









#### "WE BELIEVE IN SAVING LIVES"

#### **NEED POWER?**

Gentech Field Services is your Canadian Generator Specialist. We specialize in emergency backup power for high rise buildings, warehouses, condominiums, and commercial buildings. We are a certified service dealer for:

- Eaton Power Technologies

  - rke Fire Protect
- Wacker Neuson Portable Power Kohler Engines

All services are performed by licensed heavy equipment technicians who are gualified & have received factory training.





## What's Inside?

Executive & Committees	3
Important Phone Numbers	3
Presidents Message	4
Test Your Operator IQ	6
Building & Facility—Health & Safety	7
How Many Maintainers Does It Take to Change a Lightbulb Safely?	9
Danish Canadian Club Announcement	11
Preserving the Past, Operating the Future	12
Preventing Worker Injuries By Stressing the	15
Benefits of Proper Tool Use	
KenKen Puzzle	18
April Fun Facts	18
Steam Trap Selection	19
BOMA Course	24
Kenken Puzzle & Operator IQ Answers	25
April 2025 Guest Speaker	26
Advertising Rates & BOA Calgary Sponsors	27
Advertisers Directory	28

## **Important Phone Numbers**

Emergency	911
Alberta Boiler Safety 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	president@boacalgary.com
Les Anderson	C: 403 921 0648
Vice President	chairman@boacalgary.com
Mark Arton	(c) 403-305-7029
Associate VP	associate.vice.president@boacalgary.com
Vacant	
Chairman	chairman@boacalgary.com
Mark Arton	(c) 403-305-7029
Treasurer	treasurer@boacalgary.com
Carrissa Speager	(c) 403-969-0329
Secretary	secretary@boacalgary.com
Monika Bhandari	(c) 403-470-4169
Education Committee	education@boacalgary.com
Vacant	
Membership Committee VACANT	membership@boacalgary.com
Promotions Committee	promotions@boacalgary.com
VACANT	
Activities Committee	403-874-0850
Samson Isowode	
Technical Concerns	chairman@boacalgary.com
Kyle D'Agostino	
Webmaster	webmaster@boacalgary.com



# President's Message



## <u>I hope this message</u> <u>finds you & yours</u> <u>well and in good</u> <u>health</u>



The Danish Canadian Club will close their doors on May 31, 2025. Our last meeting there will be May 13th. We are searching for a new venue that offers a similar deal. We've been at the DCC for a long time and held our trade shows there too. *A change can be a good thing.* 

In other news, Pan Global, the publisher of Power Engineering books used by Building Operators for courses and certification, is closing down also at the end of June. It is unclear which company will provide educational material next. I will attend the IPECC conference in Calgary from June 15th to 17th to find out the next steps and report back.

Warm regards,

Les Anderson





## Clean Air Matters

We spend about 90% of our time indoors, and it has never been more important to ensure we have clean, healthy indoor environments. For over 50 years, BGE's approach has focused on people, as we strive to provide optimal air quality through proactive, integrative advisory services and quality products you can trust.

#### BGECleanAir.com

Edmonton Calgary Vancouver Fort McMurray Prince George Regina Saskatoon Winnipeg

DCS AGENCY LTD.

#### Manufacturer's Representatives for:

- Xylem / Bell & Gossett
- Watts Water Technologies / Watts Radiant
- Powers Tempering Valves
- Tekmar Control Systems
- J. C. Whitlam Manufacturing
- IBC Boilers
- De Dietrich Boilers
- Gastite Flexible Gas Piping
- OS&B Industrial Valves
- Griswold Flow Control Valves
- Metraflex Pipe Connectors
- Myson Hydronics

Alan Proctor Shawn Oakley Greg Smith #7, 6130 – 4 Street S.E., Calgary, AB. T2H 2B6 Tel: (403) 253-6808 Fax: (403) 259-8331 www.dcsalesltd.com





## 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 25

- 1) Starting, stopping or unloading of the compressor is usually done by all of the following operating controls except:
- a. temperature actuated control
- b. viscosity activated control
- c. pressure activated control
- d. humidity activated control
- e. all of the above can control the starting, stopping or unloading of the compressor

#### 2) The operating control which uses a bimetal element is a:

- a. fluid expansion actuating control
- b. pressure actuated control
- c. humidity actuated control
- d. temperature actuated control
- e. solenoid actuated control



- 3) The safety control which uses a current transformer with a resistor in the motor circuit is known as:
- a. high motor temperature cutup
- b. low oil sump temperature protection
- c. motor overload protection
- d. solenoid valve
- e. high oil temperature cutout
- 4) One of the following actuating control valves is electromagnetically operated:
- a. thermostat valve
- b. fluid expansion regulator valve
- c. evaporator pressure regulating valve
- d. condenser cooling water regulating valve
- e. solenoid valve
- 5) With regard to the high side, the maximum setting for a pressure limiting device on a

refrigeration system shall not exceed the pressure relief device by:

- a. 100 percent
- b. 75 percent
- c. 90 percent
- d. 80 percent
- e. 50 percent



## **Building & Facility - Health & Safety**

by Alan K. McDonald



The following presentation was made by Mr. Alan K. McDonald during the October 12th, Building Operator's monthly meeting.

