

# US ARMY SIGNAL CENTER AND SCHOOL

FORT MONMOUTH, N.J.

## SSTS 56009B \* INFORMATION SHEET

### COMMUNICATIONS CENTER MANAGEMENT

#### Section I. INTRODUCTION

##### 1. OBJECTIVES

a. To familiarize the student with the problem of communications center (commcenter) management.

b. To explain and discuss the principles of management in large fixed station communications centers.

##### 2. MEN, MESSAGES, AND MACHINES

a. Regardless of size, the situation of the headquarters served, the type and quantity of equipment used, or the volume of traffic, all communications centers are made up of men, messages, and machines. These three are interrelated. The volume of traffic dictates to a large extent the type and number of machines required. The type and number of machines dictate the required number of men, their skills, and their duties. Good commcenter management is the proper employment of these men, the machines they operate, and the messages they handle.

b. The principles of good management for a communications center are similar to those for any organization, business, plant, factory, or other well-run military organization. The good manager knows these principles and conscientiously applies them in his handling of men, messages, and machines.

c. You can be a good manager. Your communications center can be a well-run organization and an efficient communications agency. This information sheet will help you achieve that goal.

\* This information sheet supersedes SSTS 56009A, Communications Center Management.

d. Although a consideration of management and equipment is proper for the purposes of this text, it is not treated here. Instead, the student is referred to SSTS 56008, "Communications Center Planning," in which a detailed treatment of equipment has been included. For a list of other publications pertaining to the subject of commcenter management, including those referred to in the text, see appendix I.

### 3. THE IMPORTANCE OF GOOD MANAGEMENT

a. Recent Signal Corps developments have increased the speed of teletypewriter operations, introduced automatic switching centers, developed high speed facsimile equipment, and extended the frontiers of communications with the military application of television. Important as these advances are, they alone do not solve all of the Signal Corps' problems of "getting the message through." Many of these problems have not been caused by the inability of teletypewriter equipment to handle more than 60 words a minute, but by poor appreciation and application of the communication tools available.

b. After two years of operation, one of the Army's largest communications centers under a very energetic commander and under an equally energetic signal officer required 200 minutes to process and handle an average length message! Each message must pass through at least two communications centers, one at the originator's headquarters and one at the addressee's headquarters. Generally, at least one additional relay center will be concerned in the handling of the message. If each of the three centers involved handles a message in no better time than 200 minutes, a total of 600 minutes or ten hours is required to get a message from originator to addressee. And, even if we assume that such advances have been made in electronic communication that no time at all is required in the physical transmission of the message, a jet-propelled aircraft could fly from California to France hours before this message is delivered.

