SWITCHING SYSTEMS MANAGEMENT

NO. 1 ELECTRONIC SWITCHING SYSTEM

SERVICE RESULTS

MATCHING LOSS

1. GENERAL

1.01 This section deals with four basic types of matching loss and two types of first failure to match as related to the No. 1 Electronic Switching System (ESS).

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 The title for each figure includes a number(s) in parentheses which identifies the paragraph(s) in which the figure is referenced.

MATCHING LOSS

1.04 Matching loss is a measure of customer attempts to make calls that do not complete due to the inability of the switching machine to provide a talking and/or service path. In order to be considered as a matching loss, the called line must be idle or the service circuit must be available.

1.05 It is the responsibility of the network administrator to review service indicators daily. A firsthand knowledge of the levels of subscriber service is required to indicate when corrective action is necessary. Included in the service indicators are daily and monthly matching loss data. Matching loss is presently a performance indicator in the Network Switching Performance Measurement Plan. On January 1, 1979 incoming first failure to match, also discussed in this section, will replace incoming matching loss as the primary criterion for incoming service.

1.06 Basically there are four types of matching losses.

(a) *Incoming Matching Loss (IML):* A primary measurement of service in a No. 1 ESS office, it is the inability on the *final* try to complete an incoming call to an idle called number in the No. 1 ESS.

(b) *Outgoing Matching Loss (OML):* The inability on the *final* try to complete an originating call to an idle outgoing trunk in the No. 1 ESS.

(c) *Intraoffice Matching Loss (IAML):* The inability, on the *final* try, to complete an originating call to an idle called number within the same No. 1 ESS office.

(d) *Tandem Matching Loss (TML):* The inability, on the *final* try, to complete a tandem call to an idle trunk in the No. 1 ESS.

FIRST FAILURE TO MATCH

1.07 First failure to match is a measure of machine failure to match a talking path on a first attempt. It does not score due to all lines busy, all trunks busy, or all service circuits busy.

1.08 There are two types of first failure to match.

(a) *Incoming First Failure to Match (IFFM):* It is the inability, on a *first* try, to reserve a talking path between an incoming trunk and a called line, or an initially selected multiline hunting group line, or private branch exchange (PBX) trunk. A first try failure to reserve a talking path does not cause the call to be lost. If, on successive retries, a talking path still cannot be established, IML occurs.

(b) *Tandem First Failure to Match (TFFM):* It is the inability, on a *first* try, to reserve a talking path between the incoming tandem trunk and the initially selected outgoing trunk (or tone and announcement circuit if all outgoing groups are busy). A first try failure to reserve a path does not cause the call to be lost. If, on successive retries, a talking path still cannot be established, TML occurs.

2. MATCHING LOSS NETWORK MEASUREMENTS

2.01 The following measurements are needed to calculate matching loss for incoming, outgoing and intraoffice percentages. These measurements are also used by Program for Administrative Traffic Reports On Line (PATROL). The numbers in parentheses represent the office count number for translations and PATROL.

2.02 *Originating Calls Peg Count (014):* Scores on all calls originated by customers within the office.

It *includes:*

- Any originating call when one or more digits have been dialed.

It *excludes:*

- False starts

- Dial tone speed tests

• Permanent signals

• Through switched calls (tandem)

• Calls on screening line equipment number (except control attendant).

2.03 *Incoming Calls Peg Count (015):*
Counts the total number of incoming terminating and incoming through-switched calls recognized by the seizure of the incoming trunk and incoming register (call store) or in the case of step-by-step calls, after receipt of first digit. Hence, it also scores if the incoming call is a tandem call. Therefore, prior to computing percentage of IML for dial line index or traffic engineering purposes, the tandem call attempt peg count must be subtracted.

2.04 *Incoming Matching Loss (016):* This is an overflow count. It scores on final failures to match a talking path between the incoming trunk and the called line, or on a last trial failure to find a path between the trunk and a service circuit, or the called line and a ringing circuit. An all service circuit busy condition will ***not*** score the incoming calls overflow peg count.

2.05 *Partial Dial—Abandoned Peg Count (021):* Counts all calls on which one or more, but not all, digits have been dialed and the call has been abandoned before an interdigital time-out occurred. This includes centrex extension and attendant office originated calls that are abandoned (even when abandoned while second dial tone is returned).

2.06 *Partial Dial—Timed Out Peg Count (022):* Counts all calls on which one or more, but not all digits have been dialed and an interdigital time-out occurred. This includes centrex extension and attendant office originated calls that time-out (even if the time-out occurred during second dial tone).

2.07 *Line Busy—Incoming Peg Count (028):* Scores on all incoming termination calls if the called line is found busy and does not have call waiting feature.

2.08 *Intraoffice Calls Peg Count (031):*
Counts all office originated calls for which the called number is found to be in the same control group with the exception of centrex extension originated "0" attendant calls.

It ***includes:***

• All 7-digit non-centrex originated intraoffice calls

• All centrex extension originated intragroup calls where the line has resumed ringing, is busy or unassigned

• All centrex extension originated calls to non-centrex customers or different centrex groups in the same control group

• Intraoffice originated calls to station with activated call forwarding to a distant office

• "Speed calling" originated intraoffice calls.

It ***excludes:***

• Extension originated "0" attendant calls

• Partial dials (abandoned or timed-out)

• Service codes.

2.09 *Intraoffice Calls Overflow (032):*
Scores on all intraoffice calls as defined for intraoffice calls peg count that fail to reach the called number due to network blockage. This could be caused by a final failure to match a path to service circuits, line-to-line junctors or intraoffice trunks. This register will not score due to all service circuits or intraoffice trunks being busy.

2.10 *Outgoing Calls Overflow (033):* Scores on all office originated outgoing calls that fail to obtain a "line-to-trunk" connection due to network blockage. This could be caused by a final failure to match a path between the outgoing trunk and a transmitter, or the calling line and the outgoing trunk. It does not score on all outgoing trunks or service circuit busy condition. Do not assign on the C schedule.

2.11 *Tandem Call Attempts Peg Count (131):* Measures total attempts to switch the following calls through the control group.

• Calls over incoming trunk groups designated (in translations) to carry only tandem traffic and are routed out of the office via 3- or 6-digit translations.

• With the CTX-6 generic program, direct distance dialing (DDD) access and intertoll incoming calls, requiring outpulsing, will be included in this count.

2.12 Tandem Call Attempts Overflow (132): For CTX-7 or later generic programs, it counts the final failures to find a network path to service circuits or trunks on tandem call attempts. It does not score on outgoing trunks or service circuits busy condition. The failure to complete a tandem call will score **both** the tandem call attempts peg count and tandem call attempts overflow counters.

2.13 Tandem First Failure to Match (202): Scores on first failures to reserve a talking path, between the incoming tandem trunk and the initially selected outgoing trunk (or tone or announcement circuit in the event the desired outgoing trunk group is busy). This is available with CTX-7 and later generic programs.

2.14 Incoming First Failure to Match (205): Scores on first failure to reserve a talking path between the incoming trunk and called line or the initially selected PBX trunk when such line or trunk is terminated on the line link network. This is available with CTX-7 and later generic programs.

2.15 The above registers are all identified as having measurement code 005. The registers described below have different measurement codes as shown in parentheses following the register name. No office count number is used in identifying them.

2.16 Line Link Network (LLN) Incoming Calls Peg Count (011): Counts all incoming calls for which a talking path from the incoming trunk to the called ESS line equipment has been found and reserved. Specifically, it will score the peg count register corresponding to the LLN on which the called line is located.

2.17 This count includes incoming calls to ringing whether or not the called line answers.

2.18 It excludes incoming calls to busy tone, overflow, announcement, through switched (tandem), to directory number with screening LEN (through switched), to directory number with route index, to line equipment with activated call forwarding to a distant office and terminating end of intraoffice calls.

