ENGINEERING AND ADMINISTRATION DATA ACQUISITION SYSTEM SURVEILLANCE APPLICATIONS

CONTENTS

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SURVEILLANCE APPLICATIONS

1. GENERAL

1.01 The Engineering and Administration Data Acquisition System (EADAS) was developed to provide sufficient, timely data for use in accurate equipment provision and for more efficient network facility utilization.

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

1.03 EADAS is part of an integrated total network data system which is being developed to meet the long-term network management and administration needs of the Bell System. It is an electronic, software controlled data collection system with the capability of near real-time surveillance.

1.04 It is the surveillance aspect that sets EADAS apart so dramatically from all previous data systems. It can provide the information required by Switching Service Managers to make far more knowledgeable and effective decisions. It provides the vehicle for man/machine interaction and allows, in a very real sense, a two way communications path which has not existed before. With the communications will most assuredly come, greater understanding, compatibility and efficiency in the area of machine management.

1.05 This section is designed to provide information on the surveillance aspects of EADAS in relation to network dial administration needs. It is assumed that the reader has a general knowledge of the system's configuration and software features.

1.06 References in this section to methods, planning, data requirements, service levels, and equipment quantities are based on American Telephone and Telegraph Company recommendations.

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

2. SURVEILLANCE FEATURES

2.01 The surveillance function is largely carried out by means of user defined, predetermined calculations. Near real-time calculations are made by the central processor to perform certain validation checks on incoming data and to provide dial administrators with sufficient information to determine the quality of service being provided by their ***switching machines.*** Dial Administrators also utilize the EADAS surveillance capability to monitor performance of trunk groups and the ***data collection apparatus.*** To accomplish this, a number of calculations are performed for each of the input channels. These calculations are repeated at the end of every collection interval using the data gathered during that period. Calculated results are obtained from EADAS by entering at the Central Control Unit (CCU), the calculation definitions and other items of information needed to control printing functions. An EADAS installation may store up to 6800 such calculation definitions. Typical calculations are such items as Percent Incoming Matching Loss, Percent Dial Tone Delay, etc. ***As discussed later, it is recommended that CCU personnel be responsible for the translation of desired calculations from traditional formats into the mode required for acceptance by EADAS.***

2.02 Calculated results may be printed in three types of reports: hourly reports, exception reports and demand reports. Hourly reports (Fig. 1) are printed at pre-scheduled times in user defined formats specially prepared for this purpose. Exception reports (Fig. 2), as the name implies, are printed on an exception basis whenever a calculated result exceeds an associated user defined threshold level. These appear as one line messages on the remote DA teletype. Demand reports are simply outputs of calculated results printed in response to a user command entered from a remote or the command teletype. The output format of demand reports is very similar to that for exception reports. The exception report feature will be especially useful as the means of avoiding the production of large amounts of "normal" data which tends to mask trouble indications.

2.03 Calculated results may be printed on remote teletype machines at locations other than the Central Control Unit (CCU), usually in dial administrator offices. Printed results are transmitted at 110 baud. An EADAS processor can accommodate up to 16 such remote terminals. Most printed

results are also duplicated on the high speed line printer at the CCU site. Instructions for remote teletypewriter operation are available in DFMP Div D, Section 4f.

2.04 In establishing calculation sets in EADAS, one must first enter hour report formats, channel, entity and finally a series of calculation definitions. Detailed information on channel and entity definition is found in DFMP Division D, Section 4g. Recommended hourly report formats, threshold and calculation definition material by type of switching equipment is contained in Appendixes to this practice. Fig. 3 through 5 contain recommended forms for use with these definitions.

2.05 The channel definition describes the traffic measurement device arrangement provided at the central office. It also includes a schedule assignment for control of TUR scanning, magnetic tape writing and hourly report generation.

2.06 An EADAS system may accommodate up to 16 unique hourly report formats. For example, a format for No. 5 Crossbar offices is shown in Fig. 1. An hourly report format specifies a location where calculated values are to be printed, the headers and labels to be associated with them, spacing for legibility, etc. Each format specification is limited to a maximum of 64 fields for calculated values. Since a maximum of 16 different report formats are available for all the users of the system, some standardization is necessary. A basic format should be designed to cover all No. 5 Crossbar hourly reporting needs for a single EADAS installation, another for crossbar tandems and so on. Each calculation definition includes an option to specify a print field position number in the hourly report for that entity.

2.07 The purpose of the entity definition is to identify; (1) a set of calculations, (2) an hourly report format to be fulfilled by this set of calculations, (3) a set of three schedules which define component busy hours to be used in threshold tests for exception reporting, and (4) the remote teletype channel over which all printed output resulting from each calculation set will be printed. The entity name specified in this definition is purely arbitrary and need not be related in any way to any particular physical switching machine. In fact, as used in EADAS, the entity name merely identifies a calculation set and certain associated items of information pertaining to printing control. It is suggested that entity names be based on Common Language code for ease of identification at CCU and DA TTY locations.

> ***Note:*** For a given channel up to six entities may be defined. This might be used, for example, to handle cases where TDC concentration is used, ie., data from several offices is transmitted to the processor over a single channel. Exception and hourly reporting for any given entity can be printed only on one dial administration TTY. There may be cases where, for a given office, it is desired that some calculation results go to one dial administration TTY and others go to a second TTY. An example of this is where trunk exceptions are sent to one location, and switching equipment exceptions to a second location. This can be done in EADAS by defining a separate entity for a given channel. In this case, the calculations defined with the primary entity will be printed on one TTY whereas another set of calculations will be printed on the TTY specified for the second entity. Although a new set of calculations must be defined for the second entity, specific traffic registers from a given switching machine may be reused. Defining a separate entity uses one of the six available entity definitions per channel.

2.08 Once a channel and entity have been defined on a channel and the associated hour report format specified, the calculations (to be performed on the incoming data for that channel) can be defined. Calculation definitions like all system definitions are entered into the machine via the CCU TTY using a conversational language. A number of items must be specified in defining a calculation for an entity. (Refer to Fig. 3 which contains a form recommended for use in calculation definitions.)

(a) The calculation name (up to eight alphanumeric characters, the first of which must be alphabetic). Calculations designed to appear only on hourly reports may be named by their predefined report position number, eg., HR45. Imbedded blank spaces within the calculation name should not be used.

(b) A calculation must be defined as a master (one having other calculations associated with and responsive to it) or a slave (a calculation

dependent on a master). A failing master calculation causes its slaves to output as exceptions whether or not the slaves fail their threshold tests. A slave calculation failing its assigned threshold will appear as an exception regardless of the condition of the master. All slave calculations must be defined immediately following their master. Whereas there could be more than one slave per master, there can only be one master for any slave.

(c) The hour report position number only if the calculation appears on an hour report (positions 1 through 64 on the selected hour report format.)

(d) The calculation definition. This is an algebraic equation using addition, subtraction, multiplication, division, parentheses, integer constants, and register numbers (either scaled or unscaled designated by R or S, ie., R512 is register 512 and S512 is scaled register 512). The value of a scaled register is automatically multiplied by 10 when used in a calculation. As in normal algebra, parentheses may be used to indicate the order in which operations should be performed. (eg. A+B/C requires the addition of A to the result of B divided by C; whereas (A+B)/C says divide the sum of A and B by C.) It also provides a method of identifying a register, constant, or sum of registers called terms which can be printed as part of the output and labeled. Terms are designated by enclosing the desired intermediate results in < >. Following are some examples of equation definitions:

R500*100/R510:	The contents of register 500 is multiplied by 100 and then divided by the contents of register 510.
S500 + R1-R15:	The contents of register 500 is multiplied by 10 (indicated by an S rather than R), then added to the contents of register 1, and then the contents of register 15 is subtracted.
T1<R1 + R2 + R50> *100:	Add registers 1, 2, and 50 together (save this result for printing) and multiply by 100.
T1<R500> *100/T2<R5107>:	Same as R500*100/R510 except that both registers 500 and 510 can be printed in the output. The output might be, for example, DIALTS = 1.3%, FAL = 3, ATT = 225.

If a decimal output is desired, it is specified after the definition by typing either 1 or 2. At most two decimal figures are allowed.

Example, R500*100/R510,2: the 2 indicates two decimal figures

(e) The processor must be informed if the calculation uses registers which are measuring usage because TURs will generally be on only for scheduled periods. During an interval when the TUR is not on, the registers measuring usage are zero. In this case, the results of calculations involving usage registers will not be threshold tested if the defining channel TUR is not scheduled to collect data, and these calculations will always pass. Thus, if an entity defining channel has a TUR, then any TUR whose registers are used as cross channel references for calculations in that entity must be on the same TUR schedule. For example, calculation

R340/R762:10

for a channel 0 entity, assuming register 762 of channel 10 is a usage register, would imply that channel 0 TURs and channel 10 TURs are on the same collection schedule.

(f) An output result label and up to five term labels associated with parts of a calculation can be specified. They will appear on the exception printout only if the characters ";P" is specified at the end of the output format string. Otherwise, these labels will only appear at the CCU line printer or when the result of a calculation is printed at remote TTY's on demand.

Example, OUTPUT = %, DLY = TI, TST = T2; P!

(g) The threshold information must be specified. This includes:

(1) The type of threshold: upperbound (UB), lower bound (LB), lower and upperbound (LU), ie., bracketing values, always print (AP),or never print (NP). Never print is specified when a calculation is used for an hour report, demand or slave only reporting

but not for an exception report. The always print type is ignored if a calculation involves usage registers and the associated TUR was off for the preceding system period.

(2) The values of the threshold. First the lowerbound and next the upperbound if it is a bracket, or the nonbusy hour/busy hour values if it is a time dependent threshold.

(3) Finally, on lower and upper bound types the threshold schedule number is specified since there may be up to three such schedules. When always print or never print is specified, the threshold values and schedules can be omitted since they are meaningless. The schedule number may also be omitted for a lower/upper type of threshold since this threshold is not time-dependent.

2.09 Calculated results are generated at the end of each system data collection period, which may be either 15 or 30 minutes in length, and the results will be printed as one line exception messages depending on threshold specifications associated with each calculation. Several examples of exception message printouts are shown in Fig. 2. As shown by the first example, the calculation name is printed, followed in this case by the calculated value, and a result label such as the percent sign. The calculation definition may also be arranged to print up to five intermediate terms along with a calculated result, as shown by the second example in Fig. 2. As an extension of this capability, additional calculations may be defined as "slaves" of a particular master calculation. An illustration of a master-slave calculation pair is given in example three of Fig. 2. Slaves are printed whenever they exceed their own threshold or whenever their masters exceed their thresholds.

2.10 As discussed above, there are five possible threshold type specifications for control of exception message printouts. A threshold specification consists of up to four items: a threshold type, two threshold levels and a threshold schedule. The meaning of the value and schedule specifications varies, depending on the threshold type specified:

(a) Upper Bound (UB) type threshold—This threshold type causes an exception message to be printed whenever a calculated result equals or exceeds its threshold level. Two threshold levels are specified, one which is applied in nonbusy hours and another for busy hours. These nonbusy/busy hours are specified during entity definition. A maximum of three different threshold schedules are allowed for a given entity (calculation set).

(b) Lower Bound (LB) type threshold—This threshold type operates in a manner analogous to the UB threshold, except that it causes a message to be printed whenever a calculated result is less than or equal to its specified threshold level.

(c) Lower-Upper Bound (LU) type threshold—This threshold type provides a double-sided test. Two threshold values are specified to define lower and upper bounds for the calculated result. Currently, a threshold schedule specification for this type is not used by the system since the test is carried out for 24 hours a day.

(d) Never print (NP) type threshold—This specification prevents a calculation from being printed by itself as an exception message. It is useful in three situations; (1) when a calculation is used only for hourly report purposes, (2) when a calculation is to be printed only as a slave calculation in exception reports, or (3) when a calculation is defined only for demand reporting purposes.

(e) Always Print (AP) type threshold—This specification causes a calculation result to be printed for each data collection interval, ie., every 15 or 30 minutes. This specification should be used sparingly if at all, since it tends to produce a "cluttered" teletype output.

2.11 The Exception Reporting capability of EADAS is intended to be used for near real time surveillance of:

(a) Component loads

(b) Blocking and delay levels (service)

(c) Component holding times

(d) Maintenance outages

(e) Equipment irregularities

(f) Traffic measurement device performance

2.12 Calculated results are retained in memory for 96 data collection intervals. Thus, for a system arranged for 30 minute data collection intervals, calculated results are retained for an accumulative total of 48 hours. These results can be printed by entering appropriate commands at either the Central Control Unit or the remote teletype. Demand reporting, as this is called, is useful in making special studies, eg., customer line overflow studies, analysis of data problems, and in setting threshold levels. (Refer to Part 4 for further information on demand reporting.)

3. DIAL ADMINISTRATION REPORTING OBJECTIVES

3.01 The primary purpose of this practice is to provide recommendations on the use of EADAS for dial administrator surveillance. Thus far we have made loose references to the term "dial administrator surveillance" but the design of calculation sets requires a clearer definition of the reporting needs involved here.

