In This Issue

EXPANSION JOINTS— WHERE AND HOW TO USE THEM

NORTH BATTLEFORD, SASKATCHEWAN MAKES BIG SUCCESS OF DISTRICT HEATING

MAKING BASEMENTS PAY DIVIDENDS

Published by the
AMERICAN DISTRICT STEAM COMPANY
NORTH TONOWANDA, N.Y.
How Do You Control Expansion and Contraction in Risers?

ONE way—clumsy and almost obsolete—is to place a loop or "swing" in the line at intervals. A second way is to use an ordinary expansion joint.

The third method—one of demonstrated advantages—is to use ADSCO Riser Joints. ADSCO Riser Joints are being chosen for the country's great new buildings—

Because they are internally guided. The polished bronze guide attached to the end of the slip keeps the slip in true alignment. Weaving or twisting in the line cannot distort the slip—cannot cause it to bind and unduly wear the packing.

Because the guide cylinder and guide head are machined with extreme accuracy, so that sediment and scale cannot pass between the guide and body to lodge on the slip and cut the packing.

Because the highly polished slip slides freely through the packing without scoring or wearing it.

Because they remain steam and water tight for many years without any attention whatsoever.

You'll find, too, that ADSCO Riser Joints are economical to use. Send for complete information.

Expansion Joints—

Where and how to use them

BROADLY speaking, every run of pipe, large or small, which is subjected to changing temperatures requires that some provision be made to compensate for expansion and contraction of the pipe. The nature and purpose of the piping installation as well as the operating conditions indicate the best method to apply. The difference between the possible minimum and possible maximum temperatures and the kind of pipe to be used determine the total amount of expansion or contraction for which to provide.

There are a number of methods in common use which, under certain conditions, have demonstrated their serviceability. These methods include:

1) Keeping the pipe free from everything which would interfere with its full and natural longitudinal expansive movement. This practice can readily be followed in relatively small piping work and where the amount of expansive movement is so small as to be of no concern.

2) Laying the pipe crooked so that slight movement is allowable by the irregularities of the alignment. This is widely used in laying long gas and oil lines.
(3) Designing the piping arrangements in such a way that changes in direction of the pipe secured by a series of elbows or bends, provide sufficient flexibility in the elasticity of the pipe to absorb the expansive movement without subjecting a section or all of the piping to excessive strains. This practice can be advantageously employed in many places where the desired course of the piping affords many changes of direction; where the large amount of space so required is of no consequence and where the nature of the installation does not make this method uneconomical due to excessive pressure drop, excessive cost for special bends, piers, added insulation and other features of cost and operation.

(4) Making use of offset swing joints by a series of screwed elbow connections, arranged so that the expansive movement alternately expands and loosens some of the threaded connections as the pipe expands and contracts. This method is frequently used in making small connections to larger pipes and where the pressure of the fluid in the pipe is too low to cause leaky joints where the threaded connections tighten and loosen in taking up the pipe movement. The safe application of swing joints is necessarily extremely limited in the amount of movement available.

(5) The introduction into the piping, at predetermined points, of flexible fittings or packless expansion joints capable of being compressed or extended. The flexible member of such fittings is made of different materials selected to meet the particular operating conditions. These permit of designing long, straight runs of pipe free from unnecessary changes of direction, eliminating excessive loss of pressure and effecting economies in material and installation costs. These devices can be used to great advantage within the limitations of pressure, temperature and other conditions for which the design and materials are suitable. In many cases, however, where possible temperature differences are great, resulting in correspondingly great expansive movement of several inches per hundred feet of pipe, the cost of a sufficient number of packless joints (by reason of their limited allowable contractibility) renders them too costly. There are also cases where too frequent pipe movement (expansive and contractile) exhausts the flexibility of the moving members and the excessive fatigue results in a ruined joint.

(6) The last method is by the use of slip type expansion joints, or metal fittings having a sliding sleeve moving through a stuffing box, and providing a longitudinally flexible connection equal in permissible movement to the effective length of the sleeve or slip. The use of slip joints accomplishes the same purpose as the packless joints in permitting of strict adherence to most economical piping layout and arrangement. It has the disadvantage of being dependent on the sustained efficiency of packing to preserve a tight joint free from leaks. The slip joint has some strong points in its favor, however, which make it particularly adaptable to a broad variety of applications.