2.19 Line Link Network Incoming Calls Overflow (012): Scores on all incoming calls for which the system **failed** to find and reserve a talking path from the incoming trunk to the called line equipment due to network or junctor blockage. (With Issue 7 of CTX-6 and later generic programs, this measurement counts the blockage of the line-to-ringing connections.) Specifically, it will score the overflow register assigned to the LLN on which the called line is located. This count is **not** included in the LLN incoming peg count.

2.20 Trunk Link Network (TLN) Incoming Calls Peg Count (013): Scores on all incoming calls for which a talking path from the incoming trunk to the called ESS line equipment has been found and reserved. Specifically, it will score the peg count register corresponding to the TLN on which the incoming trunk is located.

2.21 This count includes incoming calls to ringing whether or not the called line answers.

2.22 It excludes incoming calls to busy tone, overflow, announcement, through switched (tandem), to directory number with screening LEN (through switched), to directory number with route index, to line equipment with activated call forwarding to distant office, and terminating end of intraoffice calls.

2.23 Trunk Link Network Incoming Calls Overflow (014): Scores on all incoming calls for which the system failed to find and reserve a talking path from the incoming trunk to the called line equipment due to network or junctor blockage. (With Issue 7 of CTX-6 and later generic programs, blockages of the line-to-ringing connection are **not** included in this measurement.) Specifically, it will score the overflow register assigned to the TLN on which the incoming trunk is located. This count is not included in the TLN incoming peg count.

3. INCOMING MATCHING LOSS

OFFICE INCOMING MATCHING LOSS

3.01 The office IML is used to evaluate the total ESS switching network performance on

incoming calls. It is obtained from the scoring recorded on the incoming peg count, tandem calls peg count and incoming overflow registers. The incoming call peg count register will score upon an attempt to complete an incoming terminating call. *It counts calls to busy line, and calls routed to reorder.* It also scores if the incoming call is a tandem call. The tandem call attempts peg count register measures total attempts to switch calls over incoming trunk groups designated to carry only tandem traffic. The incoming overflow register will score when a call fails on the *final* attempt due to network blockage between the incoming trunk and called line, between the incoming trunk and service circuit, or between the called line and a ringing circuit. It will not score if failure is due to all service circuits being busy.

3.02 The office IML is determined by dividing the number of incoming overflows by the incoming calls, minus tandem calls and multiplying the result by 100. The result is expressed as a percentage and reported to one decimal place. Percentage of IML can be obtained directly from PATROL.

$$\text{Percentage of IML} = \frac{\text{Incoming OFL (016)}}{\left[\begin{array}{c}\text{Incoming PC (015)} \\ - \text{ Tandem PC (131)}\end{array}\right]} \times 100$$

NETWORK INCOMING MATCHING LOSS

3.03 This meaurement is available with No. 1 ESS to identify networks having excessive reserved path blockage on incoming terminating calls. Two registers are provided for each LLN and TLN. A successful incoming terminating call will score the peg count register on the TLN where the incoming trunk appears, and the peg count register on the LLN where the called line is located. *They will not score calls to busy lines.* If there is a *final* failure to match a reserved path (talking path) between the incoming trunk and the called line, the overflow registers on the TLN and LLN serving the call will score. With Issue 7 of CTX-6 and later generic programs, the LLN overflow measurement will also score if line-to-ringing connections are blocked. The percentage of matching loss for each network may be obtained by dividing the number of LLN overflows

by the number of peg counts plus LLN overflows, and multiplying by 100.

4. OUTGOING MATCHING LOSS

4.01 OML is used to measure the switching network performance on originating outgoing calls. This is obtained from the scoring recorded on the originating peg count, intraoffice peg count, partial dial abandonment peg count, partial dial timed out peg count, and outgoing overflow registers. The originating peg count register scores on *all* customer initiated attempts that originate within the office. The intraoffice peg count register scores on all originating calls that terminate in the same control group. The partial dial abandonment peg count register scores all originating calls that are abandoned before all digits have been dialed. The partial dial timed out peg count register scores on all originating calls that fail to complete due to interdigital time out. The outgoing overflow register scores on all originating calls that fail on the *last* attempt due to network blockage between the calling number and an outgoing trunk, or a service circuit. It will not score if failure is due to an outgoing trunk or service circuits busy condition.

PERCENTAGE OF OUTGOING MATCHING LOSS

4.02 To calculate the percentage of OML, divide outgoing overflow by originating peg count, minus intraoffice peg count, minus partial dial abandon peg count, minus partial dial time out peg count. Percentage of OML can be obtained directly from PATROL.

$$\text{Percentage of IML} = \frac{\text{Outgoing OFL (033)}}{\left[\begin{array}{c}\text{Originating PC (014)} \\ - \text{ Intraoffice PC (031)} \\ - \text{ PD Abandon PC (021)} \\ - \text{ PD Time Out PC (022)}\end{array}\right]}$$

5. INTRAOFFICE MATCHING LOSS

5.01 IAML is used to evaluate the ESS switching network performance on all originating calls which terminate within the same control group. IAML is obtained from the scoring recorded on the intraoffice peg count register and the intraoffice overflow register. The intraoffice peg count register scores on all office originated calls for which the called number is in the same control group. The

intraoffice overflow register scores on the *final* failure to complete the call due to network blockage. This could be due to a failure to match a talking path through the line to line junctors or intraoffice trunks, or to service circuits. It does not score due to all trunks or service circuits busy.

PERCENTAGE OF INTRAOFFICE MATCHING LOSS

5.02 To calculate the percentage of IAML, divide the number of overflows by the peg count multiply the result by 100, and express the result as a percentage, reported to one decimal place. Percentage of IAML can be obtained directly from PATROL.

$$\text{Percentage of IAML} = \frac{\text{IAO OFL (032)}}{\text{IAO Calls (031)}} \times 100$$

6. TANDEM MATCHING LOSS

6.01 Tandem call attempts peg count register counts all attempts to switch incoming calls on trunk groups designated to carry only tandem traffic to outgoing trunks via 3- and 6-digit translations. For CTX-6 and later generic programs, it will also count DDD access and intertoll incoming calls. Tandem call attempts overflow scores on all final failures to complete any of the above described tandem calls due to inability to match a path, and prior to CTX-7 on failure to find an idle outgoing trunk or service circuit.

PERCENTAGE OF TANDEM MATCHING LOSS

6.02 To calculate the percentage of TML, divide the number of overflows by the peg count, and multiply the result by 100. TML is a percentage expressed to one decimal place. Percentage of TML can be obtained directly from PATROL.

$$\text{Percentage of TML} = \frac{\text{TCA OFL (132)}}{\text{TCA PC (131)}} \times 100$$

7. INCOMING FIRST FAILURE TO MATCH

7.01 For CTX-7 and later generic programs, this register scores on a first try failure of the No. 1 ESS machine to reserve a talking path between the incoming trunk and the called line or the initially selected PBX trunk, provided such line or trunk is terminated on the LLN. The incoming calls peg count scores the total number of incoming terminating and incoming through-switched calls. Therefore, prior to computing IFFM the tandem call attempt peg count must be subtracted.

7.02 Recent studies have shown that the percentage of IML understates actual blocking rates by not accounting either for calls to busy lines or for the effects of PBX-recycle. Therefore, as of May 1976 the ESS service criterion for network *design* is for 2.3 percent IFFM. Effective January 1979, percentage of IFFM will also be used for *performance measurement* purposes. A CTX-7 or later generic program is a prerequisite to implementing IFFM measurements. Capacity tables for No. 1 ESS based on 2.3 percent IFFM will be provided in the Traffic Facilities Practices, Division D, as they become available. For further details, see General Letter 76-05-024.

