FILE NAME: Asbestos Cement Pipe and Sheet (ACPS)

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W. CLARK COOPER, M.D.
2150 SHATTUCK AVE. (SUITE 811)
BERKELEY, CALIFORNIA 94704
PHONE (510) 649-8640
FAX NO. (510) 649-8748

February 24, 1992
WCC-5371

Dr. Barry Castleman,
1722 Linden Avenue
Baltimore, MD 21217

Dear Barry:

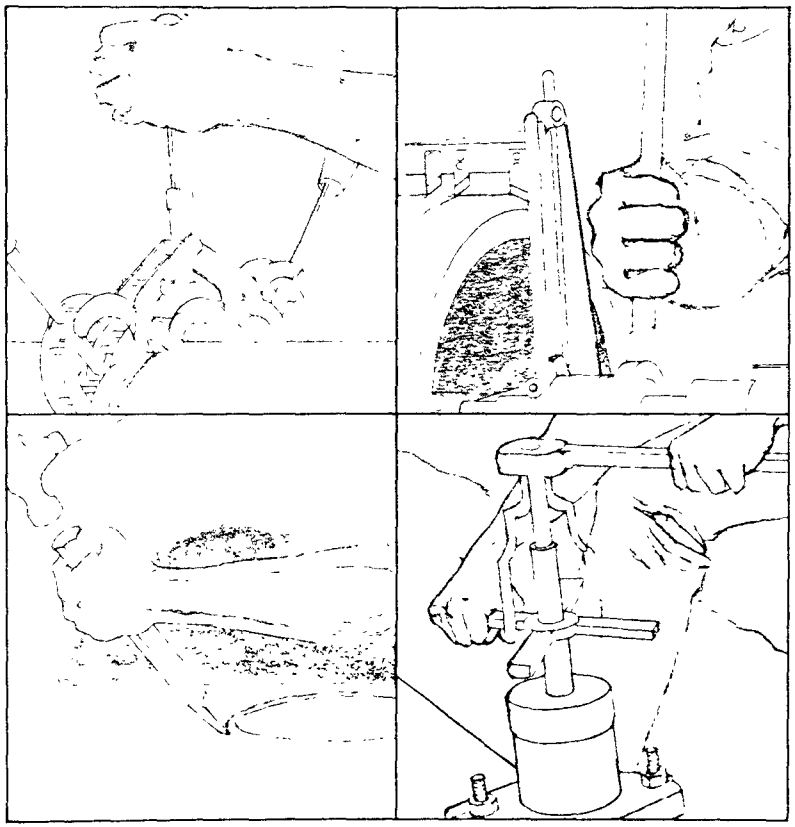
I am enclosing copies of two booklets on work practices for those handling A/C pipe, one (1977) prepared by the A/C Pipe Producers Assn, and the other(1978) by the American Water Works Assn. The contens are essentially the same. As I told you in San Francisco, I supervised industrial hygiene studies of workers handling such pipe while I was with Equitable Enviromental Health. The actual work was done by Barbara Kawahara, now Barbara Jimbo.

I was glad I had a chance to see you on Friday, although you can have no doubt about my view of the meeting as a whole. What a demonstration of combining truth and fiction! I could write or talk for hours about the fallacies and the retrospective misjudgements expressed about industry (which is not an entity but combines good and bad individuals), about labor, about government, and about researchers. Some of the latter were objective, others were out to prove preconceived ideas on both sides of the questions; some were honest, some were dishonest, And so on and on.

As the world moves on and on also, I send my best wishes.

Sincerley

W. Clark Cooper, MD



Recommended Work Practices for A/C Pipe

A/C Pipe Producers Association
1600 Wilson Boulevard, Suite 1308, Arlington, Virginia 22209

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Introduction

The Occupational Safety and Health Act in the United States and similar laws in Canada and other countries were enacted to ensure so far as possible, every worker a safe and healthy work place. This legislation is far-reaching. It covers millions of employees and nearly every employer, including those involved in utility duct and pipeline construction.

In keeping with the spirit and intent of these laws, the asbestos-cement pipe industry is cooperating with labor by disseminating information regarding the potential hazards of exposure to airborne asbestos and the means of reducing such potential hazards through good work practices.

Good work practices is what this booklet is about. The recommendations that appear on the following pages are the result of field testing and were developed through study.* They are intended as general guides to achieve safe and clean job site conditions when working with asbestos-cement (A/C) pipe products. Since field conditions will vary, adherence to these work practices will not necessarily guarantee compliance with national, state or local regulations. Questions relating to compliance should be directed to appropriate regulatory agencies.

The A/C Pipe Producers Association believes this booklet will be helpful to engineers, superintendents, contractors, foremen and laying crews in understanding and explaining established procedures for the safe handling of A/C pipe products.

*See "Asbestos Exposures During the Cutting and Machining of Asbestos-Cement Pipe," report prepared by Equitable Environmental Health Inc., March, 1977 and "News from IAC" reporting on a survey by the Occupational Hygiene

Asbestos and Health

As you are aware, airborne asbestos fiber has been identified as a possible health hazard. Very few things to which we are exposed are "zero risks." But like the automobile, electricity and x-rays, there are non-harmful ways to use potentially harmful things.

Generally, asbestos-cement (A/C) pipe products contain less than 20% asbestos. The asbestos fibers are not free, but encapsulated or "locked-in" the cement binder like reinforcing rods in concrete. The distinction between "free" and "bound" asbestos is extremely important. First of all, it determines the probability of fiber release, which in turn, directly relates to the probability of risk. More importantly, it explains clearly and simply why A/C pipe is a non-harmful use of asbestos.

Experience has shown that minimizing exposure to airborne asbestos dust is the only effective method of preventing asbestos-related diseases. Recommended work practices are the best assurance of providing exposure safeguards for yourself and your employees.

Summary of OSHA Asbestos Standard

The Occupational Safety and Health Act was signed into law on December 29, 1970, and became effective on April 28, 1971. On December 7, 1971, the Secretary of Labor issued a temporary standard for exposure to asbestos dust. As required by the Act, a permanent standard for asbestos exposure was promulgated six months later.

Under the current standard, it is the employer's responsibility to assure that exposure of employees to airborne concentrations of asbestos fibers does not exceed the following "permissible exposure levels":

a. Eight hour time weighted average: Two fibers, longer than 5 micrometers, per cubic centimeter.
b. Ceiling concentrations. Ten fibers, longer than 5 micrometers, per cubic centimeter.

In October, 1975, OSHA proposed a revision to the current standard which would reduce the eight hour time weighted average exposure to 0.5 fibers per cubic centimeter of air and ceiling concentrations to 5.0 fibers per cubic centimeter. In their notice, OSHA stated that a separate "construction industry standard" would be issued to cover workers who handle asbestos-containing products. This work practice booklet will be revised as necessary to reflect any changes the construction industry standard may necessitate.

The work practices recommended in this booklet are based on data for "peak dust concentrations" representing short time periods of maximum exposure. Field cutting and machining operations involving A-C pipe are normally infrequent and of short duration. Using these recommended work practices, it is improbable that field personnel would be exposed in a typical working day to levels exceeding the eight hour time weighted average.

Products and Operations

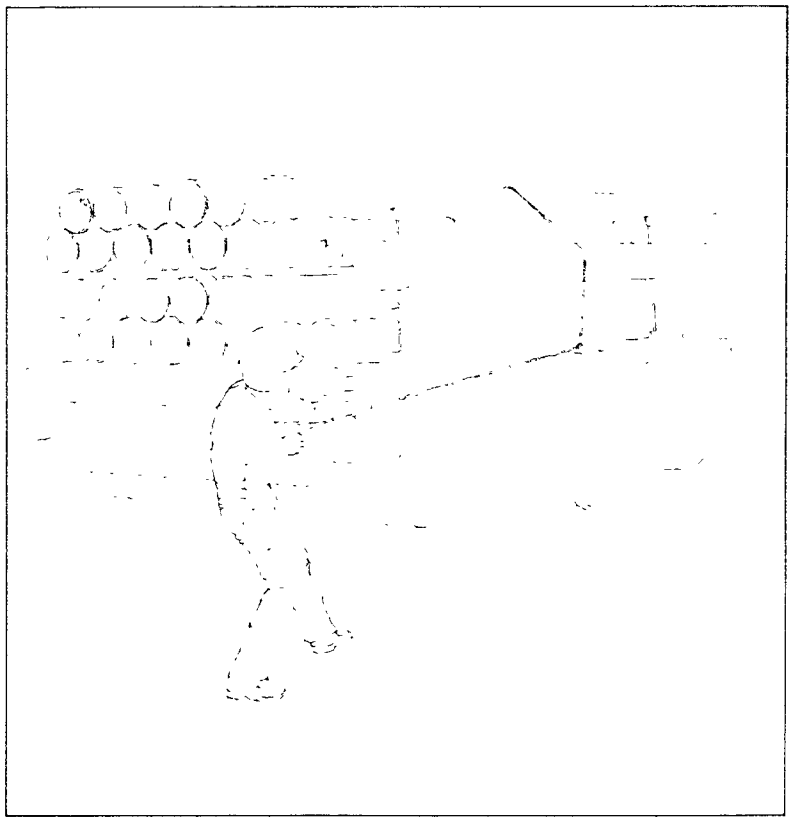
Types of A-C Pipe Products covered by these work practices include.

"Class" Pressure Pipe
"Transmission" Pressure Pipe
Pressure Sewer Pipe
Gravity Sewer Pipe
Building Sewer Pipe
Storm Drain Pipe
Perforated Underdrain Pipe
Electrical Conduit
Telephone Duct
Air Duct

Operations to which these work practices apply include

Shipping, Receiving and Handling
Cutting
Machining
Hole Cutting
Tapping
Coupling Removal
Housekeeping and Waste Disposal

Shipping, Receiving, Handling and Assembly*



A/C pipe is shipped clean from the factory and carefully loaded using methods acceptable to the carrier. Loading, unloading, stringing out and assembling A/C pipe are essentially dust-free operations. Even in enclosed spaces, airborne asbestos fiber levels from pipe handling operations are far below existing and proposed occupational standards.

All hand and mechanical unloading operations should be carried out in accordance with the manufacturer's installation manuals.

