SWITCHING SYSTEMS MANAGEMENT

NO. 5 CROSSBAR (2-WIRE)

INEFFECTIVE ATTEMPT ANALYSIS PROCEDURES

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1. GENERAL

1.01 This practice presents recommended procedures for the identification and analyzation of Ineffective Attempts (IAs) in No. 5 Crossbar Office. These procedures provide methods to highlight IAs and outline analysis techniques to facilitate their prompt corrections. The thresholds for applying these procedures are components of the Network Switching Performance Measurement Plan (NSPMP) for No. 5 Crossbar Offices, as described in DFMP, Division H, Section 5f.

1.02 Whenever this section is reissued, this paragraph will contain the reason for reissue.

2. ANALYSIS PROCEDURES

2.01 These analysis procedures are to be used whenever any of the following conditions occur in a No. 5 Crossbar Office:

- The NSPMP monthly office overflow components performance is 2 or greater for two consecutive months.
- Any two of the other NSPMP components have an index of less than 96 for two consecutive months.
- In the absence of those indications, these procedures are to be used on a routine basis, at least quarterly, to further minimize the possibility of potential problems going undetected.

2.02 Customer-originated calls that have not been completed due to overload conditions or switching machine troubles are IAs. Excessive IAs often produce dissatisfied customers and, in addition, cause some portion of the calls to be regenerated, which will aggravate overload conditions.

2.03 Analysis of switching machine data allows the network administrator to place the IAs into the overload or trouble category, identify the source of the problem, and take steps to eliminate the condition.

2.04 The responsibility for IA data collection, recording, and preliminary analysis lies with

Network Administration. It should be recognized, however, that part of the data collection process may require that Network Maintenance furnish register readings to Network Administration. Final analysis, leading to corrective programs and implementation of the programs, is the joint responsibility of Network Administration and Network Maintenance. IA analysis may be a vital input to the customer trouble report committee (structure and activities outlined in GL 75-08-233) and provides a new perspective for their prioritizing service improvement programs. A closely coordinated effort between Network Maintenance and Network Administration is required to maintain IAs at acceptable levels. Network Maintenance, however, bears the primary responsibility for correcting machine troubles while Network Administration is responsible for the reduction of overflow/overload problems. These procedures are intended to supplement the effort to improve service represented by the NSPMP for No. 5 Crossbar. The major difference is that in IA analysis the worst condition is analyzed, highlighting the major causes of failures, and consequently leading to earlier correction of incipient problems.

2.05 IAs are an indication of poor service and wasted switching capacity. The regenerated attempts caused by IA use network capacity and, in heavy load periods, can adversely affect service.

2.06 These procedures outline methods of using the switching data to facilitate identification of defective equipment or the cause of overload/overflow conditions. Normal maintenance procedures can then be used to pinpoint equipment troubles.

2.07 The network administrator uses the overflow data (trunk or equipment) to review the distribution of the traffic loads over the switching machine or the adequacy of equipment provision. For example, a No Circuit (NC) condition on a final trunk group normally indicates a requirement for more trunks, but other factors should also be investigated, such as the number of trunks out of service; are the overflows a one time condition; the status of high usage groups in the cluster, etc. The IA analysis should be done on incoming and originating data at least once a week using the busiest hour of the busiest day as defined below.

ANALYSIS PERIODS

2.08 The Originating Ineffective Attempts (OIA) busy hour is the period during which the highest OIA are normally recorded each week. This hour may be determined by reviewing the office busy period load (3 to 5 hours) on the busiest day of the week (total originating peg count). The hour that normally has the highest OIA will be used in this procedure. One important caution is that the office busy hour is not always the same as the trunk usage busy hour. In the event that an NC condition is the major cause of OIA, the OIA busy hour may vary from the office busy hour.

2.09 The Incoming Ineffective Attempts (IIA) busy hour is the period during which the highest IIA are normally recorded each week. This hour may be determind by reviewing the hours with the highest incoming peg count on the busiest day of the week. The hour that normally has the highest IIA will be used in this procedure.