7.03 PBX-recycle is a design feature of both crossbar and ESS local central offices which provides for a second attempt to find an idle channel to hunting line groups in the event that the first attempt is unsuccessful. Since, when available, a different idle line is selected for the second trial and a different set of channels is accessed, the probability of finding an idle channel with two attempts is significantly improved compared with a single attempt. For example, if the actual blocking rate were 2 percent for single attempts, it would be expected to be in the range of 0.1 percent to 0.4 percent with two attempts. It should be noted that the attempts are made only to idle lines and that the benefits of a second trial are reduced for hunting line groups that frequently do not have two idle lines or where the lines are not spread over different line link frames or networks.

PERCENTAGE OF INCOMING FIRST FAILURE TO MATCH

7.04 To calculate IFFM, divide incoming first failure to match score by incoming calls peg count, minus tandem call attempt peg count, and multiply by 100. The result is the percentage of

IFFM and should be carried to one decimal place. Percentage of IFFM can be obtained directly from PATROL.

$$\text{Percentage of IFFM} = \frac{\text{IFFM PC (205)}}{\begin{bmatrix} \text{Incoming PC (015)} \\ - \text{Tandem PC (131)} \\ - \text{Incoming to Busy (028)} \end{bmatrix}} \times 100$$

8. TANDEM FIRST FAILURE TO MATCH

8.01 For CTX-7 and later generic programs, this register scores on a first try failure of the No. 1 ESS to reserve a talking path between the incoming tandem trunk and the initially selected outgoing trunk, or, if the outgoing trunk group is busy, an idle tone or announcement circuit. The tandem call attempts peg count measures total attempts to switch tandem calls.

PERCENTAGE OF TANDEM FIRST FAILURE TO MATCH

8.02 To calculate TFFM, divide the tandem first failure to match score by the tandem call attempts peg count and multiply by 100. The result is the percentage of TFFM and should be carried to one decimal place. Percentage of TFFM can be obtained directly from PATROL.

$$\text{Percentage of TFFM} = \frac{\text{TFFM PC (202)}}{\text{TCA PC (131)}} \times 100$$

9. REQUESTING MATCHING LOSS DATA

9.01 Matching loss data is requested and provided via the traffic teletypewriter(s). The generic program contains the features necessary to cause the various counts to be made and stored.

TC15 DATA

9.02 When called for, the data in the registers are printed out. The following counts relating to matching loss are provided on the quarter-hour printout (TC15):

- Total incoming calls

- Incoming first failure to match

- Total tandem calls

- Tandem first failure to match

- Total intraoffice calls

- Intraoffice calls overflow.

Other matching loss data can be obtained hourly on the H schedule. See DFMP, Division D, Section 6i (5) for more information on TC15.

H SCHEDULE

9.03 All matching loss data counts should be assigned on the H hourly schedule. Assignments to the H schedule are by way of ESS Form 1400. The network administration should ensure that all needed counts are assigned to the H schedule. See DFMP, Division H, Section 6i(2), Traffic Measurements—Hourly for more information on the H schedule.

9.04 Network measurements collected on the H schedule during the busy hour are used by PATROL to calculate matching loss percentages. A manual listing of this data should be made for offices not inputting to PATROL or whenever special studies are needed on a daily basis.

10. MATCHING LOSS RECORDS

GENERAL

10.01 Matching loss data is available on the PATROL daily (Fig. 1) and monthly (Fig. 2) report. Included in these reports are:

- Percentage of incoming matching loss

- Percentage of outgoing matching loss

- Percentage of intraoffice matching loss

- Percentage of tandem matching loss (see Note)

- Percentage of incoming first failure to match

- Percentage of tandem first failure to match.

Note: Percentage of tandem matching loss is listed under the heading "% TM OVF."

The last three items are available only with CTX-7 or later generic programs. In addition to the percentage of matching loss for each category, the PATROL also prints out daily busy hour peg counts and main station calling rates. See DFMP, Division H, Section 6i(6), Traffic Measurements—PATROL for more information on PATROL.

10.02 If special studies are required, daily posting of matching loss data can be done on the Daily Data Record No. 6. Figure 3 shows a completed Data Record No. 6 and the instructions for completing the form. Sheet 3 of Fig. 3 is not required unless the No. 1 ESS machine is being used for tandem switching. A reproducible copy is attached at the back of this section.

10.03 Once a month each operating telephone company is required to submit data to AT&TCo which includes busy hour incoming matching loss. Data for this report is derived from Form E-6183, Busy Hour Incoming Matching Loss (Fig. 4). Details for filling out Form E-6183 are described below. The data entered on Form E-6183 should also be used to complete the appropriate columns on Form E-6421A as described in DFMP, Division H, Section 6k(4), Service Results—Performance Measurement Plan. A reproducible copy of Form E-6183 is included at the back of this section.

DAYS TO BE MEASURED

10.04 Days to be Included:

(a) Valid IML data for five business days each week (generally Monday through Friday), should be included in the IML component of the results. In some locations, Saturday may be one of the busy days. In these cases, Saturday may be used in place of a normal business day, provided it is consistently one of the five high days.

(b) All business days of the month are to be reported and included in the results, regardless of the service conditions. Such conditions may exist due to civil disturbances, curfews, etc, or may be due to storms, floods, impaired dial facilities (such as cable cut, equipment out of order), or Western Electric installation activities, etc. During these conditions, peg count and

matching loss registers should be working properly even through part of the equipment in the dial office may be out of order.

10.05 Days to be Excluded:

(a) Days on which the registers are proven to be out of order. Matching loss data should be available for all business days in a month. If proper maintenance attention is given, these registers should have a very low incidence of failure.

(b) Exclude the total day matching loss data whenever registrations are not available for one (or more) loading group. (In these cases, engineering may desire the results for the loading group[s] not affected.)

10.06 *Written Explanation of Out-of-Order Conditions:* A detailed written explanation for any day that IML data are not available for any reason, signed by an authorized network administration supervisor with network maintenance concurrence, shall be forwarded to the service observing group and division level of the network administration organization.

10.07 *Holiday Treatment:* Holidays celebrated on a nationwide basis, in general, do not carry traffic representative of the average business day and may be excluded from the official results. For example, Christmas Eve evening data are highly unrepresentative and would not be included. Specific days proclaimed as holidays may be excluded only if they are observed as holidays on a nationwide basis. Some holidays such as Lincoln's Birthday, Veterans' Day, Columbus Day, and Good Friday may well be equal to or greater than a representative business day. If one of these holidays falls on a weekday or is celebrated on a Monday or Friday, it may be included in the results, if locally desired.

SELECTION OF BUSY HOUR

10.08 For purposes of computing the IML component, the busy hour is defined as that time-consistent hour having the greatest average business day percentage of IML. The busy hour may start on the hour or half-hour (10 am to 11 am or 10:30 am to 11:30 am, etc).

10.09 Select the IML busy hour as follows. Each year prior to the busy season period, the

busy hour is selected from IML data obtained during the previous busy season. The busy hour selected from these data is retained for the duration of the current busy season unless results show another time-consistent clock hour having an average business day percentage of IML that exceeds the designated busy hour results by an amount of at least 0.5 percent for each of two consecutive service observing months. If this occurs, the hour with the higher percentage of IML is designated as the new busy hour commencing no later than the second month and is generally retained for the remainder of that busy season.

Example:

	INCOMING MATCHING LOSS	
	DECEMBER	JANUARY
9 am to 10 am (previously designated BH)	1.1%	2.0%
7:30 pm to 8:30 pm	1.6%	2.7%
Difference	.5%	.7%

Starting in January, report 7:30 pm to 8:30 pm.

