# TROUBLE ANALYSIS

CONTENTS



## 1.0 GENERAL

**1.01** This Section describes general procedures to be followed in the analysis of the trouble data received by the Network Trouble Analysis Bureau. Included are statements which can be considered basic Bureau "ground rules" or philosophy. References to procedures covered in other Sections are not dealt with in any detail in this Section.

**1.02** Analysis of data furnished the Network Trouble Analysis Bureau is primarily a Plant and Traffic function. Supporting roles of other departmental representatives are covered in Section 010-401-012. The range of activities of Bureaus can not be confined to the activities of analyzing operator reports, holding and tracing, and call thru testing.

**1.03** The amount of data and speed with which it is available makes it possible to merge troubles of similar types from many sources, thus enlarging the data base for a single analysis job. Attachment #1 shows the input data to the Bureau and some of the items which receive special analysis attention from the DDD Task Force. Attachment #3 shows the flow of Bureau data during the analysis process.

**1.04** The team approach to analysis must go beyond the identification of weak spots or isolation of types of troubles (though this identification is extremely important). The cause must be identified.

**1.05** Once having identified a problem area or weak spot, questions of the following type will require answers –

(1) Are the maintenance forces properly trained? (Percent found trouble on "hold and trace" will be a clue to this)

(2) What is the status of CMP at this location?

(3) Are management people at this location (all levels) aware of current DDD performance?

(4) Are routines being completed as scheduled?

(5) Does review of productivity performance indicate reduced maintenance efforts?

(6) Are the proper tools and test sets provided to do the job?

(7) Are engineering intervals such that the office is continually unsettled? (Will this require special maintenance considerations?)

(8) Does supervision apply PMI to improve performance of maintenance forces?

(9) Has an active "work error reduction" program been established?

(10) Are lack of facilities the primary problem?

(11) Do the Plant people realize how dependent they are for facilities upon the proper operation of all traffic measurement devices?

## 2.0 PLAN FOR ANALYSIS

**2.01** The primary role of the Network Trouble Analysis Bureau is to concentrate their effort on improving home (HMPA) and foreign home (F-HNPA) completion performance.

**2.02** Most Bureaus have the majority of their DDD traffic terminating in their prime areas. This allows them to concentrate on improving the completion performance of this traffic which uses "first links" and "end links" and frequently "inter-mediate links" in their own ***"backyard"***.

**2.03** With all Bureaus concentrating on "backyard" performance, organizations responsible for inter-state or inter-company inter-toll switching can concentrate on the performance of that part of the intermediate network handling long haul traffic. (Automatic trunk test frames). Attachment #2 shows the network separated into areas for trouble locating as described in the preceding paragraphs.

**2.04** The Bureaus serving large population centers who have little or none of their DDD traffic terminating in their prime area must rely on data from other Bureaus to assist them in improving their "backyard" performance.

Those locations which are served by common control or SXS single completing train offices can also make excellent use of local DSA reports to improve their end link performance.

**2.05** Following is a summary of items to be considered for the improvement of DDD Service in a Bureaus Prime Area –

(1) Each Bureau can use trouble reports on ***short*** haul calls to improve end link performance.

(2) Utilize service observing reports to help identify troubles in "end links", 1st links, and ***"home"*** intermediate links.

(3) Simplify operator trouble reporting.

(4) Merge all data available into a single data base for analysis. (Detail of Reports and Traces – Section 010-401-012 Attachment #11.)

(5) Concentrate your efforts on "pattern" analysis.

(6) Use supplementary observing to get additional data on trunks.

(7) Police operation of automatic trunk test frames (AOIT, ADOIT, APTT, etc.)

(8) When required for assistance to the field perform ***"selective"*** call-thru-tests.

(9) Use hold and trace to get more facts on trouble locations ***not responding*** to pattern analysis efforts.

(10) Concentrate on the correction of the major types of call failures and use the appropriate tools for analysis of each –

(A) Reorder

a. Reorder traps

b. Tracing stuck senders (OTI)

c. TUR data

d. Summary of operator encountered reorders

(B) No-ring-no answer

a. Pattern analysis of reports

b. Selective hold and trace

c. Supplementary observing

d. Call-thru tests

## 3.0 IDENTIFICATION OF WEAKSPOTS

**3.01** Since trouble reports and other data will flow into Bureaus in a steady stream, ***"shot gunning"*** the analysis efforts with no previously established priorities may place maintenance efforts where they are least needed.

