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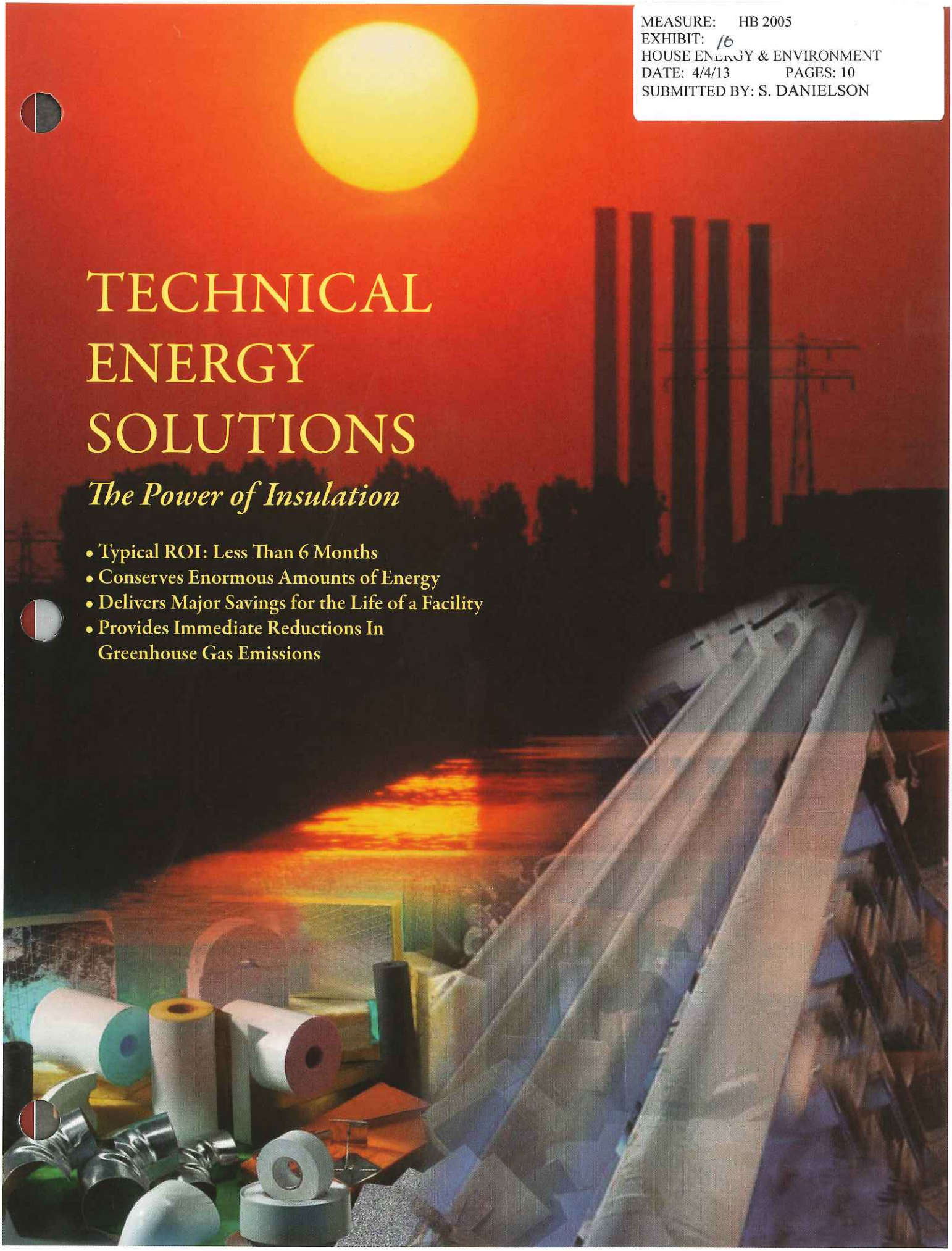
TECHNICAL ENERGY SOLUTIONS

The Power of Insulation

- Typical ROI: Less Than 6 Months
- Conserves Enormous Amounts of Energy
- Delivers Major Savings for the Life of a Facility
- Provides Immediate Reductions In Greenhouse Gas Emissions