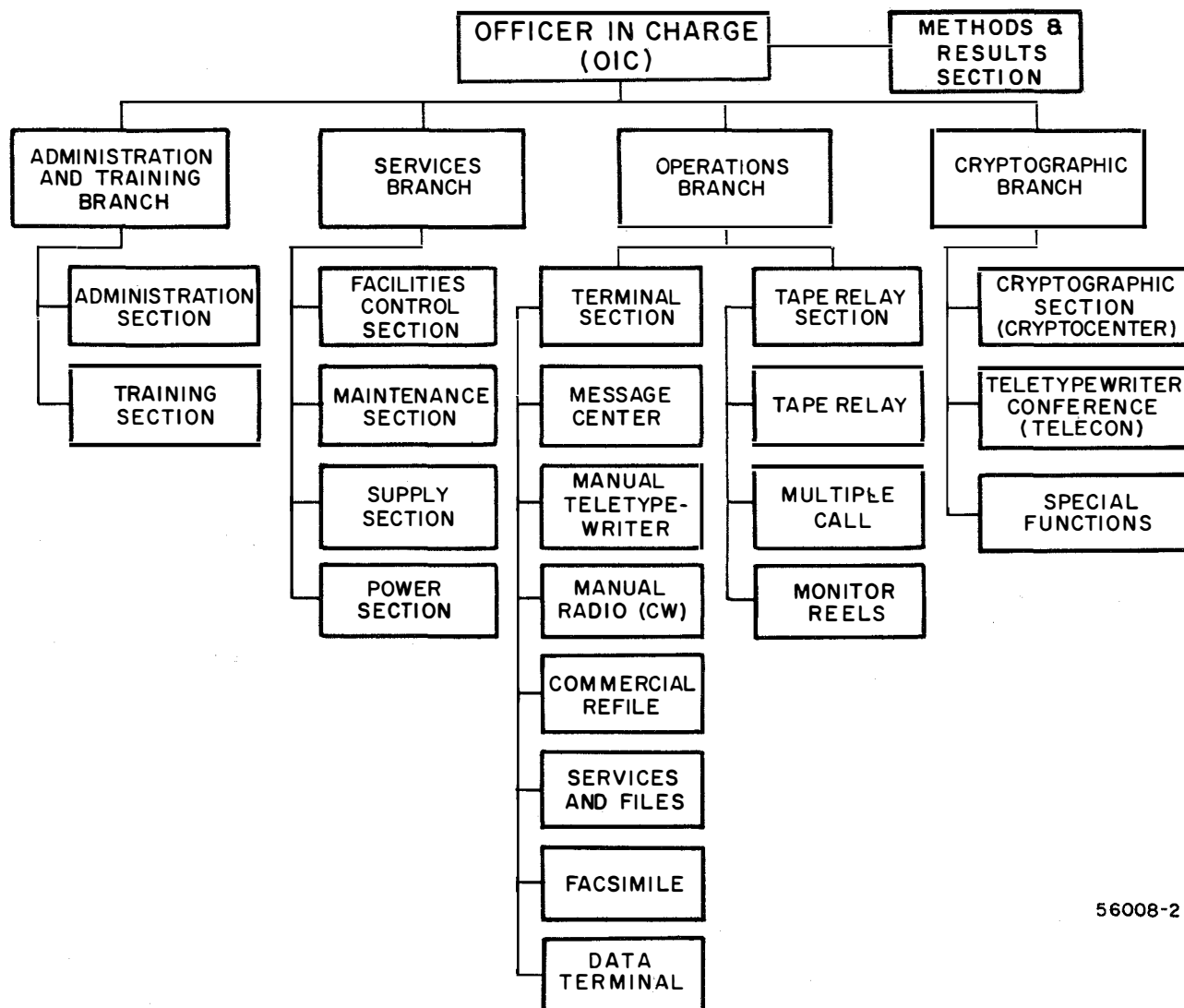
c. The implications for the signal officer are challenging. Yet, too little thought is given to the importance of the principles and mechanics of commcenter operations. There is nothing wrong in the basic concept of communications centers. There is no inherent defect which limits communications centers to high handling time. The communications center referred to above was soon handling messages in 8 to 15 minutes, with only 65 percent of the work force which formerly operated at the 200-minute level. Such excellent results were obtained only by diligent use of the principles of commcenter management by the commcenter staff.

## Section II. ORGANIZATION OF COMMCENTERS

### 4. GENERAL

Flexibility of organization is necessary to meet the communications needs of the headquarters served. Consequently, there is normally no rigid pattern for the organization of communications centers. A typical communications center (fig. 1) is subdivided into the following branches, all under the supervision of the officer-in-charge (OIC):

- a. Administrative Branch.
- b. Services Branch.
- c. Operations Branch.
- d. Cryptographic Branch.
- e. Methods and Results Section.



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Figure 1. Type communications center organization.

## 5. FUNCTIONS OF OPERATING BRANCHES

Each branch performs certain specialized functions necessary for the receipt, transmission, and delivery of messages. The OIC must coordinate the efforts of the various branches to obtain a smooth-running, efficient, productive agency.

## 6. ADMINISTRATIVE BRANCH

This is the branch in which the OIC of the communications center is located. It handles the administrative, personnel and training matters pertinent to the communications center. Found also in this branch are the assistant officer-in-charge, administrative specialists, and clerks.

## 7. SERVICES BRANCH

This branch serves the communications center in matters relating to power, maintenance, and supply for the signal equipment used in the communications center. Its personnel are skilled in the repair and maintenance of Signal Corps equipment. The branch may include a facilities control section to provide centralized control of the electrical means of communication. The facilities control section takes control of any faulty circuit, makes necessary tests, determines faults, and performs corrective action. Some signal sections prefer to place the facilities control section under the control of other operating branches.

## 8. OPERATIONS BRANCH

This branch includes the operations of both the terminal station and the tape relay station. These stations are normally separated because of the different procedures used in processing messages; however, if the communications center's traffic is light, these stations may be physically located together. In the latter case, they are usually referred to as the terminal section and the tape relay section.

