

# JEFF THEILER

USA

COO OF THE U.S. ICE RINKS ASSOCIATION

*Energy Efficiency and Water Conservation Through  
Operational Best Practices in the USA*





# Energy efficiency and water conservation through operations best practices

Jeff Theiler

Chief Operating Officer

United States Ice Rink Association

# My Background



## Work Experience

- 33 years in the ice arena industry (1991 – Present)
- 15 years @ United States Ice Rink Association

## Professional Designations

- Certified Ice Technician (CIT)
- Certified Rink Administrator (CRA)
- Certified Ice Rink Manager (CIRM)
- Certified Ice Master (CIM) Vierumäki Sports Institute

## Committees

- IIHF Facilities Committee (2013 – Present)
- ASTM International - F08.66 Sports Facilities Committee (2012 – Present)
- USA Hockey Playing Rules Committee (2016 – Present)

## International Hockey Events

- 2021 IIHF Men's World Championship – Riga, Latvia
- 2022 IIHF Men's World Championship – Tampere, Finland

# United States Ice Rink Association



## Organization

A national non-profit membership association for ice skating / ice hockey arena owners, operators, and suppliers in the United States. Formed through a joint venture between USA Hockey and U.S. Figure Skating in 2000.



## Purpose

Foster the growth and success of ice skating / ice hockey arenas, so that both USA Hockey and U.S. Figure Skating can continue to grow participation in their respective ice sports.

## Mission

To advance the American ice rink industry through world class education, certifications, resources, and networking opportunities for our members.

# Membership



## Individual

- For people that are employed at an ice skating / hockey arena.

## Facility

- For ice skating / hockey arena owners, management companies and their employees.

## Vendor

- For companies that supply products and/or services to ice skating / hockey arenas.

**\*Total Membership – 3,474 people**

## Education & Training



## Operations Courses

- Basic Arena Refrigeration
- Safe Ice Resurfacer Operation
- Ice Maintenance & Equipment Operation
- Ice Making & Painting Technologies

## Management Courses

- Human Resource Management
- Operations & Risk Management
- Programming, Marketing & Promotions

\*Over 12,000 students since 2001



# Professional Certifications



## Certified Ice Technician (CIT) - Recognized by NHL

- Basic Arena Refrigeration
- Ice Maintenance & Equipment Operation
- Ice Making & Painting Technologies



## Certified Rink Administrator (CRA)

- Human Resource Management
- Operations & Risk Management
- Programming, Marketing & Promotions



## Certified Ice Rink Manager (CIRM)

- CIT + CRA
- 5+ Years Industry Work Experience

# State of the U.S. Ice Arena Industry



## The Good News

- 1,545 indoor ice arenas (2,092 ice sheets)
  - Rinks in every state, growth in non-traditional markets
- Over the past decade the net number of ice sheets has increased
  - More new arenas have opened than existing arenas closed
- Participation in ice hockey and figure skating continues to grow steadily
  - Ice time demand starting to exceed supply in many areas of the country



# State of the U.S. Ice Arena Industry



## Not So Good News

- Aging facilities and equipment
  - Over 50% of arenas are 30+ years old
- New construction and replacement is behind pace of participation growth
  - Cost to build facilities is currently very high (inflation, interest rates)
- Operational costs rising
  - Slim profit margins, little to no capital available
- ❖ Shortage of experienced, knowledgeable and motivated labor force
  - Workers don't stay long before moving on to other companies / industries

# Moving Forward



## Invest in Human Resources

- Facilities, and equipment are only as good as the people operating them
- People want to do a good job, but “You don’t know what you don’t know”
- Provide employees access to information and resources to do their job well
- Social media is not a good source of information

# Operational Best Practices



## Not So Common Knowledge

- What should the ice temperature be?
- How thick should the ice be?
- How much ice should be scraped during resurfacing?
- How much water should be used for ice resurfacing?
- Should hot or cold water be used to resurface the ice?

# Operational Best Practices



## Ice Sheet Thickness

- Ice that is too thick → extended refrigeration system run times
- Extended run times → high energy consumption + equipment wear & tear
- High energy consumption → increased energy costs
- Recommended ice thickness: 2.5 - 3.5cm (1.0 – 1.5 inches)
  - Every additional cm of thickness = 5% – 8% increased energy consumption

# Operational Best Practices



## Ice Temperature

- Very common for the ice temperature refrigeration setpoints to be too low
- Myth: The colder the ice the harder and more durable it is
  - Too cold → poor ice quality, feels 'soft' & excessive snow build up
- Recommended ice surface temperatures
  - Ice Hockey: -5.5 to -4.4 C (22 to 24 F)
  - Figure Skating: -4.4 to -3.3 C (24 to 26 F)

# Operational Best Practices



## Ice Resurfacing Snow Removal

- Common for ice resurfacer blade depth for resurfacing to be incorrect
  - Resurfacer operators afraid to scrape out paint or logos
  - Skate gouges and holes in ice not minimized
- Recommended blade depth
  - Set depth to fill snow tank  $\frac{2}{3}$  to  $\frac{3}{4}$  full each ice resurface

# Operational Best Practices



## Ice Resurfacing Water Temperature

- Common for ice resurfacing water to not be heated to “Save Money”
  - Poor ice quality, due to dissolved gasses trapped during freezing process
- Recommended ice resurfacing water temperature:
  - 60 – 71 C (140 - 160 F)
- Common for ice resurfacer to be filled immediately after each resurface
  - Heat loss during the 60 to 90 minutes between resurfaces
  - Overfilling up to an additional 600 L of water increases cost significantly over time

# Operational Best Practices



## Ice Resurfacing Water Quantity

- Common for too much water to be used during ice resurfacing
  - Filling water tank completely, and allowing to overflow
- Recommended water usage
  - 380 to 450 L (100 – 120 gallons)
  - Ice resurfacers ice making water tanks hold 727 to 1000 L (192 – 264 gal)



# Conclusion



**Trained employees save money**

**Untrained employees increase costs**



**Questions?**



# Thank you

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