

Station Installation Manual

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Continental Telephone System

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CONTINENTAL TELEPHONE SYSTEM

STATION INSTALLATION MANUAL

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STATION INSTALLATION MANUAL

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**PART II: TOOLS, GAUGES, TEST EQUIPMENT,
MISCELLANEOUS METHODS AND
EQUIPMENT**

**PART III: COMMON CUSTOMER EQUIPMENT
GENERAL INSTALLATION**

PART IV: PROTECTION AND GROUNDING

PART V: STATION APPARATUS

PART VI: OUTSIDE PLANT

This manual is intended for the use of installation craftsmen in their daily jobs. The information in this manual will also be of value to other craftsmen such as construction linemen, cable splicers, and key telephone installers.

The master table of contents is in numerical sequence by part, as are the practices in the manual.

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PLANT PRACTICES NUMERICAL INDEX

1. GENERAL

1.01 This practice provides a numerical index of all subjects covered in all divisions of Continental Telephone System Practices—Plant Series.

1.02 Distribution Codes:

a. Distribution for all Plant Series practices will show the Roman numerals IV, followed by parenthetic alphabetical codes, as applicable. For example, a Plant Series practice to be used by Central Office and PABX personnel will show: Distribution IV (B C).

b. The established alphabetical distribution codes for Plant Series practices applicable to particular groups are:

A—Radio

B—Central Office

C—PBX

D—Outside Installer

E—Splicer

F—Construction

G—Management

H—Service Center

J—Warehouse

T—Teletype-Data

1.03 A dot (•) indicates an item that has been added since the issue of Supplement XXV.

1.04 An asterisk (*) indicates an item that has been replaced since the issue of Supplement XXV.

1.05 The Issue Number is one (1) unless otherwise indicated.

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400-000-001	4	Numerical Index—Division 400—General Plant	5	A B C D E F G H J
400-000-002		Plant Practices Numerical Index—Supplement XXVI	58	A B C D E F G H J T
400-000-003	3	Ordering Information, Continental Telephone System Practices—Plant Series	4	A B C D E F G H J
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400-100-002WD		Daily Toll Transmittal Procedures		
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• 400-100-003	2	Secrecy of Communications	5	A B C D E F G H J
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		Requisition Procedures	14	A B C D E F J
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• 400-190-001		Interconnection Record Keeping and Reporting Procedures for Customer Provided Equipment (CPE)	10	A B C D E F G H J
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• 400-210-010		Energy Conversation Guidelines	5	A B C D E F G H J
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400-300-009		Private Line & Toll Message Circuits (Form 1616) Circuit Order Test	5	B C
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410-705-601		E2B, E3B, E4B, SF Unit—Lineup	16	B

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410-800-301		Amplifier, Altec S-17T—Description, Installation & Assignment	10	B
410-805-600		Repeater, Voice, R-651/R-651D, Lineup Procedures Lear Siegler	27	B
410-805-601		Repeaters, Voice Frequency, R-635/R-635D Lear Siegler	4	B
410-850-610		Model NA-400 Ventilator for Telephone Equipment Cabinets—Installation and Maintenance	4	B C D
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420-000-000	5	Numerical Index—Division 420—Power	3	B C
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420-010-200		EML—Power Equipment Instructions	1	A B C
420-010-201	2	EML—Power—Tone Supplies, Generators, Rectifiers & Charges	3	A B C
420-020-201	3	EML—Power Batteries	2	A B C
420-050-201	2	EML—Power Interrupters & Ringing Machines	3	A B C
420-060-201		EML—Power—Power Plants & Power Supplies (Power Board)	2	A B C
GENERAL PROCEDURES				
420-099-001	2	Emergency Procedures Commercial Power Failure	3	B
420-099-050		Ringing Schemes	16	B C
INSIDE PLANT—ALTERNATORS, ENGINE ALTERNATORS, GAS TURBINE ALTERNATORS, TONE ALTERNATORS, TONE MACHINES, RINGING & COIN CONTROL GENERATORS, CHARGING GENERATORS & MOTOR GENERATORS				
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420-100-325		Tone Supply, Transistorized MF or Dual Frequency A.E. Co.	4	B
420-100-340		Multifrequency Current Supply S-C Corp.	5	B C
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420-100-600	3	Standby Generator Routine	1	B C
420-100-601		Multicycle Ringing Converter, D-55361 A.E. Co.	7	B C
420-100-602		Rectifier, Model U10KB Flotrol Lorain	3	B C
420-100-603		Rectifier, Model BE150B Lorain	5	B C
420-100-604		Rectifier, Model BE300B Flotrol Lorain	4	B C
420-100-605		Charger, End Cell (6.5V), Model 24E Flotrol Lorain	4	B C
420-100-606		Charger, End Cell (6.5V), Model 130E Flotrol Lorain	5	B C

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420-100-625		Tone Supply, Transistorized MF or Dual Frequency	A.E. Co. 3	B
420-100-639		Multifrequency Current Supply (S-428016)—Maintenance Procedures & Parts List	S-C Corp. 18	B
420-100-640		Multifrequency Current Supply Maintenance	3	B C
420-100-641		Ringing & Tone Equipment, Vibrator Type	S-C Corp. 4	B C
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420-100-700		Ringing Machines, Ringing Converters & Coin Box Batteries—Output Voltage Measurements	3	B C
420-100-726		Test & Control Equipment, 1000 Hz	W.E. Co. 6	B
420-100-727		Tone Generators Adjustment & Tone Level Measurement	9	B
INSPECTION				
420-100-810		Rectifier, Dry Disc Type	2	B
420-110-305		A.E. Co. Transistorized MF or Dual Frequency Tone Supply-Transfer Alarm and Resistance Distr. Unit (H-850243-A) Description and Operation	6	B
OUTSIDE PLANT—ALTERNATORS, ENGINE ALTERNATORS, GAS TURBINE ALTERNATORS, CHARGING ALTERNATORS & MOTOR GENERATORS				
420-150-300		Generator, Portable, Homelite Model 35A115—Description, Operation and Maintenance	5	E F
420-150-600		Generator, Portable, Onan Model 205 AJ-IP—Description, Operation & Maintenance	6	C D E F
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420-200-602		Battery Maintenance Procedures for Lead-Acid/Lead Antimony-Acid & Lead Calcium Type Batteries	14	A B C
420-200-805		Counter Cells, NAK & SAK Types—Inspection & Alkaline Solution Replacement	5	B
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420-400-301		Lorain Model T8T DC to DC Converter—Description	5	B
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420-400-401		Lorain Model T8T DC to DC Converter— Installation	8	B
420-400-405		Lorain Model CST1 Carrier Supply Unit DC to DC Converter—Installation	7	B
420-400-601		Lorain Model T8T DC to DC Converter— Maintenance	4	B
420-400-605		Lorain Model CST1 Carrier Supply Unit DC to DC Converter—Maintenance	11	B
420-405-601		Compressor Dehydrator (For Waveguide) Andrew Type 1920A Description & Maintenance	7	A B
420-405-602		Compressor Dehydrator (For Waveguide) Andrew Type 1930 Description & Maintenance	10	A B
• 420-405-615		Air Dryers Frigidryer Models 750, 1500, 3000, 5000 Maintenance	5	B C D E F
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420-500-300	2	Sub-Cycle Ringing Generator, Model LT-15 Lorain	14	B C
420-500-301		Ring Generator Control Panel, Model C20 Lorain	3	B C
420-500-302		Sub-Cycle Ringing Generator, Model T-50 Lorain	3	B C
420-500-303		Sub-Cycle Ringing Generator, Model T-25 Lorain	3	B C
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420-500-400	2	Model LT-15 and Model LT-15R Sub-cycle Ringing Generator Installation Lorain	4	B C
420-500-401		Ring Generator Control Panel, Type C20 Lorain	4	B C
420-500-402		Sub-Cycle Ringing Generator, Model T50 Lorain	3	B C
MAINTENANCE				
420-500-600	2	Sub-Cycle Ringing Generator, Model LT-15 Lorain	3	B C
420-500-601		Ring Generator Control Panel, Type C20 Lorain	3	B C
420-500-602		Sub-Cycle Ringing Generator, Model T-50 Lorain	5	B C
420-500-603		Sub-Cycle Ringing Generator, Model T-25 Lorain	5	B C
420-500-611		Ringing & Signaling Machine S-C Corp.	11	B
420-500-612		Ringing & Signaling Machine, 24 Volt USI	6	B C
420-500-613		Rotary Interrupter Equipment S-C Corp.	3	B
420-500-614		Motor Interrupter Adjustment USI	10	B

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420-500-625		Ringling Machine Governor	Lee 3	B
420-500-910		Rotary Ringling Machines— Lubrication & Inspection	4	B
420-501-304		S-C Electronic Ringling Generator Model RGI-25 Description	5	B
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420-501-605		S-C Standard Ringling Frequency Generator (437404-169/289) Adjustments	6	B
420-501-701		North Electric NX-1D/UN-1—Tone, Flashing & Distribution Unit—Test Procedures	3	B
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420-600-600		Rectifier, Power Supply (130V), Model CS1A	Lorain 3	B C
420-600-710		Power High-Low Voltage Relays	A.E. Co. 10	B
420-600-711		Electronic High-Low Voltage Alarm Circuit	A.E. Co. 2	B
420-600-802		Fuses & Fuse Panels—Inspection & Testing	13	B
420-600-803		Power Plant Meters—Inspection & Calibration	2	B
420-601-602		Busbars—Maintenance, Taping and Cleaning	3	A B C
420-625-401		Power Plants, Key Telephone Systems—Installation & Selection	8	C D
420-625-402		Power Plants Located on Customer Premises—Installation	4	C D
SWITCHING EQUIPMENT				
GENERAL				
430-000-000	6	Numerical Index—Division 430—Switching	10	B C
• 430-002-605/ 530-725-605		Control of Atmospheric Environment for Telephone Switching System	5 5	A B C V
AUTOMATIC ELECTRIC COMPANY SXS SWITCHING SYSTEM EQUIPMENT MAINTENANCE LISTS (EML)				
430-010-200		SXS Switching System Instructions	1	A B C
430-010-201		EML—Linefinders & Lineswitches	4	A B C
430-010-202		EML—Selectors	3	A B C
430-010-203		EML—Connectors	3	A B C
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430-010-205	2	EML—Trunks & Trunk Circuits	17	A B C
430-010-206		EML—Alarms	2	A B C
430-010-207		EML—SATT & Associated Equipment	21	A B C
430-010-208		EML—Directors	8	A B C
430-010-209		EML—Central Offices—General	2	A B C
430-010-210		EML—Miscellaneous Equipment	14	A B C
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430-020-200	2	Switching System Instructions	1	B C
430-020-201		EML—Linefinders	2	B C
430-020-202		EML—Selectors	2	B C
430-020-203		EML—Connectors	2	B C
430-020-204		EML—Rotary Out Trunk Switches	2	B C
430-020-205		EML—Trunks and Trunk Circuits	15	B C
430-020-206		EML—Alarms	2	B C
430-020-207		EML—DDD Equipment Type 40	13	B C
430-020-209		EML—Central Office—General	2	B C
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430-020-211		EML—Switchboards and Testboards	3	B C
430-020-220		Switching System Equipment Maintenance List DDD Equipment S-C Automatic Message Accounting (SCAMA)	11	B C
430-080-200		Automatic Electric Company Leich Switching System Instructions	1	B C
430-080-201		Automatic Electric Company Leich Switching System Equipment Maintenance List—Finders and Linefinders	3	B C
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430-095-201		Central Office Switching System— Trouble Tickets & Trouble Report Log Sheet	14	B
430-095-210		Record of Equipment & Trunks Made Busy	3	B
430-096-001		Preventing Service Interruptions— Coordinating Responsibilities Prior to Installation Operations in Central Offices	2	A B C
430-096-005		Preventing Service Interruptions— Preparation Before Starting C.O. Instal- lation Operations	3	A B C
430-096-007		Preventing Service Interruptions— Planning Ahead for Restoration of Service	1	A B C
430-096-010		Preventing Service Interruptions— General Causes of Service Interruptions	5	A B C
430-096-011		Preventing Service Interruptions— Precautions to be Observed During Instal- lation Operations	4	A B C
430-096-012		Preventing Service Interruptions— Planning and Preparations Prior to Power Transitions	2	A B C
430-096-013		Preventing Service Interruptions— Precautions to be Taken to Prevent Personal Injury or Building Damage	4	A B C
430-096-014		Preventing Service Interruptions— Precautions to be Taken on Private Line Service Equipment	2	A B C

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430-096-015		Preventing Service Interruptions— Precautions to be Taken to Prevent Maintenance Problems	2	A B C
430-096-025		Preventing Service Interruptions— Coordination and Responsibilities Prior to Construction Activity	1	A B C
430-096-201		Central Office Equipment Installation and Maintenance Activity Observation and Coordination	3	A B C
• 430-099-025		Central Office Evaluation Procedures	29	B G
430-099-202		Central Office Verification & Acceptance Test Procedures	30	A B C
AUTOMATIC ELECTRIC CO. SWITCHING				
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430-100-300		Test & Verification Switchtrain	4	B C
430-100-304		Reverting Call Equipment	20	B C
430-100-308		Intercept Service	21	B C
430-100-312		Step-by-Step Toll Switchtrain	9	B C
430-100-316		Rotary Stepping Switches	16	B C
430-100-324		The Linefinder	32	B C
430-100-331		The Selector	15	B C
430-100-336		The Connector	21	B C
430-100-338		Trunk & Level Hunting Connectors	16	B C
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430-100-617	2	A.E. Co. Minor Switch Adjustment	11	B C
430-100-618	2	A.E. Co. Type 13 (25 Point) and Type 14 (50 Point) Rotary Switches Adjustment	6	B C
430-100-620		Rotary Switch, Type 26	5	B C
430-100-622	2	A.E. Co. Types 40 & 44 Rotary Switch Adjustment	11	B C
430-100-623	2	A.E. Co. Type 45 Rotary Switch Adjustment	12	B C
430-100-628		Master Switch	2	B C
430-100-629		Plunger Lineswitch, Self-Aligning	10	B
• 430-100-641		Strowger Two-Motion Switches Repair and Replacement of Wipers	8	B C
430-100-642	2	Strowger Two-Motion Switches Adjustment of Wipers	16	B C
430-100-643	2	Strowger Two-Motion Switches Inspection and Adjustment	35	B C
430-100-644		Two-Motion Switches, Analysis of Failures & Correction of Faults—Pulsing Tests	3	B
• 430-100-648		Strowger Two-Motion Switches Replacing and Tying Wiper Cords	17	B C
FUNCTIONAL TESTING				
430-100-704		Reverting Call Switch—Functional Test	4	B C
430-100-708		Two-Motion Finder Switch, Intercepting Equipment—Functional Test	2	B C
430-100-724	3	Linefinder Equipment Functional Tests	3	B C

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430-100-725	3	Linefinders Equipment—Continuity Test	4	B C	
430-100-726		Primary Rotary Lineswitch—Continuity & Polarity Test	2	B	
430-100-727		Primary Rotary Lineswitches—Functional Test	2	B	
430-100-728		Master Switch for Plunger Lineswitch—Functional Test	2	B C	
430-100-729		Plunger Lineswitch, Self-Aligning—Functional Test	5	B C	
430-100-730		Fantail Plunger Lineswitch	7	B C	
430-100-731		Selector Operation and Level Test	2	B C	
430-100-733		Toll Selector or Toll Trunk—Operation Test	3	B	
430-100-734		Battery Searching Selectors Rotary Test	2	B	
430-100-735		Selector—Rotary Operation Test	2	B	
430-100-736		Connector—Operation Test	8	B C	
430-100-738		Local and Toll Level Hunting Connectors Functional Tests Using the Hand Test	2	B C	
430-100-740		Telephone			
430-100-745		Local and Combination Connectors—Functional Test Ring and Talk	2	B C	
430-100-746		Selector, Connector and Pulse Repeating Impulse—Operation Test	4	B C	
430-100-750		Service Code Equipment—Operation Test	2	B C	
430-100-758		Impulse Sender—Operation Test	3	B C	
430-100-760		Paystation Equipment—Operation Test	5	B	
			Coin Box Line & Associated Equipment—Discriminating Tone Test	2	B
INSPECTIONS					
430-100-829		Fantail & Self-Aligning Plunger Lineswitches Pivot Screws & B.C.O. Relays—Inspection	2	B	
430-100-855		Off Normals, Permanents & Switches Made Busy Test—Maintenance			
CLEANING & LUBRICATION					
430-100-916	2	A.E. Co. Rotary Switches Bank Cleaning Procedures	2	B C	
430-100-917	2	A.E. Co. Minor Switch Lubrication	2	B C	
430-100-918	2	A.E. Co. Type 13 Rotary Switch Lubrication	2	B C	
430-100-920	2	Rotary Switch, Type 26	2	B	
430-100-922		A.E. Co. Types 40 and 44 Rotary Switches Lubrication	2	B C	
430-100-923	3	A.E. Co. Type 45 Rotary Switch Lubrication	3	B C	
430-100-928		Master Switch	2	B	
430-100-929	2	Plunger Lineswitch	2	B	
430-100-942		Strowger Two-Motion Switches Banks & Wipers Cleaning Requirements & Procedure	8	B C	
430-100-943	2	Strowger Two-Motion Switches Lubrication Requirements and Procedures	7	B C	