### a. Terminal Station or Section.

- (1) Message Center Section. This section processes outgoing and incoming messages for the headquarters itself, for units served by the headquarters and for units served by the communications center. Its personnel includes duty officers, trick chiefs, supervisors, and message center clerks.
- (2) Service and Files Subsection. This subsection processes promptly and efficiently all service messages pertaining to messages on file. It is responsible for collecting, checking for proper handling, and filing message traffic; and for checking and filing the various logs, records, and number sheets.
- (3) Manual Teletypewriter Section. This section transmits and receives messages in the form of page copy, tape, or both. Procedures for the manual teletypewriter section are prescribed in ACP 126( ), Communication Instructions, Teletypewriter (Teleprinter) Procedure. Teletypewriter switchboards also may be included in this section. Personnel includes trick chiefs, supervisors, and teletypewriter operators.
- (4) Radiotelegraph Section. This section transmits and receives messages by means of manual CW radio circuits. The radiotelegraph normally may be maintained on a standby basis and function only as an emergency back up to other means. Personnel includes a chief operator, trick chiefs, supervisors, and radio operators.
- (5) Facsimile Section. This section transmits and receives maps, photographs, and similar information by either radio or wire. It is used primarily for rapid transmission of items that would otherwise have to be handled by mail or messenger. Personnel includes trick chiefs, supervisors, and teletypewriter operators.
- (6) Commercial Refile Subsection. This section transmits and receives messages over commercial communication systems.

b. Tape Relay Station or Section. The tape relay station receives messages in tape form and then transmits them in tape form to other stations in the tape relay network. Included in the station are provisions for message processing in accordance with all prescribed procedures. Tape relay procedures are prescribed in ACP 127( ), Communication Instructions, Tape Relay Procedures.

Monitor Reels Subsection. This section is responsible for the proper functioning of monitor reel positions and certain specific details such as correction, rerun, and pullback requests.

## 9. CRYPTOGRAPHIC CENTER BRANCH

In the cryptocenter branch, classified messages are encrypted and decrypted by means of authorized cryptosystems. Its personnel may include an OIC (who is also the cryptosecurity officer), crypto-duty officers, trick chiefs, supervisors, and cryptographic technicians.

Teletypewriter Conference (TELECON) Facilities. Teletypewriter conference is available for the transmission and reception of classified and unclassified information. This facility is employed by members of the various staffs for communication with both higher and lower echelons of the commands. It will include operators and an officer designated as the TELECON officer whose normal duty is that of duty officer of the cryptographic center. Because of the nature of intelligence passed over the teleconference facility, members of the cryptographic center operate the equipment.

## 10. METHODS AND RESULTS SECTION

This section has earned the nickname of "Watchdog of the OIC." It is responsible for continual review of in-station methods and procedures to determine whether maximum efficiency of operations, considering current local conditions, is being attained. It checks discrepancy reports, prepares periodic and special traffic reports of communications center operations, and insures that operating procedures are current and are complied with by operators. It analyzes circuit outages and conducts training programs for newly assigned individuals and whenever new procedures are introduced. It is normally placed directly under the OIC.

### Section III. PROCURING PERSONNEL

## 11. GENERAL

a. For the management of your communications center you will be concerned with procuring personnel, training personnel, and properly using personnel. Personnel procurement is discussed in this section. Training and utilization are taken up in the next two sections.

b. In units below the field army level, number and type of personnel are fixed by tables of organization and equipment (TOE). In such units, your problem is no more than that of obtaining personnel for any other TOE unit. In units above the field army level, TOE's do not exist, and personnel and equipment requirements are not established. In these higher units, you must calculate and estimate precisely the number of men you need. On the basis of your estimates, procurement will be made from a Table of Distribution or a TOE consisting of units of the 11-500 series, on a project basis, or by other special procurement methods.

## 12. FACTORS AFFECTING THE ESTIMATE

You can determine the actual number of men required to operate efficiently only by careful analysis of all of the communications center functions to be performed. Your analysis should consider the following factors:

- a. The volume of traffic, or traffic load, handled by tape relay.
- b. The traffic load to be handled by --
  - (1) Manual teletypewriter.
  - (2) Radio.
  - (3) Messenger.
  - (4) Other means of communication (such as facsimile).
  - (5) The cryptographic center.