3.02 In order to provide a basis for the recommendations on report format and calculation sets to be given in the appendixes, we provide here a hypothetical list of the dial administrator's near-real time surveillance and routine reporting needs. It is felt that these recommendations provide the basis needed to support the traditional dial administration role and therefore should represent a good starting point for an operating company's use of EADAS reporting capabilities. To the extent that these needs vary, it will be necessary to modify the recommendations given here.

3.03 This hypothetical list of dial administration reporting needs consists of three categories of measurements; (a) routine reports covering a predetermined set of measurements, (b) near-real time surveillance of traffic measurement apparatus performance, and (c) near-real time surveillance of switching system performance and maintenance outage.

3.04 ***Routine Reports***—The dial administrator is a focal point for questions from many sources, eg, traffic equipment engineers, trunk engineers, higher management, etc., concerning the "general health and state of affairs" of those offices for which he/she is responsible. Consequently, there is a need for routine reports which describe an office's performance in terms of its most important service measurements and general load conditions on its major equipment components. These reports should also include certain statistics routinely needed for reports and indexes prepared by the dial administrator. The ***hourly report*** capability of EADAS should be used to fulfill these needs. They should be printed for the official service observing busy hour and perhaps a few side hours which may be of general interest. Hourly reports should be provided primarily for reference purposes pending availability of more complete reports from the downstream processing environment. ***They are not intended for near real time-machine management purposes.***

3.05 ***Traffic Measurement Apparatus Surveillance***— The dial administrator also has prime responsibility for traffic data administration. This includes ensuring that data is collected according to schedule, and the collected data is valid. EADAS' surveillance capabilities are ideally suited to near-real time surveillance of the performance of traffic measurement apparatus. For example, ensuring that TUR and dial tone speed machines turn on as scheduled, that traffic data converters are receiving reverse commands and that data are sent to the EADAS processor. These needs are best met by the ***exception reporting*** capability of EADAS and on a very selective basis, by the hourly report capability. Detailed data validation procedures are not performed within the EADAS portion of the Total Network Data System but rather are a function of downstream processes such as TSS or COER.

3.06 ***Switching System Surveillance***—Finally, the dial administrator has the responsibility for decisions on extraordinary actions or controls to be taken in response to equipment component overloads or troubles. In order to support these decisions, EADAS calculation sets should be designed to provide near-real time surveillance of loads on all traffic sensitive equipment components and on levels of delay or call blockage which are related to equipment overloads. These needs are also met by the ***exception reporting*** capability of EADAS. This should not be confused with the need for traffic measurement summarization to support routine administrative actions which can be better supported by downstream data processing systems.

3.07 There is an emerging dial administrator interest in "ineffective attempts—whatever the cause." This broader view of near-real time

surveillance recognizes the expanded role of the traditional dial administrator into a Switching System Manager concept and in many instances, the physical amalgamation of Plant Central Office and Traffic Facilities organizations. The plant register leads required to support it must be cabled to the data acquisition devices supplying EADAS. It is recommended that consideration be given to this concept. Optional calculations which would permit a more thorough ineffective attempt analysis have been included in the calculation sets contained in the appendixes to this practice.

3.08 In summary then, calculation sets and report formats should be designed to (1) provide routine reports which give key service results and a general picture of office load conditions, (2) monitor traffic measurement apparatus operation for detection of major problems, (3) provide for near-real time surveillance of component loads and load related blockage and delay, and (4) on an optional basis, provide for a more thorough near-real time ineffective attempt analysis.

4. DEMAND REPORTS

4.01 Handling of requests for special studies such as business customer facilities usage (ATB, LTB, etc.), data problem analysis and threshold administration will be greatly expedited by the use of EADAS surveillance features. This surveillance feature should not be used for large scale administrative reporting.

4.02 The dial administrator is provided with a demand report capability and can, within the limitations of the system, retrieve both register totals and calculation results via the remote TTY.

4.03 A dump register input message allows examination of either active (currently updating) or passive (retaining the last completed system period) registers. Up to ten register totals at a time can be retrieved remotely. A total register dump can be obtained by the CCU on a particular channel.

4.04 A DA/TTY also has the capability of requesting calculated results from any of the past 96 collection periods (intervals) as follows:

(a) The results of a particular calculation from one specific collection period.

(b) The results of a particular calculation beginning at some specified period and ending at a second specified period.

(c) All calculation results for the last or some specified past period.

(d) The summed results of a given calculation for the requested number of periods.

Note: Only calculation ***results*** can be retrieved from long term storage. Calculation ***terms*** are only saved for the passive (last completed) interval. They can be displayed with the command: OP:CA:Entity name, CALC. NAME!

5. INTEGER ARITHMETIC

5.01 EADAS performs all calculations in an integer arithmetic mode. An integer is simply a whole number. EADAS ignores fractional or decimal parts of a number and is oblivious to decimal points during the performance of the arithmetic operation. Fractional and/or decimal parts of a number are truncated (cut off) after each arithmetic operation performed by the system. For example, to the EADAS system the results of the following calculations would be:

30/10 = 3 (an integer)

25/10 = 2.5 = 2 (.5 cut off to make an integer result)

3/10 = 0.3 = 0 (0.3 cut off to make an integer result)

5.02 The effects of truncation can be minimized by the way a calculation definition is expressed to EADAS. Consider each of the situations below:

Example 1:

(1/3) * 100 (* means multiply)

(1/3) * 100 = 0 because EADAS truncates fractions and decimals

therefore, 1/3 = 0 and 0 × 100 = 0

Example 2:

(1 * 100)/3 = 100/3 = 33

As you can see, example 2 expresses the same calculation as example 1, but the results calculated by EADAS are drastically different. You can overcome the effect of truncation by deferring or putting off the division operation until the last step. Deferred division is nothing more than putting off the division step until all other arithmetic operations can be performed.

5.03 Dial Administrators frequently want calculations reported which have one or two decimal places. When this is the case, the EADAS calculation can be defined as follows:

Example: The definition 15/10, 1 (one decimal place) is calculated by EADAS as: (15)(10)/10 The result is stored as: 15 The stored result is printed as 1.5

The computer program notes from the definition (which is supplied by the user) how many decimal places will appear on the printed result. It scales the numerator by a factor 10_n where n = the number of decimal places in the answer. According to this process, 1 decimal place equals 10_1 or 10. Two decimal places would be 10_2 or 100, etc. EADAS next multiplies the numerator of the calculation by the scaled factor. The calculation is performed in integers (whole numbers); the result is stored as an integer, and it is only at printing that the decimal point is inserted according to the user-specified definition. Care should be taken to ensure that the number of decimal places specified in the hour report format is consistent with the calculation definition.

5.04 As a general rule, all calculations involving decimals should be printed to one more decimal place than is actually desired, since the last place printed is obtained by truncation rather than rounding. This is particularly important for statistics used in official indexes. For example, dial tone speed, which must be accurate to one decimal place for index purposes, should always be printed with two decimal places.

5.05 For a detailed description of the EADAS integer mode of operation and calculation limitations please refer to DFMP-Div. D - Sect 4g—System Definitions.

6. CRITICAL THRESHOLD LEVEL CONCEPT FOR UPPER BOUNDED SURVEILLANCE OF COMPONENT LOADS

6.01 Some exception report calculations presented in the appendices to this practice involving component equipment usage or load are based on a "% Critical Threshold Level" concept. The basic idea behind these calculations is to detect equipment component overloads which are severe enough to make service degradation an imminent possibility.

6.02 The first step in preparing this type of calculation for a particular equipment component is determination of that measured usage level for which an exception message is desired. This would generally be somewhat higher than an engineered CCS level (which may be an average busy season or average ten high day figure for some equipment components). Once a critical CCS level is developed, the next step is to incorporate it into an exception report calculation so as to cause exception messages whenever measured usage equals or exceeds this level.

6.03 Critical load surveillance could be implemented in exception report calculations in a variety of ways. For example, we might express measured usage in terms of % occupancy as follows:

$$\% \text{ Occupancy} = \frac{\text{Measured CCS}}{36 \times \text{No. of Servers}} \times 100$$

The threshold level for this type of calculation could then be derived from the critical CCS value as follows:

$$\% \text{ Occupancy Threshold Level} = \frac{\text{Critical CCS}}{36 \times \text{No. of Servers}} \times 100$$

6.04 One might alternatively choose to monitor equipment loading in terms of % Engineered Capacity. In this case the calculation definition would be as follows:

$$\text{\% Engineered Capacity} = \frac{\text{Measured CCS}}{\text{CCS Capacity}} \times 100$$

And the corresponding threshold level would be determined as follows:

$$\text{\% Engineered Capacity Threshold Level} = \frac{\text{Critical CCS}}{\text{CCS Capacity}} \times 100$$

6.05 Both of the preceding approaches have a significant disadvantage—they result in exception messages which are not easily interpreted. For example, they result in exception messages like the following (of course equipment identification would also be included in the messages):

% Occupancy = 66%

or % Engineered Capacity = 145%

6.06 To see better the difficulty in interpreting such messages,imagine that each of the above pertained to a group of 7 non-by-link incoming registers and try to estimate quickly the severity of the loading condition implied by each message. Further suppose that a critical level of 145CCS had been chosen. Working backwards and comparing the loads required to produce each of the above messages, we can verify that the % Occupancy message represents a load substantially higher than the previously chosen critical level. So much higher in fact that intersender timeouts in distant offices would be a certainty. On the other hand, the % Engineered Capacity message given above represents a load at exactly the critical level. The main point here is that interpretation of each of the above messages requires some knowledge not contained in the messages themselves, namely knowledge of the type and quantity of equipment involved, and the corresponding critical CCS values.

6.07 It is possible to formulate these calculation definitions in a manner which makes their corresponding messages much easier to interpret. That is, the calculation definition can be arranged as follows:

$$\text{\% Critical Level} = \frac{\text{Measured CCS}}{\text{Critical CCS}} \times 100$$

And in order to obtain messages whenever the measured load is equal to the critical level we set:

% Critical Threshold = 100%

6.08 In other words, this threshold level will cause messages to result whenever actual load reaches 100% of the critical level. Note that calculation of threshold levels which correspond to critical levels is unnecessary here. Now the messages actually printed will look like this:

% Critical Level = 110%

This message is immediately interpreted—it means that actual load is 10% higher than the critical CCS level, which by definition is that level where likelihood of service degradation becomes significant.

6.09 Recommended critical CCS levels, unadjusted for TUR measurement variation, are contained in the Appendices to this practice wherever a % Critical Level type calculation is recommended.

7. ADJUSTMENT OF CRITICAL LEVELS FOR TUR MEASUREMENT VARIATION

7.01 One would like a high degree of assurance that exception messages will be generated whenever actual component load reaches the critical levels discussed in paragraph 6 above, since they represent a significant degree of (probable) service deterioration. In order to provide this assurance it will be necessary for critical levels actually used in EADAS calculations to be set somewhat lower than the unadjusted critical levels presented in the Appendices owing to the effects of TUR measurement variation (or TUR measurement error as it is sometimes called). The magnitude of this required adjustment depends on various parameters, such as; TUR scan interval, length of measurement period (15 or 30 minutes), the holding time and occupancy of the circuits being measured, etc.

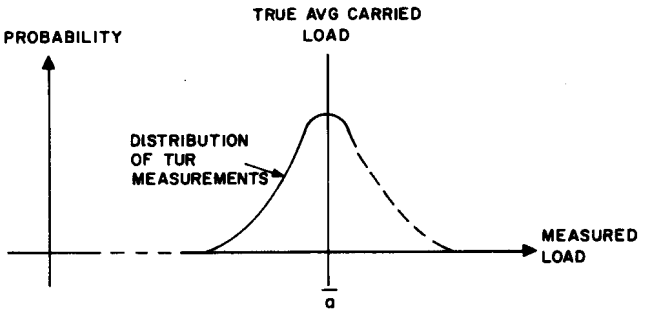
7.02 Any TUR measurement varies from the true carried load subject to statistical fluctuations due to the combined result of two effects. First, observed variation in TUR measurements will be

partly due to the scanning action of the TUR frame, which is essentially a sampling procedure. This has been called switch count error. The magnitude of measurement variations caused by this effect can be reduced by basing the measurement on a greater number of scans, ie., by either reducing the interval between successive TUR scans, or by taking measurements over longer periods of time.

7.03 Secondly, the average load typically carried by a group of servers over a finite period of time is itself subject to source variation. To understand this, imagine TUR measurements taken for 5 minute periods on a group of ten trunks operating at the P.01 blocking level. Further imagine that these measurements were taken with a TUR which had a negligible interval between successive scans, so that switch count errors were negligible. This would result in a series of load measurements which fluctuated randomly about some apparent average. During those 5 minute periods when some blocking occurred we could expect load measurements approaching 100% occupancy. But the average load (implied by P.01 blocking) is 149 CCS (on an hourly basis) or about 40% occupancy, and since this is an average, we can expect many 5 minute measurements to be well below this figure. We can therefore readily see that there would be wide fluctuations in these 5 minute load measurements even though the average load, as we would view it for engineering purposes, remained constant at 149 CCS. If we repeated this experiment with 10 minute measurement intervals we would find that the magnitude of these variations would be reduced considerably, measurements taken at 20 minute intervals would vary even less and so on. The reason for this difference in observed variations is simple; as the length of the measurement period is extended more time is allowed for instantaneous traffic fluctuations to "average out", thereby making each load measurement subject to less variations. It is important to realize that this phenomenon has nothing to do with "peakedness" or "skew". These fluctuations are an inherent characteristic of normal, random traffic offerings.