A/C Pipe Products: All
Size Range: All

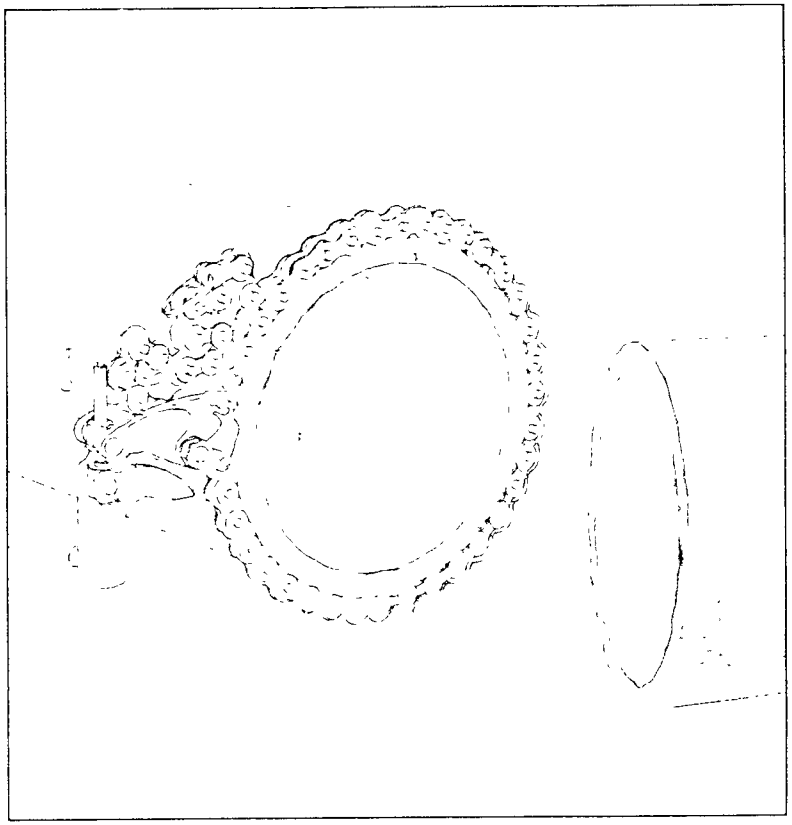
Cutting Carbide Blade Equipment



Blade cutters consist of a frame adjustable to the circumference of the pipe and a number of outboard, self-tracking rollers that align one or more carbide-tipped cutting blades. Blade cutters are typically hand-operated. Due to the relatively low mechanical input and clean cutting action, significant amounts of airborne asbestos dust are not produced.

A/C Pipe Products: All
Size Range: 3" through 24"

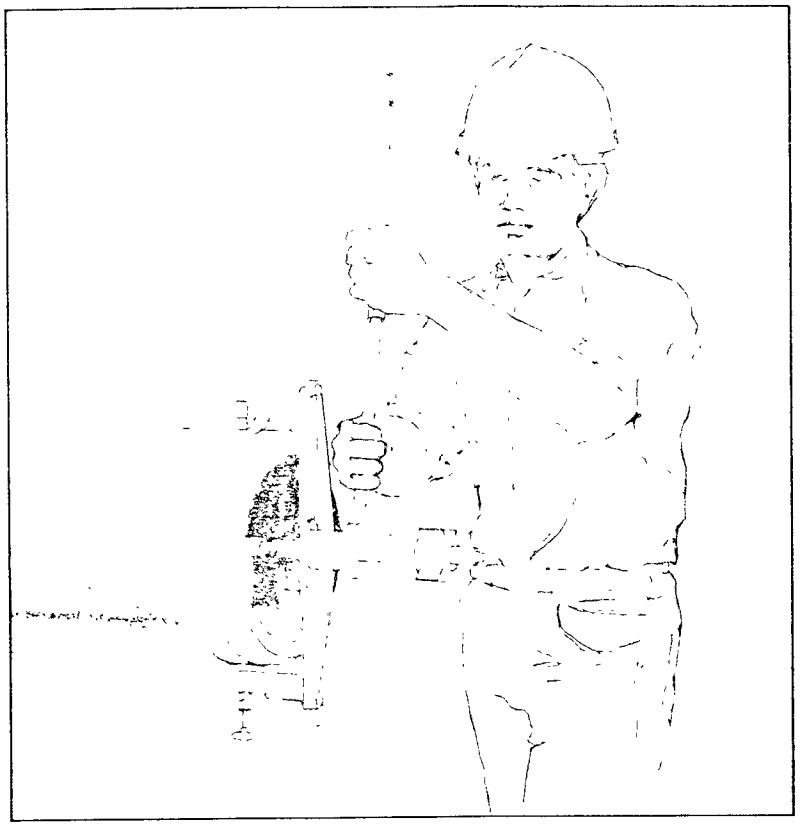
Cutting
Snap Cutting Equipment



Snap cutters or "squeeze and pop" equipment operates by means of cutting wheels mounted in a chain wrapped around the pipe barrel. Hydraulic pressure, applied by means of a remote electric or manually-operated pump, simultaneously squeezes the cutting wheels into the pipe wall until the cut is made.

A/C Pipe Products All
Size Range: Pressure Pipe—3" through 24"
Pressure, Gravity and Building Sewer; Storm Drain; Air, Electrical and Telephone Duct—3" through 36"

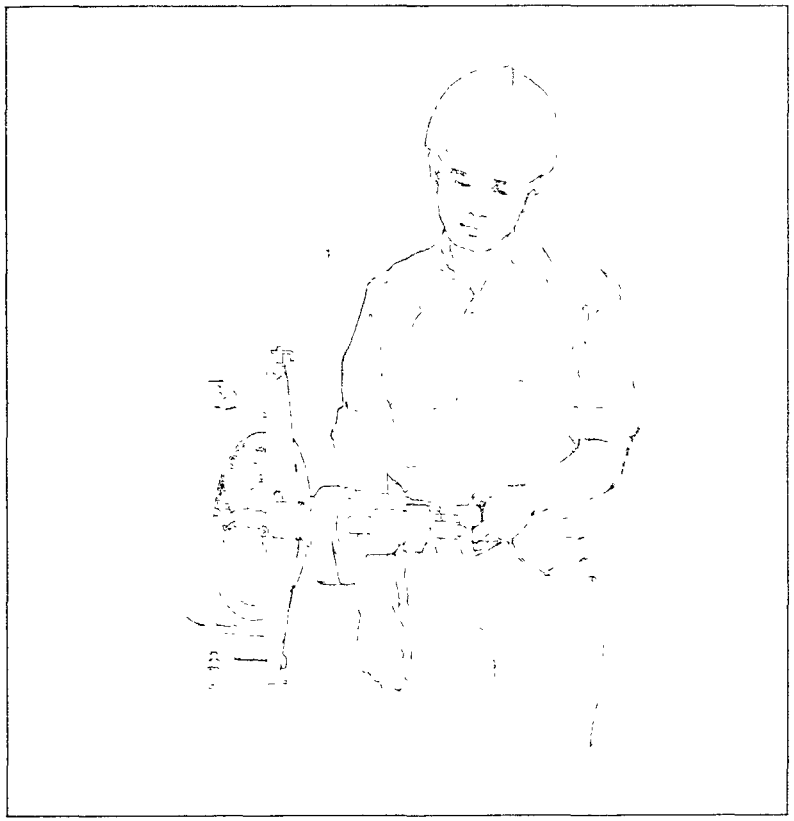
Machining
Field Lathe–Manual



Manual field lathes are designed to end-trim and re-machine rough pipe barrels to factory-machined end profiles. The lathe consists of an adjustable, self-aligning arbor inserted into the pipe bore (which acts as a mandrel upon which the turning handle operates), a screw-fed turning frame, carbide machining blades and manual (hand or ratchet) turning handles.

A/C Pipe Products: All
Size Range: All

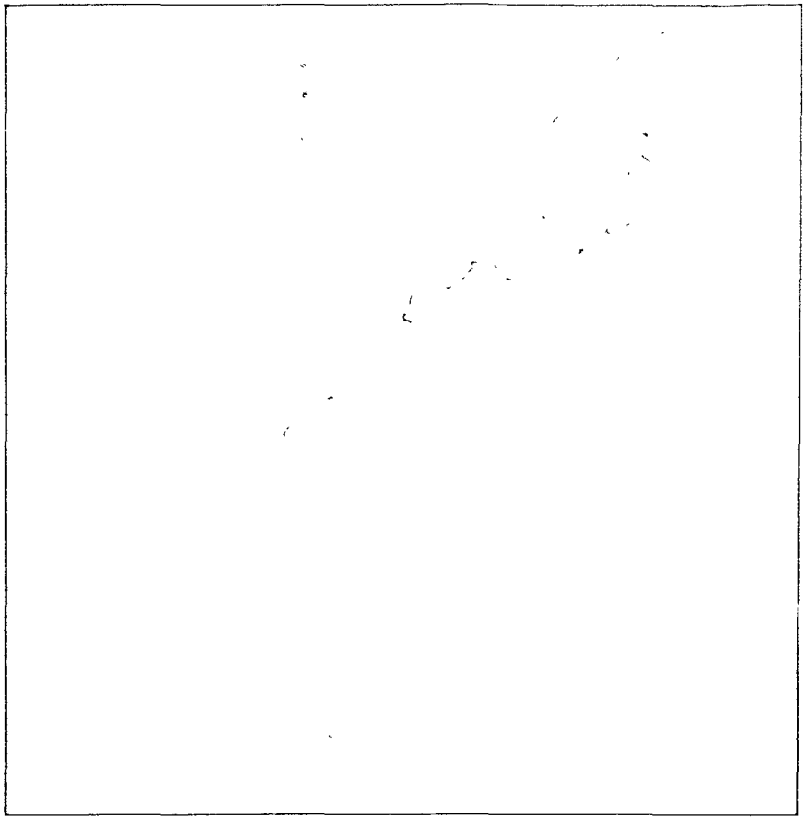
Machining
Field Lathe–Power



Power field lathes, like manual lathes, are designed to end trim and re-machine rough pipe barrels to factory-machined end profiles. The lathe consists of an adjustable, self-aligning arbor inserted into the pipe bore (which acts as a mandrel upon which the turning handle operates), a screw-fed turning frame, carbide machining blades and electric or pneumatic power drive.

