

INSULATION LIFESPAN AND INSTALLED MATERIAL EFFECTIVENESS



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Insulation Lifespan and Installed Material Effectiveness

Discussion Topics & Objectives:

- Discuss typical insulation systems in steam producing facilities
- Review evidence of expired insulation systems
 - Missing fittings, blankets, pipe covering
 - Damaged insulation
- Give information on some of the problems associated with insulation systems that are not performing properly
- Talk about the energy savings available and where to see the biggest returns

Defining Mechanical Insulation

MECHANICAL INSULATION

encompasses all thermal, acoustical, and personnel and life safety requirements in **Industrial** and **Commercial** building applications:

- Mechanical piping and equipment, hot & cold applications
- Heating, Ventilation & Air (HVAC) applications
- Refrigeration and other low temperature piping and equipment applications



How can you tell if your system is working properly?

**Is it complete?
Is it burned out?**



Does it pass the eye test?

Does the system look complete?



Does it function properly?



What product should I choose?

There are so many options, so little time!!!

**Calcium silicate
Mineral wool
Fiberglass
Removable blankets
Closed cell foam
Stainless steel jacket
Aluminum jacket**

Which one is right for my application?

WHY INSULATE?

Does paying to have our insulation concerns addressed make sense?



Backside Costs of Uninsulated equipment

Early failure, early rebuild



Did you know?

It has been estimated that between 10% & 30% of all mechanical insulation is missing or damaged!

Petroleum Segment – 21% Chemical Segment – 19%

Goodyear Tire Plant conducted an energy assessment on it's Tennessee plant and implemented a plan to reduce their energy costs by \$875,000 annually.

Key Findings

- By optimizing boiler operation and improving insulation, they significantly reduced consumption of fossil fuels.
- The investment of \$180,000 will achieve a simple payback in 2 ½ months.
- Upon completion of insulation project, they reduced natural gas by 93,000 MMBTU's & No. 6 fuel oil by 224,000 gallons.

DOE Industrial Technologies Program Case Study

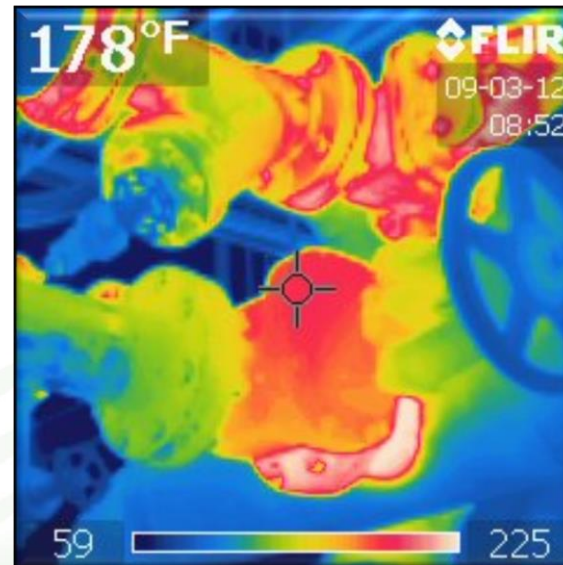


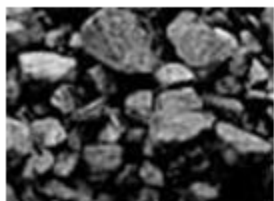
The steam system at Goodyear's Union City plant is served by four dual fueled (natural gas & No. 6 fuel oil), such as this 60,000 lbs/hr boiler pictured above.

Insulation Reduces Energy Costs

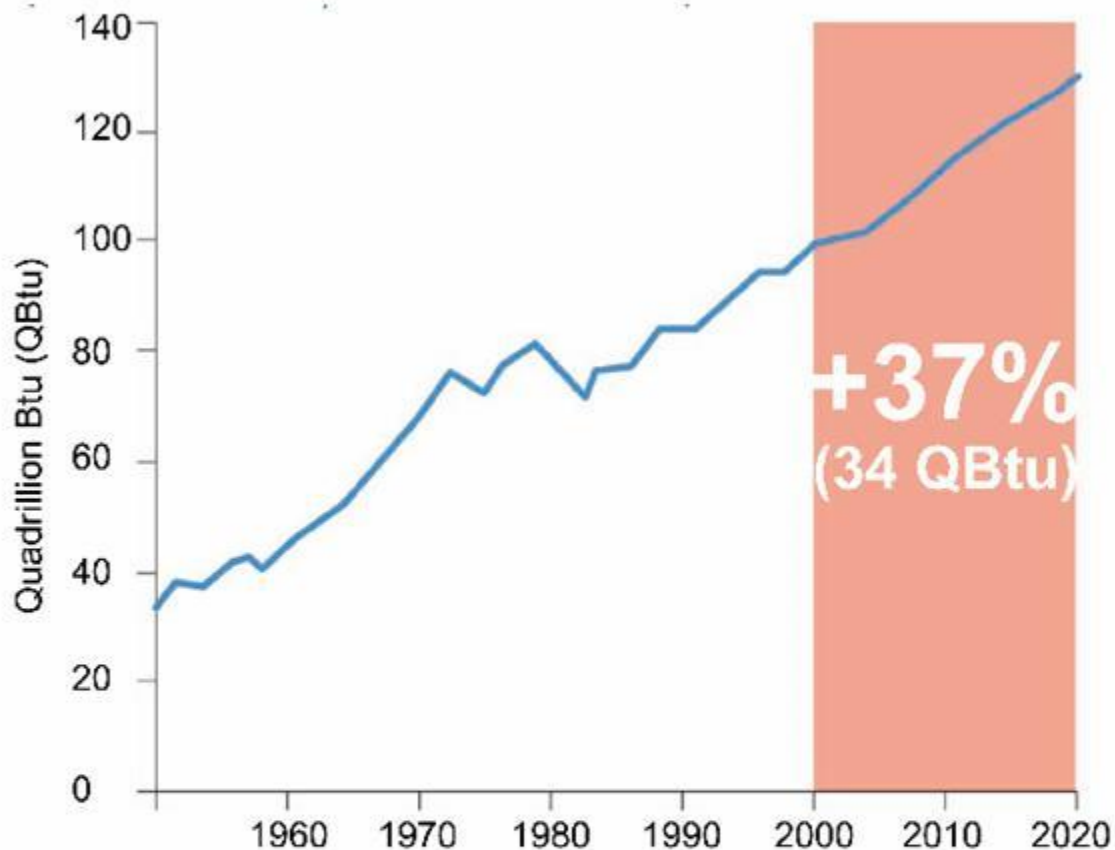
Insulation significantly reduces the energy required to run a facility and its processes.