2.10 All data must be collected on schedule for the predetermined busy hour to obtain optimum effectiveness from the analysis. The data must be obtained on a near real-time basis. Turnaround time on all methods of collection is important. When IA data is collected on film it is necessary to synchronize all cameras involved. For offices with multiple program timers this may call for re-scheduling of camera operation to obtain usable data. For example, the trunks and common control equipment must be measured in the same time period for validation to be possible. When data is collected on a completely manual basis it must be done systematically. All registers needed for IA measurements must be read in the same sequence each time or the data will be skewed. This, in turn, may result in poor validation.

2.11 These IA procedures should also be used to analyze data collected during severe overload conditions caused by snow, rain, civil disorder, etc. Under these conditions equipment may be used that is normally dormant.

3. DESCRIPTION OF MEASUREMENTS

3.01 The following is a description of measurements.

- ***Total Originating Peg Count Registrations:*** This register is scored by the marker when it establishes a channel between a calling line equipment and a trunk of any type on the trunk link frame. It also scores on test calls, calls connected to tone trunks, overflow trunks and permanent

signal holding trunks. One register is assigned per completing marker. In offices with two (2) wire and four (4) wire frames, two registers are required for each completing marker.

This register does not score on dial tone connections to originating registers, on calls switched from line equipment locations of tandem and intertoll trunks, or on abandoned partial dial calls.

- ***Stuck Sender Registrations:*** This register scores when a sender in the group fails to release within its allotted operating time. This will occur on trunk, sender or linkage troubles. One register is assigned per sender group or type sender.

- ***Completing Marker Second Trial Failure Registrations:*** This register scores when a completing marker encounters a trouble while serving a call on a second trial basis.

- ***Transverter Second Trial Failure Registrations:*** This register scores when a transverter encounters trouble while serving a call on a second trial basis. When this occurs on a message unit call the bulk billed free register is also scored and the call is permitted to complete on a free basis. On a toll call the customer will receive overflow. One register is assigned per transverter group.

- ***Outsender Intersender Time Out Release Registrations:*** When all outsenders are busy it scores the number of calls on which senders have timed out and released because of an all terminating sender or incoming register busy condition at the distant end. Time out release occurs at 4.4 seconds minimum, 5.7 seconds normal and 8.4 seconds maximum. One register is assigned per outgoing sender group and is only equipped in wire spring offices.

- ***Final Trunk Group Overflow Registrations:*** This register scores when the marker fails to find an idle trunk in the final trunk group. Due to the relatively large number of registers to be read the following approximation may be used: subtract the outsender group overflows and the OML scorings from the office overflow peg count. This figure will therefore be understated by an amount equal to the number of outsender group overflows and matching loss occurrences completing successfully on second attempts. If this equates to a negative number it will become necessary to further analyze final trunk group overflows. One register is assigned per final trunk group.

- ***Outsender Group Overflow Registrations:*** This register scores each time the marker fails to find an idle outgoing sender. It is recognized that all of these failures do not result in overflow to the subscriber. Analysis of outsender group overflows may indicate a sender group imbalance. Since this can increase the load on the alternate and final routes it is an indicator of subscriber call completion rates. One register is assigned per outgoing sender group.

- ***Originating Matching Loss Registrations:*** This register scores when the marker fails to obtain a channel between a line equipment and a trunk on an originating register class call. It will also score on through-switched calls.

  This register will not score on dial tone attempts, terminating class calls, or second failure to match on non-talking trunks. (Calls to non-talking trunks are those which some other condition has prevented from completion and the subscriber will receive an overflow signal in any case.)

  In offices where extensive alternate routing occurs the number of originating matching loss registrations will not necessarily mean lost calls. The reason for this is that if the marker fails to match a second time on an original or first route, it scores the originating matching loss register but the call may still be completed on the alternate route attempt. One register is assigned per marker group.