(a) Whenever the busy hour is not readily apparent or a shift in busy hour is expected, data for the two or three busiest or pertinent hours should be accumulated each day during the current busy season to accurately forecast the hour to be used for the next busy season. A study by half-hour for one or two representative weeks should be made to determine these two or three hours. Ordinarily, the study would be made early in the busy season. See DFMP, Division H, Section 1C(2) for details on busy hour determination.

(1) When a pronounced busy hour is indicated and data are accumulated for a single hour, a second study is made during a later month when traffic loads normally are higher. If at that time several hours are close, studies need to be continued for a longer period as in the preceding paragraph.

(2) When there is not enough IML to establish a busy hour, the hour having the highest usage, hundred call seconds (CCS), should be used.

(b) Shifts in busy hours that occur during nonbusy season period months may be ignored, if locally desired, for the purpose of indexing.

(c) A record should be made by a notation on Form E-5267 when a busy hour is changed:

(1) Showing the clock period and service results for the previously designated busy hour, and

(2) Indicating dates of verification studies.

(d) It is highly important that IML measurements not be shifted to a new hour without appropriate *validated* data.

(1) Recognition should be given to equipment made busy, maintenance outages, abnormal equipment operating conditions affecting service results; area transfers, new tariff offerings, degree of imbalance, or other factors affecting traffic characteristics; and to pertinent plant and customer reports.

(2) When the hour of highest IML does not substantially coincide with the hundred call seconds (CCS) busy hour the reason(s) should be investigated.

(e) The selection of the service observing busy hour by the network administration group should be coordinated with network design and network maintenance.

MANUAL COMPUTATION OF INCOMING MATCHING LOSS

10.10 IML results will be based on data accumulated during all business days of the month. If less than 15 days are measured, the IML component is to be omitted from the results. These cases should be very infrequent.

10.11 Form E-6183, ESS Busy Hour Matching Loss (Fig. 4) is to be used to compile and manually compute the daily and the total month's busy hour IML results for No. 1 ESS offices.

10.12 The preparation of Form E-6183 will generally be the responsibility of the network administration organization. The primary responsibilities for the day to day supervision and

development of results are with the network administrator.

10.13 The term "item" as used in the subsequent instructions refers to the column number or block number of the corresponding item on Form E-6183.

10.14 *Items—Top of Form E-6183:* Space has been provided for entering the following information:

(a) Entity: Identify the traffic unit for which matching loss data are reported.

(b) Type of Central Office Equipment: Enter the type of dial central office equipment provided the traffic unit (No. 1 ESS).

(c) Report Month: Enter the reporting month for which matching loss data are reported.

10.15 *Item 1—Date—Business Day:* Enter the date of each business day. Days on which measurements are to be included in the dial line results are covered in 10.04; days to be excluded are covered in 10.05.

10.16 *Items 2 Through 9:* Form E-6183 is designed for entering matching loss data for a single ESS traffic unit.

(a) Load Group: This space is provided for identifying, separately, each loading group. In ESS offices, the separate loading groups are incoming and intraoffice.

(b) Time: Enter the matching loss busy hour for each loading division (load group).

(c) Factor: Enter the weighting factor for each loading group as obtained from item 12.

10.17 *Item 2—Incoming Calls—BH:* Enter the number of registrations recorded for incoming calls (office count 015).

(a) Enter the code NA in this item whenever incoming calls or losses data are not available for a loading group.

(b) Line Designated TOTAL: Total for the month, the number of incoming calls.

(c) Line Designated AVERAGE: Divide the "Total" as determined in (b) by the number of days reported.

10.18 *Item 3—Tandem Calls—BH:* Enter the number of tandem calls (office count 131).

(a) Enter the code NA in this item whenever these data are not available for a particular group.

(b) Line Designated TOTAL: Total for the month, the number of tandem calls.

(c) Line Designated AVERAGE: Divide the total as determined in (b) by the number of days reported.

10.19 *Item 4—Incoming Calls Minus TDM:* Subtract the tandem calls from the incoming calls (item 2 minus item 3).

(a) Enter the code NA (not available) in this item whenever code NA has been entered in item 2 and/or item 3.

(b) Line Designated TOTAL: Total for the month the incoming calls minus TDM.

(c) Line Designated AVERAGE: Divide the total as determined in (b) by the number of days reported.

10.20 *Item 5—Matching Loss—BH:* Enter the number of incoming overflows (office count 016).

(a) Enter the code NA in this item whenever data are not available.

10.21 *Item 6—% IML:* Calculate the percentage of incoming matching loss as outlined in (a) following. Multiply the result by 100 and express the result as a percentage, reported to one decimal place.

(a) Divide the number of incoming overflows by the incoming calls minus tandem calls (item 5 divided by item 4).

(b) Enter the code NA in this item whenever data are not available.

(c) Line Designated TOTAL: Total the percentage figures, for one month.

(d) Line Designated AVERAGE: Divide the total as determined in (c) by the number of days reported.

10.22 Item 7—Intraoffice Calls—BH: Enter the number of registrations recorded on the intraoffice peg count registers (office count 031).

(a) Enter the code NA in this item whenever data are not available.

(b) Line Designated TOTAL: Total for the month, the intraoffice calls—busy hour.

(c) Line Designated AVERAGE: Divide the total as determined in (b) by the number of days reported.

10.23 Item 8—Intraoffice Matching Loss—BH: Enter the number of registrations recorded on the intraoffice overflow registers (office count 032).

(a) Enter the code NA in this item whenever data are not available.

10.24 Item 9—% Intraoffice Matching Loss—BH: Calculate the percentage of intraoffice matching loss by dividing the number of overflows by the peg count (item 8 divided by item 7). Multiply the result by 100 and express the result as a percentage, reported to one decimal place.

(a) Enter the code NA in this item when data are not reported in item 7 or item 8.

(b) Line Designated TOTAL: Total the percentage figures, for the month.

(c) Line Designated AVERAGE: Divide the total as determined in (b) by the number of days reported.

10.25 Item 10—Total Calls—BH: Enter for each day, the total incoming calls minus tandem calls plus intraoffice calls, (item 4 plus item 7).

(a) Enter the code NA in item 10 whenever data are not available for any component (item 2, 3, 5, 6, 7, 8, or 9) as indicated by a code NA.

(b) Line Designated TOTAL: Enter the monthly total number of calls obtained during the busy hour(s). This is the sum of the entries in items 4 and 7 on the line designated total.

(c) Line Designated AVERAGE: Enter the monthly average number of calls obtained during the busy hour. This is the sum of the entries in items 4 and 7 on the line designated average.

10.26 Item 11—Unusable Days (✔)—Total Busy Hours: Enter a check mark (✔) in this item whenever the code NA has been entered in item 10.

(a) Line Designated TOTAL: Enter the total number of check marks in item 11. If the total for the month is other than 0, a copy of Form E-6183 shall be forwarded to the next higher network administration echelon.

10.27 Item 12—Weighting Factor: Compute the weighting factor for each loading group.

(a) Load Group: Each measured loading group is identified.

(b) Average Calls: Enter the average calls reported on the line designated "Average" (total of items 4 and 7).

(c) Factor: Divide the average calls for each loading group by the total monthly average calls for the traffic unit. Express each factor to 3 decimal places. The sum of the weighting factors must always equal 1.000.

10.28 Line Designated WTD % ML: Calculate a monthly average weighted percentage of matching loss for the traffic unit. Multiply the percentage figure in items 6 and 9 on the line designated "AVG" by the corresponding weighting factor in item 12. Enter each weighted result on the line designated "WTD % ML," reported to 2 decimal places, separately for each loading group.