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430-101-049		Inter-Office Trunks Engineering Applications & Pulsing Limits	14	B
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430-101-705		Toll Switching Trunks—General Functional Test	4	B
430-101-706		Outdial Trunks—General Functional Test	2	B C
430-101-707		Trunk Circuit, Type 62—Functional Test	2	B
430-101-709		SATT Sender, Type 62—Pulse Repeating Test	1	B
430-101-710		Trunks to Switchboards From Banks of Simplex Selectors	4	B
430-101-718		Rotary Switches, Out Trunk Rotary Secondary Equipment Type 13—Functional Test	6	B C
430-101-723		Rotary Switches, Out Trunk Rotary Secondary Equipment Type 45—Functional Test	2	B
430-101-750		Trunk & Signaling Circuits, Pulse Repeating Test (Percent Break)	8	B
430-101-752		CLR Trunks, Coin & Non-Coin, Functional Test	3	B
AUTOMATIC ELECTRIC CO. SATT ADJUSTMENT				
430-102-302		A.E. Co. Type 62 SATT Monitor Panel (Circuit H-850021) Description	9	B
430-102-602		62 SATT Monitor Panel, Calibration & Adjustments	3	B
430-102-640		Transender Shelf Pulsing Motor Adjustment	1	B
430-102-650		Tape Perforator, Model 122, Kleinschmidt	17	B
430-102-651		Tape Perforators, Teletype (BRPE-3)	4	B
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430-102-700		Ticketer Monitor Panel Pulse Generating Relays (PA1 and PA2) Pulsing (Percent Break & Pulses per Second) Tests	4	B
430-102-702	2	A.E. Co. Type 62 SATT Monitor Panel (Circuit H-850021) Test Procedures	7	B
430-102-705		SATT ONI Operator's Position Equipment, Functional Test	2	B
430-102-706		SATT ONI Operator's Trunk Circuit, Functional Test	2	B
430-102-709		Selector Level Adapter Functional Test	1	B
430-102-710		Single Digit Adapter Circuit H-75587 Functional Tests	2	B
430-102-711		Single Digit Adapter Circuit H-75588 Functional Tests	2	B
430-102-713		Dater-Timer, SATT System Time Setting & Operational Check	8	B
430-102-715		Tabulator PA Relay Pulse Repeating Test	2	B
430-102-722		SATT Ticketer—Pulsing Test	2	B
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430-102-741		Transender Codexer—Pulsing Test	3	B
430-102-742		Transender Bay Relay PS—Pulse Repeating Test	2	B
430-102-743		Transender Codexer CA Relay—Timing Test	2	B
430-102-744		Transender Codexer Unit—Functional Test	1	B
430-102-751		Tape Perforator, Teletype (BRPE-3)—Pulsing Test	3	B
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430-102-940		Transender Shelf Pulsing Motor	2	B
430-102-950		Perforator, Model 122, Kleinschmidt	7	B
430-102-951		Tape Perforator, Teletype (BRPE-3)	9	B
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430-103-300		Type 101 Director—Operation	11	B
430-103-301		Type 101 Director—Description	26	B
430-103-302		Series 100 Director—Register-Sender Access Operation	13	B
430-103-303		Series 100 Director, Translator Monitor—Description & Operation	11	B
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430-103-700		Type 101 Director, System Maintenance Procedures	18	B
430-103-702		Type 101 Director, Register-Sender—Access Tests	4	B
430-103-710		Type 101 Director, Maintenance Procedures	10	B
430-103-715		Type 101 Director, Register-Sender Tests—General	11	B
430-103-716		Type 101 Director, Register-Sender—Circuit Timing Tests	2	B
430-103-724		Type 102 Director, Preliminary Testing	11	B
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430-103-728		Type 102 Director, Register-Sender—Access Tests	5	B
430-103-729		Type 102 Director, Register-Sender Tests—General	8	B
AUTOMATIC ELECTRIC CO. SWITCHBOARDS & EQUIPMENT				
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430-105-701		Idle Indicating Equipment—Functional Test	2	B
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430-105-720		Impulse Sender, DC Key Pulsing Equipment— Functional Test	4	B
430-105-721		Impulse Sender, DC Key Pulsing Equipment— Pulsing Test, Percent Break & Pulses Per Second	2	B
• 430-108-648		Strowger Two-Motion Switches Replacing and Tying Wiper Cords	17	B C
AUTOMATIC ELECTRIC CO. PULSING & TIMING				
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430-110-700		Selectors—Timing Requirements	7	B C
430-110-702		Selectors, Non-Pulse Repeating & Loop Pulsed—Timing Test	5	B
430-110-703		Selectors, Non-Pulse Repeating Simplex— Pulsed—Timing Test	4	B
430-110-704		Selectors, Pulse Repeating Loop Pulsed— Timing Tests	4	B
430-110-705		Selectors, Pulse Repeating Simplex— Pulsed—Timing Test	5	B
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430-110-711		Selectors, Non-Pulse Repeating Simplex- Pulsed—Pulsing Test	3	B
430-110-713		Selectors, Pulse Repeating Simplex-Pulsed— Pulsing Test	2	B
430-110-715		Selectors, Loop Pulsed—Pulse Repeating Test	3	B
430-110-716		Selectors, Simplex-Pulsed—Pulse Repeating Test	1	B
430-110-725		Connectors—Timing Requirements	7	B
430-110-726	2	Regular, Rotary, Level Hunting and Test Connector Timing Test	4	B C
430-110-730		Repeaters, Coin Box—Pulse Repeating Test, Percent Break	2	B
• 430-110-734		Local and Combination Connectors Pulsing Tests Using the A.E. Co. Type 28 Semi- automatic Routiner	3	B C
430-110-735		Connectors, Regular—Pulsing Test	2	B
430-100-736		Connectors, Rotary & Level Hunting—Pulsing Test	3	B C
430-110-740		Long Line Equipment—Pulse Repeating Test (Percent Break)	3	B C
430-110-741		Repeaters, Loop or Battery and Ground— Pulsing Tests	2	B
430-110-742		Repeaters, Non-Pulse Correcting—Timing Test	2	B
430-110-746		Switch, Reverting Call—Pulsing Test	2	B
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430-200-603		XY Universal Switch—Maintenance & Adjustment	20	B C
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430-200-634	2	Minor Switch, Direct Driven	4	B C
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430-200-640		Rotary Switch, Motor Driven	21	B C
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430-200-646		Motor Switch	31	B C
430-200-647		Minor Switch, Type 47	8	B C
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430-200-650		Rotary Switch, Small Magnet	22	B C
430-200-651		Rotary Switch, Large Magnet	20	B C
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430-200-708	2	Selectors (First)—Operation Test	1	B C
430-200-709	2	Selectors (Intermediate)—Operation Test	1	B C
430-200-715		Linefinders—Operation Test	2	B C
430-200-716		Linefinders—Chain Circuit Test	1	B C
430-200-719	2	Connectors—Operation Test	2	B C
• 430-200-725		S-C Connector Routine Test Circuit Plate		
		Maintenance Test Procedure	5	C
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430-200-875		Off Normals, Permanents & Switches Made Busy—Tests and Inspection	2	B C
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490-350-418	2	Aerial Cable Supports	7	E F
490-350-419		Aerial Cable Spans without Strand	2	F
490-350-420		Aerial Cable Guard Protection From Squirrels	4	F
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490-350-450		Aerial Cable—Terminating Lashing Wire	8	E
490-351-600		Repairing Aerial Cable, Lead Sheath Cable—Slit Sheath Method	6	E
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490-500-002		Addendum—Buried Plant—Urban Telephone Installations Only	1	F
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490-500-436	2	Protection of Buried Service Wire From Ground Level to Protector	7	C D E F
490-500-633		Buried Service Wire Repair	4	D E F
490-505-601		Buried Plant—Reclamation of Wet Buried PIC Cable—Selection of Cable	2	E
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<i>SPLICE CLOSURES</i>				
490-550-314		K & B Splice Closures—Description	12	E F
490-550-400		Buried Splices—Corrosion Protection	5	E
490-550-404		Ready Access Closures—Fig. 8 & Lashed Alpth 100MB Terminals	8	E F
490-550-405		Splice Cases, Types 20 & 21	8	E
490-550-406		Hanger Bracket Kit—Description & Installation	1	E F
490-550-407		Terminal Blocks, Loading Coils & Inductors in Ready Access Closures	8	C D E
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490-550-415		Wrapped Joints, Auxiliary Sleeves PAP & PASP Sheath	5	E F
490-550-425		Splice Cases 9A, 10A, 11A, 12A	15	E F
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490-552-428		Soldering Seams of Split Lead Sleeve	2	E
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490-600-424		Cable Splicing—AMP Model MR-1 Hand Crimping Tool Operation	4	E
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• 490-750-705 490-750-706 490-750-707 490-750-708 490-750-709 490-750-710 490-750-711 • 490-755-601		Cable Pressure Systems Cable Pressurization Computer Plotting Pressure Gradients Pressure Gradient Analysis Computing Leak Location Construction Test Procedures Temperature Compensation Pneumatic Resistance of Cables Insulated Conductor Junction Splices Model 6000-D Moisture Separator PIC, Paper or Pulp Cable Installation and Maintenance	16 5 8 3 4 6 5 3	E E E E E E E	
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490-800-300 490-800-400 490-800-401	2	Grounding Harnesses—Description Protectors—Drainage Devices Protectors—High Voltage, Joint Use	3 3 3	C D E F C D F C D F	
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490-805-350 490-805-400 490-805-401 • 490-805-402 490-805-402 490-805-403 490-805-404 490-805-405 490-805-406 490-805-407 490-805-408 490-805-415 490-805-416 490-805-417			Fuse Cable Requirements Suspension Strand—Bonding & Grounding Methods Guys—Grounding Method Addendum—Bonding and Grounding Cable Sheath Cable Sheath—Bonding & Grounding Bonding Across Sheath Openings Bonding Aerial Polyethylene Sheath Cables to Suspension Strand Bonding Armor, Buried Polyethylene Sheath Cables Bonding Underground Lead Sheath Cables Bonding Underground Alpeith Sheath Cables Bonding Armor to Sheath Buried Cable Grounding—Block and House Cable—General Grounding—Running Ground Wire—Block and House Cables Grounding—Use of Ground Clamps—Block and House Cable	11 6 7 9 9 3 3 3 3 1 1 3 7 6	E E F F E E E E F E E F D E F E F D E F

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SERVICE TEST CENTER				
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496-000-001		Numerical Index—Division 496—Service Test Center		

MONITORING OF WORKING LINES

1. GENERAL

- 1.01 This practice contains procedures to be followed by all employees when their work involves the monitoring of working telephone lines.
- 1.02 Working lines referred to in this practice are those lines other than special service lines. Special service lines require individual treatment.

2. TEST SETS

- 2.01 Use only a standard hand test telephone equipped with an approved monitoring device to monitor working lines.

3. MONITORING OPERATION

- 3.01 Work forces must monitor all working lines before opening, short circuiting, crossing, grounding, placing trouble clearing equipment or applying tone for identification. Circuits must test idle before such work is undertaken.
- 3.02 *Busy Circuit*: If circuit tests busy, employee shall immediately disconnect hand test telephone from circuit and continue with work assignment. After a reasonable period of time, remonitor circuit.
- 3.03 *Continued Busy Circuit*: If above mentioned circuit is still busy upon second or third test (provided a reasonable time has expired) and no other work has been prescribed at this location, or where it is otherwise necessary to interrupt conversation; employee should proceed as follows:
 - a. Politely excuse himself.
 - b. Identify himself as a telephone company employee.
 - c. Explain the necessity for service interruption.
 - d. Request permission to perform work on this line.
 - e. If permission is granted, thank the parties involved for their cooperation. If permission is not granted, excuse the interruption before connection with the talking party is broken.
 - f. Be sure the parties have hung up before proceeding with work, if permission is granted.
- 3.04 If either party should refuse to grant permission, employee shall disconnect hand test telephone from the line and, after a reasonable length of time, remonitor.

4. SECRECY OF COMMUNICATIONS

- 4.01 Employees monitoring working lines must be familiar with the Communications Act of 1934 which protects secrecy of communication.

4.02 *Notice of Secrecy of Communications*

- a. Employees must not disclose the contents, or any part, of any telephone, radio (including television and facsimile), teletypewriter or telegraph message addressed to another person without the permission of the sender, or wilfully alter the purport or effect or meaning of any such message. Both parties to a telephone conversation are considered senders.
- b. Employees must not use any information, derived from any private message passing through their hands and addressed to another person, or in any other manner acquired as an employee of the company.
- c. Employees must not permit any unauthorized person to listen to any telephone conversation. Employees must not monitor any connection more than is needed for its proper supervision.
- d. Employees must not tell anyone the fact or the nature of any message, except as required for handling it properly.
- e. Employees must not discuss communication arrangements made between the company and its customers, except as required for handling them properly.
- f. Employees must not give any unauthorized person any information whatever about the location of equipment, trunks, circuits, cables, etc., or about local or toll ticket records of calls, teletypewriter messages, etc.

The secrecy of communications is protected by laws imposing punishment by fine and imprisonment for its violation. Fines of as much as \$10,000 and imprisonment for as long as two years and in some instances longer may be imposed for breaking these laws.

STATION INSTALLATION AND MAINTENANCE INSPECTION

1. GENERAL

- 1.01 This practice outlines the policy and procedure to be followed by outside plant foremen and their immediate supervisor in the inspection of station installation and maintenance work performed by outside installers and repairmen under their supervision.
- 1.02 The procedures stated in this practice will be most helpful in providing reliable and courteous service to the customer, and in assuring the craftsman that management has an interest in him and the quality of his work.
- 1.03 Evaluation of the work performance, thoroughness, and customer attitude of the craftsman must be performed, utilizing (as a check list) Form 2809 Station Installation & Maintenance Inspection. See Exhibit I.
- 1.04 For practical purposes, the individual assuming the duties of the plant foreman's immediate supervisor, shall be referred to as Plant Superintendent.

2. INSPECTING PROCEDURES

- 2.01 Each month the outside plant foreman shall:
 - a. Inspect two work locations for each craftsman under his supervision.
 - b. Review the results of each inspection with the responsible craftsman. If corrective action is required, it will be corrected as soon as practicable. *The foreman and craftsman will then sign Form 2809.*
 - c. Upon completion, the plant foreman will forward the Form 2809 to the Plant Superintendent.
- 2.02 The Plant Superintendent shall:
 - a. Inspect two or more work locations previously inspected by each plant foreman, within a three-month period. Should the inspection reveal that corrective action is required, appropriate measures will be taken to remedy the unsatisfactory conditions found at the work location.

3. FORM ORDERING INFORMATION

- 3.01 Form 2809 is available in pads of 100. Order from the Stationary Storeroom, 16071 Mojave Drive, Victorville, California 92392.

EXHIBIT I

STATION INSTALLATION & MAINTENANCE INSPECTION						FORM 2808 REV. 1/69
EMPLOYEE NUMBER		EMPLOYEE NAME				
DISTRICT		FOREMAN OR SUPERINTENDENT				
NAME (Customer)			ADDRESS (Street)			(City)
TELEPHONE NUMBER	CLASS OF SERVICE	ZONE	SERVICE ORDER NUMBER	DATE COMPLETED		
INSTALLATION <input type="checkbox"/> NEW <input type="checkbox"/> RECONNECT <input type="checkbox"/> REINSTALL OTHER _____ <input type="checkbox"/>		OTHER <input type="checkbox"/> INSIDE MOVE <input type="checkbox"/> TAKE OUT <input type="checkbox"/> NO. CHANGE <input type="checkbox"/>		ROUTINE <input type="checkbox"/> PBX <input type="checkbox"/> TELETYPE - DATA <input type="checkbox"/> COIN TELEPHONES <input type="checkbox"/>		REPAIR <input type="checkbox"/> TROUBLE REPORTED WITHIN 30 DAYS <input type="checkbox"/> REPEATED COMPLAINT <input type="checkbox"/> SPECIAL INSPECTION <input type="checkbox"/> VISIT
CUSTOMER ACCEPTANCE	ITEMS		SATISFACTORY	UNSATISFACTORY	REMARKS	
	TYPE OF TELEPHONE		<input type="checkbox"/>	<input type="checkbox"/>		
	LOCATIONS		<input type="checkbox"/>	<input type="checkbox"/>		
	CLEAN UP UPON COMPLETION		<input type="checkbox"/>	<input type="checkbox"/>		
	DIRECTORY LEFT		<input type="checkbox"/> YES	<input type="checkbox"/> NO		
	DIRECTORY EXPLAINED		<input type="checkbox"/> YES	<input type="checkbox"/> NO		
	SALES ATTEMPT MADE		<input type="checkbox"/> YES	<input type="checkbox"/> NO		
	EMPLOYEE APPEARANCE		<input type="checkbox"/>	<input type="checkbox"/>		
INSPECTION	EMPLOYEE ATTITUDE		<input type="checkbox"/>	<input type="checkbox"/>		
	REACTION TO THIS VISIT		<input type="checkbox"/>	<input type="checkbox"/>		
	ITEMS CHECKED		GOOD	REVISIT REQUIRED	REMARKS & ACTION REQUIRED	
	<input type="checkbox"/> DROP		<input type="checkbox"/>	<input type="checkbox"/>		
	<input type="checkbox"/> PROTECTOR		<input type="checkbox"/>	<input type="checkbox"/>		
	<input type="checkbox"/> GROUND		<input type="checkbox"/>	<input type="checkbox"/>		
	<input type="checkbox"/> STATION WIRING		<input type="checkbox"/>	<input type="checkbox"/>		
	<input type="checkbox"/> INSTRUMENTS		<input type="checkbox"/>	<input type="checkbox"/>		
	<input type="checkbox"/> BOOTH		<input type="checkbox"/>	<input type="checkbox"/>		
	<input type="checkbox"/> TERMINALS(S)		<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/> OTHER (KEY EQPT. ETC.)		<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/> EMPLOYEE ON JOB AT INSPECTION		<input type="checkbox"/> YES	<input type="checkbox"/> NO			
<input type="checkbox"/> SAFETY PRECAUTIONS OBSERVED		<input type="checkbox"/> YES	<input type="checkbox"/> NO			
<input type="checkbox"/> FOLLOW-UP REQUIRED		<input type="checkbox"/> YES	<input type="checkbox"/> NO			
INSPECTION MADE BY			DATE OF INSPECTION		DATE CORRECTION COMPLETED	
DATE DISCUSSED WITH EMPLOYEE			EMPLOYEE SIGNATURE			

FIRST AID

1. GENERAL

- 1.01 The purpose of this practice is to outline the latest first aid procedures as recommended in the American Red Cross First Aid Textbook.
- 1.02 It is essential that all Continental Telephone employees *know first aid*. Do not attempt to save time and effort by using second best first aid methods. It is just as important to know the "don'ts of first aid as it is to know the "do's".
- 1.03 Report all injuries to your supervisor as soon as possible.

2. THE WHY AND HOW OF FIRST AID

- 2.01 First aid is defined as the immediate and temporary care given to the victim of an accident or illness until the services of a physician can be obtained.
- 2.02 First aid training also shows how injuries occur and helps to reduce accidents by increasing the desire to prevent injuries.
- 2.03 In case of serious injury, act quickly as each second of delay is important. Take care not to make statements to the victim and to bystanders about the injuries. It is not the First Aider's duty to diagnose, evaluate, or predict.
- 2.04 Follow these general directions:
 - a. Keep the victim lying down. Do not transport a seriously injured person unless it is necessary to do so.
 - b. Treat injuries in this order:
 - (1) Severe bleeding.
 - (2) Stopped respiration.
 - (3) Poisoning by mouth.
 - (4) Shock.
 - c. Check for injuries and plan what to do.
 - d. Obtain the services of a physician.

3. GETTING THE DOCTOR OR AMBULANCE

- 3.01 If possible, stay with the victim and ask someone else to call a doctor. If necessary, call the police for this purpose. (Consult a list of physicians and hospitals, if available).
- 3.02 When the doctor is called, give him the following information:
 - a. Cause and probable extent of the injury.
 - b. Location of the victim.

- c. What first aid is being given.
- d. What first aid supplies are available.
- e. Whether an ambulance is needed and if one has been called.

4. WOUNDS AND BLEEDING

4.01 A wound is a break in the skin. It is caused by force and usually extends into the underlying tissue. Control bleeding and protect wounds from contamination. The danger of tetanus (lockjaw) should be considered in all wounds. Guard against infection. (If it occurs, see paragraph 13.12.) Wounds with severe bleeding are treated as follows:

- a. Severe bleeding must be stopped without delay. Apply direct pressure to the wound using a cloth pad or even a bare hand, if necessary. See Figure 1.

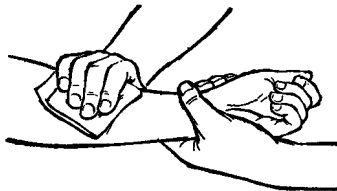


FIGURE 1. Direct Pressure on the Wound.

- b. Elevate the bleeding part, if possible.
- c. Pressure points are as follows:
 - (1) If an arm or leg is involved and direct pressure must be delayed or is not entirely effective, apply digital pressure at pressure points (Figures 2 and 3).

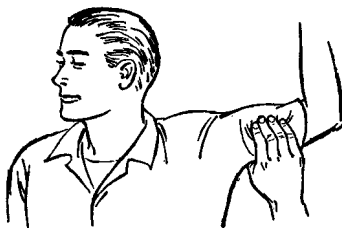


FIGURE 2. Finger Pressure on Brachial Artery.

- (2) Pressure on the inner half of the arm (midway between the elbow and the armpit) compresses the brachial artery against the bone, causing bleeding in the arm, beyond the pressure point to be controlled.
 - (3) Pressure applied just below the groin on the front inner half of the thigh compresses the femoral artery against the underlying pelvic bone. If considerable force is applied, bleeding below the point of pressure will be controlled.

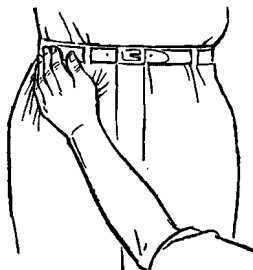


FIGURE 3. Hand Pressure on Femoral Artery.

- d. Bandage the pad firmly into place on the wound. Do not remove it once it is in place. If blood saturates the dressing, place additional layers of cloth on top of the original dressing.
 - e. *The tourniquet should be used only in extreme cases, where it is necessary to risk losing the victim's limb in order to save his life. If it is to be used:*
 - (1) Place it above and near the wound, between the body and wound.
 - (2) Make sure that it is applied tightly enough to stop bleeding.
 - (3) Wrap the material tightly twice around the limb if possible and tie a half knot. (See Figure 4A.)
 - (4) Place a short stick on the half knot and tie a full knot. (See Figure 4B.)
 - (5) Twist the stick to tighten the tourniquet until the flow of blood ceases. (See Figure 4C.)
 - (6) Secure the stick in place with the loose ends of the tourniquet or another strip of cloth. (See Figure 4D.)
 - (7) A notation must always be made and attached to the victim, giving the time of application and location of the tourniquet. Be certain that the ambulance attendants are verbally notified also.
 - (8) *Do not release the tourniquet once it has been applied. It is urgent that such cases have medical attention as soon as possible.*
- 4:02 Neck Wounds—These are most frequently made by knives, razors and windshield glass. A large artery, vein, or both, may be cut. First aid for neck wounds is as follows:
- a. Apply hand pressure both above and below the cut and continue to hold until a doctor directs that pressure be released. Do not worry about getting the hand in the wound in such severe cases.
 - b. A bulky compress of the cleanest immediately available material to maintain pressure may be a great help.

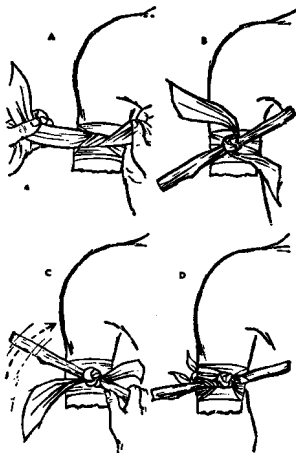


FIGURE 4. Application of Tourniquet.

4.03 Minor wounds in which bleeding is not severe. First aid for minor wounds is as follows:

- a. Wash your hands thoroughly with clean water and soap.
- b. Cleanse the injury thoroughly, using antiseptic soap and boiled water or if not available, use merthiolate on a sterile compress.
- c. Apply merthiolate from first aid kit if available. If not, cover with sterile or clean dressing and bandage snugly.
- d. See a doctor promptly if evidence of infection appears.

4.04 Wounds with internal bleeding are caused by head injury (see paragraph 9.02), or are caused by other than head injury and may be recognized by the appearance of blood at the uninjured mouth or nose. First aid for internal bleeding is as follows:

- a. Keep the victim lying on his back. Turn the head to one side.
- b. Raise the head and shoulders if breathing is difficult.
- c. If the patient is in shock or is unconscious, turn him on his side with the head and chest lower than the hips to prevent blood from being drawn into the lungs.
- d. *Do not* give stimulants.

4.05 First aid for gunshot wounds and other deep wounds is as follows:

- a. Keep the victim as quiet as possible. Moving may aggravate fractures or the existing damage to internal organs.

- b. *Do not* give stimulants. If the wound is abdominal, do not give any food or water.
- c. If air passes through a chest wound as the victim breathes, cover the wound firmly with dressing material.
- d. If intestines protrude, do not force them back into the abdomen; cover with wet cloths at body temperature. Water and dressings should be as sterile as possible under the circumstances.

5. BITES AND STINGS

5.01 First aid for animal bites is as follows:

- a. Wash the wound thoroughly to remove all animal saliva. Use a gauze compress and a soap and water solution to scrub the wound; antiseptic soap is best, but any soap will do. Thorough washing of the bite wound should be continued for at least 10 to 15 minutes; then rinse with clean running water and apply a sterile dressing.
- b. If possible, steps should be taken to confine the animal so that it will be available for examination to determine whether or not its bite may have transferred rabies or tetanus.
- c. Always consult a physician promptly.

5.02 Snake Bites (poisonous)—Most snake bites can be prevented when working in snake infested regions by wearing high topped boots or heavy leggings, and by being extremely careful about putting the hands in places where they may be bitten. Snake bite symptoms and first aid are as follows:

- a. Symptoms of poisonous snake bite:
 - (1) The bite of a rattlesnake, copperhead or cotton-mouth moccasin leaves one or two small puncture wounds. Since the coral snake chews rather than bites, it leaves no fang marks. Severe pain, swelling and discoloration of the poisoned part occurs rapidly.
 - (2) General weakness, shortness of breath, nausea, vomiting, weak and rapid pulse, dimness of vision, and possible unconsciousness occurs.
- b. First aid for poisonous snake bites:
 - (1) Begin at once. Have the victim lie down and keep quiet, as muscular activity increases circulation resulting in more rapid absorption of the venom.
 - (2) If the bite is on an extremity, tie a constricting band—*not* a tourniquet—firmly above the bite.
 - (3) Sterilize a knife or razor blade with a match flame, merthiolate, or alcohol and make incisions. Try with one incision to get into the venom deposit point. Crosscuts about 1/4" long may be made at each fang mark and over the suspected deposit point. Make shallow cuts through the skin in the crossways direction; longitudinal cuts may be deeper. Muscles and nerves run in a longitudinal direction and a deep crosscut may sever them. Beware of cutting muscles and nerves of the finger, hands, or wrist, for they lie immediately below the skin and their injury may cause disability. Apply suction, using the mouth or a suction cup. Continue suction for an hour or more.

