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MTW 00924

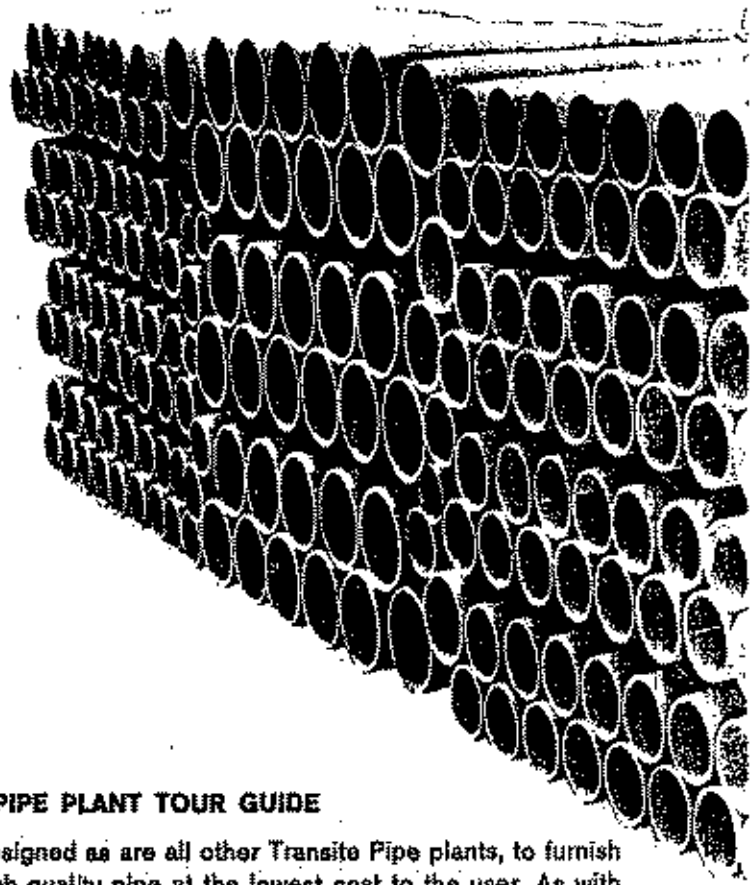
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HTW 00925

WELCOME TO JOHNS-MANVILLE TRANSITE* PIPE PLANT AT







A TRANSITE PIPE PLANT TOUR GUIDE

This plant is designed as are all other Transite Pipe plants, to furnish consistently high quality pipe at the lowest cost to the user. As with any modern operation, raw materials enter at one end and the finished products leave at the other end. But the interesting and important things that happen in between, and the reasons for them, are shown here in descriptive sketches and photos.

The actual forming of pipe is but one step in the manufacturing process. The complete operation comprises eight steps.

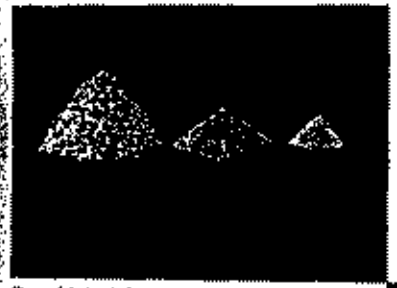
They are:

1. *Selection of Raw Materials*
2. Receiving and Storage
3. Mixing of Raw Materials
4. Forming of Pipe
5. *Curing*
6. Finishing
7. Testing
8. Unitizing

Not shown in this guide, but always present, is the "know-how" that comes from over 30 years experience in making asbestos-cement pipe.

Not shown also are over one billion feet of Transite Pipe made by Johns-Manville which are now in service in the United States and throughout the world.

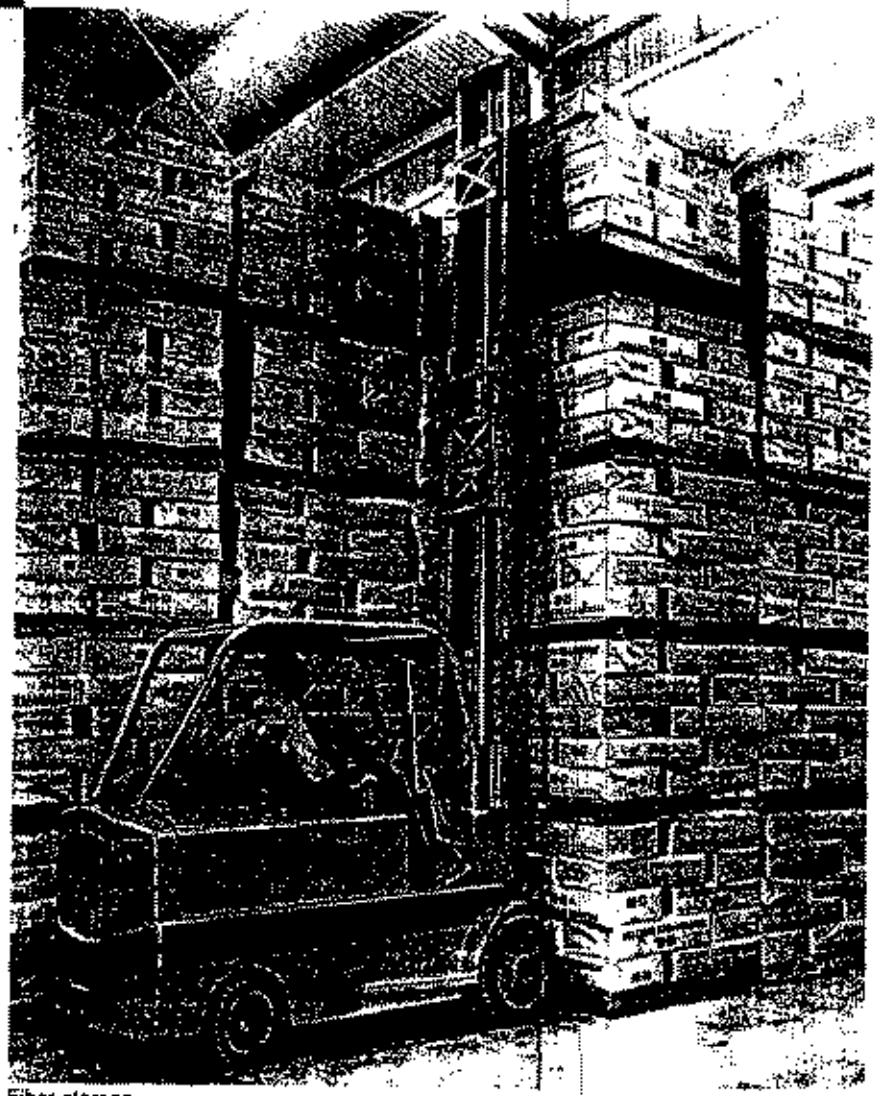
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Raw Materials



