Canadian Healthcare Engineering Society

Sustaining Healthcare Infrastructure

Winnipeg, Manitoba

September 25-27, 2011
Brought to you by....

Thermal Insulation Association of Canada

International Association of Heat and Frost Insulators and Allied Workers
www.tiac.ca

Manufacturers
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What You’ll See on the TIAC Website

News and Events.
Best Practices Guide.
Heat and Frost-what contractors do.
Denis Formula-estimating labour content.
TIAC Times.
Members.
The Butterfly Effect

Can a butterfly flapping its wings somewhere in the Amazon jungle cause....?
The Butterfly Effect

- A 6” low pressure steam valve operating at 300F.
- In use 8,320 hrs/yr.
- Ambient temperature is 80F.
- Bare-annual heat loss: 25,830,000 BTU/yr
  - Payback: None
  - GHG emissions:
    - CO₂: 4,011 lbs.
    - NOₓ: 8.6 lbs.
    - CE (Carbon Equivalent): 1,093 lbs.
ASTM C 1129

Standard Practice for Estimation of Heat Savings by Adding Thermal Insulation to Bare Valves and Flanges
The Butterfly Effect

- 1” insulation-annual heat loss: 3,120,000 BTU/yr
  - % reduction over bare: 88%
  - Payback: 8 months
  - Surface temp. 109F
  - GHG emissions reduction:
    - CO₂: 485 lbs.
    - NOₓ: 1.0 lbs.
    - CE (Carbon Equivalent): 132 lbs.
The Butterfly Effect

- 2” insulation-annual heat loss: 1,772,400 BTU/yr
  - % reduction over bare: 93%
  - Payback: 10 months
  - Surface temp. 96F
  - GHG emissions reduction:
    - CO₂: 275 lbs.
    - NOₓ: 0.55 lbs.
    - CE (Carbon Equivalent): 75 lbs.
Insulated steam piping with removable fitting covers.
Personnel Protection

☐ National Building Code of Canada requires surface temperature not to exceed 70C (158F).

☐ Accepted industry maximum surface temperature not to exceed 60C (140F).
TEMA Visual Support
Corrosion & Mould Growth

Where you have a combination of water, humidity, warmth and dust, there is always the potential for mould growth.
Corrosion & Mould Growth

Attributable to:

- Insufficient insulation on cold lines for the operating and ambient conditions = condensation.
- Compromised vapour retarder.
- Leak (interior or exterior).
- Mechanical damage.
- Workmanship.
- Corrosive environment.
- Chemical reaction between insulation and the pipe (e.g.) stainless steel.
Mechanical Damage

- Piping systems are not ladders, walkways or shortcuts.
- Permanent.
- Cascade effect.
Payback?
2” insulation-9 months.
Insulated Piping – (domestic hot water, heating hot water, chilled water and steam)
Averages 13 miles (21 kms) per hospital.

Insulated Supply Ductwork
Averages 4 acres (16,000 square metres) per hospital.
“For hospitals the energy savings from mechanical insulation are estimated to average about 149 kBTU/sf/yr (roughly 78% of the total site energy usage)"
Retrofitting?

High efficiency boiler?
Chiller?
Variable speed drives?

Deliver what you want to where you want it at the temperature you need!
Typical Energy Saving Applications

- Steam traps
- Strainers
- Unions
- Valves
- Piping
- Steam boiler bodies
St. Joseph’s Health Centre
Toronto
**Date & Time:** 25/01/2011 2:34:47 PM

**Comment:** OLD, DAMAGED AND INEFFICIENT

**Recommendation:** REMOVE AND REPLACE
Picture 15. Captured at: 2VRLPS1104

Date & Time: 26/01/2011 11:05:37 AM

Comment: OLD, DAMAGED AND INEFFICIENT
Recommendation: REMOVE AND REPLACE

Picture 16. Captured at: 4VRHPS1205

Date & Time: 26/01/2011 11:32:36 AM

Comment: UNINSULATED VALVE
Recommendation: REMOVABLE COVER
Leadership in Energy & Environmental Design (LEED)

- Energy and Atmosphere
  - Minimum Energy Performance
  - Optimize Energy Performance
Leadership in Energy & Environmental Design (LEED)

- Materials and Resources
  - Construction Waste Management
  - Resource Reuse
  - Recycled Content
  - Regional Materials
  - Rapidly Renewable Materials
Leadership in Energy & Environmental Design (LEED)

- Indoor Environmental Quality
  - Minimum IAQ Performance
  - Construction IAQ Management Plan – During Construction

GREENGUARD Certified
www.greenguard.org
3E Plus
www.pipeinsulation.org

- Energy
  - Optimize insulation thickness.
  - What if’s

- Economics
  - Payback

- Environmental
  - GHG emission reductions: CO$_2$, No$_x$ & Carbon Equivalent (CE)
In our world, this is art...
Thank you

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