A series of fundamental questions regarding Health and Safety Programs were discussed. The following is a list of these questions.

#### Do you have a Health & Safety Program?

- o Does it work?
- What are the benefits of having an Health and Safety Program?
- How do you prove you have an effective Health & Safety Program?

#### What is the level of Management Commitment?

o Does it help or hinder your efforts?

 Is Health & Safety part of your management system?

## Have you initiated an Hazard Assessment & Control System?

- Do you perform regular formal inspections?
- o What is your Reporting System?
- o Are workers motivated to use your Reporting System?
- o How are they motivated?
- $\rm o$   $\,$  How do you identify hazardous acts &
- behaviours in the workplace?
- How do you identify hazardous conditions in the workplace?
- Have you inventoried all Task to establish their level of hazard?
- Have you prioritised and written Safe
  Work Procedures for the more hazardous tasks?



## How do you orient new employees and contractors?

- o Are they adequately trained and certified?
- o How do you know?
- o Do you have a standard training program?
- o Do you use buddy system?
- Do you understand the four levels of competency?

# How do you manage the Health & Safety activities of your contractors and sub-contractors?

- Do they have specific guidelines for working in your facility?
- o Do they understand them?

o Are you sure?

## What Emergency Response Plans do you have in place?

- Are they sufficient to prepare for all potential emergencies?
- Have you included your local stakeholders?

## What Incident Reporting and Investigation System do you have in place?

- Do you understand the difference between Immediate and Root Causes?
- Have you trained key people in Incident Investigation and Analysis?

On behalf of all members of the Building Operators Association (Calgary), I would like to thank Mr. Alan K. McDonald of Pulse-8 Safety Consultants Inc.for his very informative presentation. This subject will be of great benefit to all members. Alan can be reached by phone at 403-279-0013, by fax at 403-279-3465, by e-mail: <u>alanm@pulse-</u> <u>8.com</u>. Visit his web site at <u>www.pulse-</u> <u>8.com</u>.

Article reprinted with permission



## How Many Maintainers Does It Take To Change A Lightbulb Safely?



hA recent PEM survey uncovered that safety in the workplace is currently the number one workplace concern among readers. With the awareness that a healthy economy is supporting a manufacturing boom and lessening in governmental "watch dog" powers, many maintenance workers are beginning to question their personal safety when they're asked to perform tasks that might compromise it.

Safety is a personal responsibility, yet when a person's job can be threatened resulting from a work refusal, many people will "stand down" and perform the job anyway at the risk of personal injury. How can this dilemma be avoided? The answer lies in the combined efforts of management and maintenance workforce in

developing a structured engineered approach to workplace safety.

## Working together to develop a common approach to safety

In 1995 the U.S. National Safety Council published a paper titled "in safety, half truths hide the whole story", in which the authors stated that "practically every safety related incident is the result of inadequate management action, supervisor and worker training, procedures and work conditions and / or safety rules and policy enforcement." This statement reflects the reality that a safe workplace is more likely to be one in which management has embraced worker safety as a top priority over throughput quality. A truly effective safety and

health program will only exist if "buy-in" occurs from all parties involved - both management and the maintenance workforce.

As in all well managed programs, an audit of the present state of health and safety must first take place before companies embark on the journey of change. To do this, a team comprised of both management and workforce individuals in put together, who will then ascertain and document all present policies and approaches to work place health and safety.

With the present state established and documented. the team can then compare the existing model against an ideal health and safety model, and prepare a gap analysis report. The ideal health and safety model must be formulated in accordance to the company's environmental and corporate needs if it is to be implemented successfully (the model must be applicable, attainable and economically feasible if "across the broad buy in" is to occur and be sustained).

You call research ideal-state models through subscriptions to industrial health and safety magazines, or through many books published on the subject, like the Auditing Handbook: A Step by Step Guide to Auditing The Health and Safety Program in Your Company by Bill Rozel, or this month's "Bannister on Books" selection, Managing Worker Safety and Health for Excellence by Margaret Dobson.

With a gap analysis report in place, the team is now able to set policies, goals and objectives for the health and safety program; a time-lined project is set up and responsibilities are assigned. At each milestone point the success is communicated to the rest of the organization and the program notion plan is evaluated and revised accordingly, thereby closing the program management loop.

#### Communication is vital for success

A company recently implemented a safety policy in which two maintainers were dispatched to any job requiring the use of a ladder. Management



soon noticed that it took two maintainers to change a light bulb in an office and the maintenance manager's scheduling ability came under heavy criticism and the maintainers were labeled "lazy and incompetent by management.