A/C Pipe Products: All
Size Range: All

Machining
Rasp–Manual*

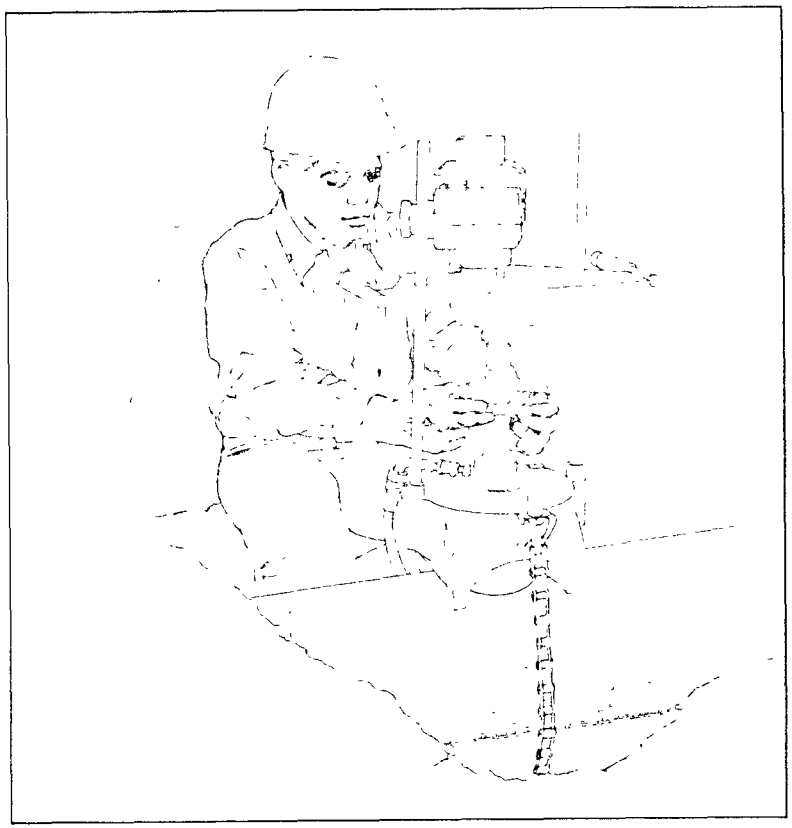


Short lengths of A/C pipe (MEE's & MOA's) can be cut for pipe closures, repairs and to locate fittings exactly. Field cut ends may be rebeveled with a coarse wood rasp to form a taper approximating the same profile as the factory-beveled end

A/C Pipe Products: All
Size Range: All

*Is assumed if not currently available. Recommended method for exposed ends

Hole Cutting
Shell Cutters



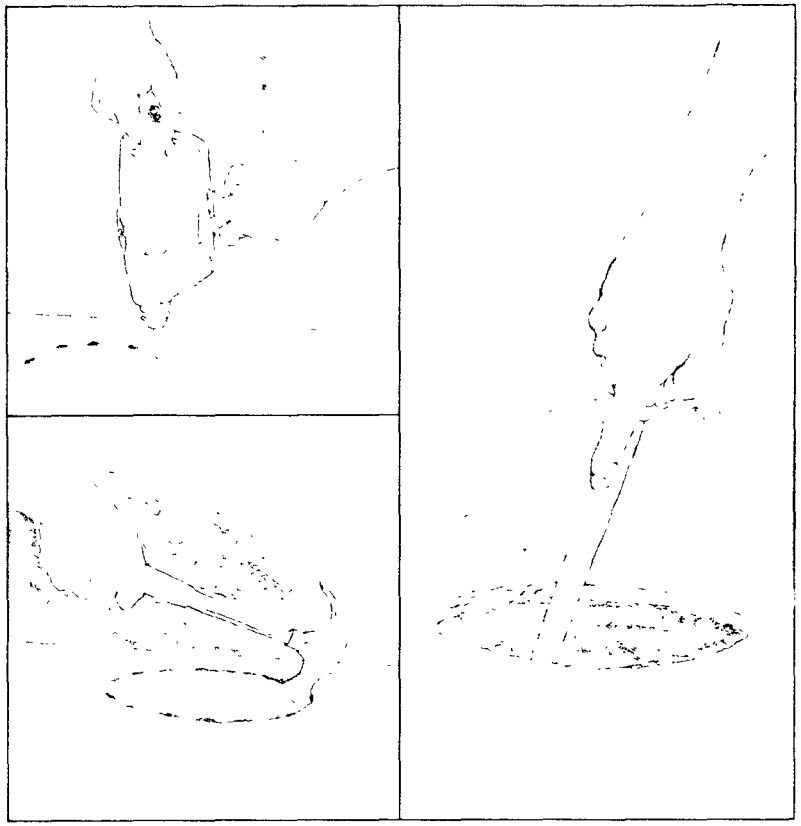
For field connections into A/C pipe, clean, even entry cuts may be accomplished by means of shell cutting equipment. Shell cutters consist of a hole cutter housing mounted on the pipe, a carbide or diamond-tipped hole cutter and a manual ratchet, pneumatic, electric or gasoline drive to power the cutting head.

When cutting holes in A/C pipe products, all dust and cuttings should be removed from the pipe or duct interior after the cutting operation. Removal may be accomplished by flushing with water, wet mopping or vacuuming prior to placing in service. DO NOT BLOW OUT WITH COMPRESSED AIR OR DRY SWEEP.

A/C Pipe Products: Pressure, Gravity and Building Sewer, Air Duct

Size Range: All

Hole Cutting
Drill and Rasp*



Field connections may be made with a heavy duty electric drill and rasp. Using a carbide-tipped drill, a series of closely-spaced holes are first drilled around the hole outline. The disc is knocked free with a hammer and the edges of the hole are dressed with a coarse wood rasp.

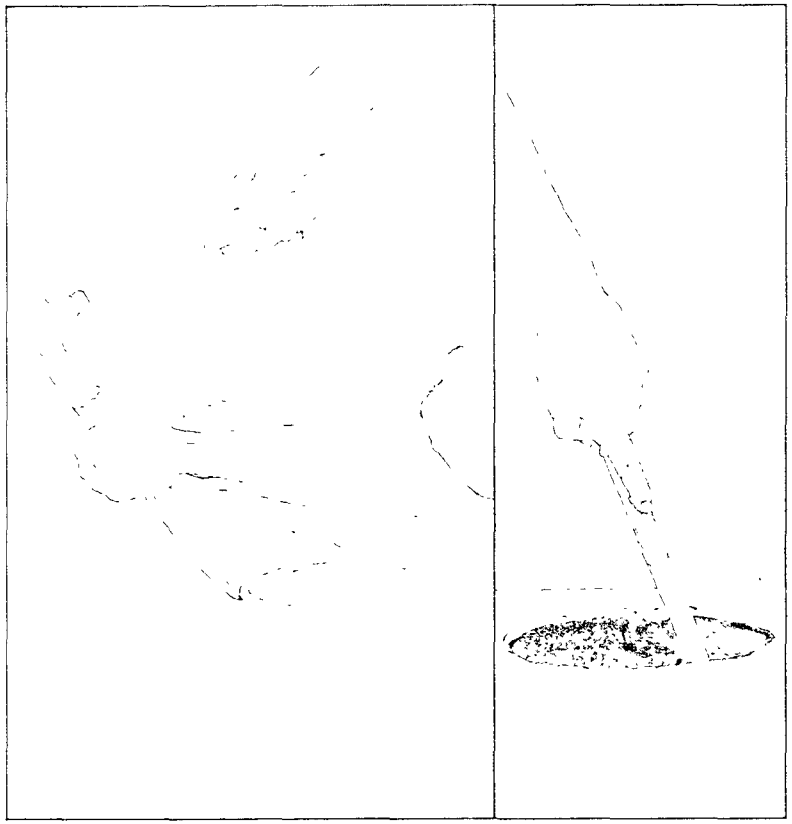
When cutting holes in A/C pipe products, all dust and cuttings should be removed from the pipe or duct interior after the cutting operation. Removal may be accomplished by flushing with water, wet mopping or vacuuming prior to placing in service. DO NOT BLOW OUT WITH COMPRESSED AIR OR DRY SWEEP.

A/C Pipe Products: Pressure, Gravity and Building Sewer; Air Duct

Size Range: All

*Exposure data not currently available. Recommendation based on exposure data for operations believed to be comparable.

Hole Cutting
Chisel and Rasp



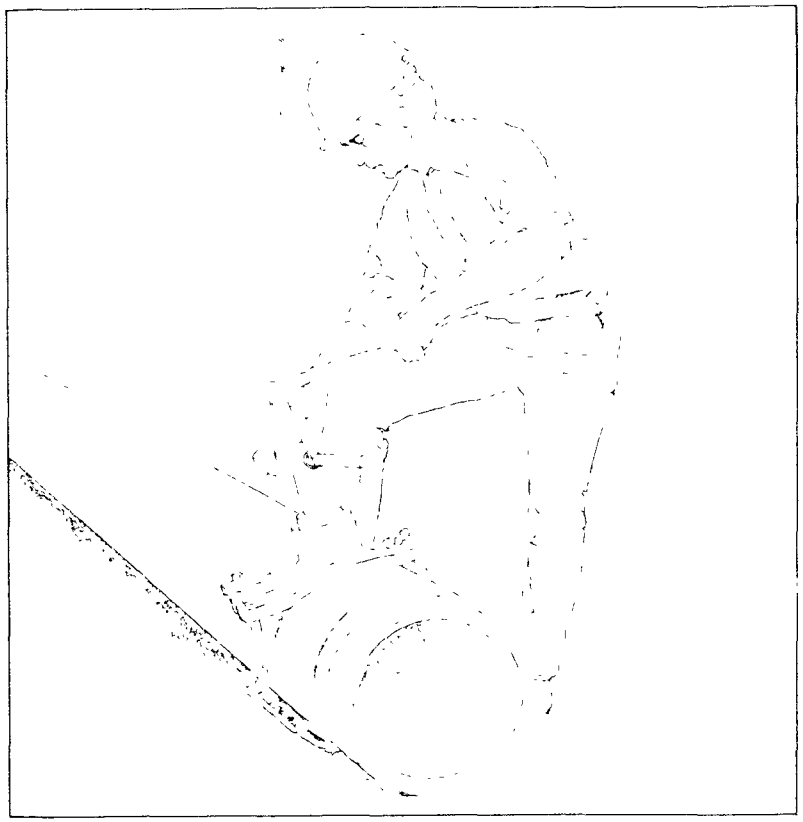
Holes may be cut into A/C pipe with a hammer and chisel. The edge of a plumber's wood chisel is used to cut completely around the hole outline, about a ¼" from the prescribed line. The operation is repeated and the cut deepened until through. The edges of the hole are then dressed with a coarse wood rasp.

When cutting holes in A/C pipe products, all dust and cuttings should be removed from the pipe or duct interior after the cutting operation. Removal may be accomplished by flushing with water, wet mopping or vacuuming prior to placing in service. DO NOT BLOW OUT WITH COMPRESSED AIR OR DRY SWEEP.

A/C Pipe Products: Pressure, Gravity and Building Sewer, Air Duct

Size Range: All

Tapping
Non-Pressure*



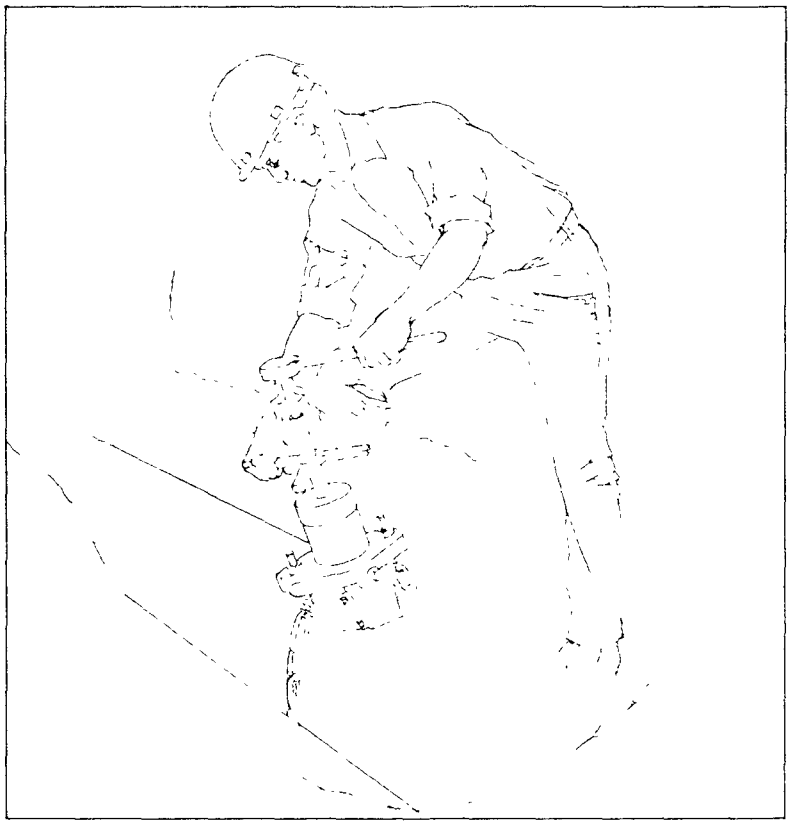
Non-pressure or "dry" tapping for service connections may be performed in or above the trench. The equipment is affixed to the pipe by means of a chain yoke. Separate drills and taps or a combination tool drills and taps the pipe wall. Corporation stops or other connections may then be affixed to the pipe.