Unloading Asbestos



Fiber storage

1. Selection of Raw Materials: Asbestos, Cement, Silica.

Asbestos. Brought in from Canada, Africa and Australia. Continuous research and product development by Johns-Manville has produced an exclusive formula wherein the proper amount of several types of fiber are used to assure maximum product strength. Most of the fiber used is Chrysotile which comes from the free world's largest asbestos mine—the Johns-Manville Jeffrey Mine located in Asbestos, Quebec.

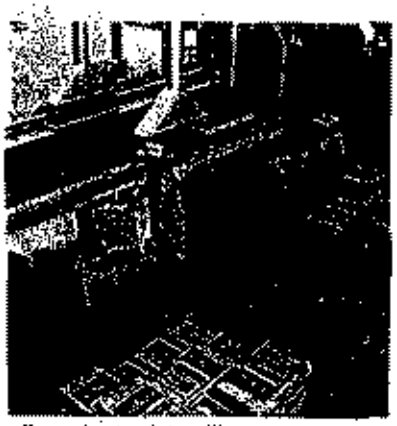
Cement. Type I Portland Cement is used in manufacturing Transite Pipe. This cement must not only meet the ASTM specification but also the more rigid requirements for uniformity in the Johns-Manville specification. A complete analysis of each shipment of cement is made by the cement company and forwarded to Johns-Manville. The J-M laboratory also checks the cement for strength. In addition, Research makes spot checks on cement used. All cement is subject to maximum controls to assure its uniformity and ability to meet the high strength requirements.

Silica. Also subject to strict specifications as to percentage of pure silica (95% SiO_2) and also as to fineness. The silica receives further processing after it is received at the plant. First it is dried completely and then fed automatically into a ball mill where it is ground into flour-like fineness. The extremely minute particles that result provide the utmost surface area for maximum chemical and physical combination with the cement—thereby imparting highest strength and corrosion resistance.

2. Receiving & Storage. Materials are received at the plants and stored in bins prior to starting the production line. The **cement** goes directly from receiving hoppers to these production line bins. The **silica** is dried and ground to specification before moving into other bins. The **asbestos** is received in bags and stored in tiers until needed for production.

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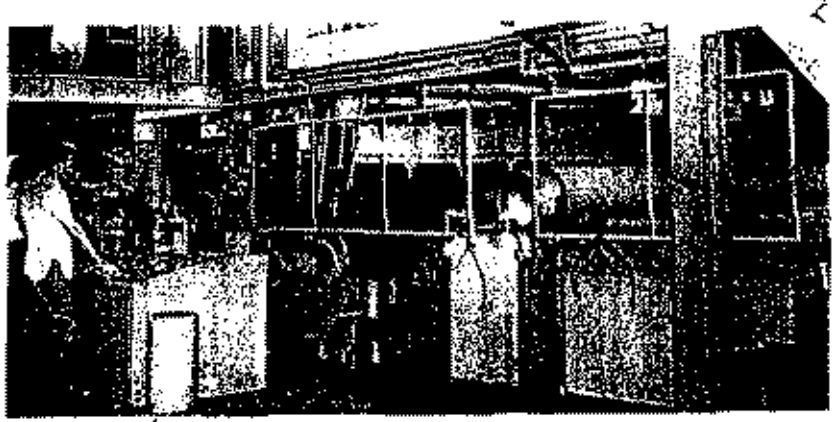
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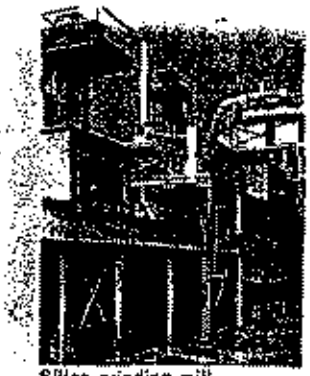
ding asbestos into willow



Controls on pipe-forming machine



Front of pipe-forming machine



Silica grinding mill

3. Mixing of Materials. The cement and silica are weighed separately by automatic electronic scales to assure maximum accuracy in proportioning. The several types of fiber to be used are blended in a dry mixer. The blend then goes to the willow where the fiber strands are separated without shortening or breaking their structure. After willowing, the blended fibers are blown into production line bins for weighing and proper proportioning with the cement and silica.

