CHAPTER I
CAST IRON SOIL PIPE HISTORY
USES AND PERFORMANCE

The origin of cast iron soil pipe manufacture both in the United States and abroad is interwoven with historical developments in the production of cast iron pressure pipe. Prior to 1890, general information and statistical data on cast iron pipe did not distinguish between pressure pipe which is used to transfer liquids under pressure, and soil pipe which was developed to serve as a companion product for gravity-flow purposes.

HISTORY OF CAST IRON SOIL PIPE

The early development of pipe systems was related to the growth of cities. As people began to concentrate within confined geographical areas it became necessary to divert water from its natural course to provide for drinking, bathing, sanitation and other needs. Ancient civilizations constructed aqueducts and tunnels and manufactured pipe and tubing of clay, lead, bronze and wood. All of these materials proved unsatisfactory since they were prone to deterioration and frequent breakdown. However, they filled a need and were used for hundreds of years until the introduction of cast iron as a pipe material.[1]

The earliest recorded use of cast iron pipe was at Langensalza, Germany circa 1562 where it supplied water for a fountain. However, the first full-scale cast iron pipe system for the distribution of water was installed in 1664 at Versailles, France. A cast iron main was constructed to carry water some 15 miles from Marly-on-Seine to the palace and surrounding area. The system is still functioning after more than 300 years of service. It represented a genuine pioneer effort, since at the time of installation, production costs on cast iron pipe were considered prohibitive. This was due principally to the fact that high-cost charcoal was used exclusively as a fuel to reduce iron ore until 1738, when it was replaced by coke in the reduction process. Immediately following this development, cast iron pipe was installed in a number of other distribution systems in France, and in 1746 it was introduced in London, England by the Chelsea Water Company. In 1785 an engineer with this company, Sir Thomas Simpson, invented the bell and spigot joint which has been used extensively ever since. It represented marked improvement over the earliest cast iron pipe which used butt joints wrapped with metal bands and a later version which used flanges, a lead gasket and bolts.

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[1] Historical information on cast iron soil pipe and fittings is contained in Noble, Henry Jeffers: "Development of Cast Iron Soil Pipe in Alabama," Supplement to *Pig Iron Rough Notes*, Birmingham, Sloss-Sheffield Steel and Iron Company, January 1941; U.S. Department of Interior, Census Office, *Manufacturing Census of 1890*, pp. 487 and 490; Cast Iron Pipe Research *Association: Handbook of Cast Iron Pipe*, Second Edition, Chicago, 1952, pp. 9-13; Clark, Victor S.: *History of Manufacturers in the United StatesÈ*, Volume III 1893-1928, New York, McGraw-Hill Book Company, Inc., 1929, pp. 127-128; American Iron and Steel Association: *Directory to the Iron and Steel Works of the United States*, Philadelphia, 1898, pp. 74-75; The Engineer, Vol. XCI, London, January to June, 1901, pp. 157, 232, 358, 268, 313, 389, 443, 533, 534, 587.

Early Production and Use in the United States

Cast iron pipe was first used in the United States about the beginning of the nineteenth century. It was imported from England and Scotland to be installed in the water-supply and gas-lighting systems of the larger cities, principally those in the northeastern section of the country. One of the first cast iron pipe installations was at Bethlehem, Pennsylvania, where it was used to replace deteriorated wooden mains. As early as 1801, the City of Philadelphia sought to promote domestic manufacture of the product, but this campaign was not successful until 1819, when production was started at a number of charcoal furnace plants in New Jersey. At about the same time, a foundry located at West Point, New York also produced limited amounts of cast iron pipe.