- ***Office Overflow Registrations:*** This register will score on any condition that causes a subscriber-originated call to be given a routing to a combination tone trunk. It will also score when all tone and overflow trunks are busy.

  Office overflow should be equal to the number of OML and outsender group overflow scorings that resulted in overflow to the subscriber in addition to the overflow scorings on the final trunk groups. One register is assigned per completing marker.

- ***Permanent Signal Registrations:*** This register scores when the marker places a request for a permanent signal tone trunk. These requests are initiated by subscriber "off hook" conditions or cable troubles which cause a short circuit on the line. One register is assigned per marker group.

  See Part 5, Analysis Calculations, to determine subscriber attempts.

- ***Bulk Bill Free Registrations:*** This register scores when a seven (7) digit call (2 line entries - local calls) are allowed to complete free from billing due to AMA failures. One register is assigned per marker group.

- ***Plant Access Test Code Registrations:*** These registers may be assigned individually to each test code or there may be a total register assigned for all test codes. In either case the scorings attributed to non-subscriber initiated calls will be recorded (eg, installer ring back, automatic number announcement). This number should be subtracted from the total originating peg count as these calls do not have any bearing on subscriber attempts.

- ***Choke Network Registrations:*** This number should be subtracted from the total originating peg count. This is not a true measurement of service.

- ***Plant Access Test Code Overflow Registrations:*** These registers may be assigned individually to each test code or there may be a total register assigned for all test codes. In either case the scorings attributed to non-subscriber initiated calls that resulted in overflow will be recorded. This number should be subtracted from total office overflow. These overflows have no bearing on NCs to the subscriber.

- ***Choke Network Overflow Registrations:*** This number should be subtracted from the total office overflow. This is not a true measurement of IA to the subscriber.

  Where choke networks are not provided and office performance is adversely affected by mass calling situations, IA measurements will show the true impact on the subscriber.

- ***Toll Overflow Registrations:*** This register will record the number of times the marker fails to find an idle CAMA, TSP or toll completing trunk. This number is derived from the sum of the overflows on the CAMA, TSP or toll completing trunk groups and is an indicator of the grade of service on toll completing calls.

- ***Final Tandem Peg Count Registrations:*** This register records the number of calls directed to the final tandem route. When there is more than one final tandem route the peg count equals the sum of all final tandem routes. One register is assigned for each final tandem trunk group.

- ***Final Tandem Overflow Registrations:*** This register records the number of calls directed to office overflow due to all final tandem trunks being busy.

  This is an indicator of the type of service given to the subscriber on the final tandem route. The final tandem overflow plus the toll overflow gives two major portions of the total NCs. The remaining portion of the total NCs should equate to the overflow on the non-alternate route trunk groups.

- ***Total Incoming Peg Count Registrations:*** This register is scored by the marker when it establishes a channel to the called line equipment on an incoming class of call. It also scores when the trunk ringing selection switch is set to return the busy signal should the called line be busy or to return the reorder signal should a failure-to-match occur. Scoring is done regardless of type

of incoming trunk, ie, interoffice, intermarker group, tandem, intertoll, toll switching, etc. One register is assigned per completing marker.

Completed intraoffice calls and completed calls switched through the No. 5 offices, either tandem or toll class, are not counted on these registers. However, attempts on the thru-switched calls are counted if an all-trunks busy or failure to match condition is encountered.

- ***Incoming Matching Loss Peg Count Registrations:*** This register scores when the marker encounters a failure to match while attempting to set up a connection between an incoming trunk and a called line. It does not score on intraoffice or tandem calls. There is no marker recycle (second trial) feature on this class of call. One register is assigned per marker group.

  The scorings indicate incoming calls (trunk link frame incoming peg count) which are not completed because of matching failures.

- ***Line Busy (BY):*** This register records the total number of incoming calls to busy lines, both individual and terminal hunting, with the exception of calls to busy intercept lines and to No. 101 ESS lines using direct access.

- ***Incoming First Failure to Match (IFFM):*** This register records all first attempt failures to find an idle channel on incoming calls to individual or terminal hunting lines. One register per marker group per loading division is normally provided.

