DOCUMENT RESUME

ED 219 612 CE 033 345

TITLE	Military Curriculum Materials for Vocational and Technical Education. Plumbing Specialist I, 3-21.
INSTITUTION	Air Force Training Command, Sheppard AFB, Tex.; Ohio State Univ., Columbus. National Center for Research in Vocational Education.
SPONS AGENCY	Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE	[82]
NOTE	144p.; For related documents see CE 033 346-347.
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	Behavioral Objectives; *Building Trades; *Equipment Maintenance; Equipment Utilization; Instructional Materials; Learning Modules; Lesson Plans; Military Personnel; Military Training; Occupational Safety and Health; *Plumbing; Postsecondary Education; Safety; *Sanitary Facilities; Skilled Occupations; *Vocational Education; *Waste Disposal; Waste Water; Water
IDENTIFIERS	Military Curriculum Project

ABSTRACT

These military-developed curriculum materials consist of a course description, course chart, plan of instruction, and lesson plans for use in training a plumbing specialist I. Study guides and workbooks for student use are also included. This course on Introduction to Plumbing covers plumbing safety; plumbing systems, terminology, and engineering drawings; exterior sewer systems; maintenance of tools; installation of building sewer systems; individual waste disposal systems; and structural openings. (MN)

MILITARY CURRICULUM MATERIALS

The military-developed curriculum materials in this course package were selected by the National Center for Research in Vocational Education Military Curriculum Project for dissemination to the six regional Curriculum Coordination Centers and other instructional materials agencies. The purpose of disseminating these courses was to make curriculum materials developed by the military more accessible to vocational educators in the civilian setting.

The course materials were acquired, evaluated by project staff and practitioners in the field, and prepared for dissemination. Materials which were specific to the military were deleted, copyrighted materials were either omitted or approval for their use was obtained. These course packages contain curriculum resource materials which can be adapted to support vocational instruction and curriculum development.

The National Center Mission Statement

The National Center for Research in Vocational Education's mission is to increase the ability of diverse agencies, institutions, and organizations to solve educational problems relating to individual career planning, preparation, and progression. The National Center fulfills its mission by:

- Generating knowledge through research
- Developing educational programs and products
- Evaluating individual program needs and outcomes
- Installing educational programs and products
- Operating information systems and services
- Conducting leadership development and training programs

FOR FURTHER INFORMATION ABOUT
Military Curriculum Materials
WRITE OR CALL

Program Information Office
The National Center for Research in Vocational Education
The Ohio State University
1960 Kenny Road, Columbus, Ohio 43210
Telephone: 614/486-3655 or Toll Free 800/848-4815 within the continental U.S. (except Ohio)

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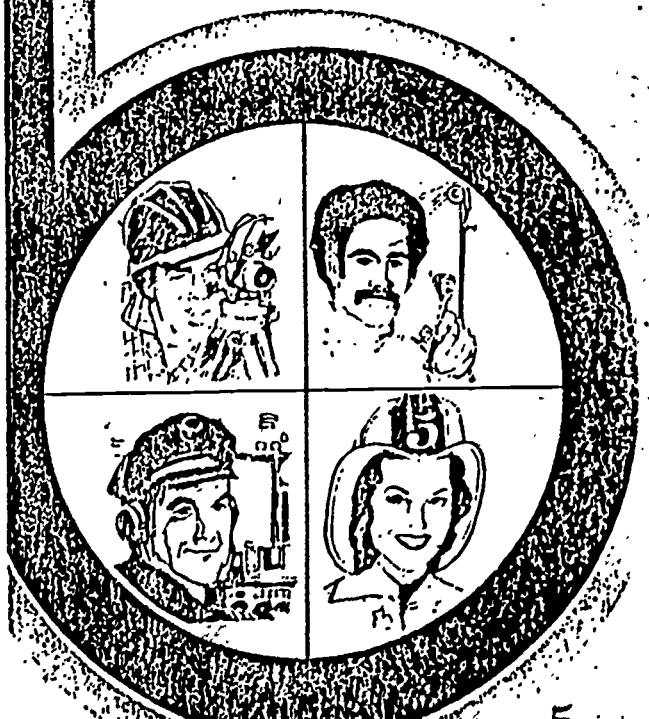
Military Curriculum Materials for Vocational and Technical Education

Information and Field Services Division

The National Center for Research in Vocational Education



Military Curriculum Materials Dissemination Is . . .

an activity to increase the accessibility of military-developed curriculum materials to vocational and technical educators.

This project, funded by the U.S. Office of Education, includes the identification and acquisition of curriculum materials in print form from the Coast Guard, Air Force, Army, Marine Corps and Navy.

Access to military curriculum materials is provided through a "Joint Memorandum of Understanding" between the U.S. Office of Education and the Department of Defense.

The acquired materials are reviewed by staff and subject matter specialists, and courses deemed applicable to vocational and technical education are selected for dissemination.

The National Center for Research in Vocational Education is the U.S. Office of Education's designated representative to acquire the materials and conduct the project activities.

Project Staff:

Wesley E. Budke, Ph.D., Director
National Center Clearinghouse

Shirley A. Chase, Ph.D.
Project Director

What Materials Are Available?

One hundred twenty courses on microfiche (thirteen in paper form) and descriptions of each have been provided to the vocational Curriculum Coordination Centers and other instructional materials agencies for dissemination.

Course materials include programmed instruction, curriculum outlines, instructor guides, student workbooks and technical manuals.

The 120 courses represent the following sixteen vocational subject areas:

- Agriculture
- Aviation
- Building & Construction Trades
- Clerical Occupations
- Communications
- Drafting
- Electronics
- Engine Mechanics
- Food Service
- Health
- Heating & Air Conditioning
- Machine Shop
- Management & Supervision
- Meteorology & Navigation
- Photography
- Public Service

The number of courses and the subject areas represented will expand as additional materials with application to vocational and technical education are identified and selected for dissemination.

How Can These Materials Be Obtained?

Contact the Curriculum Coordination Center in your region for information on obtaining materials (e.g., availability and cost). They will respond to your request directly or refer you to an instructional materials agency closer to you.

CURRICULUM COORDINATION CENTERS

EAST CENTRAL
Rebecca S. Douglass
Director
100 North First Street
Springfield, IL 62777
217/782-0759

NORTHWEST
William Daniels
Director
Building 17
Airdustrial Park
Olympia, WA 98504
206/753-0879

MIDWEST
Robert Patton
Director
1515 West Sixth Ave.
Stillwater, OK 74704
405/377-2000

SOUTHEAST
James F. Shill, Ph.D.
Director
Mississippi State University
Drawer DX
Mississippi State, MS 39762
601/325-2510

NORTHEAST
Joseph F. Kelly, Ph.D.
Director
225 West State Street
Trenton, NJ 08625
609/292-6562

WESTERN
Lawrence F. H. Zane, Ph.D.
Director
1776 University Ave.
Honolulu, HI 96822
808/948-7834

PLUMBING SPECIALIST, I

Table of Contents

PLUMBING SPECIALIST, I

Developed by:
United States Air Force

Development and Review Dates
July 2, 1975

D.O.T. No.:
862.287

Occupational Area:
Building and Construction

Target Audiences:
Grades 10-adult

Print Pages:
290

Cost:
$6.00

Availability:
Military Curriculum Project, The Center for Vocational Education, 1960 Kenny Rd., Columbus, OH 43210

Contents:	Type of Materials: Lesson Plans:	Programmed Text:	Student Workbook:	Handouts:	Text Materials:	Audio-Visuals:	Instructional Design: Performance Objectives:	Tests:	Review Exercises:	Additional Materials Required:	Type of Instruction: Group Instruction:	Individualized:
			No. of pages									
Block I — *Introduction to Plumbing*			105			★						
Plumbing Safety	•		•		•		•			★	•	
Plumbing Systems, Terminology, and Engineering Drawings	•		•		•		•			★	•	
Exterior Sewer Systems	•		•		•		•			★	•	
Maintenance of Tools	•		•		•		•			★	•	
Installation of Building Sewer Systems	•		•		•		•			★	•	
Individual Waste Disposal Systems	•		•		•		•			★	•	
Structural Openings	•		•		•		•			★	•	

★ Materials are recommended but not provided.

Course Description

Because of its long length Plumbing Specialist has been divided into three (3) courses for inclusion in the "Trial Implementation of a Model System to Provide Military Curriculum Materials for Use in Vocational and Technical Education." Training for this series of courses includes instruction on plumbing system operating principles and configurations, construction and maintenance of fixtures, faucets and plumbing system valves, and utilization and maintenance of tools, equipment, and supplies. There are 243 hours of instruction in the series.

Plumbing Specialist I is the first course in the series and includes Block I—*Introduction to Plumbing.* There are seven lessons with 42 hours of instruction. An additional three lessons were deleted because they deal with military organization and procedures. The selected lesson titles and hours follow:

Plumbing Safety (2 hours)
Plumbing Systems, Terminology, and Engineering Drawings (12 hours)
Exterior Sewer Systems (4 hours)
Maintenance of Tools (2 hours)
Installation of Building Sewer Systems (4 hours)
Maintenance of Tools (2 hours)
Installation of Building Sewer Systems (6 hours)
Individual Waste Disposal Systems (12 hours)
Structural Openings (4 hours)

This course contains materials for both student and teacher use. Printed materials for the instructor include a plan of instruction for the block and lesson plans for each lesson. These contain an outline of instruction, objectives, activities, materials and tools needed, text assignments, and references. Student materials consist of a study guide and workbook for the block. Shop drawings are attached to the workbook. Thirty-two slide sets and eight films are suggested for the series but these are not provided.