7.04 One important implication of the above comments should be clearly understood. As the measurement interval is reduced, the observed variation in TUR measurements due to sampling error and source load variation will be increased. Thus, traffic measurements taken at 15 or 30 minute intervals by EADAS will be subject to more statistical fluctuation than the hourly measurements traditionally taken for engineering or dial administration purposes.

7.05 It is sufficient for EADAS exception reporting purposes to regard a TUR measurement as a random sample from a population having a normal distribution. That is, for a true carried load a, we can expect that a large number of TUR measurements would be distributed about a as shown below:



7.06 Clearly, if the load a represents a critical CCS level, we must choose some lower value (say an "adjusted critical level") in order to ensure that exception messages result whenever the average carried load is truly equal to a. Without this adjustment, there is only a 50% chance that the desired exception message will occur when the load is exactly equal to the critical level.

7.07 The amount of downward adjustment required is dependent on two basic factors, (1) the amount of "spread" (or variance) in TUR measurements about a, and (2) the desired level of assurance that an exception message will occur when the true average carried load is equal to or exceeds the critical level. The coefficient of variation is a measure of TUR measurement variation about a, and has been tabulated in Fig. 6 for varying TUR scan rates, measurement periods, equipment quantities and loading conditions.

7.08 Adjusted critical levels may be obtained from the following formula:

$$L' = L\,[1 - 1.28\ V]$$

where: L' = the adjusted critical level CCS

L = the unadjusted critical level CCS obtained from Tables contained in the appendices to this practice by type of equipment

V = the coefficient of variation obtained from Figure 6.

Use of the adjusted critical level, L', in calculation definitions will give 90% assurance that exception messages occur whenever the true average carried load is equal to or exceeds the unadjusted critical level, L.

7.09 It is, of course, possible to modify the above formula to provide an even higher degree of assurance that desired exception messages are produced. For example, using the value 1.645 instead of 1.28 in the above formula would increase the assurance level to 95%. This is generally not recommended however, since it is likely to cause too many exception messages to be produced at engineered load levels, which of course should not be cause for dial administrator concern. As a general rule, the above recommended procedure will provide 95% or higher assurance that exception messages are ***not*** produced at engineered load levels.

7.10 The following example using Appendix A—No. 5 Crossbar Calculations, illustrates the critical level adjustment procedure. Assume an exception message is to be generated (with 90% assurance) whenever the load on a group of 6 by-link incoming registers exceeds the critical level. Also assume the following conditions apply:

1. Unadjusted Critical level = 65 CCS (Per table in Appendix A-4.12)
2. Occupancy = 0.30 (per same table)
3. Measurement interval = 30 min.
4. TUR scan interval = 20 sec.
5. Avg. register holding time = 5.0 sec.

From the coefficient of Variation tables given in Fig. 6, (sheet 3 of 12) we find the coefficient of variation to be about 8 percent. Using the formula given in paragraph 7.08, we find the adjusted critical level to be 58 CCS:

$$L' = 65[1 - 1.28(0.08)]$$

$$= 58 \text{ CCS}$$

From Figure 2, part G, 1 in Appendix A, the associated calculation definition then becomes:

% CRL = (360*[IR GRP USG])/(TUR CYC*58),1

And the busy and nonbusy hour threshold values for the calculation itself are simply 100 percent.

7.11 The engineered average ten high day load for 6 by-link incoming registers is 46 CCS. It can be shown that there is less than a 5 percent chance that the TUR measurement will exceed 58 CCS for loads at or below the average ten high day objective.

7.12 In some cases the magnitude of the critical level adjustment will be very small. For example, with a 10 second TUR scan interval and a 30 minute measurement period, the amount of adjustment required for 10 completing markers operating at the 90% or higher occupancy level is less than 2%. Such small adjustments could be ignored at local option.

8. RECORDS ADMINISTRATION

8.01 The maintenance of complete and accurate system definition records is essential to proper data acquisition and surveillance performance. Dial administration and CCU personnel must accept a shared responsibility for this function.

8.02 The recommended forms provided in Fig. 3 through 5 reflect this joint use/responsibility condition. They are usually initiated by the dial administrator. Additional EADAS related forms may be found in DFMP Div. D Sec. 4e—Operating the Central Control Unit.

8.03 These forms are designed to be self-explanatory and should be usable without reference to additional instructional material, assuming the user has a competent knowledge of system definition concepts. If required, instructional material on the use of these forms is available in DFMP, Div D, Sec 4l(6).

8.04 Fig. 3, 4 and 5 contain forms providing the means to transmit and record the addition, change or deletion of Calculation, Entity and Channel Definition information sent by the dial administrator to the CCU for System Definitions input. Hourly Report formats and schedule assignments are jointly established prior to system definition input.

8.05 After completing the left side of the appropriate form as required, the dial administrator should forward it to the CCU, retaining a copy for file.

8.06 CCU personnel are responsible for checking the accuracy and validity of the action request and completing the form prior to entering it into the system.

8.07 After entry, the completed form should be so noted and filed. A copy should also be returned to the dial administrator who originated the request.

9. SURVEILLANCE IMPLEMENTATION PROCEDURES

9.01 At the earliest practicable time prior to system cutover the following items should be resolved:

(a) Data collection needs should be surveyed and system parameter decisions made. Schedules for magnetic tape recording, TUR scanning and hourly report generation should be set up in advance. The schedules thus derived should provide broad coverage so as to minimize the need for later changes.

(b) Hourly report formats should be standardized. As a minimum, one report format for each switching system type to be accommodated should be developed. These should be derived through negotiations between the dial administrators and the CCU administrator. An effort should be made to ensure that every eventual hourly report need is anticipated, ie., that formats are made large enough to cover the maximum number of sender groups involved in the "worst case" No. 5 Crossbar office, etc. This should obviate time consuming changes to existing calculation definitions and hourly report formats each time a new office is added to the system.

(c) Dial administrators should be trained shortly before cutover in the near-real time reporting capabilities (and limitations) of EADAS. Suggested calculation sets should be provided for each switching system type. The objectives of near-real time surveillance calculations (as opposed to the downstream processes) should be explained thoroughly. A Dial Administration EADAS training package is available in DFMP Div. D, Sec. 4l(6) and (7).

(d) The pre-system cutover activities should contemplate ultimate size and serving arrangement of the system.

9.02 Well before each office is scheduled for cutover, the dial administrator involved should:

(a) Review the suggested calculation set making changes, additions, or deletions as necessary or desired. A CCU-based "calculations administrator" should be available to answer questions and provide assistance in this process.

(b) Prepare calculation requests from ETDC or converter input assignment lists. Many frustrating errors can be avoided by permitting these requests to be expressed in their traditional forms, rather than in the final EADAS input format. These final definitions can probably be made more easily and with fewer errors by the CCU "calculations administrator".

(c) Review central office traffic characteristics and select threshold schedules.

(d) Review each calculation and set initial thresholds for as many calculations as possible.

9.03 Calculations may be entered via the CCU TTY once a channel interface card is installed and channel and entity definitions have been provided. All holding time calculations and any others for which initial thresholds could not be set should be entered with NP thresholds to minimize output volumes.

(a) After all calculations are entered, effort should be directed toward correcting any obvious errors. "VE:EN," "OP:CA," and "DU:RG" printouts should be taken at the CCU for this purpose. An hourly report printout should also be taken. By scanning calculated results on the "OP:CA" listing and the hourly report for reasonableness, most obvious errors can be seen

and corrected immediately. This should preferably be done by CCU personnel. After all obvious errors are eliminated, a fresh set of listings should be mailed to the dial administrator for further review.

(b) After the calculated results have been verified, thresholds should be set or revised following the approach outlined in the appendixes to this practice.

*** 5XB HOURLY REPORT ***

ENTITY: AAAAAAAAAAA
DATE : MM/DD/YY
TIME : HH:MM

	%OFL	PC					
ORIG	XX.XX	XXXXX					
INC	XX.XX	XXXXX					
INTRA	XX.XX	XXXXX					
THRU		XXXXX					
TOT		XXXXX	XXXX	CCS/LLF			
TRK GRP-A	XX.XX						
-B	XX.XX						
-C	XX.XX						
-D	XX.XX						
	%CRL	MB					
COMP MKR	XXX.X	XXX					
DT MKR	XXX.X	XXX					
AMA TV	XXX.X	XXX					
ORIG REGS	%DTD	WTD	DLYS	TSTS	%CAP	MB	PC
DP	XX.XX	XX.XX	XXX	XXX	XXX.X	XXX	XXXXX
TT	XX.XX	XX.XX	XXX	XXX	XXX.X	XXX	XXXXX
SDR GRPS		%OFL					
0—3	XX.XX	XX.XX	XX.XX	XX.XX			
4—7	XX.XX	XX.XX	XX.XX	XX.XX			
8—11	XX.XX	XX.XX	XX.XX	XX.XX			
INC REG GRPS			%CRL				
0—3	XXX.X	XXX.X	XXX.X	XXX.X			
4—7	XXX.X	XXX.X	XXX.X	XXX.X			
8—11	XXX.X	XXX.X	XXX.X	XXX.X			
TUR CYC-0	XX						
-1	XX						
-2	XX						

Fig. 1—Sample Hourly Report Format (2.02, 2.06)

EXCEPTION REPORT EXAMPLES

1. %DTD-FR = 2.4

2. %DTD-FR = 2.4, DLY = 12, TST = 500

3. %DTD-FR = 2.4, DLY = 12, TST = 500 CCS/LFG = 465.3

Fig. 2—Sample Exception Reports (2.02, 2.09)

Page____ of____

Name_____ Telno_____

CALCULATION (ADD, CHANGE OR DELETE)

CCU USE ONLY

The **CALCULATION** Associated With_____ **NAMED**_____
(Entity Name) (Calc Name)

Entityname ☐ OK

☐ This Calculation is A **MASTER** Calculation

Calc Name ☐ OK

☐ This Calculation is A **SLAVE** to a **MASTER** Called_____ ☐ M ☐ S
(Mastername)

NOTE: Master and associated slave calculation must always be sent to the CCU as a set.
Use page ____ of ____ to indicate
the presence of a master/slave set.

Master Name ☐ OK

Based on the function you wish to perform fill in only the appropriate line(s)

☐ **DELETE** This Calculation ☐ DE

☐ **INSERT** the above named as a new calculation ☐ IN

- The results of this calculation will appear in **HOURLY REPORT FORMAT LOCATION NUMBER**_____
(ϕ-64 or none)

H.R. # ☐ OK

- This Calculation is **DEFINED** As Follows
  Note: Algebraic Definition of Calculation Including Appropriate register numbers; eg., (R725/724) (100)

_____
_____
_____
_____
_____
_____
_____

DEFINITION

- How Many **DECIMAL PLACES** (2 Max.) Should Be Calculated?_____
(ϕ-2)

DEC. PL. ☐ OK

- Does the Calculation Involve **USAGE** Measurements Taken From a TUR?_____
(yes or no)

TUR? ☐ OK

- The **RESULT** of This Calculation Should Be **LABELED**_____
(4 char max.)

RESULT ☐ OK

- From the Algebraic Definition Above Choose 1 to 5 Terms and Supply Associated Labels, eg., Term 1 R725 Label I M L

TERM 1_____ **LABEL**_____ =T1 ☐ OK
TERM 2_____ **LABEL**_____ =T2 ☐ OK
TERM 3_____ **LABEL**_____ =T3 ☐ OK
TERM 4_____ **LABEL**_____ =T4 ☐ OK
TERM 5_____ **LABEL**_____ =T5 ☐ OK
(3 char max.)

Fig. 3—Calculation Definition Form (Sheet 1 of 2) (2.04, 2.08, 8.02, 8.04)

Page_____of_____

Name_____ Telno_____

CCU USE ONLY

CALCULATION (ADD, CHANGE OR DELETE — CONTINUED)

- Choose One of the Following **TYPES OF THRESHOLD** For This Calculation

  THRESH TYPE ☐ OK

  - ☐ **UPPER BOUND** (calculated result printed when it equals or exceeds the threshold value)
  - ☐ **LOWER BOUND** (calculated result printed when it is equal to or less than the threshold value)
  - ☐ **LOWER/UPPER** (calculated result printed when it equals or exceeds the threshold range)
  - ☐ **NEVER PRINT** (the calculated res. will be stored in long term data stor. and can be printed as a slave)
  - ☐ **ALWAYS PRINT** (the calculated result will appear on every exception report regardless of threshold values)

- Choose A Pair of **VALUES** For the **THRESHOLD** _____/_____ (value 1 / value 2)

  THRESH VALUE ☐ OK

  NOTE:

  1) VALUE 1 corresponds to lower; value 2 to upper in LOWER/UPPER threshold type
  2) VALUE 1 corresponds to non-scheduled; value 2 to scheduled in LOWER BOUND and UPPER BOUND type thresholds (schedule referred to is threshold schedule for associated entity)
  3) No values need be specified with ALWAYS PRINT and NEVER PRINT threshold types

- Choose A **THRESHOLD SCHEDULE** From Those Defined With the Associated Entity _____ (1-3)

  THRESH SCHED ☐ OK

  NOTE: No schedule need be chosen for LOWER/UPPER, ALWAYS PRINT, or NEVER PRINT threshold values.