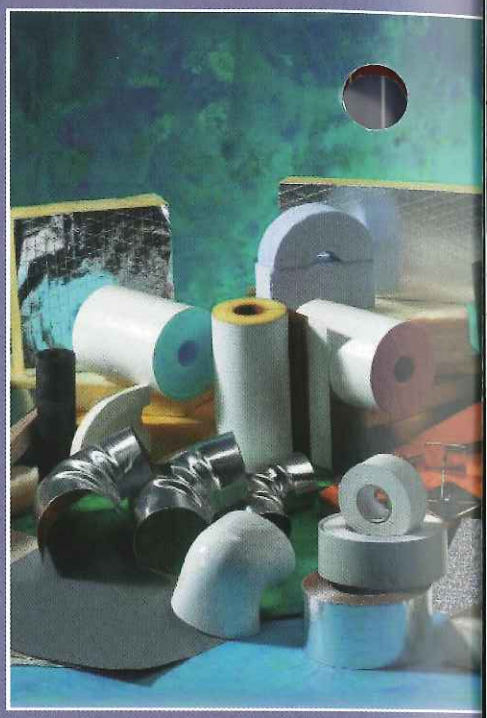


Conserving Energy With Insulation

The most widely accepted benefits of insulation are energy savings and the resulting cost savings that can be realized. Energy is often the most costly component in managing a manufacturing facility and its processes. Reducing energy consumption reduces costs. Lowering costs is a continual objective within most companies. It may not be at the top of the list, but it certainly falls within the top ten corporate initiatives, along with improving safety, quality, shareholder value, and the environment.

With the high cost of energy and our country's dependency on foreign energy sources, energy conservation is a priority with many companies. However, insulation is not normally at the top of the list of solutions because it is not considered an exciting topic. The rate of return on investment (ROI) is certainly at the top of everyone's list of objectives. So properly designing, installing, and maintaining an insulation system should be, too. In many cases, the annual rate of return is more than 100 percent. Loss of energy can increase the temperature within a facility or area, putting additional stress on other equipment and reducing that equipment's performance and life expectancy.

Energy conservation with the use of mechanical insulation, whether it is a hot or cold application, is simply an opportunity that should not be overlooked. As one facility manager notes, of all the energy-saving technologies available, a properly insulated system can provide the best ROI. It just makes good business sense to look at insulation first. Said another way, it is an investment that may have few rivals from a return perspective. Conserving energy with mechanical insulation is a quick and simple way to save both energy and money.



Enhancing Employee Safety With Insulation

When was the last time you heard about mechanical insulation at a safety meeting? Protecting workers from contact with hot or cold surfaces should be a focus of any safety program. Another important safety focus should be protecting workers from excessive equipment or other workplace noise.

Insulation systems can be a vital component in applications related to life safety, such as applications for commercial kitchen ducts, return air plenums, protection of power and communication conduit trays, and other similar applications.

The role of mechanical insulation in providing a safe work environment is seldom considered. Far beyond the impact on a company's bottom line is the very direct impact on its employees' well-being. Can you think of a more important topic or better reason to think about insulation differently?

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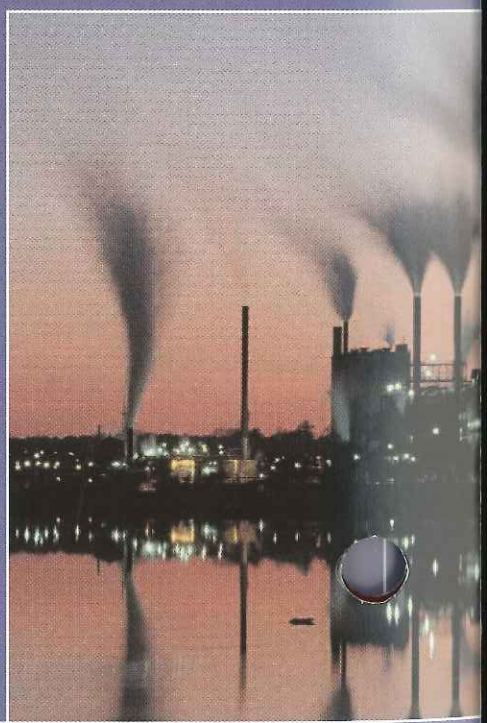

