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Announcing the Adsco Advocate

Will Help Effect Economies in the Operation of Your Plant

With this issue the ADSCO ADVOCATE makes its debut.

In launching this little publication, we realize the responsibility that rests upon us to make each issue helpful to the busy executive.

The ADVOCATE will occupy a definite place in the field of business literature. It will familiarize the men higher up with certain major economies in plant operation.

The adoption of a plan to effect these economies will save many plants thousands of dollars every year. Consequently, the subject is one with which the executive must be thoroughly familiar before arriving at a decision. The ADVOCATE will give him the story by degrees so that he can easily digest and thoroughly assimilate it.

Each issue will tell him how others are solving problems similar to those with which he may be confronted. It will point out the best way of effecting the economies it advocates.

We will be glad to send this magazine to those in your organization who are interested in the economical distribution of steam for heat and power. If you will write their names on the enclosed postcard, we will see that they are sent a copy of this and all subsequent issues.

ADSCO equipment is manufactured in our own complete and modern manufacturing plant at North Tonawanda, N. Y.
History of District Heating
In Three Installments
No. 1
Early Days Fraught With Excitement

Like most other inventions, District Heating began in a small and experimental way.

In 1877, Birdsall Holly, a noted hydraulic engineer in Lockport, N.Y., conceived the idea of transmitting steam through well insulated underground pipes. He began his experiments by running an underground line from a boiler in his cellar around the back yard and so to a radiator in one of the rooms of his home. He checked up and found that there was apparently no difference between the results obtained when the pipe was run through the yard and to the radiator than when the steam was conveyed directly from the boiler in the basement. As a result of his initial tests, Mr. Holly approached some of his Lockport friends, telling them that he would like to raise a little money in order that his experiments might be extended by carrying the pipingsystem more extensively through his yard. The money was raised and the experiments continued.

Again the results were apparently the same, the steam having lost only a small part of its heat by condensation. Mr. Holly was convinced that several city blocks could be successfully heated from one central boiler plant. His confidence was shared by several others who went with him in forming a company which installed a small underground system in Lockport in the summer of 1877.

The following taken from a reference book of the Company written in 1879 by E. P. Holly, engineer for the Company, describes the early activities and success of the new Company.

“We were convinced by Mr. Holly's experiments that steam might be sent more than a quarter of a mile in each direction from the boilers in well insulated underground pipes, thus covering an area of half a mile square. But how much farther it might be sent without too great loss from friction and condensation we did not know, but we intended to ascertain. So our works were commenced not only for that purpose, but to learn the actual workings of steam at a long distance from the boilers. Both of these things, after a winter's operation, we have thoroughly tested and find to far exceed our expectations. We find we can convey steam in small pipes a mile and a quarter from the boilers each way, without material loss; and, of course, though we have only used small pipes, we know we can carry it proportionately farther in larger pipes. But our experiments show that we can cover more than an area of four square miles in any city or village, working from one central boiler plant, and the actual working of the steam, either near the boilers or at the farthest end of the pipe is decidedly better than we expected.

“We have now, in 1879, 14,000 feet of underground steam pipe, with a pressure of 30 lbs. to the square inch and a few consumers scattered along the lines of pipe for we have purposely laid pipe mostly into districts of dwellings where we could be out of the way while making our experiments.
and could extend our pipes as far and as rapidly as desirable. We first only claimed that boilers located in the center of a district one half mile square, with mains leading out in four ways, 1200 or 1400 feet would warm all buildings within that district, but our frequent tests on condensation losses, using all forms of insulation around the iron pipes soon began to show that a much larger district could be warmed from one point. We found wood boxing filled with shavings or wood casing to be the most efficient insulation.

Even today, when District Heating has proven itself as practical, economical and profitable for heating far greater areas, these early tests showed remarkable progress. In fact, Mr. Holly was years ahead of the times. He was perhaps the first man to advocate the atmospheric or vapor system of steam heating. Years later the manufacturers of radiators had agreed with him by eliminating the inlet connections at the bottom of cast iron steam radiators. Mr. Holly had very comprehensive ideas for the use of steam from a central source. One of these was for the operation of a fire pump drawn on a truck. In those days there were no modern fire engines.

Mr. Holly conceived the idea of locating steam valves along the street near fire cisterns, so that a pipe could be quickly connected to the steam valve for operating the fire pumps, and another pipe run into the cistern. Tests were conducted in Lockport. It worked fine. In fact, Mr. Robert Hall, Manager of the American District Steam Company today, whose father was one of the founders of the company back in 1877, can just recall some of the excitement in Lockport when these tests were being made in 1879.