The maintenance manager was only following the recommendations of the health and safetv coordinator's policy guideline. The new guideline had not involved any of the management staff in its design and had not been communicated to management before implementation and a total misunderstanding of the situation resulted in needless confrontation. There are many safety policies unique to maintenance such as lock out policies, confined space management policies, ladder and lifting device policies and safety harness policies; all of these policies require commitment through equipment purchase and upkeep and through proper training. An understanding of these special needs must be communicated to manage merit; this is best done by involving management in the program development and involvement in the training process if at all possible.

Article reprinted with permission





#### To the Building Operators Association Membership.

Please see the announcement of the Danish Canadian club notification on the place where we meet monthly. Please stay with us as we talk about next steps. But as of the 31<sup>st</sup> of May, we will cease to have a venue for our meetings.

### President's Message Calgary Danish Canadian Club December 2024

We all know that our time at the 11th Avenue location is coming to an end. We have decided to close the Club operations in our current facility on the 31st of May 2025.

Peter Andersen,

President, Calgary Danish Canadian Club

## Preserving the Past, Operating the Future: Smart Maintenance for Historic Buildings

#### Juan Carlos LaGuardia Merchán

Historic buildings are more than just structures; they are cultural landmarks that tell the story of our past. However, maintaining and operating these buildings effectively requires a balance between preservation and modernisation.

As a facility manager, I have witnessed first-hand the challenges of keeping these structures functional while respecting their heritage.

The key to success lies in integrating traditional maintenance practices with modern technologies. This ensures not only the longevity of these buildings but also their compliance with contemporary operational standards, improving safety, energy efficiency, and overall sustainability.

#### The Challenges of Maintaining Historic Buildings

Historic buildings often feature ageing materials, outdated systems, and structural vulnerabilities that make their maintenance more complex than that of modern buildings. Some of the key challenges include:

• **Structural integrity:** Many historic buildings were constructed using materials and techniques that differ significantly from modern construction standards. Over time, issues such as dampness, foundation settlement, and timber decay can threaten their stability.

• Energy efficiency: Older buildings were not designed with modern energy standards in mind. Many lack proper insulation, use inefficient heating systems, and have outdated electrical wiring, leading to higher energy consumption.

• **Compliance with regulations:** Historic buildings are often subject to strict conservation laws, limiting the extent of modifications that can be made. This requires careful planning to ensure upgrades do not compromise their historical value.

**Maintenance costs:** Due to the need for specialised materials and skilled craftsmanship, maintaining a historic building can be significantly more expensive than maintaining a modern one.



# Best Practices for Maintaining Historic Buildings1. Conducting a Comprehensive BuildingAssessment

Before undertaking any maintenance or restoration work, a thorough building survey is essential. This includes structural assessments, moisture detection, and thermal imaging to identify hidden issues such as leaks, insulation gaps, or foundation weaknesses.

I recently heard of a 19th-century public building where moisture ingress was causing severe damage to the internal walls. By using non-invasive diagnostic tools, we identified the source of the problem and implemented a targeted solution without disturbing the original masonry.

#### 2. Preventive Maintenance: A Proactive Approach

Reactive maintenance in historic buildings often leads to extensive and costly repairs. Instead, a preventive maintenance plan ensures regular inspections and early detection of potential issues. Key areas to monitor include:

- Roof and guttering systems to prevent water damage
- Structural elements such as beams and loadbearing walls
- Heating, ventilation, and electrical systems Facades and external finishes to avoid deterioration

Scheduling routine inspections and minor repairs can significantly extend the lifespan of these buildings and reduce overall maintenance costs.

## **3.** Integrating Modern Technologies Without Compromising Authenticity

One of the biggest challenges in historic building maintenance is modernising essential systems while maintaining their historic character.

Fortunately, advancements in technology provide solutions that allow for discreet yet effective integration:

• **Smart climate control systems** can be adapted to older buildings to regulate temperature and humidity without invasive installation.

• Wireless IoT sensors can monitor structural movement, moisture levels, and air quality in real-time, allowing for data-driven maintenance decisions.

LED lighting retrofits offer energy efficiency while

preserving the aesthetic of traditional fixtures.

In a recent project, we replaced an outdated heating system in a listed building with an energy-efficient underfloor heating system that was installed beneath the original stone flooring, maintaining both functionality and aesthetics.

## 4. Using Compatible Materials and Conservation Techniques

Using the wrong materials can cause irreversible damage to historic buildings. Cement, for instance, can trap moisture in old brickwork, leading to accelerated deterioration. Instead, using traditional lime-based mortars and breathable paints ensures the building remains structurally sound while allowing it to "breathe."

A notable example was a Georgian townhouse restoration where modern waterproof coatings had been applied to external walls, leading to trapped moisture and severe plaster damage. By carefully removing these coatings and restoring the original lime plaster, we allowed the building to dry out naturally, preventing further decay.

