Volume 31 - Issue 6 – February 2025

# BOA

## Building Operators Association of Canada

**Official Publication of the Building Operators Association (Calgary)**

**February 2025**

# What's Inside?



# 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 |

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| | |
|---|---|
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**Front Cover: Monika Bhandari**

# President's Message

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

Safety programs contribute to a positive workplace culture by demonstrating an employer's commitment to the well-being of their staff. When employees feel that their safety is a priority, it boosts morale, job satisfaction, and overall engagement. This, in turn, can lead to higher retention rates and reduced turnover, as employees are more likely to stay with a company that values their health and safety. Furthermore, a strong safety culture enhances the organization's reputation, making it more attractive to potential employees.

Safety programs in the workplace are essential for fostering a secure and productive environment for employees. One of the primary benefits of these programs is the reduction of workplace accidents and injuries. By implementing comprehensive safety protocols, training, and regular drills, employees become more aware of potential hazards and learn how to mitigate risks effectively. This not only protects workers from harm but also minimizes downtime caused by accidents, ensuring that operations run smoothly and efficiently. Fewer injuries also lead to lower workers' compensation claims and insurance costs, which can significantly benefit the organization's bottom line.

The commercial property industry has a strong safety record in building operations and maintenance. Although not without incidents, it remains one of the safest maintenance sectors. The Building Operators Association supports workplace safety and collaborates with Alberta's Occupational Health and Safety Program through the "Certification of Recognition (COR)." This safety program encourages companies to develop safety processes that meet industry standards, enhancing safe processes, risk analysis, safety committees, and audits, further improving an already safe industry.

For more information contact: ibr.partnerships@gov.ab.ca or visit the Website: https://www.alberta.ca/get-certificate-recognition

Warm regards,

***Les Anderson***


# 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 32***

**1 Natural draft is produced in a boiler furnace when:**

a. gases are heated because they tend to contract so that each cubic meter has more mass
b. gases in the stack have less mass than an equal column of outside colder air
c. gases in the stack have more mass than an equal column of outside colder air
d. hot flue gases are condensed
e. the dampers are fully closed

**2 Primary air:**

a. is supplied in the combustion zone
b. is the same as excess air
c. is supplied on all types of burners
d. is pre-mixed with the fuel before being admitted to the furnace enters the furnace before the fuel

**3 Proper draft is important to the plant operator because it:**

a. produces efficient combustion
b. delivers the products of combustion to a high altitude
c. reduces the volume of ash and slag
d. prevents toxic gases from leaking out of the system satisfies the codes

**4 In a forced draft system, the furnace pressure is:**

a. above atmospheric pressure
b. below atmospheric pressure
c. at atmospheric pressure
d. measured in psi
e. not a factor

**5 Relative to draft, a steam jet is very popular:**

a. on railway steam locomotives
b. as a fuel atomizer
c. as a forced draft unit
d. for increasing furnace pressure
e. for decreasing draft during cold weather

# The Detrimental Effects of Micromanagement in Facilities Management

Juan Carlos LaGuardia Merchán

**Micromanagement is an all-too-common issue in facilities management, often stemming from a manager's desire to ensure everything runs smoothly.**

However, this approach can be counterproductive, leading to diminished results and dissatisfaction among team members. Understanding how micromanagement impacts performance and employee morale is crucial for successful facilities management strategies.

**Defining Micromanagement**

Micromanagement involves excessive control and supervision over employees' tasks and decisions. Managers who micromanage often delve into minute details, limiting their team's autonomy. While this may seem like a way to ensure high standards and accountability, it typically results in the opposite effect.

**Impact on Results**

1. **Reduced Productivity**: When managers focus on trivial details, they detract from strategic planning and critical decision-making. This not only hampers their productivity but also that of their team. When micromanaged, employees often waste time seeking approval for minor decisions instead of focusing on their core responsibilities.
2. **Stifled Innovation**: Facilities management thrives on innovative solutions for efficiency and cost-effectiveness. Micromanagement stifles creativity as employees feel less inclined to propose new ideas or methods, fearing criticism or rejection. This leads to a stagnant work environment where innovation is discouraged.

**Delayed Decision-Making**: In an environment where all decisions must go through a single individual, bottlenecks occur. This delays the implementation of crucial tasks, affecting the overall operational efficiency. Timely decision-making is vital in facilities management to respond swiftly to maintenance issues or unexpected challenges.

**Employee Dissatisfaction**

1. **Decreased Morale**: Constant oversight sends a message of distrust, leading to decreased morale among employees. When workers feel that their judgement and skills are not trusted, their motivation and engagement plummet. High morale is essential for a cohesive and productive team, and micromanagement directly undermines this.

2. **Increased Stress**: Micromanaged employees often experience higher stress levels. The pressure to meet unrealistic expectations or constant scrutiny can lead to burnout. In a field as demanding as facilities management, where quick thinking and problem-solving are essential, excessive stress can severely impair performance.

**3. Higher Turnover Rates**: Employee retention is a significant concern in any industry. When workers feel undervalued and overburdened by micromanagement, they are more likely to seek employment elsewhere. High turnover rates disrupt team dynamics and lead to increased recruitment and training costs.


**Healthier Management Style**

To avoid the pitfalls of micromanagement, facilities managers should adopt a more empowering leadership style. This involves:

1. **Delegating Responsibilities**: Trust your team with tasks and decisions appropriate to their roles. Delegating responsibilities not only frees up managerial time for strategic planning but also fosters a sense of ownership and accountability among employees.

2. **Encouraging Open Communication**: Create an environment where employees feel comfortable sharing ideas and feedback. Open communication channels help identify potential issues early and promote a collaborative atmosphere.

**3. Focusing on Results, Not Processes**: Shift the focus from how tasks are completed to the outcomes achieved. Allowing employees the freedom to determine their approach can lead to more efficient and innovative solutions.

**4. Providing Support and Resources**: Please ensure your team has the necessary tools and support to perform their duties effectively. Rather than micromanaging, act as a resource to facilitate their success.

While the intent behind micromanagement might be to ensure high standards and accountability, its effects are often detrimental.

Facilities managers should strive to balance oversight and autonomy, fostering an environment where employees are trusted and empowered to deliver their best work.

This approach not only enhances operational efficiency but also promotes job satisfaction and employee retention.

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# Creating Inclusive and Safe Environments for Individuals with Disabilities: The Role of Technology in Modern Facility Management

Juan Carlos LaGuardia Merchán

In the ever-evolving landscape of facility management, one critical aspect stands out: creating inclusive, safe, and accessible environments for all, particularly for individuals with disabilities. This is not merely a matter of compliance with regulations; it is a moral and ethical imperative that reflects the values of a modern, inclusive society.