4. VALIDITY CHECKS

4.01 Office overflow peg count should be equal to or greater than the sum of final trunk group overflow (include CAMA, AMA, etc).

4.02 Office overflow peg count should be equal to or less than final trunk group overflow plus outsender group overflow plus OML registrations.

4.03 Completing marker peg count is equal to or greater than the sum of the originating, incoming and thru peg counts. (.96/1.00)

4.04 Total channel peg count is equal to or less than the sum of the originating, incoming, thru and IAO peg count less line busy peg count. (.95/1.00)

5. ANALYSIS CALCULATIONS

- ***Percent Originating Ineffective Attempts (OIA):*** This percent is derived by dividing the number of OIA by subscriber attempts as follows:

$$\% \text{ OIA} = \frac{\text{total number OIA}}{\text{subscriber attempts}} \times 100$$

- ***Subscriber Attempts:*** This number is derived by subtracting the summation of the adjusted permanent signal (PS) peg count plus plant access peg count plus choke peg count from the total originating peg count.

  Number SUBS Attempts = TOT ORIG PC

  - (ADJ PSPC+PLT. ACC.+Choke PC)

  PS requests that cannot be placed on a PS tone trunk or a common overflow trunk continue to score the PS peg count until placed. None of the unplaced attempts result in originating peg count. The formula recommended to approximate the PSs which do score an originating peg count assumes that the percentage of calls handled by the common overflow trunk group (Common OFL. OFL.)/(Common OFL. PC) equates to the number of PS tone group overflows placed in the common overflow trunk group. The result of this equation is referred to as the ***adjusted*** number of PSs and is subtracted from originating peg count to determine subscriber attempts. PS peg count adjustment as used in determining subscriber attempts is:

Adjusted PERM Signals =

$$PSPC - (PS\ OFL \times \frac{Common\ OFL.\ OFL.)}{Common\ OFL.\ PC\ \ )}$$

This will result in the number of PSs to be subtracted from the total originating peg count.

Example: PS PC = 1000
PS OFL = 500
Common OFL. OFL. = 500
Common OFL. PC = 1000

The solution to the above equation is:

1000 - 250 = 750 Adjusted number of permanent signals to be subtracted from the total originating peg count.

Plant test call peg counts should be subtracted from the total originating peg count. These pegs do not have any bearing on subscriber attempts.

Plant test call overflows should be subtracted from the total office overflow. These overflows have no bearing on overflow to the subscriber.

- ***Number of Originating Ineffective Attempts:*** This number is equal to the sum of:

  Stuck Senders
  Completing marker second trial failures multiplied by the originating ratio
  Inter-sender timeout peg count (wire spring offices only)
  Office overflow peg count — PLT ACC OVFL + Choke OVFL
  Transverter second trials — bulk bill free

  Completing marker second trials are multiplied by the originating ratio (OR-RAT) which is calculated:

$$OR\text{-}RAT = \frac{total\ ORIG\ PC}{(total\ ORIG\ PC + TOT\ INC\ PC)}$$

  This calculation assumes that completing marker failures on outgoing calls are in the same proportion to incoming failures as the outgoing to incoming traffic.

- ***Percent Switch:*** This is the percentage of OIA that have occurred within the originating switch and is derived as follows:

% switch equals the sum of:

CM second TRLS × Originating Ratio (OR-RAT)
TV second TRL PC — Bulk Bill Free PC
Outsender Group Overflow
Divided by: OML / subscriber attempts × 100

$$\%\,SW = \frac{(\text{CM second TRLS} \times \text{OR-RAT}) + \text{SNDR OFL*} + \text{OML} + (\text{TV second TRL-BBf})}{\text{subscriber attempts}} \times 100$$

*Outsender Group Overflow

These failures do not always represent failures to the subscribers but they do indicate whether the originating switch is a major source of OIA.