5. Digital Facility Management and Asset Monitoring Implementing a Computerised Maintenance Management System (CMMS) tailored for historic



After restoration

After restoration

buildings allows facility managers to:

- Track maintenance schedules and inspections
- Store detailed records of restoration works
- Optimise energy use and operational efficiency
- Manage compliance with conservation laws

I introduced a digital monitoring system in a heritage-listed property, enabling remote tracking of temperature fluctuations, dampness levels, and structural stability. This proactive approach reduced emergency repair costs and improved long-term planning.

## 6. Enhancing Energy Efficiency While Maintaining Heritage Value

Improving energy efficiency in historic buildings is a challenge, but strategic upgrades can make a significant difference without compromising authenticity. Key strategies include:

- **Secondary glazing** to enhance thermal performance while preserving original windows
- **Discreet solar panel integration** on rooftops or hidden areas
- Energy-efficient boiler systems that work with existing pipework
- **Sustainable insulation materials** like sheep's wool or wood fibre boards

In one of my projects, we installed secondary glazing on a heritage-listed office building, reducing heat loss by 50% while maintaining the original sash window appearance.

## The Role of Facility Managers in Historic Building Conservation

Facility managers play a crucial role in balancing preservation with operational efficiency. By integrating preventive maintenance, modern technologies, and sustainable solutions, we can ensure that historic buildings remain functional, safe, and financially viable.

From my experience, a successful approach to historic building maintenance is built on three pillars: **knowledge, adaptability, and respect for heritage.** We must embrace technology while upholding the craftsmanship that defines these structures.

Article reprinted with permission





## Preventing Worker Injuries by Stressing the Benefits of Proper Tool Use

by John Burkhardt

.Probably the most effective - and most overlooked accident prevention measure in maintenance is tool safety. Managers can greatly reduce worker injuries by focusing their efforts on manual hand tools, such as screwdrivers and chisels, and on heavy-duty power tools, such as air-powered hammers, saws and drills.

For these efforts to succeed, managers must understand and use tool safety techniques designed to prevent injuries. Managers can reinforce these safety techniques through training sessions and other efforts designed to create a culture of safety.



#### Signs of danger

Tradespeople face a variety of dangers that arise from unsafe tool use, so the first and most important step toward safety is getting them to recognize the conditions that can cause injuries.

Take saws, for example. Wood that is wet, pitchy and full of knots can cause a saw to kickback suddenly, injuring the worker. Kickbacks in this context are defined as the sudden backward movement of the saw that causes loss of control, often resulting in severe injuries to arms, hands and legs.

Tradespeople using saws should use good-quality wood, not wood that is warped, wet or full of pitch or



knots. They should use sharp blades, making sure to examine the blade for excess sawdust in the grooves and brushing or blowing out any that has collected.

Dull blades or those with rust spots can cause kickbacks. Dull blades result in workers having to apply more force. The added force causes excess friction on the blade, allowing it to heat up and potentially warp. Safety training should emphasize that workers should not force any tool to its limit. Proper technique calls for a worker to push the saw with light force and allow it to complete its job.

Workers also must wear eye and hand protection to prevent wood chips from harming eyes and slivers from entering the hand. Managers also should be sure that tool guards are installed and in use during tool operation.

#### Shocking problems

Another common hazard with saws is electrocution. Train workers to carefully inspect the



tool's cord, as well as the entrance point where the cord meets the appliance. Replace any cords that are frayed or in poor condition. Cords also should be replaced, not simply taped, if there are spots where the cord's insulation Workers also should not operate saws in damp or moist areas. High humidity levels can cause short-circuits, especially if a tool is in poor condition. Excess vapor in the air can come in contact with motor parts that have a sparking action. Sparks are caused by the motor's brushes coming in contact with the commutator.

If a crew must work in a damp area, they should have proper ventilation, such as a fan running, or they should use a saw with an enclosed motor.

#### Drilling for safety

Drills also present a range of safety concerns.

Workers using a drill must use a bit that is the correct size for the job. Using a bit that is too small may allow the bit to loosen and separate from the chuck. Using a bit that is too large can result in jamming.

The tool user should make sure the chuck is No screwing around tightened down before starting the drill, be sure to Screwdrivers are probably the most used - and use bits that are sharp and free of dust, and blow out abused — of maintenance tools. Never use a or brush out dust from the bit if it becomes clogged

from excess work. Also, grabbing a bit or chuck when turning the power on can result in burns, abrasions and other serious injuries.

Using excess force when drilling also creates problems. Users may need to be reminded to be patient with the drill and let it move forward with light pressure. Excess force results in friction, which can damage the bit, shorten the life of the motor and cause jamming.

When a bit is jammed, shut off the power, loosen the chuck so the bit separates from the chuck and use a pliers to remove the bit from the work piece.