As facilities managers, our role extends beyond the maintenance of physical spaces; we are custodians of environments that must cater to the diverse needs of all users. The integration of new technologies plays a pivotal role in achieving this goal.

Firstly, it is essential to understand the diverse range of disabilities that may affect individuals, including mobility impairments, visual and hearing impairments, and cognitive disabilities. Each of these presents unique challenges that require thoughtful solutions. For instance, wheelchair users need accessible entrances, elevators, and restrooms.

Visually impaired individuals benefit from braille signage and tactile pathways, while those with hearing impairments require visual alarms and assistive listening systems. The aim is to create spaces where all individuals can navigate and utilise facilities independently and safely.

New technologies have revolutionised the way we approach accessibility in facility management. Smart technologies, such as automated doors, voice-activated systems, and sensor-based lighting, significantly enhance accessibility.

For example, smart door systems can automatically open for individuals in wheelchairs or those carrying items, removing the need for manual operation. Similarly, voice-activated systems can provide essential information or assistance, aiding those who may have difficulty with traditional interfaces.

Furthermore, the advent of mobile technology has brought about apps and devices specifically designed to assist individuals with disabilities. Navigation apps can guide visually impaired users through complex buildings, providing auditory cues and information about their surroundings. Real-time communication devices, like video relay services, enable those with hearing impairments to interact more easily with service providers and others within the facility.

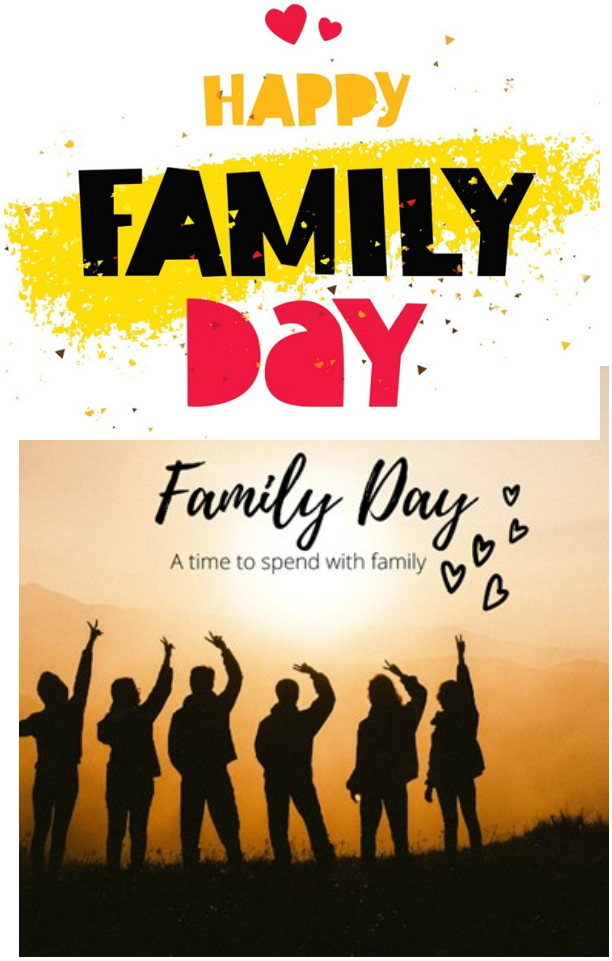
An often-overlooked aspect of accessible design is the provision of quiet, sensory-friendly spaces. For individuals with cognitive disabilities, such as autism, these spaces provide a respite from overwhelming stimuli, ensuring that all users can enjoy the facility comfortably.

The importance of training staff cannot be overstated. Staff must be knowledgeable about the specific needs of individuals with disabilities and the technologies available to assist them. This includes not only operational training but also fostering a culture of empathy and understanding within the team.

In conclusion, the role of a facilities manager is evolving, with a growing emphasis on inclusivity and the utilisation of technology to create accessible environments. By prioritising accessibility, we not only comply with legal standards but also uphold the values of equity and inclusivity, ensuring that all individuals can engage with and enjoy our facilities safely and comfortably.

This commitment is not just a professional obligation; it is a testament to our dedication to creating a better, more inclusive world for all.

*Article reprinted with permission*


HAPPY
FAMILY
Day
Family Day
A time to spend with family


28
DAYS IN THE MONTH
*Except for Leap Year
Presidents Day
Library Lovers Day
Most Romantic Month
Leap Day Every 4 Years
Random Act of Kindness Week
KINDNESS
Violets + Primrose February Flowers
Amethyst Birthstone
National Cherry Month
FEBRUARY
fun facts
National Golden Retriever Day
National Tater Tot Month
BLACK HISTORY MONTH
National Pizza Day
2
nd Month of The Year
Super Bowl 2nd Sunday
Valentine's Day
FEB 14
Make a Friend Day
Astrology Signs
Aquarius
Pisces
Groundhog Day
WINTER
MADEWITHHAPPY.COM

# Microgrids: Impressive Advances in Off-Grid Electrical Technology

Bill Henderson

It can be said that electricity is the lifeblood of our modern society, powering everything from homes to hospitals. As the energy demands grow, traditional centralized grid systems are facing numerous challenges regarding efficiency, sustainability, and resiliency. In response, recent innovations in microgrid and off-grid technology demonstrate a decisive shift toward more adaptable and environmentally conscious energy solutions. Microgrids, small-scale power grids that can operate independently or in conjunction with the main grid, are at the forefront of this evolution, offering a more personalized and resilient approach to energy management.

These decentralized systems are being advanced by a multitude of technological improvements, particularly in energy storage and renewable sources integration. Innovative applications like dynamic line ratings and advanced power electronics are making microgrids smarter and more efficient. Communities and industries are harnessing the power of microgrids to ensure uninterrupted energy supply, even amidst fluctuating conditions or extreme weather events, underscoring the significant role they play in current and future energy infrastructures.

Moreover, the growing use of microgrids symbolizes a critical stride towards greener

energy systems, as they seamlessly integrate renewable energy sources such as solar and wind power. Microgrid solutions not only provide clean and reliable energy but also offer a significant reduction in greenhouse gas emissions. The combination of environmental benefits, resilience, and technological innovation positions microgrids as a compelling alternative to traditional power delivery methods, drawing substantial interest from both public and private sectors in the energy market.

**Technological Advancements in Microgrids**

Recent innovations in microgrid technology are enhancing the efficiency and sustainability of electrical distribution networks. They focus on the integration of renewable energy, advancements in energy storage, smart grid applications, and sophisticated control systems.