- ***Percent No Circuit:*** The percentage of calls failing to find an idle trunk in the final route. This percentage is derived by dividing number of final trunk group overflows by subscriber attempts.

$$\%\,NC = \frac{\text{number final trunk group overflows}}{\text{subscriber attempts}} \times 100$$

- ***Percent External:*** The percentage of OIA ***assumed*** to have occurred because of trouble in the distant tandem, terminating office or trunking networks. This percentage is derived by dividing the sum of stuck senders plus inter-SDR timeouts by subscriber attempts.

$$\%\,EXT = \frac{\text{stuck senders + inter-SDR timeouts}}{\text{subscriber attempts}} \times 100$$

- ***Percent Final Tandem Traffic:*** A percentage indicating the total subscriber attempts routing over the final tandem routes. This number in itself is not meaningful, but it is extremely useful to develop trends in each entity or for comparison between entities. If the percentage increases it may be an indication of an increasing quantity of high usage trunks out-of-service or an increasing quantity of defective trunks left in service. This percentage is derived by dividing the number of final tandem peg counts by the number of subscriber attempts.

$$\%\,\text{final TDM TFFC} = \frac{\text{final TDM PC}}{\text{SUB ATTS}} \times 100$$

- ***Percent Final Tandem Overflow:*** The percentage of overflow occurring on the final tandem route.

$$\%\,\text{final TDM OVFL} = \frac{\text{final TDM OVFL}}{\text{final TDM PC}} \times 100$$

- ***Percent Incoming Ineffective Attempts:*** The percentage of calls failing to complete after entering the entity. This quantity is ***approximated*** because of insufficient data devices on the equipment. "Busy signals" and "no answers" ***are considered completed calls.*** This percent is derived as follows:

$$\% \text{ IIA} = \frac{(\% \text{ IML} \times \text{total INC. PC}) + (\text{CM second trials} \times \text{I-RAT})}{\text{total incoming peg count}} \times 100$$

Completing marker second trials are multiplied by the incoming ratio (I-RAT) which is calculated:

$$\text{I-RAT} = \frac{\text{total incoming PC}}{\text{total incoming + total originating PC}}$$

- ***Percent Incoming Matching Loss (IML):*** This percentage is derived as follows:

$$\% \text{ IML} = \frac{\text{incoming matching loss peg count}}{\text{total incoming peg count}} \times 100$$

- ***Percent Incoming Matching Loss Minus Line Busy (IML-LB):*** This calculation is made by dividing IML scorings by total incoming peg count minus line busy.

$$\% \text{ IML} - \text{LB} = \frac{\text{IML}}{\text{total incoming peg count} - \text{LB}} \times 100$$

- ***Percent Incoming First Failure to Match:*** This percent is calculated as follows:

$$\% \text{ IFFM} = \frac{\text{IFFM PC}}{\text{total incoming peg count} - \text{LB}} \times 100$$

6. ANALYSIS FORMATS

6.01 Recommended analysis formats are shown in figures 1 through 4.

- ***Completing Marker Second Trial (CMST):*** Completing marker second trial register scorings indicate calls which fail during completing marker second trial before the release of the dialing connection and result in overflow tone returned by the originating register. Incoming calls which fail during completing marker second trial also receive overflow. Analysis of trouble cards, both first and second trial should be done on a continuing basis.

- ***Stuck Senders (SS):*** The stuck sender registers indicate service reaction to the customer. Present central office procedures should be followed.

- ***Transverter Second Trial Failures (TST):*** Transverter second trial failures on detailed billed calls (4 and 5 line entries) result in overflow to the customer; bulk billed calls (2 line entries - local calls) result in lost revenue because calls are allowed to complete free (without AMA entry). This should be analyzed on a continuing basis: (possible translator cross connection problems, etc,).

