if a float and thermostatic trap is used at the steam coil with an atmospheric return and the steam main is adequately vented
d. not required anywhere if a float and thermostatic trap is used at the steam coil
e. required only with hot water coils

3. Ethylene glycol used in glycol coils:

a. has a higher heat transfer efficiency than hot water
b. has less friction losses in the coil and piping than hot water
c. requires a smaller pump and less horsepower than hot water
d. has much lower pressure drops through the coil and piping
e. have a lower heat transfer efficiency than hot water

4. In a hot water coil which of the following is not included for providing a good guideline for the correct application of the system with minimal possibility of freeze-up?

a. positive air venting of the coil is essential
b. the air velocity should exceed 10 m/s
c. a constant flow of water should be fed to the coil
d. the water velocity should exceed 0.8 m/s
e. the water temperature should be maintained at a reasonable preset temperature

5. The flow arrangement best suited for hot water coils is:

a. the counter flow arrangement because it is more efficient
b. the parallel flow arrangement because it gives better protection against freezing
c. one in which the cold air enters the coil where the coldest water is flowing
d. the half serpentine
e. the triple bypass flow arrangement

Boiler Shut Down

by Harry de Jong

General

When a routine shutdown is scheduled, it should be planned so there is time to perform certain operations in the shutdown procedure.

1. If the boiler is equipped with soot blowers, and any other fuel other than natural gas has been fired, the soot blowers should all be operated before taking the boiler off the line.

All the recommended rules for operating the soot blowers should be followed. One of the most important rules is that the steam load on the boiler is 70% of boiler rating or greater. Operation at low load, with its resulting colder furnace may result in some unburned combustibles escaping from the furnace and redepositing on the tubes or collecting in pockets. Agitation of the combustibles during soot blowing at low load may result in an occurrence. Therefore, It Is Important to have all of the areas of the gas passes thoroughly swept with flue gas, thus purging any combustible gas from pockets where it may collect.

2. After the soot blowing operation is complete, the steam flow from the boiler should be gradually reduced and the burner run to the low fire position.

3. With the burner in low fire position, blow down the boiler along with the water column, gauge glass, and feedwater regulator. Turn the burner off in accordance with the burner manufacturer's instructions. If the boiler is equipped with a flue gas outlet damper, it should be fully closed to allow the unit to cool slowly.

4. Remove and clean the burner oil gun. Place the fuel supply equipment in standby condition (for gas, shut main supply cock). Throw the main electrical switch, and take the feedwater regulator out of service. Hand operate the feedwater valves to keep the water level above one-half (1/2) gauge glass.

5. When the boiler pressure falls below line pressure, the boiler stop valve should be closed if the setting has cooled enough to prevent any pressure buildup. If the boiler is equipped with a non-return valve, the valve should close automatically when the boiler pressure drops below line pressure. This, of course, isolates the boiler from other units remaining in service. As the drum pressure falls below 15 to 25 psi, the manual closing device (handwheel) of the non-return (if equipped) should be closed and the vent valve on the boiler opened. This will prevent a vacuum on the boiler waterside, which will loosen well set gaskets and cause future problems. While there is still a small amount of steam pressure available, the boiler should be blown down and filled back to a safe level with freshly treated hot water in preparation for the next Startup.

If the boiler is being shut down just for overnight or for the weekend, the foregoing procedure is generally all that is required. The primary concern

is to make sure there is sufficient water in the boiler. If the boiler is only going to be shut down overnight, the boiler can be secured and will have pressure still showing the next morning. When the boiler is insulated well enough to permit steam pressure to remain overnight, there is no danger of pressures dropping low enough to start pulling a vacuum. Then the boiler vent valve can be left closed.

Continued on page 8...

In those instances where the boiler may be left unattended long enough that the boiler cools down and does start to pull a vacuum, the piping can be equipped with a vacuum breaker valve. The valve can be installed close to the top of the steam drum or shell, preferably above the water line. As the boiler cools down and the condensing of the steam starts to form a vacuum, the valve permits air to enter the drum and atmospheric pressure will exist in the drum. One precaution must be taken in such an installation. When starting up the boiler each time, be sure the boiler vent valve is opened to evacuate all of the air that has been trapped in the boiler and boiler water.

Up to this point, we have been talking about shutting down the boiler for just a few hours or a few days. If the boiler is going to be taken out of service for several weeks or several months, then a different procedure must be followed.

Wet Storage

There are two (2) basic methods of laying up a boiler for extended periods of time. They are wet and dry storage.

If the unit is to be stored for no longer than a month and emergency service is required, wet storage is satisfactory. Wet storage is not generally employed for boilers that may be subjected to freezing temperatures. Several alternative methods may be employed.