**Integration of Renewable Energy Sources**

The shift towards renewable energy is a standout progression in microgrid development. Microgrids are increasingly utilizing solar photovoltaics (PV) and wind generation systems. This integration of distributed energy resources (DERs) is foundational to the grid's modernization efforts, contributing to a reduction in fossil fuel emissions and improved local energy resilience.

**Energy Storage Innovations**

Energy storage is a cornerstone of microgrid functionality, and Battery Energy Storage Systems (BESS) are at the forefront. BESSs enable the effective integration of intermittent renewable energy sources,

thus optimizing on-site energy utilization. Their enhanced capabilities make microgrids more reliable and provide the flexibility needed for a wide range of applications, from rural electrification to urban energy management.

**Smart Grid Technologies**

Microgrids are becoming smarter, with the implementation of technologies like advanced metering infrastructure and IoT devices. These facilitate real-time monitoring and responsive distribution mechanisms within the grid, leading to more efficient electricity consumption and improved system reliability.

**Microgrid Control Systems**

Control systems for microgrids have seen significant advancements in both their regulatory requirements and technical capabilities. They provide critical functionalities, allowing microgrids to manage local balance, optimize financial gains, and enhance overall performance. These systems are imperative for ensuring smooth operation and maintaining the stability of interconnected energy sources within the microgrid.

**Off-Grid Electrical Technology Innovations**

Recent advancements in off-grid electrical

technologies have significantly enhanced the feasibility and efficiency of renewable energy solutions. These innovations play a crucial role in the shift towards sustainable power for remote locations and critical back-up systems around the world.

**Solar Panel Efficiency Improvements**

Today's solar panels are more efficient than ever, converting a higher percentage of sunlight into electricity. This is due to perovskite materials, which, when used alongside traditional silicon, create tandem cells with the potential to surpass 30% efficiency—a notable leap from the average 15-20%.

**Wind Turbine Advancements**

In the realm of wind energy, smaller, more powerful turbines have been developed for off-grid applications. These turbines are designed to maximize energy capture even at low wind speeds, making them suitable for a wider range of geographic areas.

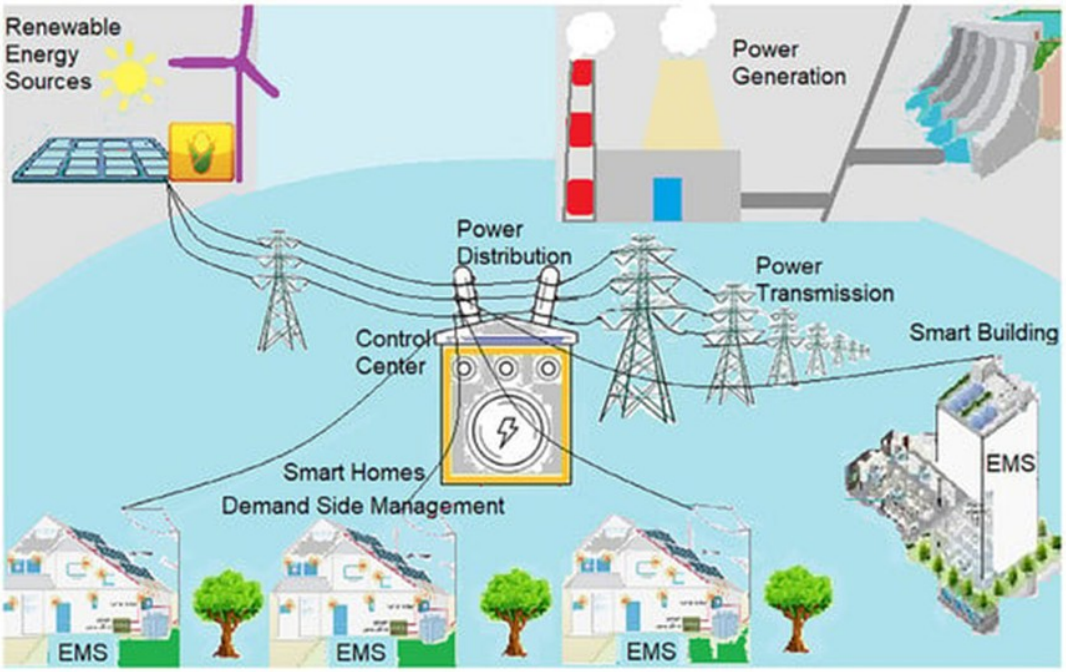
**Battery and Energy Storage Breakthroughs**

Energy storage is critical in managing the intermittent nature of renewable sources. Recent breakthroughs involve lithium-ion batteries with extended lifespans and improved energy density. Solid-state batteries are an emerging technology, promising higher energy capacity with reduced risk of fire.

**Power Management and Distribution Advances**

Intelligent power management systems have greatly improved, using smart technologies to seamlessly integrate various energy sources, balance loads, and minimize power interruptions. These systems ensure that off-grid solutions like BMT's Smart Microgrid technology can provide reliable and clean energy to remote communities.

Microgrids and off-grid technologies stand at the forefront of an energy revolution, promising a future where power is cleaner, more reliable, and universally accessible. These innovations not only challenge the status quo of energy production and distribution but also offer a blueprint for a sustainable world, where every community can thrive, unaffected by the volatility of global energy markets. As we embrace these technologies, we step closer to a greener, more resilient energy landscape, equipped to meet the demands of the 21st century and beyond.




*Article reprinted with permission*

# Pumps: The Heart of HVAC

*by James Piper*

**Proper maintenance remains essential for efficient pump operation, but new technologies offer managers greater opportunities to control costs.**

The centrifugal pump has long been the workhorse of HVAC systems, supporting the operation of chillers, boilers, cooling towers, domestic water systems, and hydronic distribution systems. And while practically every other component in an HVAC system has been greatly modified to meet ever changing requirements for efficiency and reliability, centrifugal pumps have not changed very much.

That does not mean today's centrifugal pumps are the same as those of 20 years ago. Manufacturers have made significant improvements in impeller designs, construction materials, bearing and seal designs, and couplings. But these changes have been more evolutionary than revolutionary.

As a result, many managers simply overlook the pump as an opportunity to improve the performance and reliability of HVAC systems. Building designers replicate designs used in the past in new building designs or renovation plans. System operating practices simply follow past tried and true practices. And when pumps fail, technicians replace them with new ones with the same characteristics.

The situation is changing today. Many advances that have affected other areas of building HVAC operation are being applied to pumps and their operation. As a result, engineering and maintenance managers can achieve levels of operating efficiency that were unheard of as recently as 10 years ago. And while improved operating efficiency is a primary benefits of today's pump installations, it is not the only one. System performance has improved. Reliability has increased. Maintenance requirements have been reduced.