☐ **CHANGE** the Above Named **CALCULATION**

CHANGE ☐

Based on the type of change you wish to make fill in the appropriate line(s)

- Change the Current **HOURLY REPORT FORMAT LOCATION** _____ (ϕ-64)

  HR # ☐ OK

- Change the Current **THRESHOLD TYPE** and/or **VALUE** to:

  THRESHOLD TYPE (CHECK ONE)
  - ☐ **UPPER BOUND**
  - ☐ **LOWER BOUND**
  - ☐ **LOWER/UPPER**
  - ☐ **NEVER PRINT**
  - ☐ **ALWAYS PRINT**

  THRESH TYPE ☐ OK

  THRESHOLD VALUE_____/_____ (value 1 / value 2)

  THRESH VALUE ☐ OK

- Change the current **THRESHOLD SCHEDULE NUMBER** to_____ (1-3)

  THRESH SCHED ☐ OK

- Change the calculation **NAME** to_____ (8 char. max.)

  NAME ☐ OK

CCU OPERATIONS USE ONLY

ENTERED BY_____ DATE_____ NOTIFICATION SENT_____

Fig. 3—Calculation Definition Form (Sheet 2 of 2)
(2.04, 2.08, 8.02, 8.04)

Page_____of_____

Name_____ Telno_____

CCU USE ONLY

ENTITY ADD, CHANGE OR DELETE

ENTITY NAME_____
(UP TO 12 CHARACTERS)

Based on the function you wish to perform, fill in the appropriate lines.

☐ **DELETE** the Above Entity
NOTE: CALCULATIONS ASSOCIATED WITH THIS ENTRY ARE NOT AUTOMATICALLY DELETED.

☐ INSERT the New or Previously Deleted Entity Named Above Into the System
Please Provide:

- This Entity is Associated with **CHANNEL NUMBER**_____ (ϕ-99)
- Reports About This Entity Are to Appear on **D.A. TELETYPE NUMBER**_____ (ϕ-15)
- The Following **THRESHOLD SCHEDULE(S)** Will Be Used By the Calculations Defined Under This Entity Name:

SCHEDULE 1 From _____ (ϕ-23) to _____ (1-24), And _____ (2-23) To _____ (3-24), And _____ (4-23) To _____ (5-24)

(OPTIONAL) **SCHEDULE 2** From _____ (ϕ-23) to _____ (1-24), And _____ (2-23) To _____ (3-24), And _____ (4-23) To _____ (5-24)

(OPTIONAL) **SCHEDULE 3** From _____ (ϕ-23) to _____ (1-24), And _____ (2-23) To _____ (3-24), And _____ (4-23) To _____ (5-24)

- Hourly Reports Associated With This Entity Will Appear in the **HOURLY REPORT FORMAT** Named _____ (2 Char.)

☐ Change the Definition of the Entity Named Above
Based on the type of change you wish to make fill in only the appropriate line(s)

- Reports about this entity should now appear on **D.A. TELETYPE NUMBER**_____ (ϕ-15)
- Change the **THRESHOLD SCHEDULES** Which Will Be Used by the Calculations Defined Under This Entity Name to:

SCHEDULE 1 From_____ (ϕ-23) to _____ (1-24), And _____ (2-23) To _____ (3-24), And _____ (4-23) To _____ (5-24)

SCHEDULE 2 From _____ (ϕ-23) to _____ (1-24), And _____ (2-23) To _____ (3-24), And _____ (4-23) To _____ (5-24)

SCHEDULE 3 From _____ (ϕ-23) to _____ (1-24), And _____ (2-23) To _____ (3-24), And _____ (4-23) To _____ (5-24)

- Change the **ENTITY NAME** to _____ (UP TO 12 CHARACTERS)
- Change the **HOURLY REPORT FORMAT** Associated With This Entity to_____ (12 Char.)

CCU OPERATIONS ONLY

ENTERED BY_____ DATE_____ NOTIFICATION DATE_____

ENTITY NAME ☐ OK
☐ DELETE
☐ INSERT
CHAN # ☐ OK
DATTY # ☐ OK
☐ OK
☐ OK
☐ OK
HR FORMAT NAME ☐ OK
☐ CHANGE
DATTY # ☐ OK
☐ OK
☐ OK
☐ OK
ENTITY NAME ☐ OK
HR FORMAT NAME ☐ OK

Fig. 4—Entity Definition Form (2.04, 8.02, 8.04)

Page_____of_____

Name_____ Telno_____

CHANNEL DEFINITION (OTDC & ETDC) (ADD, CHANGE, OR DELETE)

CCU USE ONLY

Based on the Function You Wish to Perform Fill in Only the Appropriate Line(s)

☐ **DELETE** the Definition of Channel_____ (ϕ-99)

☐ **ADD** a New or Previously Deleted Channel to the System

PLEASE GIVE:

- **CHANNEL NUMBER**_____(ϕ-99)
- **DATA COLLECTION UNIT ID**_____(up to 11 characters)
- **SCHEDULE NUMBER** to be Associated With This Channel_____(ϕ-15)
- Have **CALCULATIONS** to Process This Channel's Data Been Defined and Do You Wish This Processing to Begin Now?_____(yes or no)
- Are the Data Collected on This Channel to be Placed on **MAGNETIC TAPE** For Downstream Processing Beginning Now?_____(yes or no)
- What **TYPE** of Device is Sending Data on This Channel_____(ETDC, OTDC)
- Are There any **TUR'S** Associated With This Channel?_____(yes or no)
- **INPUT ASSIGNMENTS** (Fill In Below)
- Should this channel be put on line._____(yes or no)

☐ Change the Definition of the Above Channel

Based on the Type of Change You Wish to Make Fill In Only the Appropriate Line(s)

Change the **DCU ID** to_____(up to 11 characters)

Change the Associated **SCHEDULE NUMBER** to_____(ϕ-15)

Change the **TUR STATUS**

(circle one) Yes — There Are TURS on This Channel Where None Existed Before
No — All TUR'S Have Been Removed From This Channel

Change the **INPUT ASSIGNMENT** As Follows:

INPUT ASSIGNMENTS

(Lowest Ranges First, Individual Values From ϕ-1023 on ETDC)

DECADE SCALED INPUTS_____

USAGE SCANNING INPUTS (ETDC ONLY)_____

NON SCALED INPUTS (ETDC ONLY)_____

DISCRETE INPUTS (ETDC, EADAS PHASE NM ONLY)_____

CCU OPERATIONS ONLY

ENTERED BY_____DATE_____NOTIFICATION DATE_____

☐ DELETE

☐ ADD

CHAN # ☐ OK

DCUID ☐ OK

SCHED # ☐ OK

CALCS ON? ☐ Y ☐ N

MT? ☐ Y ☐ N

TUR? ☐ Y ☐ N

CHANTYPE ☐ OK

PUT ON LINE ☐ Y ☐ N

☐ CHANGE

DCUID ☐ OK

SCHED # ☐ OK

TUR? ☐ Y ☐ N

SCALED REGS = ☐ OK

USAGE REGS = ☐ OK

PEG REGS = ☐ OK

DISCRETE INPUTS = ☐ OK

Fig. 5—Channel Definition Form (2.04, 8.02, 8.04)

COEFFICIENT OF VARIATION OF TUR MEASUREMENT

The tables in this Figure provide estimates of the coefficient of variation of TUR measurements for three traffic measurement apparatus arrangements as follows:

Length of Measurement Period	TUR Scan Interval
30 min.	20 sec.
30 min.	10 sec.
15 min.	10 sec.

The tables cover two to twelve servers, holding times ranging from 0.25 to 12.0 sec., and server occupancies ranging from 0.10 to 0.95, and are intended for use in setting EADAS calculation thresholds in all common control switching systems.

The pertinent assumptions used for calculating these particular tables were as follows:

a) Random traffic originations (i.e., exponentially distributed interarrival times) from an infinite number of sources.

b) Exponentially distributed service times.

c) Calls arriving when one or more servers are idle start service immediately.

d) Calls arriving when all servers are busy are placed in a queue if an idle queuing position is available. Defections from the queue are not allowed. Sufficient queue positions were provided for in these runs so as to ensure that the load carried by the servers would be equal to or greater than 99.5 percent of the offered load.

Fig. 6—Coefficient of Variation of TUR Measurement Tables (Sheet 1 of 12) (7.07, 7.08, 7.10)

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 20 SEC.

NO. OF CKTS IN GRP = 2

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.2336	0.2336	0.2336	0.2336	0.2336	0.2354	0.2428	0.2546	0.2689	0.2841
0.20	0.1610	0.1610	0.1610	0.1610	0.1611	0.1630	0.1691	0.1782	0.1887	0.1998
0.30	0.1263	0.1263	0.1263	0.1263	0.1265	0.1291	0.1352	0.1434	0.1524	0.1618
0.40	0.1035	0.1035	0.1035	0.1035	0.1039	0.1075	0.1140	0.1219	0.1302	0.1387
0.50	0.0861	0.0861	0.0861	0.0861	0.0871	0.0919	0.0989	0.1067	0.1146	0.1225
0.60	0.0714	0.0714	0.0715	0.0717	0.0734	0.0796	0.0872	0.0950	0.1027	0.1101
0.70	0.0580	0.0581	0.0584	0.0589	0.0618	0.0695	0.0776	0.0854	0.0929	0.0999
0.75	0.0515	0.0517	0.0522	0.0529	0.0565	0.0649	0.0732	0.0810	0.0883	0.0950
0.80	0.0449	0.0454	0.0461	0.0470	0.0513	0.0604	0.0688	0.0765	0.0834	0.0898
0.85	0.0381	0.0390	0.0400	0.0412	0.0462	0.0558	0.0642	0.0714	0.0779	0.0836
0.90	0.0309	0.0322	0.0336	0.0350	0.0406	0.0502	0.0579	0.0644	0.0698	0.0746
0.95	0.0228	0.0244	0.0261	0.0276	0.0332	0.0415	0.0475	0.0522	0.0561	0.0594

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 20 SEC.

NO. OF CKTS IN GRP = 3

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1921	0.1921	0.1921	0.1921	0.1921	0.1934	0.1991	0.2086	0.2200	0.2324
0.20	0.1344	0.1344	0.1344	0.1344	0.1344	0.1355	0.1398	0.1468	0.1551	0.1639
0.30	0.1071	0.1071	0.1071	0.1071	0.1072	0.1085	0.1126	0.1187	0.1257	0.1331
0.40	0.0892	0.0892	0.0892	0.0892	0.0893	0.0911	0.0955	0.1013	0.1077	0.1143
0.50	0.0752	0.0752	0.0752	0.0752	0.0755	0.0782	0.0830	0.0888	0.0949	0.1011
0.60	0.0631	0.0631	0.0631	0.0632	0.0640	0.0678	0.0732	0.0791	0.0851	0.0910
0.70	0.0518	0.0519	0.0520	0.0522	0.0538	0.0590	0.0650	0.0711	0.0770	0.0827
0.75	0.0462	0.0463	0.0465	0.0469	0.0491	0.0550	0.0613	0.0674	0.0733	0.0788
0.80	0.0405	0.0407	0.0411	0.0416	0.0444	0.0510	0.0575	0.0637	0.0694	0.0747
0.85	0.0344	0.0349	0.0355	0.0363	0.0398	0.0470	0.0537	0.0597	0.0651	0.0701
0.90	0.0279	0.0287	0.0296	0.0307	0.0349	0.0426	0.0491	0.0547	0.0595	0.0638
0.95	0.0203	0.0215	0.0228	0.0240	0.0285	0.0356	0.0409	0.0451	0.0487	0.0517

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 20 SEC.