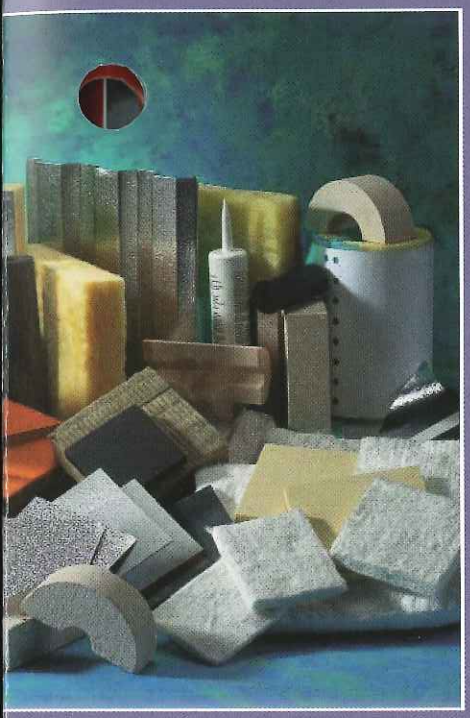

Reducing Energy Costs With Insulation

Corrosion under insulation (CUI) is a major safety and cost concern. It raises the question: If insulation is correctly designed, installed, and maintained in a timely and effective manner, is it possible the CUI problem could be minimized or even eliminated? It is an interesting subject, and there are many points of view regarding CUI. Moisture is definitely the enemy. The old saying, "Pay now or pay later," applies to insulation in this case. By not properly maintaining an insulation system, you could be creating bigger or more expensive problems. If you don't change the way things are done, you can expect the same results you've always gotten.

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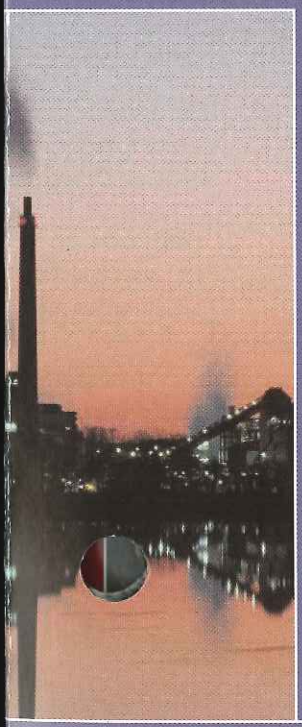
DERATIONS HAVE NOT CHANGED, BUT PERHAPS
RTANCE HAS. *Is your current insulation system designed for the 1950's or for today?*



Reducing Emissions With Insulation

A reduction in energy consumption means less fossil fuel is being burned to produce energy. The result is a reduction in the amount of greenhouse gases emitted into the atmosphere. These gases have been directly linked to global warming and pollution. This benefit is not being considered in many applications. Why not? Many people do not relate the reduction of energy consumption to the reduction of greenhouse gas emissions. By reducing greenhouse gas emissions, you are increasing carbon credits. Reducing energy, reducing emissions, and increasing the availability of carbon credits: What a great win-win-win scenario.

Sustainable Design

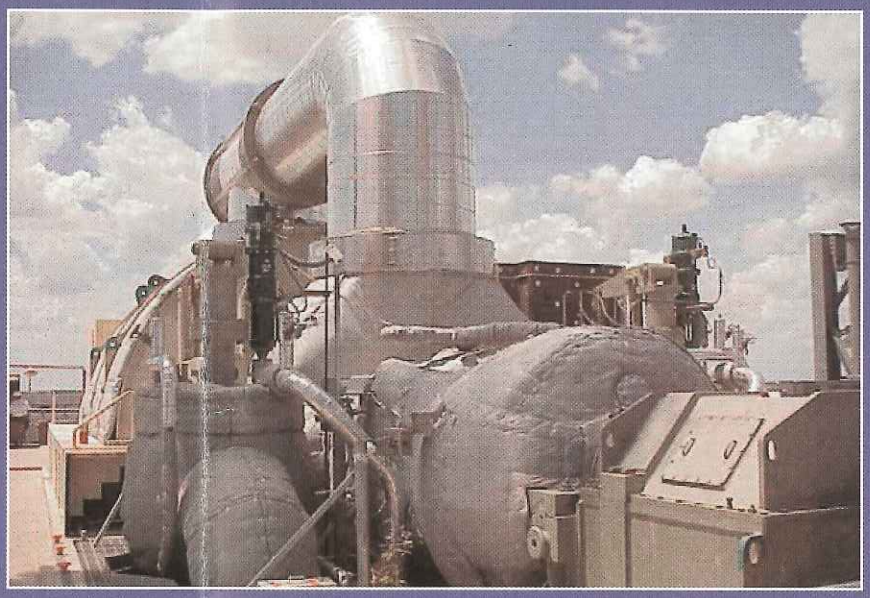
Insulation can be a major component of employing sustainable design technology. Whether you are pursuing certification or just want to start thinking "green," insulation systems—both individually or in combination with other building or equipment design options—can be vital to accomplishing your objectives. Environmental stewardship is not new, but it is no longer just an option. The economic case to build green is no longer the challenge it once was, and the potential of green buildings being mandated in many industry segments is real. Some evidence suggests that current planning, design, construction, and real estate practices contribute to patterns of resource consumption that seriously jeopardize the future of Earth's population. The proper design, installation, and maintenance of mechanical insulation should be a major consideration in all sustainable design initiatives.