NOTE: When a snake bite kit is available, the instructions inside the cover should be followed.

5.03 Snake Bites (nonpoisonous)—This paragraph covers the symptoms of and first aid for nonpoisonous snake bites.

- a. Symptoms of these bites are:
 - (1) Horseshoe-shaped row of teeth marks.
 - (2) Absence of symptoms other than those usually following a minor wound.
- b. First aid for nonpoisonous bites is to:
 - (1) Cleanse the wound thoroughly with clean water.
 - (2) Apply sterile dressing.

5.04 Insect Bites and Stings—First aid procedures to be followed for bites and stings are:

- a. Remove the “stinger” if it is still present.
- b. If possible, apply ice or ice water to the wound.
- c. Apply medicated ointment.
- d. Avoid scratching the bite.

5.05 Tick Bites—Rocky Mountain Spotted Fever is transmitted by tick bites. Despite its name, the disease can occur in any part of the country. First aid for tick bites is as follows:

- a. If a tick is present, grasp it with tweezers, remove it, and apply merthiolate to the wound.
- b. If the hands come in contact with ticks, wash them thoroughly with antiseptic soap and water. Gently scrub the area of the tick bite thoroughly with antiseptic soap and water.
- c. If any unusual symptoms develop, see a doctor.

5.06 Spider, Scorpion and Tarantula Bites—First aid for these bites is:

- a. If the bite is on an extremity, apply a constricting band for *5 minutes only* just above the bite.
- b. Keep the affected part lower than the rest of the body and apply ice, ice water, or any cold application locally for two hours.
- c. Obtain medical attention.

6. **SHOCK (DUE TO PHYSICAL INJURY)**

6.01 *All seriously injured persons should be treated for shock.*

6.02 Shock is defined as a depressed condition of many bodily functions due to failure of sufficient blood to circulate through the body following serious injury. Shock causes low bodily resistance and possibly death. Shock factors, symptoms, and first aid are discussed in the following paragraphs:

a. Factors which make shock worse are:

- (1) Pain.
- (2) Rough handling.
- (3) Improper transportation.
- (4) Continued bleeding.
- (5) Excessive cold or heat.
- (6) Stopped respiration.
- (7) Sight of blood.

b. Symptoms of shock are:

- (1) Weakness of the victim.
- (2) The skin is pale, cool, and moist. Perspiration appears on the forehead, lips, and palms.
- (3) The pulse is rapid and sometimes weak or even absent.
- (4) Breathing is fast, shallow, irregular, and sometimes comes in occasional deep breaths.
- (5) The eyes appear vacant and lusterless.

c. More general and less severe shock symptoms are:

- (1) Thirst.
- (2) Nausea.
- (3) Indifference.
- (4) Restlessness.

d. First aid for shock is:

- (1) Keep the victim lying down.
- (2) Do not add heat. Simply prevent loss of body heat by covering (if necessary with a blanket, overcoat, or newspapers). *Do not* cause the victim to sweat.
- (3) Fluids should be administered in small amounts if the victim is conscious.

7. ARTIFICIAL RESPIRATION

7.01 Rescue is usually the first step in aiding the victim. Electric shock, gas inhalation, and drowning are the most common causes of stopped respiration. Every plant man should be thoroughly familiar with rescue techniques where injury due to electricity or gas is involved, including rescue from manholes, poles, and power wires. Some of the important points to remember in effecting rescues are listed below:

- a. For injury due to electricity:
 - (1) Break the contact by separating the victim from the electrical power source, making sure that in the process you do not expose yourself to contact with the victim or the source of electricity. Use rubber gloves, long dry sticks, dry rope, dry folded clothes, and stand on insulating material if possible.
 - (2) Cut off the current supply if possible.
- b. Proceed as follows for gas inhalation:
 - (1) Recognize the danger of explosion.
 - (2) If in a building, shut off both gas and electricity supply.
 - (3) Ventilate the area thoroughly before attempting rescue.
- c. Drowning—Unless you are an expert swimmer and trained in life saving, keep out of the water when rescuing a drowning person. Instead, “row or throw.” (Learn American Red Cross life saving and water safety techniques.)

7.02 General Directions for artificial respiration are as follows:

- a. *Start at once and do not give up.* There are many cases on record where a person apparently dead has been revived after several hours of continuous artificial respiration.
- b. The purpose is to restore normal respiration by maintaining an alternating decrease and increase in the expansion of the chest and thereby an adequate air exchange.
- c. The mouth to mouth rescue breathing method is the Continental Telephone standard for general use. However, in the rare case where it is impractical to use this method, another means of ventilating the lungs should be used.
- d. The only equipment necessary to perform rescue breathing is carried with you at all times—your hands, your mouth, and your repetitive breathing.

7.03 Additional related directions for artificial respiration are:

- a. Begin artificial respiration immediately.
- b. A mechanical resuscitator operated by a trained person should be used when available.
- c. If assistance is available, have blankets or other suitable material placed over and under the victim.
- d. When breathing starts, keep the victim lying down and treat for shock.

7.04 Mouth-to-mouth (rescue breathing) Artificial Respiration—If there is foreign matter visible in the mouth, wipe it out quickly with your fingers or a cloth wrapped around your fingers. Proceed as follows:

- a. Tilt the head back so that the chin is pointing upward (Figure 5). Pull or push the jaw into a jutting-out position (Figure 6 and 7).



FIGURE 5.



FIGURE 6.



FIGURE 7.

These maneuvers should relieve airway obstruction by moving the base of the tongue away from the back of the throat.

- b. Open your mouth wide and place it tightly over the victim's mouth. At the same time pinch the victim's nostrils closed (Figure 8) or close the nostrils with your cheek (Figure 9). An alternative is to close the victim's mouth and place your mouth over his nose (Figure 10). Blow into the victim's mouth or nose. (Air may be blown through the victim's teeth, even though they may be clenched.) The first blowing efforts should determine whether or not obstruction exists. This will be apparent if there is resistance to your blowing effort and if the victim's chest fails to rise.

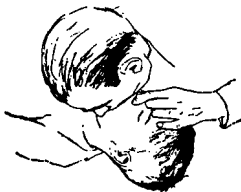


FIGURE 8.



FIGURE 9.



FIGURE 10.

- c. Remove your mouth, turn your head to the side, and listen for the return rush of air that indicates air exchange. Repeat the blowing effort. For an adult, blow vigorously at the rate of about 12 breaths per minute. For a child, take relatively shallow breaths appropriate for the child's size, at the rate of about 20 per minute.
- d. The rise and fall of the victim's chest wall is the best indication that you are correctly administering rescue breathing. Observe chest movement.
- e. If you are not getting an air exchange, recheck the head and jaw position (Figures 5, 6, and 7). If you still do not get an air exchange, quickly turn the victim on his side and administer several sharp blows between the shoulder blades. This should dislodge any obstructing matter (Figure 11). Again sweep your fingers through the victim's mouth to remove any foreign matter.

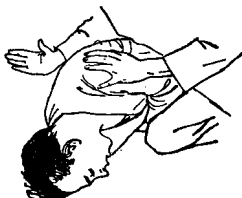


FIGURE 11.

- f. Those who do not wish to come in contact with the person may place a cloth over the victim's mouth or nose and breathe through it. The cloth does not greatly affect the exchange of air.

7.05 Mouth-to-mouth (rescue breathing) Technique is possible for infants and small children. If foreign matter is visible in the mouth, clean it out quickly as described previously in paragraph 7.04. Proceed as follows:

- a. Place the child on his back and use the fingers of both hands to lift the lower jaw from beneath and behind, so that it juts out (Figure 12).
- b. Place your mouth over the child's mouth and nose (Figure 13), making a relatively leakproof seal. Breathe into the child, *using shallow puffs of air* in order to prevent damage to the child's lungs. The breathing rate should be about 20 per minute. Observe chest movement.



FIGURE 12.

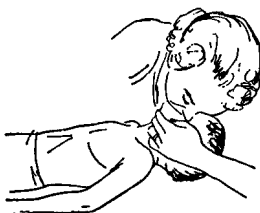


FIGURE 13.

If you meet resistance in your blowing efforts, recheck the position of the jaw. If the air passages are still blocked, the child should be suspended momentarily by the ankles (Figure 14) or inverted over the arm (Figure 15) and given two or three sharp pats between the shoulder blades to dislodge any obstructing matter. Check the mouth for obstructing matter and remove it quickly.

7.06 Back Pressure-Arm Lift Method of Artificial Respiration-It is possible that because of the nature of the injury or other circumstances, the manual method of artificial respiration should be used. It is re-emphasized that mouth-to-mouth (rescue breathing) is the preferred method because of its effectiveness, practicality, speed, and simplicity. Proceed as follows:

- a. Place the victim in the facedown, prone position. Bend his elbows and place his hands one upon the other. Turn his face to one side, placing the cheek upon the hands (Figure 16).



FIGURE 14.



FIGURE 15.

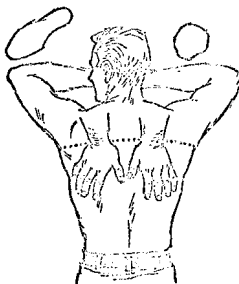


FIGURE 16. Position of Victim.

- b. Position of the operator—kneel on either the right or left knee at the victim's head, facing him. Place your knee at the side of the victim's head close to his forearm. Place your other foot near his elbow. If it is more comfortable, kneel on both knees, one on either side of the victim's head. Place your hands on the flat of the victim's back so that the palms lie just below an imaginary line running between the armpits. With thumb tips just touching, spread your fingers downward and outward (Figure 17).

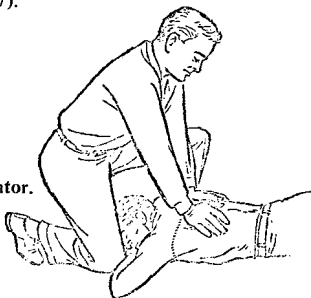


FIGURE 17. Position of Operator.

- c. Rock forward until the arms are approximately vertical and allow the weight of the upper part of your body to exert slow, steady, even pressure downward on the hands. This forces air out of the lungs. Your elbows should be kept straight and the pressure should be exerted almost directly downward on the back. You do not need much pressure (Figure 18).

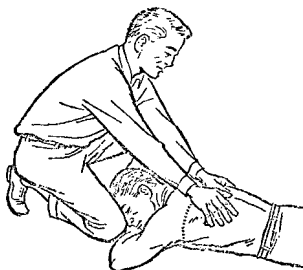


FIGURE 18. Compression Phase.

- d. Release the pressure, avoiding a final thrust and commence to rock slowly backward. Place your hands upon the victim's arms just above his elbows (Figure 19).

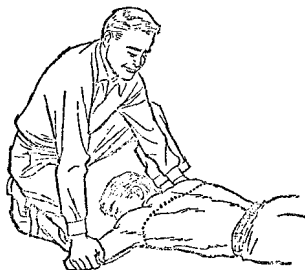


FIGURE 19. Position for Expansion Phase.

- e. Draw his arms upward and toward you. Apply just enough lift to feel resistance and tension at the victim's shoulders. Do not bend your elbows, and as you rock backward the victim's arms will be drawn toward you. Then lower the arms to the ground. This completes the full cycle. The arm lift expands the chest by pulling on the chest muscles, arching the back, and relieving the weight on the chest. The cycle should be repeated 12 times per minute at a steady rate. The compression and expansion phases should occupy about equal time with the release periods being of minimum duration (Figure 20).
- 7.07 Pole Top Resuscitation—The conditions surrounding the victim and the exposure of the rescuer to danger would have a marked relationship as to what method should be used and how soon it could be started. Whenever conditions and safety of the rescuer will permit, the following basic principles should be applied:

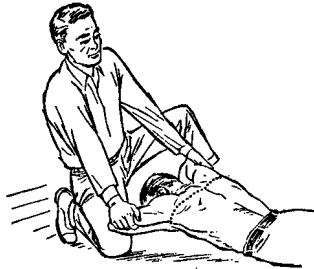


FIGURE 20. Expansion Phase.

- a. *Get the first breath of air into the victim quickly.* This should be accomplished by simple compression of the chest by any means possible. The importance of early ventilation of the lungs is shown by the following:

<u>% Chance for Survival</u>	<u>Minutes after Suspension of Breathing</u>
98%	1 min.
90%	2 min.
55%	3 min.
30%	4 min.
15%	5 min.

- b. If practicable, move the victim to a more desirable position described in step c.; however, this should be done without interrupting the exchange of air in the lungs.
- c. The rescuer, after checking the conditions and assuring himself that artificial respiration can be safely administered, lets the victim hang from his safety strap, alongside the pole. He should then take a position from which he can secure his safety strap around the pole and between the legs of the victim, then proceed upwards until the victim is straddling the strap. By moving the safety strap as high as possible on the pole, much of the victim's weight is carried by the rescuer's strap as he places his weight against it (Figure 21).
- d. **Compression Phase**—Pressure can best be applied by the rescuer locking his fingers over the lower abdomen, lifting up and back as he rocks back in his safety belt. This expels the air from the lungs as the rib cage is compressed and the intestines are forced up against the diaphragm. After firm resistance is met, release the pressure by rocking forward (Figure 22).

NOTE: Sometimes electric shock produces a muscle block which can be broken by additional finger pressure against the diaphragm.



FIGURE 21.



FIGURE 22.

Expansion Phase—Immediately after the completion of the compression phase, raise the arms beneath the victim's so that the rescuer's elbows hook beneath the victim's arm pits. The rescuer again rocks back in his safety belt lifting the victim's shoulders up and back, simulating the American Red Cross Arm-Lift Technique (Figure 23).



FIGURE 23.

- f. The compression and expansion phases described should take approximately 2-1/2 seconds each.

8. POISONING BY MOUTH

8.01 *Hurry* is the word to associate with poisoning by mouth. Give first aid without delay. If possible have someone call a doctor, poison control center, or hospital while you give first aid.

8.02 Symptoms of poisoning vary greatly according to the kind and amount of poison taken and the time elapsed. Many poisons cause no symptoms until absorbed into the system. Others cause burns in the mouth or abdominal pain. There may be nausea, vomiting, visual disturbances, convulsions, headache, or deep sleep.

8.03 First aid for poisoning is as follows:

- a. When the poison is not an acid, alkali, strychnine, or kerosene:
- (1) Dilute the poison. Quickly administer fluid (milk and/or water) in large amounts.
 - (2) Induce vomiting—strong baking soda solution or milk of magnesia. Repeat the dilution and induction of vomiting until the fluid is returned clear. If fluid cannot be administered, use fingers or a spoon in the mouth to induce gagging and vomiting.
 - (3) If the antidote is given on the label, administer it as directed. If no specific antidote is known, administer a universal antidote of two parts by volume of crumbled burnt toast, one part strong tea, and one part milk of magnesia.

- b. When the poison is an acid:
 - (1) Dilute the poison. Quickly administer fluid (milk and/or water).
 - (2) *Do not induce vomiting.* Neutralize with weak alkali (baking soda in water, or milk of magnesia); then give milk, olive oil, or egg white to protect the digestive tract lining.
 - (3) If the antidote is given on the label, administer it as directed.
- c. When the poison is an alkali:
 - (1) Dilute the poison. Quickly administer fluid (milk and/or water).
 - (2) *Do not induce vomiting.* Neutralize the poison with weak acid (vinegar, lemon juice). Follow with milk, olive oil, or egg white.
 - (3) If the antidote is given on the label, administer it as directed.
- d. When the poison is a petroleum product such as kerosene, solvents, or insecticides:
 - (1) Dilute the poison. Quickly administer fluid (milk and/or water).
 - (2) *Do not induce vomiting.*

9. INJURIES TO BONES, JOINTS, AND MUSCLES

- 9.01 Fractures are defined as a break in a bone. The various kinds of fractures, their symptoms and first aid are discussed in the following paragraphs.
- a. The various kinds of bone fractures are:
 - (1) Simple fracture—a closed fracture not associated with an open wound.
 - (2) Compound fracture—an open fracture that has a wound extending from the skin to the fracture area.
 - (3) Comminuted fracture—The bone is broken into small pieces and it may be closed or open.
 - b. Symptoms of fractures are swelling, tenderness, deformity, pain on motion, discoloration, and possibly bleeding.
 - c. First aid for fractures is:
 - (1) Do not disturb or move broken ends.
 - (2) Do not disturb or move the joints on each side of the broken bone.
 - (3) Treat the victim for shock. See paragraph 6.05.
 - (4) When in doubt, handle the injury as a fracture.
 - (5) If possible, apply an ice bag over the painful area.

- (6) Do not move the limb before immobilizing. Use splints, arm sling, newspapers, etc.
- (7) Provide transportation.
- (8) Call a doctor.
- d. Additional measures for compound fractures are:
 - (1) Control the bleeding.
 - (2) Apply a clean dressing to the wound.

9.02 Head Injuries—These consist of concussion and skull fractures.

IMPORTANT: A concussion is an injury to the brain caused by a blow to the head and may or may not involve a skull fracture. Concussion must be expected due to force in any accident. Whether or not the skull is fractured, it is not important compared to the possible injury to the brain. The primary treatment for both is the same and *in both cases it is essential to keep the victim as quiet as possible*. Symptoms of and first aid for head injuries are as follows:

- a. Some or all of the following symptoms may be present:
 - (1) Evidence of a blow, head wound, or swelling.
 - (2) Unconsciousness—total or partial—even if only for a few seconds after an accident.
 - (3) Eye pupils are unequal in size.
 - (4) Headache and dizziness.
 - (5) Paralysis of extremities.
 - (6) Bleeding from the nose, an ear canal, or the mouth.
- b. First aid for head injuries is as follows:
 - (1) **It is extremely important to keep the victim lying down and quiet.**
 - (2) *Do not give stimulants.*
 - (3) If the face is flushed, elevate the head slightly.
 - (4) If the victim is unconscious, turn the head to one side.
 - (5) Loosen clothing about the neck.
 - (6) Merely lay a dressing on the wound.
 - (7) Reassure the victim if he is conscious.

9.03 Fracture of the neck or spine is treated as follows:

- a. If at all possible, do not move the victim; summon a physician to the scene.
- b. Keep the victim flat on his back.
- c. Do not allow the head to tilt forward or sideways.
- d. If transportation is absolutely essential (even for a few feet), use a firm support such as a shutter, board, or door.

9.04 Dislocations—These injuries are defined as a displacement of the bone end from the joint. The surrounding ligaments and other soft tissue always suffer some injury. Symptoms and first aid for dislocations are:

- a. Symptoms of dislocation are swelling, tenderness to the touch, deformity, pain on motion, and discoloration.
- b. First aid for dislocation is as follows:
 - (1) Do not disturb the affected part.
 - (2) *Do not* attempt to reposition the dislocated bone.
 - (3) Obtain medical attention.
 - (4) Treat for shock as in paragraph 6.05.

9.05 Strains and Sprains—A strain is defined as an injury to a tendon or muscle. A sprain is a stretching or tearing of the ligaments around a joint. The symptoms of and first aid for these injuries are as follows:

- a. Symptoms of these injuries are:
 - (1) Strain—pain and stiffness.
 - (2) Sprain—pain, swelling, lack of use, and discoloration.
- b. First aid for a strain is:
 - (1) Rest and apply heat.
 - (2) Rubbing may help.
 - (3) In severe cases, call a doctor.
- c. First aid for a sprain is:
 - (1) Elevate the injured member and apply cold.
 - (2) If the ankle is sprained, apply a bandage over the shoe to immobilize the ankle.
 - (3) If lower extremities are involved, avoid placing weight on the limb.
 - (4) In severe cases, see a doctor.

- (5) Always have suspected sprains x-rayed.

10. BURNS

10.01 Most burns are caused by the following:

- a. Dry heat.
- b. Flame.
- c. Hot metal.
- d. Hot liquid.
- e. Steam.
- f. Electricity.
- g. Sun.
- h. Chemicals.

10.02 Possible effects of burns on the body are:

- a. Shock
- b. Infection.
- c. Permanent tissue damage.
- d. Death.

10.03 There are three degrees of burns which are:

- a. Skin merely reddened—first degree burn.
- b. Skin blistered—second degree burn.
- c. Deeper tissue is destroyed—third degree burn.

10.04 First aid for burns is as follows:

- a. Thermal burns are extensively burned areas, such as those covering the back or chest area or a large portion of one or more extremities. First aid methods to be followed are:
 - (1) Treatment for shock.
 - (2) Keep air from the burn by application of a thick dressing; if the dressing is sterile, it will help prevent further contamination. Use a lint-free material.
 - (3) The dressing should be kept dry.
 - (4) Do not break blisters.
 - (5) Transport the victim at once to a doctor or hospital.

- b. Small area burns should be treated by applying vaseline and a sterile dressing.
- c. Thermal burns of the eye should be treated thusly:
 - (1) If pain can be tolerated, irrigate the eye gently to remove the foreign material.
 - (2) Cover the eye with a dry sterile dressing or clean cloth.
 - (3) Obtain medical aid immediately.
 - (4) *Do not* apply oil or ointments.
- d. Chemical burns should be treated by:
 - (1) Washing away the chemical with large amounts of water.
 - (2) If specific chemicals for treatment are indicated on the label and they are available, apply them after washing with water.
- e. Creosote burns should be treated by washing with hot soap and water and applying vaseline to the burned area.
- f. Acid or alkali burns of the eye should be treated thusly:
 - (1) *Quickly* irrigate the eye thoroughly with plain tap water for several minutes.
 - (2) Remove any particles of the chemical.
 - (3) Have the victim close his eye.
 - (4) Place a dressing over the lid and bandage snugly.
 - (5) Obtain immediate medical attention.
- g. Sunburn—The two types of sunburn should be treated. They are:
 - (1) Mild sunburn—Treat with medicated ointment, cold cream, salad oil, or shortening.
 - (2) For severe sunburn, obtain medical advice.