**Improving pump efficiency**

The overall efficiency of any pump used in a building HVAC system is determined by a number of factors, including:

- the efficiency of the pump and motor
- the efficiency of the pump control
- how well technicians maintain the pump and its related components.

New pump designs and high-efficiency drive motors can improve operating efficiency. For example, by replacing a pump motor with a high-efficiency model, managers can achieve a reduction in energy requirements of 1-5 percent. Similarly, installing a high-efficiency pump can reduce energy requirements 1-3 percent. While these efficiency improvement numbers are relatively small, the typical annual hours of operation for many pump applications can make the resulting savings very significant.

While using higher-efficiency pumps and motors will improve operating efficiency somewhat, the greatest improvements in efficiency come from

new designs of pump controls. Traditional pump installations use constant-speed pumps. Technicians use building, balancing, throttle or bypass valves to reduce flow when demand is low or to balance the flow to different areas of the building.
These valves restrict the flow of water through the end device, but the pump still uses the same amount of energy to operate. Also, technicians tend to set these valves and forget them. Conditions and loads change in a building, but the valve setting remains the same.

An alternative to throttling flow that improves both performance and energy efficiency is the use of variable-frequency drive (VFD). VFDs have slowly gained acceptance in use with building HVAC pumps because of their ability to effectively control the operation of a pump over a wide range of flow requirements, while also significantly reducing the energy requirements for the pumping system.

For example, as control valves cut back on the flow of water through terminal heating or cooling devices, the control system senses the reduced flow requirement and directs the VFD to reduce the pump speed to match the conditions found. Since the vast majority of systems operate at loads below peak capacity 95 percent of the time or more, VFDs can greatly reduce pumping energy requirements. In a typical HVAC application, pump energy savings typically are 20-50 percent annually.

**Enter the intelligent controller**

While VFDs can greatly improve the energy efficiency and control effectiveness of pumping systems, manufacturers have developed a new generation of controls that goes even further. This new generation of pump controls — intelligent pump controllers — offers improvements in pump reliability while further improving system performance.

Intelligent controls can better adjust to system load changes, better control pump operations, and provide control over a wider range of load conditions, and produce smoother pump startups. Intelligent controllers also use VFDs to regulate pump speed, but they do so not as a standalone device, but as another element in the overall building automation system. By connecting the pump and its controller to a digital field bus, data from the pump and its sensors can integrate into the system. Software monitors the operating conditions and identifies conditions that are outside normal operations and those that could damage the pump.

For example, if the flow to a pump is restricted, the flow rate through the pump decreases. A conventional VFD control systems then signals the pump to increase its speed, possibly resulting in cavitation, a condition that can rapidly damage pump components. In contrast, an intelligent pump controller detects cavitation condition, notifies the operator of the situation, and — if programmed to do so — reduces the flow rate sufficiently to prevent cavitation without shutting down the system.

Cavitation is just one condition that intelligent controllers can detect. Operators can program the software to detect abnormalities, from sticking control valves to system leaks. Technicians can use the system to identify recurring or intermittent problems that otherwise might go undetected.

**Don’t overlook maintenance**

No matter how advanced the control system or how good the design, pump systems will operate effectively and efficiently only if managers schedule maintenance properly. Too often, though, they ignore maintenance until something goes wrong.

The resulting costs from pump repairs and disruption to building operations typically exceed the cost of ongoing pump maintenance by a factor of 10 or more. Maintenance activities and the frequency with which they must be performed vary with the capacity

of the pump and the nature of the load that it is serving.

One of the most important maintenance tasks is to pay attention to a pump's operation. Does it look and sound normal, or has it developed unusual sounds or vibrations? Louder-than-normal or unusual sounds can indicate a range of problems, from misalignment and bad bearings to cavitation.

A small leak rate at pump seals is normal, but a sudden flooding of the area near pump shafts indicates that a seal has failed and needs replacing. Excessive heat can indicate a failing bearing or a motor that might need replacing. By checking the pump regularly, maintenance technicians can identify pump problems early, reducing repair costs and disruptions to operations. Although it might be too late to prevent having to overhaul or replace the pump, at least the maintenance department, rather than the pump itself, will be able to pick the time when the pump is out of service.

Beyond periodic checks on pump operations, maintenance personnel should follow the manufacturer's recommended schedule of maintenance activities. But these are the minimum maintenance requirements. Pumps serving critical applications in a building will require additional maintenance activities if they are to enhance system reliability.

A successful pump installation requires that managers change their ways of thinking about pumps. Sticking with old design and operating practices will prevent the system from operating as efficiently and reliably as it could, and waiting to adopt new technologies that are available means missed opportunities to ensure smooth building operation and enhanced energy efficiency.

**Finding Failure**

Even with proper maintenance, pumps fail. When they do, instead of simply replacing or rebuilding the existing pump, maintenance and engineering managers should take the time to determine the cause of the failure.

Pump failures fall into four general categories:

- a defective pump
- a poor application design
- improper maintenance
- poor operating practices

Unless managers and technicians determine the cause of the failure, it will be impossible to ensure that the failure will not be repeated with the new pump.

For example, if a pump fails because of contamination in the circulating fluid, replacing the pump without taking steps to remove the contaminants will only result in the premature failure of the replacement pump. Similarly, if a pump fails due to stress induced by thermal expansion and contraction in the piping system, the replacement pump also will fail unless technicians properly install expansion joints at the pump connections.

*Article reprinted with permission*

# KenKen Puzzle

How to solve the Kenken puzzle:

*(Answers on page 32)*

- 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

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

# Our favorite facts about: VALENTINE'S DAY

MGIC

about
## 8 BILLION
conversation hearts are produced every year

–Source: National Confectioners Association

## GIFTS most given on Valentine's Day

| | |
|---|---|
| Candy | 47.5 % |
| Flowers | 34.3 % |
| Cards | 52.1 % |
| Jewelry | 17.3 % |
| Dining Out | 34.6 % |
| Clothing | 14.4 % |
| Gift Cards | 12.6 % |
| Other Gifts | 11.2 % |

–Source: Statisicbrain.com

## 180 Million cards are exchanged on Valentine's Day

–Source: Statisicbrain.com

## 11 of the Worst Valentine Gifts

1. Novelty toilet paper
2. A scale
3. A roll of quarters
4. Gym membership
5. Roses made out of duct tape
6. Key-chain that says "I love you more than bacon"
7. Heart-shaped pizza
8. A mop with a bow
9. A cactus
10. A vacuum cleaner
11. Acne cream

–Source: MGIC Marketing staff

## ROSES are the most popular FLOWERS on Valentine's Day:

| | |
|---|---|
| 63% | Red |
| 27% | Pink |
| 26% | White |
| 20% | Mixed |
| 18% | Purple |
| 15% | Yellow |
| 13% | Peach |
| 11% | Orange |

–Source: aboutflowers.com

## 58 MILLION
pounds of chocolate candy are sold during Valentine's week & more than
## 36 million
heart-shaped boxes

On average, humans spend **$26** on their PETS for Valentine's Day.