The Dry Mixer receives all materials in proper proportion, automatically controlled, and achieves complete dispersion of fibers, cement and silica. This electronically controlled accuracy in mixing keeps a uniform quality product coming from the forming machines. From the dry mixer the raw materials are forced out by screw conveyor to a trough where water is added and the mix carried to the **Wet Mix Vat.**

After brief mixing to keep all ingredients in suspension, the wet mix goes into the main vat where it is picked up by a cylinder mold. Here a thin film of stock is formed by a normal filtration process. The revolving cylinder mold comes into contact with a moving felt onto which the film of stock is transferred. The felt, as it moves toward the press or pipe forming section, passes over a vacuum box which draws out excess water from the stock.

4. Forming of Pipe. Pipe is formed on a rotating steel mandrel. As soon as the mandrel is in place the felt begins to move, transferring the mix onto the mandrel. As this transfer takes place the pipe is built up under hydraulic pressure. The top press applies pressure constantly during formation of the pipe and additional water is squeezed out. After the proper thickness of the pipe wall has been reached, the mandrel (with pipe) is removed. Another mandrel (bare) takes its place.

Immediately after formation the pipe on mandrel moves to an electrolytic loosener. By means of an electric current the moisture film between the pipe and the mandrel is changed to gas (oxygen & hydrogen) which, expanding slightly, breaks the bond and loosens the pipe. This method prevents distortion and keeps the inner wall smooth throughout.

Up to this point all operations are the same except for the blends regardless of size, length or type of pipe being made. The blend used depends on the strength requirements of the finished pipe. Because of this, the operations may now differ, depending on the end use of the pipe.

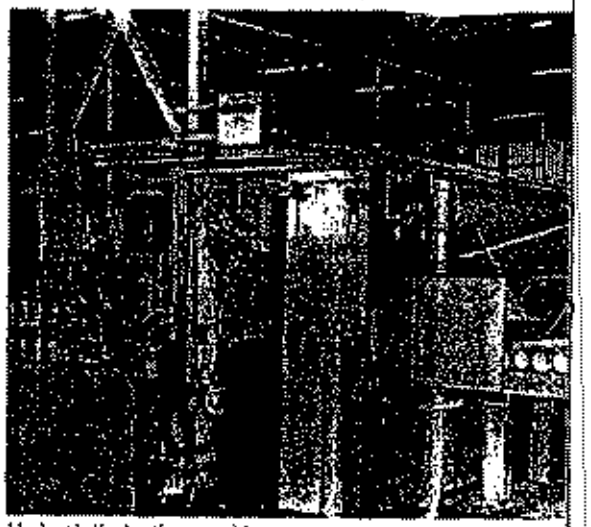
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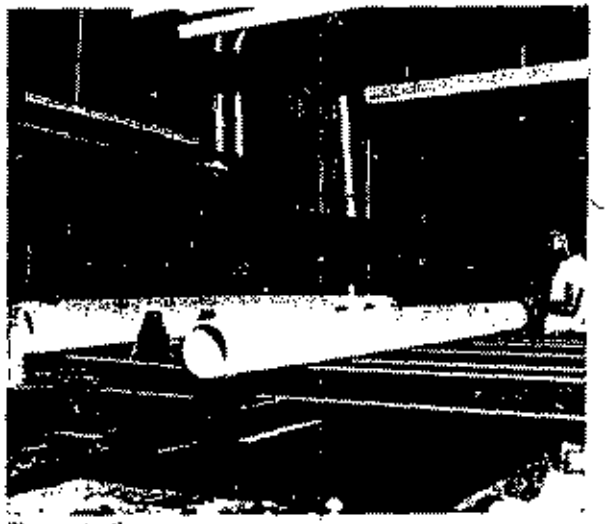
utoclave—pressure steam curing



d finishing on lathe



Hydrostatic testing machine



Flexure testing

MTW 00929



Pipe unitized for loading



Couplings being tested

5. Curing. After loosening, a pre-cure hardness is imparted to the pipe as it moves slowly on a dwell conveyor to the mandrel removal station. The mandrels are then removed and all pipe sections are placed in curing trays. These trays are then moved to the air cure room where strict time, temperature and humidity controls give the pipe a uniform primary hardness. The pipe is then ready for the autoclave. In this cure the steam, under high pressure, chemically combines the free lime normally found in all cement products with the finely ground silica. This forms highly stable and corrosion resistant calcium silicates. Here again, time, temperature, pressure and moisture are rigidly controlled. This precisely controlled curing process imparts maximum strength to the pipe during manufacture.