COURSE CHART

NUMBER	PDS CODE	DATE
3ABR55235	ARL	2 July 1975

COURSE TITLE: Plumbing Specialist

ATC OPR AND APPROVAL DATE	CENTER OPR	SUPERSEDES COURSE CHART
TTMS, 13 November 1974	Sheppard/TTOXU	3ABR55235, 5 April 1973

DEPARTMENT OPR	APPLICABLE TRAINING STANDARD
Department of Civil Engineering Training	STS 552X5, 15 Feb 73;Ch1, 25 Feb74

LOCATION OF TRAINING	COURSE SECURITY CLASSIFICATION
Sheppard AFB, Texas	UNCLASSIFIED

INSTRUCTIONAL DESIGN	TARGET READING GRADE LEVEL FOR PREPARATION OF TRAINING LITERATURE
Group/Lock Step: Proficiency Advancement	9

LENGTH OF TRAINING (9 Weeks, 0 Days)	Hours
Technical Training	322
Classroom/Laboratory (C/L)	270
Complementary Technical Training (CTT)	52
Related Training	38
Standard Traffic Safety, Course I (AFR 50-24)	12
Local Conditions Course, Course II (AFR 50-24)	2
Supplemental Military Training (SMT) (ATCR 50-20)	12
Commander's Calls/Briefings	2
End of Course Appointments; Predeparture Safety Briefing (ATCR 127-1)	10
Total	360

REMARKS

Effective date: 11 August 1975 with class 750811.

TABLE I - MAJOR ITEMS OF EQUIPMENT

Lavatory	Soil Pipe
Urinals	Copper Pipe
Valve Repair Kits	Galvanized Pipe
Water Heaters	Black Pipe
Shower Unit	Vitrified Tile
Water Closet	Traps
Grooving Tool	Valves
Tapping Machine	Insulating Materials
Test Plugs	Pipe Locator
Die Sets	
Shop Benches	
Power Grinder	
Plumber Furnaces	
Plumber Fire Pot	
Sewer Augers	
Centrifugal Pumps	
Diaphragm Pump	

3ABR55235 - COURSE CHART - TABLE II - TRAINING CONTENT

NOTE: Include time spent on technical training (TT) (classroom/laboratory (C/L) and complementary technical training (CTT)) and related training (RT). Exclude time spent on individual assistance (remedial instruction). A single entry of time shown for a unit is C/L time. When a double entry is shown, the second entry is CTT time.

WK OF TNG / HRS PER DAY 1 2 3 4 5 6 7 8		
	Course Material - UNCLASSIFIED — 54 Hours TT BLOCK I - Introduction to Plumbing	18 Hours RT
1 2(4/5)	Orientation (2 hrs); Career Field and Civil Engineer Organization (2 hrs); Plumbing Safety (2 hrs); Plumbing Systems, Terminology, and Engineering Drawings (12 hrs); Publications (6 hrs); Exterior Sewer Systems (4 hrs); Maintenance of Tools (2 hrs); Installation of Building Sewer Systems (6 hrs); Individual Waste Disposal Systems (12 hrs); Structural Openings (4 hrs); Measurement Test and Test Critique (2 hrs). (Safety as Applicable) 54 Hours C/L	
	Course Material - UNCLASSIFIED — 72 Hours TT BLOCK II - Building Waste Systems	8 Hours RT
2(1/5) 3 4(4/5)	Building Drains (12 hrs); Vents and Stacks (12 hrs); Floor Drains and Roof Drains (3 hrs); Waste Rough-In for Lavatories (3 hrs); Installation of Back Vents (6 hrs); Rough-In for Urinal Drains (6 hrs); Rough-In for Showers and Tub Drains (6 hrs); Rough-In for Water Closet Drains (6 hrs); Testing Drainage Systems (4 hrs); Measurement Test and Test Critique (2 hrs). (Safety as Applicable) 60 Hours C/L	12 Hours CTT
	Course Material - UNCLASSIFIED — 62 Hours TT BLOCK III - Exterior and Interior Water Supply Systems	2 Hours RT
4(1/5) 5 6(2/5)	Exterior Water Supply (3 hrs); Steel Pipe Assembly (3 hrs); Installation of Building Service Lines (6 hrs); Building Distribution Systems (12 hrs); Copper Tubing Assembly (12 hrs); Water Supply Rough-In for Fixtures (6 hrs); Installation of Domestic Water Heaters (4 hrs); Measurement Test and Test Critique (2 hrs). (Safety as Applicable) 48 Hours C/L	14 Hours CTT

FORM 449A APR 73 PREVIOUS EDITION OBSOLETE.

COURSE CHART – TABLE II – TRAINING CONTENT 3ABR55235

NOTE: Include time spent on technical training (TT) (classroom/laboratory (C/L) and complementary technical training (CTT) and related training (RT). Exclude time spent on individual assistance (remedial instruction). A single entry of time shown for a unit is C/L time. When a double entry is shown, the second entry is CTT time.

WK OF TNG / HRS PER DAY 1 2 3 4 5 6 7 8		
	Course Material - UNCLASSIFIED 80 Hours TT BLOCK IV - Fixtures and Appurtenances	20 Hours CTT
6(3/5) 7 8(2/5)	Installation of Bathtubs and Showers (6 hrs); Installation of Water Closets (6 hrs); Installation of Urinals (6 hrs); Installation of Lavatories (6 hrs); Insulation of Water Lines (6 hrs); Inspection and Maintenance of Plumbing Systems (6 hrs); Recovery and Restoration (12 hrs); Planning and Layout of Plumbing Systems (10 hrs); Measurement Test and Test Critique (2 hrs). (Safety as Applicable) 60 Hours C/L	
	Course Material - UNCLASSIFIED 54 Hours TT BLOCK V - Utility Equipment	6 Hours CTT
8(3/5) 9	Winterization of Piping (2 hrs); Maintenance of Valves (4 hrs); Maintenance of Sewers and Grease Traps (6 hrs); Emergency Maintenance of Exterior Piping (6 hrs); Fire Hydrants and Sprinkler Systems (12 hrs); Utility Equipment (6 hrs); Corrosion Control (3 hrs); Project and Resource Management (3 hrs); Communication Security (2 hrs); Measurement Test and Test Critique (2 hrs); Course Critique and Graduation (2 hrs). (Safety as Applicable) 48 Hours C/L	10 Hours RT

ATC FORM APR 73 449A PREVIOUS EDITION OBSOLETE.

CHANGE NOTICE

POI 3ABRW3233

(PDS Code ARL)

6

PLAN OF INSTRUCTION

(Technical Training)

PLUMBING SPECIALIST

3-21

SHEPPARD TECHNICAL TRAINING CENTER

2 July 1975-Effective 11 August 1975 with class 750811

Changed 20 January 1976-Effective 20 January 1976 with class 760120

POI 3ABR55235

LIST OF CURRENT PAGES

This POI consists of 80 current pages issued as follows:

Page No.	Issue	Page No.	Issue
*Title	20 Jan 76	38 thru 42	Original
*A	20 Jan 76	*43 and 44	20 Jan 76
i	Original	45 thru 66	Original
*1 and 2	20 Jan 76	Annex (11 pages)	Original
3 thru 16	Original		
*17 and 18	20 Jan 76		
19 thru 33	Original		
*34 thru 37	20 Jan 76		

CHANGE NOTICE INSTRUCTIONS

Effective 20 January 1976, POI 3ABR55235, 2 July 1975, is changed as follows:

1. Remove pages replaced or deleted and insert changed and new pages according to above listing.

2. The (*) in the above page listing indicates that the page is a replacement or addition or has been deleted by this Change Notice.

FOR THE COMMANDER

LEONARD A. HAMILTON, Col, USAF
Chief, Dept of Civil Engineering Tng

DISTRIBUTION: ATC/TTMS-1, AUL/LSE-1, CCAF/AY-2, MOM-1, TCE-75, TTOX-2, TTOT-1, TTOR-1, TTE-1.

FOREWORD

1. PURPOSE. This plan of instruction prescribes the qualitative requirements for Course Number 3ABR55235, Plumbing Specialist, in terms of criterion objectives presented by units of instruction, and shows duration, correlation with the training standard, support materials, and instructional guidance. It was developed under the provisions of ATCR 50-5, Instructional System Development and ATCR 52-7, Plans of Instruction.

2. COURSE DESCRIPTION. This technical training course trains airmen to perform duties prescribed in AFM 39-1 for Apprentice Plumbers, AFSC 55235. Training includes instruction on plumbing system operating principle and configuration; construction, maintenance and repair of main and building water supply, vent and waste systems; installation and maintenance of fixtures, faucets and plumbing system valves; and utilization and maintenance of tools, equipment, and supplies. In addition, related training is provided on driver education, supplemental military training, troop information program, commander's calls/briefings, etc.

3. EQUIPMENT ALLOWANCE AND AUTHORIZATION. Training equipment required to conduct this course is listed in Equipment Authorization Inventory Data Number 3ABR552350000. Training equipment authorizations for this course are based on the following Tables of Allowance:

TA 008 Civil Engineer Equipment
TA 484 Civil Engineer Plumbing Shop

NOTE: Group size is shown in parentheses after equipment listed in column 3 of numbered pages of this POI.

4. MULTIPLE INSTRUCTOR REQUIREMENTS. Units of instruction which require more than one instructor per instructional group are identified in the multiple instructor annex to this POI.

5. REFERENCES. This plan of instruction is based on SPECIALTY TRAINING STANDARD 552X5, 15 February 1973, Change 1, 25 February 1974, and Course Chart 3ABR55235, 2 July 1975.