The first manufacturer of cast iron pipe in the United States was located at Weymouth, New Jersey. Metal direct from the blast furnace was cast into 16-inch diameter pipe for the City of Philadelphia. It was used to replace the old pine-log pipe for the force main from the pumping station to the reservoir, although wooden pipe continued to be used for the distribution system. The iron was obtained by melting New Jersey bog ore and the pipe was cast in molds laid horizontally in the casting beds used to cast pig iron. The small blast furnace was tapped in the usual manner, and the stream of molten metal filled one mold and was then diverted to another. Production at this foundry and at other foundries which started to produce cast iron pipe in 1819 was strictly limited, and the industry was dormant until 1830, when a foundry designed specifically for cast iron pipe production was constructed at Millville, New Jersey. The foundry used the same ore and the same casting process as that at Weymouth, but it produced cast iron pipe on a regular basis and had a capacity of 18,000 tons of pipe per year.The company at Millville had been in existence since 1803.

Prior to the early 1850’s, horizontal green-sand molds and dry-sand or loam cores were used exclusively to produce cast iron pipe. By 1854 the “cast-on-end-in-pit” principle of pipe manufacture using dry-sand molds and dry-sand cores started to gain wide acceptance for the production of pressure pipe. It was introduced by George Peacock, who is also credited with inventing the drop pattern used in machine molding and the application of core arbors to the green-sand molding of fittings. Vertical casting was used to produce pressure pipe in 12-foot lengths, while horizontal molds continued to be used for shorter lengths of pressure pipe. A green-sand core was developed for use with the horizontal mold, and this was the first method employed to manufacture cast iron soil pipe.

As the demand for cast iron pipe increased, eastern Pennsylvania and the adjoining sections of New Jersey developed as the earliest site of the industry, with the largest works located in the immediate vicinity of Philadelphia. The plants in eastern Pennsylvania used anthracite coal to reduce iron ore, and after 1861, when coke made from bituminous coal was widely adopted, cast iron pipe manufacture was started in western Pennsylvania and Ohio.

Growth and Dispersion of Foundries, 1880-1890

Prior to 1880, the foundries of New Jersey and Pennsylvania supplied the great majority of the nation’s cast iron pipe requirements, but during 1880-1890 production spread to the South and the Midwest. The advance in municipal improvements in these areas and the dispersion of the pig iron industry encouraged the location of plants closer to the new markets and at points where pig iron and fuel costs were low. The largest number of cast iron pipe foundries built during 1880-1890 were located in the southern and mid-western sections of the country. Most of these were of comparatively large capacity, so that by 1890, the share of total output by the foundries of New Jersey and Pennsylvania had declined to 43 percent.

During the census year 1890, there were 33 establishments in the United States engaged principally in the manufacture of cast iron pipe. The rapid growth of the industry between 1880 and 1890 was indicated by the large number of foundries constructed during the period. Table 1 presents a statistical summary of the cast iron pipe industry in 1890. The data presented by the Census Office was the first statistical tabulation of cast iron pipe works separate from the operations of general foundries that had ever been published. It was not indicated just how much of total cast iron pipe production was pressure pipe and how much was soil pipe, and the foundry breakdown does not reflect the construction of a number of plants undertaken during 1890.

TABLE 1
Cast Iron Pipe Industry, by States: 1890

States	Number of Establishments[3]	Capital	Employees	Pipe Production	
				Tons[4]	Value
New York Massachusetts	3	$ 589,463	337	13,066	$ 412,382
New Jersey	6	4,543,204	2,284	185,510	4,800,590
Pennsylvania	6	1,320,407	709	48,860	1,225,440
Southern States[1]	8	3,561,162	1,964	128,253	3,178,175
Ohio	4	1,950,311	1,067	73,734	1,829,680
Other Western States[2]	6	2,215,186	1,218	63,827	1,644,942
Total United States	33	$14,179,733	7,579	513,250	$13,091,209

Source: U.S. Department of the Interior, Census Office, *Manufacturing Census of 1890*, pp. 487 and 490. This was the first statistical tabulation of cast iron pipe works separate from the operations of the general foundries that had ever been published.

[1] Includes establishments located as follows: Alabama 1, Kentucky 2, Tennessee 2, Texas 1, Virginia 2.

[2] Includes establishments located as follows: Colorado 1, Michigan 1, Missouri 2, Oregon 1, Wisconsin 1.

[3] Does not include 2 idle establishments located in Pennsylvania.

[4] Short tons.