NO. OF CKTS IN GRP = 4

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1666	0.1666	0.1666	0.1666	0.1666	0.1677	0.1726	0.1808	0.1907	0.2013
0.20	0.1173	0.1173	0.1173	0.1173	0.1173	0.1181	0.1217	0.1275	0.1346	0.1422
0.30	0.0944	0.0944	0.0944	0.0944	0.0944	0.0953	0.0985	0.1035	0.1094	0.1157
0.40	0.0795	0.0795	0.0795	0.0795	0.0795	0.0806	0.0839	0.0886	0.0940	0.0996
0.50	0.0677	0.0677	0.0677	0.0677	0.0679	0.0696	0.0732	0.0779	0.0830	0.0882
0.60	0.0575	0.0575	0.0575	0.0575	0.0579	0.0605	0.0646	0.0695	0.0745	0.0795
0.70	0.0476	0.0476	0.0477	0.0478	0.0488	0.0526	0.0574	0.0624	0.0674	0.0723
0.75	0.0426	0.0427	0.0428	0.0430	0.0445	0.0490	0.0541	0.0592	0.0642	0.0690
0.80	0.0374	0.0376	0.0378	0.0382	0.0402	0.0454	0.0508	0.0561	0.0610	0.0656
0.85	0.0319	0.0322	0.0327	0.0332	0.0359	0.0418	0.0475	0.0527	0.0575	0.0619
0.90	0.0259	0.0264	0.0271	0.0279	0.0313	0.0377	0.0433	0.0483	0.0526	0.0565
0.95	0.0188	0.0197	0.0207	0.0218	0.0256	0.0319	0.0367	0.0406	0.0439	0.0467

Fig. 6—Coefficient of Variation of TUR Measurement Tables (Sheet 2 of 12) (7.07, 7.08, 7.10)

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUP SCAN INTEPVAL = 20 SEC.

NO. OF CKTS IN GRP = 5

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1491	0.1491	0.1491	0.1491	0.1491	0.1501	0.1544	0.1617	0.1705	0.1801
0.20	0.1052	0.1052	0.1052	0.1052	0.1052	0.1059	0.1091	0.1142	0.1205	0.1273
0.30	0.0852	0.0852	0.0852	0.0852	0.0852	0.0859	0.0886	0.0929	0.0981	0.1037
0.40	0.0723	0.0723	0.0723	0.0723	0.0723	0.0731	0.0757	0.0798	0.0844	0.0894
0.50	0.0622	0.0622	0.0622	0.0622	0.0622	0.0634	0.0663	0.0703	0.0747	0.0793
0.60	0.0532	0.0532	0.0532	0.0532	0.0534	0.0553	0.0587	0.0628	0.0671	0.0715
0.70	0.0444	0.0444	0.0445	0.0445	0.0452	0.0481	0.0521	0.0564	0.0608	0.0651
0.75	0.0399	0.0399	0.0400	0.0401	0.0412	0.0448	0.0491	0.0536	0.0579	0.0621
0.80	0.0352	0.0353	0.0354	0.0357	0.0372	0.0415	0.0462	0.0507	0.0551	0.0592
0.85	0.0301	0.0303	0.0306	0.0310	0.0332	0.0382	0.0432	0.0478	0.0521	0.0560
0.90	0.0244	0.0248	0.0254	0.0260	0.0289	0.0345	0.0395	0.0440	0.0480	0.0516
0.95	0.0177	0.0184	0.0193	0.0201	0.0234	0.0290	0.0335	0.0371	0.0403	0.0430

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 20 SEC.

NO. OF CKTS IN GRP = 6

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1361	0.1361	0.1361	0.1361	0.1361	0.1370	0.1410	0.1476	0.1557	0.1644
0.20	0.0961	0.0961	0.0961	0.0961	0.0962	0.0968	0.0996	0.1043	0.1101	0.1162
0.30	0.0781	0.0781	0.0781	0.0781	0.0781	0.0787	0.0811	0.0850	0.0897	0.0948
0.40	0.0667	0.0667	0.0667	0.0667	0.0667	0.0673	0.0696	0.0731	0.0773	0.0818
0.50	0.0578	0.0578	0.0578	0.0578	0.0578	0.0587	0.0611	0.0646	0.0685	0.0726
0.60	0.0498	0.0498	0.0498	0.0498	0.0499	0.0514	0.0542	0.0578	0.0616	0.0656
0.70	0.0419	0.0419	0.0419	0.0420	0.0424	0.0448	0.0482	0.0520	0.0559	0.0597
0.75	0.0378	0.0378	0.0378	0.0379	0.0387	0.0416	0.0454	0.0493	0.0532	0.0570
0.80	0.0334	0.0334	0.0335	0.0337	0.0349	0.0385	0.0426	0.0467	0.0506	0.0544
0.85	0.0286	0.0288	0.0290	0.0293	0.0311	0.0354	0.0398	0.0440	0.0479	0.0515
0.90	0.0233	0.0236	0.0240	0.0246	0.0270	0.0319	0.0365	0.0406	0.0442	0.0476
0.95	0.0169	0.0175	0.0182	0.0189	0.0218	0.0268	0.0309	0.0344	0.0374	0.0400

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 20 SEC.

NO. OF CKTS IN GRP = 7

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1260	0.1260	0.1260	0.1260	0.1260	0.1268	0.1305	0.1367	0.1441	0.1522
0.20	0.0891	0.0891	0.0891	0.0891	0.0891	0.0897	0.0923	0.0966	0.1019	0.1076
0.30	0.0725	0.0725	0.0725	0.0725	0.0725	0.0730	0.0752	0.0788	0.0831	0.0878
0.40	0.0621	0.0621	0.0621	0.0621	0.0621	0.0627	0.0647	0.0679	0.0717	0.0758
0.50	0.0542	0.0542	0.0542	0.0542	0.0542	0.0548	0.0570	0.0601	0.0637	0.0674
0.60	0.0470	0.0470	0.0470	0.0470	0.0471	0.0482	0.0506	0.0538	0.0573	0.0609
0.70	0.0398	0.0398	0.0398	0.0398	0.0402	0.0421	0.0451	0.0485	0.0520	0.0555
0.75	0.0360	0.0360	0.0360	0.0361	0.0367	0.0391	0.0424	0.0460	0.0496	0.0530
0.80	0.0319	0.0320	0.0320	0.0322	0.0331	0.0362	0.0398	0.0435	0.0471	0.0506
0.85	0.0274	0.0275	0.0277	0.0280	0.0295	0.0332	0.0372	0.0410	0.0446	0.0480
0.90	0.0223	0.0226	0.0229	0.0234	0.0255	0.0299	0.0340	0.0378	0.0413	0.0444
0.95	0.0162	0.0167	0.0173	0.0179	0.0205	0.0251	0.0289	0.0322	0.0351	0.0376

Fig. 6—Coefficient of Variation of TUR Measurement Tables (Sheet 3 of 12) (7.07, 7.08, 7.10)

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 20 SEC.

NO. OF CKTS IN GRP = 8

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1179	0.1179	0.1179	0.1179	0.1179	0.1186	0.1221	0.1278	0.1348	0.1424
0.20	0.0833	0.0833	0.0833	0.0833	0.0833	0.0839	0.0863	0.0904	0.0953	0.1007
0.30	0.0679	0.0679	0.0679	0.0679	0.0679	0.0684	0.0704	0.0737	0.0778	0.0822
0.40	0.0584	0.0584	0.0584	0.0584	0.0584	0.0588	0.0607	0.0636	0.0672	0.0710
0.50	0.0511	0.0511	0.0511	0.0511	0.0511	0.0517	0.0536	0.0564	0.0597	0.0632
0.60	0.0446	0.0446	0.0446	0.0446	0.0447	0.0456	0.0477	0.0506	0.0538	0.0572
0.70	0.0380	0.0380	0.0380	0.0381	0.0383	0.0399	0.0425	0.0456	0.0489	0.0521
0.75	0.0345	0.0345	0.0345	0.0346	0.0350	0.0371	0.0400	0.0433	0.0466	0.0498
0.80	0.0307	0.0307	0.0307	0.0308	0.0316	0.0343	0.0376	0.0410	0.0443	0.0475
0.85	0.0264	0.0265	0.0266	0.0268	0.0281	0.0315	0.0351	0.0386	0.0419	0.0451
0.90	0.0216	0.0217	0.0220	0.0224	0.0243	0.0282	0.0320	0.0356	0.0388	0.0418
0.95	0.0156	0.0161	0.0166	0.0171	0.0194	0.0237	0.0273	0.0304	0.0331	0.0355

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 20 SEC.

NO. OF CKTS IN GRP = 9

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1111	0.1111	0.1111	0.1111	0.1111	0.1119	0.1151	0.1205	0.1271	0.1342
0.20	0.0786	0.0786	0.0786	0.0786	0.0786	0.0791	0.0814	0.0852	0.0899	0.0949
0.30	0.0641	0.0641	0.0641	0.0641	0.0641	0.0645	0.0664	0.0696	0.0734	0.0775
0.40	0.0552	0.0552	0.0552	0.0552	0.0552	0.0556	0.0573	0.0601	0.0634	0.0670
0.50	0.0485	0.0485	0.0485	0.0485	0.0485	0.0490	0.0507	0.0533	0.0564	0.0597
0.60	0.0426	0.0426	0.0426	0.0426	0.0426	0.0434	0.0453	0.0479	0.0509	0.0540
0.70	0.0365	0.0365	0.0365	0.0365	0.0367	0.0380	0.0404	0.0432	0.0462	0.0493
0.75	0.0332	0.0332	0.0332	0.0332	0.0336	0.0354	0.0380	0.0410	0.0441	0.0471
0.80	0.0296	0.0296	0.0296	0.0297	0.0304	0.0327	0.0357	0.0388	0.0419	0.0449
0.85	0.0256	0.0256	0.0257	0.0259	0.0270	0.0300	0.0333	0.0365	0.0397	0.0426
0.90	0.0209	0.0210	0.0213	0.0216	0.0232	0.0268	0.0304	0.0337	0.0367	0.0395
0.95	0.0152	0.0155	0.0160	0.0165	0.0186	0.0225	0.0259	0.0288	0.0314	0.0338

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 20 SEC.

NO. OF CKTS IN GRP = 10

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1054	0.1054	0.1054	0.1054	0.1054	0.1061	0.1092	0.1143	0.1206	0.1273
0.20	0.0745	0.0745	0.0745	0.0745	0.0745	0.0750	0.0772	0.0809	0.0853	0.0900
0.30	0.0608	0.0608	0.0608	0.0608	0.0608	0.0612	0.0630	0.0660	0.0696	0.0735
0.40	0.0525	0.0525	0.0525	0.0525	0.0525	0.0528	0.0544	0.0570	0.0602	0.0636
0.50	0.0463	0.0463	0.0463	0.0463	0.0463	0.0467	0.0483	0.0507	0.0536	0.0567
0.60	0.0408	0.0408	0.0408	0.0408	0.0408	0.0414	0.0432	0.0456	0.0484	0.0513
0.70	0.0351	0.0351	0.0351	0.0352	0.0353	0.0364	0.0386	0.0412	0.0440	0.0469
0.75	0.0321	0.0321	0.0321	0.0321	0.0323	0.0339	0.0363	0.0391	0.0420	0.0448
0.80	0.0286	0.0287	0.0287	0.0287	0.0293	0.0314	0.0341	0.0370	0.0399	0.0427
0.85	0.0248	0.0248	0.0249	0.0250	0.0260	0.0287	0.0318	0.0348	0.0378	0.0406
0.90	0.0203	0.0204	0.0206	0.0209	0.0223	0.0257	0.0290	0.0321	0.0349	0.0376
0.95	0.0148	0.0151	0.0155	0.0159	0.0178	0.0214	0.0246	0.0275	0.0300	0.0322

Fig. 6—Coefficient of Variation of TUR Measurement Tables (Sheet 4 of 12) (7.07, 7.08, 7.10)

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 20 SEC.

NO. OF CKTS IN GRP = 11

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1005	0.1005	0.1005	0.1005	0.1005	0.1012	0.1041	0.1090	0.1150	0.1214
0.20	0.0711	0.0711	0.0711	0.0711	0.0711	0.0715	0.0736	0.0771	0.0813	0.0859
0.30	0.0580	0.0580	0.0580	0.0580	0.0580	0.0584	0.0601	0.0629	0.0664	0.0701
0.40	0.0501	0.0501	0.0501	0.0501	0.0501	0.0504	0.0519	0.0544	0.0574	0.0607
0.50	0.0443	0.0443	0.0443	0.0443	0.0443	0.0447	0.0461	0.0484	0.0512	0.0541
0.60	0.0392	0.0392	0.0392	0.0392	0.0392	0.0398	0.0413	0.0436	0.0463	0.0490
0.70	0.0339	0.0339	0.0339	0.0339	0.0340	0.0350	0.0370	0.0394	0.0421	0.0448
0.75	0.0310	0.0310	0.0310	0.0310	0.0313	0.0326	0.0349	0.0374	0.0401	0.0428
0.80	0.0278	0.0278	0.0278	0.0278	0.0283	0.0302	0.0327	0.0354	0.0382	0.0409
0.85	0.0241	0.0241	0.0242	0.0243	0.0251	0.0276	0.0304	0.0333	0.0361	0.0388
0.90	0.0198	0.0199	0.0200	0.0203	0.0216	0.0246	0.0277	0.0307	0.0334	0.0360
0.95	0.0144	0.0147	0.0150	0.0154	0.0172	0.0205	0.0236	0.0263	0.0287	0.0309

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 20 SEC.