FOR THE COMMANDER

Leonard A. Hamilton

LEONARD A. HAMILTON, Col, USAF
Chief, Dept of Civil Engineering Tng
USAF Sch of Applied Aerosp Sci

Supersedes Plan of Instruction 3ABR55235, 27 February 1974, Changed 28 August 1974
OPR: Department of Civil Engineering Training
DISTRIBUTION: See Page A

MODIFICATIONS

Pages 1 – 2 of this publication has (have) been deleted in adapting this material for inclusion in the "Trial Implementation of a Model System to Provide Military Curriculum Materials for Use in Vocational and Technical Education." Deleted material involves extensive use of military forms, procedures, systems, etc. and was not considered appropriate for use in vocational and technical education.

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		Audio Visual Aids Slides, BCE Organization Structure Slides, Structural Pavement Career Field Training Methods Discussion (1.5 hrs) Performance (0.5 hr) Instructional Environment/Design Classroom (1.5 hrs) Laboratory (0.5 hr) Group/Lockstep: Proficiency Advancement Instructional Guidance Discuss the meaning of an AFSC and show how closely related tasks are categorized. Explain some of the numbers assigned to each category. Explain how the CDCs and OJT are used in upgrade training through the rank of MSgt. Indicate that SMSgt and CMSgts hold superintendent positions and may emerge from any of the related career fields within Civil Engineering. Use extracts from AFM 39-1 when discussing the duties and responsibilities of the plumber. Hand out AFR 85-5 and discuss the structures, duties, and responsibilities of Civil Engineering. Accomplish workbook.
3. Plumbing Safety a. Given publications containing plumbing safety instructions, list five safety precautions to be observed by plumbers, each referenced to a publication which verifies their accuracy.	2 (2/0) Day 1 (0.5/0)	Column 1 Reference / STS Reference 3a / 3a(1), 3a(2), 3a(3), 3a(4), 3a(5), 3a(6), 3a(7), 3a(9), 3a(10), 3b, 3c 3b / 3a(8)

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PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
b. After viewing training film FLC 16/149, Piping Safety, list six safety precautions to be observed when using ladders and scaffolds. The listed safety precautions must be those illustrated in the training film.	(1.5/0)	Instructional Materials SG 3ABR55235-I-3, Plumbing Safety WB 3ABR55235-I-3-P1, Plumbing Safety Audio Visual Aids Training Film: FLC 16/149, Piping Safety Training Methods Discussion (1 hr) Performance (1 hr) Instructional Environment/Design Classroom (1 hr) Laboratory (1 hr) Group/Lockstep: Proficiency Advancement Instructional Guidance Discuss the safety precautions that the students should know when working with or in the vicinity of flammable materials. When possible, display the item being discussed. Use personal experiences to emphasize the importance of observing all safety procedures and regulations. Point out areas in the course where the students must recognize the hazards and exercise appropriate precautions. Explain that additional safety precautions will be discussed when applicable during his performance. Emphasize that many safety precautions practiced in this course are also applicable in the field, barracks, or home. Accomplish the workbooks. The following reference should be used in preparing the lesson: AFR 127-101, Ground Accident Prevention Handbook

PLAN OF INSTRUCTION NO. 3ABR55235	DATE 2 July 1975	BLOCK NO. I	PAGE NO. 4

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
4. Plumbing Systems, Terminology, and Engineering Drawings	12 (12/0) Days 2, 3	Column 1 Reference / STS Reference 4a — 6a(4), 6a(6), 6a(7) 4b — 6a(1), 6a(3), 6a(7) 4c — 6b(1), 6b(2) 4d — 6c 4e — 6f 4f — 8a, 8b
a. Given the names and definitions of plumbing systems, accurately match each name with its definition.	(4/0)	
b. Given a sketch of four different plumbing systems, write the correct name of each in the blank space provided.	(2/0)	Instructional Materials SG 3ABR55235-I-4, Plumbing Systems, Terminology, and Engineering Drawings WB 3ABR55235-I-4-P1, Plumbing System Terminology WB 3ABR55235-I-4-P2, Identification of Plumbing Materials WB 3ABR55235-I-4-P3, Codes, Standards, and Specifications WB 3ABR55235-I-4-P4, Shop Equipment WB 3ABR55235-I-4-P5, Engineering Drawing
c. Given selected samples of pipe, tubing, joints, and fittings, each identified with a letter, correctly name each item.	(2/0)	
d. Given a list of definitions, select the one that defines a code, a standard and a specification. Each definition must be selected correctly.	(1/0)	Audio Visual Aids Slides, Plumbing System
e. Given a list of tools, materials and equipment, select and underline those items that are shop equipment. Selection must be 100% accurate.	(1/0)	Training Equipment Display Board, Plumbing Hardware (12) Samples of Plumbing Materials (12) Shop Tools for Fabricating Plumbing Systems (12)
f. Given an engineering drawing of a basement and second floor plumbing plan and a list of eight questions concerning the type, location and configuration of the plumbing system, correctly answer each question.	(2/0)	Training Methods Discussion (9 hrs) Performance (3 hrs)

PLAN OF INSTRUCTION (Continued)

1	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		Instructional Environment/Design Classroom (9 hrs) Laboratory (3 hrs) Group/Lockstep: Proficiency Advancement Instructional Guidance After discussing the plumbing system terms and expressions, direct the students to complete WB 3ABR55235-I-4-P1, Plumbing Systems Terminology. Discuss the construction features and operating principles of plumbing systems and the materials required to properly construct various plumbing systems. Direct the students to complete WB 3ABR-55235-I-4-P2, Identification of Plumbing Materials. Explain the meaning of plumbing codes and standards and why they vary in different sections of the country. Define and discuss specifications and the necessity for adhering to them when constructing plumbing systems. Accomplish WB 3ABR55235-I-4-P3. Explain and show the students plumbing materials, tools, and shop equipment. Complete WB 3ABR55235-I-4-P4. Explain the symbols and other characters that are used on engineering drawings and the interpretation of symbols when constructing and maintaining plumbing systems. Direct the students to complete WB 3ABR55235-I-4-P5 on engineering drawings. Emphasize the need for safety practices when applicable. The following reference should be used in preparing the lesson: National Plumbing Code
	6 (6/0) Day 4 (1/0)	Column 1 Reference → STS Reference 5a → 4a 5b → 4b, 4c 5c → 4d 5d → 4f 5e → 4g 5f → 4b 5g → 4h

PLAN OF INSTRUCTION NO	DATE	BLOCK NO	PAGE NO
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Note: Page 14 has been deleted due to military-specific material.

PLAN OF INSTRUCTION (Continued)

1	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		system while demonstrating the use of the index. Have the students locate specific TO numbers and titles in TOs 0-1-01 and 0-2-1. Identify TOs 00-5-1 and -2 and discuss their purpose. Demonstrate how they are used and have the students locate the information required. Elaborate on each part as it is found. Identify AFR 0-2 as the index of regulations. Define regulations as documents establishing responsibility and rules for operation. Have the students use an index to locate specific numbers and titles of AFRs. Identify commercial manuals and permit the students to find selected information. Indicate that commercial manuals will be their greatest source of information for performing plumbing tasks.
6. Exterior Sewer Systems	4 (4/0) Day 5 (1/0)	Column 1 Reference: 6a, 6b STS Reference: 6a(3), 8a; 3a(3), 11a, 11b, 11 c Instructional Materials SG 3ABR55235-I-6, Exterior Sewer Systems WB 3ABR55235-I-6-P1, Exterior Sewer Components WB 3ABR55235-I-6-P2, Preparation of a Graded Trench Audio Visual Aids Slides, Exterior Plumbing System Training Film: FLC 19/0286, Sewer Construction Training Equipment Septic Tank (12)
a. Given a sketch of an exterior sewage collection system, name the major components of the system. All items must be named correctly.		
b. Grade and backfill a trench to a fall of 1/4 inch per foot from an existing building drain to the inlet of an installed septic tank. (The backfill procedures may be simulated.)	(3/0)	

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PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		Training Methods Discussion and Demonstration (2 hrs) Performance (2 hrs) Instructional Environment/Design Classroom (2 hrs) Laboratory (2 hrs) Group/Lockstep: Proficiency Advancement Instructional Guidance Use slides of a waste collection system to identify building and sewer mains. Describe a lift station and discuss its purpose. Discuss identification and locations of manholes and treatment plants. Show the relationship of building drains, building sewer, and the main sewer system. Emphasize the symbols that are used to identify joints and fittings, and show the importance of the legend. Show the student samples of materials that are used in the construction of a waste system. Discuss such factors as pipe sizing, fall per foot, directional changes, and obstructions which aid or retard proper function of the system. Mention the codes and the effect of the design and construction of waste systems. Discuss the different types of shoring methods and instances where each may be used. Have the students complete the work projects. The following references should be used in preparing the lesson: AFM 85-14, Operation and Maintenance of Sewage and Industrial Waste Plants and Systems National Plumbing Code

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PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
7. Maintenance of Tools a. Inspect and maintain plumber's hand tools in accordance with TO 32-1-101. b. Using a grinder, dress and sharpen a cold chisel as required in accordance with TO 32-1-101.	2 (2/0) Day 5 (0.5/0) (1.5/0)	Column 1 Reference — STS Reference 7a — 6e, 7b — 3b, 3c, 4e, 6e, 9b, 9c Instructional Materials SG 3ABR55235-I-7, Maintenance of Tools WB 3ABR55235-I-7-P1, Sharpening and Dressing Plumbing Tools TO 32-1-101, Maintenance of Hand Tools Training Equipment Bench Grinder (12) Hand Tools for Plumbing (1) Face Shield (4) Training Methods Discussion and Demonstration (1 hr) Performance (1 hr) Instructional Environment/Design Classroom (1 hr) Laboratory (1 hr) Group/Lockstep; Proficiency Advancement Instructional Guidance Discuss the relationship, purpose and use of hand and shop tools. Demonstrate the inspection and operation of the grinder. Have the student identify and inspect cold chisels. Using TO 32-1-101 as a reference, demonstrate the sharpening of a cold chisel. Have the students sharpen and dress tools from the tool room IAW TO 32-1-101. Enforce proper safety precautions.