Mr. Hall, who was a very small boy then, can just remember walking down the street with his father one morning and seeing scores of high hats worn by the many visitors to Lockport. The distinguished gentlemen who were honoring Lockport by their presence were capitalists, bankers, engineers, etc., who had arrived on special trains from New York and Boston, Philadelphia and other eastern points, and who had come to inspect the heating system and witness Mr. Holly's various tests. This was just prior to the installation of the first large district heating system in New York City. The New York plant is, today, the largest district heating plant in the world and represents an investment of more than $25,000,000 dollars.

Other district heating plants installed by the American District Steam Company soon after the New York plant were, Denver, Colo., Clearfield, Pa., Phillipsburg, Pa., Harrisburg, Pa., Springfield, Mass., Reading, Pa., Wilkesbarre, Pa., Auburn, N. Y., Dubuque, Ia., Milwaukee, Wis., Detroit, Mich., and San Francisco, Cal.

Another idea advanced by Mr. Holly in those days was the use of steam for fighting fires. The steam was to be supplied from a central source and the steam hose attached to the steam valves located on the street. This idea is as sound today as when Mr. Holly first advanced it. Areas that are now heated from central plant could use it. By filling the basement or a room with steam, fire can be smothered much quicker than by flooding the room with water. By filling a closed building with steam, fire will make but little headway and soon die out.

From Mr. Holly's original idea over fifty years ago, District Heating has spread to hundreds of cities and towns throughout the world—providing greater comfort to millions of people.

Utica Gas and Electric Co. Install New High Pressure Steam Main

A Highly Efficient Engineering Feat Employing Both Underground and Aerial Construction

The economies that can be effected by the distribution of steam from a central power plant were again demonstrated by the Utica Gas and Electric Company, Harbor Point, Utica, N.Y.

Recently this company decided to run a high pressure 6" steam line by an underground and aerial route from the new Harbor Point Power Plant to "boost" a set of boilers at the new Coal Gas Plant some 1200 feet away. The best possible type of insulation and the most permanent type of underground conduit were selected.

How the Line was Insulated

The entire line was covered with two inches of magnesia sectional covering next to the pipe and one inch of hair felt covering over that. The insulation was covered with three ply Mulehide roofing bound by copper wire, with joints cemented to further protect the insulating material inside.

Starting at the power plant, this insulated line was run in special Multicell tile conduit for some 350 feet, at which point it becomes an aerial line for some 700 feet, when it again goes underground to the Coal Gas Plant.

The conduit which protects the insulation from the direct action of the soil and seepage water was built on a four inch concrete base poured in a graded trench. Rollers were placed on this base and the pipe lined up on them preparatory to electrically welding the individual pipe lengths to give strong joints that will not leak at high pressures.

Providing for Expansion in Pipe

To provide for expansion in the pipe when heated, guided expansion joints with cast steel bodies and air cooled slips to protect the packing were welded into both the underground and aerial lines. By welding, gasket and bolt troubles were eliminated. Expansion joints were anchored in large masses of concrete buried deep in the ground. The current for welding was supplied by a generator mounted on a Fordson Tractor.

After the pipe was welded, it was
One or more anchor bases located to meet requirements of any installation.

Rugged construction to meet most severe conditions.

Large stuffing box correctly designed to assure tight joint.

Made in best-quality cast iron for pressure up to 250 lbs. and in cast steel for higher pressure and superheat work.

Extra heavy external guide with machined cylinder and guide flange assures true thrust of slip into joint. Limit stop prevents slip pulling out.

Air-cooled duplex slip preserves packing, keeps joint tight and minimizes repacking and tightening of flange.

Air-cooled slip eliminates excessive packing and maintenance costs

The air-cooled slip between the inner and outer sleeve of the Adsco Duplex Sleeve Guided Expansion Joint cools the outer sleeve which bears against the packing, to a considerably lower temperature than the inner sleeve which is in contact with the steam.

The life of the packing is prolonged because heat is responsible for packing deterioration. Lower price packing can be used. The intervals between gland adjustments are lengthened.

Engineers are using the Adsco Duplex Sleeve Guided Expansion Joint not only for superheated service, but wherever additional protection against wear of packing is desired.

The Adsco Duplex Sleeve Guided Expansion Joint is one of several thousand Adsco Expansion Devices for pipe lines conveying steam, water, oil, air, gases and liquids.

Get your Expansion Joints from Expansion Headquarters.