11. ILL EFFECTS OF EXCESSIVE HEAT

11.01 Exposure to excessive heat may result in heat exhaustion, heat stroke, or heat cramps. Symptoms of and first aid for heat are as follows:

- a. Symptoms of heat exhaustion are:
 - (1) Temperature is normal.
 - (2) Fatigue.
 - (3) Headache.
 - (4) Vomiting or nausea.

- b. Symptoms in severe cases of heat exhaustion are:
 - (1) Profuse perspiration.
 - (2) Extreme weakness.
 - (3) Pale and clammy skin.
 - (4) Heat cramps may be present.
- c. First aid for heat exhaustion is to:
 - (1) Provide bed rest.
 - (2) Every 15 or 20 minutes give a half glass of water in which a half teaspoon of salt has been dissolved.
- d. Symptoms of heat stroke are:
 - (1) Usually begins with a sharp pain in the head and dizziness.
 - (2) Almost immediate unconsciousness.
 - (3) Skin is dry and very hot.
 - (4) The face is flushed.
 - (5) Breathing is difficult.
 - (6) Very high temperature.
 - (7) Pulse is rapid.
- e. First aid for heat stroke is as follows:
 - (1) Arrange for medical care immediately.
 - (2) Move the victim to a cool place; indoors if possible.
 - (3) Provide bed rest.
 - (4) Remove clothing.
 - (5) Sponge the body with alcohol or lukewarm water to reduce the body temperature. Pulse rate should be 110 per minute or less. Resume the sponging if the temperature rises again.
 - (6) When the victim is fully conscious, give a half glass of water with half a teaspoonful of salt dissolved in it.
 - (7) Provide covering according to the victim's comfort.
- f. Symptoms of heat cramps are pain in the abdominal muscles or limbs with profuse perspiration.

- g. First aid for heat cramps is to:
 - (1) Apply firm, steady pressure to the painful area.
 - (2) Apply warm wet towels to the painful area.
 - (3) Give a half glass of salt water. Repeat this several times at 15 minute intervals.

12. ILL EFFECTS OF EXCESSIVE COLD

12.01 Frostbite is defined as the freezing of a body part, usually the nose, ears, cheeks, fingers, or toes. Symptoms of frostbite vary and the condition may not be evident to the victim. Symptoms and first aid for this condition are as follows:

- a. Frostbite symptoms are:
 - (1) Feeling of intense cold or numbness.
 - (2) Pain in the early stages, later subsiding.
 - (3) Dead white, glossy skin, later changing to yellow.
 - (4) Blisters may appear.
- b. First aid for frostbite is:
 - (1) Handle a frozen or frostbitten area with the greatest care.
 - (2) Firm pressure applied against the area with a warm hand is helpful but *rubbing with the hand or snow is definitely harmful*.
 - (3) If outside, cover the frozen area with woolen material.
 - (4) Make the victim warm and remove him to a warm room as soon as possible.
 - (5) If the frozen area is still cold or numb, rewarm it by immersing it in *lukewarm* water, or by wrapping it in blankets. **Do not rub or expose to extreme heat**, such as a hot stove, hot water bottle, or heat lamp, etc. **Excessive heat may increase the damage.**
 - (6) Once the fingers or toes are rewarmed, encourage the victim to exercise them.
 - (7) Do not disturb blisters.

12.02 Prolonged Exposure to Cold—Symptoms of and first aid for this type of exposure are:

- a. Symptoms of exposure:
 - (1) General numbness.
 - (2) Difficulty in moving with staggering.
 - (3) Drowsiness or failing eye sight.
 - (4) Unconsciousness in advanced cases.

- b. First aid for this exposure is:
 - (1) Start artificial respiration if breathing has stopped.
 - (2) Move the victim to a warm room as soon as possible.
 - (3) Rewarm the victim as rapidly as possible by wrapping him in warm blankets or by immersing him in warm *but not hot* water.
 - (4) When the victim responds, give him a hot drink and dry his body thoroughly if wet.

13. OTHER EMERGENCIES (LISTED ALPHABETICALLY)

13.01 Apoplexy—is defined as a sudden loss of consciousness, sensation, and motion. Symptoms of and first aid for apoplexy are as follows:

- a. Symptoms of apoplexy are:
 - (1) Unconsciousness usually occurs.
 - (2) Loud, heavy breathing.
 - (3) Slow, strong pulse rate.
 - (4) **Partial** paralysis. This is seen in an unconscious person by lack of muscular tension if one of the extremities is moved.
- b. First aid for apoplexy is as follows:
 - (1) Obtain medical care immediately.
 - (2) Place the victim on his back. If breathing is difficult, place him on his side to allow saliva to drool from his mouth.
 - (3) Cover the victim sufficiently to prevent chilling.

13.02 Appendicitis—is defined as inflammation of the appendix.

- a. Symptoms of appendicitis are as follows:
 - (1) Abdominal pain usually generalized in the beginning, later localizes especially in the lower right abdomen.
 - (2) Nausea or vomiting.
 - (3) Mild fever.
 - (4) Constipation or diarrhea may be present.
- b. First aid for appendicitis is as follows:
 - (1) Obtain medical attention without delay.
 - (2) *Do not* administer laxatives, food, or water.

- (3) An ice bag placed over the painful area may help relieve discomfort but it should be understood that this merely removes a symptom and does not correct the condition.
- 13.03 Blisters—are defined as an elevation of the skin containing watery liquid. This paragraph applies only to blood blisters and water blisters caused by pinching and chafing. See paragraphs 10.04 and 12.01 for blisters due to burns and frostbite. First aid for blisters is as follows:
 - a. Wash the blister thoroughly with antiseptic soap and warm water. Dry, and apply a small amount of merthiolate to the edge of the blister. Puncture the blister at this point with a sterilized needle, or other sharp sterile object. Press out the fluid.
 - b. Apply a sterile dressing held in place with a bandage.
 - c. If the blister has already burst, wash with antiseptic soap and water and apply a dressing.
 - d. Consult a doctor if the blister is very extensive or if there is evidence of infection.
- 13.04 Boils and Sties—A boil is defined as a localized swelling and inflammation of the skin due to infection in a skin gland and containing pus. A sty is an inflamed, swollen sebaceous gland at the edge of the eyelid. First aid for these ailments is as follows:
 - a. Boils and sties in the facial region should be kept free from pressure.
 - b. Boils in other regions may be covered lightly with compresses saturated with a solution of 1 tablespoonful of epsom salts dissolved in 1 pint of warm water.
 - c. NEVER squeeze a boil. If it breaks, wipe away the pus with a sterile pad soaked in rubbing alcohol.
- 13.05 Bruises and Contusions—A bruise or contusion is an injury that does not break the skin but causes rupture of small underlying blood vessels with discoloration of the tissues. First aid for these injuries is:
 - a. Apply cold packs, use ice when available.
 - b. Elevate the injured area to reduce swelling and relieve pain.
- 13.06 Convulsions in Young Children—These are abnormal, violent, and involuntary contractions of the muscles. Symptoms of and first aid for convulsions are as follows:
 - a. Symptoms of convulsions are:
 - (1) Muscle spasms and twitching of various degrees.
 - (2) Stupor or sleep may follow the spasms.
 - b. First aid for this condition is:
 - (1) Remain calm in the child's presence.
 - (2) Provide bed rest and quiet.

- (3) Call a doctor.
- (4) *Do not* give an enema, bath, or warm packs unless so directed by a doctor.

13.07 Epileptic Fits—are any of the various disorders marked by disturbed electric rhythms of the central nervous system. Symptoms of and first aid for epileptic fits are as follows:

- a. Symptoms of epilepsey are:
 - (1) An attack of epilepsy is generally preceded by a loud cry and the victim generally falls.
 - (2) The victim becomes unconscious and has convulsive, jerking movements of the muscles.
- b. First aid for this condition is as follows:
 - (1) Prevent the victim from harming himself by placing a pillow, coat, or blanket under his head.
 - (2) Place folded compress, clean handkerchief, or piece of wood, etc., between his teeth at one side of his mouth to prevent him from biting his tongue. *Do not* obstruct breathing.
 - (3) *Do not* restrain convulsive movements.
 - (4) *Do not* give stimulants.
 - (5) When jerking has ceased, loosen clothing about the neck and keep the victim quiet.

13.08 Eye Injuries—are classified according to the following types:

- a. Group 1 cases—injury to the eyelids and soft tissue around the eye.
- b. Group 2 cases—injury to the surface of the eyeball.
- c. Group 3 cases—injury that extends through the surface of the eye into the deeper tissues.
- d. First aid for Group 1 injuries is as follows:
 - (1) Open wound should be covered with a sterile dressing and bandage.
 - (2) Bruises or “black eyes” may be given cold compresses immediately after injury.
 - (3) Use warm compresses after swelling has been controlled.
- e. First aid for Group 2 injuries is as follows:
 - (1) If the injury is due to entry of a chemical, flush the eye thoroughly and repeatedly with clean water.
 - (2) Obtain medical attention immediately.

- (3) If the injury is due to entry of a foreign body, pull down the lower lid and see if the foreign body lies on the surface of the lid lining. If so, it can be lifted off gently with the corner of a clean handkerchief or a piece of moist cotton. *Never* use dry cotton around the eye.
- (4) Grasp the lashes of the upper lid gently between the thumb and forefinger while the victim looks upward. Pull the upper lid forward and down over the lower eyelid. A foreign body on the upper lid lining can be dislodged and swept away with tears. Flush the eye with a cool solution. This can be done with an eye dropper or small bulb syringe if available.

f. First aid for Group 3 cases is as follows:

- (1) Lay a sterile compress or clean cloth over the eye.
- (2) *Make no attempt at further first aid.*
- (3) Obtain medical care as quickly as possible.
- (4) If necessary to transport the victim, keep him FLAT, using a stretcher.

13.09 Fainting—is defined as losing consciousness due to a temporary decrease in the blood supply to the brain. First aid for fainting is as follows:

- a. Often a person feeling faint can prevent fainting by lowering his head as though to tie a shoe.
- b. If further care is necessary, treat for shock as in paragraph 6.05.

13.10 Heart Attack—is an interruption of normal heart functions. Symptoms of and first aid for heart attack are as follows:

- a. Symptoms of heart attack are:
 - (1) Chest pain.
 - (2) Shortness of breath.
 - (3) Bluish color of the lips and fingernails.
- b. First aid for heart attack victims is as follows:
 - (1) Keep the victim quiet and as comfortable as possible.
 - (2) **Obtain medical care at once.**

13.11 Hernia—is the protrusion of an organ or part through connective tissue or through the cavity wall in which it is enclosed. Symptoms of a hernia are protrusion or bulging in any region of the abdomen from the navel to the crotch. First aid for a hernia is as follows:

- a. Have the victim lie down and refrain from physical activity.
- b. If the bulge does not subside, apply cloths saturated with cold water to the area.

- c. If the above measures fail, have the victim lie on his abdomen and bring his knees up under the chest.
- d. *Do not* attempt to reduce the bulge by pressure.
- e. Send for a doctor.

13.12 Infection—is defined as a condition caused by contaminating disease-producing germs.

- a. Symptoms of infection are:
 - (1) Pain and swelling.
 - (2) Redness and heat.
 - (3) Pus and red streaks.
 - (4) Tenderness.
- b. First aid for infection is as follows:
 - (1) Apply hot compresses—2 teaspoonfuls of salt per quart of boiled water.
 - (2) Be sure that the hot compresses do not burn the victim.
 - (3) Keep the victim at rest.
 - (4) **Obtain medical attention as soon as possible.**

13.13 Insulin Reaction—is caused by excessive insulin in the system and is characterized by the progressive development of a coma. The symptoms of and first aid for insulin shock are:

- a. Symptoms of insulin reaction are:
 - (1) Confusion.
 - (2) Stupor.
 - (3) Mental disturbance.
 - (4) Unconsciousness.

NOTE: Diabetics should and generally do wear a tag or carry a readily accessible card to identify them. **Search for such identification only in the presence of a witness.**

- b. First aid for insulin shock is:
 - (1) Administer any food or drink containing sugar.
 - (2) Send for a doctor.

13.14 Nosebleed—First aid for a nosebleed is as follows:

- a. Have the victim sit up with his head thrown slightly back.

- b. Have the victim breath through his mouth.
- c. Loosen clothing around the neck.
- d. Apply cold packs of the nose.
- e. Pressing the nostrils together firmly for 4-5 minutes often stops the bleeding and gives opportunity for a clot to form.
- f. Have the victim avoid blowing his nose for a few hours.
- g. If these measures do not stop the bleeding, **obtain medical attention immediately.**

13.15 Plant Poisoning—There are three types of poisonous plants:

- a. Poison Ivy—see Figure 24.
- b. Poison Oak—see Figure 25.
- c. Poison Sumac—see Figure 26.

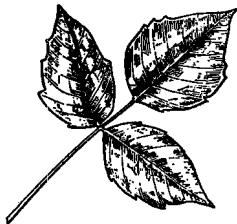


FIGURE 24. Poison Ivy.

Grows as a climbing plant and is found on fences, poles, and trees. Also, grows as a crawling plant and a low shrub. Leaves are green in spring and summer but turn to brown in fall. All of the plant, including the roots, is poisonous. The berries, when present, are white.



FIGURE 25. Poison Oak.

Closely related to the ivy plant, similar in appearance and habits of growth, but with the edges of the leaves more deeply notched. It is not a tree and is in no way related to the oak family.

13.16 Preventive measures are as follows:

When exposure to poison oak is expected, it is advisable for employees to immunize themselves by taking oral immunizing Broemmel. Immunizing extracts and injections administered by physicians should be continued in lieu of or in addition to the use of ointment by those employees who have found the treatment to be helpful.

13.17 Employees who are known to be susceptible to oak or ivy poisoning should not be assigned to work in known infested areas unless they have been immunized against the infection by the doctor or as covered in the preceding paragraph.

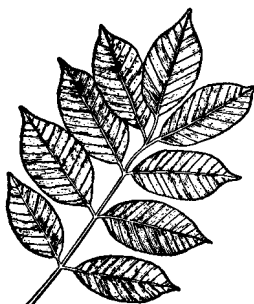


FIGURE 26. Poison Sumac

A shrub or small tree which may grow 20 feet high. Distinguished from the nonpoisonous sumac by its loose, drooping clusters of berries, which are always white. Leaves are orange colored in spring, green in summer and orange or russet in the fall.

- 13.18 Before entering poison oak areas rub in B-Y's Medicated Ointment thoroughly to all exposed areas. Continue rubbing until greasiness or stickiness disappears. Repeat application after washing or bathing.
- 13.19 Use of immunizing mixture--This extract may be ordered as a first aid supply. The following precautions and instructions should be observed:
- a. It should be taken only by persons known to be susceptible to the poisoning.
 - b. *No more* than the contents of one bottle should be taken each season and it should be taken in doses only as directed on the bottle.
 - c. For best results, the mixture should be taken up to one month in advance of exposure, but it may safely be used and generally proves helpful if taken after known exposure or after reaction has started. When used for treatment after reaction has started it should *not* replace the use of calamine lotion or other approved first aid measures.
 - d. In cases where the reaction has become serious and widespread, or when it involves the eyes, medical care should always be secured in addition to the use of the mixture and other approved first aid measures.
 - e. Preventive measures outlined in the foregoing should not be discontinued after taking the mixture.
- 13.20 First aid for plant poisoning is as follows:
- a. As soon as possible, wash the exposed part with soap and water.
 - b. Apply B-Y's medicated ointment liberally. Repeat as often as necessary and continue treatment until the rash disappears.

NOTE: The use of calamine solution or other preparations for first aid treatment *should be discontinued when using B-Y's medicated ointment.*

- c. If calamine lotion is used rather than B-Y's medicated ointment, the following instructions should be followed:
 - (1) The lotion should *not* be rubbed into the skin, but should be painted on or daubed over the areas involved by means of a small wad of cotton, cloth, or sponge, or it may be daubed with the fingers.
 - (2) Repeated applications of the lotion should be made at intervals necessary to keep the infected parts covered until the rash heals or disappears.
- d. *In severe cases and cases involving the eyes, a physician should be consulted.*

13.21 Splinters are thin pieces of an object which become imbedded in the skin. First aid for splinters is as follows:

- a. If the splinter is near the surface, it may be picked out.
- b. Apply merthiolate to the skin.
- c. Remove the splinter with a knife point, needle, or tweezers that have been sterilized.
- d. Induce bleeding.
- e. Apply merthiolate to the wound.
- f. Cover the wound with a clean compress.
- g. If the foreign body is buried deeply or if the wound is of considerable size, apply merthiolate and a proper dressing. See a doctor.

13.22 Unconsciousness (cause unknown) is defined as not possessing mind, sensation, or feeling.

- a. Possible causes of unconsciousness are:
 - (1) Asphyxia (see paragraph 7).
 - (2) Shock (see paragraph 6).
 - (3) Poisoning, including sleeping pills (see paragraph 8).
 - (4) Head injury (see paragraph 9.02).
 - (5) Heat stroke (see paragraph 11.03).
 - (6) Heart attack (see paragraph 13.10).
 - (7) Apoplexy (stroke) (see paragraph 13.01).
 - (8) Epilepsy (see paragraph 13.07).
 - (9) Insulin reaction (see paragraph 13.13).

- b. First aid for an unconscious victim is:
 - (1) Give artificial respiration if the victim is not breathing.
 - (2) Move the victim as little as possible until the cause of unconsciousness can be determined.
 - (3) If necessary to prevent the victim from choking on vomitus, blood, etc., place him on his abdomen, with his head turned to one side.
 - (4) Send for a doctor without delay.

14. TRANSPORTATION

- 14.01 In rendering emergency assistance in serious accident or illness, there is no greater need for calmness than in the procedures associated with transportation.
- 14.02 The objective is to avoid subjecting the patient to unnecessary disturbance during planning, preparation, and transfer, to prevent injured body parts from twisting, bending, and shaking. **Take the necessary time and effort to provide good transportation.** (More harm is done through improper transportation than through any other measure associated with emergency assistance.)
- 14.03 If a person must be lifted to safety before a check for injuries can be made, the body should not be jackknifed. An attempt should be made to give adequate support to each extremity, the head and the back, keeping the entire body in a straight line and maintaining it immobile. One method for accomplishing this is the 3-man hammock carry—victim lying face up—supine. Steps for this method of carry are:
 - a. Step 1—All carriers kneel on the knee towards the victim's feet (see Figures 27 and 28).
 - b. Step 2—No. 1 cradles the victim's head and shoulders with his top arm. His other arm is placed under the victim's lower back.
 - c. Step 3—No. 2 slides his top arm under the victim's back above No. 1's bottom arm, and his other arm just below the buttocks.
 - d. Step 4—No. 3 slides his top arm under the victim's thighs above No. 2's bottom arm. His other arm is placed under the victim's legs below the knees.

NOTE: The hands of carriers No. 1 and No. 2 should be placed about halfway under the victim's body at this stage (see Figure 29).

 - e. Step 5—At a signal, the victim is lifted to the carriers' knees and rested there while the hands are slid far enough under the victim to allow rotation of the hands inward to secure an interlocking grip. (See Figure 30.)
 - f. Step 6—At the next signal, all carriers stand erect with the victim. (See Figure 31.)
 - g. Step 7—To lower the victim to the ground, merely reverse the procedure.



FIGURE 27. Hammock Carry Step 1—Position of Bearers.



FIGURE 28. Hammock Carry—Showing Interlocking Grip.

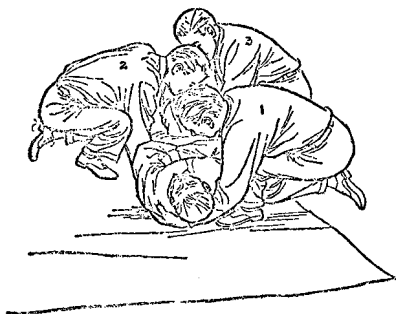


FIGURE 29. Position of Bearers—Ready to Lift.



FIGURE 30. Position of Bearers—Lifting Victim to Knees.



FIGURE 31. Ready to Carry.

14.04 If the victim must be pulled to safety, he should be pulled in the direction of the long axis of his body, not sideways. If available, a blanket or similar object placed beneath the victim will serve as a drag and lessen the danger of aggravating any injuries. Blanket drag is performed as follows:

- a. Place the blanket diagonally beneath the victim.
- b. Cross the arms of the victim over his chest, then fold the lower end and sides of the blanket over the victim.
- c. Drag the victim by grasping the end of the blanket near the victim's head. (See Figure 32.)

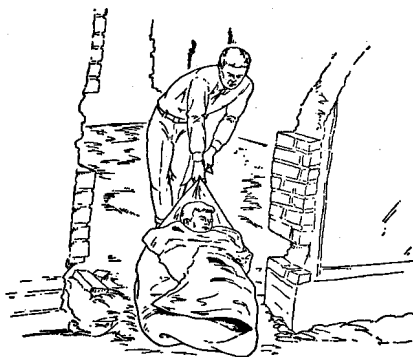


FIGURE 32. The Blanket Drag.

14.05 Persons who may have head injuries, fractures of the thigh, leg, arm, and pelvis bones, or possible back injuries should not be transported in a sitting position.

14.06 Methods of transportation are:

- a. Litter (stretcher). If no litter is available, one may be improvised. Use a cot or door, or use two poles with a blanket as shown in Figure 33; a strong sheet, rugs, or coats may be substituted for the blanket.

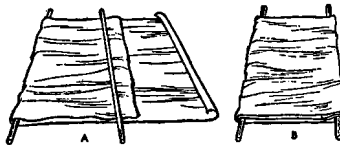


FIGURE 33. Improvised Litter.