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PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
8. Installation of Building Sewer Systems	6 (6/0) Day 6	Column 1 Reference — STS Reference 8a — 12j 8b — 11e(8) 8c — 3a(2), 11f(5), 11f(6), 15a
a. Given operating procedures and working as a team member, pump all standing water from a trench or reservoir.	(2/0)	Instructional Materials SG 3ABR55235-I-8, Installation of Building Sewer Systems WB 3ABR55235-I-8-P1, Pumping a Trench WB 3ABR55235-I-8-P2, Cutting Vitrified Tile WB 3ABR55235-I-8-P3, Assembling Clay Tile Pipe
b. Cut a section of vitrified pipe with a hammer and chisel. Completed work must be ± 1/8 of given length.	(2/0)	
c. Using oakum and mortar, assemble a clay tile joint. Mortar must be tapered approximately 45° from end of bell to pipe.	(2/0)	Audio Visual Aids Slides, Installing Sewer System Training Equipment Hand Tools for Plumbing (1) Shop and Special Tools for Plumbing (2) Water Pump, Engine Driven (12)

PLAN OF INSTRUCTION NO. 3ABR55235	DATE 2 July 1975	BLOCK NO. I	PAGE NO. 11

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	DURATION HOURS	SUPPORT MATERIALS AND GUIDANCE
		Training Methods Discussion and Demonstration (2 hrs) Performance (4 hrs) Instructional Environment/Design Classroom (2 hrs) Laboratory (4 hrs) Group/Lockstep: Proficiency Advancement Instructional Guidance Discuss the use of water pumps in pumping out excavations filled with water. Mention several other methods, such as digging drainage ditches and bucket bailing. Accomplish criterion 8a as a team project. Identify vitrified tile pipe and demonstrate the assembling of a joint using mortar. Explain how to make a bell-type joint using bituminous material and a rolling ring. Demonstrate cutting pipe using a hammer and chisel. Discuss the purpose of a thimble and the codes governing its installation and use. Demonstrate the proper lifting techniques, and enforce these techniques during the performance. Demonstrate the method of grading pipe. Show some illustrations of backfill preparation and application. Discuss the importance of having properly prepared and applied backfill in trenches. Have the students complete the work project. The following reference should be used in preparing the lesson: National Plumbing Code

PLAN-OF INSTRUCTION NO. 3ABR55235	DATE 2 July 1975	BLOCK NO. I	PAGE NO. 12

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
9. Individual Waste Disposal Systems	12 (12/0) Days 7, 8	Column 1 Reference / STS Reference 9a — 8c(1), 15b 9b — 3a(1), 11e(3) 9c — 3a(1), 11e(12) 9d — 3a(1), 11f(8), 15a Instructional Material SG 3ABR55235-I-9, Individual Waste Disposal Systems WB 3ABR55235-I-9-P1, Bituminous Fiber Pipe Assembly WB 3ABR55235-I-9-P2, Laying a Drainage Field
a. View training films FLC 9/209, Principles of Operation and Design of Septic Tanks, and FLC 9/210, Typical Household Systems. Sketch a typical household septic tank system and name the major components. All major components must be included and correctly named.	(2/0)	Audio Visual Aids Training Film: FLC 9/209, Principles of Operation and Design of Septic Tanks Training Film: FLC 9/210, Typical Household Systems Slides, Individual Waste Disposal System
b. Cut bituminous fiber pipe with a handsaw. Completed work must be square with the end of the pipe and within ± 1/8 inch of given length.	(2/0)	Training Equipment Hand Tools for Plumbing (1)
c. Using a tapering tool, cut a taper on a fiber pipe so that a coupling can be installed to fit snugly.	(2/0)	Training Methods Discussion and Demonstration (6 hrs) Performance (6 hrs)
d. Following prescribed procedures and using either bituminous fiber or plastic pipe with swedged connections, assemble a typical leaching field to a grade of 2 to 6 inch fall per 100 feet.	(6/0)	Instructional Environment/Design Classroom (6 hrs) Laboratory (6 hrs) Group/Lockstep:Proficiency Advancement

PLAN OF INSTRUCTION NO. 3ABR55235	DATE 2 July 1975	BLOCK NO. I	PAGE NO. 13

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		Instructional Guidance With the aid of films and schematics, describe the various types of individual systems and discuss pros and cons of each. Identify the types of pipe materials used in individual waste systems. Demonstrate how joints are assembled. Discuss such factors as freeze depths, absorbent ability, leaching field design, location and operation. Discuss maintenance of septic tanks. Demonstrate the use of a tapering machine. Have the students make a sketch of a leaching field and determine the quantity and types of pipe required to construct the leaching field. Emphasize the importance of proper backfill preparation. Have the students recover the pipe, clean the piping and tools, and return them to storage. Have the students complete the workbook projects. The following reference should be used in preparing the lesson: National Plumbing Code
10. Structural Openings	4 (4/0) Day 9	Column 1 Reference — STS Reference 10a — 8c(1), 11d 10b — 3a(1)
a. Using working drawings and manufacturer's rough-in specifications, mark the openings for pipe passage through structural members. Marks must be within ± 1/8 inch of specifications.	(1/0)	10c — 11d Instructional Materials SG 3ABR55235-I-10, Structural Openings WB 3ABR55235-I-10-P1, Preparing Structural Openings Manufacturer's Rough-in Specifications
b. Given five different situations which require a hole to be cut in a structural member and five hole-cutting tools, select the tool which is best suited to accomplish the task.	(1/0)	Audio Visual Aids Slides, Structural Openings

PLAN OF INSTRUCTION NO. 3ABR55235	DATE 2 July 1975	BLOCK NO. I	PAGE NO. 14

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
c. Using the procedures provided and working as a member of a team, cut holes in the booth area for the passage of pipe. The completed holes must be within ± 1/8 inch of specifications.	(2/0)	Training Equipment Shop Tools for Plumbing (2) Hand Tools for Plumbing (1) Training Methods Discussion and Demonstration (2 hrs) Performance (2 hrs) Instructional Environment/Design Classroom (2 hrs) Laboratory (2 hrs) Group/Lockstep:Proficiency Advancement Instructional Guidance Discuss the human desire to hide what otherwise cannot be made attractive. It then becomes necessary to route piping within the walls of building. Use a building drawing to demonstrate how a plumber would plan the routing of pipe to avoid passing through structural members. Demonstrate how to use manufacturer's rough-in specifications to determine the height and locations of piping. Draw a plumber's sketch to identify the locations of the holes. Give the students a drawing of the booth area. Identify the locations of holes to be cut. Demonstrate measuring and cutting tool techniques. Give the students assistance when required and stress safety when using plumb bob, hammer, wood chisel, saws, brace, and bits. Have the students complete the workbooks. The following references should be used in preparing the lesson: AFR 127-101, Ground Accident Prevention Handbook National Plumbing Code

PLAN OF INSTRUCTION NO. 3ABR55235	DATE 2 July 1975	BLOCK NO. I	PAGE NO. 15

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
11. Related Training (as shown on the course chart)	18	
12. Measurement Test and Test Critique	2 (2/0)	

PLAN OF INSTRUCTION NO. 3ABR55235	DATE 2 July 1975	BLOCK NO. I	PAGE NO. 16

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE: TCETC/7Aug75	INSTRUCTOR:
COURSE NUMBER: 3ABR55235	COURSE TITLE: Plumbing Specialist
BLOCK NUMBER: I	BLOCK TITLE: Introduction to Plumbing
LESSON TITLE: Plumbing Safety (Day 1)	

LESSON DURATION

CLASSROOM/LABORATORY	COMPLEMENTARY	TOTAL
2 Hrs	0	2 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
3	2 July 1975	3

STS/CTS REFERENCE

NUMBER	DATE
552X5	15 February 1973, Chg 1, 25 Feb 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
None	None	None	SG I-3 WB I-3-P1 FLC 16/149, Piping Safety

CRITERION OBJECTIVES AND TEACHING STEPS

3a. Given publications containing plumbing safety instructions, list five safety precautions to be observed by plumbers; each referenced to a publication which verifies their accuracy.

(1) Housekeeping
(2) Personal cleanliness
(3) Clothing and equipment
(4) Tools and equipment
(5) Excavations
(6) Toxic gases
(7) Molten lead
(8) Heated compounds
(9) Caustics
(10) Storage and handling of flammable liquids
(11) Storage and handling of compressed gas cylinders

LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

(12) Open flame heating devices
(13) Lifting
(14) Electrical hazards
(15) Fire extinguishing agents
(16) Ground Accident Prevention Handbook AFR 127-101

3b. After viewing training film FLC 16/149, Piping Safety, list six safety precautions to be observed when using ladders and scaffolds. The listed safety precautions must be those illustrated in the training film.

(1) Types of ladders
(2) Ladder safety
(3) Scaffolds
(4) Erection of ladders and scaffolds

Course No: 3ABR55235
Day 1

Branch Approval: Robert B. Harper
Date: 7 August 1975

PART II

INTRODUCTION (5 Minutes)

REVIEW: NONE

ATTENTION:

OVERVIEW:

MOTIVATION:

BODY (1 Hour 50 Minutes)

PRESENTATION:

3a: Given publications containing plumbing safety instructions, list five safety precautions to be observed by plumbers, each referenced to a publication which verifies their accuracy.