When using a drill to remove rivets or when drilling through metal, workers should always use protective eye wear. Burrs and metal filings can fly around, causing eye injuries. Auxiliary handles on drills are designed to provide extra stability. Workers should be reminded to firmly grasp the handles and brace the drill. As with other electrical tools, cord inspection and replacement, if needed, are essential for safety.

If using a drill equipped with a screw bit set, workers must use the correct bit for the head of the screw. Not doing so can result in the screw head becoming damaged or the user losing control.



screwdriver as a punch, wedge, pry bar or pliers. Using the tool this way can damage it and render it useless for other jobs. If the blade is bent, the handle broken or the tip twisted and dull, the screwdriver can slip out of the slot and cause hand injuries.

One key to safety here is selecting a screwdriver tip that corresponds to the screw. Workers may need to redress the tip to keep it sharp and square instead of allowing the tip to become rounded. This condition can cause injuries from the screw slipping out of the slot. Phillips screwdrivers have less tendency to slip out due to blade design.

To enhance safety when using screwdrivers, workers should be instructed to hold they should use a screwdriver with an insulated handle. This precaution decreases the chances of a short-circuit when working on electrical equipment.

When using chisels, make sure workers redress the head of the chisel after considerable use. This prevents mushrooming, which is when the head starts to spread out. When this happens, the striking surface is compromised, and flying metal filings can cause eye injuries. Workers should wear eye protection when driving implements into surfaces.

#### Training

The best way for managers to stress tool safety is through training, which should be incorporated into both lectures and hands-on instruction with group interaction. If required training is too timeconsuming for managers to organize and conduct inhouse, consider an outside provider.

Maintenance managers must make sure all workers have a clear understanding of how to work with both hand and power tools. Allow time for the workers to ask questions and provide feedback during the hands-on period or after the training session.

Also be sure workers help reinforce safety lessons so that at the end of the day, the tools are clean and ready for the next day's work. Safety must be taught at a level at which all workers can understand, and it must be done frequently to successfully reinforce the lessons.

#### A culture of safety

Managers trying to cultivate a safety culture can't do it alone. It is always beneficial to have personnel who take safety seriously and can practice safety as a job in the company structure.



numerous hats, a job structure that can compromise the duty of safety personnel by taking them away from safety and forcing them to perform unrelated tasks. And in organizations where downsizing is a problem, managers should consider the benefits of working with outside experts or professionals versed in safety.

Finally, managers seeking to create a culture of tool safety in their departments may need to prompt discussions about it with the organization's human resources department and perhaps even restructure of the safety program. The goal of these and all related actions is to give departments the resources and the opportunity to protect workers and ensure smooth facility operations.

Article reprinted with permission

# KenKen Puzzle

How to solve the Kenken puzzle:

(Answers on page 25)

- 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

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



## **Steam Trap Selection**

#### by Hoffman ITT

Selecting the proper type of steam trap is an important element in steam systems. There are many types of steam traps each having its unique characteristics and system benefits. ITT Hoffman offers thermostatic, bimetal, thermodisc, float and thermostatic, and bucket traps which are the most commonly used types. Deciding which type of trap to use is sometimes confusing and, in many cases, more than one type can be used. The following is intended to point out system conditions that may be encountered and the characteristics of each type of trap. Within steam systems, important considerations must be taken into account. These considerations include venting of air during startup; variations of system pressures and condensing loads; operating pressure and system load; continuous or intermittent operation of system; usage of dry or wet return lines; and overall probability of water hammer.



#### **Air Venting**

At start-up all steam piping, coils, drums, tracer lines, or steam spaces contain air. This air must be vented before steam can enter. Usually the steam trap must be capable of venting the air during this start-up period. A steam heating system will cycle many times during a day and fast venting of air is necessary to obtain fast distribution of steam for good heat balance. A steam line used in process may only be shut down once a year for repair and venting of air may not be a major concern.

#### **Modulating Loads**

When a modulating steam regulator is used, such as on a heat exchanger, to maintain a constant temperature over a wide range of flow rates and varying inlet temperatures, the condensate load and differential pressure across the trap will change. When the condensate load varies, the steam trap must be capable of handling a wide range of conditions at constantly changing differential pressures across the trap.

#### **Differential Pressure Across Trap**

When a trap drains into a dry gravity return line, the pressure at the trap discharge is normally at O psig. When a trap drains into a wet return line or if the trap must lift condensate to an overhead return line, there will normally be a positive pressure at the trap discharge. To assure condensate drainage, there must be a positive differential pressure across the trap under all load conditions.

#### Water Hammer

When a trap drains high temperature condensate into a wet return, flashing may occur. When the high temperature condensate at saturation temperature discharges into a lower pressure area, this flashing causes steam pockets to occur in the piping, and when the latent heat in the steam pocket is released, the pocket implodes causing water hammer. Floats and bellows can be damaged by water hammer conditions.