To minimize (a) the fouling of valves, regulators, meters, etc. with chips and (b) unnecessary addition of asbestos to drinking water, all dust and cuttings should be removed from the pipe interior by flushing with water, wet mopping or vacuuming prior to placing in service. DO NOT BLOW OUT WITH COMPRESSED AIR OR DRY SWEEP.

A/C Pipe Products: Pressure Pipe

Size Range: All

Tapping Pressure*



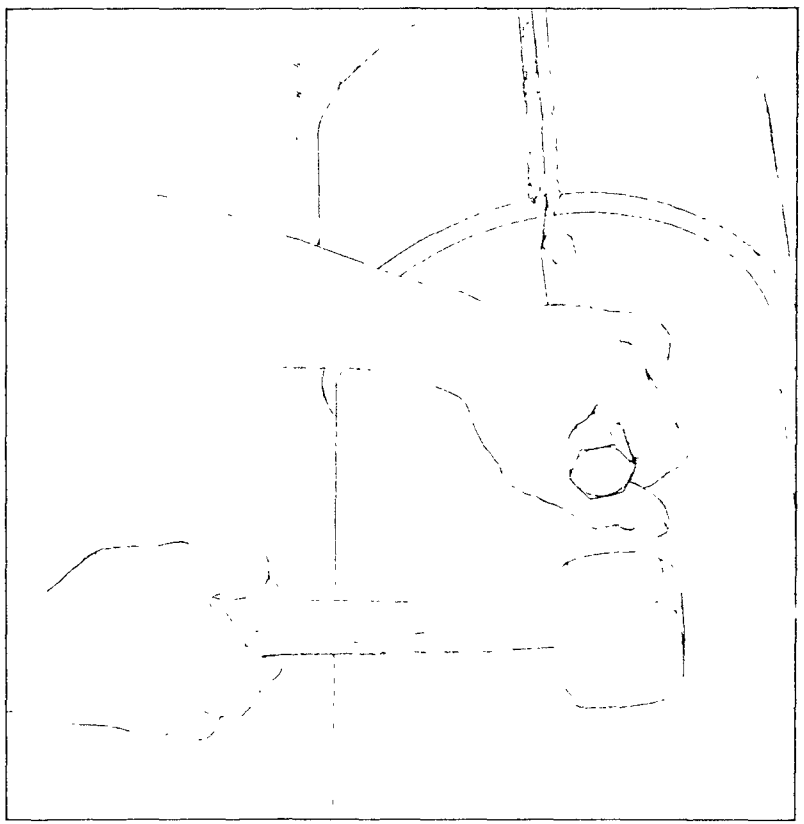
Pressure or "wet" tapping for service connections is performed in the trench while the pipe is under pressure. The equipment (manual or power driven) is affixed to the pipe by means of a chain yoke. A combination boring and inserting bar drills and taps the pipe wall and inserts a corporation stop or pipe plug. The pressure chamber, which protects against water leakage, also catches the asbestos-cement chips, so this is essentially a dust-free operation.

To minimize (a) the fouling of valves, regulators, meters, etc with chips and (b) unnecessary addition of asbestos to drinking water, provisions should be made for downstream flushing or use of tapping equipment with positive purge or "blow-off" features

A/C Pipe Products: Pressure Pipe
Size Range: All

*Exposure data not currently available. Recommendation based on exposure data for operations believed to be comparable.

Coupling Removal Hammer and Chisel*



Replacement of damaged pipe necessitates excavation, exposure and removal. Coupling removal may be accomplished by gradually splitting the coupling lengthwise, using a chisel and ball-peen hammer. After the top of the coupling has been split, a crowbar or similar tool is used as a lever to split the bottom of the coupling.

A/C Pipe Products: All pipe with A/C couplings
Size Range: All

*Exposure data not currently available. Recommendation based on exposure data for operations believed to be comparable.

Housekeeping and Waste Disposal

Housekeeping is an important part of any safe construction operation. It is even more essential when airborne dust created by the *lack* of good housekeeping has the potential for harm to employees or others.

EQUIPMENT: All external surfaces of equipment should be maintained free of dust accumulations that might, if dispersed, create asbestos fiber concentrations above permissible exposure limits.

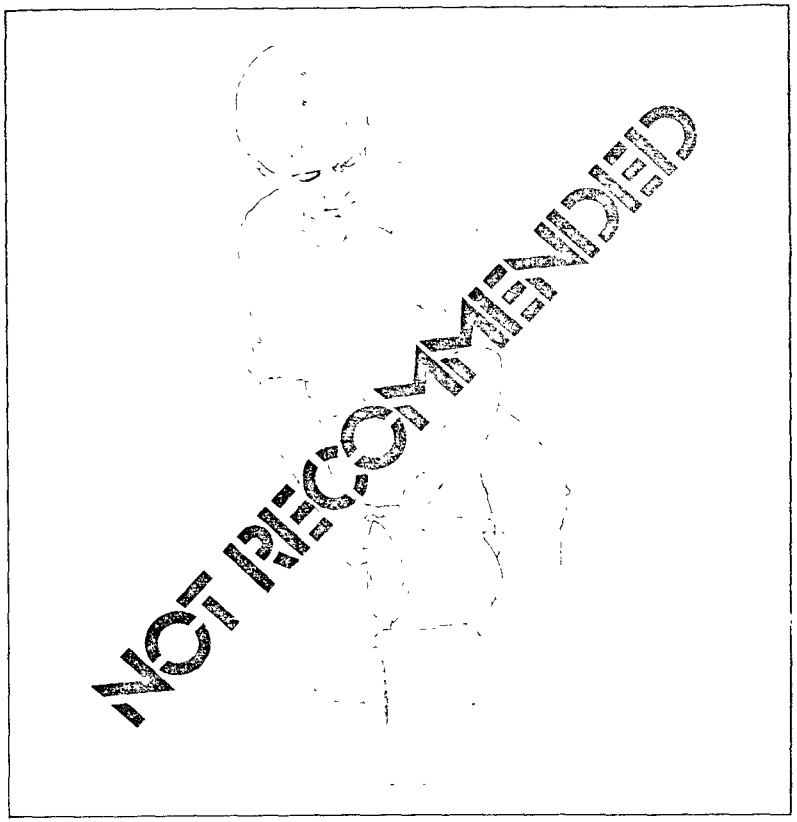
WASTE DISPOSAL: Asbestos-cement chips and cuttings from the field operations described in this booklet should be disposed of in a manner that will not contribute airborne asbestos dust to the atmosphere. Where cutting and machining operations are performed at the construction site, the chips should be placed in the trench and buried with the pipeline.

Where operations are performed at a central location such as a contractor's or distributor's yard on a more or less continuing basis, the chips and cuttings may be collected and mixed wet with cement and made into non-friable forms. These forms may be used in the trench as supports for cast iron fittings and valves, as appropriate.

Otherwise, chips and cuttings should be collected in sealed bags or closed containers impermeable to asbestos dust. *Loose material should never be dry swept.* When vacuum equipment is available, it should be used. Water or other dust suppressants should be applied in those circumstances where sweeping is unavoidable. DO NOT BLOW WASTE MATERIAL WITH COMPRESSED AIR.

No visible emissions to the atmosphere may result from the collection, processing, packaging, transporting or deposition of any asbestos-containing material. Wastes should be disposed at a site operated in accordance with the requirements or applicable national, state or local laws.

Cutting Abrasive Disc–Dry



Power driven saws with abrasive discs (masonry blades) should not be used for dry cutting or beveling asbestos-cement pipe. Abrasive disc cutters produce concentrations of airborne asbestos dust which exceed OSHA permissible levels.* THIS WORK PRACTICE IS THEREFORE SPECIFICALLY NOT RECOMMENDED

A-C Pipe Products: All
Size Range: All

*Data not currently available regarding effect of local exhaust ventilation dust collection systems on concentrations of asbestos fibers encountered.

A/C Pipe Producers Association

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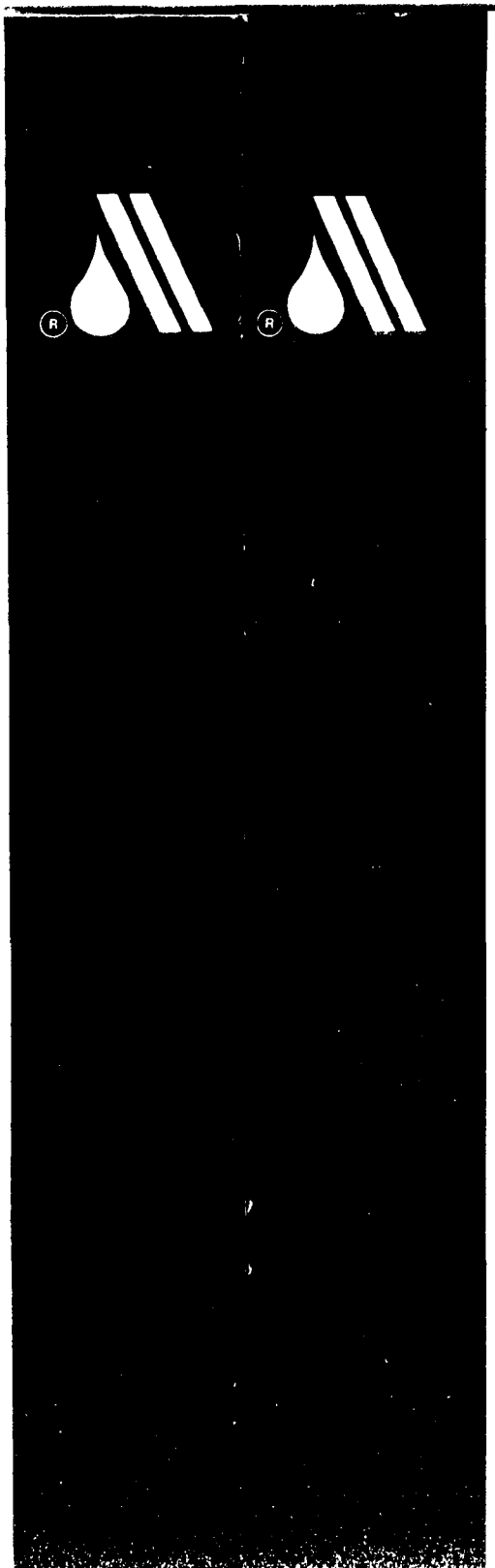
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AWWA No M16

Work Practices for Asbestos-Cement Pipe

AMERICAN WATER WORKS ASSOCIATION

MANUAL OF WATER SUPPLY PRACTICES

1P-10M-6/78-30016

Work Practices for Asbestos-Cement Pipe Manual



American Water Works Association
6666 W. Quincy Ave., Denver, Colorado 80235

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Printed in US

Committee Recognition

The Committee* on Use of Asbestos in Water Utility Construction,
Jeptha A. Wade, Jr., *Chairman*
Ann Smith, *Subcommittee Chairman,*
that reviewed and approved this manual had the following personnel at the time of approval:

Robert W. Greaves
East St. Louis & Interurban Water Co.
East St. Louis, IL

Joseph E. Jackson
Assn of Asbestos Cement Pipe Producers
Washington, D.C.