10.29 Item 13—Weighted % ML—Total Month: Enter the monthly percentage

of matching loss results for the traffic unit, reported to one decimal place. Add the weighted result in the line designated "WTD % ML," for items 6 and 9 and report the figure to one decimal place.

Note: Enter the result to the next higher number whenever the fraction is 0.5 or larger. For example, 2.45 to be reported 2.5; 1.49 to be reported 1.5; 1.62 to be reported 1.6.

10.30 *Item 14—Index Points Earned—Total Month:* Read the monthly average "Weighted % ML" in item 13 directly into the "Performance" column of the "Incoming Matching Loss—BH" table of the Network Switching Performance Measurement Plan Index Table (Fig. 5). Enter the corresponding points earned in item 14. Express the result to one decimal place.

10.31 *Item 15—Component Index—Total Month:* Read the performance figure reported in item 13 into the component index column of the index table.

10.32 *Item 16—Weakspot(✔)—Total Month:* Enter a check mark (✔) in item 29 whenever the dial tone speed component index for the traffic unit, as reported in item 15, is 89 or lower.

10.33 In computing the percentage of incoming matching loss for an echelon higher than a traffic unit level, such as a multitraffic unit city, district, division, or an area, the traffic unit results are weighted. The weight assigned to each traffic unit is based on the average number of incoming calls, busy hour, as reported on Form E-6183, item 10 on the line designated *average* and is the percentage that the average incoming calls in each traffic unit are of the total incoming calls of the group of traffic units being measured. Express the traffic unit weighting factors to four decimal places. The sum of the weighting factors should always total 0.9999, 1.0000 or 1.0001.

Example: Multitraffic Unit City:

TRAFFIC UNIT	(1) TOTAL NO. INC. CALLS-BH (AVG. PER DAY)	(2) WTG. FACTOR	(3) PERCENTAGE OF IML-BH	(4) WEIGHTED PERCENTAGE OF IML-BH
225	2,038	.1613	2.2	.3548
751	4,729	.3743	1.4	.5240
698	5,868	.4644	1.8	.8359
City A	12,635	1.0000		1.7147

Percentage of IML — BH = 1.7% for City A.

11. ANALYSIS OF MATCHING LOSS DATA

NETWORK BALANCE

11.01 Matching loss is an indicator of network imbalance. As shown in Fig. 6, it is possible to have an office IML of 1 percent, and at the same time individual networks, LLN or TLN, could be experiencing significantly higher matching loss. *It is recommended that the network administrator check the matching loss of individual networks periodically.* It is also advisable to check individual junctor group usage, trunk grid usage, and line concentrator usage to evaluate balance and capacity.

11.02 The example of overloaded L-T junctors in Fig. 6 may be the result of improper junctor wiring, or links made busy by maintenance. In persuing the cause of junctor overloads, verification should be requested of junctor assignments and junctor rearrangements. Trunk switch frame grid usage and junctor group usage should be checked. A count of links made busy for those networks indicating a high matching loss should also be requested. In even an underloaded office high matching loss can occur due to trunk imbalance, service circuit imbalance, or concentrator imbalance.

11.03 The No. 1 ESS may make several attempts to match a path through the network before routing a call to overflow. As a result the machine can be very close to a severe overload and still indicate a low matching loss. A few additional calls can then cause a sudden unacceptable matching loss. IFFM and TFFM are more sensitive indicators of impending blockage problems. These counts are very useful in pointing out developing blockage problems, thus permitting the possibility of corrective action before a high matching loss ratio occurs. When an increase above normal occurs in IFFM

or TFFM, it is advisable to check the IML at individual networks.

11.04 Corrective action may include one or more of the following:

- Reduction in the number of trunks or service circuits out of service

- Trunk redistribution

- Line redistribution

- Junctor redistribution

- Reduction of links made busy

- Capacity changes

- Office deloading.

Before such action is taken all data must be thoroughly analyzed in order to pin-point the source of trouble. Corrective action must be a joint endeavor of network administration, maintenance, and design.

11.05 For additional information relating to network balance, refer to DFMP, Division H, Section 6g, Load Balance.

CUSTOMER SERVICE

11.06 Matching loss is also an indicator of customer service. It can be assumed that whenever there is an IML of 2 percent or greater, customer service is below standard. Daily and monthly monitoring of IML should be performed. This data is available on the TC15 and H schedule printouts and on the PATROL printout for daily totals and monthly averages. *Where available, the Engineering and Administration Data Acquisition System (EADAS) should be assigned to provide routine reports on matching loss.* IML should be watched closely during the busy season. It will act as an indicator of the type of service the customer is receiving and an indication of network imbalance.

NETWORK DESIGN

11.07 Although junctor engineering procedures are designed to produce 2 percent IML at engineered load, the junctor assignment program (JAP) may overprovide line-to-trunk junctors in the smaller or middle sized ESS offices (Fig. 7). This overprovision will reduce IML at engineered load. For example, if an average of one extra subgroup per group is provided, IML will be reduced to about 0.8 percent over a wide range of junctor group sizes. As the office grows, a point will be reached where it is no longer possible to overprovide line-to-trunk junctors and IML will approach 2 percent in the busy season prior to relief. *In the smaller offices, the CCS loads on the network should be observed to determine when engineered load has been reached for timing of network additions.* This is the responsibility of the network administrator. Particular attention should be directed to other service indicators especially losses on intraoffice traffic and blocked dial tone conditions, as determined by traffic measurements taken on the office. Because of additional time required for network path hunts and retrials, matching loss also has a detrimental effect on processor real time capacity.

11.08 Since OML is usually substantially below 1 percent even when IML approaches 2 percent in No. 1 ESS, any significant increase in OML should be carefully examined.

DATA ON OFFICE NO. XXXXXX for 12/24/75 11:30 HAS BEEN PROCESSED AND RECORDED.

NO. 1 ESS SUMMARY OF TRAFFIC DATA FROM 12/24/75 TO 12/24/75 HOUR ENDING 11:30

	O+T CCS/M	O+I -TM MSCR	TOTAL CCS	O+I PG CNT	AVG HT	STATIONS IN SERVICE TOTAL	POTS	CTX	COIN
OFFICE COUNT	6.37	4.19	103594	68153	160	16255	13890	1502	863

	DIAL PULSE STA.	TST	%DLY	TOUCH-TONE STA.	TST	%DLY	WGHTD %DLY
DIAL TONE	12188	535	0.00	4067	365	0.00	0.00

	INCOMING –TM MSCR	CALLS	%ML	OUTGOING MSCR	CALLS	%ML	INTEROFFICE MSCR	CALLS	%ML
MATCHNG LOSS	2.13	34578	0.12	1.66	26937	0.00	0.27	4413	0.20

	%OFC OVF	%INC FFM	%OUT NC	%NM BLDK	O+I PG CNT	%OVF	TANDEM CALLS %FFM	%NC	PG CNT
INEFF. ATT.	1.43	0.13	0.89	0.00	68153				0

	MF RADR TST	%DLY	DP RADR TST	%DLY	RP RADR TST	%DLY	TOTAL RCVR PG CNT	%OVF
RADR AND OVF	415	0.00	53	0.00	432	0.00	34227	0.0

Note: PATROL generates the above report in response to each input of daily busy hour data. If two busy hour data tapes are input to PATROL, two of the above summaries will be printed out, one for each input.