(1) Housekeeping

(a) Keep floors and aisles clean

(b) Clean up spilled liquids immediately

(c) Store materials to prevent tripping

(d) Have adequate lighting

(e) Keep oil rags in storage containers

(f) Dispose of scrap metal (salvage)

(2) Personal cleanliness

(3) Clothing and equipment

(a) Wear safety glasses or face shield

(b) Wear clothing suited for job

1 Leather gloves

2 Asbestos gloves

3 Safety toe shoes

4 Remove jewelry--could get caught in moving machinery

5 Do not wear loose or torn clothing

(4) Tools and equipment

(a) Good quality tools

(b) Keep tools and equipment in good condition

(c) Use proper type wrench

(d) Pull on wrench

(e) Don't hold objects in hand when using screwdriver (put in vise)

(f) Don't have mushroom head on chisels

(g) Always use safety glasses when using chisels

(h) Keep cutting tools sharp

(i) Ground all power tools

(j) When passing tools handles first

(5) Excavations

(a) Danger of cave-in (shore trench)

(b) If 5 feet or more in depth, trench will be shored

(6) Toxic gases

(a) Asphyxiants-prevent a person's blood from absorbing oxygen

(b) Irritants-causes inflamation of the respiratory system

(c) Anesthetics-have sleeplike affect

(d) Poisons-act directly on body

(7) Molted lead

(a) Burn

(b) Explosion

(c) Moisture

(d) Protective clothing

(8) Heated compounds

(a) Burns

(b) Asphyxiation

(9) Caustics

(a) Burns

(b) Asphyxiation

(10) Storage and handling of flammable liquids

(a) Store in approved area

(b) Keep away from heat

(c) Keep area well ventilated

(d) Use approved storage containers

(e) No smoking

(11) Storage and handling of compressed gas cylinders

(a) Storage

1 In approved areas

2 Cylinders should be protected from extreme heat and cold

3 Keep area well ventilated

4 Electrical circuits will be nonsparking

5 Secure all cylinders

6 Plainly mark empties

7 Store empties separate from full

8 Store different gases separately

9 Store acetylene upright

(b) Handling

1 Use hand truck when possible

2 Close valve

3 Don't lift by valve

4 Protect valve (use cover)

5 Load acetylene upright

(12) Open flame heating devices

(a) Keep area well ventilated

(b) Keep away from flammable and explosive materials

(c) Inspect bottles

(d) No horseplay

(13) Lifting

(a) Keep back straight

(b) Don't lift objects that are too heavy

1 50 lbs male workers

2 25 lbs female workers

(14) Electrical hazards

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(a) Shock

(b) Turn off electricity before working on equipment

(c) Shorts can cause fires

(d) Caution when working on wet ground

(e) Ground outlets

(15) Fire extinguishing agents

(a) Class A-wood, paper and trash-use water

(b) Class B - Flammable liquids - use foam or CO_2 (carbon dioxide)

(c) Class C-Electrical-use dry chemicals or CO_2

(16) Ground accident prevention handbook AFR 127-101

3b. After viewing training film FLC 16/149, Piping Safety, list six safety precautions to be observed when using ladders and scaffolds. The listed safety precautions must be those illustrated in the training-film.

(1) Types of ladders

(a) Fixed ladders (permanently installed)

(b) Extension ladders

(c) Step ladders

(2) Ladder safety

(a) Sufficient length

(b) Secure footing

(c) Check rungs

(d) Base, 1/4 the length away from wall

(e) Ladder made of nonconductant material if used near electrical hazard

(3) Scaffolds

(a) Platforms made of 2 x 10 planks

(b) Railings

(c) Cross bracing

(d) Secure braces and top if over 10' high

APPLICATION:

Have students complete WB 3ABR55235-I-3-P1.

EVALUATION:

Evaluate by oral, written questions, and/or observation of student's performance during lesson. This may be accomplished at any time during lesson for increased effectiveness.

CONCLUSION (5 Minutes)

SUMMARY:

REMOTIVATION:

STUDY ASSIGNMENT: Complete SG 3ABR55235-I-4.

LESSON PLAN (Part I, General)

APPROVING OFFICE AND DATE: TCETC/7Aug75	INSTRUCTOR
COURSE NUMBER: 3ABR55235	COURSE TITLE: Plumbing Specialist
BLOCK NUMBER: I	BLOCK TITLE: Introduction to Plumbing

LESSON TITLE: Plumbing Systems, Terminology and Engineering Drawings (Days 2 and 3)

LESSON DURATION

CLASSROOM/LABORATORY	COMPLEMENTARY	TOTAL
12	0	12

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
5	2 July 1975	4

STS/~~GTA~~ REFERENCE

NUMBER	DATE
552X5	15 February 1973, Chg 1, 25 Feb 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Display Board Samples of Plumbing Materials Shop Tools	None	None	SG I-4 WBs I-4-P1; P2; P3; P4; and P5 Slides: Plumbing System

CRITERION OBJECTIVES AND TEACHING STEPS

4a. Given the names and definitions of plumbing systems, accurately match each name with its definition.

(1) Building water service line
(2) Building plumbing system
(3) Sanitary sewer system
(4) Drainage system
(5) Cross connections
(6) Building gas piping system
(7) Building air system

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

4b. Given a sketch of four different plumbing systems, write the correct name of each in the blank space provided.

(1) Base water distribution system
(2) Service lines
(3) Building plumbing systems
(4) Sanitary waste system

4c. Given selected samples of pipe, tubing, joints, and fittings, each identified with a letter, correctly name each item.

(1) Types of pipes and tubing
(2) Joints and fittings

4d. Given a list of definitions, select the one that defines a code, a standard and a specification. Each definition must be selected correctly.

(1) Codes
(2) Standards
(3) Specifications

4e. Given a list of tools, materials and equipment, select and underline those items that are shop equipment. Selections must be 100% accurate.

(1) Shop tools, handtools, and equipment
(2) Materials

4f. Given an engineering drawing of a basement and second floor plumbing plan and a list of eight questions concerning the type, location and configuration of the plumbing system, correctly answer each question.

(1) Blueprints
(2) Working drawing
(3) Bill of materials

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3ABR55235
Days: 2 and 3

Branch Approval: [signature]
Date: 7 August 1975

PART II

INTRODUCTION (40 Minutes)

CHECK PREVIOUS DAY'S STUDY ASSIGNMENT:

REVIEW: Give daily quiz.

ATTENTION:

OVERVIEW:

MOTIVATION:

BODY (5 Hours 15 Minutes)

PRESENTATION:

4a. Given the names and definitions of plumbing systems, accurately match each name with its definition.

(1) Building water service line

(a) Definition - the pipe from the water main or other source of water supply to the building served

(b) Components

1 Starts at corporation stop

2 Curb stop

3 Meter stop

4 Water meter - indicates volume of water flow

5 Stop and waste valve

6 Piping

(2) Building plumbing system

(a) Definition - all piping and fixtures used for water supply, gas, air and waste disposal installed in the building

(b) Components

1 Cold water system

2 Hot water system

3 Gas and air system

4 Drainage system

(3) Sanitary sewer system

(a) Definition - the part of the piping system that receives the discharge from soil, waste and other drainage pipes, but does not carry any storm, surface, or ground water

(b) Components

1 Public sewer - a common sewer controlled by public authority

2 Private sewer - a sewer privately owned and not directly controlled by public authority

3 Disposal plant - removes impurities from water

4) Drainage system

(a) Definition - piping which conveys sewage rain water, or other liquid waste to a point of disposal. This excludes the public sewer system

(b) Components

1 Storm drainage system - carries runoff water caused by rain or snow

2 Industrial drainage system - collects contaminated liquid waste and carries it to an industrial waste plant

(5, Cross connections

(a) Definition - connection between two otherwise separate piping systems one of which contains potable water and the other of questionable quality

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(b) Components

1 Piping

2 Fittings

(6) Building gas piping system

(a) Definition - piping that conveys gas from gas service line to building fixtures and appliances

(b) Components

1 Black iron piping

2 Valves and fittings

(7) Building air system

(a) Definition - piping that conveys compressed air from source to air operated equipment and devices

(b) Components

1 Black iron piping

2 Valves and fittings

4b. Given a sketch of four different plumbing systems, write the correct name of each in the blank space provided.

(1) Base water distribution systems

(a) Components

1 Source

2 Pumps

3 Treatment plant

4 Storage tanks

5 Control valves

6 Fire hydrants

7 Water mains

(b) Symbols

(2) Service lines

(a) Components

1 Gas service

2 Air service

3 Water service

(b) Symbols

(3) Building plumbing systems

(a) Components

1 Cold water distribution system

a Mains

b Branches

c Risers

2 Hot water distribution systems

a Heaters

b Main

c Risers

d Branches

3. Air and gas distribution systems

a Mains

b Branches

c Risers

(b) Symbols

(4) Sanitary waste system

(a) Components

1 Interior

a House (building) drain-lowest part of drainage system which receives discharge from soil and waste piping and conveys it to the house sewer

b Soil Pipe - carries discharge from water closets and urinals and similar fixtures to building drain

c Soil branch - horizontal part of soil piping which carries waste from water closets, urinals and similar fixtures to the vertical part of soil piping

d Waste pipe - conveys waste from all other fixtures to building drain

2 Exterior

a Building (house) sewer - horizontal part of drainage system which conveys the discharge of the building drain to a public sewer or other point of disposal (begins five feet outside of building wall)

b Main sewer line (public sewer)

c Lift station

(b) Symbols

APPLICATION:

Have students complete WB I-4-P1.

CONCLUSION (Day 2)

SUMMARY:

STUDY ASSIGNMENT:

Read SG 3ABR55235-I-4.

INTRODUCTION (Day 3)

CHECK PREVIOUS DAY'S STUDY ASSIGNMENT:

REVIEW: Give daily quiz.

ATTENTION:

OVERVIEW:

MOTIVATION:

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PRESENTATION:

4c. Given selected samples of pipe, tubing, joints, and fittings, each identified with a letter, correctly name each item.