Harold E. Kerkhoff
Gwinnett County Water Auth.
Lawrenceville, GA.

Wm. S. Kowalski, *Vice-Chairman*
Township of Cedar Grove
Cedar Grove, NJ.

H. L. Olson, *Secretary*
Johns-Manville Corp.
Denver, CO.

James R. Rawlins
Pilot-Wheeler Mfg. Co.
Torrance, CA

Ann Smith, *Subcommittee Chairman*
Texas Water Utility Assoc.
Garland, TX.

Thomas A. Switalski
Certainteed Products Corp.
Valley Forge, PA.

Jeptha A. Wade, *Chairman*
California Water Service Co.
San Jose, CA.

Clarke Cooper (MD), Advisor
Equitable Environmental Health, Inc.
Berkeley, CA.

*All but C. Cooper members AWWA

Acknowledgment

A/C Pipe Producers Assn. ("ACPPA") prepared, published, and copyrighted a pamphlet in 1977, "Recommended Work Practices for A/C Pipe," which formed the basis for this manual. AWWA received ACPPA permission to reproduce the pamphlet as part of AWWA Manual 16, "Work Practices for Asbestos-Cement Pipe."

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Foreword

The Occupational Safety and Health Act in the US and similar laws in Canada and other countries were enacted to ensure so far as possible every worker a safe and healthful work place. This legislation is far reaching. It covers millions of employees and nearly every employer, including those involved in utility duct and pipeline construction.

In keeping with the spirit and intent of these laws, this committee has reviewed information regarding the potential hazards of exposure to airborne asbestos and the means of reducing such potential hazards through good work practices.

This manual is about good practices. The recommendations that follow are the result of field testing and were developed through study.[1 1a, 2] They are intended as general guides to achieve safe and clean job-site conditions when working with asbestos cement (A-C) pipe products. Since field conditions will vary, adherence to these work practices will not guarantee compliance with national, state, or local regulations. Questions relating to compliance should be directed to appropriate regulatory agencies.

The committee believes this report will be helpful to engineers, utility managers, superintendents, contractors, foremen, and laying crews in understanding and explaining established procedures for the safe handling of A-C pipe products.

Asbestos and health. Prolonged or heavy exposure to airborne asbestos fiber has been identified as a possible health hazard. Very few things to which man is exposed are "zero risks," but as for the automobile, electricity, and x-rays, there are non-harmful ways to use potentially harmful things.

Experience has shown that minimizing exposure to airborne asbestos dust is the only effective method of preventing asbestos-related diseases. Recommended work practices are the best insurance of providing exposure safeguards for employer and employee.

Generally, A-C pipe products contain less than 20 per cent asbestos. The asbestos fibers are not free but encapsulated or "locked-in" the cement binder like reinforcing rods in concrete. The distinction between "free" and "bound" asbestos is extremely important. First it determines the probability of fiber release, which in turn directly relates to the probability of risk. It explains why A-C pipe is a non-harmful use of asbestos.

Many studies have been made to establish a link between asbestos ingested with potable water and cancer. All such studies have proved negative. The USEPA and the State of Connecticut recently reported on an epidemiological study conducted in that state to find a relationship between the use of A-C pipe and cancer. It was reported that[3]

> The preliminary findings of the epidemiology study did not show any excess in cancer incidence for stomach, colon, or rectum in Connecticut townships during 1935-1973 that could be related to the use of asbestos-cement pipe for drinking water.

A select study group sponsored by the AWWA Research Fdn. reported[4]

No firm evidence shows that the proper use of asbestos-cement pipe poses a hazard to health by reason of ingestion of asbestos fibers. Calculations comparing the probable ingestion exposure in occupational groups to that likely to occur as a result of ingestion of potable water from asbestos-cement pipe systems suggest that the probability of risk to health from the use of such systems is small—approaching zero.

Summary of OSHA asbestos standard. The Occupational Safety and Health Act was signed into law on Dec. 29, 1970, and became effective on Apr. 28, 1971. On Dec. 7, 1971, the secretary of labor issued a temporary standard for exposure to asbestos dust. As required by the act, a permanent standard for asbestos exposure was promulgated six months later.

Under the current standard, it is the employer's responsibility to ensure that exposure of employees to airborne concentrations of asbestos fibers does not exceed the following "permissible exposure levels":

1. Time weighted average (TWA) is the permissible exposure level to airborne concentrations of asbestos fibers longer than 5 μm on an 8-hr time-weighted average, as determined on the basis of a 40-hr work week and by the method prescribed in "Standard for Exposure to Asbestos Dust" promulgated by OSHA, June 7, 1972. The present TWA permissible exposure level is 2 fibers/cm^3.
2. Ceiling concentration is the maximum level of exposure to airborne concentrations of asbestos fibers longer than 5 μm as determined for a period of up to 15 min by the method prescribed in "Occupational Exposure to Asbestos" published by OSHA. The present permissible ceiling concentrations is 10 fibers/cm^3.

In October 1975 OSHA proposed a revision to the existing standard, which would reduce the 8-hr time-weighted average exposure to 0.5 fibers per cubic centimeter. In its notice, OSHA stated that a separate "construction industry standard" would be issued to cover workers who handle asbestos-containing products.

The work practices recommended in this manual are based on data for "ceiling dust concentrations" representing short periods of maximum exposure. (Field-cutting and machining operations involving A-C pipe are normally infrequent and of short duration.) Using these recommended work practices, it is improbable that field personnel would be exposed in a typical working day to levels exceeding the 8-hr time-weighted average.

References

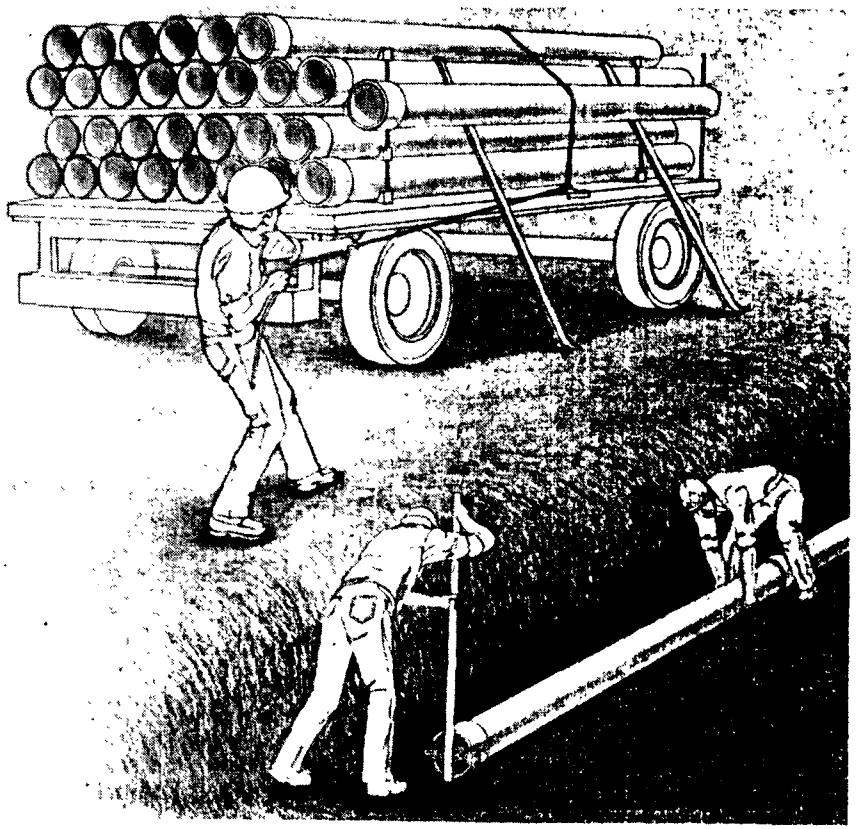
1. Dust Exposures During the Cutting and Machining of Asbestos-Cement Pipe. Report prepared by Equitable Envir. Health, Inc. (Mar. 1977).

1a. Additional studies (Dec. 15, 1977).

2. News from TAC. TAC Construction Mtls., Ltd. (Report of a survey from the Occupational Hygiene Unit of North of England Indl. Health Svce.) (Feb. 1977).
3. Exposure to Asbestos Fibers in Water Distribution Systems. AWWA Ann. Conf., Anaheim, Calif. (May 1977).
4. A Study of the Problem of Asbestos in Water. *Jour. AWWA*, 66:9 (Sep. 1974, pt. 2).

Section 1
Recommended Work Practices

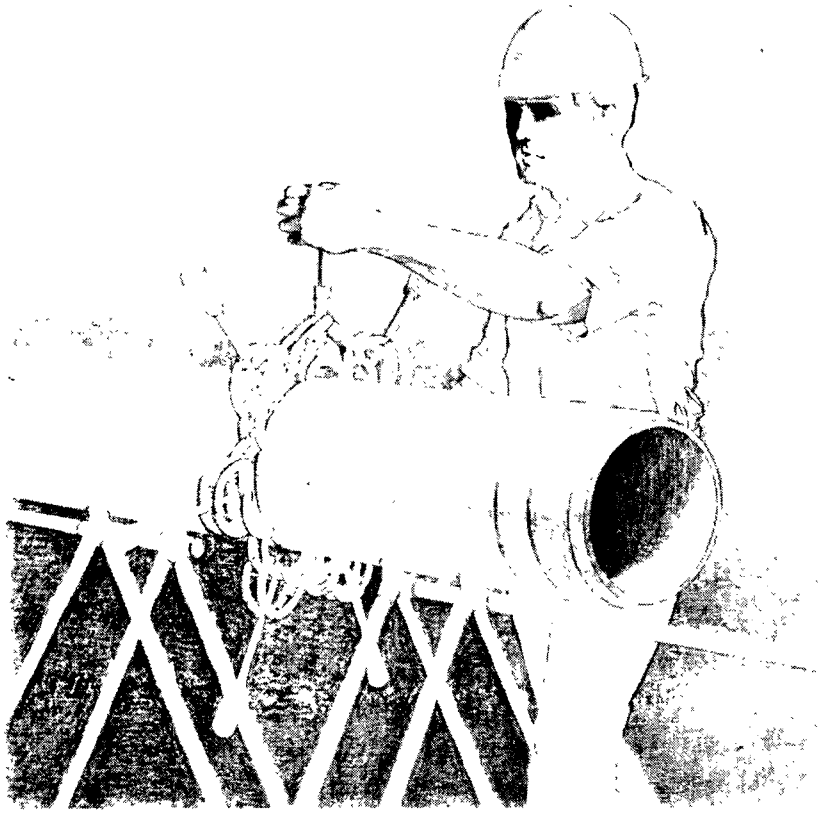
Shipping, Receiving, Handling, Assembly and Disassembly of A-C Pipe in All Size Ranges.