Condensation Control

Insulation systems are needed to maintain the surface temperature above the dew-point temperature of the ambient air. Condensation is a real-world problem that, if not corrected, can certainly lead to other real-world problems. If designed, installed, and maintained properly, insulation can eliminate the problem of condensation. The damage caused by condensation is often understated. It is a potential safety hazard; it can damage surrounding surfaces and equipment; and it can be the primary cause for sustaining mold growth, affecting indoor air quality. It can also be a major contributor to corrosion under insulation (CUI).

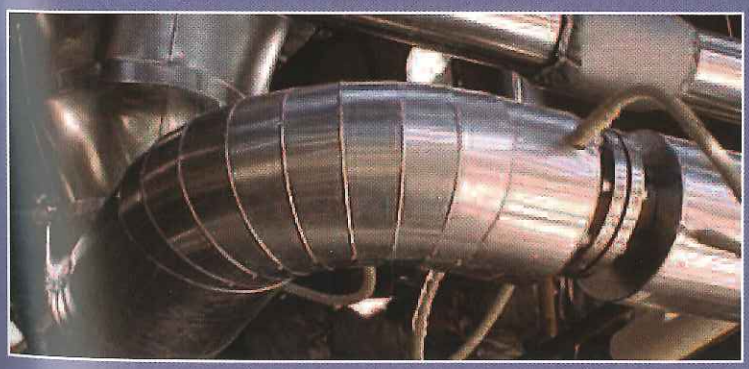
Realizing a Return and Reducing Life-Cycle Cost

Insulation is a technology that can provide unrivaled rates of return on investment (ROI) and improve life-cycle cost. Yet, despite the overwhelming proof, insulation is often not considered from an ROI perspective. It's not just about obtaining a return. After reviewing the significant rate of return possible, the more prudent question is: Why have we not looked at and implemented this technology in the past? Quantifying the rate of return is no longer a mystery; software and energy assessment procedures are proven and readily available. It has been estimated that a building's initial construction cost represents only 20 to 30 percent of the building's entire cost over its 30- to 40-year life. So the life-cycle cost of the total project deserves consideration, rather than focusing solely on the initial capital cost.



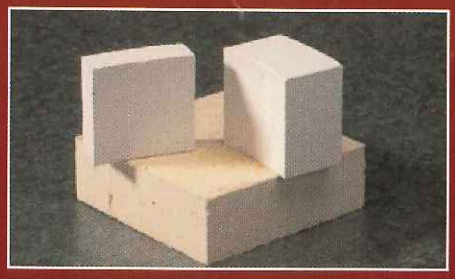
Improving Process Control and Productivity

Most processes involve fluid, air, or gas, and are designed to leave point A at one temperature or pressure and arrive at point B at another. The initial design incorporates a series of engineering assumptions. If the insulation system in the initial design is not installed and maintained, process control and productivity will suffer. A properly designed, installed, and maintained insulation system can provide the expected results. In many cases, it can even improve upon the results that are currently being realized.



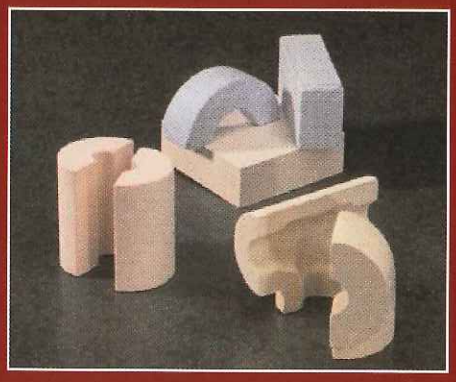
Building a Better Work Environment

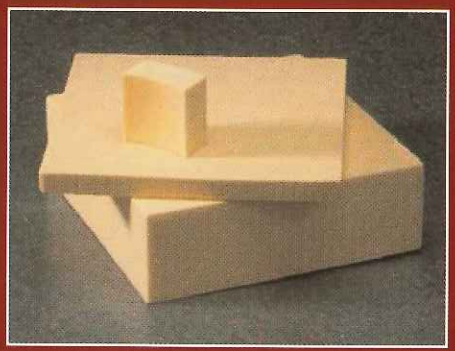
Study after study has proven that improved indoor air quality increases occupants' productivity and efficiency. Noise control—whether it is in an office or in a plant—can increase productivity. Improved air quality and sound attenuation both benefit an occupant's health, productivity, and overall job satisfaction. Insulation can play a major role in accomplishing these goals.