- b. Traction Blanket Lift (5 men and victim)—position of victim—supine. Proceed as follows:

- (1) Step 1—Pleat a standard army blanket in folds about 1' long and place on the floor just above the victim's head so that the pleated blanket will "feed out" from the bottom.
- (2) Step 2—Fold back the top pleat so that the man at the head and the two men at the shoulders can kneel on the fold.
- (3) Step 3—No. 1 takes the position on one or both of his knees and grasps the victim's head in the standard manner for applying traction. (See Figure 34.)

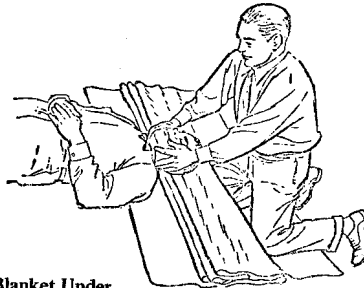


FIGURE 34. Placing the Blanket Under the Victim.

- (4) Step 4—Nos. 2 and 3 kneel on one or both knees at the victim's shoulders, placing one hand flat under his shoulder blade and the other in his armpit. (See Figure 35.)

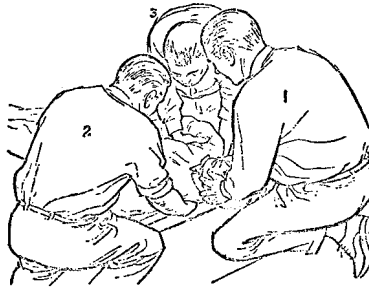


FIGURE 35. Holding Victim Against the Pull of the Blanket.

- (5) Step 5--Nos. 4 and 5 grasp the bottom pleat of the blanket and pull the blanket under the victim while Nos. 1, 2, and 3 hold the upper portion of the victim's body in place. (See Figure 36.)

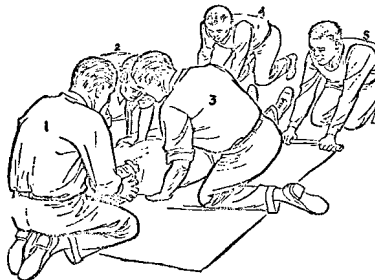


FIGURE 36. Pulling the Blanket Through

- (6) Step 6--Roll the blanket tightly at the sides until it fits the contour of the victim's body. (See Figure 37.)



FIGURE 37. Rolling Edges Tightly for Firm Grip.

- (7) Step 7--Nos. 2 and 3 (on opposite sides) grasp the blanket with the top hands at the victim's shoulder and the bottom hands at his lower back. Nos. 4 and 5 grasp blanket with top hands at his hips and lower hands at his legs (below knees). No. 1 remains at his head, holding slight traction. (See Figure 38.)



FIGURE 38. Blanket Fits Contour of Body.

- (8) Step 8--At a signal, Nos. 2, 3, 4, and 5 lean back in opposite directions, using the back muscles and body weight. This will lift the victim 6" to 8" from the floor so that a litter can be slid underneath him. Use same procedure for victim in prone position. (See Figure 39.)

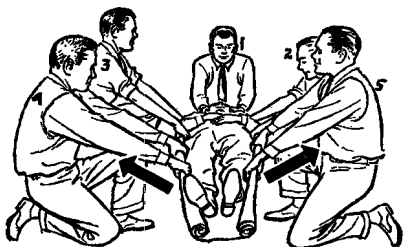


FIGURE 39. Bearers Lean Backward and Litter is Placed under Victim.



FIGURE 40. Lowering Victim to Litter.

c. The suspension lift is performed as follows:

- (1) Step 1--The victim lies in a prone position with his hands under his chin, similar to the position assumed in applying artificial respiration. (See Figure 41.)



FIGURE 41. Position of Victim.

- (2) Step 2--Carrier 1 kneels on one or both knees at the victim's head. He carefully slides his hands under the mid-forearms of the victim until the upturned palms of his hands rest under the victim's armpits. (See Figure 42.)



FIGURE 42. Position of Carrier No. 1.

- (3) Step 3--Carriers 2 and 3 grasp the victim's hipbone with their top hands and his knee cap with their lower hands. (See Figure 43.)



FIGURE 43. Position of Carriers.

- (4) Step 4--On signal, all lift together so that the victim is raised 5" or 6" from the floor (just high enough to slide a litter underneath). (See Figure 44.)

NOTE: Care should be taken so that the body is lifted as a unit. Also, carriers Nos. 2 and 3 should shift the weight toward carrier No. 1 when raising the victim.

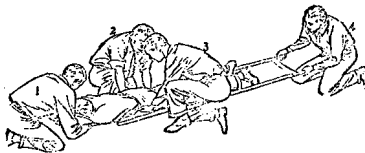


FIGURE 44. Lifting and Placing of Litter.

- d. Many other methods of transportation are useful. Learn first aid and know them all.

- 14.07 Methods of Transfer—These include special methods for short-distance transfers, the walking assist, manual carries, transfer by supporting devices such as stretchers and cots, and transfer by vehicles. It is difficult for inexperienced people to lift and carry a person gently. Their efforts may not be well coordinated. They need careful explanations.
- 14.08 The best device for short-distance transfers is the stretcher or cot. It is important to remember that the short-distance transfer is harmful unless the injured parts are immobilized. “Splint them where they lie” unless there is urgent danger in delay. Unless there is unusual urgency, it is best to wait until an ambulance is available.
- 14.09 Aside from rare exceptions, the drive should be at moderate speeds, with gentle stops and starts, and with observance of all safety rules.

PREVENTION OF AND FIRST AID FOR SKIN IRRITATION FROM CREOSOTE

1. GENERAL

- 1.01 The purpose of this practice is to provide the procedure to be used for prevention of and first aid for skin irritation from creosote.
- 1.02 It is desirable that all employees who have occasion to handle creosote treated poles and other creosote treated wood products know and follow simple precautions to prevent skin irritations which may result from contact with creosote.
- 1.03 All employees should follow the first aid practices as outlined in this practice if creosote irritation does occur.

2. PREVENTIVE MEASURES

- 2.01 Employees climbing, handling, or working on creosoted poles or crossarms where some of the creosote may be transferred to the skin (for example, while the poles or arms are new or during hot weather) should observe the following precautions:
 - a. *Do not* roll up the shirt sleeves.
 - b. Wear gloves.
 - c. Keep the neck well covered with a collar or handkerchief.
 - d. Keep the pant legs well down over the ankles.
 - e. When direct skin contact with creosote is likely, rub the arms, face and other possible exposed skin areas with vaseline or with medicated ointment before starting the work.
 - f. As soon as practicable after completing the work, remove the protective coating with a clean, dry cloth. Then wash thoroughly with soap and hot water.
 - g. *Never* rub the eyes or wipe perspiration off with the hands or shirt sleeve if they have been exposed to creosote.
 - h. When there has been direct skin contact with creosote:
 - (1) Wash the skin with plenty of hot water and soap.
 - (2) Coat the affected area with medicated ointment.
 - i. When creosote exposure has occurred, wash the hands, arms, face, and neck with plenty of hot water and soap before lunch and after the day's work.

NOTE: In washing the face, thoroughly wash the hands before attempting to wash around the eyes.
 - j. Clothing that has been in contact with creosote should be soaked in soapy hot water and washed as soon as possible.

3. FIRST AID

3.01 The following first aid procedures are to be followed for exposure to creosote:

a. Skin Irritations:

- (1) Wash the affected area with plenty of hot water and soap.
- (2) If the irritation continues for 24 hours or if a large area is affected, see a doctor for treatment.

b. Eye Burns:

- (1) Flush the eye with water by submerging the face in a basin of water and opening and closing the eyelids.
- (2) Drop two or three drops of castor oil into the eye.
- (3) Apply an eye bandage.
- (4) Obtain medical attention.

RESCUE OF PERSON FROM LIVE WIRE ON GROUND

1. GENERAL

- 1.01 This practice outlines methods of rescuing a person who is in contact with a live wire that is on the ground or at any location other than on a pole.
- 1.02 In an electric shock accident, quick rescue and prompt artificial respiration (if normal breathing has stopped) are extremely important. In some cases the injured person may remain in contact with the wire because of his inability to let go of the live conductor, or due to his being unconscious.
- 1.03 An attempt to rescue a person from contact with a live wire is dangerous for anyone who does not understand how to proceed, because of the fact that the electric current may be carried through the victim's body to the rescuer, or the live wire may come in contact with the rescuer or other person and shock him unless proper precautions are taken.
- 1.04 If an unconscious person is in contact with a wire and it is not definitely known that the wire has been de-energized, assume that it is a live circuit in proceeding to clear him from contact with the wire.
- 1.05 In all cases where the victim is unconscious, call a physician to the location as soon as possible without delaying the rescue. After the victim has been removed from the contact, begin first aid as is necessary.
- 1.06 All employees should review this practice and other applicable first aid practices as well as the Red Cross First Aid Textbook at frequent intervals so that if it should become necessary to rescue a person in contact with a live wire on the ground, the rescue work will be handled promptly and safely.

2. PLANNING THE RESCUE

- 2.01 Before starting the rescue, consider quickly but carefully how the operation can best be carried out. The most important details to be considered are as follows:
 - a. Position of the injured person with respect to the conductor. His position will influence the method to be employed in clearing the contact; that is, whether to:
 - (1) Cut the wire, or
 - (2) Pull the wire clear of the victim, or
 - (3) Roll him off the wire, or
 - (4) Lift him clear of the wire.
 - b. Presence of a nearby switch so that the wire may be de-energized.
 - c. Rescue equipment available that could be used for cutting or moving the wire or moving the victim, such as:
 - (1) Rubber gloves.
 - (2) Rubber footwear.

- (3) Pliers.
 - (4) Dry rope.
 - (5) Tree pruner.
 - (6) Long handled shovel.
 - (7) Dry board.
 - (8) Dry ladder.
 - (9) Triangular bandage.
 - (10) Other non-conducting material.
 - d. Dependable assistants.
 - e. Probable voltage of circuit.
 - f. Presence of bystanders. It may be necessary to modify the rescue methods so that bystanders will not be injured by the energized wire while it is being handled.
- 2.02 Men conducting the rescue must remain calm, think clearly, and avoid impulsive and unsafe operations. Keep in mind the fact that wet ropes, wet wood and wet clothing are not good insulators and severe shocks can be transmitted by them. Avoid standing on wet ground and in water.
- 2.03 Employees should become generally familiar with the types of construction used by the electric companies that operate in the areas where rescue work may be necessary so that they may be able to recognize the different types of circuit voltages to be encountered.
3. **FREING A PERSON FROM CONTACT WITH LIVE WIRE OF LESS THAN 10,000 VOLTS**
- 3.01 In rescuing a person who is in contact with a live wire, wear rubber gloves and rubber footwear. While putting on the protective equipment, take the precaution to look for holes or cuts and signs of wear.
- 3.02 If rubber gloves are available, with or without rubber footwear, proceed in accordance with one of the following methods. They are listed in order of preference:
- a. Pull the wire clear of the victim by means of a rope, or push it clear with a tree pruner, board, or ladder.
 - b. Cut the live wire on both sides of the victim or on the remaining side if the wire is broken.
 - (1) Use pliers or a tree pruner.
 - (2) In cutting the wire, close the eyes or turn the head away so that the eyes will not be exposed to the electrical flash.
 - (3) Warn bystanders to keep clear so that they will not be injured by the ends of the wire after it has been cut.

- (4) In many kinds of electric circuits, voltage may remain on the wires after they have been cut at one place. If possible and if it will not delay the rescue operations, hold the wire down by means of a board or tool handle before it is cut so that the wire ends will stay under control.
 - c. Roll the victim off the wire. Observe the wire closely to avoid accidental contact with it and prevent the ends from hitting bystanders.
 - d. Lift the victim off the wire.
- 3.03 If rubber gloves are not available, extreme care must be exercised to avoid direct contact with the body of the person or the live circuit. Use one of the following methods which are listed in order of preference:
- a. Pull the wire clear of the victim by means of a dry rope, provided that it appears that the wire can easily be freed. A dry tree pruner may also be used in pulling the wire or cutting it clear.
- NOTE: *Do not* under any circumstances use a wet rope or other wet materials that may come in contact with the live wire or the body of the victim.
- b. If the live wire cannot be freed readily by pulling it clear, slip a dry rope or other dry material under the shoulder or other part of the victim's body and roll him or lift him off the wire. A dry board, ladder, or dry stick may be used to assist in pushing the rope under his body.
 - c. If the victim's clothing is wet, *do not* touch him under any circumstances unless rubber gloves are being worn. If his clothing is dry, it may be touched only if other dry insulating material is not available.
 - d. Before grasping any portion of the victim's clothing, touch it lightly to make sure that there is no voltage in it.
 - (1) Preferably stand on a dry board or other insulating material while in contact with the clothing.
 - (2) Remember that under wet weather conditions extreme care must be used to avoid shocks even though rubber gloves and rubber footwear or the equivalent are used.

4. FREEING A PERSON FROM CONTACT WITH LIVE WIRE OF MORE THAN 10,000 VOLTS

- 4.01 If the victim is in contact with a live wire and in the best judgement of the rescuer the voltage exceeds 10,000 volts, the rescuer should for his own protection secure the assistance of a qualified employee of the power company to break the contact before proceeding with the rescue. This precaution is necessary since the rubber gloves are not designed to withstand higher voltages and the rescuer cannot be sure that ropes, tree pruner handles, ladders and such equipment that might be used with rubber gloves are always dry enough to provide the degree of protection required.

5. ARTIFICIAL RESPIRATION AND OTHER FIRST AID

- 5.01 If normal breathing has stopped, start artificial respiration immediately after the rescue. Follow the methods as outlined in the American Red Cross First Aid Book. In CTSP 400-405-001, refer to:

- a. Artificial Respiration, paragraph 7.
- b. Burns, paragraph 10.
- c. Shock, paragraph 6.

FIRST AID
RESCUE OF EMPLOYEE FROM POLE

1. GENERAL

- 1.01 This practice specifies methods of rescuing an employee working aloft when (on account of electric shock or for any other reason) help is required to lower him to the ground.
- 1.02 In an electric shock accident, quick rescue and prompt artificial respiration if normal breathing has stopped are extremely important. In some cases, the injured person may remain in contact with the wire because of his inability to let go of the live conductor or due to his being unconscious.
- 1.03 Unless it is definitely known that the cause of the disability is not electric shock or that the contact with the electric supply conductors has been broken, it should be assumed that all of the wires on the pole are energized with dangerous voltages. In this event, the rescuer should take precautions as specified in this practice to protect himself and his assistants from injury due to electric shock.
- 1.04 In all cases where the employee has received a severe electric shock or is unconscious, have someone call a physician to the location as soon as possible without delaying the rescue. (If the victim is conscious and can safely be moved after receiving first aid, he should be taken where he may receive the services of a physician.) In administering first aid and transporting the victim, follow the recommendations covered in the American Red Cross First Aid Text Book and outlined in CTSP 400-405-001.
- 1.05 Send someone to get the truck as soon as possible if it is not near the scene of the accident, as it may contain useful equipment or it may be needed as an insulated platform to effect the rescue and to transport the injured employee.
- 1.06 In electric shock cases, notify the serving power company which operates the equipment involved in the accident as soon as possible.
- 1.07 If the cause of the disability is not electric shock, the rescue work may be conducted more deliberately and without the necessary speed which is essential in electric shock cases.
- 1.08 Review this practice and also the Red Cross First Aid Text Book at intervals so that if an accident on a pole should occur, the rescue work would be handled effectively.

2. PLANNING THE RESCUE

- 2.01 Before starting the rescue, plan quickly but carefully how the operation can best be carried out. The most important details to be considered are the following:
 - a. Probable cause of the disability (electric shock, sickness, fainting, etc.). In an electric shock case, determine if possible the source of the shock and whether or not the contact has been cleared. If the source is not apparent or if the nature of the disability cannot be determined from the ground, assume that the injured person has been shocked and that the contact still exists, and use the protective measures applicable to such cases.
 - b. Rescue materials should be available for use such as rope, rubber gloves, pliers, tree pruner, climbers, body belt, safety strap, ladder. (An extension ladder may be used, under some conditions, to facilitate the removal of the victim.)

- c. Assistants to help handle the rope in lowering him from the pole.
 - d. Position of the victim in respect to wires and other attachments on the pole.
 - e. Method to be used in clearing contact between the victim and the source of shock. (Lifting him clear, opening switch, cutting wires, etc. If wires are to be cut, consider the possibility of unsound pole falling due to an unbalanced load effect on the pole.)
 - f. Side of the pole to be climbed and the position from which rescue work will be done.
 - g. Point of attachment for the rope to be used in lowering the employee.
 - h. Need for cutting wires below the victim which might interfere with rescue work and the lowering operations.
 - i. Protection of the rescuer from electric shock (if pole, rope or other equipment is wet).
 - j. Availability of the truck to be used (with necessary precautions) as an insulated platform, particularly under wet conditions.
- 2.02 Employees should become generally familiar with the types of construction used by the electric companies that operate in the areas where rescue work may be necessary so that they are able to recognize the different types of circuit voltages to be encountered.
3. **REMOVING AN EMPLOYEE FROM CONTACT WITH LIVE CIRCUIT OF LESS THAN 15000 VOLTS**
- 3.01 In electric shock cases, the rescuer should wear rubber gloves throughout operations when he will be exposed to possible shock. If rubber gloves are not available, rescue work may be undertaken *only* if the contact can first be cleared by available safe means, such as the use of a dry rope, dry board, dry tree pruner, dry ladder, or opening a switch. Men conducting the rescue must remain calm, think clearly, and avoid impulsive and unsafe operations. Keep in mind the fact that wet ropes, wet wood and wet clothing are not safe insulators, and severe shock can be transmitted by them.
- 3.02 When handling wires that may be "hot", use only one hand if practicable and keep the other hand and other parts of the body clear of wires, guys, suspension strand, cable terminals, or other grounded structures.
- 3.03 If the reason for the high voltage being on the plant is evident, the contact should be removed (where practicable to do so) without handling the supply conductors. In some cases it may be possible to clear the contact by throwing a dry hand line over the telephone or supply wires and pulling them apart or by pushing them apart with a ladder or long dry stick, such as a tree pruner handle or pike pole. Do not use green wood or damp sticks in attempting to separate the wires and avoid standing on wet ground and in water.
- 3.04 If methods mentioned above cannot be employed and if rubber gloves are worn, the contact between the supply wires and telephone conductors may be opened by cutting the telephone wires with pliers. For this purpose a tree pruner with a dry pull rope may also be used, preferably with rubber gloves.

- 3.05 Under extreme conditions, secondary electric circuits may be cut, provided that rubber gloves are worn while the wires are being cut. Do not attempt to cut a primary wire.
- 3.06 In cutting supply wires or telephone wires that are crossed with electric supply wires, take a position so that the cut wires will not fly back or fall and injure the rescuer or other person. Turn the face away or close your eyes while cutting the wire to protect the eyes from the electric flash that may follow.
4. **REMOVING AN EMPLOYEE FROM CONTACT WITH LIVE CIRCUIT OF MORE THAN 15000 VOLTS**
 - 4.01 In electric shock cases, if the injured employee remains in contact with either charged telephone or power wires and, in the best judgment of the rescuer, the voltage involved is greater than 15000 volts, the rescuer should, for his own protection, secure the assistance of a qualified employee of the power company to break the contact or open the switch before proceeding with the rescue. This precaution is necessary since rubber gloves are not designed to withstand higher voltages and the rescuer cannot be sure that ropes, tree pruner handles, ladders and such equipment that might be used with rubber gloves are always dry enough to provide the degree of protection required.
5. **ASCENDING THE POLE**
 - 5.01 Keeping in mind the rescue plan as developed in accordance with paragraph 2, proceed with the rescue.
 - 5.02 The rescue rope should be a rope in good condition, not less than 3/8" in size, and long enough to permit any available assistants on the ground to lower the victim. (A larger rope is preferable.)
 - 5.03 Push a loop formed near the end of the rescue rope under the body belt at the back so that it can be conveniently carried up the pole and removed when needed.
 - 5.04 Climb the pole on the selected side and get into proper position for rescue.
 - 5.05 While aloft, exercise every precaution to avoid contact with telephone wires, suspension strand, cable guys and other equipment, as well as contact with the victim unless it is clearly evident that the contact with the "hot" wire has been broken.
 - 5.06 If necessary, in order to facilitate lowering the victim, cut those telephone wires which would interfere. (It is assumed that no wires will be cut which, in the planning of the rescue, it was concluded would be likely to cause the pole to fall.) In cutting the telephone wires, exercise care to avoid dropping them on persons below. Be careful also that no projecting ends are left which might injure the victim while he is being lowered.
6. **REMOVING EMPLOYEE FROM CONTACT WITH WIRES AND LOWERING HIM**
 - 6.01 Pass the rescue rope over a crossarm or other suitable strong attachment located above the employee. If working alone, take one complete turn of the rope around the crossarm or other fixture so as to provide some snubbing action to assist in holding the victim's weight.
 - 6.02 Avoid direct contact with the victim until he is clear of the wires or other equipment that may be charged. When practicable, double back the end of the rope on itself and place the double rope end around the victim's body under the arms, and tie it either at the front or back with a bowline knot. However, time should not be taken to double the end of the rope if it delays the rescue.

- 6.03 If it will facilitate the rescue, pass the rope through the D rings of the victim's body belt and tie the rope securely, preferably in front. If the rope is attached to his belt, take care in handling him so that the belt will not slip over his shoulders or down over his hips and cause him to fall. If necessary to move the employee to facilitate attaching the rope, this may be done by pulling on his safety strap.
- 6.04 After the rope has been secured to the victim by either of the methods described in paragraphs 6.02 and 6.03, pull the victim toward the pole by means of the rope or both the rope and the safety strap. If help is available on the ground, these assistants should be guided by the rescuer on the pole.
- 6.05 When the preparations for lowering have been completed, unsnap or cut the employee's safety strap and lower him to the ground, guiding him when necessary so that he will clear attachments on the way down.