A-C pipe is shipped clean from the factory and carefully loaded using methods acceptable to the carrier. Loading, unloading, stringing out, and assembling A-C pipe are essentially dust-free operations. Even in enclosed spaces, airborne asbestos fiber levels from pipe-handling operations are far below existing and proposed occupational standards.

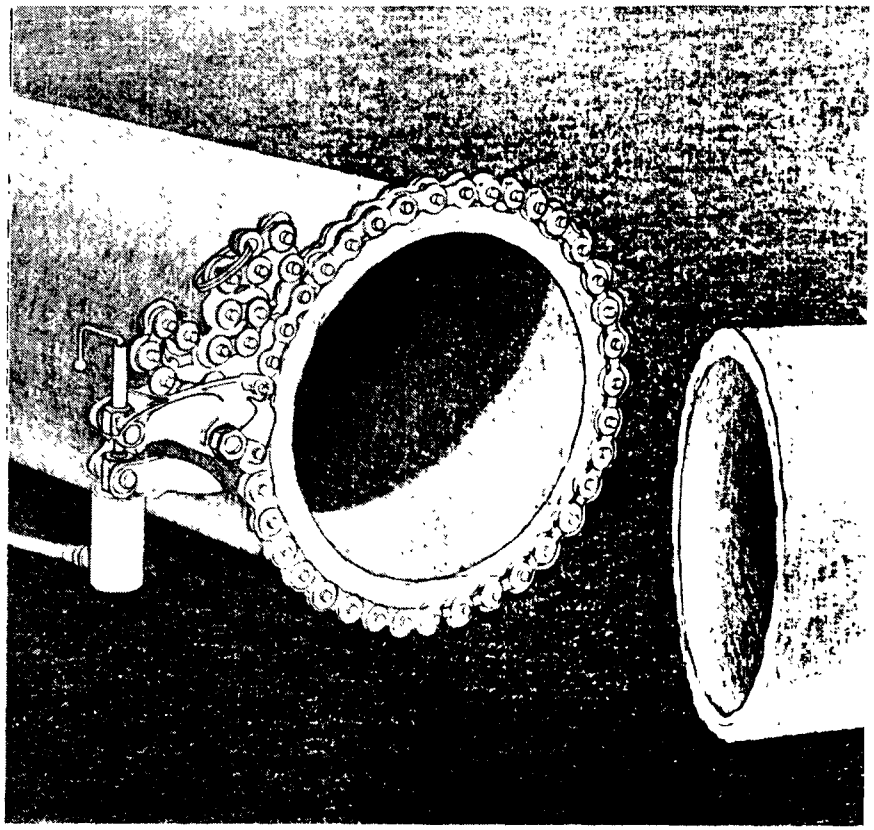
All hand- and mechanical-unloading operations should be carried out in accordance with the manufacturer's installation manuals.

Cutting of all A-C Pipe, in Sizes From 3 in. Through 24 in. Using Carbide-Tipped Blades.



Blade cutters consist of a frame adjustable to the circumference of the pipe and a number of self-tracking rollers that align one or more carbide-tipped cutting blades. Blade cutters are typically hand-operated. Because of the relatively low mechanical input and clean cutting action, significant amounts of airborne asbestos dust are not produced. Waste material is disposed of in accordance with "Housekeeping and Waste Disposal," Section 3.

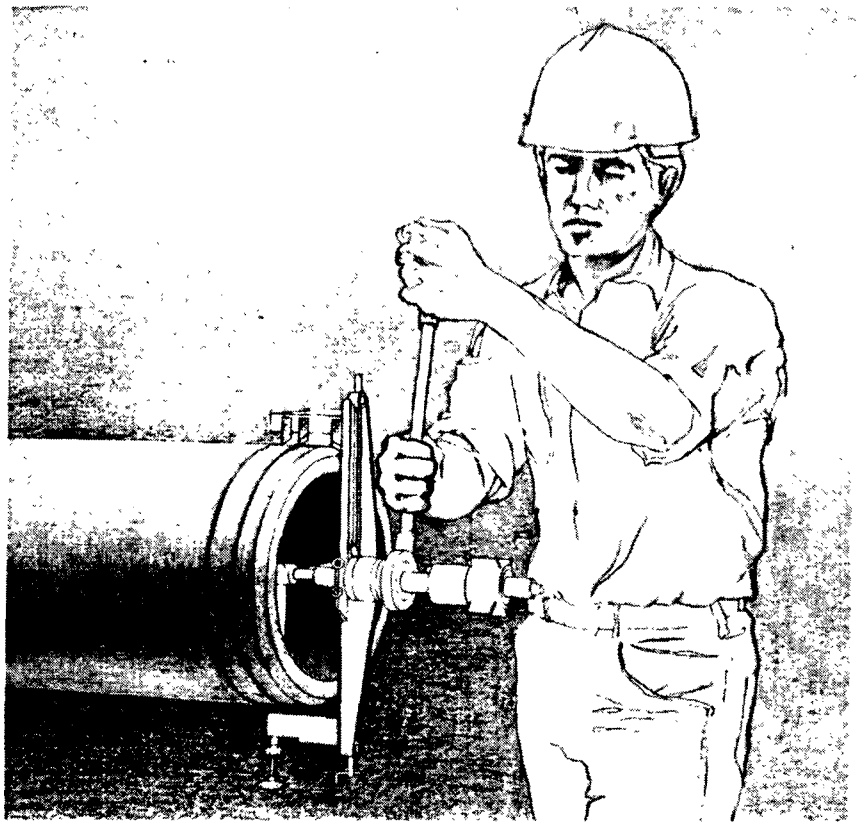
Cutting of all A-C Pipe in Size Ranges 3 in. Through 24 in.* Using Snap Cutters.



Snap cutters ("squeeze-and-pop" equipment) operate by means of cutting wheels mounted in a chain wrapper around the pipe barrel. Hydraulic pressure applied by means of a remote electrically, pneumatically, or manually operated pump, squeezes the cutting wheels into the pipe wall until the cut is made. Waste material is disposed of in conformance with "Housekeeping and Waste Disposal," Section 3.

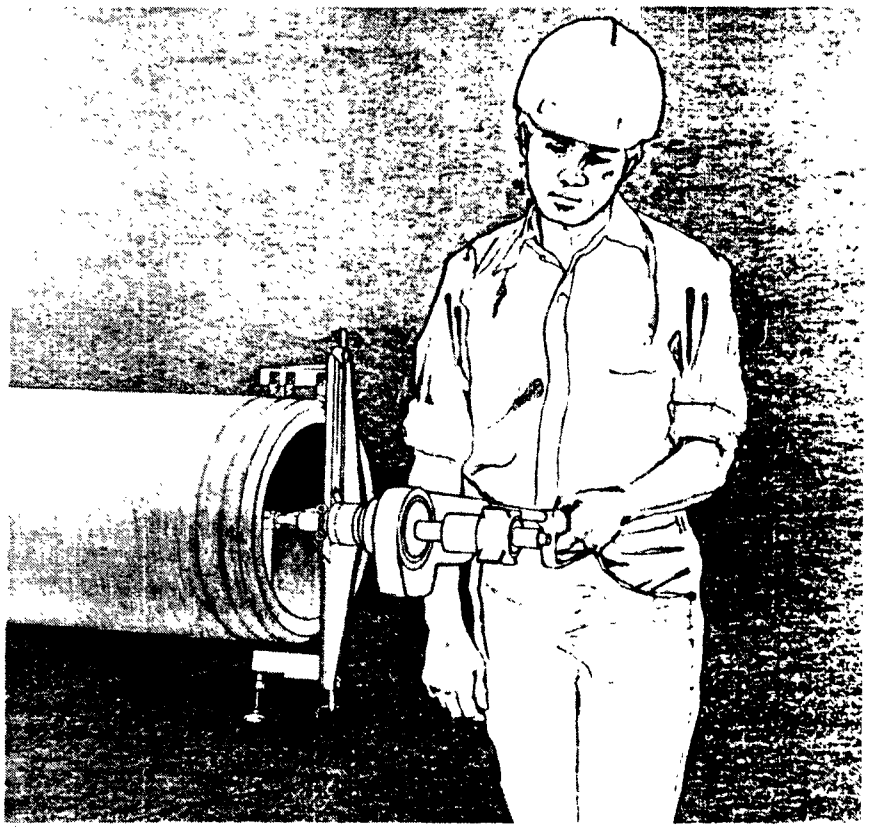
* Applicable also to pressure, gravity and building sewer; storm drain; air, electrical, and telephone duct in size 3 in. through 36 in.

Machining of all A-C Pipe in all Sizes Using Manual Field Lathe.



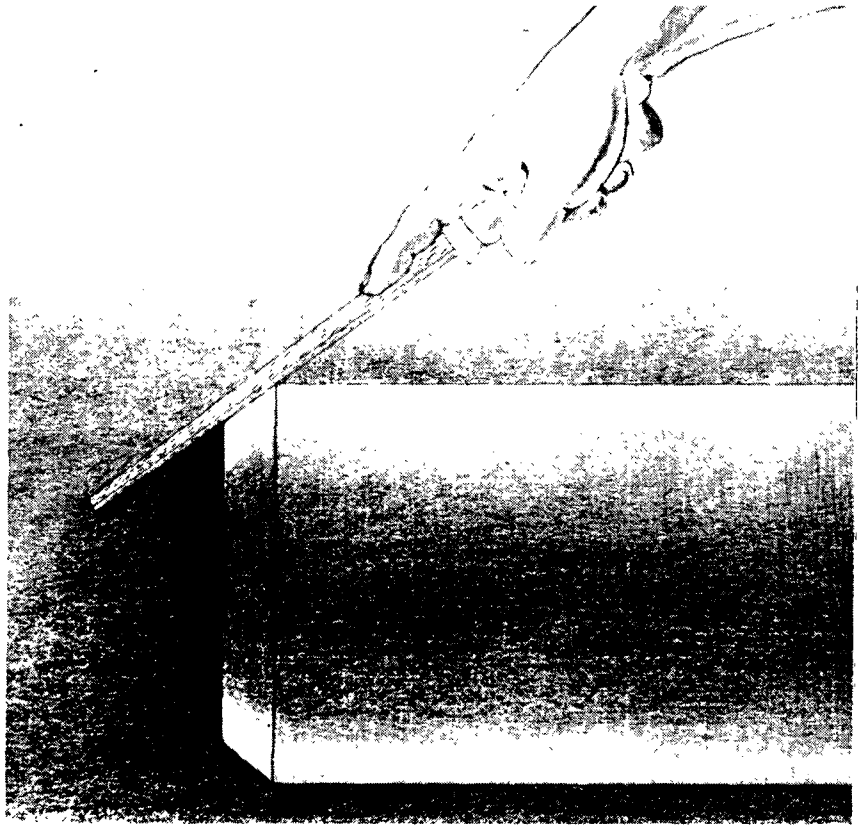
Manual field lathes are designed to end-trim and remachine rough pipe barrels to factory-machined end profiles. The lathe consists of an adjustable, self-aligning arbor inserted into the pipe bore (which acts as a mandrel upon which the turning handle operates), a screw-fed turning frame, carbide machining blades, and manual (hand or ratchet) turning handles. Waste material is disposed of in accordance with "Housekeeping and Waste Disposal," Section 3.