- c. The total trunk requirements.
- d. The equipment to be used on trunks (such as semi-automatic teletypewriter, manual teletypewriter, radio).
- e. The type of cryptographic equipment to be used.
- f. The clerical and services personnel required.
- g. Nature of the traffic (tactical, administrative, long logistical traffic, etc.).

### 13. TRAFFIC LOAD

Although your estimate of the number of men required must be based upon the factors listed above, you will have to base certain personnel requirements upon the traffic load. Tables have been prepared to provide estimates of your personnel requirements, but use them with caution. They can be no more than guides or starting points upon which to start your estimate.

### 14. SPECIALIST REQUIREMENTS

a. Officer-in-Charge. One OIC is required per communications center. His control is decentralized to branch chiefs who are responsible for certain allied functions. The need may arise for an assistant officer-in-charge, to assist the OIC in his supervisory duties and to assume his duties during his absence. This officer also handles the administrative and staff work.

b. Operations Duty Officers. The duty officer is responsible for all communications center operations except cryptographic on his particular shift. Table I provides an estimate of the number of operations duty officers necessary for each shift of a particular type communications center processing a certain number of groups per shift.

c. Cryptographic Duty Officers. These officers are responsible for close supervision and detailed observation of the work of their subordinates. An estimate on specific type communications centers on a group-per-shift basis is given in table I.

TABLE I. PERSONNEL REQUIREMENTS: COMMCENTER

Groups per Shift	Cryptocenter						Operations			Message			Teletype-		
	Duty Officer			Crypto Repairman			Duty Officer			Center Supervisor			writer Repairman		
	B	M	L	B	M	L	B	M	L	B	M	L	B	M	L
5,000 -- 25,000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25,000 -- 50,000	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
50,000 -- 100,000	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1
100,000 -- 250,000	3	3	1	1	1	1	2	1	1	2	1	1	3	2	1
250,000 -- 500,000	4	3	2	2	1	1	2	2	1	3	2	1	4	3	1
500,000 -- 750,000				3	2	1	3	2	1	4	3	2	5	3	2
750,000 - 1,000,000				3	3	2	3	2	1	4	3	2	5	4	3
1,000,000 - 1,500,000				5	4	3	3	3	2	4	4	3	7	5	4
1,500,000 - 2,000,000				7	5	4	3	3	2	4	4	3	9	6	5

B. Busiest shift  
M. Medium shift  
L. Lightest shift

d. Teleconference (TELECON) Officer. Your need for a TELECON officer will depend upon the headquarters served and the desires of its commander.

e. Personnel Officer. In some of the larger fixed station communications centers, the full-time assignment of a personnel officer may be necessary to maintain records, schedules and reports. Normally, however, you will not be likely to require a full-time personnel officer.

f. Supply and Maintenance Officer. At least one supply and maintenance officer is required for over-all supervision of maintenance work and the power installation. It may be necessary for this officer to double as the cryptographic maintenance officer. In some instances, the maintenance officer is also the commcenter supply officer.

g. Message Center Trick Chief. One is required per shift regardless of traffic conditions.

h. Tape Relay Trick Chief. One is required per shift regardless of traffic conditions.

i. Cryptographic Center Trick Chief. One is required per shift regardless of traffic conditions.

j. Manual Radio (CW) Trick Chief. One may be required for each shift, depending on the status of this installation. In many instances, CW radio is used as back-up for radio teletypewriter and is not on a full-time basis.

k. Methods and Results Section Trick Chief. One is required per shift regardless of traffic conditions.

l. Teletypewriter Maintenance Chief. One is required per shift regardless of traffic conditions.

m. Cryptographic Maintenance Chief. One is required per shift regardless of traffic conditions.

n. Power Section Chief. Whether you need this specialist depends upon the nature and size of the power section.

o. Message Center Supervisor. The need for this position is governed by groups per shift and is indicated in table I.

p. Relay Supervisor. The number of relay supervisors depends on the number of circuits in operation as well as groups per shift. This information appears in table II.

q. Cryptographic Center Supervisor. Normally you will require one supervisor for each five cryptographic technicians.

r. Multi-call Section Supervisor. One is required per shift regardless of traffic conditions.

s. Methods and Results Supervisor. One is required per shift regardless of traffic conditions. In the larger communications centers, additional supervisors may be assigned to this section to supervise the service and files subsection. This is usually necessary for communications centers handling 250,000 and more groups per shift.

t. Teletype Maintenance Supervisor. One is required per shift regardless of traffic conditions.