When traps drain into wet return lines, a check valve should be installed after the trap to prevent backflow. The check valve also reduces shock forces

transmitted to the trap due to water hammer. Where possible, wet returns should be avoided.

#### Application

The design of the equipment being drained is an important element in the selection of the trap. Some equipment will permit the condensate to back up. When this occurs the steam and condensate will mix and create water hammer ahead of the trap. A shell and tube heat exchanger has tube supports in the shell. If condensate backs up in the heat exchanger shell, steam flowing around the tube supports mixes into the condensate and causes steam pockets to occur in the condensate. When these steam pockets give up their latent heat, they implode and water hammer occurs, the water hammer often damages the heat exchanger tube bundle. The trap selection for these types of conditions must completely drain condensate at saturation temperature under all load conditions.



Steam mains should be trapped to remove all condensate at saturation temperature. When condensate backs up in a steam main, steam flow through the condensate can cause water hammer. This is most likely to occur at expansion loops and near elbows in the steam main.

Applications such as tracer lines or vertical unit heaters do not mix steam and condensate. In a tracer line as the steam condenses, it flows to the end of the tracer line and backing up of condensate ahead of the trap does not cause water hammer as



the steam does not pass through the condensate. Vertical unit heaters normally have a steam manifold across the top and, as the steam condenses in the vertical tubes, it drains into a bottom condensate manifold. As the steam does not pass through the condensate, water hammer normally would not occur.

#### **STEAM TRAP OPERATION, ADVANTAGES, DISADVANTAGES AND PRIMARY APPLICATIONS** A review of the trap operating principle will show

how various types of traps meet the different system characteristics.

#### Float & Thermostatic Traps

Advantages:

- Completely drains condensate at saturation temperature
- Modulates to handle light or heavy loads, continuous discharge equal to condensing load
- Large ports handle high capacities
- Separate thermostatic vent allows fast venting of air during start-up
- Modulating ports provide long life Cast iron bodies

#### Disadvantages:

- Float or bellows may be damaged by water hammer
- Primary failure mode is closed
- Does not withstand freezing Limited to 175 psig

Primary Applications:

• Heating main drip traps

- Shell & tube heat exchangers
- Tank heaters with modulating temperature regulators
- Unit heaters requiring fast venting
- Steam humidifiers
- Air blast heating coils
- Air pre-heat coils
- Modulating loads
- Applications that require fast heating at start -up

#### **Bucket Traps**

Advantages:

- Completely drains condensate at saturation temperature
- Open bucket will tolerate moderate water Hammer
- Available in pressures up to 900 psi
- Normal failure mode is open Cast iron, ductile iron or cast steel

#### Disadvantages:

- Marginal air handling during start-up
- Cycles full open or closed
- May lose prime during light loads and blow

live steam

- Requires manual priming to provide water seal
- Does not withstand freezing Process main drip traps
- Where condensate is lifted or drains into wet return line
- Drum type roller dryers
- Steam separators
- Syphon type or tilting kettles

#### **Bucket Trap**

The trap body must be manually primed at initial start-up. Under operation the body will remain full of condensate.

During start-up air is vented through the bleed hole in the top of the bucket into the return line. Condensate entering the trap will flow around the bucket and drain through the open seat.

As steam flows into the trap, it collects in the

top of the bucket. The buoyancy of the steam raises the bucket and closes the seat.

**Bucket Trap with Optional Thermal Vent** An optional thermal vent installed in the bucket allows faster air venting during start-up. This feature should be specified where frequent start-up occurs.

#### Thermostatic Bellows Type Trap

Advantages:

- Sub cools condensate usually 100 to 300 F
- Normally open at start-up to provide fast air venting
- Follows steam saturation curve to operate over wide range of conditions
- Brass or cast steel bodies
- Self draining Energy efficient
- Small and inexpensive
- Fast response to changing conditions
- Fail open or fail closed models



Disadvantages:

- Water hammer can damage bellows
- Super heat can damage bellows if it exceeds trap temperature rating
- Pressure limit is 300 psig
- Requires cooling leg to prevent backing up condensate in applications where this may cause water hammer.

#### Thermostatic Trap

Thermostatic traps are normally open devices. This allows fast venting of air during start-up.

Applications:

- Radiators, convectors, unit heaters
- Cooking kettles

- Sterilizers
- Heating coils
- Tracer lines
- Evaporators

NOTE: A solid fill expansion element (see Hoffman 17K) thermostatic trap should be used where water hammer (cavitation) may occur.

#### **Thermostatic Trap**

Cold condensate during start-up drains through the trap. As temperatures reach 100 to 300 F. of saturation the trap closes.

During operation thermostatic traps find an equilibrium point to drain condensate approximately 100 to 300 F. below saturation at a continuous flow.