7. ARTIFICIAL RESPIRATION AND OTHER FIRST AID

- 7.01 When the victim reaches the ground, immediately remove the rope or body belt from his chest so that it will not interfere with his breathing.
- 7.02 If normal breathing has stopped, start artificial respiration immediately and other first aid procedures that may be necessary in accordance with the recommendations of the American Red Cross First Aid Text Book and CTSP 400-405-001, paragraphs 7.02 and 7.07.

SAFEGUARDING SPECIAL SERVICE CIRCUITS CLIP TYPE CONNECTING BLOCKS

1. GENERAL

1.01 This practice is issued to describe the device used to identify the terminations of wiring for special services on clip-type connecting blocks.

2. 10,000 Ω TERMINATING RESISTOR (RADIO LOOPS)

2.01 The 10,000 Ω resistor is applied to provide a termination for the line at all times, including lengthy periods when no customer's equipment is connected to it. At such times, it may be necessary to test the circuit for continuity, balance and noise in preparation for a new lease period. Maintaining a permanent termination in a manner not susceptible to casual disconnection eliminates the need to dispatch an installer/repairman to the broadcast location to apply a termination when such tests are to be made.

3. CIRCUIT IDENTIFICATION FOR CLIP TYPE CONNECTING BLOCKS

3.01 The device used to identify the terminations of wiring for special services is made of red plastic material folded so that it can be placed over the terminals of a clip type connecting block (i.e., 66-Type). Three sizes are available: one which covers two terminals, one which covers three terminals, and one which covers six terminals. The 2-terminal clips are shown in place on terminals of a 66E block in Figure 1.

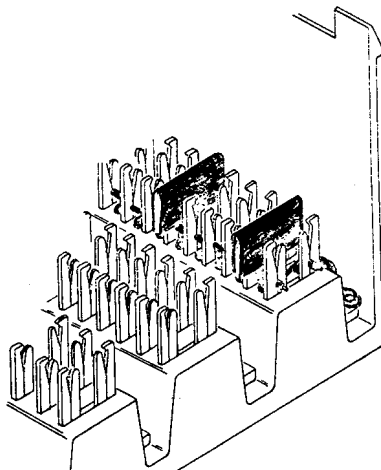


FIGURE 1. Red Signal Device Used to Identify
Special Service Wire Terminations on
Clip-Type Connecting Block.

4. ORDERING INFORMATION

ITEM	COLOR	SIZE	NUMBER	SUPPLIER
Clip Insulator	Red	Two Terminals	P11800	Stromberg-Carlson
Clip Insulator	Red	Three Terminals	P11799	Stromberg-Carlson
Clip Insulator	Red	Six Terminals	P11798	Stromberg-Carlson

NOTE: It is not the purpose of the Plant Practice Section to indicate where a product should be purchased. The above simply mentions one known supplier.

VEHICLES GENERAL OPERATING INSTRUCTIONS

1. GENERAL

- 1.01 This practice covers operating instructions that are common to all vehicles. It is necessary that every operator and potential operator of a company vehicle be familiar with the contents of this practice. If the instructions covered herein are followed, extended vehicle life, improved safety, and lower maintenance costs will result.

2. BEFORE MOVING THE VEHICLE

- 2.01 The method in which the operator handles the vehicle is the greatest factor in obtaining maximum economy and performance. The operator should be thoroughly instructed in the operation of the vehicle before it is placed in his care.

- 2.02 The following procedures should be followed before moving the vehicle:

- a. Before starting, check engine oil and coolant levels. *Place transmission in neutral* and depress clutch pedal (if provided), this lessens the load on the starter and decreases the drain on the battery. Automatic transmissions must also be placed in neutral or park.
- b. *Avoid racing the engine when first starting* as it is harmful to the engine, especially in cold weather. Even though light oils are used, the flow of oil is retarded until engine is properly warmed.
- c. Allow the engine to idle for a short period (2 to 5 minutes), and push manual choke in on vehicles so equipped before attempting to move the vehicle. *Drive vehicle conservatively until heat gauge reads normal.*
- d. *Check the oil pressure gauge*; it should rise immediately upon starting and should not drop until engine is thoroughly warmed and then only slightly. Oil pressure light indicators will go out when the pressure is up, however, a moment should be allowed for the oil to circulate.
- e. Many repair bills can be avoided by keeping the clutch in proper adjustment so that it will release properly and a smooth shift achieved. *Always check the clutch action before moving vehicle.* Clutch adjustment varies (3/4" - 2-1/2") depending upon type of vehicle.
- f. Check brakes

(1) *Air Equipped System*

The audible warning device should be on at pressures below 60 pounds.

Allow engine to run until pressure reaches 100 to 120 pounds.

Apply brakes several times with engine running. Pressure should drop to approximately 85 pounds then recover to maximum pressure.

Turn ignition off. Apply brakes and hold. The pressure should not drop over 5 pounds initially. With the brakes held on, the pressure should not decrease at a rate over 1 pound for each 2 minutes. (*This test is basic, and should be performed at the start of each shift.*)

(2) *Vacuum Brakes - Trucks*

Start engine and allow sufficient time for vacuum to build up in system (approximately 1 minute).

Apply brakes and check pedal travel. This should not be over 30% of the available travel distance.

Release brakes and allow engine to idle for 1 minute.

Turn off engine and apply brakes 3 times. ADEQUATE VACUUM SHOULD BE IN RESERVE TO ASSIST ON THE THIRD APPLICATION.

If the vehicle is equipped with a gauge, start engine and BUILD A VACUUM RESERVE OF 18" TO 23". Turn off engine. The vacuum should not drop over 2 inches during a 5 minute period. *This test should be performed at the start of each day.*

If the vehicle is towing a trailer equipped with vacuum brakes, check connections and hoses for leaks and damage.

Vehicles equipped with vacuum booster brakes should not be towed when there has been an engine failure, make use of a tow bar for this condition.

(3) *Light Trucks and Passenger Cars*

Depress brake pedal to a full stop position. THE PEDAL SHOULD BE FIRM.

(4) *All Systems - Operational*

Check tires for proper inflation and visible defects.

Check all lights including stop and turn signals.

After making the above initial tests, place the vehicle in gear and increase speed to 10 mph. Apply brakes. The vehicle should stop promptly without any side directional pull.

3. MOVING INSTRUCTIONS

3.01 Occasionally drivers acquire habits in driving which shorten the life of the vehicle and its component parts. Some points to observe to avoid this are listed below.

- a. *Keep the tires properly inflated*, not only to reduce the tire wear and save fuel, but also as a safety measure to insure proper braking and steering. Tire pressures will vary with size, type and usage.
- b. *Good brakes are essential* so that the vehicle will be under control at all times. A good driver rarely needs to use the brakes to their full capacity and is aware of the fact that excessive strains are placed on the entire chassis if emergency applications are made.

- c. *Avoid allowing engine to idle for long periods*; this will result in dilution of the oil on the cylinder walls. This means that the cylinder walls, bearing, and pistons will not be properly lubricated. At idling speeds, engines will draw in more fuel than is actually consumed, and unburned fuel has a tendency to form harmful carbon deposits, dilute oil and foul spark plugs.
- d. *Stopping on hills*—When it is necessary to stop on a hill, *be sure that the hand brake is set before leaving the vehicle*. If grade is particularly steep, **IT IS ADVISABLE TO BLOCK WHEELS WITH CHOCK BLOCKS ON HEAVY DUTY VEHICLES**. When parking parallel to curbs, be sure to turn wheels *toward curb* if vehicle is *facing downhill*, and turn wheels *away from curb* if vehicle is *facing uphill*.
- e. Be sure to watch dashboard gauges for indications of overheating of engine, excessive discharging or charging of generator/alternator, and low oil pressures. It is important that these gauges be checked intermittently during all operations of the vehicle. Check for excessive oil and water leaks under vehicle when backing or driving from a parking location.
- f. Vehicle speed limits: No person shall drive a vehicle faster than is reasonable or prudent having due regard for the traffic on, and the surface and width of, the highway and in no event at a speed which endangers the safety of persons or property. **THIS IS IN ADDITION TO POSTED SPEED LIMITS WHICH SHALL NOT BE EXCEEDED.**

3.02 Manual Shift Transmissions -

- a. When shifting gears, move the gear shift lever as far as it will go, to assure that they gears are fully engaged. When gears are not fully engaged, they will wear rapidly or chip.
- b. Avoid driving with foot resting on the clutch pedal (referred to as “riding the clutch”), as this may cause the clutch to slip; it may also cause premature wear of the clutch facing, release bearing and engine thrust bearing. *Gradually* release the clutch when starting or changing gears. Avoid jackrabbit starts.
- c. **INCORRECT USE OF THE ENGINE AS A BRAKE MAY CAUSE A GREAT DEAL OF UNNECESSARY MOTOR TROUBLE.** If the engine is forced to run faster than the rated speed or the speed permitted by a governor setting, internal engine parts will not react fast enough and can completely destroy the engine. For example, if the engine is governed at 4,000 RPM, permitting the vehicle to travel 40 miles per hour in high gear, and the unit is driven downhill at a speed of 50 miles per hour, momentum of the vehicle will force the engine to run 800 RPM over the governed speed. This increase is enough to destroy the engine.
- d. When traveling downgrade, it is advisable to change to the same gear as required to go up the grade, or one gear lower. This will normally provide adequate engine braking action. *Always* keep the motor running. *In all cases* brakes *must* be reserved as the main factor in retarding the descent. Do not rely on brakes alone on long grades as they will become hot and “Fade.” Over prolonged use, brake fade will result in complete temporary (until cooled off) loss of braking. *Do not* allow engine to operate in excess of governed speed.
- e. Lugging the engine on uphill grades at low engine speeds promotes overheating and is harmful to all working parts of the engine. Although it is desirable to have an engine that will pull exceptionally well, proper engine speed should be maintained by selecting a lower gear when traveling uphill. (Lugging is defined as being unable to increase speed by depressing the accelerator.)

- f. There are certain types of field conditions where it is practically impossible to shift to a lower gear without stopping the vehicle. For example, operating in loose sand where the momentum of the vehicle is rapidly decreasing, the gears on the main shaft of the transmission will lose their momentum faster than those of the driveshafts. In this type of soil, it is desirable to bring the vehicle to a complete stop before attempting to shift. When vehicle is at a standstill, select the proper gear before resuming operations.

3.03 *Four-Wheel Drive* — DRIVERS MUST BE FAMILIAR WITH THE FUNCTIONS OF THE FOUR-WHEEL-DRIVE TRANSFER ASSEMBLY TO OBTAIN SAFETY AND EFFICIENCY. Refer to manufacturer's instructions for specific vehicles.

3.04 *Automatic Transmissions* — In present use are various automatic transmissions each of which operate somewhat differently. Avoid driving with left foot on brake pedal as this will wear brakes and place a strain on the transmission and engine.

4. CARE OF VEHICLE CAB

4.01 Tools and work equipment are NOT to be carried in the cab of the vehicle. Under no condition will an employee drive or ride in the cab of a vehicle while wearing tool belts, climbers, lineman's safety belt or tool pouch.

4.02 Cabs must be kept in a clean orderly condition at all times.

5. PRECAUTIONS FOR VEHICLES AT JOB LOCATIONS

5.01 When locating vehicle at job site, safety is a most important consideration; therefore, the workmen or crew should complete the necessary precautions listed below, as applicable:

- a. Direct vehicle operator when backing vehicle to job site location.
- b. Place traffic cones, "Men Working" signs and high level warning devices as applicable.
- c. Place flasher lights.
- d. Check aerial clearances before derrick is raised into place.
- e. Inspect site to prevent property damage.
- f. Secure dolly or poles.
- g. Make sure that vehicle is in gear or "park" and EMERGENCY BRAKE AND MICO-BRAKE LOCK are applied when left unattended.
- h. Place chock blocks when parking vehicle on hills and grades. Do not rely on brake lock devices such as mico-lock, or hand vacuum and air controls for unattended parking on grades.

5.02 Warning devices or flagmen are required when traffic may be hindered by the job-site parked vehicle near hills, curves or other obstructions to other drivers' vision are encountered.

5.03 Before raising, swinging or otherwise operating the lift, boom or derrick *make sure there will be no interference from traffic, nearby objects* OR POWER FACILITIES. All operations shall be done with the vehicle facing with the direction of traffic, when practicable.

- 5.04 Before entering or leaving the vehicle, the driver should always assure himself that boom, basket, derrick, ladder, or any other part of the vehicle is not in contact with any object that might energize the truck. *If there is any doubt, it must be assumed that the truck is energized.*

SAFETY PRECAUTIONS: Plan and conduct work in the vicinity of power structures as though any metallic part of the power structure is alive with a dangerous voltage. Avoid all contacts, directly or indirectly, with any metallic part of the power system.

If shocks are experienced, due to other than normal telephone voltages and currents, work involving contact with wires should be stopped immediately.

When an accidental contact with power wires is made, **NO ONE SHALL APPROACH AND MAKE CONTACT WITH VEHICLE OR WIRES.** Vehicle driver, operator or any other person who may be on the vehicle, shall remain on the vehicle until the contact can be cleared.

5.05 *Moving vehicles with a man in the operator basket -*

- a. When a workman/operator is in the basket of a lift, boom or ladder the driver shall not leave the cab of the truck unless the engine is turned off, hand brake set, and the vehicle is either in low or reverse gear "park" position. If the vehicle is on a grade, in addition to the above, chock blocks must be placed against the wheels.
- b. Any movement of the truck, while a workman/operator is in the basket, is to be made only at the direction of that workman.
- c. When operating on inclines or terrain where the vehicle is not level, exercise caution as stability of the vehicle is reduced. While traveling over uneven ground, speeds must be reduced and the boom or ladder must be retracted, lowered and aligned with the vehicle.

When moving the vehicle with the boom or ladder elevated, the speed should not exceed 2 miles per hour. The driver should be alert for instructions from the workman/operator in the basket. No wires, lines, strand, or cable should be attached to the boom or ladder, except as permitted in detailed instructions for specific vehicles. Under all conditions when a man is in the basket, the vehicle must be operated in the lowest possible gear.

- 5.06 No person driving, or in control of, or in charge of, a motor vehicle shall permit it to stand on any highway unattended without first effectively setting brakes therein and stopping the motor thereof as stated in paragraph 5. (A Vehicle Code effective in many states.)

This means, in effect, that a workman/operator SHALL NOT BE IN THE BASKET OF ANY AERIAL PERSONNEL CARRIER WITH NO ONE IN CONTROL OR ATTENDANCE AT THE VEHICLE CAB WITH THE ENGINE RUNNING. The only exception is a vehicle that is specifically designed for security during one-man operation.

6. **INTERCOMMUNICATION SPEAKERS**

- 6.01 Intercommunication speakers are provided in most areas for all aerial lift, boom basket and ladder vehicles. These speakers are located in the basket area and in the cab of the vehicle. They are to provide two-way communications between the workman/operator and the driver.

CAUTION: An intercom should be used whenever there are two men on the vehicle; one man in the basket and the other in the vehicle.

7. FLASHER WARNING SIGNALS

- 7.01 Certain vehicles have been equipped with special amber warning lights. The conditions under which these lamps may be used are limited. Their use is confined to periods when utility crews are actually engaged in construction, removal, maintenance or inspection of telephone plant during such times that our vehicles shall be either moving at a rate of speed less than the normal flow of traffic, thereby creating a hazard, or parked *other* than adjacent to a curb.
- 7.02 *Warning lamps are intended to augment and not to take the place of* traffic safety warning devices such as, cones, signs, flags, flasher lights, and high level warning standards, presently required by safety practices.

8. VEHICLE SECURITY

- 8.01 To prevent losses of tools, materials or other property, the following measures shall be taken:
- a. All tools and materials not in use shall be placed in the proper compartments on the vehicle, not on the bed of the truck or the ground nearby.
 - b. When leaving the vehicle unattended at a work location or when stopping for lunch, all bins and compartments containing tools and materials and cab shall be *locked* and the *keys shall be removed from the truck*. Other items should be removed and placed in protective tool areas, chained and locked to the vehicle.

9. REPORTING VEHICLE TROUBLE

- 9.01 All vehicle defects which create unsafe conditions or potential mechanical failures to the driver or workman/operator, shall be reported as directed by local procedure.

PARKING COMPANY VEHICLES AND CIRCLE OBSERVATION CHECK

CONTENTS	PARAGRAPH
GENERAL	1
PARKING COMPANY VEHICLES	2
CIRCLE OBSERVATION CHECK	3

1. GENERAL

1.01 This practice is reissued to duplicate procedures contained in the Safety Series CTSP 610-600-010, PARKING COMPANY VEHICLES AND CIRCLE OBSERVATION CHECK. Due to major revisions in format and content, brackets indicating changes and/or additions are omitted. **Remove from the file and destroy all copies of CTSP 400-800-012, Issue 1, 1971.**

1.02 This practice provides procedures for parking Company vehicles and for making the circle observation check when leaving a parked position.

1.03 The procedures in this practice must be followed by all Continental Telephone employees when driving Company vehicles.

1.04 The purpose of this practice is to help eliminate backing-up accidents involving Company vehicles.

2. PARKING COMPANY VEHICLES

2.01 When parking a Company vehicle on the street or other public thoroughfare, park in a parallel position if at all possible.

2.02 If it will be necessary to back up the vehicle, do so when parking and not when leaving the parked position. Any other Company employee present should act as a guide outside and to the rear of the vehicle.

2.03 When the vehicle is in the desired parked position:

- Put it in the proper gear.
- Engage the hand brake.
- Turn the wheels into the curb and/or use wheel chocks (if available).

d. Shut off the engine before leaving the vehicle.

2.04 With the exception of passenger cars, all Company vehicles are equipped with traffic cones. When these vehicles are parked, a traffic cone will be placed at the left front and another traffic cone at the left rear of the vehicle.

2.05 Unless specifically prohibited or otherwise not feasible, **all Company vehicles shall be backed into parking lot spaces.** (Accidents occur frequently when two or more vehicles are being backed out of parking spaces at the same time.)

3. CIRCLE OBSERVATION CHECK

3.01 When preparing to leave a parked position, all operators of Company vehicles shall check for hazardous conditions around, behind and under the vehicle. It is important to check for the presence of children or animals, or hazards such as posts, other parked vehicles, etc.

3.02 In addition to making the circle observation check, operators of Company vehicles that require the placing of traffic cones (paragraph 2.04), will proceed in the following manner:

- Pick up the traffic cone at the left front of the vehicle.
- Cross in front of the vehicle from the left to the right; then along the right side to the right rear of the vehicle.
- Go from the right rear to the left rear of the vehicle and pick up the second traffic cone.
- Place the traffic cones in their proper storage place in the vehicle.
- Get into the vehicle and leave the parked position immediately.

CAUTION: If there should be a delay in leaving the parked position for any reason, the operator shall get out of the vehicle and make the circle observation check again; the situation may have changed.

DISTRIBUTING FRAME PROCEDURES

1. GENERAL

1.01 This addendum is issued to correctly identify the standard color coding for four wire cross connect jumpers used on distributing frames.

1.02 The color code referenced in paragraph 5.02 of CTSP 400-975-001 is not a standard, and should be crossed out. With red pencil or ink, write, "See addendum, paragraph 2.02," and file this addendum in front of the practice.

2. STANDARD FOUR WIRE JUMPER COLOR CODING AND IDENTIFICATION

2.01 Continental System Supply provides a standard color coding of white, red, blue, and black wires.

2.02 Paragraph 5.02 c. of CTSP 400-975-001 should read:

Four conductor jumpers have white, red, blue and black wires. The white wire is the tip (+), the red is the ring (-), the blue is the control (C, S or B₁) lead and the black is the extra control (EC, HS or B₂) lead. The fourth (EC, HS or B₂) wire is used in making connections to equipment such as the distributing terminal assembly (DTA) frame and the trunk intermediate distributing frame (TIDF).

3. IDENTIFICATION OF FOUR WIRE COLOR CODES

3.01 Other color codes have been used in the field in the past and this has created problems in identification. The following paragraphs identify the various four wire jumper color codes.

3.02 Four conductor jumpers color coded white, red, blue and black (standard):

- a. White is the tip (+) lead.
- b. Red is the ring (-) lead.
- c. Blue is the control or sleeve (C, S, B₁) lead.
- d. Black is the EC, HS or B₂ lead.

3.03 Four conductor jumpers color coded white, red, blue and green:

- a. White is the tip (+) lead.
- b. Red is the ring (-) lead.
- c. Blue is the control or sleeve (C, S, B) lead.
- d. Green is the EC, HS or B₂ lead.

3.04 Four conductor jumpers color coded white, red, green and black:

- a. White is the tip (+) lead.
- b. Red is the ring (-) lead.
- c. Green is the control or sleeve (C, S, B) lead.
- d. Black is the EC, HS or B₂ lead.

1. GENERAL

- CTSP 400-300-019 -- Monitoring of Working Lines
CTSP 400-405-001 -- First Aid
CTSP 400-450-110 -- Central and PABX Office Safety Precautions
CTSP 400-700-100 -- Special Safeguarding Measures (SSM) for Leased Circuits
CTSP 400-700-101 -- Safeguarding Special Service Circuits--Clip Type Connecting Blocks
CTSP 400-905-070 -- Contact Memo Order--Form CM 1066
CTS 405-700-xxx -- Soldering Irons and Wire Wrap Tools (series)
CTSP 410-650-410 -- Soldering Methods
CTSP 430-905-804 -- Rolling Ladders - Inspection
CTSP 430-906-303 -- Intercept Strapping -- Description and Methods
CTS 490-700-xxx -- Main Frame Terminations (series)

2.01 The following tools and materials are required when running jumpers:

- ### Distribution B

- i. Rubber gloves and canvas bag holder.
- j. Frame Bag (for wire clippings and jumper scraps).
- k. Wiping cloth (for copper tip).

2.02 The following tools are required when making solderless wrapped connections:

- a. Electric wrapping tool.
- b. Hand wrapping tool.
- c. Combination 22-24 gauge bit.
- d. Combination 22-24 gauge sleeve.
- e. Unwrapping tool.
- f. Holder for wrapping tool.