Machining of all A-C Pipe in all Sizes Using Power-Drive Field Lathe.



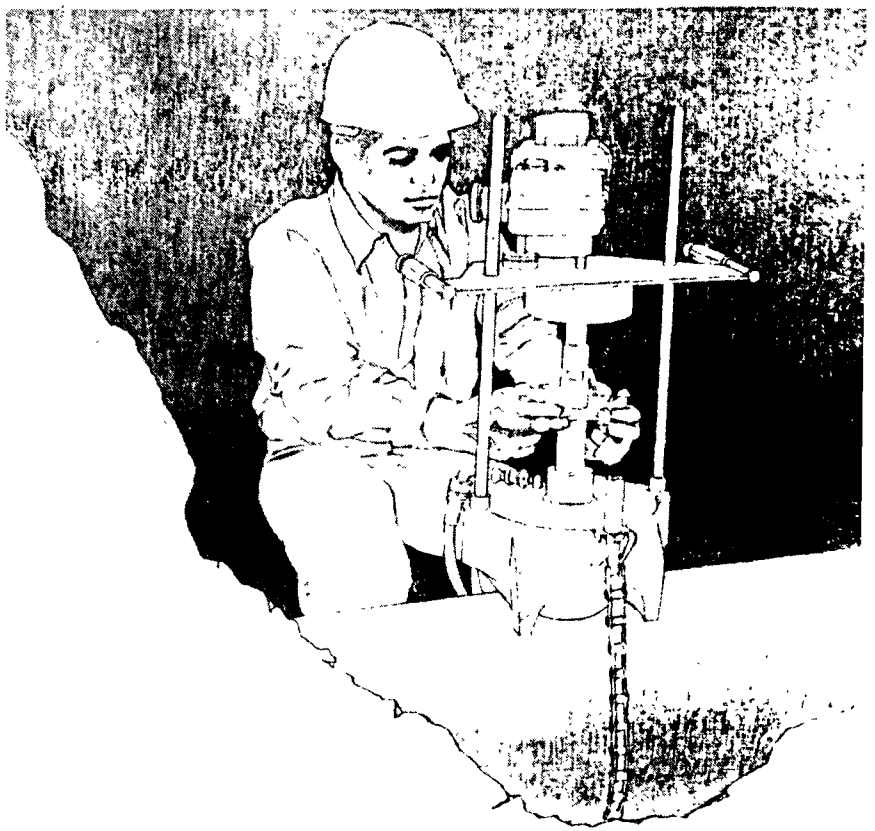
Power field lathes, like manual lathes, are designed to end-trim and remachin rough pipe barrels to factory-machined end profiles. The lathe consists of a adjustable, self-aligning arbor inserted into the pipe bore (which acts as a man drel upon which the turning handle operates), a screw-fed turning frame, carbid machining blades and electric- or pneumatic-power drive. Waste material is dis posed of in accordance with "Housekeeping and Waste Disposal," Section 3

Machining of all A-C Pipe in all Sizes Using A Manual Rasp.



Short lengths of A-C pipe, machined-end exclusively (MEE) and machined overall (MOA), can be cut to make closures and repairs and to locate fittings exactly. Field-cut ends may be rebeveled with a coarse wood rasp to form a taper approximating the profile of the factory-beveled end. Waste material is disposed of in accordance with "Housekeeping and Waste Disposal," Section 3.

Hole Cutting in A-C Pipe* of all Sizes Using Shell Cutters.

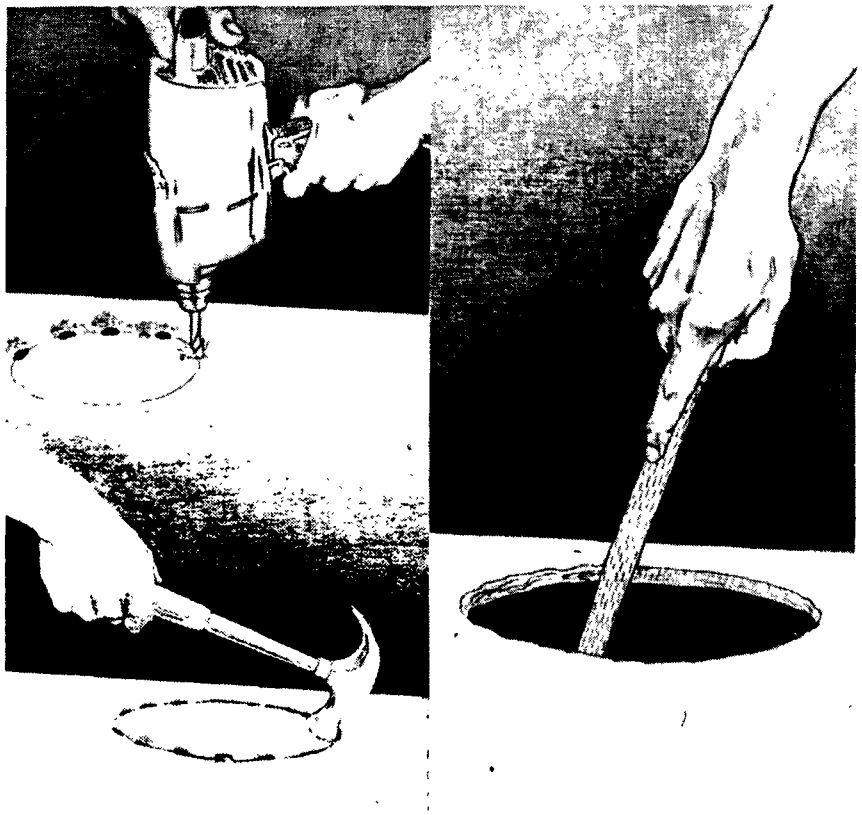


For field connections into A-C pipe, clean, even entry cuts may be accomplished by means of shell-cutting equipment. Shell cutters consist of a hole cutter housing mounted on the pipe, a carbide- or diamond-tipped hole cutter and a manual ratchet or a pneumatic, electrical or gasoline drive to power the cutting head.

When cutting holes in A-C pipe products, all dust and cuttings should be removed from the pipe or duct interior after the cutting operation. Removal may be accomplished by flushing with water, wet mopping, or vacuuming prior to placing in service. *Do not blow out with compressed air, or dry sweep.* Waste material is disposed of in accordance with "Housekeeping and Waste Disposal," Section 3.

* Technique applicable for pressure-, gravity-, and building-sewer pipe as well as air ducting

Hole Cutting in A-C Pipe* of all Sizes Using Drill and Rasp.

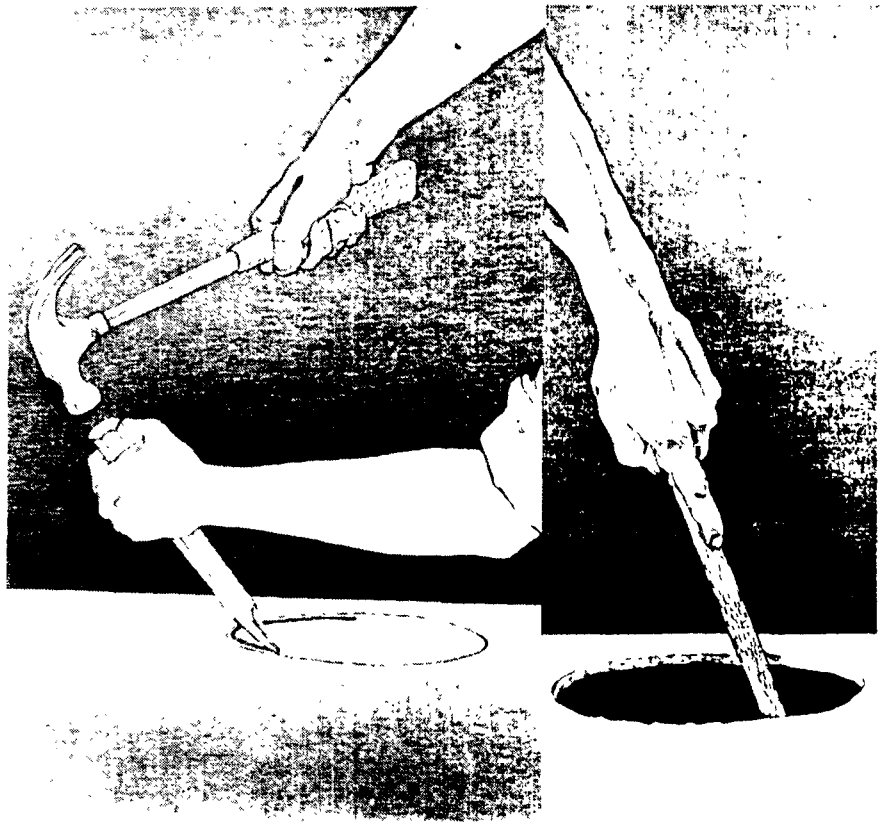


Field connections may be made with a heavy-duty electrical drill and rasp. Using a carbide-tipped drill, a series of closely spaced holes first are drilled around the hole outline. The disc is knocked free with a hammer and the edges of the hole are dressed with a coarse wood rasp.

When cutting holes in A-C pipe products, all dust and cuttings should be removed from the pipe or duct interior after the cutting operation. Removal may be accomplished by flushing with water, wet mopping or vacuuming prior to placing in service. *Do not blow out with compressed air, or dry sweep.* Waste material is disposed of in accordance with "Housekeeping and Waste Disposal," Section 3.

*Applicable also to pressure, gravity and building sewer and air duct

Hole Cutting in A-C Pipe* in all Sizes Using Chisel and Rasp.