- There was over 18' of bare pipe with vic elbows and a couple gate valves.
- Heat Loss > 8.2 MBtus per hour of operation (per each section repaired)
- 2" insulation added back to pipes would improve efficiency by 92% saving more than 7.6 MBtus per hour





**All types
of energy
sources,
including
efficiency &
conservation
Initiatives,
must be
employed to
meet the
demand**



U.S. Energy Consumption Projections

Source: U.S. Energy Information Administration Statistics Center





U.S. Department of Energy
Energy Efficiency and Renewable Energy

Save
ENERGY
Now

Industrial Technologies Program

**Assessment References indicate Mechanical Insulation
provides an attractive "Simple" return**

Near Term (<1 yr. return)82%

Medium Term (<3 yr. return)...15%

Long Term (>3 yr. return) 3%

Missing, damaged, or uninsulated ..70%

Upgrade or improve 30%



SAVE ENERGY NOW

Examples

NEAR TERM Insulation Initiatives

☐ **BAYER (2 Steam Plants), Institute, WV**

By improving and replacing missing insulation on the steam and condensate lines – Potential savings \$926,000 per year

☐ **BOISE CASCADE (Paper Mill), Jackson, AL**

By replacing missing pipe insulation – Estimated savings \$80,000 per year, cost to complete the work \$25,000 = Payback in 3.2 months

☐ **DOW CHEMICAL (Chemical Plant), Hahnville, LA**

By replacing, repairing, and improving insulation on steam system - Potential savings of \$811,000 per year

☐ **GOODYEAR, Union City, TN**

*A significant number of process units are partially insulated
Potential savings = \$402,000 per year. Estimated cost to insulate ranges between \$80,000-\$200,000 = payback in 2 – 5 months. "This same opportunity can be applied to other company facilities."*

A simplistic view

Insulation, a better option than a light bulb?

Energy Conservation Option	Energy Savings, MMBtu/yr (1)
1 ft of insulation on 350°F pipe	14.4
1 car, 5% increase in mpg	3.7
1 compact florescent light bulb	0.9
1 ft of insulation on 180°F pipe	0.9
1 ft of insulation on 42°F pipe	0.6
1 tree	n/a

*Energy conservation with the use of mechanical insulation - “**Low Hanging Fruit**” - is simply an **OPPORTUNITY** that should not be overlooked.*

It is an investment that may have few rivals from a return perspective.

(1) Equivalent energy savings in Millions of Btu/yr (MMBtu/yr) of primary fuel

EXAMPLE

***Heat Loss – Energy
Conservation***



- **8" NPS Steel Horizontal Pipe**
- **350°F Process and 75°F Avg. Ambient Temperature**
- **8 MPH Average Wind Speed**
- **Fuel Source – Natural Gas @ \$10/mcf**
- **Project Location – Orlando, Florida**
- **Insulation – Mineral Wool System with Aluminum Jacket**

EXAMPLE

Heat Loss – Energy Conservation

VARIABLE INSULATION THICKNESS	HEAT LOSS (BTU/FT/YR)	ESTIMATED INSULATION COST (\$/LF)	ANNUAL COST (\$/LF)	PAYBACK YEARS	CO ₂ EMISSION (LBS/FT/YR)	SURFACE TEMP. (°F)	
BARE	23,180,000				3,376.0		
1.5 INCH	1,200,000	\$17.87	\$18.56	1.2	174.7	101	
2 INCH	954,900	\$21.00	\$16.27	1.4	139.1	92	
3 INCH	679,100	\$29.35	\$14.76	1.6	98.2	83	

The finished product!

Shiny, new, most
importantly...**FUNCTIONING!**



THANK YOU

Insulation, is it effective? Does it work for you?

THINK ABOUT INSULATION DIFFERENTLY

SEATTLE

SPOKANE

PORTLAND

www.hudsonbayins.com