#### **Thermostatic Bimetal Traps**

Advantages:

- Sub cools condensate
- Energy efficient (will not pass live steam)
- Adjustable temperature range of condensate discharge (some models)
- Normally open at start-up for fast air venting
- Modulating action (provides long life)
- Cast steel or forged steel
- Rugged design withstands water ham mer
- Not affected by super heat
- Available in pressures to 2850 psig
- Completely drains condensate when system is off, may be used outdoors in freezing Weather Conditions.

#### Disadvantages:

 Requires cooling leg to prevent backing up condensate in applications where backing up condensate may cause water hammer.

#### Applications:

- Tracer lines Unit heaters
- Process
- Greenhouse coils
- Super heat steam lines
  - Drip traps on steam lines Article reprinted with permission



# New pipes inside your old pipes.



## Cost Effective, Less Disruptive. Simple as that.

Whether you're replacing a drain stack in a skyscraper or a piece of cracked cast under the floor in a shopping centre, we have it handled!

- · Vertical drain stacks behind walls
- Horizontal drains under floors
- HVAC and chiller pipes
- · Pipes with multiple bends and offsets
- · Pipes with branch connections
- 11/2 10 Inch diameter (custom sizes available)
- Inside any type of pipe (including cast iron, steel, asbestos concrete, PVC, ABS)
- 50+ year life expectancy

REVIVE Pipe Restoration Inc. Inside Building Specialists 403-903-4445 www.revivepipes.com

# Kickstart your career as a Building Operator



#### Learn Anywhere.

The BOMA Building Operator Program 5th Class Course is now online! For more info, visit boma.ca



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 expositionst will course the cost of the 150 hour course textbooks, and BOMA certificate upon completion

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 Iloyd.suchetilboma.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

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

CONSULTING • DESIGN • INSPECTION • TESTING SERVICES

**Anton J. Vlooswyk,** P.Eng. Cel: (403) 651-1514 Tel: (403) 287-0888 Fax: (403) 287-0880 Email: anton@beei.ca

102, 4029- 8th Street S.E. Calgary, Alberta, T2G 3A5 www.beei.ca



#### **TEST YOUR OPERATOR IQ ANSWERS**

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

The history of April Fool's Day only goes back to the 16th century.

Legend says ... April Fools Day started with a change in the calendar. The "new year" celebration was moved from April 1<sup>st</sup> to Jan 1<sup>st</sup>.

Some people did not hear about this change for many years. Other ignored the change, and continued to celebrate as they had always. These people were called "fools".



In the 1500's, some people began playing tricks on the "fools". Over time, April 1<sup>st</sup> became a day of playing tricks, and a challenge – a competition of sorts - to see who could come up with the best prank.

Today, almost 500 years later, April 1<sup>st</sup> is still a day when tricks are played on people in a spirit of fun. Anyone who plays a mean trick is just being mean. For the rest of us, April Fool's Day is a challenging game of trickery!



## JOIN US: <u>TUESDAY APRIL 8, 2025 AT 5PM FOR OUR</u> <u>IN-PERSON</u> <u>MONTHLY MEETING</u>

- Title:A/C Compressors and Refrigerants<br/>How the Industry is Adapting
- Presenters: Ron Alsop Bitzer Canada Inc Regional Sales Manager
- Location: Danish Canadian Club, 727 11 Ave SW, Calgary, AB T2R 0E3

#### **Presentation Summary**

- Overview of Bitzer compressors.
- How to get more efficiency from compressors.
- ⇒ New refrigerants low GWP.
- $\Rightarrow$  Why the change.
- $\Rightarrow$  What does this means for the industry.
- $\Rightarrow$  What to expect in the future.
- $\Rightarrow$  What timelines are we looking at.

#### Bio

Ron is the Regional Sales Manager for Bitzer Canada (compressor manufacturer) for the past 12 years. Ron has been the Sales and Technical Representative in the Wholesale Refrigeration and HVAC industry for over 34 years.



#### **BOA CALGARY OPERATOR MAGAZINE ADVERTISING RATES FOR 10 EDITIONS:**

	1/8 page	\$200	Premium Locations:	
Adu	1/4 page	\$400	1/2 page inside/outside cover	\$850
vertisi	1/2 page	\$775	1/2 page outside cover	\$900
Lake T	Full page	\$1000		

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



## **Advertisers Directory**

Boiler Services Black & McDonald	403-235-0331	
<i>Drain Services</i> Revive Pipes	403-903-4445	
<i>Engineering Services</i> Building Envelope Engineering	403-287-0888	Support those that support
<i>Filtration</i> BGE Air Quality Solutions Ltd.	403-243-5941	YOU! Next time you are looking for a product
Fire Protection Services Constant Fire Protection	403-279-7973	or a service provider, please consider connecting with one of our advertisers & members of the Building Operators
<i>HVAC &amp; Electrical</i> Services Black & McDonald	403-235-0331	Association of Calgary
<i>Indoor Air Quality Services</i> Gasonic Instrument Inc,	403-276-2201	June 1
<i>Motor Services</i> James Electric Motor Services	403-252-5477	Alberta Certified Power Engineers
<i>Power Systems</i> Custom Power Products	855-948-8810	Check to see when your power
Supply Services DC Sales Corporation	403-253-6808	engineer certificate is due for renewal!
<i>Power Services</i> Westcan Power Services	877-832-0697	www.absa.ca/urrector/es/alberta-certified-power-engineers-orrectory/