NO. OF CKTS IN GRP = 12

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.0962	0.0962	0.0962	0.0962	0.0962	0.0969	0.0997	0.1044	0.1101	0.1162
0.20	0.0680	0.0680	0.0680	0.0680	0.0680	0.0685	0.0705	0.0738	0.0778	0.0822
0.30	0.0555	0.0555	0.0555	0.0555	0.0555	0.0559	0.0575	0.0603	0.0636	0.0671
0.40	0.0480	0.0480	0.0480	0.0480	0.0480	0.0483	0.0498	0.0521	0.0550	0.0581
0.50	0.0425	0.0425	0.0425	0.0425	0.0425	0.0429	0.0442	0.0464	0.0490	0.0518
0.60	0.0378	0.0378	0.0378	0.0378	0.0378	0.0383	0.0397	0.0419	0.0444	0.0470
0.70	0.0329	0.0329	0.0329	0.0329	0.0329	0.0338	0.0356	0.0379	0.0404	0.0430
0.75	0.0301	0.0301	0.0301	0.0301	0.0303	0.0315	0.0336	0.0360	0.0385	0.0411
0.80	0.0270	0.0270	0.0270	0.0271	0.0274	0.0291	0.0315	0.0340	0.0366	0.0392
0.85	0.0235	0.0235	0.0236	0.0237	0.0244	0.0266	0.0293	0.0320	0.0346	0.0372
0.90	0.0193	0.0194	0.0195	0.0197	0.0209	0.0237	0.0266	0.0294	0.0320	0.0345
0.95	0.0141	0.0143	0.0146	0.0150	0.0166	0.0198	0.0226	0.0252	0.0275	0.0296

CCEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 2

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1651	0.1651	0.1651	0.1652	0.1665	0.1801	0.2011	0.2231	0.2444	0.2645
0.20	0.1139	0.1139	0.1139	0.1139	0.1153	0.1261	0.1415	0.1573	0.1724	0.1867
0.30	0.0893	0.0893	0.0893	0.0894	0.0913	0.1014	0.1146	0.1278	0.1403	0.1520
0.40	0.0732	0.0732	0.0733	0.0735	0.0761	0.0863	0.0983	0.1100	0.1209	0.1312
0.50	0.0609	0.0609	0.0611	0.0616	0.0650	0.0756	0.0869	0.0976	0.1075	0.1168
0.60	0.0505	0.0507	0.0512	0.0519	0.0564	0.0674	0.0783	0.0883	0.0974	0.1059
0.70	0.0411	0.0416	0.0426	0.0437	0.0492	0.0607	0.0713	0.0807	0.0891	0.0969
0.75	0.0366	0.0374	0.0386	0.0400	0.0460	0.0577	0.0681	0.0771	0.0852	0.0926
0.80	0.0321	0.0333	0.0348	0.0363	0.0429	0.0547	0.0647	0.0734	0.0810	0.0878
0.85	0.0275	0.0292	0.0310	0.0328	0.0398	0.0516	0.0611	0.0691	0.0761	0.0822
0.90	0.0228	0.0248	0.0269	0.0289	0.0361	0.0473	0.0558	0.0627	0.0685	0.0735
0.95	0.0173	0.0197	0.0219	0.0239	0.0305	0.0398	0.0462	0.0512	0.0553	0.0587

Fig. 6—Coefficient of Variation of TUR Measurement Tables (Sheet 5 of 12) (7.07, 7.08, 7.10)

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 3

	AVERAGE HOLDING TIME (SEC)									
OCCUPANCY	0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1358	0.1358	0.1358	0.1358	0.1368	0.1475	0.1645	0.1823	0.1996	0.2161
0.20	0.0950	0.0950	0.0950	0.0950	0.0958	0.1038	0.1160	0.1288	0.1410	0.1527
0.30	0.0758	0.0758	0.0758	0.0758	0.0767	0.0840	0.0942	0.1048	0.1149	0.1245
0.40	0.0631	0.0631	0.0631	0.0631	0.0644	0.0717	0.0810	0.0903	0.0992	0.1075
0.50	0.0532	0.0532	0.0532	0.0534	0.0553	0.0629	0.0717	0.0802	0.0883	0.0958
0.60	0.0446	0.0447	0.0449	0.0453	0.0480	0.0560	0.0646	0.0726	0.0800	0.0869
0.70	0.0367	0.0369	0.0374	0.0381	0.0418	0.0505	0.0588	0.0664	0.0734	0.0797
0.75	0.0327	0.0332	0.0339	0.0347	0.0389	0.0479	0.0562	0.0636	0.0703	0.0764
0.80	0.0288	0.0294	0.0304	0.0314	0.0362	0.0454	0.0535	0.0606	0.0670	0.0728
0.85	0.0246	0.0257	0.0269	0.0282	0.0334	0.0428	0.0506	0.0574	0.0634	0.0686
0.90	0.0203	0.0217	0.0233	0.0248	0.0305	0.0397	0.0471	0.0531	0.0583	0.0627
0.95	0.0152	0.0170	0.0188	0.0204	0.0259	0.0339	0.0397	0.0442	0.0479	0.0511

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 4

	AVERAGE HOLDING TIME (SEC)									
OCCUPANCY	0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1178	0.1178	0.1178	0.1178	0.1186	0.1279	0.1425	0.1580	0.1729	0.1872
0.20	0.0829	0.0829	0.0829	0.0829	0.0835	0.0902	0.1007	0.1116	0.1222	0.1323
0.30	0.0668	0.0668	0.0668	0.0668	0.0674	0.0732	0.0819	0.0910	0.0997	0.1079
0.40	0.0562	0.0562	0.0562	0.0562	0.0570	0.0627	0.0705	0.0785	0.0861	0.0933
0.50	0.0479	0.0479	0.0479	0.0480	0.0492	0.0551	0.0625	0.0698	0.0767	0.0832
0.60	0.0406	0.0406	0.0407	0.0409	0.0428	0.0492	0.0563	0.0632	0.0696	0.0755
0.70	0.0337	0.0338	0.0341	0.0345	0.0372	0.0443	0.0513	0.0579	0.0639	0.0694
0.75	0.0302	0.0304	0.0309	0.0315	0.0347	0.0420	0.0491	0.0555	0.0613	0.0666
0.80	0.0266	0.0270	0.0276	0.0284	0.0322	0.0399	0.0468	0.0531	0.0586	0.0637
0.85	0.0228	0.0235	0.0244	0.0254	0.0297	0.0377	0.0445	0.0505	0.0557	0.0604
0.90	0.0187	0.0198	0.0210	0.0222	0.0269	0.0348	0.0413	0.0467	0.0514	0.0555
0.95	0.0140	0.0154	0.0169	0.0183	0.0230	0.0302	0.0355	0.0397	0.0431	0.0461

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 5

	AVERAGE HOLDING TIME (SEC)									
OCCUPANCY	0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1054	0.1054	0.1054	0.1054	0.1061	0.1144	0.1275	0.1413	0.1547	0.1674
0.20	0.0744	0.0744	0.0744	0.0744	0.0749	0.0808	0.0901	0.0999	0.1094	0.1184
0.30	0.0602	0.0602	0.0602	0.0602	0.0607	0.0657	0.0734	0.0815	0.0892	0.0966
0.40	0.0511	0.0511	0.0511	0.0511	0.0517	0.0564	0.0633	0.0703	0.0771	0.0835
0.50	0.0440	0.0440	0.0440	0.0440	0.0448	0.0497	0.0562	0.0626	0.0687	0.0745
0.60	0.0376	0.0376	0.0377	0.0378	0.0391	0.0444	0.0507	0.0567	0.0624	0.0677
0.70	0.0314	0.0315	0.0317	0.0320	0.0341	0.0400	0.0462	0.0520	0.0573	0.0622
0.75	0.0282	0.0284	0.0287	0.0291	0.0317	0.0380	0.0442	0.0498	0.0550	0.0598
0.80	0.0249	0.0252	0.0257	0.0263	0.0294	0.0360	0.0422	0.0478	0.0528	0.0574
0.85	0.0214	0.0219	0.0227	0.0235	0.0271	0.0341	0.0402	0.0456	0.0503	0.0546
0.90	0.0176	0.0184	0.0194	0.0205	0.0246	0.0317	0.0375	0.0425	0.0468	0.0506
0.95	0.0130	0.0143	0.0155	0.0167	0.0209	0.0273	0.0323	0.0362	0.0395	0.0424

Fig. 6—Coefficient of Variation of TUR Measurement Tables (Sheet 6 of 12) (7.07, 7.08, 7.10)

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 6

	AVERAGE HOLDING TIME (SEC)									
OCCUPANCY	0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.0962	0.0962	0.0962	0.0962	0.0969	0.1044	0.1164	0.1290	0.1412	0.1528
0.20	0.0680	0.0680	0.0680	0.0680	0.0685	0.0738	0.0823	0.0912	0.0998	0.1081
0.30	0.0552	0.0552	0.0552	0.0552	0.0556	0.0601	0.0671	0.0744	0.0815	0.0882
0.40	0.0471	0.0471	0.0471	0.0471	0.0476	0.0517	0.0579	0.0643	0.0705	0.0763
0.50	0.0408	0.0408	0.0408	0.0409	0.0415	0.0457	0.0514	0.0573	0.0628	0.0681
0.60	0.0352	0.0352	0.0352	0.0353	0.0363	0.0409	0.0464	0.0519	0.0571	0.0619
0.70	0.0296	0.0297	0.0298	0.0300	0.0317	0.0368	0.0423	0.0476	0.0524	0.0570
0.75	0.0267	0.0268	0.0270	0.0274	0.0295	0.0350	0.0405	0.0457	0.0504	0.0547
0.80	0.0236	0.0238	0.0242	0.0247	0.0273	0.0331	0.0387	0.0438	0.0483	0.0525
0.85	0.0203	0.0207	0.0213	0.0220	0.0251	0.0313	0.0369	0.0418	0.0462	0.0501
0.90	0.0167	0.0174	0.0182	0.0191	0.0227	0.0291	0.0344	0.0390	0.0430	0.0466
0.95	0.0124	0.0134	0.0145	0.0155	0.0192	0.0252	0.0298	0.0335	0.0367	0.0394

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 7

	AVERAGE HOLDING TIME (SEC)									
OCCUPANCY	0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.0891	0.0891	0.0891	0.0891	0.0897	0.0967	0.1077	0.1194	0.1307	0.1415
0.20	0.0630	0.0630	0.0630	0.0630	0.0634	0.0684	0.0762	0.0844	0.0924	0.1000
0.30	0.0513	0.0513	0.0513	0.0513	0.0516	0.0557	0.0622	0.0689	0.0755	0.0817
0.40	0.0439	0.0439	0.0439	0.0439	0.0443	0.0480	0.0537	0.0596	0.0653	0.0707
0.50	0.0383	0.0383	0.0383	0.0383	0.0388	0.0425	0.0477	0.0531	0.0582	0.0631
0.60	0.0332	0.0332	0.0332	0.0333	0.0341	0.0381	0.0432	0.0482	0.0529	0.0574
0.70	0.0282	0.0282	0.0282	0.0284	0.0298	0.0343	0.0394	0.0442	0.0487	0.0528
0.75	0.0255	0.0255	0.0257	0.0259	0.0277	0.0326	0.0376	0.0424	0.0467	0.0508
0.80	0.0226	0.0227	0.0230	0.0234	0.0256	0.0309	0.0360	0.0406	0.0449	0.0488
0.85	0.0195	0.0198	0.0203	0.0208	0.0236	0.0292	0.0343	0.0388	0.0429	0.0466
0.90	0.0160	0.0165	0.0173	0.0180	0.0212	0.0270	0.0320	0.0363	0.0401	0.0434
0.95	0.0118	0.0127	0.0136	0.0146	0.0179	0.0234	0.0277	0.0313	0.0344	0.0370

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 8

	AVERAGE HOLDING TIME (SEC)									
OCCUPANCY	0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.0833	0.0833	0.0833	0.0833	0.0839	0.0904	0.1008	0.1117	0.1223	0.1323
0.20	0.0589	0.0589	0.0589	0.0589	0.0593	0.0639	0.0713	0.0790	0.0865	0.0936
0.30	0.0480	0.0480	0.0480	0.0480	0.0484	0.0522	0.0582	0.0645	0.0706	0.0764
0.40	0.0413	0.0413	0.0413	0.0413	0.0416	0.0450	0.0503	0.0558	0.0611	0.0661
0.50	0.0362	0.0362	0.0362	0.0362	0.0366	0.0399	0.0447	0.0497	0.0545	0.0591
0.60	0.0316	0.0316	0.0316	0.0316	0.0322	0.0358	0.0405	0.0451	0.0496	0.0537
0.70	0.0269	0.0269	0.0270	0.0271	0.0282	0.0323	0.0369	0.0414	0.0456	0.0495
0.75	0.0244	0.0244	0.0245	0.0248	0.0263	0.0307	0.0353	0.0397	0.0438	0.0476
0.80	0.0217	0.0218	0.0220	0.0224	0.0243	0.0291	0.0338	0.0381	0.0421	0.0457
0.85	0.0187	0.0190	0.0194	0.0199	0.0223	0.0274	0.0321	0.0364	0.0402	0.0437
0.90	0.0154	0.0159	0.0165	0.0172	0.0200	0.0254	0.0300	0.0340	0.0376	0.0408
0.95	0.0114	0.0121	0.0130	0.0138	0.0169	0.0220	0.0261	0.0295	0.0324	0.0350