1. The boiler to be stored should be closed and filled to the top with chemically treated feedwater or condensate, to minimize corrosion during standby storage. Water pressure greater than atmospheric pressure should be maintained within the boiler during the storage period. A head tank may be connected to the highest vent of the boiler to maintain pressure above that of atmospheric pressure.

For short periods of wet storage, the water or condensate in the boiler should contain approximately 450 PPM of caustic soda and 200 PPM of sodium sulfite. If the boiler is equipped with a superheater of the drainable type, it can also be filled with the above-described treated water by overflowing from the boiler.

If the superheater is non-drainable, it should be filled with condensate or demineralized water containing no more than 1 PPM of dissolved solids. Before introducing the water into the superheater, sufficient hydrazine should be added to achieve a concentration of about 200 PPM. Sufficient volatile alkali should also be added to produce a pH of 10. The treated water may be introduced into the superheater through an outlet header drain until the water flows into the boiler. When the superheater is filled, close the vents and drains. This quality of water may also be used in the boiler. If the storage period should extend beyond a month, the concentration of hydrazine should be doubled.

2. As an alternative, the boiler may be stored with water at normal operating level in the drum and nitrogen maintained at greater than atmospheric pressure in all vapor spaces. To prevent in leakage of air, it is necessary to supply nitrogen at the vents before the boiler pressure falls to zero as the boiler is coming off the line. If boiler pressure falls to zero, the boiler should be fired to re-establish pressure and drums and superheaters thoroughly vented to remove air before nitrogen is admitted. All partly filled steam drums and superheater headers should be connected in parallel to the nitrogen supply. If nitrogen is supplied only to the steam drum, nitrogen pressure should be greater than the hydrostatic head of the longest vertical column of condensate that could be produced in the superheater, or a minimum of 5 psi.

3. Rather than maintain the water in the boiler at normal operating level with a nitrogen cap, it is sometimes preferred to drain the boiler completely, applying nitrogen continuously during the draining operation and maintaining a pressure of nitrogen greater than atmospheric throughout the draining and subsequent storage.

Dry Storage

Dry storage is preferable for boilers out of service for extended periods of time or in locations where freezing temperatures may be expected during standby. The cleaned boiler should be thoroughly dried, since any moisture left on the metal surface would cause corrosion. After drying, precautions should be taken to preclude entry of moisture in any form from steam lines, feed lines, or air.

A moisture absorbing material should be used, such as quicklime, at the rate of two (2) pounds or silica gel at the rate of five (5) pounds for 30 cubic feet of boiler volume. It may be placed on desiccant trays inside the drums or inside the shell to absorb moisture from the air. The manholes should then be closed and all connections on the boiler should be tightly blanked. The effectiveness of the materials for such purposes and the need for their renewal may be determined through regular internal boiler inspections.

We would strongly recommend that large signs be placed in conspicuous places around the boiler to indicate the presence of moisture absorbing materials. The message to be conveyed can be as follows:

Note: Moisture absorbing material has been placed in both the fireside and waterside of this boiler.
These materials must be removed before any water is introduced into the boiler and before the boiler is fired.

For long periods of storage, internal inspections should be performed to assess the condition of the moisture absorbing materials. Such inspections should be initiated monthly, unless experience dictates otherwise. The moisture absorbing material increases in volume as moisture is absorbed, making it necessary to use deep pans. Fresh material should be substituted as needed at the time of the inspection.

Alternatively, air dried externally to the boiler may be circulated through it. The distribution should be carefully checked to be sure the air Rows over all areas.

If the boilers are going to be stored in any place other than a dry, warm protected atmosphere, then

steps should be taken to protect the exterior components also. Burner components that are subject to rust, such as jackshaft, linkage, valve stems, moving parts, etc., should be coated with a rust inhibitor and covered to protect them from moisture and condensation. Electrical equipment, electronic controls, relays, switches, etc., should be similarly protected.
Pneumatic controls, regulators, diaphragm or piston operated equipment should be drained or unloaded and protected so that moisture, condensation, rust, etc. will not damage the equipment during a long period of storage. Feedwater lines, as well as blowdown, sootblowers, drain lines, etc., should all be drained and dried out. Valve stems, solenoid valves and diaphragms should all be protected by lubricant, rust inhibitors, plastic coverings or sealants.

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How to Give Your Machine a Physical

by Jim Fitch

Doctors have perfected the skills of conducting physical exams. They know what questions to ask and how to examine the body for clues that signify health, injury or disease. The same is true of pilots. They are taught how to perform critical preflight checks or inspections that reveal mechanical condition and safety. By walking around the plane with checklist in hand, pilots survey the aircraft for signs of tire damage, maintenance errors, material defects, and even sabotage.