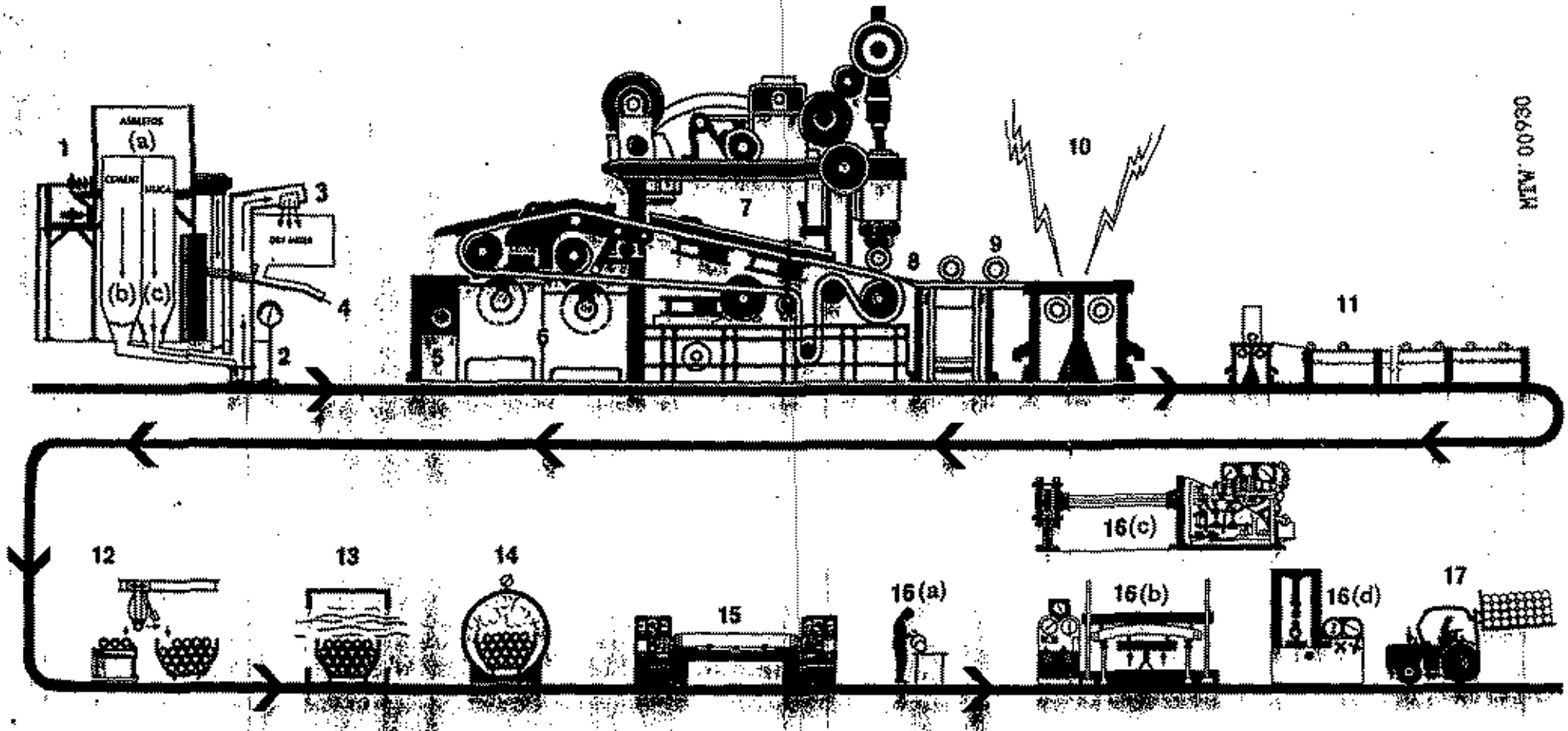
6. Finishing. After the steam cure the pipe moves to the finishing lathes. Ends are trimmed and machined to exact dimensions to match couplings thereby providing for both tightness and ease of assembly. Couplings and fittings are made to the same exacting standards.

7. Testing. All pipes are checked thoroughly for compliance with specifications. Close tolerances are maintained to assure maximum uniformity in the finished product. **Flexural** tests are given to all small diameter pipes used underground in water or sewer service. **Hydrostatic** strength tests are given to all water and sewer pipes. For water pipe each section is tested to 3½ times its class strength for five seconds and samplings are tested to 4 times. For example, class 150 pipe is tested routinely at 525 psi and the sampling to 600 psi. All gravity sewer pipe is tested to 50 psi. **Crushing** tests are performed in the laboratory under guidance of the Quality Control supervisor who is responsible for all inspections, checks and tests.

8. Bundling and Shipping. Most pipe is unitized before storing or shipping. Only large size pipe is handled individually. Pipe is carefully loaded in accordance with loading manual requirements to assure safety in transit. Pipe is shipped by truck or rail.



Truckload of pipe and couplings



FLOW CHART OF TRANSITE PIPE MANUFACTURE

1. **Production line bins**—raw materials enter the line as follows:
   - (a) **asbestos**—from the willow where the fiber is separated into individual strands and thoroughly mixed
   - (b) **cement**—directly from receiving hoppers
   - (c) **silica**—from grinding mill
2. **Electronic Scales**—for precise weighing; accurate control for uniform results
3. **Dry Mixer**—blends raw materials thoroughly
4. **Conveying Trough**—water carries stock to wet mix vat
5. **Wet Mix Vat**—thorough dispersion of reinforcing fibers
6. **Screen Cylinder Mold**—picks up slurry and deposits on moving felt
7. **Vacuum Box**—excess water removed
8. **Felt** deposits stock on **Mandrel**—wall thickness built up under pressure to proper size
9. **Mandrel (with pipe)**—removed from machine; next mandrel positioned
10. **Electrolytic Loosener**—frees pipe from mandrel; prevents distortion
11. **Slow-down Conveyor**—provides pre-cure time; initial set
12. **Mandrels**—removed and pipe stencilled for identification
13. **Air Cure Room**—strict control of time, temperature and humidity
14. **Autoclaves**—high pressure steam curing imparts maximum strength and excellent chemical stability
15. **Lathes**—trim and machine ends to exact dimensions
16. **Testing Equipment**—checks for adherence to rigid specifications
    - (a) **inspection**
    - (b) **flexure testing** machine
    - (c) **hydrostatic tester**
    - (d) **crush tester** (laboratory)
17. **Materials Handling Equipment**—transfers pipe to shipping area

