

## REMOVAL OF LATERAL SILVER MIGRATION DEPOSITS AND CARBONIZATION FROM BANKS ASSOCIATED WITH 197- AND 198-TYPE SWITCHES

### 1. GENERAL

1.01 This section covers procedures for scraping lateral silver migration deposits and carbonization from the front edges of phenol fiber supply bank insulators of banks associated with 197- and 198-type switches.

1.02 This section is reissued to rate the section AT&TCo Standard, to include information on the formation of the lateral silver migration deposits and their effect, and to revise the procedures for scraping the deposits from the insulators. Detailed reasons for reissue will be found at the end of the section. Since this reissue covers a general revision, the arrows ordinarily used to indicate changes have been omitted.

1.03 This section should be applied only after discussion with the appropriate plant staff supervisor.

1.04 In step-by-step system banks, silver migration may occur where silver-plated contacts are used in the bank assembly. Silver migration is a process by which silver, when in contact with insulating materials under electrical potential, is removed ionically from its initial location, and is redeposited as metal at some other location. The type of silver migration covered by this section is referred to as lateral migration and takes the form of a deposit of silver, usually of very slight depth on the front edge of the phenol fiber insulator (supply bank insulator) to which the contacts are attached. Silver migration deposits are usually dull black in appearance and may be unevenly distributed along the edge of the insulator. These surface deposits can bridge adjacent contacts laterally as indicated in Fig. 1, resulting in electrical leakage, carbonization, and dielectric breakdown of the insulator. These deposits may be removed by manually scraping them from the front edge of the insulator with a dental scraper. In some cases, however, the silver penetrates into the phenol fiber insulator to an appreciable distance back from the front edge. Under this condition, scraping the front edge of the insulator is ineffective and the insulator or bank multiple must be replaced.

1.05 When first introduced, silver-plated contacts were cemented to a thin strip of varnished cambric which was placed against a phenol fiber insulator in the bank assembly. Approximately 30 per cent of banks having silver-plated contacts are of this construction which may be identified by

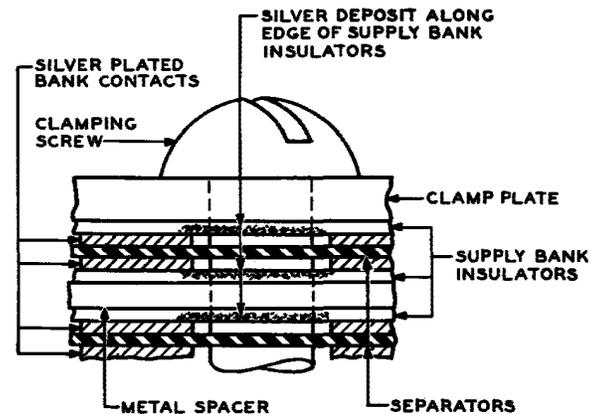


Fig. 1 - Partial Section of Bank Showing Relation of Parts

visual inspection. Subsequently, the contacts were cemented directly to the phenol fiber insulator (supply bank insulator) and the varnished cambric strip eliminated. The procedures for removing carbonization and lateral silver migration deposits covered in this section apply only to banks in which the silver-plated contacts are cemented to the phenol fiber supply bank insulator. Where silver-plated contacts are attached to a varnished cambric strip, the silver migrates into the cambric and relief cannot be obtained by scraping the edge of the insulator. In such cases it is necessary to replace the varnished cambric strip and adjacent insulator with a new supply bank insulator as covered in Section 030-705-807 or to replace the bank multiple.

### 2. LIST OF TOOLS AND MATERIALS

Code or Spec No.	Description
<u>Tools</u>	
389A	Brush
510C	Test Lamp (must be equipped with a No. 561A tool (straight tip) and a W2BL (48V) cord)
-	Dental scraper, Black's Cutting Instrument, Tarno No. 83, S.S. White Dental Mfg. Co.
-	Stone, Norton Co. HB 13 (or equivalent)
-	Vacuum Cleaner

SECTION 069-501-802

Code or Spec No.	<u>Description</u>
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Materials

- |          |   |
|----------|---|
| KS-2423  | Cotton Twill Cloth  |
| KS-14666 | Cleaning Cloth  |
| -        | Toothpicks, Hardwood, Flat at One End and Pointed at the Other                                      |
| -        | Plastic Tubing, No. 4 Irvolite-XTE-30, .208 I.D., Irvington Varnish & Insulator Co. (or equivalent) |

3. PREPARATION

3.01 Make-busy Information: Before scraping silver migration deposits or carbonization from supply bank insulators as covered in Part 4, make the switch associated with the bank busy in accordance with approved procedures. On certain types of connectors, the busy ground is removed when the shaft is moved off-normal. In such cases, open the circuit to the release magnet as covered in 3.02.

3.02 To open the circuit to the release magnet, block the vertical off-normal springs in their unoperated position by means of a toothpick as shown in Fig. 2. On 198-type switches, and when necessary on 197-type switches, insulate the contacts of the rotary off-normal springs that close the circuit to the release magnet.

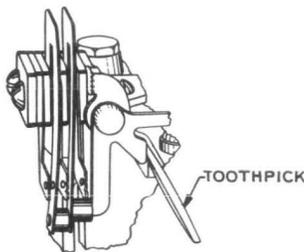


Fig. 2 - Method of Blocking Vertical Off-normal Springs in Their Unoperated Position

3.03 Protecting Adjacent Apparatus: Place a KS-14666 cloth over any apparatus below the bank from which silver migration deposits are to be removed.