3. SAFETY PRECAUTIONS

3.01 Employees are expected to make use of all safeguards provided for their protection and that of their fellow employees and to observe the following precautions:

- a. When using a rolling ladder, make sure the brake is set.
- b. When pulling or passing jumper wire, take care to avoid injury to hands and arms.
- c. Double back the end of the jumper wire before unreeling. This will reduce the risk of puncture wounds and aid in preventing the free ends from sagging.
- d. Do not stand or climb on the transverse arms of distributing frames.
- e. While working on or near distributing frames, eye protection must be worn at all times.
- f. Use rubber gloves when working near breakdown voltage tests.

4. FRAMES AND ASSOCIATED EQUIPMENT

4.01 Distributing frames are open metal frameworks which provide neat, accessible terminating facilities for outside cable pairs, central office line circuits, and other central office equipment. Connections can be made by simply changing jumpers, which allows the central office cabling to be largely a permanent installation.

4.02 Main distributing frames (MDF) are frames on which the outside telephone lines terminate on one side; the multiple cabling of the lines and trunks of the office terminate on the other side. The central office protective equipment is usually mounted on the MDF, which serves as a test point between the individual telephone lines and the central office. There are two types of MDF:

- a. *Type A* has all outside lines and cables terminated on the horizontal side; the vertical side has all connections to central office equipment and protective devices for the lines or cable pairs.

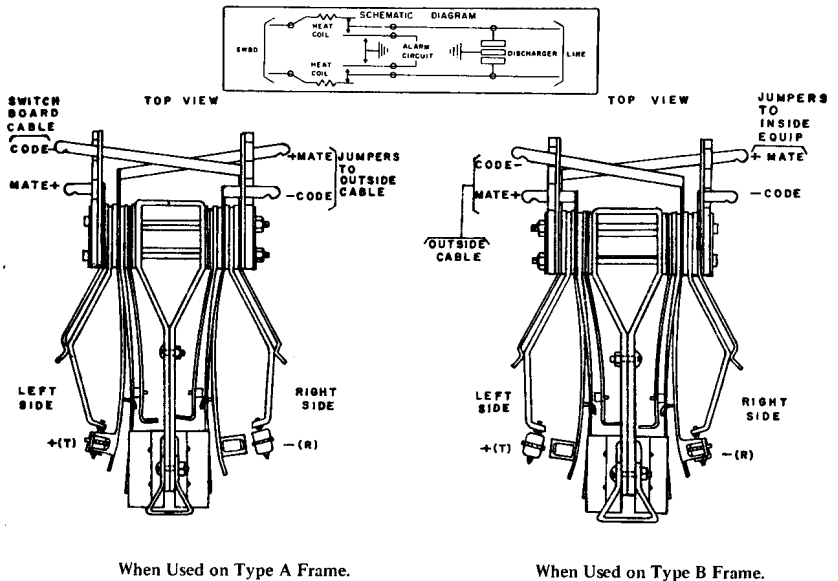
- b. *Type B* has all outside lines for cables and their protective devices terminated on the vertical side; the central office equipment terminates on the horizontal side. *Type B* is the more commonly used.
- 4.03 Line intermediate distributing frames (LIDF) are used to provide neat and flexible facilities for terminations and cross-connections that are intermediate in the switching sequence. The frames are similar to the MDF in construction and cross-sectional dimensions, but do not have protectors. On one side, wiring is terminated to terminal blocks mounted horizontally. Jumpers between terminal blocks permit the adjustment of trunking arrangements.
- 4.04 Combined distributing frames (CDF) are usually located close to the cable vault. The CDF is designed for type B protection, with the outside cable pairs terminated on protectors mounted vertically on one side of the frame, and central office equipment on terminal blocks mounted horizontally on the other side. A CDF combines the functions of an MDF and LIDF; therefore, no separate LIDF is required.
- 4.05 The trunk intermediate distributing frame (TIDF) is similar to the CDF in construction and cross-sectional dimensions, but terminal blocks are mounted vertically on one side and horizontally on the other. Many of the central office trunk circuits are terminated on these blocks and are crossconnected by means of jumpers. The TIDF is designed to be lined up with and connected to the CDF to form a single assembly. This permits the running of jumpers from either side of the TIDF to either side of the CDF, and vice versa.
- 4.06 The major components of the frame are:
- a. *Jumper rings* serve to guide jumpers where they make sharp changes in direction and have an insulated cover to protect the jumper wire insulation from chafing against the framework.
 - b. *Guard rails* and end guard rails are lengths of angle iron used to protect the terminal blocks from damage by rolling ladders and other floor equipment. End guards are similarly mounted to protect the ends of the frame. These guards form a continuous protection, extending slightly beyond the fronts of the terminal blocks and protectors.
 - c. A *ground bus bar* of flat, hard, drawn copper is furnished with each vertical assembly. When connected, the entire frame is equipped with a continuous ground connection that is both electrically and mechanically strong. A ground lead connects the ground bus bar to the central office ground.
 - d. The *central office protector* (spring and terminal assembly) provides cable termination and protects central office equipment and personnel from excessive, high foreign voltages and/or *sneak* currents. There are several different types in general use but their function is the same.
 - (1) One type of protector, the Cook 3800 central office protector, is shown in Figure 1. In operation, the protector opens the switchboard circuit, grounds the outside line, and operates an alarm circuit. It provides for temporary disconnect, and the self-soldering heat coils can be reset easily without changing the coil. Line connections are on one side of the protector and switchboard connections are on the other side. The protector is reset after operation simply by relatching the operating spring over the heat coil.
 - (2) The *test plug* (shoe) shown in Figure 2 is designed to fit the type 3800 protector. Test plugs are used to test line circuits through or around the heat coils. The test plug divides the circuit so that tests can be made looking either to the outside plant or to the central office equipment.

- (3) *Carbon protector blocks* (also known as carbon blocks, protector blocks, open space cutouts, or carbons) are essentially lightning arresters. They serve to protect the central office equipment from excessive voltages which might result from power contacts and protect the outside plant from the effects of lightning.
- (4) The plain carbon block fits into a groove of the protector mounting base which is grounded. If the line becomes crossed with a power circuit or is hit by lightning, the high voltage impressed on the line causes an arc to form across the air gap to the grounded block, effectively shunting the line to ground and dissipating the voltage. Frequently the protector blocks show marks of arcing after a foreign voltage has been discharged through the blocks to ground. Whenever heat coils are replaced, remove and inspect the protector blocks and inner surfaces for discoloration or pitting. Discolored, pitted or broken blocks should be replaced.

e. *Heat Coils:*

- (1) Heat coils are used in conjunction with carbon protector blocks to protect the central office equipment from small values of continuous current called *sneak* currents. The heat coils, which are directly in each side of the line, will operate whenever a faulty condition occurs which permits a small value of current to flow in the circuit for any length of time. These heat coils are rated to ensure operation at a current of .35 A for three hours at 68° F. or .5 A for 210 seconds at 68° F.
- (2) When operated, the Cook type 3800 heat coil opens and grounds the line. The heat coil is self-soldering and contains two small triggers. The circuit normally passes through the springs, through the heat coils, and then through the heavily tensioned spring which rests against the triggers when the coils are normal. When too much current flows through the coil, solder in the coil is melted, which in turn causes a trigger to rotate. The rotating alarm spring is pressed against the grounded protector mounting plate, while the heavily tensioned spring rests against the carbon protector blocks. After a heat coil has become hot enough to melt the solder and then cool, the solder hardens and holds the trigger so that the trigger cannot rotate. A heat coil of this type can be used repeatedly by removing it and reinserting it so that the trigger engages the heavily tensioned spring. An alarm lamp (called the *telltale* alarm lamp), is associated with each vertical. One side of this lamp is connected through a switch to battery. The other side is connected through the alarm spring of the protector to ground. Any heat coil operating will cause the lamp to light.

- f. *Fanning strips* are mounted on each vertical. The left-hand fanning strip has staggered holes, one for each of the cable pairs terminated on the left side of the protectors. The right-hand side also has staggered holes, one for each jumper that can be terminated on that side. The holes are positioned so that each is opposite a pair of terminals on the protector assembly.
- g. *Terminal boards (or blocks)* are generally defined as T-bar sections of wood and other insulation such as molded, hard black rubber. The stem of the T carries double ended terminals held transversely in rows. The base of the T (called the mounting base) has holes opposite both ends of the terminals which serve as a fanning strip for cables or jumpers. Terminal boards provide terminating facilities on the horizontal side of the CDF, and both the vertical and horizontal sides of the IDF.
- h. *Distributing blocks* are similar in construction to terminal boards. One side is permanently wired, while the wiring on the other side can be changed.



NOTE: Cable wires connected to left side of protector block.
Jumper wires connected to right side of protector block.

FIGURE 1. Cook 3800 Central Office Protector

5. DISTRIBUTING FRAME CROSS-CONNECTIONS

- 5.01 The terms *cross-connection* or *jumper* are applied to twisted insulated conductors used to provide flexible assignment of inside plant equipment. Generally, all fixed plant is permanently cabled to a distributing frame. Connections between various equipment are then made with jumpers. *Cross-connection work is one of the most important operations performed in the central office.* Before running any jumpers, verify all terminal locations to avoid errors and save time. Refer to paragraph 6.01.
- 5.02 Twenty-two gauge distributing frame wire should be used on all frames, except for single conductor jumpers. Because of its increased mechanical strength, 20-gauge wire should be used for single conductor jumpers.
 - a. Two-conductor jumpers have white and red insulated wire. The white wire, called the *tip*, is used to connect to the positive ground (+) side of the line. The red wire, called the *ring*, is used to connect to the negative battery (-) side of the line.
 - b. Three-conductor jumpers have white, red, and blue wires. The third (blue) wire is called the *sleeve*; it is the control (C) lead wire and controls the guarding, holding, and releasing of switches, and holds switches operated to guard them against seizure by other calls.

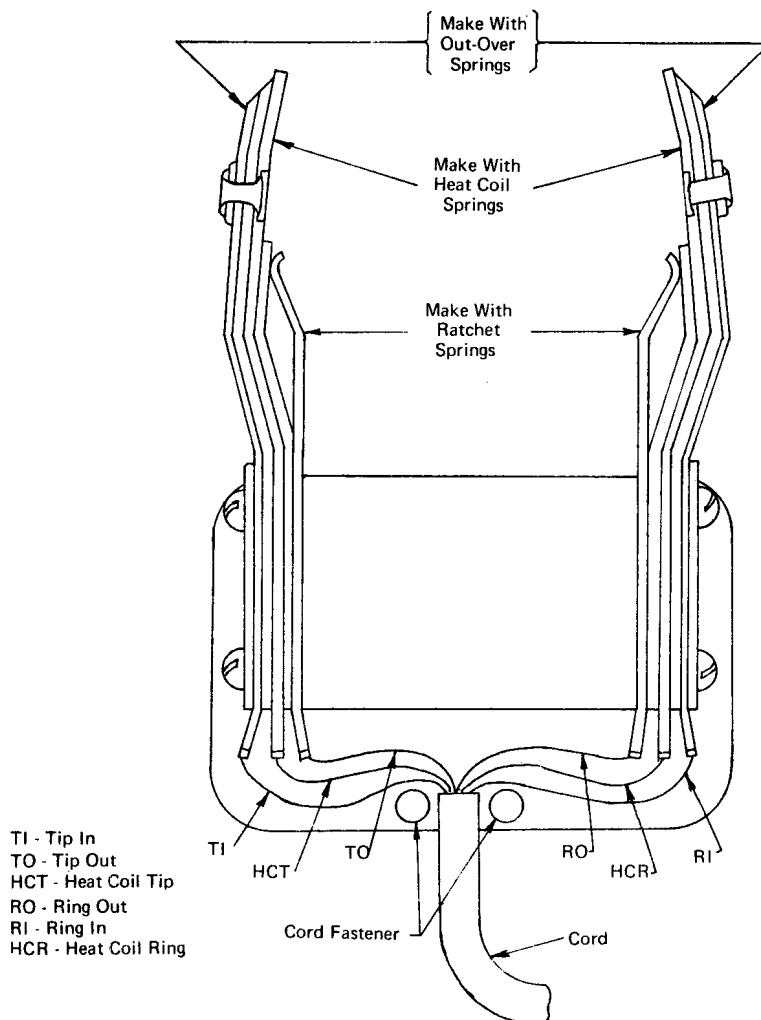
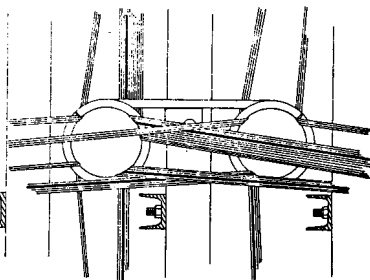


FIGURE 2. Cook 3800 Test Plugs (Shoes)

The test plugs (shoes) are used to test line circuits through or around the heat coils dividing the circuit into its compound parts, thereby simplifying the testing operation. The test plug (shoe) is designed to fit the Central Office Protector (3800).

- c. Four-conductor jumpers have white, red, blue, and black wires. The white wire is the *tip* (+), the red is the *ring* (-), the blue is the control (C, S, or B₁) lead and the black is the extra control (EC, HS, or B₂) lead. The fourth (EC, HS, or B₂) wire is used in making connections to equipment such as the distributing terminal assembly (DTA) frame and the trunk intermediate distribution frame (TIDF).
- 5.03 Jumpers are usually run from the horizontal side of a frame to the vertical side. When running in or handling jumpers, do not allow the wires to become kinked. At the point where a jumper enters a jumper ring, place it in such a way that it will neither bind against nor cross over other jumpers or jumper ring bars.
- 5.04 Figure 3 is a line drawing of jumpers entering and leaving a ring and is being used *only* to illustrate the distribution of jumpers to different sections of the ring, depending on the direction of origin and termination. Figures 4, 5, and 6 illustrate the correct use of rings when running jumpers, i.e., with the wire slack and *resting lightly* against the rings.

NOTE: Continuous jumper activity may loosen jumper rings. Loose rings should be tightened as soon as possible to prevent complications in jumper running.



**FIGURE 3. Line Drawing Designed to Illustrate
How Jumpers, Ideally, Should Enter and
Leave Rings.**

- 5.05 The majority of unacceptable (crossed and poorly placed) jumpers are those run from right to left on the horizontal side. These jumpers are run through rings on their particular horizontal levels, then to connecting blocks on the vertical side. Proper procedures are:
- Run the jumper into a ring on the same horizontal level with the jumper wire entering near the top inside edge. See Figure 4.
 - If the jumper is to go to a connecting block three or more levels below its horizontal level, use the right hand to bring it around inside and to the bottom of the ring. Place the left hand under and behind the ring to receive the jumper (see Figure 5) and place it in a downward position (see Figure 6). This type of jumper may be run in front of existing jumpers on the vertical side. Run as directly as possible into the proper connecting block hole.
 - If the jumper is to go to a connecting block three or more levels *above* its horizontal level, proceed as in paragraph 5.05 a. Then bring the jumper out *in front* of existing jumpers on the vertical side and run it as directly as possible into the proper connecting block hole.

- d. If the jumper is to go from its horizontal level *straight across* (or less than three levels up or down), proceed as in paragraph 5.05 a. Then bring the jumper around the inside edge of the ring to a point where it can run as directly as possible into the proper connecting block hole. Run it *behind* the existing jumper on the vertical side.
- 5.06 Run jumpers from *left to right* as described in paragraph 5.05. Jumpers should be placed *in front* of existing jumpers on the vertical side. As stated in paragraph 4.04, the jumpers should lie against the jumper rings when they have been run and tied down.
- 5.07 Run short horizontal jumpers (within three verticals of straight across) *underneath* all other jumpers but *on top of* the ironwork of their respective levels (see Figure 7). In most instances, they will then cause the least possible interference with other jumpers in the rings through which they are run. Run these jumpers through the rings so that they pull on the inside edge of the rings and go as directly as possible to the proper connecting block holes.
- 5.08 A contact memo (or rack sheet) may require that a jumper be run from one block on a horizontal level to another block on the same level. This type of jumper should be run through a ring at least one vertical to the *right* of the *right-hand* block of the two on which it is to terminate. The jumper will then lie against the ring when it is tied down to the connecting block.
- 5.09 An order may require that a jumper be run from one block on a vertical to another block on the same vertical. This type of jumper should be run through a ring at least one level *above* the *higher* of the two blocks on which it is to terminate. The jumper will then lie against the ring when it is tied down to the connecting block.
- 5.10 Avoid weaving jumpers through existing jumpers or between the individual conductors of an existing jumper. Be sure to keep jumpers above the horizontal ironwork and inside the vertical ironwork of the frames (see Figure 7).
- 5.11 Run lineswitch-to-X-block jumpers as directed by the central office foreman. Allow approximately 5 inches of slack (measured from the point of tying down), so that jumpers can be pulled.
- 5.12 To prevent a congestion of jumpers on one level and one ring, run cable ties on different levels.
- 5.13 When running used jumpers, remove all kinks and knots. Inspect the wire and discard any with damaged insulation.
- 5.14 Be sure to run the jumpers through the correct holes in the fanning strips of connection blocks (see Figure 8). Avoid crossing jumpers at the holes of blocks on the vertical side of the LIDF. If a jumper comes to a block (vertical) from a higher (horizontal) level, do *not* run it around existing jumpers in the outer row of holes (see Figure 8) to get to the inner row. Pull existing jumpers in the outer row toward the outer edge of the block. This will clear a *straight run* to the hole in the inner row. Make every effort to avoid running a jumper in such a way that it will interfere with another jumper.
6. **TYING DOWN JUMPERS**
- 6.01 If a jumper is working on a location assigned for a new jumper to be run, verify the assignment. If the assignment is correct, pull the old jumper and give the complete information to Line Assignment forces. This ensures that if the assignment is incorrect, corrections will be made before work is called for by outside plant forces.

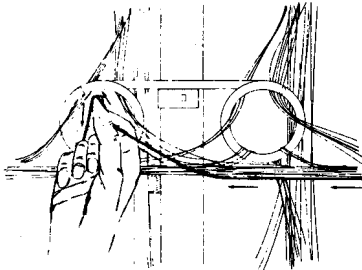


FIGURE 4. Right Hand Receiving a Right-to-Left Jumper (HLIDF) and Placing It Into Ring at the Top Inside Edge.

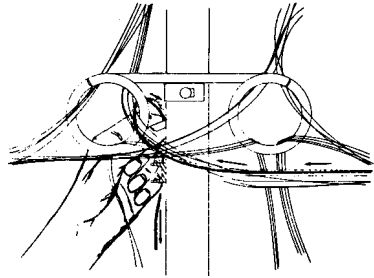


FIGURE 5. Left Hand Placed Under and Back of a Ring to Receive a Right-to-Left Jumper (HLIDF).

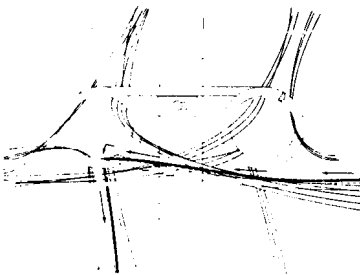


FIGURE 6. Tied-Down Jumper Correctly Placed Against the Bottom Inside Edge of a Ring.

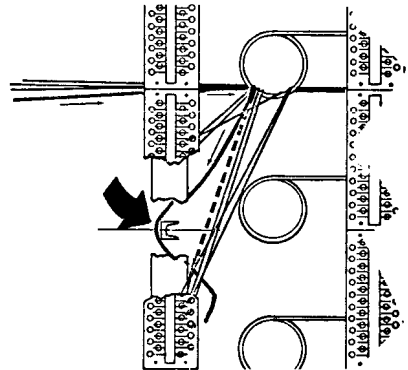


FIGURE 7. Large Arrow Points to Jumper Run Outside Vertical Ironwork. Broken Line Represents Correct Run.

- 6.02 Before stripping insulation from jumper wire, place the distributing frame bag on the shelf below the shelf where the work is to be done. Make sure there will be approximately 4 inches of slack in the jumper when it is tied down. Measure the slack by making sure the jumper length will extend the width of a hand beyond the front edge of the block. (An exception to the 4-inch slack requirement applies to jumpers run directly across the horizontal side; in this case, allow only enough slack for pulling and to prevent binding.)
- 6.03 Untwist the jumper back far enough so the wires will come through the fanning strip parallel to each other. Wrap the wires so that insulation comes just to the notch of the pin as shown in Figure 9. Allow for stretch in the case of plastic insulation. Figures 9 through 17 show typical terminations.

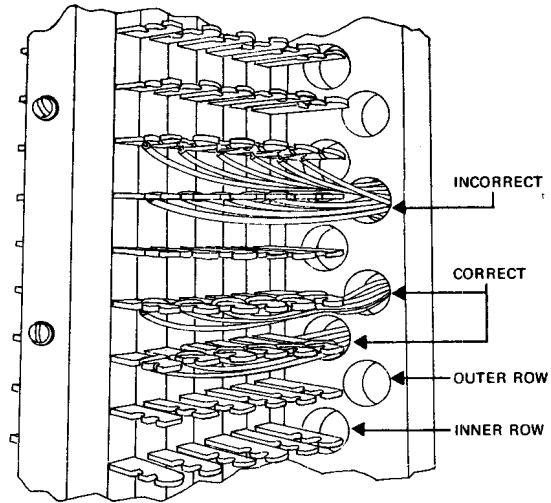


FIGURE 8.

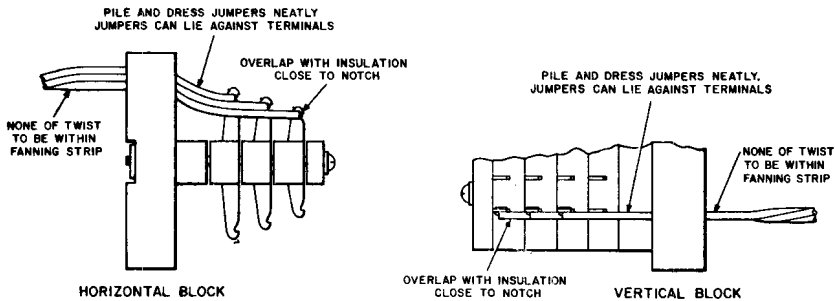
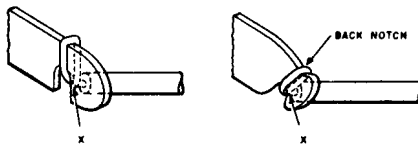


FIGURE 9. Termination of Wire on Terminal Strip

6.04 With the jumper supported against the fanning strip, break off the wire on the terminal by a series of up and down motions for *horizontal* terminal strips, or left and right motions for *vertical* terminal strips. The motions should be in a direction parallel to the flat surface of the terminal to avoid strain on the terminal. This method avoids crossing the wires with other terminals of the terminal strip, or crossing the pliers with terminals when cutting the wire.