(1) Types of pipes and tubing

(a) Composition

1 Cast iron

2 Steel

3 Copper

4 Brass

5 Fiber

6 Cement asbestos

7 Plastics

8 Glass

9 Rubber

(b) Methods of identity

1 Weight

2 Color

3 Density

(2) Joints and fittings

(a) Composition

1 Material

a Steel

b Copper

c Brass

d Fiber

e Cement asbestos

f Plastic

g Glass

h Rubber

2 Types

a Screwed

b Flanged

c Soldered

d Welded

e Caulked

3 Purpose

a Change direction

b Reduce in size

c Join pipe

d Drainage (recessed)

(b) Methods of identity

1 Size

2 Shape

a Y (Wye)

b T (Tee)

4d. Given a list of definitions, select the one that defines a code, a standard and a specification. Each definition must be selected correctly.

(1) Codes

(a) Definition - rules and regulations that govern the use of materials and design of the plumbing system

(b) Types

1 Local codes

2 State codes

3 National codes

4 AFM 85-20

(2) Standards - rules or basis of comparison in measuring or judging capacity, quantity, quality of material and safe efficient plumbing techniques. Standards are directives on how fixtures are installed

(3) Specifications - made by an architect to specity the size, type, quality, quantity, and strength of materials to be used. They state exact measurements for an installation

4e. Given a list of tools, materials and equipment, select and underline those items that are shop equipment. Selection must be 100% accurate.

(1) Shop tools, hand tools, and equipment

(a) Pipe vise

(b) Pipe cutter

(c) Pipe reamer

(d) Pipe dies

(e) Tube cutters

(f) Tube benders

(g) Flaring tools

(h) Joint runners

(i) Melting furnace

(j) Power threaders

(k) Bench grinders

(l) Chain tongs

(m) Wrenches

(n) Pliers

(o) Hacksaws

(p) Hammers

(q) Cold chisels

(r) Rulers

(s) Level

(t) Plumb bob

(u) Files

(v) Screwdrivers

(w) Brace

(x) Bits

(y) Saws

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(2) Materials

(a) Oakum

(b) Lead

(c) Solder

(d) Putty

(e) Nuts and bolts

(f) Pipe dope

(g) Hanging straps

(h) Nails

4f. Given an engineering drawing of a basement and second floor plumbing plan and a list of eight questions concerning the type, location and configuration of the plumbing system, correctly answer each question.

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(1) Blueprints

(a) Definition - engineering drawings that show the type, location and configuration

(b) Plot plan - building and streets identified by symbols

(c) Roof

(d) Floor

(e) Elevation

(f) Foundation

(g) Maps

1 Water

2 Gas

3 Drainage

4 Air

(2) Working drawing

(a) Top

(b) Side

(c) Isometric

(3) Bill of materials

(a) Can be obtained from

1 Engineering drawings

2 Working drawing

3 Specification sheets

(b) Purpose

1 List materials needed

2 For project

3 Save time

4 Save money

APPLICATION:

Have student complete WB 3ABR55235-I-4-P2 thru P5.

EVALUATION:

Evaluate by oral, written questions, and/or observation of student's performance during lesson. This may be accomplished at any time during lesson for increased effectiveness.

CONCLUSION (10 Minutes)

SUMMARY:

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REMOTIVATION:

STUDY ASSIGNMENT:

Complete next study guide and answer questions. 3ABR55235-I-5.

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LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE: TCETC/8Aug75	INSTRUCTOR:
COURSE NUMBER: 3ABR55235	COURSE TITLE: Plumbing Specialist
BLOCK NUMBER: I	BLOCK TITLE: Introduction to Plumbing

LESSON TITLE: Exterior Sewer Systems (Day 5)

LESSON DURATION

CLASSROOM/LABORATORY	COMPLEMENTARY	TOTAL
4 Hrs	0	4 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
8	2 July 1975	6

STS/CTS REFERENCE

NUMBER	DATE
STS 552X5	15 February 1973, Chg 1, 25 Feb 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Septic Tank	Shoring Jacks	None	SG I-6 WB I-6-P1; P2 Slides: Exterior Plumbing System TF, FLC 19/0286

CRITERION OBJECTIVES AND TEACHING STEPS

6a. Given a sketch of an exterior sewage collection system, name the major components of the system. All items must be named correctly.

(1) Building sewer
(2) Mains
(3) Manholes
(4) Lift station
(5) Treatment plant

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

6b. Grade and backfill a trench to a fall of 1/4 inch per foot from an existing building drain to the inlet of an installed septic tank. (The backfill procedures may be simulated.)

(1) Purpose to assure proper fall per foot of a sewer line.
(2) Methods of grading
(3) Shoring methods
(4) Backfilling procedures

Course No: 3ABR55235
Day 5

Branch Approved: Robert Harper
Date: 8 August 1975

PART II

INTRODUCTION (45 Minutes)

CHECK PREVIOUS DAYS STUDY ASSIGNMENT:

DAILY QUIZ

REVIEW:

ATTENTION:

OVERVIEW:

MOTIVATION:

BODY (3 Hours 5 Minutes)

PRESENTATION:

6a. Given a sketch of an exterior sewage collection system, name the major components of the system. All items must be named correctly.

(1) Building sewer

(a) Function-conveys waste from the building to the main sewer or a point of disposal

(b) Construction

1. Materials

a. Cement asbestos

b. Vetrified clay

c. Cast iron

d. Plastic

e. Fittings

2 Design

a 3 inch diameter or less, fall not less than 1/4 inch per foot

b Larger than 3 inch, fall is 1/8 inch/foot

(2) Mains

(a) Function-conveys sewers from submains, laterals, outfall to disposal plant

(b) Construction

1 Lateral sewer

a Building sewer to submain

b Found in alley or street

2 Submain

a Receives sewer from 2 or more laterals

b Conveys sewer from laterals to sewer main

3 Sewer main

a Receives sewer from submain, laterals and building sewer

b Conveys sewer to outfalls sewer

4 Outfall sewer

a Recieves all sewer

b Conveys all sewer to disposal plant

(3) Manholes

(a) Function

1 Allow access to sewer for cleaning

2 Change direction sewage flow

(b) Construction

1 Brick and concrete body

2 Cast iron lid

3 Located at end of laterals

4 Not to exceed 300 feet apart

(4) Lift station

(a) Function-pump sewage to a higher elevation

(b) Construction

1 Concrete enclosure

2 Submergible pump/controls

3 Located where gravity will not allow sewage to flow to treatment plant

(5) Treatment plant

(a) Function

1 Removes disease producing organism from liquid

2 Removes solids from liquid

3 Removes unpleasant odor

(b) Construction

1 Grit chamber-removes inorganic materials (sand, gravel)

2 Bar screen-removes floating materials

3 Settling tank-allows heavy object to settle out of liquid

6b. Grade and backfill a trench to a fall of 1/4 inch per foot from an existing building drain to the inlet of an installed septic tank. (The backfill procedures may be simulated.)

(1) Purpose to

(a) Loose dirt causes settling

(b) Settling causes bad joints and sagging pipe

(2) Methods of grading

(a) Engineers transit

(b) Butter board

(c) Level

(d) String level from Bldg drain to highest septic tank opening.

(3) Shoring methods

(a) Purpose-to prevent cave in

1 Dept of trench

2 Type of soil

(b) Materials

1 1 x 6 boards

2 Plywood

3 Shoring jacks

a Spacing determined by soil

b Spacing determined by depth trench

NOTE: Demonstrate grading a trench.

(4) Back filling procedures

(a) Fill and tamp bottom

(b) Fill 3 to 4 inches of soil on sides of pipe

(c) Cover pipe with 6 inches to fill

(d) Continue with 9-12 inches layers of backfill

(e) Overfill

APPLICATION:

Have students complete SW 3ABR55235-I-6-P1 and P2, Evaluate.

EVALUATION:

Evaluate by oral, written questions, and/or observation of student's performance during lesson. This may be accomplished at any time during lesson for increased effectiveness.

CONCLUSION (10 Minutes)

SUMMARY:

REMOTIVATION:

STUDY ASSIGNMENT: Read SG 3ABR55235-I-7 and answer questions at the end of SG

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE	INSTRUCTOR
TCETC/8Aug75	
COURSE NUMBER	COURSE TITLE
3ABR55235.	Plumbing Specialist
BLOCK NUMBER	BLOCK TITLE
I	Introduction to Plumbing

LESSON TITLE
Maintenance of Tools (Day 5)

LESSON DURATION

CLASSROOM/LABORATORY	COMPLEMENTARY	TOTAL
2 Hrs	0	2 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
10	2 July 1975	7

STS/CTS REFERENCE

NUMBER	DATE
552X5	15 February 1973, Chg 1, 25 Feb 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Bench grinder Plumber's hand tools	Face Shield	None	SG I-7 WB I-7-P1 TO 32-1-101

CRITERION OBJECTIVES AND TEACHING STEPS

7a. Inspect and maintain plumber's hand tools in accordance with TO 32-1-101.

(1) Categories of tools
(2) Inspection and maintenance

7b. Using a grinder, dress and sharpen a cold chisel as required in accordance with TO 32-1-101.

(1) Types of grinders
(2) Use of a bench grinder
(3) Safety precautions

ATC FORM AUG 72 770

Course No: 3ABR55235
Day 5

Branch Approval: Robert B. Haywood
Date: 8 August 1975

PART II

INTRODUCTION (5 Minutes)

CHECK PREVIOUS DAYS STUDY ASSIGNMENT

REVIEW: NONE

ATTENTION:

Have you ever tried to do a job and you didn't have the right tools available?