ADSCO tested under 250 lb. steam pressure and the welds hammered with a standard machinist's hammer at this pressure without the slightest sign of leakage.

Multicell Tile Conduit

After the pipe line was welded together, the conduit was completed by building the Multicell tile side walls and top. The tile used were salt glazed, of special design and exceptionally strong. Dimensioned 4"x8"x 16", they mason easily and quickly into the conduit shape. The tile top was covered with a 1/8" layer of mortar, mopped with hot liquid asphaltum to protect the conduit from surface seepage.

The expansion joints in the underground sections were placed in a manhole to allow plenty of working room for repacking and greasing the slips. The aerial section of the line was placed about two feet above the ground on concrete piers, placed on fifteen foot centers buried deep in the ground—and into which the pipe guides and rollers were securely bolted and perfectly aligned. No housing nor conduit was necessary for the aerial line as the three ply Mulehide Roofing provided ample protection from the weather.

As the line approaches the Coal Gas Plant, it again goes underground to the plant itself. Along the outside of the building a riser was erected about 45 feet long which fed into the boiler headers.

As the building was finished only about fifteen feet above ground, the erection of this riser presented some difficulties. It was possible by the use of a derrick truck, aided by three guy wires on the top end of the riser, to erect it into position. It was then welded in place to the underground main.

Steam Traps Remove Condensate

A long steam line must be graded, of course, to allow the line condensate to flow to some convenient low point or points, at which places it is removed by high pressure traps. This particular line used three such traps to discharge the condensate.

To regulate the delivery pressure of the line in the Coal Gas Plant to 180 pounds regardless of the inlet pressure at the other end of the line, an electrically controlled remote control reducing valve with its by-pass was installed in the power plant, connected with an electric device operated on the solenoid principle at the Gas Plant.

From the foregoing it can be seen that the transmission of high pressure steam over long distances with low heat losses has developed greatly within the past few years, both as to the strength and ease of construction and the efficient insulation of the pipe line for either aerial or underground work.

Note—This installation was made by Adso's construction subsidiary, The Northeastern Piping & Construction Corp.
Industrial Plants Can Save Coal-Labor-Cost of Boilers

Power Bill Can Be Reduced By Selling Steam to Neighboring Factories

Thousands of manufacturing plants throughout the United States and Canada are heating each building separately. When they erect a new building, they install a new boiler.

If the managers of these plants would look into the possibilities of district heating—that is, heating all buildings from one central boiler—they would be surprised at the savings that could be effected.

Savings of Various Kinds

The savings made possible through district heating are of various kinds. Less coal is required when only one large boiler is operated. The cost of the boilers must be considered—and also maintenance. The cost of maintaining one large boiler is less than the cost of maintaining several smaller boilers. It also requires less labor to operate a central boiler.

When a new building is to be erected, it costs money to excavate for the boiler and the boiler room takes up valuable space. Boilers are always wearing out and must be replaced.

Centralize Heating as Old Boilers Wear Out

Many executives who realize the possibility of industrial heating are installing it as fast as old boilers wear out, selecting one boiler plant as the central plant and making additions to it to provide for the new load. By following this plan, they release valuable space for manufacturing purposes, and effect part of the savings of district heating, which they will enjoy completely when the entire heating system is centered in one plant.

Where several buildings are heated by separate boilers, a big saving of coal, labor and boilers can be effected by heating all buildings by steam delivered through efficient underground mains from a central boiler plant.

In plants where steam is distributed from a central source through wasteful overhead mains, the savings effected by replacing them with efficient underground mains will quickly pay for the cost.

Reduce Costs for Heat and Power

Besides the economies in fuel and labor effected by district steam heating, many concerns find it profitable to sell steam for heat and power to neighboring plants and buildings. In this way, they are able to greatly reduce their own costs for heat and power. This practice is not confined to industrial plants; many large stores and office buildings sell steam to neighboring stores and buildings. Some buildings supply heat to all the other buildings in the block, while others take in even a larger area.

While district steam heating is an undeveloped opportunity in the case of a high percentage of the larger industrial plants, a large number of plants are already operating along these lines. Many of these plants, however, are losing considerable money every year through exposed inefficient piping systems and, where the lines carried underground, are inadequately insulated and protected.

Replace Inefficient Steam Lines

In some cases, steam losses due to inefficient operation and frequent replacement of pipe and cheaply constructed housing in underground lines, more than offset any savings effected by distributing the steam from a central boiler plant. It would pay firms who are suffering these losses to replace their inefficient lines with modern, up-to-date lines which save 91% of the steam that an uninsulated pipe would waste.