Mechanics, lubrication technicians and even equipment operators must be skilled at giving physicals as well. Like the doctor or pilot, they need to be alert to subtle changes or symptoms that might be an early sign of machine malfunction or accelerated wear. One of the obvious problems with conducting such inspections is that for most machines, the critical operating components are shielded from view by panels, casings, guards and housings, including the lubricant in most cases. It's like asking your doctor to give you a physical while wearing body armor.

Still, the machine and the lubricant can telegraph hints and signals to us in a variety of ways, but only if we are both tuned in and literate to their message. Tuned in means being vigilant and ubiquitous, like a detective, always looking for clues even when camouflaged from view. Literate means not only recognizing the presence of the clue but also being wise to the meaning of its message and the corrective response.

As in nearly all cases, the selection of machine inspections should be tailored to the machine design, criticality and operating environment. This means optimize the inspection process, not maximize. This is done by using good judgment in selecting which inspections are needed and how frequently they should be carried out. Following is a list of problem-revealing tests and inspections relating to oil lubrication. They require limited technical proficiency and most involve no special tools or instrumentation.

1. Oil Color Change. Monitor changes in lubricant color through sight glasses and oil samples. Lubricants experiencing thermal and oxidative distress will exhibit marked changes (darkening) in color and opacity. Many types of contaminants will alter color as well. Additionally, a wrong lubricant can often be recognized by a shift in darkness or color.

2. Impaired Air-handling Ability. Most healthy lubricants will rapidly release entrained air. However, distressed and contaminated lubricants may fail to release air from the body of the oil and may also

form sustained surface foam. Aeration and foam problems are not always a problem with the condition of the oil but may point to entrained air sources and mechanical conditions. Sight glasses and inspection hatches may provide the first sign of a problem.

3. Impaired Water-handling Ability. Water and oil don't usually mix. However, in the event that they become conjoined in an emulsion, the problem is usually associated with a change in the oil properties (many causes) or contamination. Observing oil/ water separation after violently mixing quantities of each in a sample bottle or laboratory glassware is an easy check for this property.

4. Blotter Spot Structure. This inspection has been discussed before in Noria publications. It involves placing a couple drops of oil on blotter paper or card stock, then observe for radial structure to form (rings, starburst, etc.). Healthy, uncontaminated oils don't produce structure. Instead, the oil will wick up into the paper leaving only a uniform gradient of oil color behind.

5. **Patch Test Inspection of Debris Field.** This test has also been discussed extensively in Noria publications. Sometimes called the poor boy's particle counter, it provides information not only about particle size and count but, to the trained eye, can also provide information about particle composition and shape. Even a $20,000 particle counter can't do that!

6. Bottom Sediment and Water (BS&W). It is often said that what is bad for the oil, or has degraded from the oil, or has been liberated from the surfaces of your machine is also heavier than the oil. We know that substances heavier than the oil will settle when mixed with the oil. There is great wisdom to routinely inspecting for BS&W using special sight glasses or drain port sampling. After all, if nothing has settled, much could be said for what aberrant conditions are not happening to your machine.

7. The Voice in Noise. Few machines are quiet during operation. Even completely healthy machines have something to say. You've heard the adage, "a singing gear is a happy gear". This is often true, but not always. Machine sounds change for specific reasons. Try to locate the point of generation. Some maintenance technicians play doctor by using crude stethoscopes in the form of a garden hose of a steel rod held to their ear, with the other end touching potential noise-generation sources.

8. Checking Your Machine's Temperature. Doctors use thermometers, but maintenance technicians employ a variety of tools including online temperature probes (thermocouples or resistance temperature detectors (RTDs)), thermal imaging cameras or handheld heat guns. A few common causes of temperature excursions include wrong lubricants, degraded lubricants, contaminated

lubricants, abnormal friction/wear, and the list goes on.

9. **Pressure Drop.** In the same way oil temperature can change in response to an assortment of problems, oil pressure can increase or decrease as well. Anything that can change viscosity (don't make me compile another list…) or form surface deposits can change system pressure. For similar reasons, it is no surprise that doctors pay special attention to blood pressure during an exam.

10. **Filter Life.** When filters plug prematurely, there is usually good reason. What's plugging the filters and why they're plugged are considerations worthy of our attention. Areas of particular concern are soft contaminants (such as sludge, organic material, dead additive residue, biomass, etc.), terrain dust and wear debris. The filter is the final resting place for a variety of machine and lubricant operational waste products. I'm sure you've already noted the interesting human health analogies here as well.