Almost all of the establishments producing cast iron pipe in 1890 were engaged in its manufacture as a specialty. Foundries devoted to general work produced a small amount of pipe, but this was primarily for the local trade or for specific applications. The demand for standard sizes of pipe necessitated its production on a large scale in foundries designed and equipped specifically for this type of work. A number of pipe manufacturers also produced hydrants, fittings and connections, and a few of them made hydraulic and gas machinery, machine shop equipment, and general foundry products. However, this non-pipe production activity constituted only a small part of the total business of these establishments. Most of the foundries used pig iron exclusively to manufacture pipe, but a few used small quantities of scrap iron.

During the 1880's a number of municipal codes were instituted dealing with the use of pipe in building construction, and both pressure pipe and soil pipe were manufactured to meet the specifications of these codes. One of the first plumbing codes was published in 1881 at Washington, D.C. and it contains the following references to soil pipe installations and specifications:

> Sec. 17. When necessary to lay a soil pipe under a building, such pipe shall be of iron with leaded joints, and shall be so located as to be accessible for inspection. Such pipes shall be kept above ground if practicable, shall not be less than 4″ in diameter, and shall extend above the roof of the house; this extension shall be at least 4″ in diameter.
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> Sec. 19. The weight of all iron pipe used underground shall not be less than —
> For 6″ pipe, 20 lbs. per linear foot
> For 5″ pipe, 17 lbs. per linear foot
> For 4″ pipe, 13 lbs. per linear foot
> For 3″ pipe, 9½ lbs. per linear foot
> For 2″ pipe, 5½ lbs. per linear foot
>
> Sec. 20. All iron soil and sewer pipes shall be coated inside and outside with coal tar applied hot. All changes in direction shall be made with curved pipes, and all connections with Y branches and 1/8 bends.[2]

An important development in soil pipe manufacture occurred in the late 1880's, when John Foran introduced a machine which made possible the economical production of green-sand cores. Prior to this time, green-sand cores were made either by ramming the core material in a core box, or by using tempered sand packed upon a core arbor by hand, or dropped through a sieve upon a revolving core barrel. The on-side method of soil pipe manufacture with green-sand molds and green-sand cores remained in exclusive use until the advent of centrifugal casting for soil pipe production.

Emergence of the Cast Iron Soil Pipe Industry

The decade of the 1890's marked the emergence of cast iron soil pipe manufacture as a distinct industrial activity. Cities continued to install water works and sewage systems at a rapid pace, and the total number of cast iron pipe foundries in the United States increased to 64 in 1894 and 71 in 1898. The total in 1894 was divided equally between pressure pipe and soil pipe foundries, and by 1898 there were 37 foundries devoted to soil pipe production. They were located in 13 states and had an annual melting capacity of approximately 560,000 net tons. New York with 7 foundries was foremost among the states in soil pipe production. There were 4 foundries each in Alabama, New Jersey, Pennsylvania and Illinois; 3 foundries each in Maryland and Wisconsin, 2 foundries each in Ohio and Indiana; and single foundries located in Delaware, Kentucky, Tennessee and Missouri. Consequently, by the turn of the century the cast iron soil pipe

[2] Henry Jeffers Noble, "Development of Cast Iron Soil Pipe in Alabama," p. 10.

industry had penetrated the Northeast, the South and the Midwest.

In 1899, the Central Foundry Company with a capital stock of $14 million was incorporated as a consolidation of 34 of the nation's principal cast iron soil pipe manufacturers. It operated as one concern, and some of the individual plants absorbed by the company were closed. In 1900 the company was operating 14 soil pipe foundries in different parts of the country with an aggregate daily capacity of about 500 tons of finished products. By 1903 additional operations had been combined, and the number of foundries operated by the company was reduced to 9. There were 3 plants in Alabama at Anniston, Bessemer and Gadsden, and one plant each at Baltimore, Maryland; Medina, New York; Newark, New Jersey; Lansdale, Pennsylvania; South Pittsburgh, Tennessee; and Vincennes, Indiana.