OVERVIEW:

Today we will discuss: (1) Inspection and maintenance of tools
(2) Use of Bench grinder

MOTIVATION:

TO DO a job you must have the right tool and it must be in good shape.

BODY (2 Hours 45 Minutes)

PRESENTATION:

7a. Inspect and maintain Plumber's Hand tools in accordance with TO 32-1-101.

(1) Categories of tools

(a) Hand

(b) Shop

(c) Special

(2) Inspection and maintenance (inspect tools before and during use)

(a) Hand tools

1 Pipe wrenches

a Sharpen teeth with file

b Replace worn parts

c Clean and oil

2 Pliers

a Keep teeth clean and sharp

b Keep pivot pin tight

c Clean and oil

3 Swing brace

a Lubricate brace bearing

b Do not disassemble chuck

c Do not drop the brace for the wood parts will break

4 Bits

a Sharpen nibs and lips

b If spur is damaged, turn bit in

5 Hammers

a Clean and oil heads

b Check and replace broken handles

c Grind face

6 Center punch

a Grind to cone shape

b Check to assure 90° angle

c Grind mushroom heads

7 Cold chisel

a Grind to proper angle

aa. 90° hard metal

bb. 70° soft metal

b. Grind mushroom heads

c. To temper for hardness

aa. Heat to cherry red

bb. Dip cutting about 1-1/4" in cold water

cc. Dip head about 1" in cold water

dd. Polish harden ends with file or abrasive cloth

ee. When red disappears, dip entire chisel

8. Screwdriver

a. Grind sides parallel

b. Square tip

c. Temper similiar to chisels

9 Rulers

a Lubricate joints

b Keep clean

c Use care when folding and unfolding

10 Tapes

a Lubricate lightly

b Keep clean

c Roll up when not in use

11 Level

a Avoid careless handling

b Store in safe place

12 Plumb Bob

a Replace string when frayed

b Wrap string up when not in use

c Keep metal oiled

13 Goggles

a Keep clean and protected.

b Replace if broken

14 Gloves

a Clean with saddle soap

b Check for holes

c Replace if torn

(b) Special Tools

1 Tapering tool

2 Watermain taping maching

3 Sewer snakes

4 Pipe threaders (Before operating make sure pipe is secure.)

(c) Shop tools

1 Chain Vise

2 Chain tongs

3 Melting furnace

4 Bench grinder

7b. Using a grinder, dress and sharpen a cold chisel as required in accoradnce with TO 32-1-101.

(1) Types of grinders

(a) Hand grinder

(b) Bench grinder

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(c) Stand grinder

(2) Use of bench grinder

(a) Perform peroperation inspection

1 Check power cord

2 Check switch

3 Check grinding wheel

(b) Adjust tool rest

(c) Remove all jewelry

(d) Turn on grinder allowing it to reach peak RPM

(e) Grind tool in accordance with TO 32-1-101

(3) Safety precautions

(a) Never wear jewelry while operating grinder

(b) Never wear glove while using grinder

(c) Always give grinder a preoperation inspection

(d) Always wear safety shield when using grinder

(e) Always wear long sleeved garment when using grinder

NOTE: Demonstrate grinder to students.

APPLICATION:

Have the students operate the grinder and sharpen a cold chisel using WB I-7-P1. (This will be accomplished as required during Day 6)

EVALUATION:

Evaluate by oral, written questions, and/or observation of student's performance during lesson. This may be accomplished at any time during lesson for increased effectiveness.

CONCLUSION (10 Minutes)

SUMMARY:

Today we have discussed tools, and how they should be maintained, Why tools should be checked before and during use, and how sharpen tools using a bench grinder.

REMOTIVATION:

Care and use of all tools is very important to all tradesmen. Without this knowledge a person is a hazard on any contruction or maintenance job.

STUDY ASSIGNMENT:

Read study guide on installation of building sewers and answer the questions at the end of the study guide. 3ABR55235-I-8

LESSON PLAN (Part I, General)

APPROVAL OFFICER AND DATE [illegible]	INSTRUCTOR MASTER COPY
COURSE NUMBER 3 [illegible]5235	COURSE TITLE Plumbing Specialist
BLOCK NUMBER I	BLOCK TITLE Introduction to Plumbing

LESSON TITLE
Installation of Building Sewer Systems (Day 6)

LESSON DURATION

CLASSROOM/LABORATORY	COMPLEMENTARY	TOTAL
6 Hrs	0	6 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
11	2 July 1975	8

STS/CTS REFERENCE

NUMBER	DATE
552X5	15 February 1973, Chg 1, 25 Feb 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE
Bobby Littlejohn	8 Aug 75		

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Water Pump Shop and Special Tools Hand tools	Snap cutters Trowels	None	SG I-8 WBs I-8-P1 thru P3 Slides: Installing Sewer System

CRITERION OBJECTIVES AND TEACHING STEPS

8a. Given operating procedures and working as a team member, pump all standing water from a trench or reservoir.

(1) Manually draining a trench
(2) Mechanical pumps

8b. Cut a section of vitrified pipe with a hammer and chisel. Completed work must be ± 1/8" of a given length.

(1) Tools for cutting
(2) Cutting procedures

8c. Using oakum and mortar, assemble a clay tile joint. Mortar must be tapered approximately 45° from end of bell to pipe.

(1) Methods used for assembly
(2) Tools and materials
(3) Procedures
(4) Thimbles

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Course No: 3ABR55235
Day 6

Branch Approval: [illegible]
Date: 8 August 1975

PART II

INTRODUCTION (45 Minutes)

CHECK PREVIOUS DAYS STUDY ASSIGNMENT:

REVIEW:

ATTENTION:

OVERVIEW:

MOTIVATION:

BODY (5 Hrs and 5 minutes)

PRESENTATION:

8a. Given operating procedures and working as a team member, pump all standing water from a trench or reservoir.

(1) Manually draining a trench

(a) Digging a drainage trench or ditch

(b) Bailing trench out using buckets

(2) Mechanical pumps

(a) Diaphragm pump

(b) Centrifugal pump

NOTE: Before using preform a visual check (preoperative check)

8b. Cut a section of vitrified pipe with a hammer and chisel. Completed work must be ±1/8 of given length.

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(1) Tools for cutting

(a) 8 oz ball peen hammer

(b) 1/4 inch cape chisel

(c) 1/2 inch cold chisel

(d) Gloves

(e) Face shield

(2) Cutting procedures

(a) Sound out pipe

(b) Measure and mark (Base of bell to end of spigot).

(c) Lay pipe on mound of dirt, or wood blocks

(d) Score pipe with cape chisel and hammer (rotate pipe so chisels on top)

(e) Cut pipe with cold chisel and hammer

(f) Sound out cut pipe

8c. Using oakum and mortar, assemble a clay tile joint. Mortar must be tapered approximately 45^0 from end of bell to pipe.

(1) Methods used for assembly

(a) Lead and oakum (cast iron pipe only)

(b) Cement and oakum (2 parts sand, 1 part cement)

(c) Bituminous compound and oakum (restricts root growth)

(d) Precast rubber seals

(2) Tool and material

(3) Procedures

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(4) Thimbles

(a) Lay out a thimble

(b) Cutting procedures

APPLICATION:

Have students complete WB 3ABR55235-I-8-P1, WB 3ABR55235-I-8-P2, Part I, WB 3ABR55235-I-8-P2, Part II, and WB 3ABR55235-I-8-P3.

EVALUATION:
Evaluate by oral, written questions, and/or observation of student's performance during lesson.

CONCLUSION (10 Minutes)

SUMMARY:

REMOTIVATION:

STUDY ASSIGNMENT: SG 3ABR55235-I-9. Read and answer questions.

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE	INSTRUCTOR
TCETC/11 Aug 75	
COURSE NUMBER: 3ABR55235	COURSE TITLE: Plumbing Specialist
BLOCK NUMBER: I	BLOCK TITLE: Introduction to Plumbing
LESSON TITLE: Individual Waste Disposal Systems (Day 7 & 8)	

LESSON DURATION		
CLASSROOM/Laboratory	LABORATORY Complementary	TOTAL
12 Hours	0	12 Hours

POI REFERENCE		
PAGE NUMBER	PAGE DATE	PARAGRAPH
13	2 Jul 75	9

STS/CTS REFERENCE	
NUMBER	DATE
552X5	15 February 1973, Chg 1, 25 Feb 1974

SUPERVISOR APPROVAL			
SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION			
EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Tapering Tools Shop Tools		NONE	SG I-9 WB I-9-P1, P2 FLC 9/209, Principles of Operation and Design of Septic Tanks FLC 9/210, Typical Household Systems

CRITERION OBJECTIVES AND TEACHING STEPS

9a. View training films FLC 9/209, Principles of Operation and Design of Septic Tanks, and FLC 9/210, Typical Household Systems. Sketch a typical household septic tank system and name the major components. All major components must be included and correctly named.

(1) Use
(2) Purpose
(3) Construction
(4) Maintenance
(5) Distribution
(6) Leaching or drainage field
(7) Types of Joints

ATC FORM AUG 72 770

LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

9b. Cut bituminous fiber pipe with a handsaw. Complete work must be square with the end of the pipe and within ± 1/8 inch of given length.

(1) Types of handsaws suitable
(2) Procedures
(3) Safety precautions

9c. Using a tapering tool, cut a taper on a fiber pipe so that a coupling can be installed to fit snugly.

(1) Purpose of tapering
(2) Tapering procedures

9d. Following prescribed procedures and using either bituminous fiber or plastic pipe with swedged connections, assemble a typical leaching field to a grade of 2 to 6 in fall per 100 feet.

BODY (11 Hours)

PRESENTATION:

9a. View training films FLC 9/209, Principles of Operation and Design of Septic Tanks, and FLC 9/210, Typical Household Systems. Sketch a typical household septic tank system and name the major components. All major components must be included and correctly named.