Fig. 1—PATROL Response to Input of Daily Data (10.01)

000522H   TEST OFC   SP-CTX-7-8-0   COMP.ID: 000
NO.1 ESS MATCHING LOSS DATA FROM 08/23/1976 TO 09/22/1976
HOUR ENDING 11:00

	INCOMING-TM			OUTGOING			INTRAOFFICE		
	MSCR	CALLS	%ML	MSCR	CALLS	%ML	MSCR	CALLS	%ML
08-23-76	0.74	19189	0.08	0.39	10099	0.00	0.52	13546	0.05
08-24-76	0.60	15540	0.05	0.34	8921	0.00	0.47	12189	0.05
08-25-76	0.62	16083	0.07	0.35	8988	0.00	0.47	12045	0.07
08-26-76	0.60	15532	0.01	0.33	8463	0.00	0.45	11568	0.03
08-27-76	0.62	16121	0.03	0.33	8625	0.00	0.45	11697	0.01
08-30-76	0.68	17642	0.05	0.38	9922	0.00	0.50	12997	0.10
08-31-76	0.59	15290	0.09	0.34	8818	0.01	0.47	12272	0.03
09-01-76	0.59	15217	0.05	0.34	8744	0.00	0.46	12033	0.03
09-02-76	0.60	15604	0.04	0.32	8205	0.00	0.46	11877	0.06
09-03-76	0.56	14419	0.00	0.34	8710	0.00	0.44	11487	0.05
09-07-76	0.62	15980	0.02	0.36	9339	0.00	0.51	13078	0.02
09-08-76	0.56	14621	0.03	0.33	8591	0.00	0.43	11255	0.01
09-09-76	0.55	14237	0.02	0.31	8105	0.00	0.42	10963	0.05
09-10-76	0.55	14244	0.01	0.31	7962	0.00	0.42	10914	0.03
09-13-76	0.66	16999	0.03	0.34	8811	0.00	0.47	12121	0.05
09-14-76	0.54	14077	0.04	0.31	7937	0.00	0.41	10645	0.02
09-15-76	0.57	14667	0.03	0.32	8395	0.00	0.44	11270	0.07
09-16-76	0.53	13770	0.01	0.31	7929	0.00	0.42	10913	0.04
09-17-76	0.55	14223	0.03	0.31	8113	0.00	0.40	10462	0.09
09-20-76	0.61	15734	0.09	0.34	8884	0.01	0.49	12647	0.10
09-21-76	0.58	15013	0.07	0.32	8271	0.00	0.43	11094	0.04
09-22-76	0.52	13355	0.05	0.31	7976	0.00	0.42	10910	0.03
AVERAGE	0.59	15343	0.04	0.33	8628	0.00	0.45	11726	0.05

Fig. 2—Portion of PATROL Monthly Report (Sheet 1 of 2) (10.01)

```
      000522H     TEST OFC         SP-CTX-7-8-0      COMP.ID: 000
      NO.1 ESS INEFF. ATTEMPTS DATA FROM 08/23/1976 TO 09/22/1976
                   HOUR ENDING 11:00
```

	%OFC	%INC	%OUT	%NM	O+I	TANDEM		CALLS	
	OVF	FFM	NC	BLKD	PG CNT	%OVF	%FFM	%NC	PG CNT
08-23-76	0.94	0.10	0.19	0.00	49248	0.00	0.00	0.31	4537
08-24-76	1.15	0.05	0.02	0.00	42444	0.00	0.00	0.10	3981
08-25-76	1.09	0.08	0.00	0.00	42411	0.00	0.00	0.00	3474
08-26-76	1.18	0.01	0.00	0.00	41268	0.00	0.00	0.03	3994
08-27-76	1.23	0.04	0.05	0.00	41875	0.00	0.00	3.10	3745
08-30-76	1.31	0.06	1.41	0.00	46903	0.00	0.00	1.95	4355
08-31-76	0.97	0.10	0.00	0.00	41918	0.00	0.00	0.00	3866
09-01-76	0.91	0.05	0.01	0.00	41529	0.00	0.00	0.18	3817
09-02-76	0.80	0.04	0.01	0.00	41193	0.00	0.00	0.19	3662
09-03-76	0.83	0.00	0.00	0.00	40249	0.00	0.00	0.00	3870
09-07-76	0.91	0.02	0.00	0.00	44179	0.00	0.00	0.00	4112
09-08-76	0.77	0.03	0.00	0.00	39268	0.00	0.00	0.00	3534
09-09-76	0.78	0.02	0.02	0.01	38292	0.00	0.00	0.00	3473
09-10-76	0.77	0.02	0.00	0.00	38062	0.00	0.00	0.00	3529
09-13-76	1.39	0.03	0.10	0.00	43242	0.00	0.00	0.00	3697
09-14-76	1.36	0.05	0.00	0.01	37366	0.00	0.00	0.00	3385
09-15-76	1.85	0.04	0.01	0.00	39251	0.00	0.00	0.00	3480
09-16-76	0.57	0.01	0.00	0.00	37318	0.00	0.00	0.00	3273
09-17-76	0.64	0.03	0.01	0.00	37902	0.00	0.00	0.00	3629
09-20-76	0.60	0.11	0.00	0.00	42679	0.00	0.00	0.10	3897
09-21-76	0.59	0.08	0.00	0.00	39230	0.00	0.00	0.03	3449
09-22-76	0.57	0.06	0.01	0.01	36956	0.00	0.00	0.00	3221
AVERAGE	0.96	0.05	0.08	0.00	41036	0.00	0.00	0.27	3726

Fig. 2—Portion of PATROL Monthly Report (Sheet 2 of 2) (10.01)

NO. 1 ESS
DAILY DATA RECORD NO. 6
MATCHING LOSS

INSTRUCTIONS FOR PREPARATION

Sheet_____ of_____

A. Incoming Matching Loss

Column 3 = Column 1 − Column 2

$$\text{Percentage of IML} = 100 \times \frac{\text{Incoming Overflow (016)}}{\text{Incoming Calls (015)} - \text{Tandem Calls (131)}}$$

$$\text{Column 5} = 100 \times \frac{\text{Column 4}}{\text{Column 3}}$$

Incoming First Failure to Match

$$\text{Percentage of IFFM} = 100 \times \frac{\text{Incoming First Failure to Match (205)}}{\text{Incoming Calls (015)} - \text{Tandem Calls (131)}}$$

$$\text{Column 7} = 100 \times \frac{\text{Column 6}}{\text{Column 3}}$$

B. Intraoffice Matching Loss

$$\text{Percentage of IAML} = 100 \times \frac{\text{Intraoffice Overflow (032)}}{\text{Intraoffice Calls (031)}}$$

$$\text{Column 10} = 100 \times \frac{\text{Column 9}}{\text{Column 8}}$$

C. Outgoing Matching Loss

Column 14 = Column 11 − Column 8 − Column 12 − Column 13

$$\text{Percentage of OML} = 100 \times \frac{\text{Outgoing Overflow (033)}}{\substack{\text{Originating Calls (014)} - \text{Intraoffice Calls (031)} - \text{Partial} \\ \text{Dial Abandonment (021)} - \text{Partial Dial Time Out (022)}}}$$

$$\text{Column 16} = 100 \times \frac{\text{Column 15}}{\text{Column 14}}$$

D. Tandem Matching Loss

$$\text{Percentage of TML} = 100 \times \frac{\text{Tandem Call Overflow (132)}}{\text{Tandem Call Attempts (131)}}$$

$$\text{Column 19} = 100 \times \frac{\text{Column 18}}{\text{Column 17}}$$

Tandem First Failure to Match

$$\text{Percentage of TFFM} = 100 \times \frac{\text{Tandem First Failure to Match (202)}}{\text{Tandem Call Attempts (131)}}$$

$$\text{Column 21} = 100 \times \frac{\text{Column 20}}{\text{Column 17}}$$

Fig. 3—Daily Data Record No. 6 (Sheet 1 of 3) (10.02, 10.03)

NO. 1 ESS
DAILY DATA RECORD NO. 6
MATCHING LOSS

ESS UNIT __Morton__

HOUR [1] [5] : [3] [0] - [1] [6] : [3] [0]