The above list of ten inspections is just a start. There are far too many field tests and inspections to describe in one column. For those who make a living caring for the health of lubricants and machinery, the value of being proficient in performing machinery physicals is immense. Flanked by laboratory analysis and other predictive maintenance technologies, the modern-day lubrication and condition-monitoring professional is indeed fortunate to have such an increasingly vivid view of the internal state and operational health of his machinery.

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KenKen Puzzle

How to solve the Kenken puzzle:

(Answers on page 18)

- 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÷		4–		2÷	
3	20×	2–	60×		
			15+	2	
20+		3+			
			8+		
1–		7+		30×	

Why Should I care about Sub-metering?

by Alberto Quiroz

Traditionally, multi-residential buildings installed one bulk or central meter that supplied the consumption information of the whole building. This resulted in an unfair allocation of energy costs to individual residents without knowledge of actual consumption by each resident. Sub-metering is an excellent way to transfer responsibility and associated costs for utility usage to individual processes.

When it comes to commercial facilities or manufacturing companies that have extensive, sophisticated facilities, energy management is essential, and good energy management practicesrequire detailed information on how energy is being consumed. Facility engineers need to understand where and how power is used on their properties.

Electrical Sub-metering: What is It?

Electrical sub-metering involves the installation of power meters in each distribution circuit to monitor energy usage for each individual resident, tenant apartment, tenant office, production department, or individual pieces of equipment.

Are There Any Benefits in Sub-metering?

There are a wide range of benefits to electrical sub-metering. In addition to allowing the energy manager to monitor energy consumption accurately in real-time, the sub-metering system can record actual energy usage. This historical data will enable the user to analyze, compare energy usage across similar buildings or facilities over time, to identify areas of wasted energy, and to make better, data-driven, decisions to optimize the facility's energy performance.

Sub-metering is a critical component of future facility operational improvements regarding energy efficiency, energy conservation improvements, and improvements in indoor environmental quality.

Common Applications of Sub-metering

Energy cost allocation in production facilities

Understanding energy consumption is the key to lower rising energy costs and improve energy efficiency. With sub-metering, you can monitor the energy usage of each production unit - from entire departments to individual pieces of equipment. With this data, you will gain a better understanding of your energy usage per piece of equipment, simplifying cost

benefit analysis when it is time to refurbish or purchase new more efficient equipment, additionally it allows the financial manager allocate the correct production per unit.

Tenant sub-metering

Tenants living in residential and non-sub-metered buildings are often billed on the square footage of their space. The landlord's electrical bill is for the whole building, and each resident based on the amount of space they rent. Tenants are billed on the entire consumption of the rest of the residents and not on their individual consumption. Tenant sub-meteringallows each one of them to be billed for the amount of energy they consumed. Tenants will be more likely to improve their energy consumption habits and lower the overall consumption if they are held responsible for their usage. In future blogs we will discuss how sub-metering in residential buildings has reduced the overall electricity bill.

Energy sustainability has become an essential business function for many organizations. Microsoft, Facebook, Apple, and many other tech companies have committed to 100% renewable energy to reduce the footprint of their platforms.

It is time for all property owners and managers to start thinking about making their energy consumption transparent and use the data from a reputable sub-metering system to make informed decisions to reduce energy costs.

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Winter Driving Tips

Do your part to keep our highways safe and to help maintenance crews clear the roads as safely and efficiently as possible. Plan ahead and drive according to the conditions.

- **Unless travel is absolutely necessary, stay off the roads during major storms.**
- Winterize your vehicles. This should include an examination of the spare tire, battery, belts, hoses, anti-freeze, tires, brakes, heater, defroster and windshield wipers.
- Carry an emergency road kit.
- Clear all snow and ice completely off windows, side view mirrors, headlights, taillights and licence plates.
- Buckle up and adjust head restraints. The centre of your head restraint should be even with the top of your ears.
- Keep your vehicles more than half full of fuel. The extra volume can help reduce moisture in your fuel system, which adds extra weight to your vehicle. A topped-up gas tank will also help if you become stranded.
- Slow down. The posted speed limit is intended for ideal road conditions. Road signs may indicate 110 km/h, but icy or snow-covered roads warrant slower speeds.
- Drivers are legally required to drive according to road conditions. You can be charged with a traffic offence you aren't driving to the conditions.
- Stay back from snowplows. They will let you pass when it's safe to do so.
- Plan your destination ahead of time.
- Keep your headlights on so drivers behind you can see your taillights - don't rely on daytime running lights.
- Never use cruise control in winter conditions.
- On snowy roads, try driving outside of the previous tire tracks for extra traction.
- Signal early to let other drivers anticipate and react. Check your rear view and side mirrors, and always shoulder check before changing lanes.
- Avoid sudden moves. Abrupt changes in direction or slamming on the brakes could cause you to spin out of control.
- On wet /slick surfaces, allow at least three times the normal following distance.
- Remember; bridge decks are often slicker than other parts of the highway are, due to greater temperature fluctuations.
- Know your braking system and how it reacts on ice. Be gentle with braking pressure on slick roads.
- Avoid braking on curves; rive through a safe, steady speed.
- Accelerate slightly when approaching hills and then maintain a steady speed going up.
- Gear down for both uphill climbs and downhill grades. This will avoid brake