PRODUCT DEVELOPMENT BUILDING NO. 2

1ST FLOOR		2ND FLOOR
PILOT PLANTS	LABS	LABS
FIBERS AND INSULATIONS	FIBERS AND INSULATIONS	AVIATION INSULATIONS
REFRACTORIES	REFRACTORIES	MINERAL AND GLASS FIBERS
CERAMICS		
MOLDED AND BOARD PRODUCTS	MOLDED AND BOARD PRODUCTS	
ASBESTOS TEXTILES	ASBESTOS TEXTILES	TAPES AND RUBBER PRODUCTS
TAPES AND RUBBER PRODUCTS	REINFORCED AND MOLDED PLASTICS	NEW ORGANIC MATERIALS
FIBER GLASS TEXTILES	FIBER GLASS TEXTILES	
PACKINGS	PACKINGS	FRICTION MATERIALS
FRICTION MATERIALS		

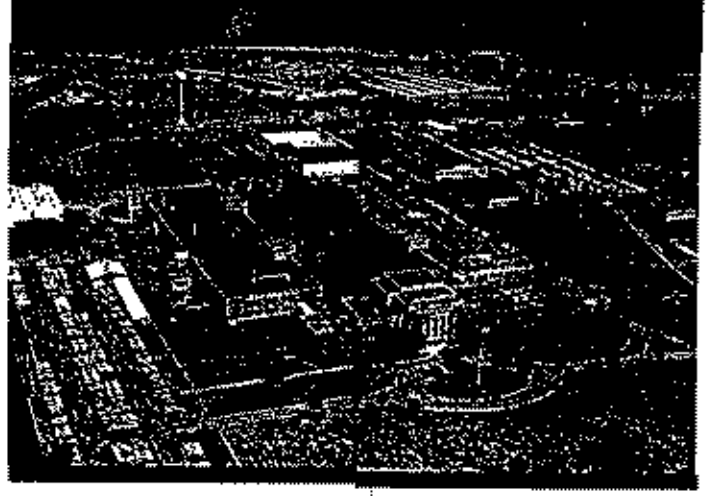
RESEARCH AND ENGINEERING CENTER

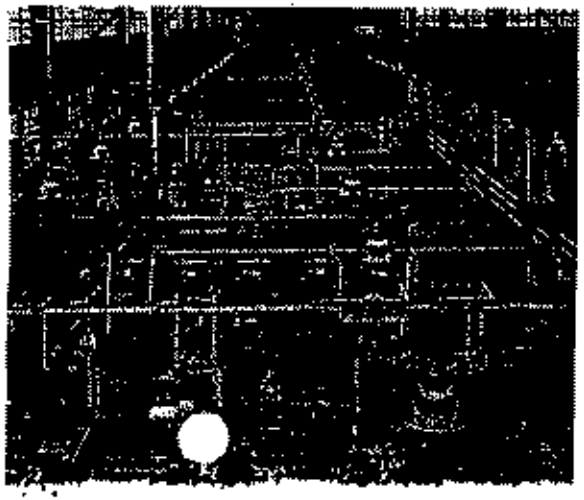
The Johns-Manville Research and Engineering Center is an eight-building complex located on a ninety-three acre tract adjacent to the company's Manville, N. J. plant.

In the foreground of the aerial photo of the Center, are the Research Building and the two Product Development wings. The floor plans of these three buildings are also shown on this page.

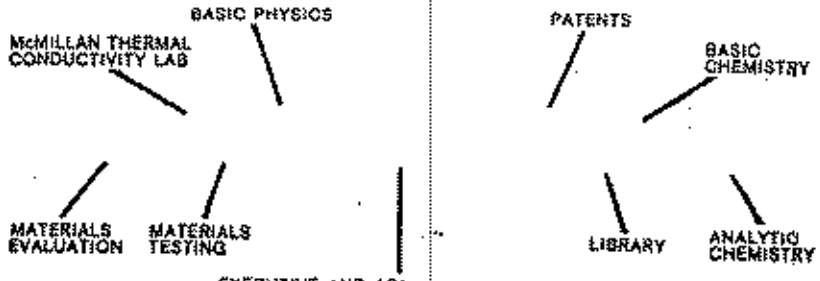
The J-M Center is the largest research facility in the world devoted to building materials, insulations, asbestos-cement pipe, and allied industrial products. Within its well equipped pilot plants and laboratories may be carried out practically every manufacturing operation conducted in the fifty Johns-Manville plants throughout the world (thirty-nine in the United States, three in Canada and one each in Argentina, Belgium, England, France, Germany, Italy, Lebanon and Mexico).

It is estimated that 85 to 90 per cent of the Johns-Manville products sold today, which comprise 28 separate businesses, are now or represent improved quality or volume as a result of organized research.



