

SWITCHING SYSTEMS MANAGEMENT
DATA ADMINISTRATION
BUSY HOUR DETERMINATION—END OFFICE

	CONTENTS	PAGE
1.	GENERAL	1
2.	BUSY HOUR STUDIES	1
3.	BUSY HOUR STUDY PROCEDURES	2
4.	STUDY PERIOD EVALUATION	2
5.	REASONABILITY CHECK	2
6.	SELECTION OF THE BUSY HOUR	3

1. GENERAL

1.01 This section delineates the general theories and procedures to be used in busy hour determination for local end offices. Descriptions of the unique requirements of specific switching machines may be found in the appropriate section of Division H of the Dial Facilities Management Practices.

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

1.03 Effective engineering and administration of switching equipment are dependent on accurate data. This makes the proper selection of busy hours most essential. Proper selection of busy hours also permits a minimum amount of data processing to satisfy the varied data requirements for a given office. For network design purposes, the busy season office busy hour is the time-consistent 60-minute period with the highest usage per main station throughout the busy season. The 60-minute

period may begin on either the hour or the half-hour. It will normally be time-consistent throughout the entire busy season, ie, the same clock hour in each month of the busy season.

1.04 Different equipment components may have different busy hours. In order to provide the proper quantity of equipment, it is necessary to obtain data in each equipment component busy hour or to establish a ratio for that component to the usage obtained in the hour that is chosen as the office busy hour. There are some inherent dangers in employing the ratio, but these may be offset by the savings in downstream data processing.

1.05 The busy hour studies may be used to establish a relationship to other hours for use in preparing the method of procedures and equipment outage allowances.

Example:

8-9A = 300 CCS (75%)

9-10A = 400 CCS (100%)

2-3P = 350 CCS (87.5%)

2. BUSY HOUR STUDIES

2.01 To determine the busy hour for each component, it is necessary to collect and analyze data by half-hours during all periods of the business day that may produce high loads. This normally is between 8 AM and 11 PM for 5 to 15 consecutive business days. Local office characteristics, however, will determine the hours and days to be used following appropriate studies (Part 3).

NOTICE

Not for use or disclosure outside the
Bell System except under written agreement

SECTION 1c(2)

2.02 In some cases, an office may have an unquestionable busy hour, and 5 days would be adequate. In other offices, several different hours may appear to carry loads of approximately the same magnitude. This would necessitate studies of longer duration (15 days). If several hours carry approximately the same load regularly, load and service data should be collected for these suspected busy hours throughout the entire busy season.

2.03 Customer calling characteristics within a service area may change, resulting in a shift of predetermined busy hours. This usually occurs gradually unless it is affected by some abrupt outside influence such as a rate change, business shift, new switching center, area transfers, etc. When shifts are suspected, the network administrator should conduct additional busy hour studies to assure that proper data are being reported and used. As soon as the overtaking hour is **recognized**, both hours should be reported to provide sound historical trend data.

3. BUSY HOUR STUDY PROCEDURES

3.01 Busy hour studies must be conducted on a regular systematic basis to insure that the proper hours are being measured throughout each busy season. The length of time required to take a busy hour study and the number of hours to be examined during the study vary and are dependent upon the knowledge a network administrator has of current and past customer calling characteristics.

3.02 If the busier hours of the day are not known or changes in the switching center characteristics are suspected, then a busy hour study of the following magnitude should be conducted. In the busy period prior to the busy season, accumulate data for 5 business days for each equipment component on an hourly basis, normally from 8 AM to 11 PM. In the interest of manual clerical or data processing time, it may be feasible to read a reduced number of registers as **busy hour indicators** for this preliminary step. The network administrator must be aware that the busy hour indicator method combines components by function and can possibly mask component busy hours that occur outside the hours selected by the indicators.

3.03 Summarize and compute a 5-day average for each hour of each component. Select the 3 to 6 busiest hours for further detailed analysis over a period of 5 to 15 business days. The longer number of hours and days is required if a predominant busy hour is not evident.

3.04 Study the 3 to 6 busiest hours, by half-hours, for a period of 5 to 15 consecutive days. The half-hour intervals should start 30 minutes before and end 30 minutes after the selected hours.