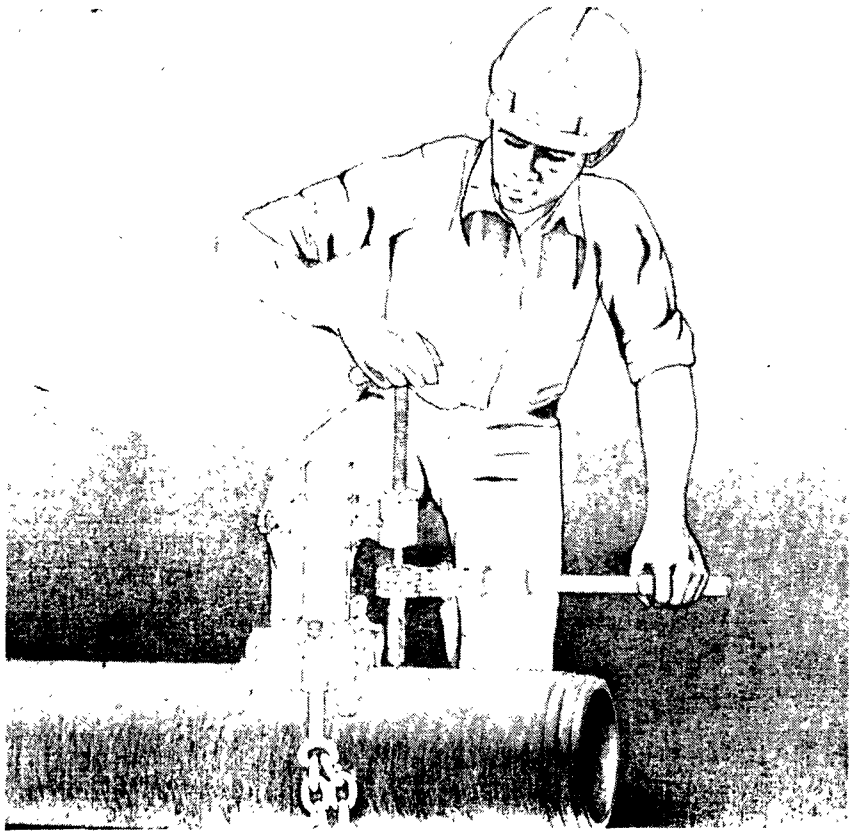


Holes may be cut into A-C pipe with a hammer and chisel. The edge of a plumber's wood chisel is used to cut completely around the hole outline, about ¼ in. (7 mm) from the prescribed line. The operation is repeated and the cut deepened until through. The edges of the hole are then dressed with a coarse wood rasp.

When cutting holes in A-C pipe products, all dust and cuttings should be removed from the pipe or duct interior after the cutting operation. Removal may be accomplished by flushing with water, wet mopping or vacuuming prior to placing in service. *Do not blow out with compressed air, or dry sweep.* Waste material is disposed of in accordance with "Housekeeping and Waste Disposal," Section 3.

*Applicable also to pressure, gravity and building sewer and air duct

"Dry" Tapping of A-C Pressure Pipe in all Sizes.



Nonpressure or "dry" tapping for service connections may be performed in or out of the trench. The equipment is affixed to the pipe by means of a chain yoke. Separate drills and taps or a combination tool is used to drill and tap the pipe wall. Corporation stops or other connections may then be affixed to the pipe.

To minimize (1) the fouling of valves, regulators, meters, and other equipment with chips and (2) the unnecessary addition of asbestos to drinking water, all dust and cuttings should be removed from the pipe's interior by flushing with water, wet mopping, or vacuuming prior to placing the pipe in service. *Do not blow out with compressed air, or dry sweep.* Waste material is disposed of in accordance with "Housekeeping and Waste Disposal," Section 3.

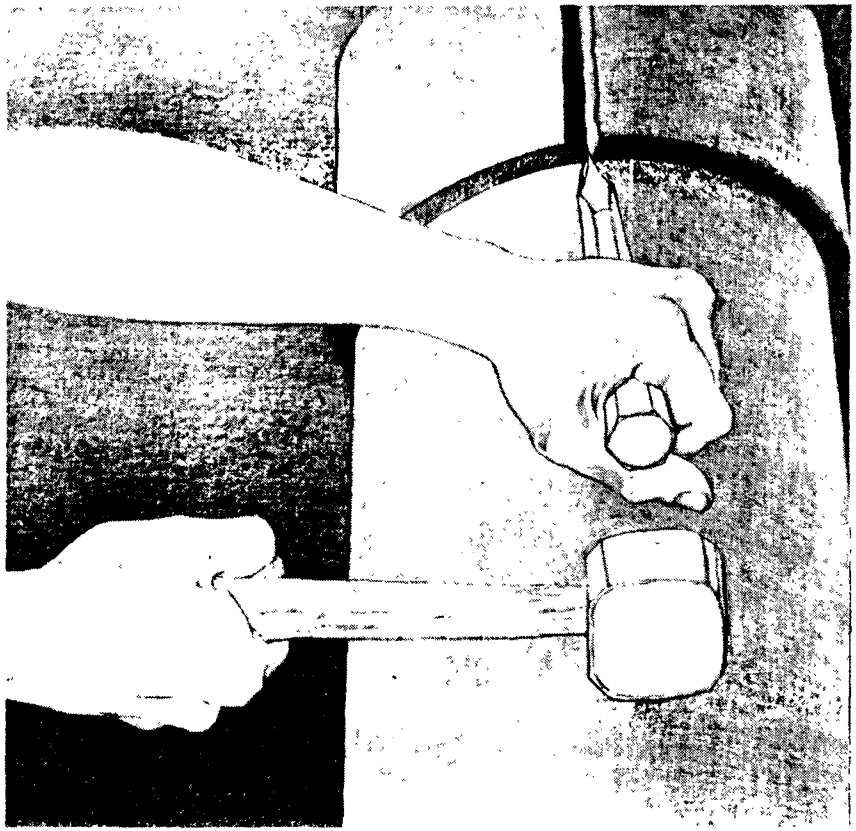
"Wet" Tapping of A-C Pressure Pipe in all Sizes.



Pressure or "wet" tapping for service connections is performed in the trench while the pipe is under pressure. The equipment (manual or power driven) is affixed to the pipe by means of a chain yoke. A combination boring-and-inserting bar drills and taps the pipe wall and inserts a corporation stop or pipe plug. The pressure chamber, which protects against water leakage, also catches the asbestos-cement chips, so this is essentially a dust-free operation.

To minimize (1) the fouling of valves, regulators, meters, and other equipment with chips and (2) unnecessary addition of asbestos to drinking water, provisions should be made for downstream flushing or use of tapping equipment with positive purge or "blow-off" features. Waste material is disposed of in accordance with "Housekeeping and Waste Disposal," Section 3.

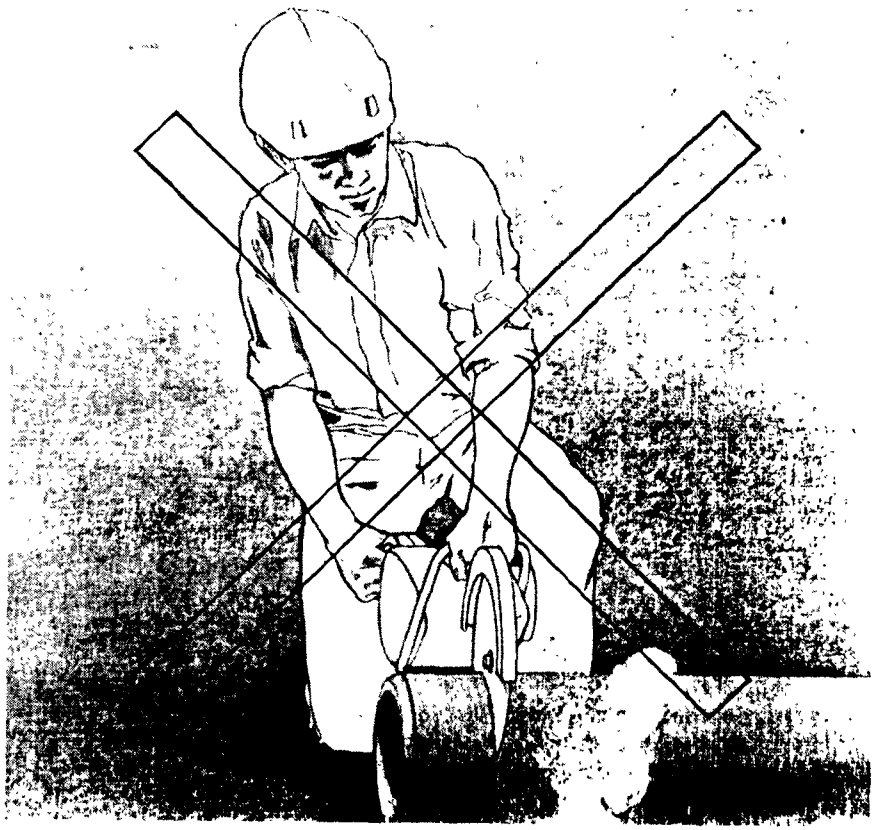
A-C Coupling Removal From all Pipe in all Sizes Using Hammer and Chisel.



Replacement of damaged pipe necessitates excavation, exposure and removal. A-C coupling removal may be accomplished by gradually splitting the coupling lengthwise using a chisel and hammer. After the top of the coupling has been split, a crowbar or similar tool is used as a lever to split the bottom of the coupling. Waste material is disposed of in accordance with "Housekeeping and Waste Disposal," Section 3.

Section 2
Non-Recommended Work Practices

Cutting Any A-C Pipe Using Abrasive Disc-Dry Tools.



Power-driven saws with abrasive discs (masonry blades) should not be used for dry cutting or beveling A-C pipe. Abrasive disc cutters produce concentrations of airborne dust that exceed OSHA permissible levels. *This work practice is therefore specifically not recommended.*

Machining Any A-C Pipe Using Right-Angle Sanders or Other Dry High-Speed Abrasive Tools.



Power-driven abrasive-disc sanders should not be used for shaping or beveling A-C pipe. Abrasive discs produce concentrations of airborne dust that exceed OSHA permissible levels. *This work practice is therefore specifically not recommended.*

Section 3
Housekeeping and Waste Disposal

Housekeeping is an important part of any safe construction operation. It is even more essential when airborne dust created by the lack of good housekeeping has the potential for harm to employees or others.

Care of Equipment

All external surfaces of equipment should be maintained free of A-C pipe dust accumulations that might, if dispersed, create asbestos-fiber concentrations above permissible exposure limits.

Waste Disposal.

Waste disposal at construction site. A-C chips and cuttings from the field operations described here should be disposed of in a manner that will not contribute airborne asbestos dust to the atmosphere. Where cutting and machining operations are performed at the construction site, the chips should be placed in the trench, in such a manner as to avoid raising dust and should be buried with the pipeline.

Waste disposal at central or stock location. Where operations are performed at a central location such as a contractor's or corporation's yard on a more or less continuing basis, the chips and cuttings may be collected and mixed wet with cement and made into nonfriable forms. These forms may be used in the trench as supports for cast-iron fittings and valves, as appropriate.

Otherwise, chips and cuttings should be collected in sealed bags or closed containers impervious to asbestos dust. Loose material should never be dry-swept. When vacuum equipment is available, it should be used. Water or other dust suppressants should be applied in circumstances where sweeping is unavoidable. *Do not blow waste material with compressed air.*

No visible emissions to the atmosphere may result from the collection, processing, packaging, transporting, or deposition of any asbestos-containing material. Wastes should be disposed of at a site operated in accordance with the requirements of applicable national, state, or local laws.