

LINE LOAD CONTROL
OPERATING METHODS
NO. 1 CROSSBAR OFFICES

WHY do we need it?????

The military, civil defense, and other government authorities have constantly increased the degree of their reliance on Telephone Company communications, both during normal times and periods of emergencies. Thus at all times it is necessary that service for lines essential to defense, public safety, and disaster relief be continuous and unimpaired.

WHEN should we use it?????

When heavy traffic conditions exist, all normally available overload control measures should be promptly employed. When these control measures do not adequately relieve the traffic condition, the use of Line Load Control is necessary to insure adequate service to certain predetermined lines.

WHO is responsible for its use?????

The decision to use Line Load Control can only be made by those familiar with the particular office and the area served, and must be based on personal observations of existing conditions. Promptness of action is vitally important. It is not practical for the people on duty in the central office to differentiate among overload situations on the basis of their cause. Therefore; authority to use Line Load Control must be vested in either the employee in charge of, or on duty in, the office when the situation arises.

Close coordination between Traffic and Plant personnel on duty should be maintained and the decision should be joint. However; when time will not permit consultation, the person in charge of, or on duty in, the central office should act on his own initiative.

HOW does it work and **WHAT** are the details?????

That is what this practice is all about.

CONTENTS	PAGE
1. GENERAL	2
2. DESCRIPTION	2
3. CONDITIONS FOR USE	3
4. RECOGNIZING ORIGINATING OVERLOADS	4
5. METHOD OF APPLYING LINE LOAD CONTROL	4
6. METHOD OF RESTORING SERVICE	5
7. METHOD OF HANDLING PERMANENT SIGNALS	5
8. RECORDS AND REPORTS	5
9. APPARATUS	5
10. TRAINING	6

1. GENERAL

1.01 This section describes the application of line load control in No. 1 crossbar offices where line load control equipment is provided.

1.02 This section is reissued for the following reasons:

- (a) To include authority to use line load control.
- (b) To include the present "alert" and "take cover" conditions.
- (c) To include steps which should be taken prior to the use of line load control.
- (d) To rearrange the text.

Since this is a general revision, the arrows ordinarily used to indicate changes have been omitted.

2. DESCRIPTION

2.01 Line load control equipment in dial offices provides a means by which lines considered essential to national defense and public welfare may be assured of continuity of service under overload conditions. This is accomplished by temporarily denying originating service to

some or all of the lines not considered essential. Flexibility in application is provided while serving essential lines to permit continuation of service to as many nonessential lines as possible. Line load control does not affect calls already established, and does not prevent calls being completed to lines temporarily denied originating service. Thus, essential calls may reach any telephone at all times.

(a) With line load control, all lines on each line link frame in an office are divided into three categories, designated as class A, class B, and class C. Lines assigned to class A include the essential lines, and ordinarily constitute about 10 per cent of the lines in the office. The remaining lines are assigned to class B and class C, with approximately 45 per cent of the total lines in each class.

(b) Coin lines normally will not be included in line load control, thus enabling the general public to obtain communication service on urgent calls, and avoiding problems of coin supervision, refund, and collection. Where coin development is unusually high it may be necessary to provide line load control to some coin line link frames in order to place some lines in B and C classifications to achieve the objectives of line load control. When this is done, those which are assigned in class A are selected for geographic dispersion; also, important public locations where the stations are sheltered and accessible are included.

(c) Where essential users and coin lines number less than 10 per cent, additional non-essential lines are assigned to class A to maintain equipment balance. However, a margin for growth or line reclassification must be maintained in the A groups.

(d) A (red) G lamp is provided at the line load control cabinet for each line link frame to indicate a calls-waiting condition. A flashing red lamp indicates an overload on that frame. Close observation of the red lamps enables the use of line load control on overloaded frames without affecting other frames.

(e) Control keys are provided as follows: A CLB and CLC master key for the B and C classes of lines, respectively, and individual keys for the B and C classes of each line link frame. A white lamp is associated

with each B key, and a green lamp with each C key. Visual and audible alarms are given when the master control keys are operated, but the alarms can be retired by operating an alarm release key.

(f) The operation of a master key in conjunction with one or more line link frame keys causes originating traffic to be blocked in the line link frames for which the keys are operated. These arrangements permit application of line load control to all B and/or C lines in the office as a whole or individually by line link frame as required, thus affording considerable flexibility as to the extent of control. Calls in progress are not affected at the time the control keys are operated.