Even under most severe pressure, temperatures and other operating conditions, slip joints of correct design, materials and workmanship will outlast the piping itself. Properly selected they can be used with confidence on temperatures and pressures far beyond the limit of security of present day packless joints. Another feature is their ability to accommodate an indefinite number of pipe movements and to serve the expansive needs of from two to ten times the length of pipe that can be cared for by a packless joint.

All of these methods have their proper applications and their limitations. To use a slip joint where a pipe bend is the correct thing is just as poor engineering judgment as to use a bend where a packless joint is the logical answer. Swing joints, while always open to severe engineering attack, are the only available method of meeting certain conditions. It would be folly to spend a lot of money on expansion equipment for certain cold gas and oil pipe lines where the very small expansive movement can readily be absorbed in the irregular alignment of the piping when laid. To trust to this same method, however, in other localities, or for other kinds of piping, where the permissible temperature differences require that definite provision be made for expansion and contraction, in order to avoid the danger of rupturing the line and throwing it out of service, it would be courting disaster to blindly trust to hap-hazard methods.

The development within the past number of years, in packless and slip type expansion joints, has brought out a great assortment of equipment. There are packless joints of half a dozen varieties and slip joints without number. Every manufacturer is aiming at the same mark—to develop a joint that will give dependable service. The degree of success achieved rests largely on the direct experience the manufacturer has had in the design, construction and utilization of expansion devices and the effectiveness with which he has applied the knowledge so gained. The manufacturer who is committed to a policy of "Service to Customers" not only applies himself to the solution of his customers' problems, but is ever anxious to pass on the knowledge he has acquired in this special field for the benefit of his customers, even though his recommendations may result in the purchase of his competitors' equipment, when the requirements of a particular installation indicate the inapplicability of his own.

No one expansion joint is suitable for all conditions and until we reach that level of ethical development where every manufacturer and salesman strives only for the orders which they can fill with a fuller assurance of service to customer than can their competitors, it is exceedingly important that every designer and specifying engineer, every construction engineer and others who are responsible for the definite selection of expansion equipment, familiarize themselves with the needs of each job and discover the equipment best suited for them.
ONE day in the spring of 1922, M. D. Cadwell, Superintendent of Public Utilities, North Battleford, Saskatchewan, received a document from the citizens of that city. It read:

"WE, the undersigned patrons and consumers of the Municipal Central Heating Plant, owned and operated by the Corporation of the City of North Battleford, having enjoyed the manifold comforts and conveniences incidental to, accruing from and as a direct result of the central steam service supplied to our premises during the past winter months of 1921-22, hereby publicly declare,

1. That Central Station Heating has introduced a new epoch into commercial circles and community life in North Battleford.
2. That from a standpoint of health, sanitation, cleanliness, safety, reliability, comfort, and convenience, it is far in advance of, and excels most effectively the old and former method of heating by individual furnace or private heating system.
3. That, in our opinion, based on actual experience and commensurate with the uniformity of temperature and quantity of heat, absolute elimination of the gas, soot and smoke evil, central heating is not only preferable, but more economical than the system of heating in vogue heretofore.
4. That we would most reluctantly revert to the former and antiquated method of heating our premises now served with the City Central Heating Plant, and most earnestly beseech that the present heating system be continued."

The signatures on that testimonial of satisfaction included those of the city's leading business men. By their declaration to the Department of Utilities, these citizens of North Battleford paid tribute to Mr. Cadwell's ability as sponsor of District Heating in North Battleford, and at the same time, paved the way for the future development of one of Canada's pioneer District Heating plants. The entire story should be entered in the records of District Heating as an outstanding example of civic spirit and community progressiveness.

District Heating made its initial bow in North Battleford in 1916, when a steam main was laid from the power plant to the Public Library, a distance of about 750 feet. This service proved so satisfactory that M. D. Cadwell, Superintendent of Public Utilities, decided to investigate the possibilities for further expansion.

After nearly four years of exhaustive survey and study, he was convinced that he was on the right track. District Heating unquestionably would prove practicable and successful in North Battleford; the only remaining problem was how to finance the project.