Fig. 6—Coefficient of Variation of TUR Measurement Tables (Sheet 7 of 12) (7.07, 7.08, 7.10)

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 9

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.0786	0.0786	0.0786	0.0786	0.0791	0.0853	0.0950	0.1053	0.1153	0.1248
0.20	0.0556	0.0556	0.0556	0.0556	0.0559	0.0603	0.0672	0.0745	0.0815	0.0882
0.30	0.0453	0.0453	0.0453	0.0453	0.0456	0.0492	0.0548	0.0608	0.0666	0.0720
0.40	0.0390	0.0390	0.0390	0.0390	0.0393	0.0425	0.0474	0.0526	0.0576	0.0624
0.50	0.0343	0.0343	0.0343	0.0343	0.0347	0.0377	0.0423	0.0469	0.0514	0.0557
0.60	0.0301	0.0301	0.0301	0.0301	0.0307	0.0339	0.0383	0.0426	0.0468	0.0507
0.70	0.0258	0.0258	0.0258	0.0259	0.0269	0.0306	0.0349	0.0391	0.0430	0.0467
0.75	0.0235	0.0235	0.0236	0.0237	0.0250	0.0291	0.0334	0.0375	0.0414	0.0449
0.80	0.0209	0.0210	0.0212	0.0215	0.0232	0.0275	0.0319	0.0360	0.0397	0.0432
0.85	0.0181	0.0183	0.0186	0.0191	0.0212	0.0260	0.0304	0.0344	0.0380	0.0413
0.90	0.0149	0.0153	0.0158	0.0164	0.0190	0.0240	0.0284	0.0322	0.0355	0.0386
0.95	0.0110	0.0117	0.0124	0.0132	0.0160	0.0208	0.0247	0.0279	0.0307	0.0332

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 10

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.0745	0.0745	0.0745	0.0745	0.0750	0.0809	0.0901	0.0999	0.1094	0.1184
0.20	0.0527	0.0527	0.0527	0.0527	0.0531	0.0572	0.0637	0.0706	0.0773	0.0837
0.30	0.0430	0.0430	0.0430	0.0430	0.0433	0.0467	0.0520	0.0577	0.0631	0.0683
0.40	0.0371	0.0371	0.0371	0.0371	0.0374	0.0404	0.0450	0.0499	0.0547	0.0592
0.50	0.0327	0.0327	0.0327	0.0327	0.0330	0.0359	0.0401	0.0446	0.0488	0.0529
0.60	0.0288	0.0288	0.0288	0.0289	0.0293	0.0323	0.0364	0.0405	0.0444	0.0481
0.70	0.0249	0.0249	0.0249	0.0249	0.0258	0.0292	0.0332	0.0372	0.0409	0.0444
0.75	0.0227	0.0227	0.0227	0.0229	0.0240	0.0277	0.0318	0.0357	0.0393	0.0427
0.80	0.0203	0.0203	0.0205	0.0207	0.0222	0.0262	0.0303	0.0342	0.0377	0.0410
0.85	0.0176	0.0177	0.0180	0.0184	0.0203	0.0247	0.0289	0.0327	0.0361	0.0392
0.90	0.0144	0.0148	0.0153	0.0158	0.0182	0.0228	0.0269	0.0305	0.0338	0.0367
0.95	0.0107	0.0113	0.0119	0.0126	0.0153	0.0198	0.0234	0.0266	0.0293	0.0317

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 11

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.0711	0.0711	0.0711	0.0711	0.0715	0.0771	0.0859	0.0953	0.1043	0.1129
0.20	0.0503	0.0503	0.0503	0.0503	0.0506	0.0545	0.0608	0.0674	0.0737	0.0798
0.30	0.0410	0.0410	0.0410	0.0410	0.0413	0.0445	0.0496	0.0550	0.0602	0.0652
0.40	0.0354	0.0354	0.0354	0.0354	0.0357	0.0385	0.0429	0.0476	0.0521	0.0564
0.50	0.0313	0.0313	0.0313	0.0313	0.0316	0.0343	0.0383	0.0425	0.0466	0.0504
0.60	0.0277	0.0277	0.0277	0.0277	0.0281	0.0309	0.0347	0.0386	0.0424	0.0459
0.70	0.0240	0.0240	0.0240	0.0241	0.0248	0.0279	0.0317	0.0355	0.0390	0.0423
0.75	0.0219	0.0219	0.0220	0.0221	0.0231	0.0265	0.0304	0.0341	0.0375	0.0407
0.80	0.0197	0.0197	0.0198	0.0200	0.0214	0.0251	0.0290	0.0326	0.0360	0.0391
0.85	0.0171	0.0172	0.0174	0.0178	0.0195	0.0236	0.0276	0.0312	0.0344	0.0374
0.90	0.0140	0.0143	0.0148	0.0153	0.0175	0.0218	0.0257	0.0291	0.0322	0.0350
0.95	0.0104	0.0109	0.0115	0.0122	0.0146	0.0189	0.0224	0.0254	0.0280	0.0303

Fig. 6—Coefficient of Variation of TUR Measurement Tables (Sheet 8 of 12) (7.07, 7.08, 7.10)

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 30 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 12

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.0680	0.0680	0.0680	0.0680	0.0685	0.0738	0.0823	0.0912	0.0999	0.1081
0.20	0.0481	0.0481	0.0481	0.0481	0.0484	0.0522	0.0582	0.0645	0.0706	0.0764
0.30	0.0393	0.0393	0.0393	0.0393	0.0395	0.0426	0.0475	0.0527	0.0576	0.0624
0.40	0.0339	0.0339	0.0339	0.0339	0.0342	0.0369	0.0411	0.0456	0.0499	0.0540
0.50	0.0301	0.0301	0.0301	0.0301	0.0303	0.0328	0.0367	0.0407	0.0446	0.0483
0.60	0.0267	0.0267	0.0267	0.0267	0.0271	0.0296	0.0333	0.0370	0.0406	0.0440
0.70	0.0232	0.0232	0.0232	0.0233	0.0239	0.0268	0.0304	0.0340	0.0374	0.0405
0.75	0.0213	0.0213	0.0213	0.0214	0.0223	0.0255	0.0291	0.0327	0.0359	0.0390
0.80	0.0191	0.0191	0.0192	0.0194	0.0206	0.0241	0.0278	0.0313	0.0345	0.0375
0.85	0.0166	0.0167	0.0169	0.0172	0.0189	0.0227	0.0264	0.0299	0.0330	0.0359
0.90	0.0137	0.0140	0.0143	0.0148	0.0168	0.0209	0.0246	0.0279	0.0309	0.0335
0.95	0.0101	0.0106	0.0112	0.0118	0.0140	0.0181	0.0214	0.0243	0.0268	0.0291

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 15 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 2

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.2336	0.2336	0.2336	0.2336	0.2354	0.2546	0.2841	0.3150	0.3447	0.3729
0.20	0.1610	0.1610	0.1610	0.1611	0.1630	0.1782	0.1998	0.2219	0.2432	0.2632
0.30	0.1263	0.1263	0.1263	0.1265	0.1291	0.1434	0.1618	0.1803	0.1977	0.2142
0.40	0.1035	0.1035	0.1036	0.1039	0.1075	0.1219	0.1387	0.1550	0.1703	0.1846
0.50	0.0861	0.0861	0.0865	0.0871	0.0919	0.1067	0.1225	0.1374	0.1512	0.1640
0.60	0.0714	0.0717	0.0724	0.0734	0.0796	0.0950	0.1101	0.1240	0.1366	0.1481
0.70	0.0581	0.0589	0.0602	0.0618	0.0695	0.0854	0.0999	0.1127	0.1241	0.1343
0.75	0.0517	0.0529	0.0546	0.0565	0.0649	0.0810	0.0950	0.1072	0.1178	0.1273
0.80	0.0454	0.0470	0.0491	0.0513	0.0604	0.0765	0.0898	0.1011	0.1108	0.1193
0.85	0.0390	0.0412	0.0437	0.0462	0.0558	0.0714	0.0836	0.0936	0.1020	0.1092
0.90	0.0322	0.0350	0.0379	0.0406	0.0502	0.0644	0.0746	0.0826	0.0893	0.0950
0.95	0.0244	0.0276	0.0306	0.0332	0.0415	0.0522	0.0594	0.0649	0.0694	0.0733

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 15 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 3

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1921	0.1921	0.1921	0.1921	0.1934	0.2086	0.2324	0.2574	0.2817	0.3046
0.20	0.1344	0.1344	0.1344	0.1344	0.1355	0.1468	0.1639	0.1818	0.1990	0.2153
0.30	0.1071	0.1071	0.1072	0.1072	0.1085	0.1187	0.1331	0.1479	0.1621	0.1754
0.40	0.0892	0.0892	0.0892	0.0893	0.0911	0.1013	0.1143	0.1274	0.1398	0.1514
0.50	0.0752	0.0752	0.0753	0.0755	0.0782	0.0888	0.1011	0.1131	0.1243	0.1347
0.60	0.0631	0.0632	0.0635	0.0640	0.0678	0.0791	0.0910	0.1022	0.1125	0.1220
0.70	0.0519	0.0522	0.0529	0.0538	0.0590	0.0711	0.0827	0.0932	0.1026	0.1113
0.75	0.0463	0.0469	0.0479	0.0491	0.0550	0.0674	0.0788	0.0889	0.0979	0.1060
0.80	0.0407	0.0416	0.0429	0.0444	0.0510	0.0637	0.0747	0.0842	0.0926	0.1001
0.85	0.0349	0.0363	0.0380	0.0398	0.0470	0.0597	0.0701	0.0788	0.0863	0.0928
0.90	0.0287	0.0307	0.0328	0.0349	0.0426	0.0547	0.0638	0.0710	0.0771	0.0823
0.95	0.0215	0.0240	0.0264	0.0285	0.0356	0.0451	0.0517	0.0567	0.0609	0.0644

Fig. 6—Coefficient of Variation of TUR Measurement Tables (Sheet 9 of 12) (7.07, 7.08, 7.10)

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 15 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 4

	AVERAGE HOLDING TIME (SEC)									
OCCUPANCY	0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1666	0.1666	0.1666	0.1666	0.1677	0.1808	0.2013	0.2230	0.2440	0.2639
0.20	0.1173	0.1173	0.1173	0.1173	0.1181	0.1275	0.1422	0.1576	0.1725	0.1865
0.30	0.0944	0.0944	0.0944	0.0944	0.0953	0.1035	0.1157	0.1284	0.1406	0.1521
0.40	0.0795	0.0795	0.0795	0.0795	0.0806	0.0886	0.0996	0.1107	0.1214	0.1314
0.50	0.0677	0.0677	0.0678	0.0679	0.0696	0.0779	0.0882	0.0984	0.1081	0.1171
0.60	0.0575	0.0575	0.0576	0.0579	0.0605	0.0695	0.0795	0.0890	0.0979	0.1062
0.70	0.0476	0.0478	0.0482	0.0488	0.0526	0.0624	0.0723	0.0813	0.0896	0.0971
0.75	0.0427	0.0430	0.0436	0.0445	0.0490	0.0592	0.0690	0.0777	0.0856	0.0928
0.80	0.0376	0.0382	0.0391	0.0402	0.0454	0.0561	0.0656	0.0740	0.0815	0.0882
0.85	0.0322	0.0332	0.0345	0.0359	0.0418	0.0527	0.0619	0.0697	0.0765	0.0825
0.90	0.0264	0.0279	0.0296	0.0313	0.0377	0.0483	0.0565	0.0632	0.0689	0.0738
0.95	0.0197	0.0218	0.0238	0.0256	0.0319	0.0406	0.0467	0.0514	0.0553	0.0586

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 15 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 5

	AVERAGE HOLDING TIME (SEC)									
OCCUPANCY	0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1491	0.1491	0.1491	0.1491	0.1501	0.1617	0.1801	0.1995	0.2182	0.2360
0.20	0.1052	0.1052	0.1052	0.1052	0.1059	0.1142	0.1273	0.1410	0.1543	0.1669
0.30	0.0852	0.0852	0.0852	0.0852	0.0859	0.0929	0.1037	0.1150	0.1259	0.1362
0.40	0.0723	0.0723	0.0723	0.0723	0.0731	0.0798	0.0894	0.0993	0.1088	0.1177
0.50	0.0622	0.0622	0.0622	0.0622	0.0634	0.0703	0.0793	0.0883	0.0969	0.1049
0.60	0.0532	0.0532	0.0533	0.0534	0.0553	0.0628	0.0715	0.0800	0.0879	0.0953
0.70	0.0444	0.0445	0.0448	0.0452	0.0481	0.0564	0.0651	0.0731	0.0805	0.0873
0.75	0.0399	0.0401	0.0406	0.0412	0.0448	0.0536	0.0621	0.0700	0.0771	0.0836
0.80	0.0353	0.0357	0.0364	0.0372	0.0415	0.0507	0.0592	0.0668	0.0736	0.0797
0.85	0.0303	0.0310	0.0321	0.0332	0.0382	0.0478	0.0560	0.0632	0.0694	0.0750
0.90	0.0248	0.0260	0.0274	0.0289	0.0345	0.0440	0.0516	0.0579	0.0632	0.0678
0.95	0.0184	0.0201	0.0218	0.0234	0.0290	0.0371	0.0430	0.0475	0.0512	0.0544