**3.02** Procedures must be included in each Bureau which will best identify for it its poorest performing location in a given trouble category. This will allow the Bureau to ***"rifle"*** its analysis efforts in order to obtain maximum DDD service improvement.

**3.03** Weakspots which have been identified are kept posted on the Bureaus status board to keep all analyzers and clerks aware of the need for concentrated effort on these locations.

**3.04** The identification of weakspots is done for each administrative unit or maintenance group based on category of trouble or DDD measurement being used, i.e.–

(1) From the detail of reports and traces terminating printout, identify the poorest performing class 5 office in each Toll Center.

(2) In a like manner identify the poorest performing Toll Center in a District, and District in a Division, etc.

(3) Reviewing the observed machine results, what machine based on in-trunk, or out-trunk observing has the poorest % B & F rate? What trunk group serving lower or higher echelon machines has the poorest performance?

(4) Where is the poorest RO condition located? No-ring-no answer?

## 4.0 SELECTION OF WEAKSPOTS

**4.01** As mentioned in paragraph 2.05 item D, the summary of reports and traces will include operator and customer trouble reports, service observing failures, connection appraisals results, 121 failures, and other reports of ineffective attempts.

**4.02** Reports of failures which are received daily are sorted or stroked on a daily summary sheet as they are received. This is done to quickly identify trunk groups or end offices urgently in need of attention.

**4.03** The mechanized report, Detail of Reports and Traces, is used to do the identification of weakspots mentioned in paragraph 3.04. Report volumes and number of failures required to build patterns will determine the frequency of the Detail of Reports and Traces.

**4.04** Failure rates can be computed against known volumes of traffic or other indicators which are readily available at each location and can be included in a mechanical computation step when listing the detail of reports and traces. Methods frequently used for weakspot pinpointing are –

(1) Failures/1,000 stations

(2) Failures/100 CCS of engineered capacity

(3) Failures/100 trunks in a route

(4) Failures/100 busy hour calls

**4.05** The Bureau should select a method to identify weakspots that is acceptable to the maintenance forces and easily obtained.

**4.06** Where the summary of failure data is fully computerized, a third component can be used for more precise indications of where maintenance efforts should be directed. The volume of reports along with the indicator chosen, would then appear as –

FAILURES / X / 100 FAILURES

If X is 100CCS of engineered capacity, then the weakspot would be the location having the highest number of failures per 100CCS of engineered capacity per 100 failures.

**4.07** Paragraph 4.06 has not taken trouble category (type) into consideration. Should the computer program be sophisticated enough to allow this, and level of DDD service be such that this detailed identification is required, it can be included in the weakspot identification procedures.