–Source: BING

## 1868
The first Valentine's Day box of chocolates was introduced by Richard Cadbury

–Source: History.com

## TEACHERS receive the most VALENTINES

YOU RULE!

–Source: Hallmark research cards

# The Roofing-Mold Connection

*By Derek Josephson, a staff consultant with Benchmark Inc. in Cedar Rapids, Iowa*

**Proper installation, thorough inspection and prompt repairs can combine to help protect facilities operations and occupants**

Many maintenance and engineering managers have begun to fully comprehend the potential ramifications of mold for indoor air quality (IAQ). These ramifications can manifest themselves as damaged building materials, degraded IAQ, sick building symptoms, and potential lawsuits.

Mold commonly occurs in most organic building materials. It is common to see lichens, or mold, growing on the top exterior surface of roofs, within wet organic roof insulation boards, and on wet wood nailers, interestingly enough on both treated and non-treated materials. The one thing that all these surfaces have in common is that they are are above the roof deck and, therefore, have minimal impact on IAQ.

When mold growth develops on interior surfaces, IAQ can be affected and building occupants start asking questions. Most organic building materials can support mold growth if temperature and moisture conditions are within supportive limits. Typical materials include ceiling tiles, gypsum board, wallpaper, insulation, adhesives, wood trim and wood framing materials. These materials have been used for years in construction, many never experiencing mold growth.

**Identifying the culprit**

What is the catalyst for mold growth: temperature or moisture? Temperature seems to be unlikely, as many similar building types have similar interior environments, and some have mold, while others do not. It appears that moisture might be the single most probable catalyst to affect mold growth. This seems likely as most observed mold growth is associated with leaks and condensation problems in roofs, windows or walls. Studies have proven that leaks in a building can contribute to mold growth within as little as 48 hours.

Mold has been observed in ceiling tiles near repeated roof leaks or where a lack of insulation creates condensation. Mold can spread in gypsum board behind vinyl wallpaper where roof, window and wall leaks or condensation create a moist environment.

The vinyl wallpaper prevents moisture from drying out. Moisture in “paper” wallpaper, organic adhesives, insulation materials and wood products also provides a delectable environment for mold development.

**Leak response**

The obvious first step in any manager’s effort to prevent roof leaks — and mold growth — is proper installation of the original system. Beyond that, if roof leaks are a major contributor to mold development, then keeping water out of organic building materials is paramount to preventing mold growth. Managers must establish an aggressive leak response program. Technicians must investigate leaks, determine origin points and address deficiencies in a timely manner. Otherwise, old infestation is assuredly the expected outcome. Leaks must be stopped within 48 hours and the wet materials dried out, or mold growth is possible.

**A Proactive Step**

Leak response, though important, is reactive, and materials often get wet before a problem can be identified. A better approach would be to develop and

preserve an aggressive roof-maintenance program. This program would include the following steps:

**Periodically inspect every roof to identify deficiencies.**

It is best to perform these inspections in each spring and fall. Inspections should be performed by individuals capable of determining not only apparent immediate problems but also conditions that could become problems in the near future. The inspections should concentrate on high-risk areas such as around roof hatches, drains, mechanical equipment and high-traffic areas.

In addition to semi-annual inspections, perform inspections after severe storms, repair or alterations to rooftop equipment, or reroofing projects in adjacent roof areas.

Perform repairs in a timely manner. Once inspectors have identified deficiencies, a qualified roofing mechanic must make the repairs. A properly executed roof maintenance program should not only reduce leaks — and minimize mold development — but also should increase roof longevity.

If managers suspect mold has infested a building material, a visual inspection is the primary and most important step in identifying a possible mold-contamination problem. Inspectors should visually assess the extent of water damage and mold growth and investigate all organic materials.

The inspectors also should take extreme care and diligence to thoroughly investigate hidden and hard-to-see surfaces. They should use moisture meters to determine excessive moisture contents that could promote fungal growth. Bulk sampling generally is not required unless there is a need to identify a specific fungal type. Managers then can develop remedial strategies on the basis of the visual inspection.

**Safety first**

When investigating for mold, it is important for workers to adhere to these safety tips:

- Do not touch mold or moldy items with bare hands.
- Do not get mold or mold spores in the eyes.
- Do not breathe in mold or mold spores.

Consider using appropriate personal protective equipment (PPE). The minimum PPE should be a respirator, gloves and eye protection.

Once visual assessment determines the extent of mold, remediation is the next step. The goal is to remove or clean contaminated materials in a way that prevents fungi and dust contamination from leaving the work area and entering an occupied or non-abatement area, while protecting the health of the abatement workers.

Non-porous materials, such as metal decks, and semi-porous materials, such as wood or concrete, that are structurally sound can be cleaned with a detergent. Porous materials such as wallpaper, insulation, acoustical or fireproofing materials, gypsum boards and ceiling tiles generally require removal and disposal.

**Clean-up considerations**

Remediation procedures depend on the building occupancy, the area of contamination, the material to remediate and the size of the area affected. Typical procedures are include these:

- Provide required notification in accordance with OSHA Hazard Communication Standard (29 CFR 1910.1200)
- Provide abatement workers with necessary PPE. At a minimum, this should include respiratory protection, gloves, eye protection and disposable protective clothing.

- Workers in occupied areas must be protected from dust and contamination. It appears especially prudent to relocate infants, persons recovering from recent surgery, immune suppressed people or people with chronic inflammatory lung aliments.
- Cover work areas and seal them with plastic to contain dust and debris. Establish a worker decontamination room.
- Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags.
- The contained area and decontamination room should be HEPA vacuumed and cleaned with a detergent solution.

Air monitoring might be required to determine acceptability for occupancy.

It appears that mold growth and roof leaks are directly related. As a result, annual roof maintenance might be the first line of defense against mold development.

If leaks exist, they must be investigated and repaired immediately. To stop mold development, managers must take the position that roof leaks are not acceptable and that they must not be tolerated. An aggressive preventive maintenance program not only should provide tangible results in mold prevention but should go along way in improving public relations.

**Cold-Weather Roofing Considerations**

If a roofing project is begins during cold weather, it is important to realize that weather affects most roof-system installations. Managers should consider these points for cold-weather roofing application.