Following the turn of the century, Alabama quickly moved to the lead among the states which produced cast iron soil pipe. In 1900 the state was the third largest pig iron producer in the nation due principally to its deposits of iron ore, coal and limestone, which were located in close proximity. The manufacture of pressure pipe had become a factor in the iron industry in Alabama prior to 1890, and soil pipe production was started there during 1888-1893. The state offered the advantages of excellent foundry irons and low production costs, which served to attract investment capital, and eventually the hub of the soil pipe industry was shifted from the Northeast to the South, and more specifically to Alabama. By 1915, soil pipe foundries had been constructed in this state at Birmingham, Bessemer, Pell City, Gadsden, Anniston, Holt, Attalla and Talladega, and they contributed about 35 percent of the nation's soil pipe requirements.

The production of cast iron soil pipe and fittings in the United States, which reached a peak level of 280,000 net tons in 1916, slackened during World War I and totaled only 111,000 net tons in 1918. Following the war, building projects which had been deferred were undertaken, and as construction activity increased so did the demand for building materials, including soil pipe. During the early 1920's, the industry invested heavily in new plants and equipment. In Alabama, at Anniston, 5 new foundries were constructed which raised the city's annual output to 140,000 net tons and made it the largest production center for cast iron soil pipe in the world. By 1922, the nation's production of cast iron soil pipe and fittings had reached 357,000 net tons, and approximately 180,000 net tons or 50 percent of this total was produced in Alabama.

USES OF CAST IRON SOIL PIPE

Cast iron soil pipe and fittings are used primarily in building construction for sanitary and storm drain, waste, and vent piping applications. The product is installed in residential construction, hospitals, schools, and commercial and industrial structures. For this reason, the pattern of cast iron soil pipe shipments and sales is directly related to the pattern of building activity.

In buildings, the principal assembly of this piping is installed within the partitions and serves the tub, lavatory, and water closet fixtures. The main line in this assembly is the cast iron soil stack, which runs vertically from the building drain up through the structure and through the roof. Waste lines are connected to this main soil stack, and vent lines may also be tied in at a point above the highest fixture. In some installations vent lines are connected to a separate vent stack, which acts as the main source of air to and from the roof.

The building or house drain, the lowest horizontal piping in the drainage system, receives the discharge from the soil, waste, and drainage pipes from within the building and conveys the discharge to the building sewer. The building or house sewer, in turn, conveys the discharge outside of the structure, to the point prescribed by the local plumbing code for joining of the city sewer, septic tank or other means of disposal.

Another use for cast iron soil pipe and fittings in building construction is for storm drainage from roofs, yards, areaways and courts. It is used for collecting subsoil drains which are placed around the foundation for connection into a storm drainage system or into a sump. It is also used for roof leaders, particularly when these are placed within the building, pipe space, or other area. Extensive use is made of soil pipe for storm drainage on high-rise buildings where large setbacks accumulate substantial amounts of rain water and snow. At present, cast iron soil pipe is used in high rise building construction for drain, waste, vent and sewer purposes without concern for building height and is, in fact, the preferred material. There are large numbers of uses for cast iron soil pipe other than in building construction.

REQUIREMENTS FOR A SAFE AND DURABLE DRAIN, WASTE AND VENT SYSTEM

The satisfactory performance of a piping system used for drain, waste, vent and sewer plumbing requires that the material possess the following important characteristics:

a. Durability exceeding expected life of the building
b. Resistance to corrosion
c. Noncombustible and does not contribute to the spreading of flames
d. Resistance to abrasion
e. Ability to withstand temperature extremes
f. Ability to withstand traffic and trench loads
g. Low coefficient of expansion/contraction
h. Joints which resist infiltration and exfiltration
i. Strength and rigidity
j. Resistance to noise transmission

Cast Iron Soil Pipe and Fittings Meet or Exceed All These Requirements

Tests of cast iron soil pipe for these properties reveal its superior characteristics as a material for all drain, waste, vent, and sewer piping.