Alberta

wear and chances of sliding. Be careful of abrupt downshifting which can cause skidding, particularly when turning.

- Take your foot off the brake if you start to skid, and steer in the direction you want to go. When the wheels regain their grip, brake firmly and smoothly.
- When driving a rear-wheel drive, prepare to steer just enough in the opposite direction to prevent a counter skid.

CARRY AN EMERGENCY ROAD KIT INCLUDING:

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- Fire Extinguisher
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- Road Map and Compass
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- Paper Towel or Rags
- Sand, Road Salt or non-clumping Kitty Litter
- Flashlight with Extra Batteries
- Emergency Food – anything that won't spoil like granola bars, nuts or chocolate
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- Cell Phone
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Building Operators Association of Canada

Tradeshow

POSTPONED

UNTIL

May 2022

5th Class Power Engineering Course

The Online BOMA 5th Class Power Engineering Course:

- **Will begin in Feb (exact date TBA) 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, text-books, and BOMA certificate upon completion**
  please note this does not include the ABSA exam*
- **The total cost including GST is $2,199.75**
- ***No prerequisites are required for the course***

New to the industry? If you are looking to become a building operator, then we recommend taking the Building Operator Level 3 online course. Visit our website for more info: https://boma.ca/courses-list/building-operator-program/

If you need further information please contact info@boma.ca

Kenken Puzzle Answer

2÷ 4	2	4− 5	1	2÷ 3	6
3 3	20× 4	2− 6	60× 2	5	1
1	5	4	15+ 6	2 2	3
20+ 6	3	3+ 1	5	4	2
5	6	2	8+ 3	1	4
1− 2	1	7+ 3	4	30× 6	5

TEST YOUR OPERATOR IQ ANSWERS

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

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November Meeting Minutes

No minutes recorded for this month

JOIN US: TUESDAY DECEMBER 14, 2021 AT 5PM FOR OUR VIRTUAL MONTHLY MEETING

Title & Brief: **Live Q&A with Harry Wollin - TMP Consulting Engineers**

Harry is accredited with several professional organizations, APEGA, ASET and ASHRAE. Harry's experience includes are very broad in design, inspection, system start-up and contract administration. For wide variety of projects including office buildings, laboratories, restaurants, schools and recreational facilities, laboratories and renovation projects in the discipline of mechanical engineering. Harry has developed a unique ability to understand building systems and equipment capacities and then reconfiguration systems to operate in a more efficient manner.

Guest Speaker: Harry Wollin PL Eng. Principal - TMP Consulting Engineers

Harry graduated from the Southern Alberta Institute of Technology in 1977 and went to work as a design draftsman for a local mechanical consulting firm. Harry used his gifts in innovative design and problem solving to develop a successful career in mechanical consulting. Harry' consulting expertise has been applied locally and as well for a period of time in England. In 1996 Harry became a principal in his current company TMP Consulting Engineers.

Harry has an even greater passion to help people, and this is reflected in his involvement in several nonprofit boards, some of these include; the Impact Society, an organization working in the education system to help children discover their unique strengths and increase confidence; Fathers Heart, an organization focused in Africa, supporting the most vulnerable of society, widows and orphans.

Harry has always made time for conversation and mentoring to share the experiences gathered over the decades be it over a meal or a game of golf. Known for bringing out the red pen and the napkin to share the knowledge.

Click on the link to register for the BOA Monthly Meeting

BOA CALGARY OPERATOR MAGAZINE ADVERTISING RATES:

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

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Constant Fire Protection	403-279-7973
HVAC & Electrical Services	
Black & McDonald	403-235-0331
Boulder Mechanical Contractors Ltd.	403-230-5519
Indoor Air Quality Services	403-276-2201
Gasonic Instrument Inc,	
Black & McDonald	403-235-0331
Lighting Services	
Calgary Lighting Products	403-258-2988
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