Most materials used in any roof system are affected by cold weather. Left unprotected, they can get wet or too cold. Installing them if they are wet or before they have arrived at the proper temperature is likely to create problems with blisters or wrinkles. This is particularly problematic for materials such as SBS-modified bitumen that needs to “relax” before installation.

Many membrane and insulation adhesives can only be installed when the ambient air temperature is 40 degrees and rising. They also must be kept at acceptable temperatures during storage. If the adhesives are installed below these temperatures or are allowed to freeze, they might never achieve proper adhesion.

Several adhesive manufacturers restrict shipment of water-based products to the snow belt during the winter months. If a project is specified with these adhesives, they might be unavailable when work begins. This could require delaying the project or using alternative adhesives that might have objectionable odors or fumes.

Managers can mitigate several of these limitations with proper planning, such as temporary heated storage. Understanding the cold-weather limitations of the roof system and discussing the options before undertaking the project will help parties make informed decisions that help complete the project successfully.

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# Shooting Pains

## Powder Actuated Tools

***The only difference between this hand tool and a handgun is that the bullet***

***is a pin. Don't be caught looking down its barrel.***

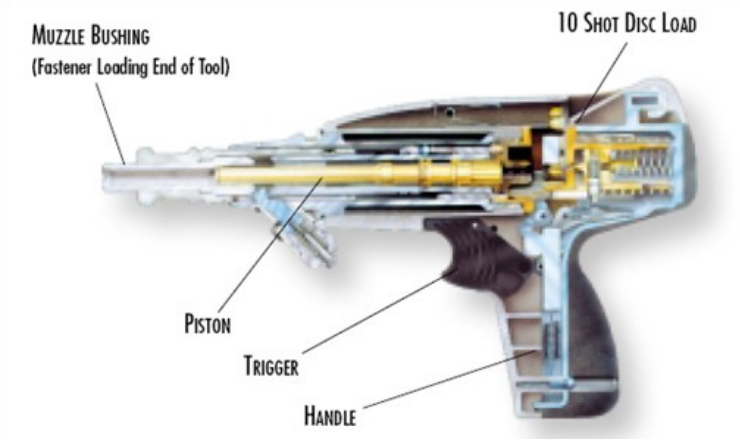
It's coffee time. The carpenter at the construction project is working with a powder actuated tool to attach strapping to a concrete wall when he hears the lunch truck blowing its horn outside. He immediately puts down the tool and goes to join the line for coffee. When he comes back, he starts chatting with the plumber who had joined him for the break.

Without thinking, the plumber casually picks up the powder actuated tool and points it at the wall. He pulls on the trigger a few times. Nothing happens. He keeps talking with the carpenter and cocks the gun. He aims at the wall and again pulls on the trigger. Nothing happens. He pushes the tool against the wall and notices that the guard on the muzzle is spring loaded and that it moves in and out. Curious, he puts his hand over the muzzle and pushes on it to test the strength of the spring. At the same time, he pulls the trigger again. This time it fires, and the plumber seriously injures two of his fingers.


Powder actuated tools are as dangerous as handguns. Referred to as "powder actuated" or "explosive actuated", these tools use a powder charge to fire a pin or fastener into hard materials such as concrete, mild steel or masonry.

There are two types of powder actuated fastening tools: direct-acting and indirect acting. In a direct-acting tool, the "load" essentially a firearm cartridge without the lead bullet - acts directly against the fastener so that it is shot out the barrel of the tool, usually at high velocity, into the material. In an indirect-acting tool, the load acts on a piston within the tool's barrel, which in turn drives the fastener that is sitting at the end of the barrel. Because the mass of the piston acts on the pin, the pin's velocity does not need to be as high as in a direct-acting tool.

Most powder actuated tools used in construction are low velocity. That wasn't always the case. When the tools were first introduced in 1947, most were direct-acting, high-velocity. If the pin ricocheted or "fish-hooked" in the material, it could easily fly across a room with sufficient velocity to injure either the operator or a bystander. Many accidents occurred because of the




high velocity of the tools. However, powder actuated tools today are almost all indirect-acting, low velocity (because the fastener has a low velocity, it is very rare for the pin to ricochet). In fact, many provinces discourage or do not allow the use of high-velocity tools, and most powder actuated tool manufacturers will not supply pins and loads for these tools anymore. Anyone who still has a high-velocity tool should consider retiring it .

There are many different regulations across Canada regarding the use of powder actuated tools. They can be found in the occupational heath and safety legislation for each province under "explosive actuated fastening tool."

Most provincial regulations require that only a qualified operator trained by the tool manufacturer or a related agent operate the tool. Most manufacturers of powder actuated tools offer free, standard training programs for operators and instructors. After training, operators and instructors are issued certificates stating that they are qualified to operate a tool and/or to train others.

Accidents involving powder actuated tools, like the one described above, are rare. When incidents do happen, it is usually because of improper handling. The most common accident is accidental firing of the tool on oneself, followed by injuries to the eyes from the base material breaking and debris being propelled upward. Also, long term use of powder actuated tools without hearing protection can result in hearing loss. Operators should be wearing hearing protection, eye protection and a face shield. Heavy shirts and pants provide some protection against ricochets and flying fragments of materials and fasteners. Always check if a powder actuated tool is loaded when you pick it up. This is the most important and primary safety precaution. The most common injury occurs when people fire a tool thinking it is not loaded. (This has even happened to instructors when, for example, they are not looking, and a student loads the gun and puts it back down.) It is also important to read the instructions carefully for each model of tool.

Never place your hand or fingers over the front (muzzle) end of the tool. Also, never alter parts for use in the tool. This can affect the built-in safety features of the tool. Operators and people working within the vicinity must be wearing eye and hearing protection.