Corrosion Resistance

Cast iron has, for hundreds of years, been the premier piping material throughout the world for drain, waste, and vent plumbing applications and water distribution. Cast iron can be cast in the form of pipe or fittings at low cost and has excellent strength properties. Unique corrosion resistance characteristics make it ideally suited for plumbing applications. Cast iron, because of the presence of free graphite, when exposed to corrosion leaves behind an insoluble layer of corrosion products which provide somewhat of a barrier against additional corrosion.

"Cast Iron is a generic term that identifies a large family of ferrous alloys. Cast irons are primarily alloys of iron that contain more than 2% carbon and 1% or more silicon. Low raw material costs and relative ease of manufacture make cast irons the least expensive of the engineering metals. Cast irons can be cast into intricate shapes because of their excellent fluidity. Because of the excellent properties obtainable with these low-cost engineering materials, cast irons find wide application in environments that demand good corrosion resistance. Services in which cast irons are used for their excellent corrosion resistance include water and soils." [3]

The majority of soils throughout the world are non-corrosive to cast iron. More than 410 water and gas utilities in the United States have cast iron distribution mains with continuous service records of more than 100 years. Nine have mains more than 150 years old. Over 95 percent of all cast iron pipe that has ever been installed in underground service in the United States is still performing its intended function.

The corrosion of metals underground is an electrochemical phenomenon of two main types: galvanic and electrolytic.

Galvanic corrosion is self-generating and occurs on the surface of a metal exposed to an electrolyte (such as moist, salt-laden soil). The action is similar to that occurring in a wet or dry cell battery. Differences in electrical potential between areas on the surface of the metal (pipe) in contact with such soil may occur for a variety of reasons, including the joining of different metals (iron and copper or brass). Potential differences may also be due to the characteristics of the soil in contact with the pipe surface: e.g. pH, soluble salt, oxygen and moisture content, soil resistivity, temperature and the presence of certain bacteria. Any one of a combination of these factors may cause a small amount of electrical current to flow through the soil between areas on the pipe or metal surface. Where this current discharges into the soil from such an area, metal is removed from the pipe surface and corrosion occurs.

Electrolytic corrosion occurs when direct current from outside sources enters and then leaves an underground metal structure such as pipe. At the point where current leaves the metal surface to return to its source through the soil, metal is removed and corrosion occurs.

Over 95 percent of the soils in the United States are non-corrosive to cast iron. Those few soils that are somewhat corrosive to cast iron include the natural soils containing high concentration of decomposing organic matter (swamps, peat bogs, etc.) alkalis or salt (tidal marshes). Man made corrosive soils result from the discharge of various mining and other industrial and municipal wastes into refuse dumps or landfills.

The National Bureau of Standards and the Cast Iron Pipe Research Association (now known as the Ductile Iron Pipe Research Association) have studied the underground corrosion of cast iron pipe for many years. As a result of these studies, a procedure has been developed for determining the need for any special corrosion protection and a simple and inexpensive method of providing such protection by means of a loose wrap of polyethylene film. This information for the

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[3] ASM Handbook; Corrosion of Cast Irons, Vol. 13; p. 567

correct use of polyethylene is contained in ANSI/AWWA C105/A21.5. Also, ASTM A 674 provides installation instructions and an appendix which details a 10 point scale to determine if the soils are potentially corrosive to cast iron. Information on this Standard is available from the Cast Iron Soil Pipe Institute and its member Companies.

Since the 300 series of nickel-chromium stainless steel is even more resistant to corrosion than cast iron, the stainless steel No-Hub couplings used to join hubless cast iron soil pipe require no more special protection against corrosion than the pipe itself. Over 1 billion No-Hub couplings installed since 1961 in the United States attest to the durability of these couplings.

Expansive Soils

Some dense clay soils expand and shrink when subjected to wetting and drying conditions. In dry periods, cracks form and when wet conditions return, the soil absorbs moisture and expands. If this condition is present it is recommended that the trench be excavated to greater than normal depth and select backfill materials be used to provide for protection from this movement.