Finally, in the summer of 1920, the City Council gave its authorization to proceed with further installation, providing those North Battlefordians, who had signified their intention of using the service, would finance the work.

It was the immediate and unhesitating response of the citizens of North Battleford which should be recorded as an example of strong public spirit and community solidarity. They agreed to make an advance deposit, proportional to the estimated requirements of each consumer. The laying of additional steam lines was started in the fall of that same year.

The lateness of the season, however, proved a handicap to installation work, and the new utility was able to supply only ten consumers during that winter. By the following spring, the installation had been given a thorough test; the enthusiasm of the initial consumers was so ardently expressed that the new utility was besieged with petitions for service from all sections within heating range.

Under the personal supervision of Mr. Cadwell, installation work progressed rapidly, so that by September 1921, thirty consumers were receiving steam service.

Today the utility has well over one hundred patrons, and is earning (Continued on Page 10)
Here is an Expansion Joint That "Holds Everything!"

Designed With Air Chamber That Reduces Transmission of Heat to Packing

A Joint That Stays Tight Under Most Severe Conditions

Look at the design of this joint closely—here you see a scientific principle employed to help solve your pipe expansion problems.

The greatest source of trouble with expansion joints for high temperatures is the failure of the packing.

Repacking joints is costly—very costly—both in time and money. A continuously tight joint demands sustained efficiency of packing. High temperatures ruin packing and knowing this, ADSCO Engineers designed the DUPLEX AIR-COOLED SLEEVE.

The surface of the slip shell bearing against the face of the packing is cooled as an air-cooled engine is cooled. The effective life of the packing is MULTIPLIED MANY TIMES!

For security and assurance of continuing tight joint service, specify and insist on ADSCO DUPLEX-SLEEVE GUIDED EXPANSION JOINTS.

For Super Heat and Any Other Service Where Additional Protection Against Wear of Packings is Desired

The temperature difference between the atmosphere and the air in the open-ended air chamber sets up an air circulation. This circulating air carries away the excessive heat from the outside sleeve which is not in direct contact with the temperature of the fluid in the pipe.

The temperature of the sleeve surface bearing against the packing is greatly reduced (from 25% to 35%). Destructive heat is reduced to moderate heat and the life and efficiency of the packing is thereby safeguarded.

In addition to the Duplex-Sleeve feature, note the scientifically correct method of positively GUIDING the movement of the slip so that no undue strain can reach the packing to destroy the tight seal between the packing and the polished, non-corrosive surface of the slip.

ADSCO makes superior joints for all purposes.

Send for Valuable Reference Book on Contraction and Expansion in Pipe Lines

Valuable Reference Book
"The Blue Book of Expansion" contains condensed tables of expansion in pipe lines and complete dimensions. Will save you much time in the selection of the correct type of expansion device for any service department.

MAIL THE COUPON

American District Steam Company, N. Tonawanda, N. Y.
Gentlemen: Kindly send me your new book, "Reference Data on Expansion in Pipe Lines".

Name
Company
Street
City
a handsome revenue yearly on its service. North Battleford deserves great credit for being one of the pioneers of District Heating in Canada, by which move they point the way to more efficient, economical and modern heating systems in other Canadian urban centers.

In its investigation of the fuel supply of Canada in 1923, a special committee of the Senate gave special attention to the economic results of North Battleford's District Heating System, and requested complete information and comparative costs of individual heating plants as against the centralized supply.

Mr. Cadwell, in reporting to the Committee explained that in a modern city power plant, loss in exhaust steam dissipated in circulating water or atmosphere, was 58 per cent of a total 100 per cent value of coal supplied to the boilers; and in continuing, stated, "It was primarily for the purpose of utilizing this waste and converting it into a revenue-producing service that the North Battleford Municipal Steam Heating Plant was installed; and since its inception, the over-all economy of the power plant has been greatly increased. The heat (latent heat of the steam from the engines) which was formerly dissipated in the circulating water, is piped into the 'heating mains' and revenue therefrom has approximated $20,000* annually for the municipality."

F. L. Wanklyn of Montreal, Fuel Commissioner for Quebec, in reporting to the special parliamentary committee of the Senate on the North Battleford District Heating project, stated that 25 per cent of the value of coal was wasted in the average home by improper firing; and as a corrective, advocated the use of district heating plants, citing the heating system used by North Battleford.