TABLE II. PERSONNEL REQUIREMENTS: TAPE RELAY

GROUPS	Banks of Ccts	RELAY SUPERVISORS								RELAY OPERATORS							
		4	5	6	7	8	9	10	1	2	3	4	5	8	9	10	
100,000 to 500,000	Busiest Shift			1								1					
	Medium Shift					1							1				
	Lightest Shift							1						1			
500,000 to 1,000,000	Busiest Shift	1										1					
	Medium Shift				1								1				
	Lightest Shift						1							1			
1,000,000 to 2,000,000	Busiest Shift	1										1					
	Medium Shift				1								1				
	Lightest Shift						1							1			

u. Cryptographic Maintenance Supervisor. One is required per shift regardless of traffic conditions.

v. Manual Radio (CW) Supervisor. As in the case of the CW Trick Chief, this specialty is dependent upon the status of the section. One may be required for each shift.

w. Administrative Supervisor. One ordinarily is required for communications centers handling more than 250,000 groups per day.

x. Personnel Supervisor. One ordinarily is required for communications centers handling more than 250,000 groups daily.

y. Operators and Clerks.

- (1) Message Center Incoming and Outgoing Clerks. You will probably require one each incoming and outgoing clerk for each 5000 groups handled per shift.
- (2) Tape Perforators. One perforator is required for each 5000 groups per shift.
- (3) Tape Relay Operators. For reasons similar to those mentioned for the relay supervisor, you will have to calculate operator requirements on the basis of the size of the communications center and the groups per shift. An estimate of the number of relay operators is included in table II.
- (4) Multi-call Processing Operators. One is required for each 10,000 groups per shift.
- (5) Expeditors. One expeditor is required for each 150,000 groups per shift.
- (6) Cryptographic Technicians. One technician is required for each 2500 groups per shift.
- (7) Manual Radio (CW) Operators. The number of these operators required depends on the factors given for manual radio trick chiefs and supervisors.



- (8) Service and Files Clerk. One is required for each 125,000 groups per shift.
- (9) Routing and Information Clerk. One is required for each 250,000 groups per shift.
- (10) Teletypewriter Repairmen. See table I.
- (11) Telecon Operators. Once again your estimate will be affected by the particular needs of the headquarters.
- (12) Supply Clerk. One is required for each 250,000 groups per shift.
- (13) Clerk Typist. Same as (12).
- (14) Personnel Clerk. Same as (12).
- (15) Cryptographic Repairmen. See table I.
- (16) Powermen. A large communications center will probably require 1 to 3 powermen per shift, depending on the source of power and/or the type power equipment utilized.

#### 15. CORRECTIVE FACTORS

a. Large fixed station communications centers operate twenty-four hours a day, seven days a week. Tape relay practices dictate continual operation of all stations in the network, with the exception of those designated as tributaries. This is done to make constantly available the alternate routings engineered into the network. The preceding data on personnel requirements are based on shifts rather than total commcenter requirements. In peace or war, you will find it advisable to plan on using each man on no more than one shift per day, five days per week. The requirements estimated in the various tables and explanations do not embrace those factors which prevent effective full-time employment. Some of these factors are:

- (1) Other military duties -- kitchen police, interior guard duty, troop information program.
- (2) Time off -- recreational time, passes, and leaves.
- (3) Time off -- illness, sick call, and hospitalization.
- (4) Skill of personnel. Where semi-skilled or unskilled operators must be used or when a new communications center is being installed, you will be wise to provide initially for additional operators. When eventually trained as skilled operators, these persons can form a nucleus of reserve cadre for the establishment of other communications centers in the area.
- (5) Equipment. Your calculations for personnel are determined by the type of tape relay equipment employed, such as the AN/TGC-5, AN/TGC-4, AN/FGC-38, etc.
- (6) Number of hours in the work week. Earlier research has shown that a higher efficiency results when the work week is 40 hours in length, and that this efficiency remains higher than when the work week is 44 hours, 48 hours, or even 56 hours.

b. Each one of four (4) headquarters lumped these considerations into a corrective factor which was supported as correct by management statistics. Headquarters "A" used a corrective factor of 1.75; headquarters "B", 1.50; headquarters "C", 1.65; and headquarters "D", 1.75. Of course, the corrective factors were different because of the different situation of each unit involved. You can expect, however, a corrective factor somewhere between 1.50 and 1.75. Once you have established an estimate and a corrective factor, do not be content with your calculations; be prepared to revise your actual requirements in the light of experience in actual operation.