- ***Intersender Time Out Release (if equipped):*** When a marker encounters all senders busy in a group it signals the senders of that group, through the out sender group release circuit, to release if the intersender timing interval has been exceeded, thus restoring those senders to service. The terminating office causing the problem is not readily identifiable. No direct indication is given to the maintenance people. If this feature is equipped, it is important that intersender time out scorings be investigated. It may be necessary to block normal the R relay of the outgoing sender group release circuit (SD 26055-01) to develop

stuck sender time outs so that they can be held and traced.

- ***Final Trunk Group Overflow:*** This register scores when a marker fails to find an idle trunk in the final trunk group resulting in an overflow to the customer. Registers which have either scored no overflow for a period of four consecutive weeks during the busy season or exceeded the allowables for two or more consecutive weeks should be checked using the capacity tables. Peg count and overflow scorings can be reasonably validated by using assumed holding times when overflow has been reached. Also using peg count and assumed holding times, determination can be made whether overflow should occur. Suspected register trouble should be referred to Network Maintenance for test to ensure that the registers are wired and scoring properly. This test must be made from each marker and for each route relay associated with a final trunk group. The availability test (ability of each trunk being picked by each marker) may also be made using the master test frame (no test trunk selection should ***not*** be used).

- ***Originating Matching Loss:*** One originating matching loss register is equipped for each marker group. This register scores when a marker, on a second trial, fails to find a channel between a subscriber and the selected trunk. The customer receives an overflow if the failure-to-match occurs on a final route. However, if the failure-to-match occurs on a non-final route, the marker will route advance and attempt to complete the call over a new set of trunks and channels as follows.

  A second failure-to-match occurs after a first failure-to-match resulted in a marker recycle and a channel is not found to the new trunk link and trunk. The original route relay is released and the alternate route relay is operated. If upon testing channels after a second failure to match all channels are found busy, a third failure-to-match occurs which causes the marker to set the originating register for overflow. No adjustments can be made in the OML results for these events because it is not possible to distinguish between those calls which completed on second trial from the calls that resulted in overflow to the subscriber.

- ***Outsender Group Overflow:*** This register scores when a marker fails to find an idle outgoing sender in a sender group. The customer receives an overflow on a final route. However, if the condition occurs on a non-final route, the marker will route advance and complete the call over a new group of trunks and senders. (No adjustment can be made in the outsender group overflows for this event.)

  When analysis indicates an outsender group overflow problem Network Administration should check balance between outsender groups of the same type and check sender load regarding the possible need for additional senders. If neither imbalance nor load are the contributing factors, the outsender group involved must be referred to Network Maintenance for investigation. The Network Maintenance check must give consideration to outsenders made busy, immediate tracing and releasing of stuck senders, and routine of outsenders for availability and proper operation.

  The outsender group peg count and overflow registers shall be verified by comparing load to overflows. If overflows are experienced when load does not warrant, particular attention should be focused on the make busy and stuck sender performance during the period in question.

  Where two or more outsender groups of the same type are provided, review each group and arrange for an outsender link trunk rearrangement if a group is overloaded. During periods of heavy traffic a quick analysis of sender load can be made by operating the sender delay action key at the master test frame, jack, lamp and key circuit. This will activate a minor alarm and display lamp for any sender group which has a sustained group busy condition. By releasing this alarm each time it sounds, repeated all senders busy of a group can be quickly determined.

- ***Office Overflow:*** This register scores when a marker attempts to connect a customer to a combination tone trunk for a 120 IPM

overflow tone. The scorings on these registers should always be less than or equal to the total scorings on the OML, ATB, and ASB registers. This is so because ***only*** those OML and outsender group busy (ASB) scorings ***that result in overflow*** will score the office overflow register.

Each marker should overflow at about the same rate. If an imbalance occurs here, check originating peg count for balance. Particularly high scorings per individual marker may be due to false ASB or ATB testing. The marker overflow trap feature will help to detect these troubles. For low scorings per individual marker check for made-busy periods or have register tested.