From the interest shown throughout the provinces in North Battleford's project, there seems to be justification for the forecast, that District Heating in Canada is likely to show very rapid growth. One thing, however, is certain: the North Battleford District Heating System is a success. It is growing steadily. The people of that city are proud of their heating service; they enjoy its advantages of greater comfort, convenience, health and safety, while benefiting indirectly through the increased municipal income thereby provided for other improvements, and the reduction of general taxation.

*Based upon earnings up to 1923 only.

Making Basements Pay Dividends

ONE of the extremely important results of District Heating in the field of commerce is the elimination of the boiler room and fuel storage, and the coincident release of that space for profit-producing purposes.

In crowded centers, where every square foot of space is at a premium, the value of the basement assumes noticeable proportions. Not so long ago the owner of a department store refused an offer of $50,000 a year for basement space released for use by the introduction of District Heating and the elimination of his old boiler room and its equipment.

This is but one instance among many. In every city where District Heating is used there can be found tangible evidence of the earnings to be derived from basements rendered usable by the installation of District Heating Service.

From the rental of space formerly occupied by heating equipment, the owners of one large building in Kansas City more than pay for all the steam used during the year. Other buildings in other cities have transformed their renovated basements into salesrooms, restaurants, manufacturing departments, offices and warehouses.

In New York City where any space in the business section commands enormous rentals, the basement's emancipation from coal storage and heating service has resulted in increased revenue to practically every building served by District Heating.

Several years ago the New York Evening Post commented on the uses to which some of the rehabilitated basements had been put: The Postal Life Building, Bank of Commerce and the Harriman National
Bank installed storage vaults where their coal and boilers had been. Space formerly devoted to the power plant in the Constable Building is now occupied by a modern, high-class restaurant. The Evening Telegram uses the space for a battery of printing presses, and numerous other buildings have converted their basements into profit-producing assets.

In considering this aspect of District Heating, the crying need for parking accommodations and garage space cannot be overlooked. Throughout the business districts of every large city, the automobiles pile up in mass formation at every curb. Parking violations fill the court calendars. The traffic squad finds vigilant enforcement almost impossible. Motorists will park—in fact, must park, traffic regulations notwithstanding.

Conditions like these give impetus to the growing conviction that some provisions may well be made to house the cars of customers and tenants in the basements of business buildings. The plan already has proved successful in several cities, and is receiving serious attention in other large centers. The elimination of the space-wasting power plant and related equipment helps to make this idea practicable.

So in this connection, too, District Heating plays a profit-producing part—for what greater inducement could be offered a prospective customer or tenant than adequate parking facilities in the basement?

Contemplation of the District Heating subject solely from the standpoint of the potential earnings of basement space cannot help but result in one conclusion—that in addition to the items of convenience and efficiency, District Heating may well be considered from the standpoint of purely profit-producing possibilities.

Thus far we have concerned ourselves primarily with the basement's possibilities for making money. Now let us look at the subject from the standpoint of saving money.


"The cost of sub-basement construction is an item of investment which is receiving more and more attention prior to the construction of a new building," says the Bolton Company; and continuing, "If steam and electricity are to be purchased, the construction of space for boiler and engine plants may be omitted; and expenditures for construction of machinery spaces alone, exclusive of the expense of installing machinery, ranging from $16,250 in buildings of medium size, to $140,000 in large buildings, can be dispensed with by modern operating methods. Under unfavorable conditions, such as would require rock excavation, these amounts may be greatly exceeded."

But of course the saving does not end with the elimination of power plant construction costs. An equivalent or even greater economy results from the omission of the boiler and engine plants, and auxiliary machinery. These savings vary—ranging from $30,000 to $650,000, depending on the type and size of the building to be erected.

The Bolton Company, after an analysis of a great number of building projects, submits the following figures as a general guide to the cost of power installations:

<table>
<thead>
<tr>
<th>Boilers and Engine Plants</th>
<th>Installation Cost per Horse Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 300 H.P. Capacity</td>
<td>$150.00</td>
</tr>
<tr>
<td>Up to 100 H.P.</td>
<td>200.00</td>
</tr>
<tr>
<td>Above 1000 H.P.</td>
<td>250.00</td>
</tr>
</tbody>
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Another frequently forgotten item of importance to be considered in connection with the economies of District Heating is the saving of space occupied by smoke stacks. A survey of buildings having chimneys disclosed that from twenty to one hundred square feet per floor can be added by dispensing with the chimney. The high cost of erecting these chimneys is eliminated, and the value of the space released figures from $20 to $300 per floor, depending upon the prevailing rental.