## 16. SELECTION OF PERSONNEL

a. Large fixed station communications centers employ a greater percentage of civilian than military personnel. It is not unusual to find only the key positions held by officers and enlisted personnel. In an oversea theater you can expect to find a good percentage of indigenous personnel used chiefly as operators, with Department of the Army civilians in certain key positions.

b. Selection of military personnel will not present any new problems to you, but selection of civilian personnel may. It is needless to point out that the technical qualifications of a potential employee and his ability to perform his duties must be of high consideration. However, emphasizing previous commcenter experience and qualifications at the expense of other considerations has created for some commcenters a difficult problem in turnover.

c. This problem of turnover became particularly acute in a large STARCOM station in the United States. Actually, the turnover problem had been created by this emphasis on previous experience. In many instances the OIC hired new employees who, though they possessed the necessary technical qualifications, were in circumstances which made it unlikely that they would remain on the job for any length of time. From that station's experience come some points to be considered when screening applicants:

- (1) Female employees over 30 years of age are considered the most likely prospects.
- (2) Grade structure and wage rates for teletypewriter operators are not likely to hold the average male employee.
- (3) Applicants who are attending school are likely to seek employment in the field of their school training upon completion of their schooling.
- (4) Applicants whose education or qualifications indicate ambitions which would not be satisfied by the limited opportunity offered in the commcenter are not good employment prospects.
- (5) Applicants who live a great distance from the commcenter building are likely to seek work closer to their homes rather than put up indefinitely with transportation difficulties.

d. By paying less attention to the experience and technical qualifications and more to the circumstances giving the greatest promise of long term employment, you can reduce this turnover problem. But, to do this, you must have a vigorous training program to provide your personnel with the skills they lack from previous experience.

## Section IV. TRAINING PERSONNEL

### 17. THE TRAINING PROGRAM

Communications center operations are dynamic. The entire field of communications is ever-changing. New equipment, new methods, new techniques, new practices, new procedures and, above all, new problems can be expected to arise as rapidly in the future as they

have in the past. Good management requires the personnel of a communications center to adapt and re-adapt themselves to these new conditions and to keep up with rapid changes in communications. This can only be done by a program of continuous training. The program should embrace two broad categories: on-the-job training for newcomers to the communications center and in-the-job training for everyone else.

## 18. ON-THE-JOB TRAINING

a. All individuals newly assigned to a communications center must receive on-the-job training to prepare them for their duties. It is best to make the basic assumption that the incoming operator is assigned to the communications center itself rather than to a particular job within the center. He must, therefore, be trained in all of the functions and operations of the commcenter. However, individuals assigned to the station for temporary duty to receive only a particular kind of training are trained according to their needs. The length of time during which training should be conducted will vary according to the trainee's background, his progress, and the immediate needs of the operating sections. Normally, the large communications center should expect to develop a program for on-the-job training which would cover a period of three weeks.

b. On-the-job training includes:

- (1) A general introduction to the communications center, its organization, layout, mission, employment, and its importance.
- (2) A review of commcenter procedures and the in-station practices of the station.
- (3) An introduction to equipment, processes, and methods.

c. On-the-job training can be broken down into a classroom phase and an operations phase. In the classroom, teach the trainee the use of equipment and forms under established methods and procedures. Emphasize efficient operation to insure reliability, speed and security. The classroom phase should be limited. As soon as the trainee has received the basic essential working knowledge, introduce him to the actual operations area. Supervised training under the actual working conditions (such as the existing noise, the bustle of activity and the many other distractions inherent in communications center operations) is desirable. This type of training prepares the individual more properly than classroom instruction, or "the sink or swim" method of turning him loose on the job. It is somewhat analogous to a pressure chamber in which the individual is gradually conditioned to the environment in which he will perform.

d. The progress made by trainees must be made a matter of record. This will be of value to your supervisors in deciding where the trainee is to be best placed. You will find such records helpful in evaluating the trainee's knowledge, and they will serve to alert section chiefs and other supervisors to the competence of the trainee. Performance tests are excellent evaluating media and could be used to measure the trainee's competence.

