INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

WORLD TELECOMMUNICATION DEVELOPMENT CONFERENCE (WTDC-98)

Valletta, Malta, 23 March - 1 April 1998

Document 52-E
19 February 1998
Original: French

For information

Agenda item: 3.1 **PLENARY MEETING**

France Telecom

COMPUTERIZED SUBSCRIBER MAINTENANCE SYSTEM (CSMS)

Action to improve data reliability
The cost of faults

Importance of documentation

- Are pairs available for new connections?
- Where are they and what condition are they in?
- Which cable/distribution cabinet/DP is the source of the line fault?
- What addresses are served by this equipment?
- How many subscribers do we have on this exchange, this distribution cabinet, this building?
- Are they all billed?

Importance of documentation

- Are pairs available for new connections?
- Where are they and what condition are they in?
- Which cable/distribution cabinet/DP is the source of the line fault?
- What addresses are served by this equipment?
- How many subscribers do we have on this exchange, this distribution cabinet, this building?
- Are they all billed?

If you cannot locate, you cannot repair

If you cannot measure, you cannot manage

Effects of poor documentation

- on quality of service
  - fault clearance time
  - speed of connection of new subscribers
- on investments
  - forecasting overloads
- on operator revenue
  - loss of traffic

Effects of poor documentation

- on quality of service
  - fault clearance time
  - speed of connection of new subscribers
- on investments
  - forecasting overloads
- on operator income
  - loss of traffic

Failure to keep documentation up to date may seriously affect operation, productivity and quality of service, with disastrous economic consequences

Common errors

- wrongly recorded connections to the distribution frame, the distribution cabinet or the distribution point
- reported line to be in use that has become free on the ground
- reported pair to be in reserve but in use on the ground
- reported pair to be in reserve and not usable
- subscriber registered on more than one pair
- new DPs distributing non-recorded lines

Error rates found

- Various specific examples reported
  - by the EML company in the Middle East:
    - 11% error rate in respect of the distribution frame
    - 24% error rate in respect of distribution cabinets
  - by Sofrecom in Latin America and Asia:
    - even higher rates: 15 to 30% in major cities
    - up to 40% in the provinces
- For old networks, an error rate of 20% is assumed

Commercial losses

- Documentation errors are usually detected at crucial points in the customer management process:
  - implementation of a connection request
  - clearance of a fault
- An error in the base leads the customer to postpone the use of his installation:
  - loss of traffic
  - initiatives for the sale of new services are hampered
  - negative image of the operator
- There is a risk of losing customers in a competitive environment

Poor management of network extensions

- Lack of reliable information
  - number of pairs available for each distribution cabinet and each DP
  - transport and distribution occupancy rates
  - number of defective pairs per cable
- Risk of planning pointless or premature operations
- Risk of not making provision in good time for a network extension or an essential repair

Attempted evaluation of costs

- Hypothesis of an operator of 100 000 lines with an error rate of 20% and a network conforming to international standards
- Example of impact on investments
  - 3% of the lines become usable only after reliability improvement
  - 3 000 lines recovered by means of reliability improvement
  - average cost of constructing a line = 2 500 francs
  - possible gain from a reliability exercise = 7.5 million francs
- Impact on turnover
  - for an annual turnover per line of FF 1 500 ==> 1 500 x 3 000 = 4.5 million francs

Attempted evaluation of costs

- Impact on subscriber construction costs
  - hypothesis
    - 4 000 interventions per year
    - 20% documentation error rate
    - hence 800 interventions on wrongly recorded lines
    - time lost per intervention on wrong lines = 2 hours
  - total cost: 1 600 hours or 9.5 man/months per year
- Impact on fault clearance cost
  - hypothesis
    - actual fault rate of 0.5 per year, i.e. 50 000 interventions
    - additional burden of 0.3 hours for each wrongly recorded line
  - total cost: 50 000 x 20% x 0.3 hours = 3 000 hours
    i.e. 17.5 man/months per year

Existing systems for reliability improvement

- A test instrument to be connected to the terminal blocks of distribution frames or distribution cabinets
  - portable and lightweight for outdoor use
  - equipped with front tap shoes
- An answering machine connected to the automatic exchange
  - automatically sends back the calling number by modem, on the line
  - this number is recorded by the test instrument
  - may be connected to an electronic line tester
- Signalling required
  - the automatic exchange must be able to retransmit the caller's number
  - this signalling method is used by most operators
- Processing of retrieved data
  - usually on a separate computer

Operational diagram

Automatic exchange

Distribution
Frame

Distribution cabinet

Distribution Point

Subscriber line

Front tap shoe

Answering machine

Processing of recorded data

Identification and

line testing device

Manual device for
individual
measurement
of a pair

Some reliability projects carried out by Sofrecom

- Action to improve data reliability
  - Mexico: TELMEX
  - Argentina: TELECOM ARGENTINA
- Initialization of a database checked for reliability
  - Indonesia: PT TELKOM
- CSMS experience
  - Office of Posts & Telecommunications of Benin, Sofrecom and EML

COMPUTERIZED SUBSCRIBER MAINTENANCE SYSTEM (CSMS)

The concept

The principles

The functions

The conditions for success

CSMS - The concept

- Focus on problems of management and maintenance in the local loop
- Build an IS model for the management and maintenance of the local telecommunication network
- Provide a suitable tool for line service personnel
- Provide a procedure for the maintenance management of small and medium-sized operators:
  - reliable, easy to use, computerized
- Provide recommendations and a guide for the selection of a suitable CSMS
- Improve quality of service in the local loop through the use of appropriate information technology applications

CSMS - The principles

- Use existing software and hardware whenever possible
- Analyse the full range of IS requirements for network management and maintenance
- Modular (addition of modules as required)
- Easy to use (not just user-friendly)
- Robust (reliable)
- Extendable (start small, then grow)
- Keep it simple

CSMS - The functionalities

- Control and manage human resources (teams) and technical resources
- Monitor signalling systems, alarms, faults
- Keep statistical tables (IS)
- Have the abilityto analyse critical points (IS)
- Manage
  - signalling systems
  - preventive maintenance work
  - corrective maintenance work

Managing faults

REPORTING

Recording of the fault

TESTING

Recording of test results

Allocation of the fault to a specialized form of intervention

ORIENTATION

Assignment of the work to a repair team

CLEARANCE

Recording of repair work

Records

Managing resources

DP

Pairs

DP

DISTRIBUTION POINT

DISTRIBUTION CABINETS

Telephone exchange

Distribution cabinet

Distribution cabinet

LINE TEAMS

Equipment

SWITCHING TEAMS

DF

Distribution frame

Automatic exchange

Local network

Gathering analytical data

Causes of faults

speed of clearance

bad weather

faulty implementation

wilful damage

customer mishandling

CSMS - Conditions for success

- Specify (characteristics)
- Educate (management and staff)
- Integrate (with the rest of the IS)
- Guide (choose the right solution)
- Finance (commitment by the operator's senior management)
- Test
- Select
- Purchase
- Install and bring into service
- Monitor