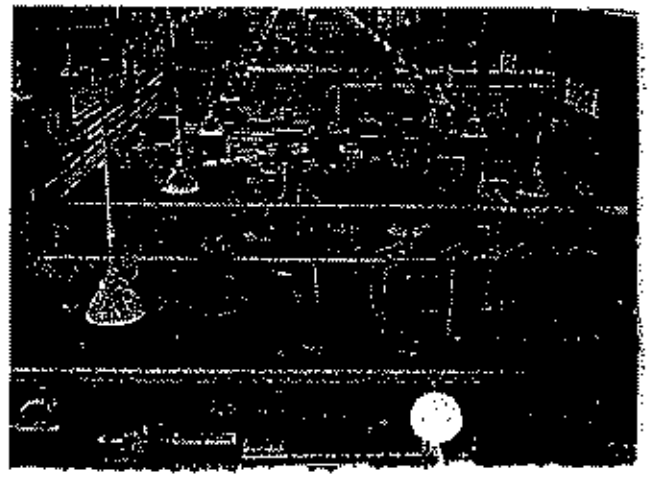


RESEARCH BUILDING

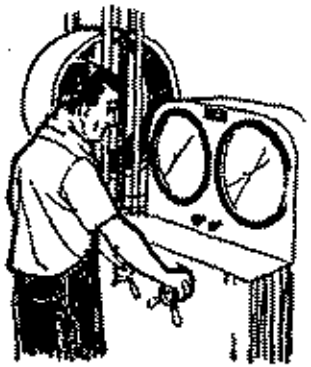


PRODUCT DEVELOPMENT BUILDING NO. 1

2ND FLOOR		1ST FLOOR
LABS	LABS	PILOT PLANTS
ASBESTOS FIBER	ASBESTOS FIBER	ASBESTOS FIBER
PAPER AND MILLBOARD		MOLDED AND BOARD PRODUCTS
		PLASTIC - FIBER GLASS PANELS
ROOFING	MOLDED AND BOARD PRODUCTS	PAPER AND MILLBOARD
		WOOD FIBER PRODUCTS
FINISHES, IMPREGNANTS & ADHESIVES	WOOD FIBER PRODUCTS	ASBESTOS-CEMENT BUILDING PRODUCTS
		FINISHES, IMPREGNANTS AND ADHESIVES
ASBESTOS CEMENT BUILDING PRODUCTS	FLOORING	FLOOR TILE
		ROOFING
ASSEMBLED UNITS AND STRUCTURES	ASBESTOS CEMENT BUILDING PRODUCTS	ASSEMBLED UNITS AND STRUCTURES
		MOLDED AND BOARD PRODUCTS
FILTER AIDS	FILTER AIDS	FILTER AIDS



MTM 00931



The widespread acceptance and phenomenal growth of the use of asbestos-cement pipe in America can be attributed in large part to Johns-Manville's continuing research program.

At the company's research and engineering center at Manville, N. J. a complete pipe plant is duplicated, exact in every detail except for size (4 ft. long pipe is produced rather than the standard 10 ft. or 13 ft. length).

Equipment includes, in addition to the pipe forming machine, such associated equipment as a high pressure autoclave for curing; a wet saw for cutting and trimming; a lathe for machining; a hydrostatic tester for testing to destruction under internal pressure. Equipment in the Materials Evaluation Section is used for beam and crush testing.

Other equipment throughout the center, including the most modern analytical and electronic devices, chemical laboratories, and the giant computer are in constant use. These facilities are not available anywhere else in the world for product development on asbestos-cement pipe.

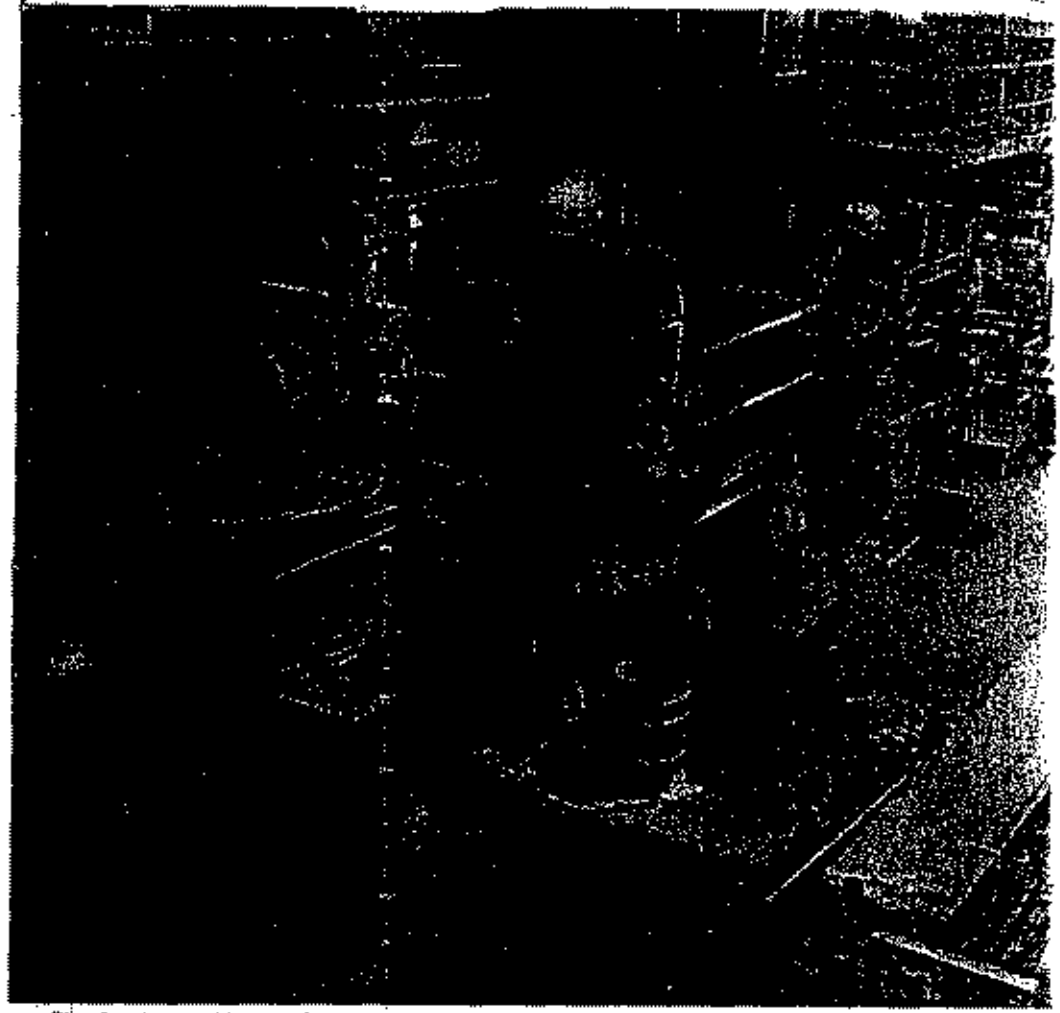
850 FULL-TIME EMPLOYEES at the Research and Engineering Center. Included are trained chemists, physicists, engineers and technicians who are engaged in constant study and analysis of customer needs. Raw materials, manufacturing techniques and application of all pipe products receive continuing attention.