Resistance to Abrasion

Cast iron soil pipe is highly resistant to abrasion from sand, gravel, glass particles, garbage disposal residue, dishwasher discharge, and debris being carried in suspension, both at low and high velocities, or washed along the lower portion of the sewer or drain. This characteristic has been very well documented by examinations of existing soil pipe.

CAST IRON SOIL PIPE JOINTS AND THEIR CHARACTERISTICS

The cast iron soil pipe gasketed joints shown in Figure 1 are semi-rigid, water tight connections of two or more pieces of pipe or fittings in a sanitary waste, vent, or sewer system. These joints are designed to give rigidity under normal conditions and still permit sufficient flexibility under adverse conditions, such as ground shift, footing settlement, wall creepage, building sway, etc., to allow pipe movement without breakage or joint leakage. Properly installed, the joints have equal longevity with the cast iron soil pipe, and can be installed in walls, under ground, and in other inaccessible places and forgotten.

Types of Cast Iron Soil Pipe and Fittings

Cast Iron Soil Pipe used in the United States is classified into two major types — hub & spigot and hubless (No Hub).

Hubless cast iron soil pipe and fittings are simply pipe and fittings manufactured without a hub in accordance with ASTM A888 or CISPI 301. The method of joining these pipe and fittings utilizes a hubless coupling which slips over the plain ends of the pipe and fittings and is tightened to seal it. Hubless cast iron soil pipe and fittings are made in only one class or thickness. There are many varied configurations of fittings and both pipe and fittings range in sizes from 1 1/2″ to 10″. Couplings for use in joining hubless pipe and fittings are also available in these same size ranges from the member companies of the Cast Iron Soil Pipe Institute.

Hub and Spigot pipe and fittings have hubs into which the spigot (plain end) of the pipe or fitting is inserted. The joint is sealed with a rubber compression gasket or molten lead and oakum. Hub and Spigot pipe and fittings are available in two classes or thicknesses. These are classified as Service (SV) and Extra Heavy (XH). Because the additional wall thickness is added to the outside diameter Service (SV) and Extra Heavy (XH) have different outside diameters and are not readily interchangeable. These two different types of pipe and fittings can be connected with adaptors available form the manufacturer. Hub and Spigot pipe and fittings are made in accordance with ASTM A-74 and are available in 2″-15″ sizes. Compression gaskets, lubricant, and assembly tools are available from the member companies of the Cast Iron Soil Pipe Institute.

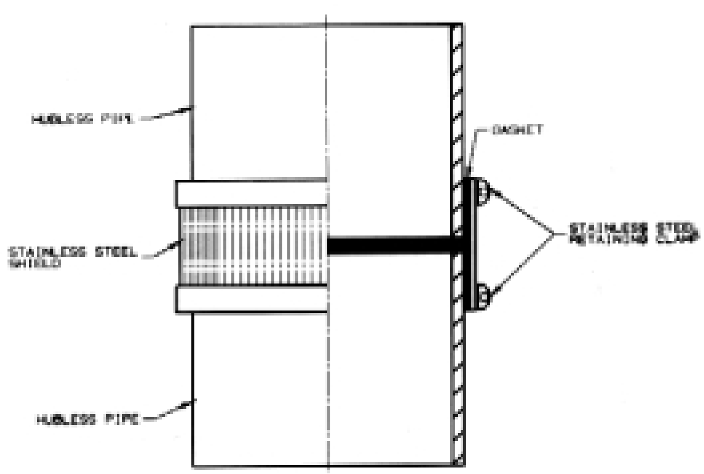
Shielded Hubless Coupling

The shielded hubless coupling for cast iron soil pipe and fittings is a plumbing concept that provides a more compact arrangement without sacrificing the quality and permanence of cast iron. The illustrated design in Figure 1 shows the system typically uses a one-piece neoprene gasket, a shield of stainless steel retaining clamps. The great advantage of the system is that it permits joints to be made in limited-access areas.

The 300 series stainless steel which is often used with hubless couplings was selected because of its superior corrosion resistance. It is resistant to oxidation, warping and deformation, offers rigidity under tension with a substantial tensile strength, and yet provides sufficient flexibility.