NOTE: Twenty-gauge wire may be cut instead of broken. Excess cut or broken wire should not be allowed to fall on terminal strips, protectors, floor, etc.

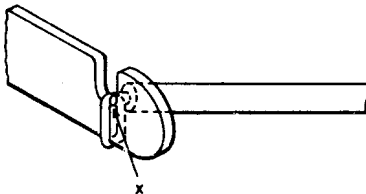
- 6.05 To terminate a wire on the terminal of a protector where the notch appears on the *underside* of the terminal (as shown in Figure 10), bring the wire under the terminal, up through the notch, along the front of the terminal, over the top edge (or through the back notch, where provided), and down the rear side, making one complete turn of bare wire around the terminal. Cut or break the excess wire at point X.



**FIGURE 10. Termination of Wire on Protector
with Notch on Underside of Terminal**

- 6.06 To terminate a wire on the terminal of a protector where the notch appears on the *upper side* of the terminal (as shown in Figure 11) bring the wire through the notch, down the front side, and up the rear side, making one complete turn of bare wire around the terminal. Cut or break the excess wire at point X.

NOTE: If a protector is broken, replace the defective terminal (or spring), using a spring bender or appropriate size wrench. Do not terminate the jumper wire on the spring on the cable side of the protector as this will remove the protection on the side of the line affected and create a fire hazard.



**FIGURE 11. Termination of Wire on Protector
with Notch on Upper side of Terminal**

- 6.07 To terminate a wire on a type 444 jack, pass the wire through the proper hole in the fanning strip (as shown in Figure 12), bring the wire under the terminal, up through the notch, across the top of the terminal, and down through the back notch (as shown in Figure 13). Cut or break the excess wire at point X.
- 6.08 To terminate a wire on a terminal of a type 65 (or similar) terminal strip, bring the wire along the left side of the terminal, through the notch, back along the right side of the terminal, and across the top (as shown in Figure 14). Cut or break the excess wire at point X.
- 6.09 When terminating jumpers on terminal strips of the type shown in Figure 10, first connect the wire on the terminal nearest the front and then work toward the rear of the block.

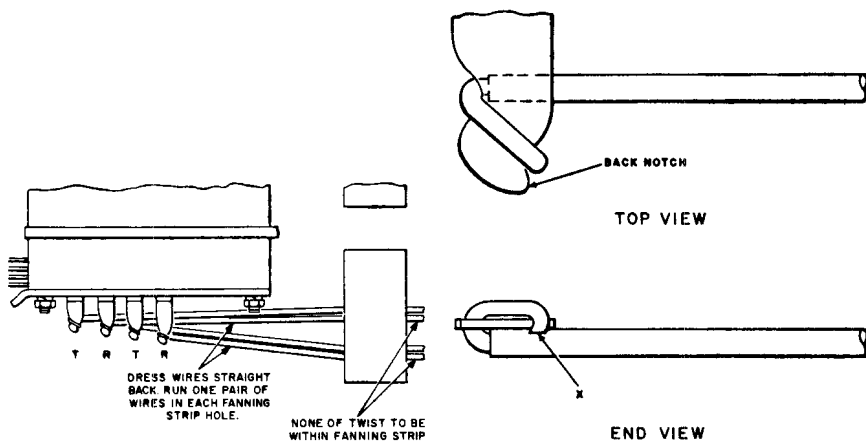


FIGURE 12. Termination of Wire on Type 444 Jack at MDF

FIGURE 13. Termination of Wire on Terminal with a Back Notch

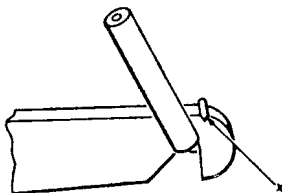


FIGURE 14. Termination of Wire on Terminal of Type 65 (or Similar) Terminal Strip

6.10 To terminate a wire on a terminal which is in a *vertical* position (horizontal IDF), with a single notch (either with or without a back notch), bring the wire along the left side of the terminal, through the notch, along the right side of the terminal, and across the back (or through the back notch, where provided). See Figure 15. Cut or break the excess wire at point X.

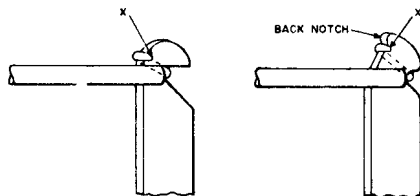


FIGURE 15. Termination of Wire on Vertical Terminal with a Single Notch

- 6.11 To terminate a wire on a terminal which is in a *horizontal* position (vertical IDF), with a single notch (either with or without a back notch), bring the wire along the bottom of the terminal, through the notch, back along the top of the terminal, and terminate at the back (or back notch, where provided). See Figure 16. Cut or break the excess wire at point X.

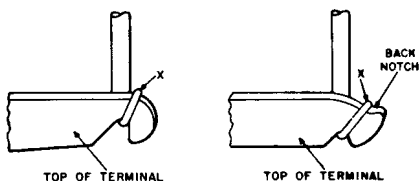


FIGURE 16. Termination of Wire on Horizontal Terminal with a Single Notch (Top View)

- 6.12 To terminate wires on a terminal strip where the terminals have twin notches or double twin notches and only one set of leads is required, connect them in the outer notches unless it is necessary to reserve these notches for strapping, subject to change in service. The jumpers should be terminated as described in paragraphs 6.10 and 6.11 and as shown in Figure 17.

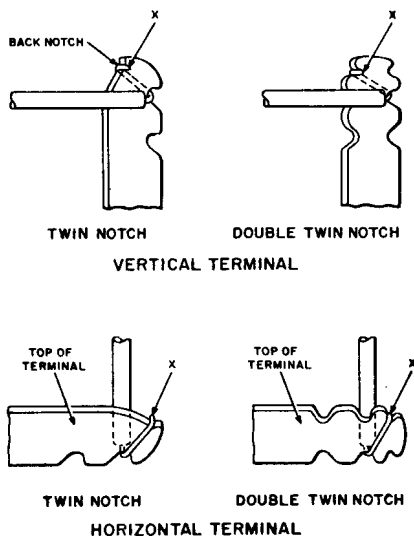


FIGURE 17. Termination of Wire on Terminal with a Twin Notch or Double Twin Notch

- 6.13 Where a second jumper is to be terminated on the same terminal with another jumper, the first jumper should be unsoldered and removed and both the terminal and the notch in the terminal freed from all excess solder. The two jumpers should then be terminated in the same notch.
- 6.14 Immediately after wire is connected to the terminal, it should be soldered.
- 6.15 Tie down as many jumpers as possible called for on rack sheets, but do not connect normals until called for by the installer.
- 6.16 The frameman on the vertical side should tie down all jumpers as he receives them. If jumpers cannot be tied down at the time they are caught, tie them in the wood. Pull out the loose ends for easy visibility, except when jumpers are *hold sheet* items. In such cases, tie the jumpers in the wood and tuck the loose ends back into existing jumpers. (The frameman should be able to look down the frame and easily detect the jumpers to be tied down and the tails of kills to be cleaned off.)
- 6.17 When a jumper is to be terminated on the back pins, tie a knot in the loose end.

7. WRAPPED CONNECTIONS

- 7.01 *Solderless Wrapped Connections:* The *minimum* number of turns around the terminal shall be 6 complete turns for 24-gauge wire, and 5 complete turns for 22-gauge wire. A skinned length of 1-5/8 inches should be sufficient for 22- and 24-gauge wire to permit the required number of turns around the terminal. See Figure 18. More than the required number of turns is permissible. To be sure satisfactory connections are being made, check them periodically.
- 7.02 *Soldered Wrapped Connections:* A *minimum* of three complete turns around the terminal shall be made for soldered wrapped connections. A skinned length of 3/4 inch should be sufficient to permit the required number of turns around the terminal. See Figure 19. More than the required number of turns is permissible.
- 7.03 *Skinning Leads:* Care must be taken when skinning leads for wrapped connections. It is important that the leads are not *nicked* or *flattened*. Do not bend the wires as this makes it difficult to insert the wire ends into the wire feed slot of the bit.

NOTE: Before skinning cable conductors on the equipment side of terminal strips, the wires shall be in their final position.

- 7.04 *Wrapping Leads:* Wrap leads as follows:

- a. Insert the skinned portion of the lead into the feed slot of the wrapping bit; ensure that no bare wire is showing. Bond the insulated portion of the lead into the anchoring notch as illustrated in Figure 20. Hold the wire taut in the anchoring notch and push the tool onto the terminal. Use of the left or right anchoring notch is determined by the direction of approach:

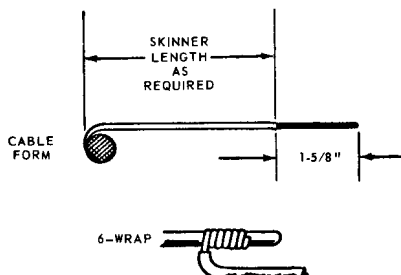


FIGURE 18. Skinned Wire Required for a Solderless Connection

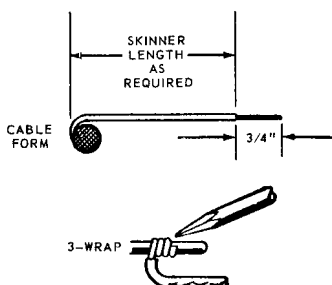


FIGURE 19. Skinned Wire Required for a Soldered Connection

- (1) A lead dressed to the left of the terminal is placed in the left anchoring notch.
- (2) A lead dressed to the right of the terminal is placed in the right anchoring notch.

NOTE: If the wire is not inserted up to the insulation, a shiner may result. A shiner shall not be longer than 1/8 inch. A longer length shiner is potential trouble.

- b. The tool shall be inserted over the terminal as far as it will go without touching the terminal molding.

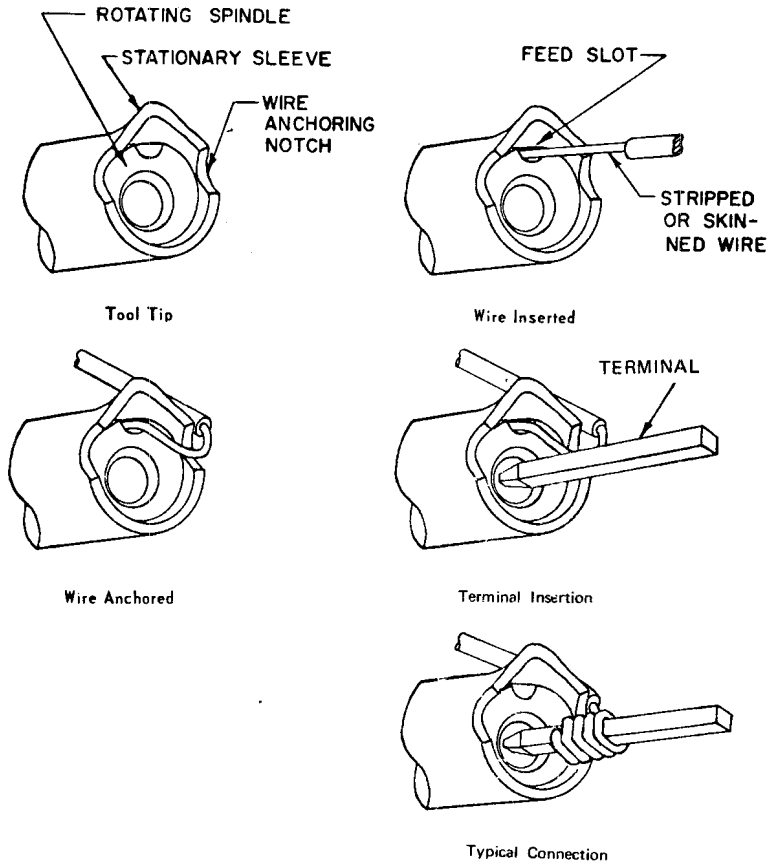


FIGURE 20. Solderless Wrapped Connection Process.

- c. The tool shall be in a direct line with the terminal before being operated.
- d. Operation of the trigger will wrap the wire on the terminal. The tool will automatically move backward as the wire coils on the terminal, producing a finish connection.
- e. Insufficient pressure on the tool when wrapping may cause separation as shown Figure 21.



FIGURE 21. Separated Turns Resulting from Insufficient Pressure

- f. Excessive pressure on the tool when wrapping can cause overriding (overlapping) turns as shown in Figure 22.

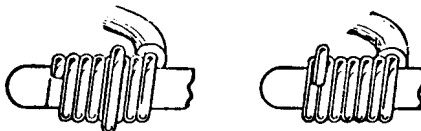


FIGURE 22. Overriding (Overlapping) Turns Resulting from Excessive Pressure

- g. While it is not necessary for the wire end to be flat against the terminal, in no case should it project to the extent that the required 1/64-inch clearance between the wire and an adjacent terminal cannot be maintained. In addition, the wire end must not extend over 1/8 inch.
- h. Where the clearance between the wire end and the adjacent terminal is not the required 1/64 inch (or the wire end extends 1/8 inch), the wire end can be wrapped down using the wire wrapping tool, pliers, spudger or similar tool. This connection shall be soldered.

7.05 More than one wire per terminal:

- a. Where more than one connection per terminal is necessary, the method of wrapping the second or third connection is determined by the remaining terminal length after the first connection has been made. Each 6-turn connection takes approximately 1/4 inch of the terminal. In order to make a second or third connection, at least 1/4 or 1/2 inch of the terminal must be available. See Figure 23.



FIGURE 23.

- b. If there is not sufficient terminal length available for solderless connecting, a 1-1/4 to 3-turn connection may be made, but must be soldered. See Figures 24A and 24B.
- c. If there is not sufficient terminal length for a 1-1/4 inch turn connection, wrap the lead over the previous connection and solder. See Figure 25.



FIGURE 24A.

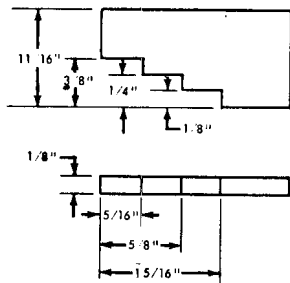


FIGURE 24B.



FIGURE 25.

- d. Where it is not practical to apply solderless wire wrapped connections on terminal strips, the soldering operation can be facilitated if the wrapping tool is not placed on the terminal as far as it will go. A depth guide (as shown in Figure 26 and used as illustrated in Figure 27) will position the wrapping tool to leave sufficient space for three connections of three turns each. After the first horizontal row of connections has been made on a group of terminal strips, the remaining terminals can be gauged by eye rather than repositioning the guide on each succeeding row of terminals.



COLOR PLASTIC OR FIBRE

FIGURE 26. Depth Guide for Soldered Connections on Terminal Strips

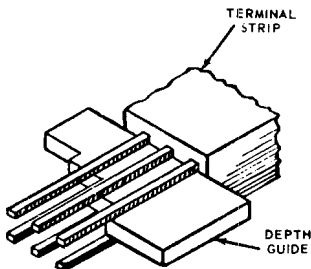


FIGURE 27. Method of Using Depth Guide for Soldered Connections on Terminal Strips

7.06 Soldering Wrapped Connections:

- a. When a terminal contains solder, either on an existing connection or resulting from a previously soldered connection, all connections added to this terminal shall be soldered.
- b. When soldering a wrapped connection, a minimum of two adjacent turns of the connection shall be soldered.

- c. Where a connection requiring solder is added to a terminal, all connections on that terminal shall be soldered.

7.07 Removing Wrapped Connections:

- a. The spiral may be unwound with an unwrapping tool or pliers (see Figure 28), or by hand if there is sufficient slack.

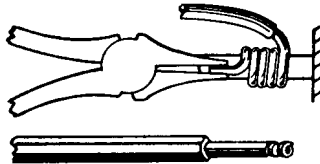


FIGURE 28. Removing Wrapped Connection

- b. Where a connection has been soldered, a soldering iron should be applied to the connection and the spiral unwound with pliers or by hand. *Do not use the unwrapping tool.*
- c. No attempt shall be made to pull the wrap from the terminal by pulling on the lead. This may break the wire and make the wrap difficult to remove.
- d. If a wrap must be removed and then reconnected, proceed as follows:
 - (1) When there is sufficient slack in the lead to obtain the proper skinned length, cut the previously connected lead back, skin and reconnect. Do not rewrap a previously wrapped skinned length; the tensile strength of the lead has been reduced by the first wrapping operation.
 - (2) Where there is insufficient slack to make a normal connection, skin 1/4 inch of insulation from the lead and wrap at least 1-1/4 turns of wire, using the wrapping tool or pliers. This wrap shall be soldered.

NOTE: This does not apply to jumpers. If there is not enough slack, replace the jumper.

- (3) Rewrapped connections made on a terminal that was not previously soldered do not require soldering.

8. SOLDERING REMINDERS

8.01 Soldering methods are covered in CTSP 410-650-410.

8.02 The soldering iron should be hot before an attempt is made to solder a connection. Test for heat by touching a piece of solder to the copper tip, *never by holding the iron near the hand or face.*

8.03 Take care not to melt the plastic insulation with the soldering iron. Place the iron tip against the pin and wire. Hold the tip against the pin until solder flows freely on the pin. Use as little solder as possible to cover the wire and weld it to the pin. The use of excessive heat and solder causes solder runs on pins.

- 8.04 Excess solder should be removed from the hot tip *only* by wiping on the wiping pad. *Never flip solder from the iron; solder splashes can be very dangerous.*
- 8.05 Examine the pins and blocks around the work for excess solder and splashes. Remove excess solder with a spudger and correct any potential trouble. A short-bristled, nonmetallic brush is useful for cleaning between the pins after excess solder has been loosened. Hold the free hand under the block (or use a wiping cloth) and make sure the distributing frame bag is properly placed to catch the excess solder.
- 8.06 All loose solder, loose wire, bits of insulation, etc., *must* be placed in the distributing frame bag as work is being performed. This is most important to reduce the chances of accidents caused by slipping on bits of material and to maintain a neat appearance.

9. ORDERS

9.01 Removing Jumpers:

- a. When removing jumpers, make sure that the jumper to be cut is clear of other jumpers.
- b. Before cutting a jumper, monitor the line to make sure it is not busy. Do not cut a jumper if the line is in use.
- c. Immediately place all disconnected normals on intercepting service (operator or mechanical, depending on the order being worked). This action is important as it reduces no-ring complaints. When cutting other jumpers, leave a *tail* at least 3 inches long attached to those pins which are not to be cleaned immediately. Pull such tails out from the block so that they can be easily seen. Remove tails each day (with a hot iron) and clean the pins.

9.02 Out (O) Orders:


- a. After cutting long jumpers, remove (pull) them from the horizontal rather than the vertical side. If a long jumper is removed from the vertical side, it may rub on and melt the plastic coating on the conductors of a working circuit.
- b. If two men work together on O orders, any error is likely to be found and can be corrected, which will reduce the possibility of a customer complaint. If a frameman is working alone, he can pull up the slack on one side to mark the jumpers to be cut, or he can go up on the test turret and short the pins at the X-block or lineswitch before cutting the jumpers.
- c. Any orders, whether connect, remove, F&T, or C, may or may not be designated HOLD (to be completed at a specified time). Do the preparatory work (running jumpers, etc.) on HOLD orders as soon as possible. However, do not complete a HOLD order until the installer calls in and requests it.
- d. Immediately correct any errors found when working or trying to work HOLD orders. Call Line Assignment and get a correction as soon as possible.
- e. Complete *all* work on disconnect orders designated as HOLD at the time specified to prevent disconnecting in error.

9.03 *Testing:* Test all orders (whether hold or nonhold) immediately after the normal is connected. Test by dialing the connector normal on the test turret and shorting the cable pair on the cable side of the VMDF (the test will then include a check of the protector springs).

9.04 *Intercept Service:*

- a. Orders requiring intercept service will state the method to be used in intercepting disconnected normals (mechanical or operator). Do not solder intercept straps; make a good mechanical connection.
- b. When disconnected, rotary or level hunting connector groups should have the strapping removed at the connector board terminal block. Connect the first number of a group to be intercepted to the intercept pins of the block involved. If intercept of additional numbers is required, jumper the second number to another convenient connector board intercept block. This will ensure access to the intercept operator if a second call is being answered. On dial PBX equipment, restore ground to the disconnected line equipment.

9.05 *Completion Symbols:* To indicate the progress of work on an order, the following symbols can be used to mark the order:

- | | |
|-------------------------------------|---|
| a. Jumper run. | O |
| b. Jumper run and tied in the wood. |  |
| c. Jumper tied vertical. | ⊙ |
| d. Jumper tied horizontal. | ⊖ |
| e. Completed. | ⊗ |
| f. Disconnected. | + |

10. **SPECIAL CONDITIONS**

10.01 Write up on the job order special cuts or trouble cuts received from the testboard. Show the date, time, and name of testboardman; also show the name of the person who is to do the work.

10.02 If the testboard requests a jumper to be reversed at a protector to compensate for a reversed pair, inform the foreman and place a tag on the pair. Write on the tag the date, the reason for reversal, and the name of the testboardman.

10.03 Place dummy carbons and dummy heat coils in special lines *only* when an order specified them. Make sure the carbons are marked and the cable is tagged. Cover the protector with a protector guard. When the line is disconnected, remove the dummy carbons, heat coils, and the tag; replace with standard protection.

10.04 Run a jumper tied to the cable side of the protector (bypassing the protection) as follows:

- a. Run the jumper as usual in the fanning strip and then run it behind the fanning strip and through the hole for the cable pair.
- b. Tag the jumper on the right-hand side to avoid any assumption that the pair is vacant.