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 15 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 6

	AVERAGE HOLDING TIME (SEC)									
OCCUPANCY	0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1361	0.1361	0.1361	0.1361	0.1370	0.1476	0.1644	0.1821	0.1992	0.2155
0.20	0.0961	0.0961	0.0962	0.0962	0.0968	0.1043	0.1162	0.1287	0.1409	0.1524
0.30	0.0781	0.0781	0.0781	0.0781	0.0787	0.0850	0.0948	0.1050	0.1150	0.1243
0.40	0.0667	0.0667	0.0667	0.0667	0.0673	0.0731	0.0818	0.0908	0.0994	0.1076
0.50	0.0578	0.0578	0.0578	0.0578	0.0587	0.0646	0.0726	0.0808	0.0886	0.0959
0.60	0.0498	0.0498	0.0498	0.0499	0.0514	0.0578	0.0656	0.0732	0.0804	0.0872
0.70	0.0419	0.0420	0.0421	0.0424	0.0448	0.0520	0.0597	0.0670	0.0737	0.0800
0.75	0.0378	0.0379	0.0382	0.0387	0.0416	0.0493	0.0570	0.0642	0.0707	0.0766
0.80	0.0334	0.0337	0.0343	0.0349	0.0385	0.0467	0.0544	0.0613	0.0675	0.0732
0.85	0.0288	0.0293	0.0302	0.0311	0.0354	0.0440	0.0515	0.0581	0.0639	0.0691
0.90	0.0236	0.0246	0.0257	0.0270	0.0319	0.0406	0.0476	0.0535	0.0585	0.0629
0.95	0.0175	0.0189	0.0204	0.0218	0.0268	0.0344	0.0400	0.0444	0.0480	0.0511

Fig. 6—Coefficient of Variation of TUR Measurement Tables (Sheet 10 of 12) (7.07, 7.08, 7.10)

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 15 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 7

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1260	0.1260	0.1260	0.1260	0.1268	0.1367	0.1522	0.1686	0.1845	0.1995
0.20	0.0891	0.0891	0.0891	0.0891	0.0897	0.0966	0.1076	0.1192	0.1304	0.1411
0.30	0.0725	0.0725	0.0725	0.0725	0.0730	0.0788	0.0878	0.0973	0.1065	0.1151
0.40	0.0621	0.0621	0.0621	0.0621	0.0627	0.0679	0.0758	0.0841	0.0921	0.0996
0.50	0.0542	0.0542	0.0542	0.0542	0.0548	0.0601	0.0674	0.0750	0.0821	0.0889
0.60	0.0470	0.0470	0.0470	0.0471	0.0482	0.0538	0.0609	0.0680	0.0746	0.0808
0.70	0.0398	0.0398	0.0399	0.0402	0.0421	0.0485	0.0555	0.0622	0.0684	0.0742
0.75	0.0360	0.0361	0.0363	0.0367	0.0391	0.0460	0.0530	0.0596	0.0656	0.0712
0.80	0.0320	0.0322	0.0326	0.0331	0.0362	0.0435	0.0506	0.0570	0.0628	0.0681
0.85	0.0275	0.0280	0.0286	0.0295	0.0332	0.0410	0.0480	0.0541	0.0596	0.0645
0.90	0.0226	0.0234	0.0244	0.0255	0.0299	0.0378	0.0444	0.0500	0.0548	0.0590
0.95	0.0167	0.0179	0.0192	0.0205	0.0251	0.0322	0.0376	0.0418	0.0454	0.0484

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 15 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 8

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1179	0.1179	0.1179	0.1179	0.1186	0.1278	0.1424	0.1577	0.1725	0.1866
0.20	0.0833	0.0833	0.0833	0.0833	0.0839	0.0904	0.1007	0.1115	0.1220	0.1319
0.30	0.0679	0.0679	0.0679	0.0679	0.0684	0.0737	0.0822	0.0910	0.0996	0.1077
0.40	0.0584	0.0584	0.0584	0.0584	0.0588	0.0636	0.0710	0.0787	0.0862	0.0932
0.50	0.0511	0.0511	0.0511	0.0511	0.0517	0.0564	0.0632	0.0702	0.0769	0.0832
0.60	0.0446	0.0446	0.0446	0.0447	0.0456	0.0506	0.0572	0.0637	0.0699	0.0757
0.70	0.0380	0.0381	0.0381	0.0383	0.0399	0.0456	0.0521	0.0583	0.0642	0.0696
0.75	0.0345	0.0346	0.0347	0.0350	0.0371	0.0433	0.0498	0.0559	0.0616	0.0668
0.80	0.0307	0.0308	0.0312	0.0316	0.0343	0.0410	0.0475	0.0535	0.0589	0.0639
0.85	0.0265	0.0268	0.0274	0.0281	0.0315	0.0386	0.0451	0.0508	0.0560	0.0606
0.90	0.0217	0.0224	0.0233	0.0243	0.0282	0.0356	0.0418	0.0471	0.0517	0.0557
0.95	0.0161	0.0171	0.0183	0.0194	0.0237	0.0304	0.0355	0.0397	0.0431	0.0461

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 15 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 9

OCCUPANCY	AVERAGE HOLDING TIME (SEC) 0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1111	0.1111	0.1111	0.1111	0.1119	0.1205	0.1342	0.1487	0.1627	0.1759
0.20	0.0786	0.0786	0.0786	0.0786	0.0791	0.0852	0.0949	0.1051	0.1150	0.1244
0.30	0.0641	0.0641	0.0641	0.0641	0.0645	0.0696	0.0775	0.0858	0.0939	0.1016
0.40	0.0552	0.0552	0.0552	0.0552	0.0556	0.0601	0.0670	0.0743	0.0813	0.0879
0.50	0.0485	0.0485	0.0485	0.0485	0.0490	0.0533	0.0597	0.0663	0.0726	0.0785
0.60	0.0426	0.0426	0.0426	0.0426	0.0434	0.0479	0.0540	0.0601	0.0660	0.0714
0.70	0.0365	0.0365	0.0366	0.0367	0.0380	0.0432	0.0493	0.0551	0.0606	0.0657
0.75	0.0332	0.0332	0.0334	0.0336	0.0354	0.0410	0.0471	0.0529	0.0582	0.0631
0.80	0.0296	0.0297	0.0300	0.0304	0.0327	0.0388	0.0449	0.0506	0.0557	0.0604
0.85	0.0256	0.0259	0.0264	0.0270	0.0300	0.0365	0.0426	0.0481	0.0530	0.0574
0.90	0.0210	0.0216	0.0224	0.0232	0.0268	0.0337	0.0395	0.0446	0.0490	0.0529
0.95	0.0155	0.0165	0.0175	0.0186	0.0225	0.0288	0.0338	0.0378	0.0411	0.0440

Fig. 6—Coefficient of Variation of TUR Measurement Tables (Sheet 11 of 12) (7.07, 7.08, 7.10)

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 15 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 10

	AVERAGE HOLDING TIME (SEC)									
OCCUPANCY	0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1054	0.1054	0.1054	0.1054	0.1061	0.1143	0.1273	0.1411	0.1543	0.1669
0.20	0.0745	0.0745	0.0745	0.0745	0.0750	0.0809	0.0900	0.0997	0.1091	0.1180
0.30	0.0608	0.0608	0.0608	0.0608	0.0612	0.0660	0.0735	0.0814	0.0891	0.0964
0.40	0.0525	0.0525	0.0525	0.0525	0.0528	0.0570	0.0636	0.0705	0.0771	0.0834
0.50	0.0463	0.0463	0.0463	0.0463	0.0467	0.0507	0.0567	0.0629	0.0689	0.0745
0.60	0.0408	0.0408	0.0408	0.0408	0.0414	0.0456	0.0513	0.0571	0.0626	0.0678
0.70	0.0351	0.0352	0.0352	0.0353	0.0364	0.0412	0.0469	0.0524	0.0576	0.0624
0.75	0.0321	0.0321	0.0322	0.0323	0.0339	0.0391	0.0448	0.0502	0.0553	0.0599
0.80	0.0287	0.0287	0.0289	0.0293	0.0314	0.0370	0.0427	0.0481	0.0529	0.0574
0.85	0.0248	0.0250	0.0255	0.0260	0.0287	0.0348	0.0406	0.0457	0.0504	0.0546
0.90	0.0204	0.0209	0.0216	0.0223	0.0257	0.0321	0.0376	0.0425	0.0467	0.0505
0.95	0.0151	0.0159	0.0169	0.0178	0.0214	0.0275	0.0322	0.0361	0.0394	0.0423

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 15 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 11

	AVERAGE HOLDING TIME (SEC)									
OCCUPANCY	0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.1005	0.1005	0.1005	0.1005	0.1012	0.1090	0.1214	0.1345	0.1471	0.1591
0.20	0.0711	0.0711	0.0711	0.0711	0.0715	0.0771	0.0859	0.0951	0.1040	0.1125
0.30	0.0580	0.0580	0.0580	0.0580	0.0584	0.0629	0.0701	0.0776	0.0850	0.0919
0.40	0.0501	0.0501	0.0501	0.0501	0.0504	0.0544	0.0607	0.0672	0.0735	0.0795
0.50	0.0443	0.0443	0.0443	0.0443	0.0447	0.0484	0.0541	0.0600	0.0657	0.0711
0.60	0.0392	0.0392	0.0392	0.0392	0.0398	0.0436	0.0490	0.0545	0.0598	0.0647
0.70	0.0339	0.0339	0.0340	0.0340	0.0350	0.0394	0.0448	0.0500	0.0550	0.0596
0.75	0.0310	0.0310	0.0311	0.0313	0.0326	0.0374	0.0428	0.0480	0.0528	0.0572
0.80	0.0278	0.0278	0.0280	0.0283	0.0302	0.0354	0.0409	0.0459	0.0506	0.0548
0.85	0.0241	0.0243	0.0247	0.0251	0.0276	0.0333	0.0388	0.0437	0.0482	0.0522
0.90	0.0199	0.0203	0.0209	0.0216	0.0246	0.0307	0.0360	0.0406	0.0447	0.0483
0.95	0.0147	0.0154	0.0163	0.0172	0.0205	0.0263	0.0309	0.0347	0.0379	0.0407

COEFFICIENT OF VARIATION OF TUR MEASUREMENT
MEASUREMENT INTERVAL = 15 MIN.- TUR SCAN INTERVAL = 10 SEC.

NO. OF CKTS IN GRP = 12

	AVERAGE HOLDING TIME (SEC)									
OCCUPANCY	0.25	0.50	0.75	1.00	2.00	4.00	6.00	8.00	10.00	12.00
0.10	0.0962	0.0962	0.0962	0.0962	0.0969	0.1044	0.1162	0.1288	0.1409	0.1524
0.20	0.0680	0.0680	0.0680	0.0680	0.0685	0.0738	0.0822	0.0910	0.0996	0.1077
0.30	0.0555	0.0555	0.0555	0.0555	0.0559	0.0603	0.0671	0.0743	0.0813	0.0880
0.40	0.0480	0.0480	0.0480	0.0480	0.0483	0.0521	0.0581	0.0644	0.0704	0.0762
0.50	0.0425	0.0425	0.0425	0.0425	0.0429	0.0464	0.0518	0.0575	0.0629	0.0681
0.60	0.0378	0.0378	0.0378	0.0378	0.0383	0.0419	0.0470	0.0523	0.0573	0.0620
0.70	0.0329	0.0329	0.0329	0.0329	0.0338	0.0379	0.0430	0.0480	0.0527	0.0571
0.75	0.0301	0.0301	0.0302	0.0303	0.0315	0.0360	0.0411	0.0460	0.0506	0.0549
0.80	0.0270	0.0271	0.0272	0.0274	0.0291	0.0340	0.0392	0.0440	0.0485	0.0526
0.85	0.0235	0.0237	0.0240	0.0244	0.0266	0.0320	0.0372	0.0419	0.0462	0.0501
0.90	0.0194	0.0197	0.0203	0.0209	0.0237	0.0294	0.0345	0.0389	0.0429	0.0464
0.95	0.0143	0.0150	0.0158	0.0166	0.0198	0.0252	0.0296	0.0333	0.0365	0.0392

Fig. 6—Coefficient of Variation of TUR Measurement Tables (Sheet 12 of 12) (7.07, 7.08, 7.10)