New York architects and the architects of other large cities have grasped this advantage with gratifying results, and the floor space which otherwise would be devoted to the chimney and its insulation is now made to produce income. In all metropolitan areas where District Heating is available can be seen the concrete evidence of this practice—towering skyscrapers built without the costly and marring chimney structures.

By marshaling the facts concerning these various benefits of District Heating, we develop an imposing argument for this service—with the greatest conceivable appeal to commerce—the appeal of sound economics in terms of dollars and cents earned and saved.
suited to the actual operating conditions. Servicing and replacements are extremely expensive after installation work is completed, and this further emphasizes the importance of wise selection of equipment. A careful study of catalogs is helpful and the recommendations of manufacturers, based on a knowledge of conditions, are useful and should be secured.

A volume could be written on the selection of expansion joint packing; a brief word must suffice. There are special packings developed for steam work, others for water, oil, gas and in fact, every different purpose. Each such class is again sub-divided for varying ranges of pressure and temperature. The selection of packings should not be left to guess work but should have careful study. No one packing is good for all classes of service. When ordering expansion joints, the purchaser should definitely state the operating conditions, whether for steam, water or oil, and mention the pressure and temperature. If previous experience has indicated a satisfactory packing, this should be specified on the order. The recommendation of the expansion joint manufacturer on this point can well be sought as well as the suggestions of packing manufacturers.

After joints have been purchased and are delivered on the job, care must be exercised to protect them during the course of installation. The bright surface of the slip should be wrapped to prevent damage. The man in charge of the work must know how much traverse the joint is designed to accommodate, and see to it that the maximum possible movement does not exceed this amount. He must check the anchorage of the joint body to see that all possible strains are adequately provided for. He must examine the alignment of the pipe, connecting to the slip end of the joint, to be assured that the expansive movement is prevented from placing any lateral strain on joint or packing. The use of externally guided joints is very helpful to this end as a substantial, well-designed external guide cylinder will correct minor lateral strains and maintain the slip concentrically in the packing as it moves into the joint.

In the matter of installation details, the suggestions of the manufacturer can very often save the customer a great deal of time and expense and such suggestions are always gladly furnished.

The object of this article is to stress the importance of careful selection of the right type of expansion equipment for every class of service, to point out the need of serious application of engineers and constructors to the end that expansion joint installations render long and trouble-free service. It also wants to emphasize the desirability of asking manufacturers to pass on the benefit of their experience to those faced with pipe expansion problems. In matters of correct selection of joints and packing, details of installation and the like, it is the part of wisdom, economy and safety to place your problems squarely before those who manufacture and guarantee the equipment.
WHEREVER railroads go—and business flourishes—the Bush Terminal of Brooklyn is known. Nowhere in the world is there another terminal warehouse comparable in size or in the extensiveness of its service.

Steam power and heat for the various Terminal buildings are supplied through underground steam transmission lines from a centrally located boiler plant. Recently further extension of the steam lines was imperative. . . .

With confidence born of knowledge and experience, the Bush Terminal Company commissioned the Northeastern Piping & Construction Corporation to make the installation.

In selecting Northeastern to make the installation, Bush Terminal followed the policy of the large utility companies who choose the outstanding organization in this special branch of engineering and construction.

The Northeastern Piping & Construction Company has installed many of the biggest and most efficient District Heating Systems in existence today. The experienced counsel and advice of its corps of construction engineers is freely available to you on any major steam piping installation.

Estimates of cost gladly prepared.

NORTHEASTERN PIPING & CONSTRUCTION CORP.
NORTH TONAWANDA, N. Y.
Branches: New York, Philadelphia, Chicago, Seattle
Subsidiary of AMERICAN DISTRICT STEAM COMPANY
GENERAL OFFICES AND WORKS
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Over 50 years experience in the installation of District Heating Systems.