One type of construction particularly meets the requirements of the industrial plant, as it combines long life and efficiency with low first cost. It has been on the market for years and in hundreds of cases has remained in the ground for over thirty years without replacement.
Railroads Losing Large Sums Through Wasteful Distribution of Steam

Manufacturing Plants Also Figure Among Heavy Losers

If the railroads of America exercised as much economy in the use of steam as they do in other directions, they would save a large sum annually.

The methods used on most roads for distributing steam entails a high percentage of loss. As the railroads are one of the largest users of steam for heat and power, an analysis of the steam requirements of the average railroad will be interesting to those of our readers who are not familiar with railroad problems.

Where and How Railroads Use Steam

Steam and hot water are distributed throughout railroad terminals, including depots, freight-houses, locomotive shops, roundhouses, car shops, yards and other properties. While some roads operate through areas, where the climate is such as to require little artificial heating of terminal facilities, nevertheless, all railroads maintain high pressure steam lines between their central power plants, roundhouses and locomotive shops. This steam is used for the operation of draft blowers when engines are being fired up preparatory to leaving the terminal; for the operation of boiler washing, and fire protection pumps; as a source of power for engine driven line shafts; for testing locomotive boilers under steam pressure; for operating ventilating fans, steam hammers and various other purposes. Even on railroads in territories where climatic conditions are moderate, it is almost always necessary to provide some steam heat in storehouses, roundhouses, shops, office buildings, etc. during a portion of the year, and as the great majority of railroads operate in northern latitudes, these roads are obliged to install steam distribution systems for use during the entire heating season.

It is impossible to determine accurately the quantity of steam transmission piping in service on the railroads today, or to provide an entirely accurate estimate of the quantity installed each year, either on new work or in replacements.

Railroads Using 450,000 Feet of Steam Line

On one western road, however, operating from 7000 to 8000 miles, it has been estimated that approximately 10,000 lineal feet of steam pipe line are installed annually, while on a second western road of about the same mileage, the annual installation of such pipe is about 15,000 lineal feet. From this data, and with a general knowledge of conditions on the average railroad, it is estimated that for the country as a whole about 1½ lineal feet of underground piping for steam and hot water service is laid annually per mile of railroad. Inasmuch as the total steam railroad mileage in the United States and Canada is approximately 300,000 — it follows, on the basis of the above estimate, that the annual installation of steam transmission lines will be about 450,000 lineal feet.

Only a small percentage of existing steam lines and new line installed every year is properly insulated and protected. (Continued in Next Issue)

Consult Our Round Table of Engineers

To further the sale of ADSCO Products for steam distribution, we offer our 50 years experience in the district heating field to engineers who are confronted with problems of steam distribution.

For over 50 years we have co-operated with engineers on projects ranging from the centralized heating of a few buildings to district heating operations embracing large down-town business areas.

Let us know what your problem is and we will help you solve it. Or, if you are interested in the highly specialized line of ADSCO products for steam distribution, write for literature on Adsco Expansion Devices, Anchor and Service Fittings, Conduit Materials, Gate Valves, Steam and Condensation Meters, etc.

ENGINEERS SERVICE DEPARTMENT

AMERICAN DISTRICT STEAM COMPANY

GENERAL OFFICES AND WORKS

NORTH TONAWANDA, N.Y.

Offices and Agents in Principal Cities

Specialists in Steam Distribution for over 50 Years.
A few of the many types of ADSCO EXPANSION JOINTS

D-8. 250 pound double slip, semi-guided joint with anchor and service outlet. Requires little space. Traverse from 4" to 12" per slip.

No. S4. Single Semi-Guided Expansion Joint with Anchor, with service. Traverse 4, 6, 8, 10 or 12 inches.

No. S1. 125 pound single slip, semi-guided expansion joint. No anchor, no service. Traverse 4, 6, 8, 10 or 12 inches.

No. S2T. 125 pound single sleeve guided expansion joint with tie rods. With anchor. No Service. Traverse 4, 6, 8, 10 or 12 inches.

Model P-1. 125 pound double packless varia tor that floats in the pipeline. Total traverse 2 inches. Limit stop assures an equal travel of both slips. Not furnished with service outlets nor anchorage.

No. D4G. 125 pound double slip externally guided expansion joint. With anchor, with service. Traverse 4, 6, 8, 10 or 12 inches per slip.

No. R-1. All brass riser expansion joint. Internally guided for expansion in risers, supply and return lines of interior heating systems.