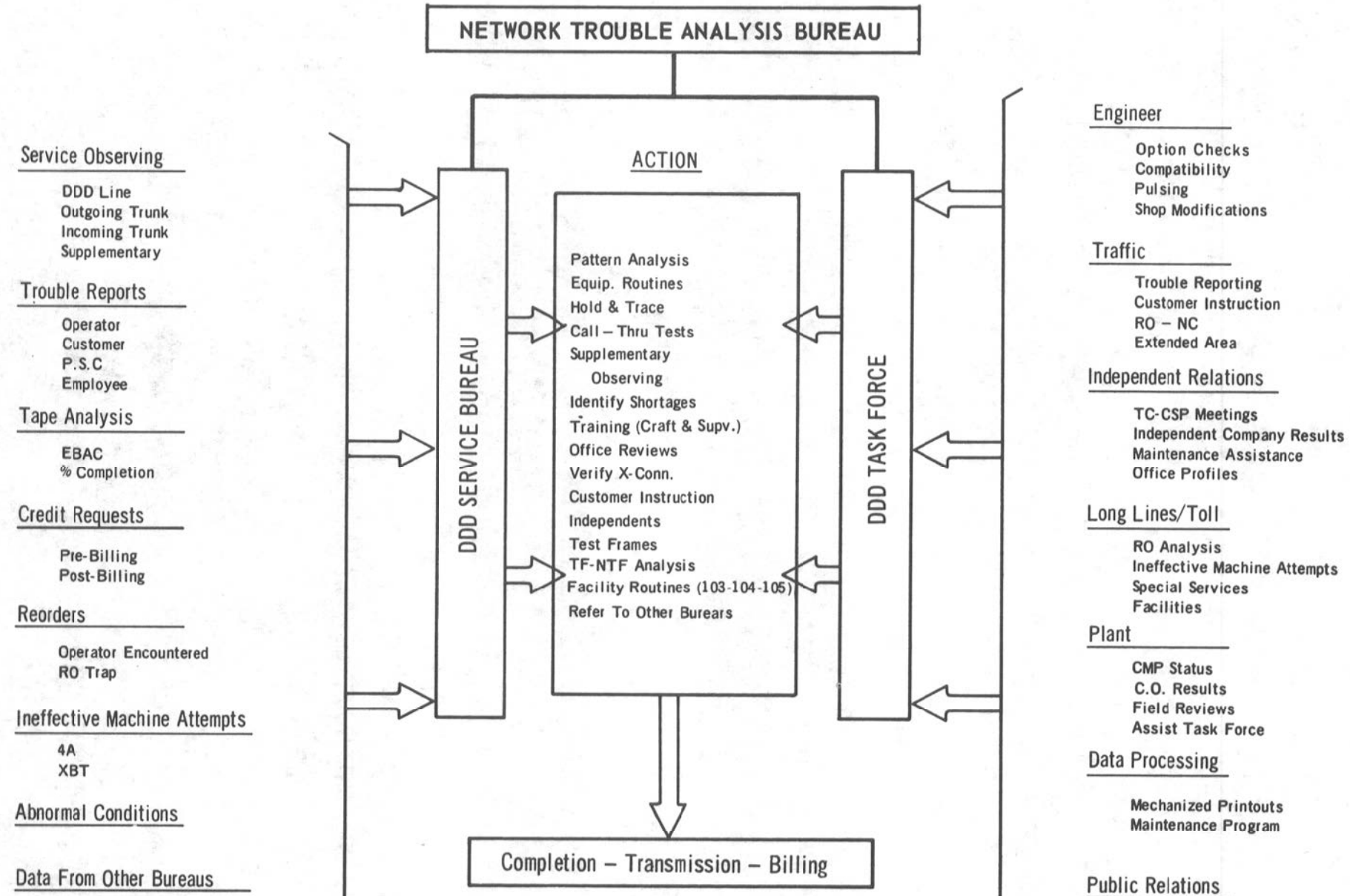
## 5.0 MISCELLANEOUS

**5.01** Basically, the Bureau must be able to –

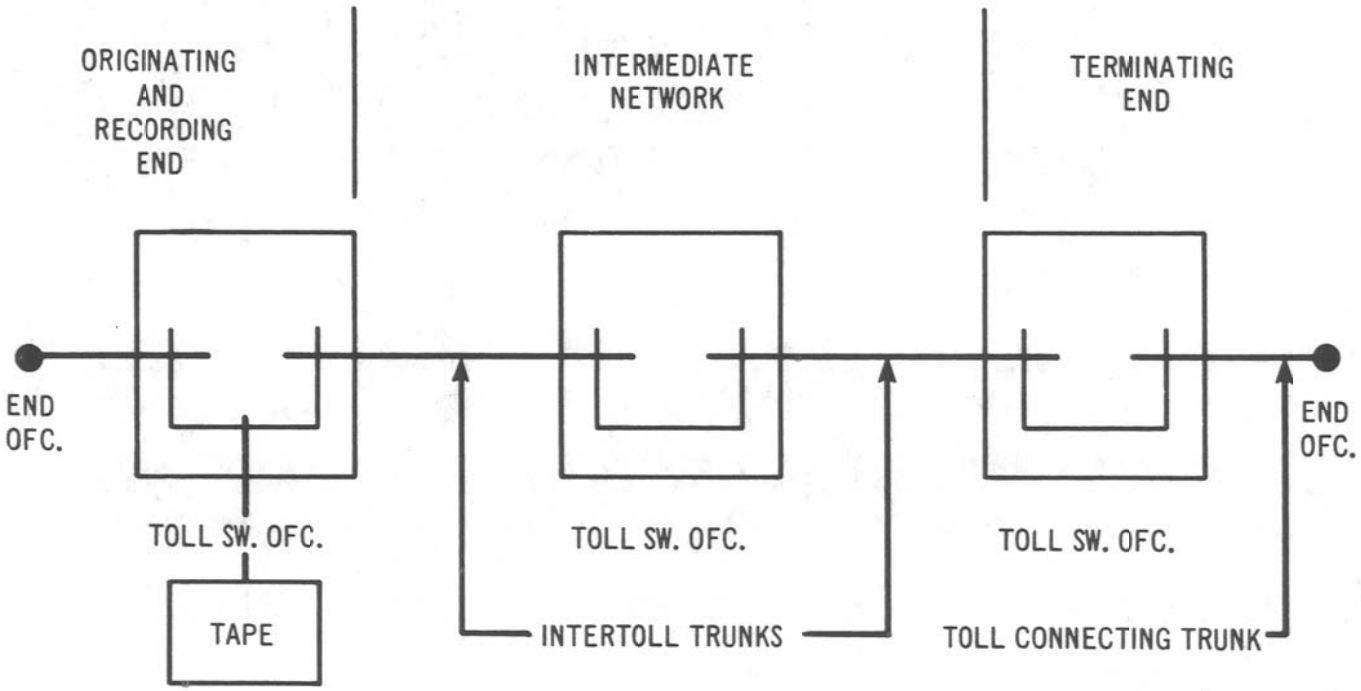
(1) Explain at any time "***why***" and "***what***" triggered the action taking place in the Bureau. (Special analysis, holding and tracing, call-thru testing etc.)