201



#### Professional Pump & Electric Motor Repair

35,000 Square Foot Service Center and Warehouse In-House Machine Shop & Fabrication Departments Fully Equipped Service Vans Certified Hydronic Designer on Staff Calgary's Largest Replacement Motor Inventory Largest Stock of Pumps & Pump Parts in Western Canada Custom Built Fans and Blowers to Meet Your Specifications ISO & COR Certified **Consumer Choice Award 8 Years Running** 

All Service Technicians are Trained in Confined Space Entry Fire Pump, Booster Pump and Sump Pit Annual Inspections Available **Energy Efficient Audits and Solutions** On Call 24 Hours, 7 Days a Week

A.O. Smith, Baldor, Century, Emerson, Franklin, Fasco, Lafert, Leeson, Marathon, WEG, Teco-Westinghouse, US Motors

Pumps Armstrong, Albany, Barnes, Bell & Gossett, Burkes, Darling, Franklin, Goulds, Grundfos, Hydromatic, Liberty, Little Giant, Monarch, Paco, Taco, Tsurumi, Xylem

Fans & Blowers Airdex, AirKing, Broan, Dayton, Delhi, Fantech, Fasco, Greenheck, Lau, Nederman, Nutone, Schaefer, Tjernlund Variable Frequency Drives & Motor Controls ABB, Danfoss, Baldor/Reliance, WEG, Santerno, Teco-Westinghouse, Tornatech

Accessories Gear Boxes, Pressure Tanks, Gauges, Bearings, Mechanical Seals, Flow Indicators, Filter Housings, Filters, Flanges, V-Belts, Float Switches, Pressure Switches, Pulleys, Sheaves, Relays, Contactors, Pressure Reducing Valves

#### Are your pumps leaking money?



#### **Booster Audit**

We have ability to monitor water useage and power consumption to provide the following:

- A comprehensive pre audit booster inspection
- An energy audit with an estimate of annual energy savings and potential payback.
- The "scope of work" for the installing contractor
- Start-up and commissioning on site
- Yearly maintenance inspections
- On site service 24/7/365

#### **Grundfos BoosterpaQ**

- Most efficient cascade control, application optimized software in the industry
- Single source responsibility: One manufacturer for pumps, motors, drives and control
- Plug & Play Easy to install and commission Large, clear, user friendly & advanced controls
- interface Reduced floor space footprint
- Ethernet & BUS communications option Drinking water approvals: NSF61/372, Hygenic designed 316SS manifolds

4020 - 8 Avenue S.E, Calgary, Alberta, T2G 3A7 www.jameselectric.ca motors@jameselectric.ca



We look forward to seeing you <u>in-person</u> for our meeting at the **Danish Canadian Club** (727 11 Ave SW) on Tuesday April 8, 2025 @ 5pm

## Please visit the Building

**Operators Association of** 

## Canada YouTube Channel

## to watch the Speakers.



Need Trained Building Operators? CCIS OGTP Be A Part of the First Training of its Kind 5th Class Power Engineering 'Building Operator' Training Program Our first ever program graduated nineteen 5th Class Power Engineers **Building Operators** 90% secured employment with major companies in town! If you are a Building Owner/ At no cost to you! Manager and would like to: Please contact: - know more about this training or Monika Bhandari - be a work experience host employer or Phone: 403.514.8328 - have recruting advantage after Email: mbhandari@ccisab.ca completion of training 1111-11 Ave SW 5th Floor Calgary, Alberta T2R 0G5

100



#### Black&McDonald

#### Services

Heating, Ventilation & Air Conditioning Sheet Metal Electrical Building Automation Systems Plumbing Refrigeration Voice & Data Communications Instrumentation High Voltage Process Piping Millwright & Rigging

Calgary Office 1071 26 St NE Calgary 403-235-0331

#### Capabilities

Design/Build Renovation & Upgrade Fast-track Change-out Building Commissioning Infrared Thermography Facilities Management & Operation Planned Preventive Maintenance Sheet Metal Fabrication Pipe Complete Boiler Services 24-hour Emergency Service

#### Facilities

Commercial/Office Industrial Education & Institutional Healthcare Industrial Telecom & Data Centers Sports & Assembly Airport & Transit Stations Military Bases

www.ogtp.ca



Black & McDonald is a leader in quality service, committed to implementing innovative solutions throughout a facility's life cycle.

Canada Atouta.

www.blackandmedonald.com