If higher than usual scoring occurs on one marker, suspect trouble in the TCH-relays of the marker. It is possible for a TCH-relay to be open, or blocked non-operated, resulting in the loss of the associated channel to service in the particular marker. OML results must be given load and service considerations with corrective action to be taken if the office is over capacity or affected by line link or trunk link imbalance. If this is not the case, matching loss checks should include availability checks made by plant to insure that channels are not made busy either by MB plugs or channel test relays blocked in error in the markers.

7. ABBREVIATIONS

AMA: automatic message accounting

ASB: outsender group busy

ATB: all trunks busy

CAMA: centralized automatic message accounting

IA: ineffective attempt

IAO: intraoffice outgoing trunk

IFFM: incoming first failure to match

IIA: incoming ineffective attempt

MB: make busy

NC: no circuit

NSPMP: network switching performance plan

OIA: originating ineffective attempt

OML: originating matching loss

PC: peg count

PS: permanent signal

TSP: traffic service position

INCOMING INEFFECTIVE ATTEMPT ANALYSIS

XBAR NO. 5

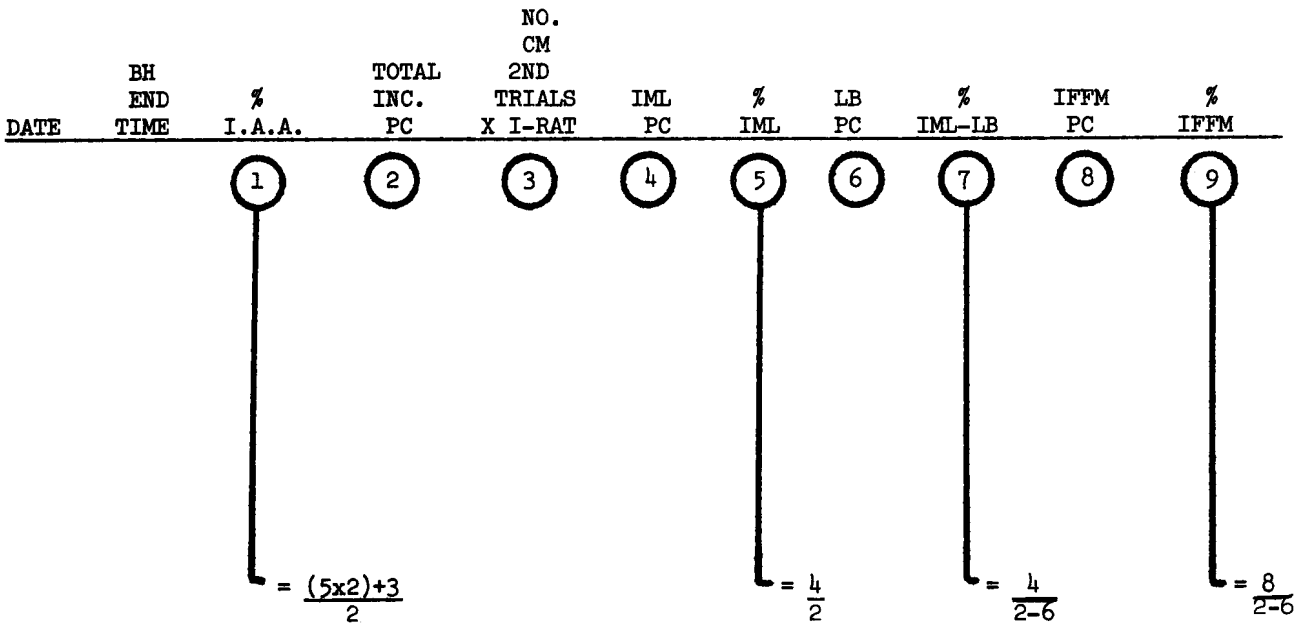

Fig. 1—Recommended IIA Analysis Format

ORIGINATING INEFFECTIVE ATTEMPTS

XBAR NO. 5

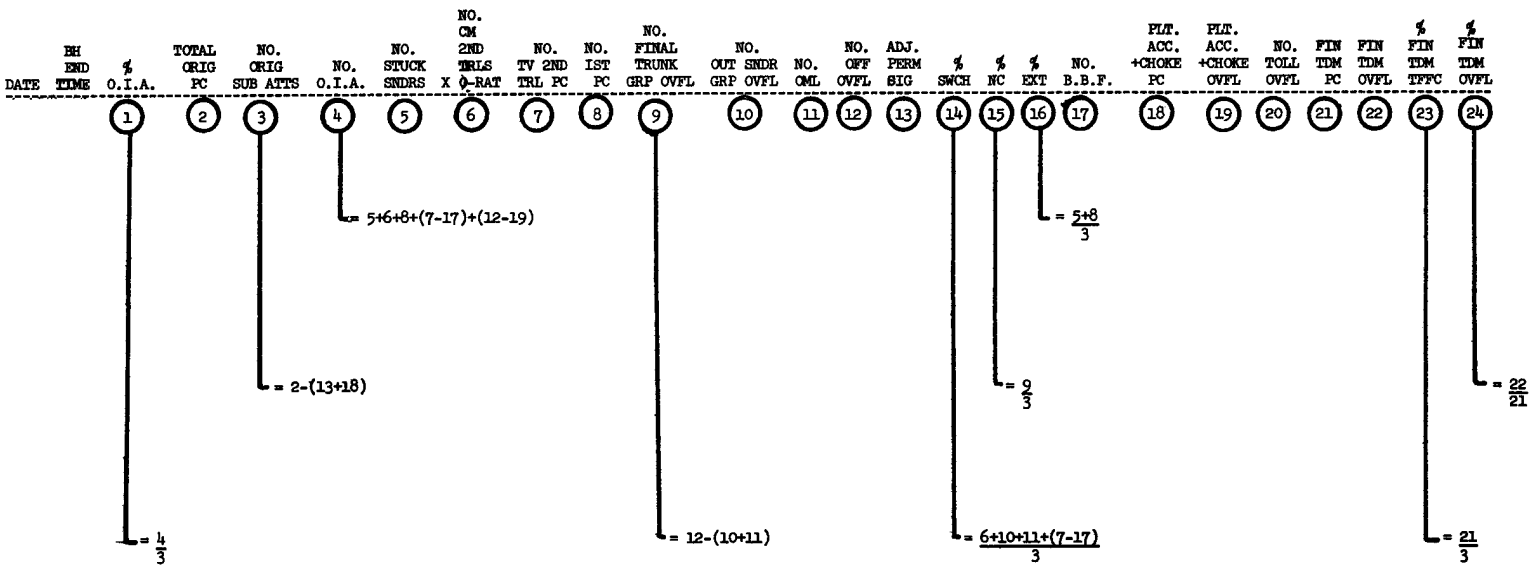

Fig. 2—Recommended OIA Analysis Format

INCOMING INEFFECTIVE ATTEMPT ANALYSIS

XBAR NO. 5

DATE	BH END TIME	% I.A.A.	TOTAL INC. PC	NO. CM 2ND TRIALS X I–RAT	IML PC	% IML	LB PC	% IML-LB	IFFM PC	% IFFM

Fig. 3—Incoming Ineffective Attempt Analysis

ORIGINATING INEFFECTIVE ATTEMPTS

XBAR NO. 5

DATE	BH END TIME	% O.I.A.	TOTAL ORIG PC	NO. ORIG SUB ATTS	NO. O.I.A.	NO. STUCK SNDRS	NO CM 2ND TRLS X O-RAT	NO. TV 2ND TRL PC	NO. IST PC	NO. FINAL TRUNK GRP OVPL	NO. OUT SNDR GRP OVFL	NO. OML	NO. OFF OVFL	ADJ. PERM SIG	% SWCH	% NC	% EXT	NO. B.B.F.	PLT. ACC. + CHOKE PC	PLT. ACC. + CHOKE OVFL	NO. TOLL OVFL	FIN TDM PC	FIN TDM OVFL	% FIN TDM TFFC	% FIN TDM OVFL

Fig. 4—Originating Ineffective Attempts