**(2) Identify to any manager the trouble weakspots in his administrative area and the nature of the problem.**

(3) Recommend a joint course of action which will result in improved DDD performance.


NETWORK TROUBLE ANALYSIS BUREAU
ACTION
DDD SERVICE BUREAU
DDD TASK FORCE
Pattern Analysis
Equip. Routines
Hold & Trace
Call – Thru Tests
Supplementary
Observing
Identify Shortages
Training (Craft & Supv.)
Office Reviews
Verify X-Conn.
Customer Instruction
Independents
Test Frames
TF-NTF Analysis
Facility Routines (103-104-105)
Refer To Other Burears
Completion – Transmission – Billing
Service Observing
DDD Line
Outgoing Trunk
Incoming Trunk
Supplementary
Trouble Reports
Operator
Customer
P.S.C
Employee
Tape Analysis
EBAC
% Completion
Credit Requests
Pre-Billing
Post-Billing
Reorders
Operator Encountered
RO Trap
Ineffective Machine Attempts
4A
XBT
Abnormal Conditions
Data From Other Bureaus
Engineer
Option Checks
Compatibility
Pulsing
Shop Modifications
Traffic
Trouble Reporting
Customer Instruction
RO – NC
Extended Area
Independent Relations
TC-CSP Meetings
Independent Company Results
Maintenance Assistance
Office Profiles
Long Lines/Toll
RO Analysis
Ineffective Machine Attempts
Special Services
Facilities
Plant
CMP Status
C.O. Results
Field Reviews
Assist Task Force
Data Processing
Mechanized Printouts
Maintenance Program
Public Relations
Employee Information
Public Information
Customer Instruction
Public Activities

# VISUALIZE THE DDD NETWORK SEPARATED INTO TWO AREAS OF ACTION FOR TROUBLE LOCATING – THE ENDS AND THE 'NTERMEDIATE NETWORK




- THE ENDS ARE THE ORIGINATING/TERMINATING PORTIONS OF DDD CALL HANDLING EQUIPMENT CONSISTING OF THE END OFFICES, THE RECORDING EQUIPMENT (AMA-CAMA), INTERCONNECTING TRUNKS AND THE TOLL SWITCHING EQUIPMENT THAT IS THE ENTRANCE AND EXIT TO THE INTERMEDIATE NETWORK.

- THE INTERMEDIATE NETWORK CONSISTS OF THE INTERTOLL TRUNKS AND TOLL THROUGH-SWITCHING OFFICES (IF INVOLVED) THAT INTERCONNECT THE ENDS.

- WHEN THE TERMINATING END OFFICE IS LOCATED IN A BUREAU'S PRIME AREA OR PRIME AREA EXTENSION, ALL SWITCHING OFFICES AND FACILITIES INVOLVED ARE IN THE BUREAU'S "BACKYARD"

TYPICAL TROUBLE ANALYSIS PROCEDURE