Raw materials laboratory—continuing analysis and evaluation.



Complete chemical facilities are available for professional research



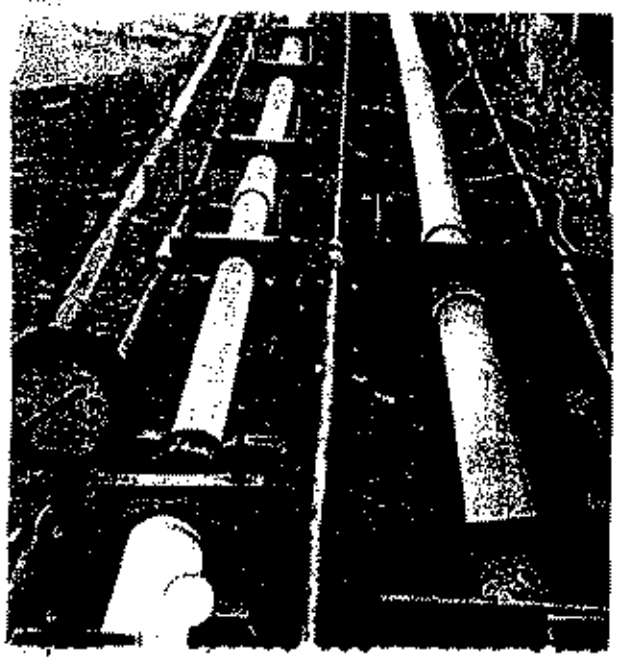
Pipe forming machine at pilot plant.

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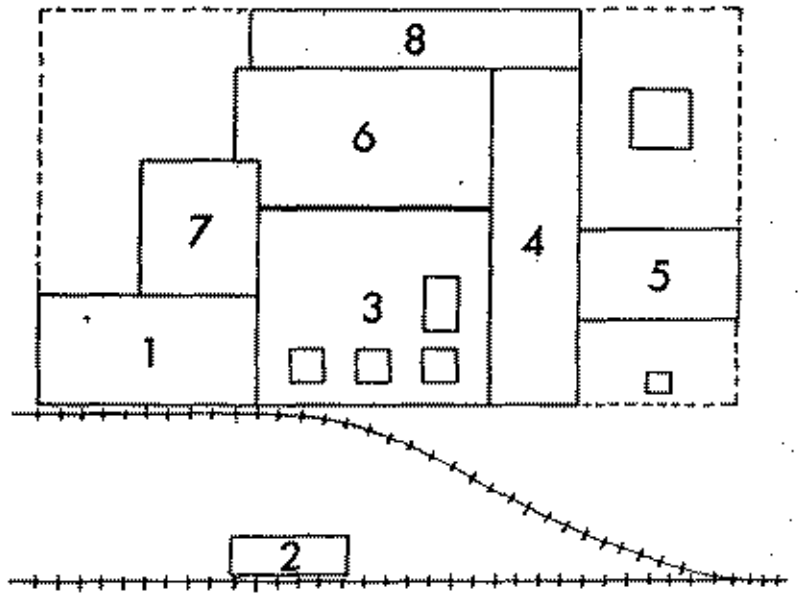
This research program means better pipe tomorrow just as past J-M research has led to major improvements through the years.

In one industry alone—the sanitary industry—which includes water and sewage piping—Asbestos-Cement Pipe and continuous J-M research have been responsible for:

- The widespread acceptance of the rubber ring joint—TRANSITE has featured since 1929
- The great reduction in tuberculation problems—TRANSITE can't tuberculate; it is 100% non-ferrous
- The improvement in flow capacity—TRANSITE'S C=140 stays high throughout pipe life
- The accelerated elimination of red water, of pipe damage from electrolysis and soil corrosion—TRANSITE is 100% non-metallic and immune to stray earth currents and pipe line pollution
- The tremendous upgrading of sewer pipe specifications—especially in leakage allowance—TRANSITE always a leader (100 gallons per inch of pipe diameter per mile per 24 hours)
- Elimination of rigid connections and time-consuming poured joints—TRANSITE just slips together



Permanent demonstration set-up for water line pressure test.