In the illustration below, the shield is corrugated in order to grip the gasket sleeve and give maximum compression distribution. The stainless steel worm gear clamps compress the neoprene gasket to seal the joint. The gasket absorbs shock, vibration and completely eliminates galvanic action between the cast iron soil pipe and the stainless steel shield.

(A) TYPICAL HUBLESS COUPLING



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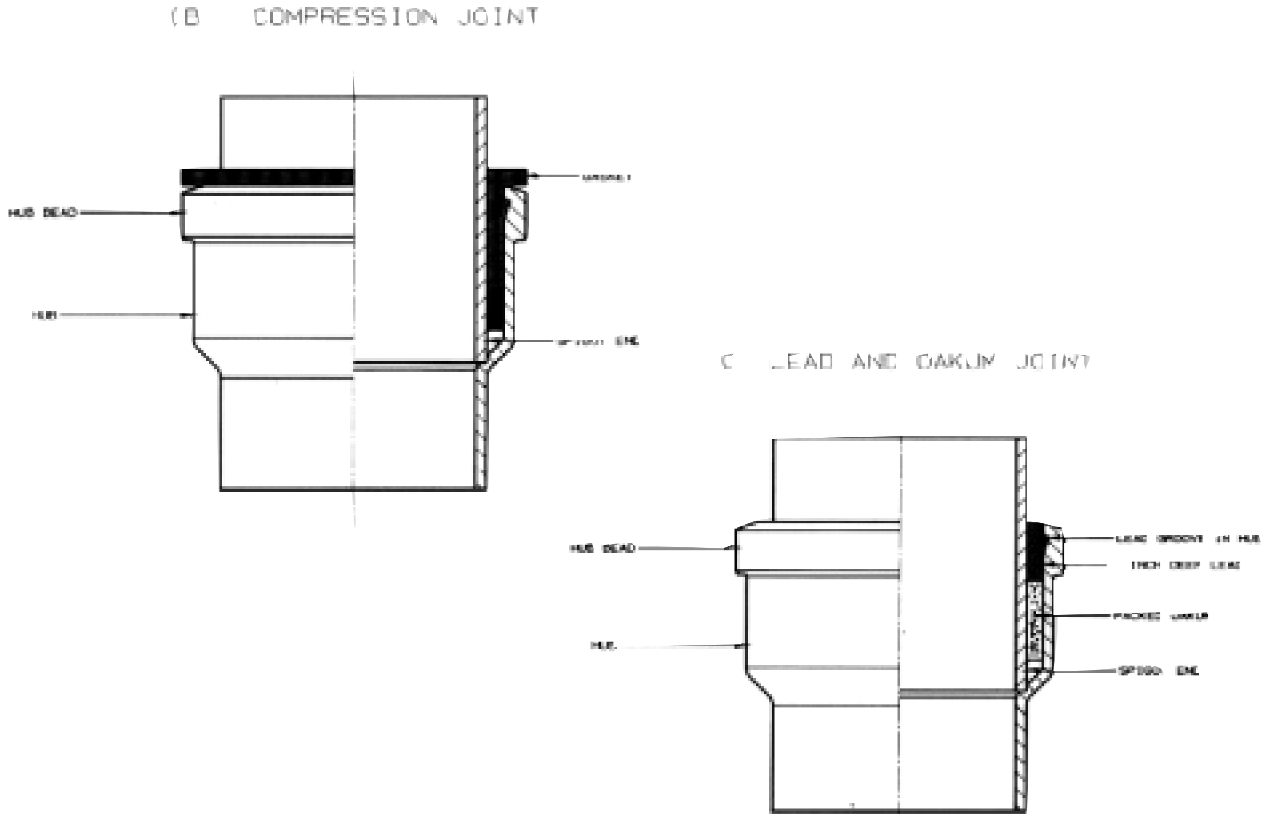

Figure 1 continued

FIG. 1 — Typical Joints being Used to Connect Cast Iron Soil Pipe and fittings are:

The Compression Joint

The compression joint is the result of research and development to provide an efficient, lower-cost method for joining cast iron soil pipe and fittings. The joint is not unique in application to cast iron soil pipe, since similar compression-type gaskets have been successfully used in pressure pipe joints for years. As shown in Figure 1, (B) the compression joint uses hub and spigot pipe as does the lead and oakum joint. The major difference is the one-piece rubber gasket.