2.02 Auxiliary control arrangements also are available whereby the line load control equipment can be operated from a point away from the main control cabinet, such as at a shelter area, usually within the building. These arrangements consist of duplicating the master control keys and associated lamps, the alarm release key and, optionally, the office load meter in a wall mounted metal cabinet at the shelter location. This cabinet is padlocked or sealed to guard against inadvertent or unauthorized operation of the keys.

(a) When such an auxiliary cabinet is installed, it is possible to operate any or all of the individual line link frame keys at the main control cabinet. Then at the shelter area, it is possible to operate the master keys in accordance with the readings of the office load meter and on the basis of other pertinent information that may be available (see Part 10).

Caution: *The auxiliary control affects only those line link frames whose individual keys were previously operated at the main control cabinet.*

Restoral of service can be effected only at the main control cabinet.

3. CONDITIONS FOR USE

3.01 It is not possible to prescribe exact conditions under which line load control should be applied. Variations in type of equipment, optional features and arrangements will cause similar offices to respond differently to identical

external influences. However, there are certain events which might create the need for line load control. These are divided into the following three categories:

(a) Civil defense action affecting civilian population, as follows:

(1) Public alerts which do not involve evacuation of civilian population. These justify line load control as actual overloads may require.

(2) Take cover warnings and public alerts which require telephone employees to retire to shelter area having auxiliary line load control equipment. These justify line load control as actual overloads may require. See caution on auxiliary control Paragraph 2.02 (a).

(3) Take cover warnings, and public alerts when civilian defense instructions require evacuation. If telephone personnel must evacuate buildings, line load control should be operated before leaving. ***These are exceptions to the rule that actual and serious overload be experienced before operating line load control.***

(b) Public disaster or unusual incidents affecting the area served by a central office or offices. These include:

(1) Accidents involving a wide area or large number of people; for example: fires, explosions, wrecks, mine cave-ins, dam breaks, etc.

(2) Natural catastrophes such as blizzards, floods, hurricanes, tornadoes, earthquakes, etc.

(3) Civil disturbance, riot, prison breaks, etc.

(c) Other events such as: news reports, recreational events, conventions, advertising, etc.

3.02 In many cases, the condition will be a unique occurrence so that previous experience does not exist to serve as a guide. Each situation will require the balanced considerations of such items as: cause, time of day, relationship to busy period, and effectiveness of other less drastic controls.

4. RECOGNIZING ORIGINATING OVERLOADS

4.01 An overload condition exists when the capacity of the central office equipment is exceeded for a sustained period. An overload of originating equipment may be recognized by one or more of the conditions indicated below. It must be recognized, however, that the existence of one or more of these conditions, although indicative of an overload, is not an automatic directive for the application of line load control.

- (a) Large number of stuck senders, partial dials, or both; an alarm accompanied by excessively high readings on PD (partial dial) and SC (slow completion) meters.
- (b) All originating markers busy alarm.
- (c) Originating marker connector time alarms.

(d) A calls-waiting condition on the line link frames indicated by the lighting of the (red) G lamps at the line control cabinet.

(e) A large number of permanent signals indicated by the lighting of the following lamps:

- (1) PS lamps on district link frames in non-AMA offices.
- (2) NT lamp at the maintenance recorder frame in AMA offices.
- (3) TB5 lamp in displays at the originating trouble indicator.
- (4) PS lamp at the "A" switchboard.
- (5) Numerous NC, PB, or C lamps of the permanent signal trunks and (if some of the permanent signals were routed to overflow) the lighted PS lamps of the common overflow trunks.

(f) Heavy battery drain indicated by the office load meter.

4.02 Stuck senders are indicative of trunk cable failures or connecting and local office terminating overloads and should be traced to determine the trunk groups or routings involved. Removal of appropriate trunks from service under these conditions will assist and may completely alleviate the backup into the originating equipment and will enable subscribers to utilize routings to nonoverloaded destinations, without resorting to the use of line load control.

4.03 Permanent signals may be an indication of subscriber cable failures, and the prompt removal of associated line circuits from service will remove the load caused by this trouble condition from the common control circuits, links, districts, etc, and thus obviate the need for applying line load control under this condition.

4.04 Where the originating overload results from undue traffic stimulation or from conditions such as Paragraph 4.01 (a) and cannot be alleviated by other means, the temporary denial of originating service to selected groups of subscribers through the application of line load control should be undertaken.

5. METHOD OF APPLYING LINE LOAD CONTROL

5.01 There are two methods of applying line load control, depending on the conditions and the equipment arrangements available.