MECHANICAL INSULATION

Commercial and Industrial





The Power of Insulation

Thinking About Insulation Differently

Insulation is a proven means for conserving energy, reducing greenhouse gas emissions, increasing process productivity, providing a safer and more productive work environment, controlling condensation (which can lead to mold growth), supporting sustainable design technology, and a host of other benefits. It does all of this while providing a return on investment (ROI) rate that is seldom rivaled. Yet, insulation is often overlooked and its benefits undervalued. Insulation is truly the lost or forgotten technology. Can you think of a more important time than now to think about insulation differently?

A Proven Technology, Taken for Granted

Discussing the benefits of insulation is not an exciting topic to many people. An insulation system has no moving parts, gauges, or computer chips; it is often hidden from view; and its benefits are taken for granted. This leads many to seek alternative energy-conservation solutions that they think are more exciting or offer what they see as more quantifiable results. But those assumptions could not be further from the truth. A properly designed, installed, and maintained insulation system can provide short- and long-term benefits that exceed expectations, and the results *are* quantifiable.

Insulation—An Engineered Approach

An insulation system is a technology—one that needs to be engineered into and maintained throughout the entire process. It has been estimated that between 10 and 30 percent of all insulation that has been installed is now missing or damaged. This practice of not replacing or maintaining an insulation system in a timely and correct manner has led to the full benefits of insulation not being realized. In many cases, significant other issues—such as excessive energy loss, corrosion under insulation (CUI), mold development, increased cost of operations, and reduced process productivity or efficiency—develop.

Return on Investment and More

The power of insulation—its return on investment (ROI)—is no longer a mystery. There are software and assessment programs available that can calculate the amount of energy being saved with existing insulation systems or lost if the insulation is missing or damaged. They can also determine the potential dollar savings that can be obtained by upgrading an insulation system or replacing what is missing. These programs calculate the number of pounds of greenhouse gas emissions that could be prevented from release into the atmosphere, insulation thicknesses required for condensation control, personnel protection, surface temperatures, and the estimated ROI. The benefits of insulation are easily quantifiable in a timely manner.

Resources

www.insulationleaders.com

A wealth of information devoted to the industrial and specialty insulation industry is available at ***www.insulationleaders.com***. Designed with industrial and commercial owners in mind, the site offers short video segments explaining the benefits of insulation. The video clips include:

- An introduction to the benefits of insulation, including immediate and long-term return on investment, something with which all business owners are concerned.
- "The Silent Bandit," which details how energy loss leads to increased energy costs and decreased equipment life cycle.
- A description of 3E Plus®, a program developed to determine how much insulation is needed in order to use less energy and improve plant efficiency while reducing plant emissions.
- "Best of Both Worlds," which explains to owners that financing energy improvements through insulation can be accomplished in a short time frame while yielding immediate cost savings.
- Actual Department of Energy studies on the cost savings achieved through the proper installation of mechanical insulations in "Proof's in the Pudding."
- "Do It Right," which explains that quality installation beginning at day one will pay huge dividends for years to come.

The International Association of Heat and Frost Insulators and Allied Workers (HFIAW) has been in existence for over 100 years. Established in 1903, HFIAW members work each day insulating mechanical systems, conserving energy and reducing greenhouse gases for countless clients. The HFIAW has 86 local unions across the United States and nine local unions across Canada, with 25,000 members working for over 1,200 signatory contractors. All members have completed a comprehensive apprenticeship program that includes detailed health and safety training. HFIAW members perform work in nuclear and coal-burning powerhouses, refineries, steel mills, water treatment facilities, factories, auto plants, airports, office buildings, schools, hospitals and all commercial facilities. For more information about the International Association of Heat and Frost Insulators and Allied Workers visit ***www.insulators.org***.