When the spigot end of the pipe or fitting is pushed or drawn into the gasketed hub, the joint is sealed by displacement and compression of the rubber gasket. The resulting joint is leak-proof and root-proof. It absorbs vibration and can be deflected up to 5 degrees without leakage or failure.

The Lead And Oakum Joint

Cast iron soil pipe joints made with oakum fiber and molten lead are leak-proof, strong, flexible and root-proof. The waterproofing characteristics of oakum fiber have long been recognized by the plumbing trades, and when molten lead is poured over the oakum in a cast iron soil pipe joint, it completely seals and locks the joint. This is due to the fact that the hot metal fills a groove in the bell end of the pipe, firmly anchoring the lead in place after cooling. When the lead has cooled sufficiently, it is caulked into the joint with a caulking tool to form a solid metal insert. The result is a lock-tight soil pipe joint with excellent flexural characteristics.

Soundproofing Qualities of Cast Iron with Rubber Gasket Joints

One of the most significant features of the compression gasketed joint and hubless couplings is that they assure a quieter plumbing drainage system. The problem of noise is particularly acute in multiple dwelling units. Although soundproofing has become a major concern in construction design, certain plumbing products have been introduced which not only transmit noise but in some cases actually amplify it. The use of neoprene gaskets and cast iron soil pipe reduces noise and vibration to an absolute minimum. Because of the density and wall thickness of the pipe, sound is muffled rather than transmitted or amplified, and the neoprene gaskets separate the lengths of pipe and the units of fittings so that they suppress any contact-related sound. The result is that objectionable plumbing noises are minimized.

A detailed discussion of the soundproofing qualities of cast iron soil pipe DWV systems is contained in Chapter X.

ECONOMIC ADVANTAGES OF CAST IRON SOIL PIPE

The foregoing sections of this chapter, which discuss the uses of cast iron soil pipe, its properties, and the various joining systems, demonstrate that cast iron soil pipe affords a number of economic advantages. These advantages include performance, versatility, low cost installation and product availability.

Performance

The performance and durability of cast iron soil pipe are superior to any other product used for sanitary and storm drain, waste, and vent piping. These facts are supported by the test results presented previously in this chapter and have a direct bearing on product selection. The choice is clear because service to the customer requires that performance constitutes the principal reason for material selection, and in the matter of performance cast iron soil pipe has no equal.

Versatility

Cast iron soil pipe is the most versatile sanitary and storm drain, waste, and vent piping material on the market. It is available with a variety of joining methods so that it can be installed efficiently throughout the plumbing drainage system, both above and below the floor and beneath the ground. It is adaptable for use in all types of building construction, including one-family and two-family homes, multiple dwelling units or apartment building, high-rise structures such as hotels and office buildings, and many commercial industrial applications. The lead and oakum, compression gasket and hubless couplings can be used either individually or in combination in a given plumbing system in order to meet the needs of any specific condition. All three joining methods are available with a variety of pipe lengths and with a complete line of cast iron soil pipe fittings.

Low-Cost Installation

Cast iron soil pipe offers the advantages of low-cost installation as a result of the speed and efficiency with which the hubless couplings and compression gasket joints can be made, and the use of 10-foot pipe lengths which reduces the required number of joints in a given plumbing system. Further, cast iron soil pipe can be preassembled before it is placed in the ground or plumbing wall. This eliminates the need to work in cramped quarters or muddy trenches and so speeds installation.

Product Availability

Cast iron soil pipe foundries are strategically located in various sections of the country so that orders can be filled on very short notice. In many areas it is possible to place an order and have it delivered overnight, ready for use the following day. Contractors need not be concerned about supply shortages since the industry’s manufacturing capacity is adequate and since the basic raw materials for the manufacture of soil pipe are abundant and readily obtainable from domestic sources.