MONTH AND YEAR [0] [6] - [7] [4]

SHEET ____ OF ____

DATE	A. INCOMING MATCHING LOSS							B. INTRAOFFICE ML			C. OUTGOING MATCHING LOSS					
	INCOM CALLS	TANDEM CALLS	INCOM -TDM	INCOM OVFL	% IML	IFFM	% IFFM	INTRA CALLS	INTRA OVFL	% IAML	ORIG CALLS	PARTIAL DIAL ABDN	PARTIAL DIAL T.O.	OUTGO CALLS	OUTGO OVFL	% OML
	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
5-21	12035	—	12035	0	0	313	2.6	5994	0	0	21768	1565	93	14116	0	0
22	14459	—	14459	0	0	304	2.1	6378	0	0	22995	1972	99	14546	0	0
23	11264	—	11264	0	0	270	2.4	5433	0	0	20659	1428	67	13731	0	0
24	11018	—	11018	0	0	286	2.6	5360	0	0	20225	1556	95	13214	0	0
27	Holiday	—														
28	NA	—														
29	11450	—	11450	0	0	286	2.5	5616	0	0	20456	1429	61	13350	0	0
30	11421	—	11421	0	0	308	2.7	5755	0	0	20667	1507	62	13343	0	0
31	11590	—	11590	0	0	267	2.3	6547	0	0	22765	1693	92	14433	0	0
6-3	13032	—	13032	0	0	313	2.4	6547	0	0	22839	1576	78	14638	0	0
4	11957	—	11957	0	0	299	2.5	5816	0	0	21423	1600	81	13926	0	0
5	11908	—	11908	0	0	333	2.8	5927	0	0	22073	1611	107	14428	0	0
6	10916	—	10916	0	0	295	2.7	5685	0	0	20686	1591	88	13322	0	0
7	11485	—	11485	0	0	299	2.6	5953	0	0	22297	1711	89	14544	0	0
10	12757	—	12757	0	0	319	2.5	6579	1	0	23437	1783	90	14985	0	0
11	11199	—	11199	0	0	245	2.2	5684	0	0	21172	1468	86	13934	0	0
12	11102	—	11102	0	0	255	2.3	5510	0	0	20051	1474	86	12981	0	0
13	10533	—	10533	0	0	263	2.4	5419	0	0	20094	1498	61	13116	0	0
14	10125	—	10125	0	0	244	2.4	5253	0	0	19853	1498	63	13039	0	0
17	12183	—	12183	0	0	280	2.3	6279	0	0	22780	1597	84	14820	0	0
18	11220	—	11220	0	0	281	2.5	6100	0	0	21508	1601	66	13741	0	0
19	10703	—	10703	0	0	278	2.6	5639	0	0	21054	1658	88	13669	0	0
20	10474	—	10474	0	0	262	2.5	5569	0	0	20357	1554	90	13174	0	0
TOTAL																
AVG	11563		11563	0	0	286	2.5	5859	0	0	21390	1589	82	13859	0	0
NOTES:																

Fig. 3—Daily Data Record No. 6 (Sheet 2 of 3) (10.02, 10.03)

NO. 1 ESS
DAILY DATA RECORD NO. 6
MATCHING LOSS

HOUR ☐ ☐:☐ ☐ - ☐ ☐:☐ ☐

ESS UNIT _____

SHEET____ OF____

MONTH AND YEAR ☐ ☐-☐ ☐

DATE	D. MATCHING TANDEM LOSS															
	TDM CALL ATMS	TDM CALL OVFL	% TML	TFFM	% TFFM											
	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
TOTAL																
AVG																
NOTES:																

Fig. 3—Daily Data Record No. 6 (Sheet 3 of 3) (10.02, 10.03)

ESS BUSY HOUR MATCHING LOSS

ENTITY _00000_ TYPE OF C.O. EQUIPMENT _NO. 1 ESS_ MONTH _JUNE_ 19_77_

LOAD GROUP	IML					IAML			TOTAL CALLS BH	UNUS-ABLE DAYS (√)
	TIME: 3³⁰ – 4³⁰ pm FACTOR:					TIME: 3³⁰ – 4³⁰ pm FACTOR:				
DATE BUS. DAY	INC. CALLS BH	TDM CALLS BH	INC. CALLS MINUS TDM (2-3)	MATCH. LOSS BH	% IML	IAO CALLS BH	MATCH. LOSS BH	% IAML		
1	2	3	4	5	6	7	8	9	10	11
5-23	13451			2	.0	11070	1	.0	24521	—
24	13072			—	.0	10880	—	.0	23952	—
25	12304			—	.0	10635	—	.0	22939	—
26	11983			—	.0	10325	—	.0	22308	—
27	12404			—	.0	8935	—	.0	21339	—
5-30	13484			—	.0	10402	—	.0	23886	—
31	12200			—	.0	10745	—	.0	22945	—
6-1	12207			—	.0	9665	—	.0	21872	—
2	12425			—	.0	9980	—	.0	22405	—
3	12527			—	.0	10113	—	.0	22640	—
6-6	13238			—	.0	11489	—	.0	24727	—
7	12725			—	.0	10505	—	.0	23230	—
8	12274			—	.0	10557	—	.0	22831	—
9	12016			—	.0	9396	—	.0	21412	—
10	13749			—	.0	12403	—	.0	26152	
6-13	13099			—	.0	10155	—	.0	23254	—
14	12735			—	.0	11064	—	.0	23799	—
15	12229			—	.0	10206	—	.0	22435	—
16	11912			—	.0	9993	—	.0	21905	—
17	12235			—	.0	9344	—	.0	21579	—
6-20	14422			—	.0	11433	—	.0	25855	—
TOT.	266691				.0	219295		.0	485986	—
AVG.	12699				.0	10443		.0	23142	
WTD%ML					.0			.0		

WEIGHTING FACTOR			12	17	NOTES:				
LOAD GRP	AVG. CALLS	FACTOR				T O T A L	WEIGHTED % IML	13	
IML							INDEX PTS. EARNED	14	15.0
IAML						M O N T H	COMPONENT INDEX	15	100.0
							WEAKSPOT (√)	16	
TOTAL		1.000							

Fig. 4—ESS Busy Hour Matching Loss (10.03, 10.11)

INCOMING MATCHING LOSS — BUSY HOUR		COMPONENT INDEX
ESS		
PERFORMANCE	POINTS	
.0 — 1.7	15.0	100
1.8 — 1.9	14.9	99
2.0 — 2.1	14.7	98
2.2	14.6	97
2.3	14.4	96
2.4	14.3	95
2.5	14.1	94
2.6	14.0	93
2.7	13.8	92
—	—	91
2.8	13.5	90
2.9 — 3.0	13.2	88
3.1 — 3.2	12.8	85
3.3 — 3.4	12.3	82
3.5 — 3.6	11.7	78
3.7 — 3.8	11.1	74
3.9 — 4.0	10.5	70
4.1 — 4.2	9.8	65
4.3 — 4.5	9.0	60
4.6 — 5.0	8.3	55
5.1 — 6.0	7.5	50
6.1 — 7.0	6.0	40
7.1 — 8.0	4.5	30
8.1 — 10.0	3.0	20
10.1 — 12.0	1.5	10
Over 12.0	0.0	0

Fig. 5—Network Switching Performance Measurement Plan Index Table (10.30)

EXAMPLE OF OVERLOADED LLN (00)

	LLN 00		LLN 01		LLN 02		Office Total	
	PC	OVFL	PC	OVFL	PC	OVFL	PC	OVFL
	9876	273	8270	0	8804	0	26910	273
Percentage of IML		2.8%		0%		0%		1.0%

	TLN 00		TLN 01		TLN 02	
	PC	OVFL	PC	OVFL	PC	OVFL
	9847	91	8262	86	8796	96
Percentage of IML		.9%		1.0%		1.1%