(a) Individual Line Link Frame Control:

Operate either or both of the CLB and CLC master keys at the line load control cabinet in the equipment room. Momentarily operate the AR key to silence the major alarm. Operate either or both of the B and C frame keys of each frame requiring line load control, as indicated by a lighted (red) G lamp, to the operated (pulled out) position to deny originating service to the associated lines.

(b) Shelter Area Control:

Operate the desired B and C frame keys to the pulled out position at the line load control cabinet in the equipment room prior to retiring to the shelter area. At the line load control cabinet in the shelter area, operate the CLB and CLC keys. Momentarily operate the AR key to silence the major alarm.

5.02 Whenever feasible, control should be accomplished by progressively suspending service on as few lines as possible. This means taking lines out by individual line link frames, selecting first those line link frames which are indicated to be most heavily loaded. This procedure is continued until the cumulative effect in load reduction is adequate, or until all B and C lines are removed from service.

5.03 Where the load builds up suddenly or where the line load control arrangements require it, all B or C lines or both may need

to be removed at once. Close observation of the (red) G lamps should follow to detect whether this action reduced the load beyond the point required, in which case individual frames of either B or C lines or both should be restored, if possible, to the point that the office can safely handle existing loads.

5.04 Whichever procedure is followed, when a point has been reached at which there is assurance of adequate service for the essential lines, an attempt should be made to maintain this condition and also to give equality of service to the nonessential lines by rotating the B and C classes within the line link frames. This is done by restoring one B or C frame key each time an additional one is operated.

6. METHOD OF RESTORING SERVICE

6.01 Restoral can be effected by either the gradual or mass restoral method. However, the gradual method will normally be most appropriate. Service can be restored only from the equipment room control location. Observe that sufficient equipment is available for service before restoring lines by checking that the various load indicating lamps are extinguished at the line load control cabinet. Restore individual B and C frame keys to the normal (pushed in) position as the load condition permits, and observe that the associated B and C lamps are extinguished.

6.02 Maintain a close watch on the load indicating lamps and when it is apparent that load control is no longer required, restore the CLB and CLC master keys at the control cabinet (equipment room or shelter area). Observe that the CLB and CLC lamps are extinguished.

7. METHOD OF HANDLING PERMANENT SIGNALS

7.01 Permanent signals which appear prior to the application of line load control are not affected by the operation of the B and C frame keys and CLB and CLC keys, since no established connections are affected by these keys. Therefore, in order to insure maximum equipment for essential services during line load control, action must be taken to free associated common equipment from the permanent signal lines.

7.02 *Checking for Permanents:* Permanent signals should be traced or identified. Connect the dial handset to the line link frame vertical unit and monitor and challenge in the usual manner. If a call is in progress, disconnect and proceed to the next vertical. *In cases of an excessive number of permanents, line hold magnets should be manually released and blocked promptly on each line link frame to provide facilities.* See Paragraph 7.03. If a link is being held with no call in progress, resulting in no response to a challenge, determine the class of line (A, B, or C) holding the channel and proceed as follows:

- (a) If the link is connected to a line being denied service, manually release the line hold magnet. Since the line is in a denied class, it cannot reseize a link.
- (b) If the line is in a B or C class which has not been denied service, disconnect the line from the equipment as covered in Paragraph 7.03. A record should be maintained showing the action taken on each line and the class. Refer the records to the repair desk.
- (c) If the line holding the link is a class A line, do not disturb the connection. Keep a record of each class A line on permanent signal and refer immediately to the test desk for action.

7.03 *Removing Permanents from Service:* Disconnect from the equipment, lines on which a permanent condition exists by placing a 550B tool in the line vertical unit off-normal spring. Make a record of lines so denied.

8. RECORDS AND REPORTS

8.01 The required reports of the use of line load control should be entered on the proper forms and referred to other departments in accordance with local instructions. These reports should include such information as date, time, reason, and duration.

9. APPARATUS

9.01 No. 1011G dial hand test set equipped with a No. 3W8A cord assembly consisting of a W3AA cord, a No. 471A jack, and one No. 351A plug.

9.02 No. 550B (cutover) tool, as required.

10. TRAINING

10.01 Line load control procedures are infrequently put into use. There may be little or no advance warning of events causing the overload condition. Therefore, employees should be familiar with overload indications as they apply to the particular office. For example, it is not uncommon for the office load meter to indicate a full load condition for sustained periods

of time, or for certain other overload indications to occur daily. Procedures for applying and removing line load control, and the appropriate records and reports which are applicable to the particular office should also be known.

10.02 A program providing both initial and follow-up training would seem to be a must for effective use of line load control equipment.