3.05 For each register, compute the 5- to 15-day average for each half-hour. Combine adjacent half-hour averages and select the busy hour for each component.

3.06 It is recognized that mechanized programs may be available to perform some of the summarizing mentioned above. Typical manual procedures are described for the selection of the 3 to 6 busiest hours and the busy hour in order to provide a comprehension of the summary process.

3.07 If the busier hours of the day are known, a 10-day busy hour study should be scheduled directly for a 2-week period. If it is determined that the office and group busy hours have remained fixed for several years, it may be necessary to take only one 5-day check of these hours during each busy period. This study is intended to confirm an established busy hour and to guide in establishing the busy hour for the following season.

3.08 If the change to daylight saving time occurs during the busy period, a new busy hour study may be required.

3.09 Prior to the start of data collection for the busy hour studies, measuring devices should be thoroughly tested for proper operation and cross-connections. Equipment outages should be reviewed and steps taken to eliminate them. Detector test and early morning review of usage during study is suggested.

4. STUDY PERIOD EVALUATION

4.01 The network administrator must examine the validity of the data in the light of occurrences within the one- or 2-week study period. The studies may be distorted by short-duration peaks in load caused by conditions such as school closing, weather phenomena, local group activities, holidays, etc. The study should be rescheduled if the data is deemed invalid.

5. REASONABILITY CHECK

5.01 The network administrator should make checks of the busy hour study data that are

pertinent to the switching systems being studied. The following checks should be performed:

- (a) Compare usage totals of appropriate components.
- (b) Compare usage totals of similar groups or frames in the office.
- (c) Check day-by-day consistency of usage for each group or frame.
- (d) Derive and analyze holding times of various components.
- (e) Check usage against service.

6. SELECTION OF THE BUSY HOUR

6.01 Selection of the busy hours should include the following considerations:

- (a) All busy hours will be time-consistent but will not necessarily start on clock hours.
- (b) Busy hours for all components may not always occur at the same time.
- (c) The office busy hour is the hour (1) when the originating CCS per main station is the greatest in a step-by-step office or (2) when the load on the network (normally expressed in CCS/MS) is the greatest in a common control office.
- (d) If the average busy hour for a component differs only slightly in magnitude from that of an office busy hour, then the office busy hour is generally used as the component busy hour to conserve on data processing. This procedure may lead to poor customer service, and judicious decisions are required to ensure its proper use. The data should be factored to prevent understatement of the load.
- (e) When service results are zero or negligible, service busy hours should be selected from busy hours for the equipment of which they are a function.
- (f) Where several different hours appear to carry loads of approximately the same magnitude, studies should be continued until the busy hour is definitely determined (normally not more than 15 days).

(g) If several hours regularly carry approximately the same load, traffic data should be collected for these hours throughout the entire busy season.

6.02 If there are conflicts between service and equipment busy hours, the network administrator should determine the reasons for the conflicts.

(a) Clerical accuracy:

- (1) Check for omissions and errors in computation or transcription.
- (2) Review film for errors in reading.

(b) Maintenance:

- (1) Measure the impact of equipment outages in service.
- (2) Analyze early morning usage or delay data for possible equipment trouble.

(c) Administration:

- (1) Check that usage, peg count, and service data are measured for the same time intervals.
- (2) Review dial tone speed (DTS) machine test line assignments.
- (3) Check for sampling error caused by small service measurement base.
- (4) Determine possible influence of imbalance on service results.
- (5) In ESS offices using the Program for Administrative Traffic Reports On-Line (PATROL), the office description file should accurately represent equipments installed.

(d) Validity checks:

- (1) Make hourly and daily comparisons of register readings.

(e) Dial tone speed machine:

- (1) Check for false delays caused by DTS machine or test line trouble.

SECTION 1c(2)

- (2) Review actual and expected tests to verify DTS machine calibration.
- (f) TUR checks:
 - (1) Compare related usage measurement.
 - (2) Conduct TUR detector test.

6.03 It is possible that, after the above analysis, there still may be a conflict. The conflict may be justified, eg, when the offered load is highly peaked or concentrated into a small portion of the measured hour. If this is a normal calling characteristic, the hour with the greatest service reaction should be the hour selected as the service busy hour, but the data should also be collected for the highest load hour.