EXAMPLE OF OVERLOADED TLN (02)

	LLN 00		LLN 01		LLN 02		Office Total	
	PC	OVFL	PC	OVFL	PC	OVFL	PC	OVFL
	5742	53	5252	48	4730	46	15694	147
Percentage of IML		0.9%		0.9%		1.0%		0.9%

	TLN 00		TLN 01		TLN 02	
	PC	OVFL	PC	OVFL	PC	OVFL
	4722	0	5198	0	5729	147
Percentage of IML		0%		0%		2.6%

EXAMPLE OF OVERLOADED L-T JUNCTOR (LLN 00 — TLN 02)

	LLN 00		LLN 01		LLN 02		Office Total	
	PC	OVFL	PC	OVFL	PC	OVFL	PC	OVFL
	6821	188	6310	0	5993	0	19104	188
Percentage of IML		2.8%		%		%		1.0%

	TLN 00		TLN 01		TLN 02	
	PC	OVFL	PC	OVFL	PC	OVFL
	5965	0	6282	0	6799	188
Percentage of IML		0%		0%		2.8%

Fig. 6—Examples of Hidden Matching Loss (11.01, 11.02)
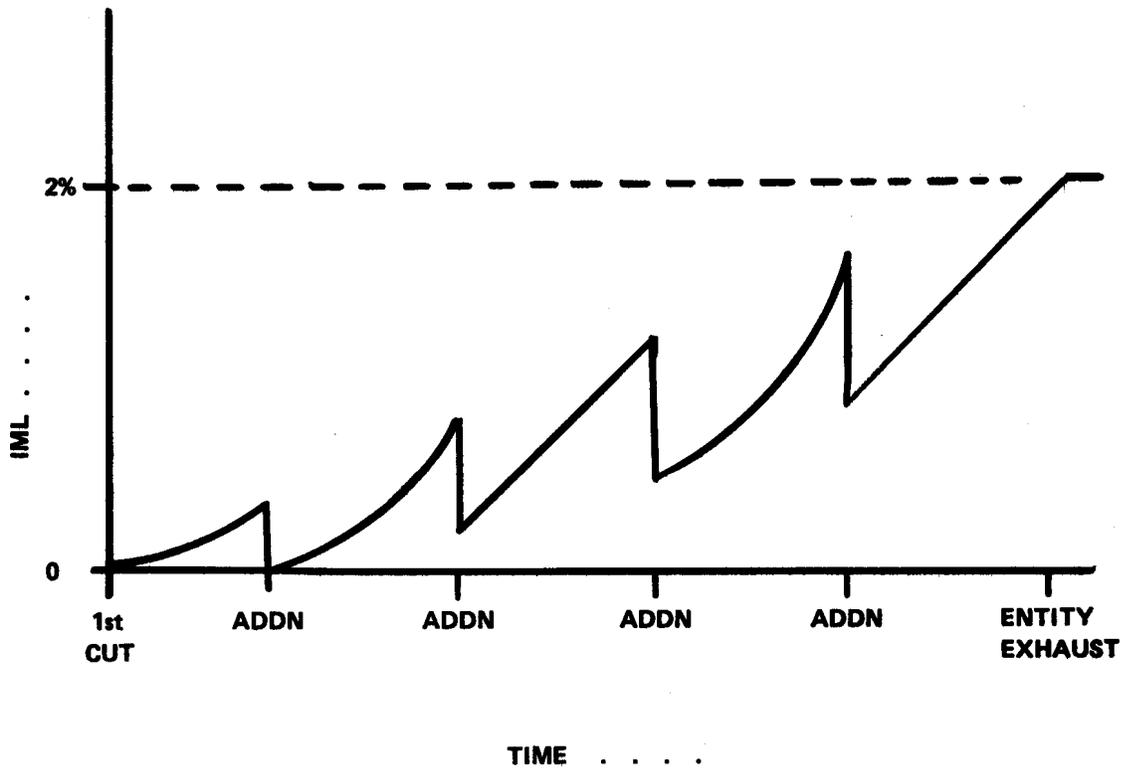
PRESENT NO. 1 ESS NETWORK DESIGN SHOULD APPROACH 2 PERCENT IML (ABSBH) ONLY IN LARGE OFFICES (approaching 16 networks).

Fig. 7—Incoming Matching Loss Network Design (11.07)

INSTRUCTIONS FOR PREPARATION

Sheet_____ of_____

A. Incoming Matching Loss

$$\text{Percentage of IML} = 100 \times \frac{\text{Incoming Overflow (016)}}{\text{Incoming Calls (015)} - \text{Tandem Calls (131)}}$$

Incoming First Failure to Match

$$\text{Percentage of IFFM} = 100 \times \frac{\text{Incoming First Failure to Match (205)}}{\text{Incoming Calls (015)} - \text{Tandem Calls (131)}}$$

B. Intraoffice Matching Loss

$$\text{Percentage of IAML} = 100 \times \frac{\text{Intraoffice Overflow (032)}}{\text{Intraoffice Calls (031)}}$$

C. Outgoing Matching Loss

$$\text{Percentage of OML} = 100 \times \frac{\text{Outgoing Overflow (033)}}{\begin{array}{l}\text{Originating Calls (014)} - \text{Intraoffice Calls (031)} - \text{Partial}\\ \text{Dial Abandonment (021)} - \text{Partial Dial Time Out (022)}\end{array}}$$

D. Tandem Matching Loss

$$\text{Percentage of TML} = 100 \times \frac{\text{Tandem Call Overflow (132)}}{\text{Tandem Call Attempts (131)}}$$

Tandem First Failure to Match

$$\text{Percentage of TFFM} = 100 \times \frac{\text{Tandem First Failure to Match (202)}}{\text{Tandem Call Attempts (131)}}$$

Column 3 = Column 1 — Column 2

$$\text{Column 5} = 100 \times \frac{\text{Column 4}}{\text{Column 3}}$$

$$\text{Column 7} = 100 \times \frac{\text{Column 6}}{\text{Column 3}}$$

$$\text{Column 10} = 100 \times \frac{\text{Column 9}}{\text{Column 8}}$$

Column 14 = Column 11 — Column 8 — Column 12 — Column 13

$$\text{Column 16} = 100 \times \frac{\text{Column 15}}{\text{Column 14}}$$

$$\text{Column 19} = 100 \times \frac{\text{Column 18}}{\text{Column 17}}$$

$$\text{Column 21} = 100 \times \frac{\text{Column 20}}{\text{Column 17}}$$

HOUR ☐ ☐:☐ ☐ - ☐ ☐:☐ ☐

MONTH AND YEAR ☐ ☐-☐ ☐

ESS UNIT _____

SHEET____ OF____

DATE	A. INCOMING MATCHING LOSS							B. INTRAOFFICE ML			C. OUTGOING MATCHING LOSS					
	INCOM CALLS	TANDEM CALLS	INCOM – TDM	INCOM OVFL	% IML	IFFM	% IFFM	INTRA CALLS	INTRA OVFL	% IAML	ORIG CALLS	PARTIAL DIAL ABDN	PARTIAL DIAL T.O.	OUTGO CALLS	OUTGO OVFL	% OML
	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TOTAL																
AVG																

NOTES:

ESS UNIT _____

SHEET ____ OF ____

HOUR ☐ ☐ : ☐ ☐ - ☐ ☐ : ☐ ☐

MONTH AND YEAR ☐ ☐ - ☐

DATE	D. MATCHING TANDEM LOSS															
	TDM CALL ATMS	TDM CALL OVFL	% TML	TFFM	% TFFM											
	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.	REG NO.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
TOTAL																
AVG																
NOTES:																