3E Plus® Software

The North American Insulation Manufacturers Association (NAIMA) developed the 3E Plus® software program, which eliminates the complexity of determining the appropriate insulation thickness. This program is being used by certified insulation energy appraisers as well as independent engineers, contractors, industrial process engineers, environmental managers, and others in the commercial and industrial construction industry. It is a tool for selecting the appropriate insulation thickness needed to reduce heat loss or gain, maintain process-control temperature, maintain a safe surface temperature for personnel protection, and control condensation. The program can also calculate the quantity of greenhouse gas emissions (CO_2, NO_x, and others) associated with each thickness. The program includes thermal conductivity curves from current ASTM Material Specifications for most insulations. Users have the option of inputting thermal data from other sources if desired. Visit ***www.pipeinsulation.org*** to download the free software, or send an e-mail to NAIMA at ***3Eplus@naima.org***.

Certified Mechanical Insulation Appraisers

The International Union through the efforts of the International Training Fund continues to certify energy appraisal experts in this limited, highly efficient mode of energy loss analysis. For a listing of certified appraisal experts go to ***http://www.insulators.org/pages/energyAppraisals.asp***.

Heat & Frost Insulators & Signatory Contractors
LMCT
Labor Management Cooperative Trust

The Labor Management Cooperation Trust (LMCT) advances the interests and prosperity of the Union, its members, signatory employers, associations, customers and users of Union services in industries encompassed by the jurisdiction of the International Association of Heat and Frost Insulators and Allied Workers. The LMCT improves communication between representatives of labor and management, and engenders cooperative and harmonious relations between labor and management in the Heat and Frost Insulators and Allied Workers. The LMCT provides workers and employers with opportunities to explore new and innovative joint approaches to organizational effectiveness through the use of safe, efficient and high quality construction services in development, maintenance and rehabilitation of industrial and commercial facilities.

Call 301-731-9101 or email ***HFI@insulators.org*** with any questions or requests for additional information.

Mechanical Insulation Maintenance and Upgrade:

Here's What You Need to Know

Based on data from more than 700 industrial energy assessments, implementing a comprehensive mechanical insulation maintenance and upgrade program in the commercial and industrial market segments could lead to:

Energy savings of $4.8 billion per year

CO_2 reductions of 43 million metric tons per year

Generation of 89,000 jobs

What do these numbers mean?

Energy savings of $4.8 billion per year equates to:

- 45 billion kWh of electricity, enough to power 4.2 million households (4% of U.S. households) for a year and equivalent to annual output from 10,300 wind turbines
- 82 million barrels of oil, enough to fill about 41 supertankers
- 19 million tons of coal, enough to fill 190,000 railcars
- 480,000,000,000,000 Btus (0.48 quadrillion Btus) of primary energy—about 0.5% of total U.S. annual consumption or 1.83 days of energy consumption for the entire United States

43 metric tons of CO_2 reduction per year equates to:

- Adding 1.9 billion mature trees (4.3 million acres of new forest, an area the size of Connecticut and Delaware combined)
- Removing 7.9 million cars from the roads, about 3% of 254 million cars registered in the United States
- Shutting down 11 coal-fired power plants, 1.6% of U.S. installed coal-fired capacity
- Installing 730 million compact florescent light bulbs, equivalent to 2.3 light bulbs for every man, woman, and child in the United States

Generation of over 89,000 jobs:

Mechanical insulation maintenance is an excellent example of "shovel-ready" green job opportunities for stimulus spending. It can put tens of thousands of people to work and retain existing jobs while contributing to the competitiveness of U.S. manufacturing, reducing our country's dependence on foreign energy sources, improving our environment, and increasing profitability of private and public businesses and facilities. Equally important, the majority of insulation contractors who install and maintain mechanical insulation systems represent independent small businesses in every state. Mechanical insulation is a proven technology. It does not require research and development or engineering or design processes. Materials and skilled craft personnel are available now and ready to be deployed.

Just one worker for a single day can save:

- Insulating 45 linear feet of 8-in. high-pressure steam line equates to about $13,600 per year in energy savings, equivalent to removing 13 cars per year from the highways. Assuming the facility exists for 20 more years, the total energy savings from that one workday would be $272,000.
- Insulating 70 linear feet of 3-in. low pressure steam line equates to over $4,000 per year in energy savings, reducing CO_2 emissions as much as removing 3.7 cars from the highways. Assuming the facility exists for 20 more years, the total energy savings from that one workday would be $80,000.

www.insulators.org

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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

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

Insulation, Is "Greener" than Trees

Carbon Reduction Option	Lbs of CO_2 per Year
1 ft of insulation on 350°F pipe	2,308
1 car, 5% increase in mpg	570
1 compact florescent light bulb	130
1 ft of insulation on 180°F pipe	109
1 ft of insulation on 42°F pipe	88
1 tree	50