Before fastening with the tool (after

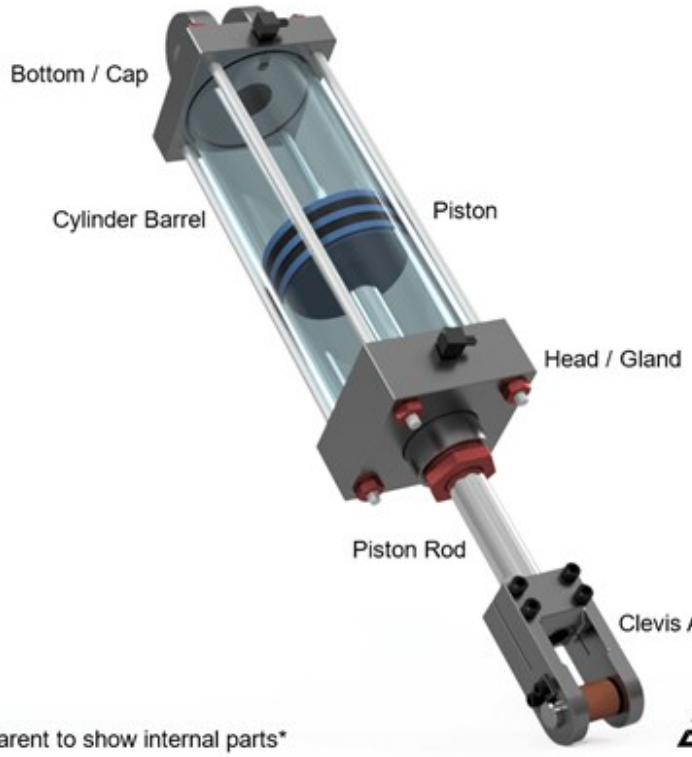
making sure it is unloaded), conduct the functional check described in each tool's manual. Without a fastener, push the tool against the work surface and pull the trigger (you should hear the firing mechanism click), then release the tool from the work surface. Carry out several functional tests to ensure the cocking slide and firing mechanism operate freely. (Check the tool's manual for specific details.) A powder actuated tool should only be used on poured concrete, structural steel, and hollow and grout filled masonry units. Do not try to guess the hardness of a material. And never fire into very hard or brittle materials such as cast iron, tile, glass or rock. These can shatter and result in injury.

Before fastening into any unidentified material, check to see if it is too hard, too soft or too brittle by using the "centre-punch test": Try to drive a pin into the material using a standard hammer. (Wear eye protection during this test.)

Do not use the powder actuated tool on the material if, a) the fastener point is flattened (the material is too hard); b) the fastener penetrates the material easily (the material is too soft); or c) the material cracks or shatters (the material is too brittle).

If the pin makes a small indentation, the material is suitable. Next, as a final safety measure, test fire into the base material using the lowest power level load for the tool being used.

There are acceptable fastener placement and penetration guidelines for concrete and steel. If fastening into concrete, do not fasten closer than 76 millimeters (three inches) from the edge; do not fasten closer than 76mm (three inches) to another fastener; and concrete must be at least three times as thick as the fastener penetration.




*Cylinder barrel made transparent to show internal parts*

If fastening into steel, do not fasten closer than 13mm (a half inch) from the edge; do not fasten closer than 38mm (1-1/2 inches) to another fastener; and the steel must be at least as thick as the fastener shank diameter.

Again, it is important to follow the instructions supplied with the tool. The loads used in powder actuated tools come in different power levels. The load levels are designated by numbers, marked on each box of loads: As the number increases, the power level increases. Power level is also indicated by the colour of the box, or the colour on each load. Loads of different power levels should not be mixed together - the operator may pick up the wrong power level load.

Tools should be cleaned according to the manufacturer's instructions to ensure the parts continue to move freely. In general, the piston rod, barrel assembly, and receiver should all be cleaned on a daily basis. And the piston should be checked for damage.

Powder actuated tools are safe if care and common sense are applied. Again, most injuries are caused by accidental firing: Users should be trained to always unload a tool and always check to see if a tool is loaded when they pick it up. Ultimately, operators should treat the tools with the same respect they would a handgun.

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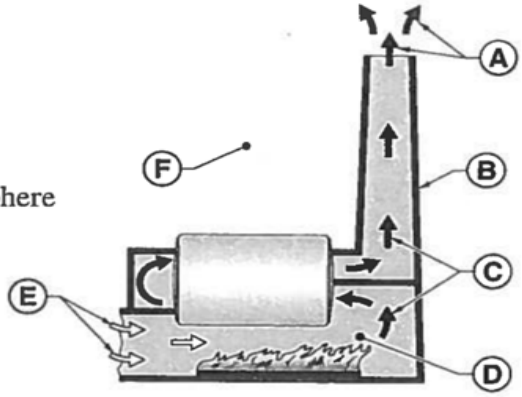
# Name it...

## Identify the part of the equipment....

*Answers on page 32*

### Natural Draft




_____ 1. Cold air for combustion

_____ 2. Hot gases of combustion

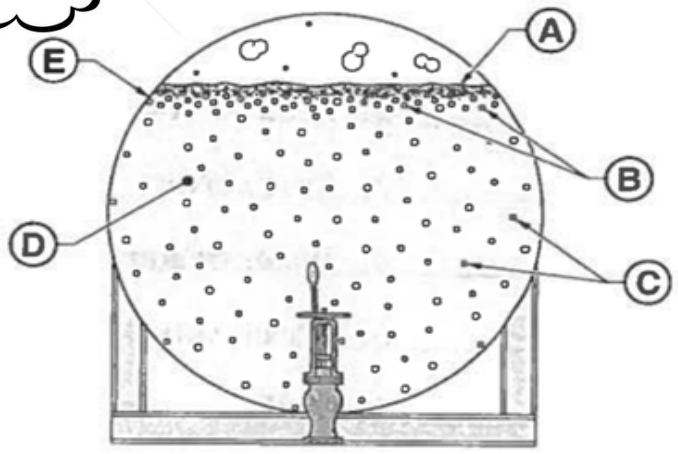
_____ 3. Gases of combustion released to atmosphere