3.04 Gaining Access to Supply Bank Insulator: Raise the switch shaft, also rotating it if necessary, to a position that provides access to the supply bank insulator from which deposits are to be scraped. If the switch is equipped with

a commutator, make sure that the shaft is positioned so that the commutator wiper will not interfere with the scraping operation.

Dental Scraper

3.05 Insulating Handle: Place a 4-3/4-inch length of the plastic tubing over the handle of the dental scraper with the tubing overhanging the end of the handle by approximately 1/32 inch. Slipping the tubing over the handle will be facilitated by proceeding as follows. Clamp a short section of the handle near the blade in a vise. Work the tubing over the handle with a KS-2423 cloth held around the tubing to obtain a better grip on it. Take care not to damage the blade of the scraper or cause injury by contact with the cutting edge.

3.06 Sharpening Cutting Edge: The cutting edge of the scraper must be kept sharp and at right angles to the sides of the blade in order to avoid tearing the insulator. Sharpen the cutting edge when necessary with short (approx 1 in.) strokes across the sharpening stone as follows. Hold the scraper with the surface of the bevel flat against the stone. Then draw the scraper across the stone with the cutting edge trailing as shown in Fig. 3. As the scraper is drawn across the stone, hold it at the same angle throughout the stroke to avoid rounding the cutting edge. After sharpening the edge, turn the scraper over and place the surface adjacent to the cutting edge flat on the stone. Then with one or two light sidewise strokes, remove any burrs which may have formed on the cutting edge.

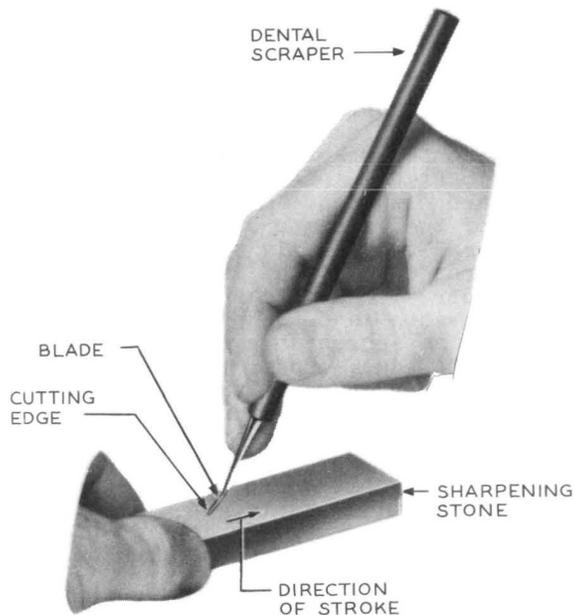


Fig. 3 - Sharpening of Dental Scraper

4. SCRAPING PROCEDURES

4.01 General: In order to properly control the scraping operation, illuminate the edge of the supply bank insulator to be scraped, using the No. 510C test lamp equipped with the No. 561A straight tip. Hold the lamp in one hand and the scraper in the other while scraping the deposits as described in 4.02.

4.02 Hold the scraper horizontally with its blade perpendicular to the edge of the insulator. The cutting edge of the blade should be vertical and toward the direction of the scraping stroke. Starting at the center of the insulator, work toward one end scraping the deposits with short slow strokes of 1/2 inch or less. Scrape away as little of the insulator as practicable since it is necessary to maintain a minimum 0.010-inch overhang of the insulator beyond the adjacent clamp plate or metal spacer. Do not scrape portions of the insulator not having deposits. Frequently examine the insulator to check whether the deposits have been removed. Take care to remove deposits at the corners between contacts and insulators. After removing deposits from half the insulator, remove them from the other half in a similar manner.

4.03 After the deposits have been removed from the edge of the insulator, check that the edge overhangs the adjacent clamp plate or metal spacer at least 0.010 inch. Checking the overhang will be facilitated by using the edge of the scraper as a feeler. Failure to leave an overhang of minimum 0.010 inch introduces the hazard of electrical flashover between a terminal and the grounded metal spacer, and if this should occur, it will probably be necessary to replace the supply bank insulator as covered in Section 030-705-807, or if the condition is prevalent throughout a bank or bank multiple, to replace the bank multiple.

4.04 Brushing the Bank: After the scraping has been completed, remove debris from

the bank using the No. 389A brush and the vacuum cleaner. Hold the nozzle of the vacuum cleaner near the separators at the left side of the bank and starting at the right, brush loose particles to the left so that they are drawn into the vacuum cleaner. First brush the uppermost bank level on which scraping has been done and continue on succeeding lower levels as necessary. After brushing the bank, remove the cloth from adjacent apparatus taking care that debris from the cloth is not deposited on the apparatus.

REASONS FOR REISSUE

1. To revise the paragraph covering application of the section (1.03).
2. To add information on the formation and effect of silver deposits (1.04 and 1.05).
3. To revise Fig. 1.
4. To revise the List of Tools and Materials (Part 2).
5. To revise the make-busy information (3.01 and 3.02).
6. To revise Fig. 2.
7. To add a paragraph for protecting adjacent apparatus (3.03).
8. To revise the paragraph for gaining access to the supply bank insulator (3.04).
9. To revise the method of insulating the dental scraper handle (3.05).
10. To revise the procedure for sharpening the cutting edge of the dental scraper (3.06).
11. To revise Fig. 3.
12. To revise the scraping procedures (4.01, 4.02, and 4.03).
13. To revise the procedure for brushing the bank (4.04).