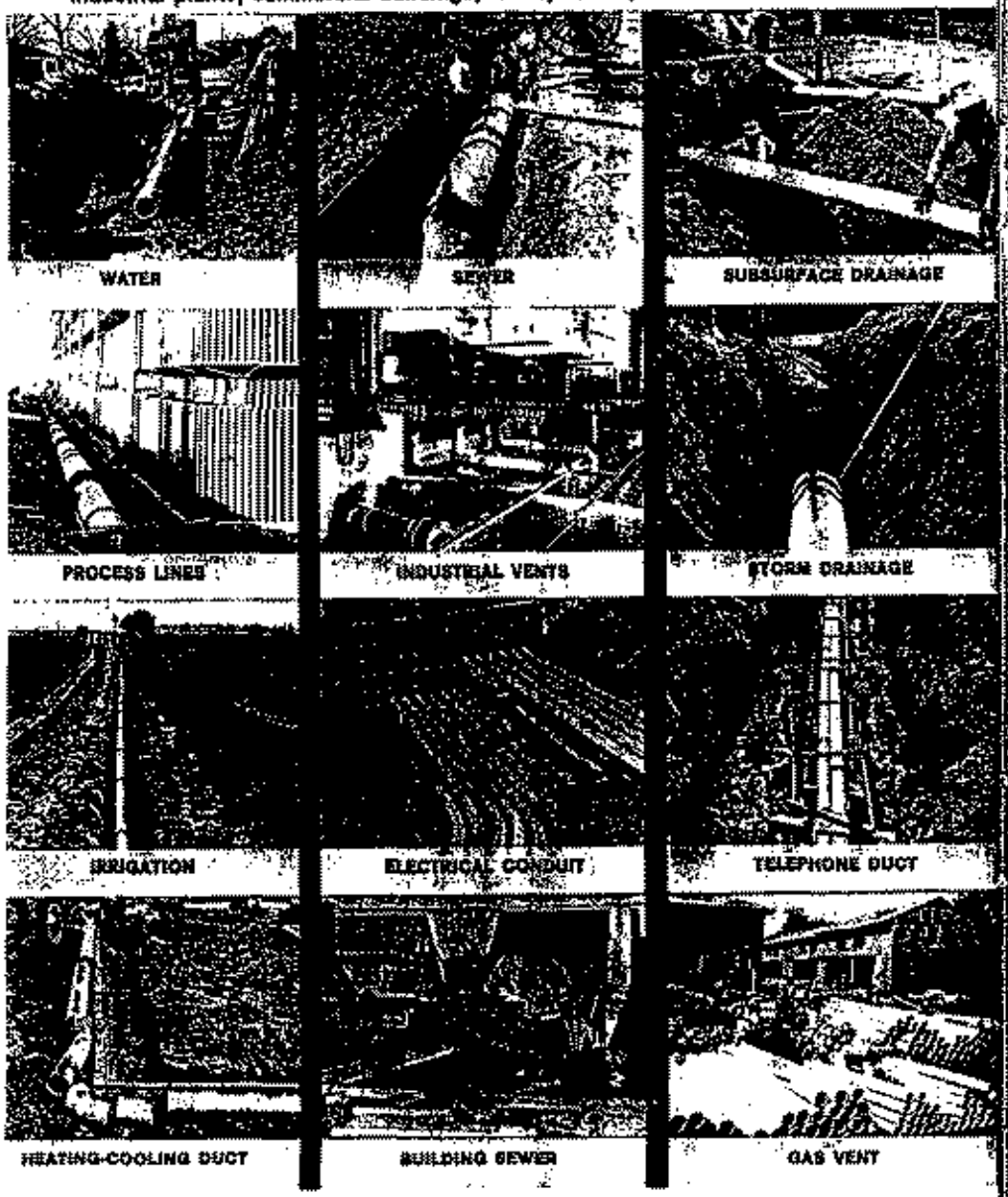


HTW 00933

Although the actual layout of Transite pipe plants may differ to some degree in arrangement, there are certain basic areas common to all. These areas include:

1. **Receiving and Shipping.** From rail sidings and unloading platforms materials are moved by modern equipment to the warehouse and thence to production line.
2. **Silica Grinding.** Raw silica is moved into a grinding mill where, after it is thoroughly dried it is crushed by constantly moving steel balls into a "flour," and its size is rigidly controlled according to exacting specifications.
3. **Forming End.** This is the section where water is added to the raw materials to form the basic pipe stock (slurry). The forming end extends through all phases of the pipe making machine including water extraction, pipe forming, electrolytic loosening of mandrel and placing in trays for the primary air cure.
4. **Air Curing Area.** Here, both temperature and humidity are accurately controlled. This control is an additional step taken to assure maximum uniformity in the final pipe product.
5. **Autoclaves.** In these high pressure steam ovens the final cure takes place. The cement undergoes a chemical change and the free lime normally found in cement products combines with the extremely fine silica flour. This reaction imparts strong corrosion resistance to the finished pipe giving it a markedly superior stability.
6. **Finishing End.** After pipe, couplings and fittings have been cured they are brought to the lathes for trimming and end machining. This area also includes testing equipment.
7. **Shipping.** In this area pipe, fittings and couplings are prepared for shipment. Except for larger sizes, all pipe sections are unitized for efficiency in bundling. Modern materials handling equipment moves the units to storage and shipping areas.
8. **Administration Offices—Parking Lot—Power Supply.** Space for these functions at the typical Transite pipe plant—including room for expansion—runs to 100 acres or more. A medical unit, cafeteria and personnel facilities are usually located, along with business offices, in such an administration area.

12 of many ways they serve public works, (municipal and government); utilities; industrial plants; commercial buildings; farms; homes; institutions.



JOHNS-MANVILLE
22 East 40th St.
New York, N. Y. 10016

MTW 00934

Transite Pipe Plants
in the U. S. A.
Manville, N. J.
Waukegan, Ill.
Marrero, La.
Denison, Tex.
Long Beach, Calif.
Stockton, Calif.
Green Cove Springs, Fla.
(Under construction)

District Offices
Atlanta, Baxter
Chicago (Waukegan, Ill.)
Cleveland, Denver
Houston (Houston and
Denison, Texas)
Los Angeles (Long
Beach, Calif.)
New York (Manville, N. J.)
Philadelphia, Syracuse
San Francisco (Stockton,
Calif.)
Seattle