(1) Use

(a) When public sewer connection is not feasible

(b) When community or private sewer system and treatment plant not available

(2) Purpose

(a) Hold soluable influent until changed into a liquid form by bacterial action (animal and vegetable solids)

(b) Hold insoluable influent until separation occurs and septic tank is cleaned

(3) Construction

(a) Design

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Course No: 3ABR55235
Days 7 & 8

Branch Approval: [signature]
Date: 11 August 1975

PART II

INTRODUCTION (45 Minutes)

CHECK PREVIOUS DAYS STUDY ASSIGNMENT:

REVIEW:

ATTENTION:

OVERVIEW:

MOTIVATION:

1 Best when bacteria scum is undisturbed

2 Single compartment tanks

3 Multi-compartment tanks

4 Minimum size 500 gallons

(b) Components

1 Manholes

2 Baffles

3 Pipe inlet and outlet

4 Invert

5 Dosing chambers

(c) Capacity

(d) Connection with garbage disposal 50% larger

(e) Hermetical seal

(f) Material selection

1 Must resist corrosion

2 Resist earth loads

(g) Common materials

1 Concrete

2 Brick-mortar joints

3 Metal-corrosion treated

4 Plastic

5 Fiberglass

6 Cinder block-mortar joints

(h) Installation techniques

1 Inplace construction

2 Pre-fab installations

(i) General dimensions and requirements

(4) Maintenance

(a) Cleaning

1 Pumping

2 Flushing

(b) Repair

(5) Distribution

(a) Box

1 Purpose-to distribute liquid to all distribution lines evenly

2 Construction and installation

(b) Heater

1 Purpose-same as for distribution box

2 Construction and installation

(6) Leaching or drainage field

(a) Factors to consider

1 Lay of the land

2 Water supply-location of lakes

3 Types of soil

(b) Distribution lines

1 Construction

a Depth-18" thru 24"

b Grade-2" thru 6"/100 ft
(Best is transit)

c Width-18" thru 24"

d Space between lines-min6'

e Gravel bed-min of 6"

2 Materials

a Perforated pipe (facing down)

b Open joint clay tile

c Untreated building paper

(7) Types of joints

(a) Split coupling

(b) Solid coupling (Swedged connections)

(c) Open joint

9b. Cut bituminous fiber pipe with a handsaw. Completed work must be square with the end of the pipe and within ± 1/8 inch of given length.

(1) Types of handsaws suitable

(a) Crosscut

(b) Rip (Use strap vise to hold)

(2) Procedures

(a) Measure and mark pipe

(b) Place pipe in vice

(c) Oil saw

(d) Use drip pan

(e) Use long even strokes applying oil as required

(3) Safety precautions

(a) Wear gloves to protect hands

(b) Avoid oil spills to prevent falls

9c. Using a tapering tool, cut a taper on a fiber pipe so that a coupling can be installed to fit snugly.

(1) Purpose of tapering--enable ends of pipe to be joined by swedges connection

(2) Tapering procedures

(a) Wipe inside and outside of pipe to remove cuttings and foreign material

(b) Always read instructions when using tapering tool

(c) Insert tapering tool insuring that it is centered and tightened

(d) Turn handle clockwise cutting a 2^{o} taper

(e) Remove tapering tool and inspect taper

(3) Safety precautions

(a) Wear gloves to protect the hands

(b) Be extremely careful with cutting blade which is very sharp

APPLICATION:

Complete Parts I, II, and III of WB 3ABR55235-I-9-P1.

EVALUATION:

Evaluate by oral, written questions, and/or observation of students performance during lesson.

CONCLUSION (DAY 7) (5 Minutes)

SUMMARY:

STUDY ASSIGNMENT:

Have students study SG 3ABR55235-I-9 and review their notes.

INTRODUCTION (Day 8)

CHECK PREVIOUS DAYS STUDY ASSIGNMENT

REVIEW:

OVERVIEW:

MOTIVATION:

PRESENTATION:

9d. Following prescribed procedures and using either bituminous fiber or plastic pipe with swedged connections, assemble a typical leaching field to a grade of 2 to 6 inch fall per 100 feet.

(1) Advantages and application of swedged connections

(2) Tools

(a) Hammer

(b) Board

(3) Swedging procedures

(a) Place coupling on tooled end by hand

(b) Place another pipe into other side of coupling

(c) Place coupling no. 2 on other end of pipe no. 2

(d) Place board over end of coupling no. 2 insuring coverage of complete coupling

(e) Drive entire arrangement using hammer

(4) Trench Preparation

(a) Place stake at each end of the trench 2 feet beyond each end and near one side

(b) Stretch string between stakes and level

(c) Determine fall required

(d) Adjust string to fall per foot

(e) Using a stick with required depth marked, grade the trench and fill with 6" of gravel

(5) Procedures for laying and checking the pipe

(a) Assemble pipe-outside trench

(5) Checking with grade stick

(6) Backfill procedures

(a) Gravel-2" minimum over pipe

(b) Top soil-free of rocks and foreign materials

APPLICATION:

Complete Part I, II, and III of ~~WB-3ABR55235-I-9-P1~~

EVALUATION:

Evaluate by oral, written questions, and/or observation of students performance during lesson.

CONCLUSION (10 Minutes)

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SUMMARY:

REMOTIVATION:

STUDY ASSIGNMENT:

Read SG 3ABR55235-I-10, answer the questions at the end of the text and review for measurement test over block I.

LESSON PLAN (Part I, General)

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APPROVAL OFFICE AND DATE Aug 75	INSTRUCTOR MASTER COPY
COURSE NUMBER 3ABR55235	COURSE TITLE Plumbing Specialist
BLOCK NUMBER I	BLOCK TITLE Introduction to Plumbing

LESSON TITLE

Structural Openings (Day9)

LESSON DURATION

CLASSROOM/Lab	LABORATORY	TOTAL
4 Hrs	0	4 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
14	2 Jul 73	10

STS REFERENCE

NUMBER	DATE
55235	1973, Chg 1, 25 Feb 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE
Bobby Littlejohn	11 aug 75		

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Shop Tools	Keyhole Saw Brace and Bits Frame Square Dividers	NONE	SG I-10 WB I-10-P1 Manufacturer's Rough-in Specifications Slides: Structural Openings

CRITERION OBJECTIVES AND TEACHING STEPS

10a. Using working drawings and manufacturer's rough-in specifications, mark the openings for pipe passage through structural members. Marks must be within ± 1/8 inch of specifications.

(1) Types of structures
(2) Types of wood buildings
(3) Masonry buildings
(4) Metal buildings
(5) Structural members

ATC FORM AUG 72 770

10b. Given five different situations which require a hole to be cut in a structural member and five hole-cutting tools, select the tool which is best suited to accomplish the task.

(1) Keyhole saw
(2) Brace and bits
(3) Wood chisels
(4) Star drill
(5) Masonry bit
(6) Tin snips
(7) Power drill
(8) Cutting torch

10c. Using the procedures provided and working as a member of a team, cut holes in the booth area for the passage of pipe. The completed holes must be within ± 1/8 inch of specifications.

(1) Blueprints
(2) Working drawings
(3) Types of openings
(4) Shower drain
(5) Water closet drain

Course No: 3ABR55235
Day 9

Branch Approval: [signature]
Date: 11 August 1975

PART II

INTRODUCTION (5 Minutes)

CHECK PREVIOUS DAYS STUDY ASSIGNMENT

REVIEW:

ATTENTION:

OVERVIEW:

MOTIVATION:

BODY (110 Minutes)

PRESENTATION:

10a. Using working drawings and manufacturer's rough-in specifications, mark the opening for pipe passage through structural members. Marks must be with ± 1/8 inch of specifications.

(1) Type of structures

(a) Wood

(b) Masonry

(c) Metal

(2) Types of wood buildings

(a) Box

1 Single wall,

2 Piping exposed

3 Usually for temporary use

(b) Frame

1 Double wall

2 Piping concealed

3 Usually for permanent use

(3) Masonry buildings

(a) Brick

(b) Stone

(c) Cement blocks

(d) Concrete

(4) Metal buildings

(a) All piping exposed

(b) Sheet metal covering fastened to a metal frame

(5) Structural members

(a) Foundation

(b) Sill

(c) Floor joist

(d) Subflooring

(e) Sole plate

(f) Studs

(g) Top plate

(h) Rafters

(i) Ceiling joist

(j) Rafters

(k) Roof decking

10b. Given five different situations which require a hole to be cut in a structural member and five hole-cutting tools, select the tool which is best suited to accomplish the task.

1

(1) Keyhole saw

(2) Brace and bit (3" and under, can use expansion bit)

(3) Wood chisel

(4) Star drill

(5) Mousonary bit

(6) Tin snips

(7) Power drill

(8) Cutting torch

(9) Hand saw

(a) Rip saw

(b) Cross cut

10c. Using the procedures provided and working as a member of a team, cut holes in the booth area for the passage of pipe. The completed holes must be within ± 1/8 inch of specifications.

(1) Blueprints

(a) Show location of all fixtures (refer to blueprints before cutting holes)

(b) Gives all of the dimensions for the building

(c) Gives the exact location of windows, wall, and doors

(2) Working drawings

(a) Side view

(b) Top view

(c) Isometric view

(3) Types of opening

(a) Overcut

(b) Undercut

(c) Center cut

(4) Shower drain

(5) Water closet drain

APPLICATION:

Complete WB3AMR55235-I-10-P1.

EVALUATION:

Evaluate by oral, written questions, and/or observation of students performance during lesson.

CONCLUSION (10 Minutes)

SUMMARY:

REMOTIVATION:

STUDY ASSIGNMENT:

Read SC 3ABR55235-11-1 and answer questions.