_____ 4. Cold ambient air

_____ 5. Chimney

_____ 6. Heat


### Foaming




_____ 1. Trapped steam bubbles

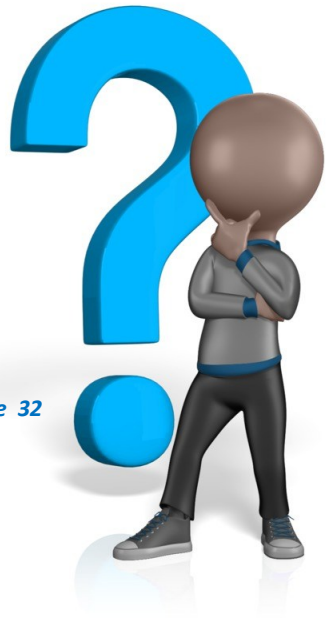
_____ 2. Boiler

_____ 3. Boiler water

_____ 4. Film from impurities

_____ 5. Steam bubbles

# Name it....



## Identify the part of the equipment....

*Answers on page 32*

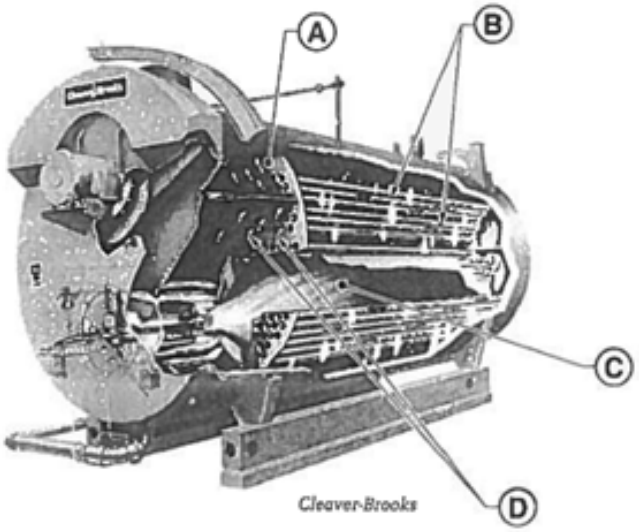
### Scotch Marine Boiler

_____ 1. Tubes

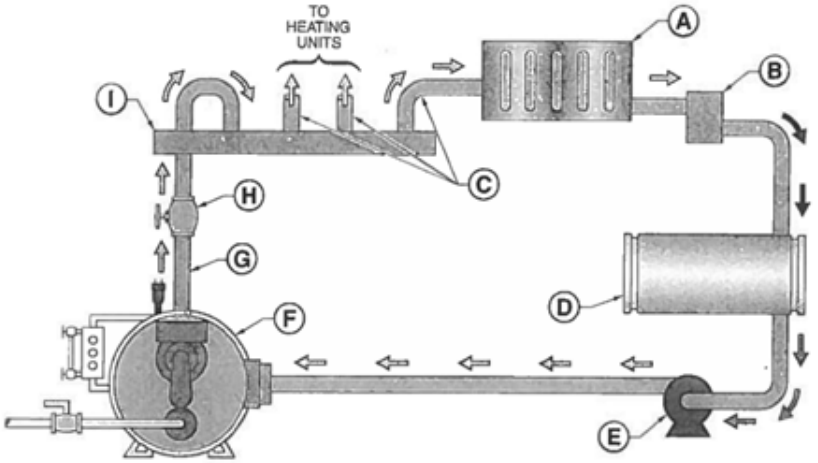
_____ 2. Tube sheet

_____ 3. Gases of combustion

_____ 4. Internal furnace




### Steam Heating System




_____ 1. Condensate receiver tank

_____ 2. Main steam line

_____ 3. Feedwater pump

_____ 4. Steam header

_____ 5. Branch lines

_____ 6. Main steam stop valve

_____ 7. Heating unit

_____ 8. Steam trap

_____ 9. Boiler

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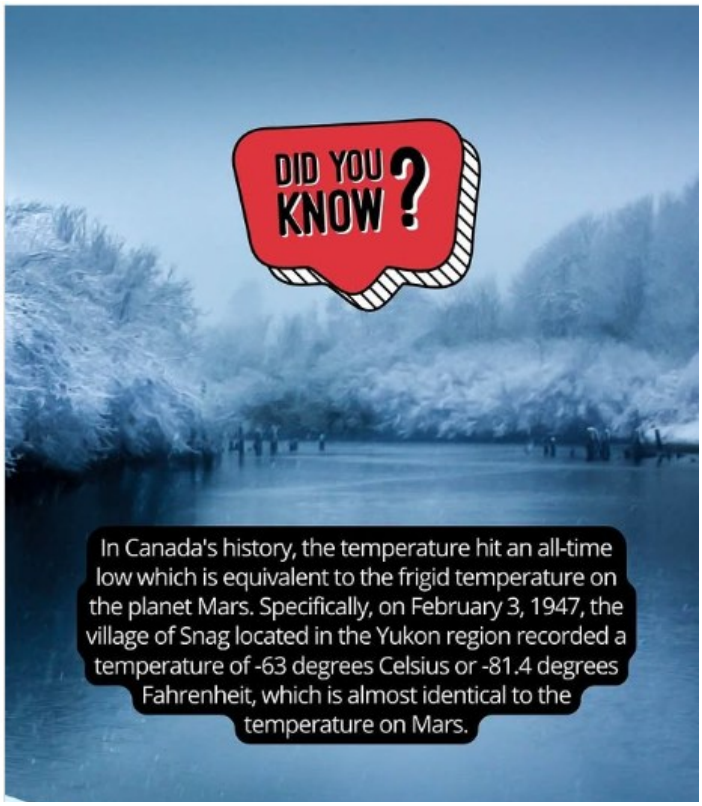
## Kenken Puzzle Answer

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

### TEST YOUR OPERATOR IQ ANSWERS

**Answers:** 1) b 2) d 3) a 4) a 5) a




## Name it... Answers

**Natural Draft:** 1) E 2) C 3) A 4) F 5)B 6) D

**Foaming:** 1) B 2) E 3) D 4) A 5) C

**Scotch Marine Boiler**: 1) D 2) G 3) E 4) I 5) C 6) H 7) A 8) B 9)F

**Steam Heating System:** 1) B 2) A 3) D 4) C

**February is Heart Month**

Make time and take charge of your heart health.

# JOIN US:
# TUESDAY FEBRUARY 11, 2025 AT 5PM FOR OUR IN-PERSON MONTHLY MEETING

**Title:** **What Can Academy Pump & Motor Do for You**

**Presenters:** **Derrick Moes**
**Academic Pump & Motor**
**Technical Sales Representative**

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

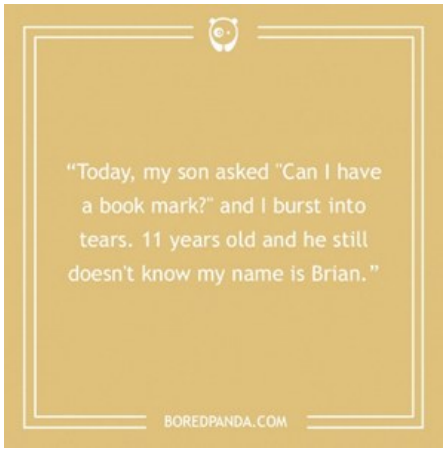
**Bio:** **Derrick Moes has been in the industry since 2002, with a background in electric motor rewind training at SAIT. He has held various positions, including inside and outside sales, and has developed strong skills through his experience coaching youth hockey. Recently, Derrick co-founded Academy Pump and Motor with Lincoln Jones, and is excited to share the company's capabilities and future plans with the Building Operations Community.**

**The Building Operations Association looks forward to welcoming Derrick Moes to the meeting on February 11th!**

BOA
Building Operators Association of Canada

# Just for laughs!



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

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

BOA Building Operators Association of Canada