## 19. IN-THE-JOB TRAINING

In-the-job training is given to assigned personnel where a new and particular need for it has arisen. For some, it may be only a review and refresher; for others it may be training for new or additional duties. A new and particular need for training may arise from a new situation, a change in procedures, an increase in the equipment of channels, or for other reasons. In-the-job training may be remedial. You might want to use it to eliminate incorrect procedures that may have developed. It may be training for expected changes; it may be instruction leading to the introduction of new ideas and developments; it may be training to develop supervisors or to simplify work methods; it may be training intended for the service test of equipment for engineering laboratory research. In-the-job training represents, more or less, the long range aspects of the training program.

## 20. ADMINISTERING THE TRAINING PROGRAM

a. The officer-in-charge (OIC) of a communications center is responsible for training his personnel. He has a methods and results section, an administrative section, and supervisors who assist him in establishing and conducting the program. You might have the methods and results (M&R) section determine the actual subject matter or curriculum while instructors chosen from among the supervisors conduct the training. The administrative section can maintain the necessary records. If the communications center is sufficiently large to warrant it you may find it valuable to establish a training section made up of highly trained and skilled individuals with extensive experience. This section would undertake the administration of the program and conduct the actual training in close liaison with the M&R Section. A large STAR-COM station in the United States made a study of its training procedure and came up with a very definite preference for a variant of the latter method. The station's study concluded that --

- (1) Supervisors should not be burdened with training responsibilities.
- (2) Training should be a function of a training supervisor.

b. You will have to evaluate your situation and adopt a system most suited to it, but, regardless of your preference, you should set up and maintain a vigorous training program. Under pressure of continually increasing traffic, large personnel turnover, installation of new circuits and facilities, and insufficient personnel, it is easy to neglect training and even give it up altogether. Yet it is under these conditions that an active, well-executed training program is most important.

### Section V. EMPLOYING PERSONNEL EFFICIENTLY

## 21. TRAFFIC CONSCIOUSNESS

The most desirable attitude that can be instilled in your communications center operators is an intangible called "traffic consciousness." Simply, traffic consciousness is that interest in the work at hand which holds people on the job as long as there is traffic to be handled. Traffic consciousness implies that each individual is aware of the extreme importance of the message and will put forth all effort to handle the traffic expeditiously and accurately. Traffic consciousness implies self-denial to "get the message through." In time of war or national disaster it is relatively simple to develop this attitude, as compared to normal, peacetime, routine activities; but even then it is born and nurtured only by good management. In return for this desirable attitude on the part of your personnel, you must manage your commcenter intelligently, exercise good judgement, promote the welfare and well-being of your people, and supervise effectively.

## 22. SUPERVISION

Supervision is perhaps the greatest single factor in creating efficiency and traffic consciousness. Supervisory responsibility is of primary importance and it must be constant. Supervision must come from persons thoroughly skilled in the activity under supervision. Your supervisors must use the same traits of leadership and knowledge of personnel management required for good supervision of any military activity.

- a. First of all, locate your commcenter supervisor in a position in the communications center where he can exercise full visual control of his assigned area.
- b. Require him to be readily accessible to his subordinates who may require his attention.
- c. Have him continually evaluate his personnel, recommend further or remedial training, and recommend men for training for higher positions.

d. Encourage him to recommend changes to the Standing Operating Procedure (SOP) and in-station procedures when necessary.

e. Train him to find bottlenecks, to determine their causes, and to eliminate them.

### 23. ASSIGNMENT OF PERSONNEL

It is just as necessary in communications centers as elsewhere to put the right man in the right job. Exert every effort to make an accurate evaluation of a man's aptitudes and skills. Consider each person as an individual and place him where he can perform with maximum effectiveness. Some people are content to perform routine jobs requiring little initiative or imagination. Others are satisfied only when they can exercise initiative and imagination. Obviously, a good supervisor does not assign an imaginative individual to a position that is routine. Routine-minded personnel should be assigned to routine jobs. Whenever possible, respect the wishes of the individual in assignment. When, because of the situation, you must assign imaginative individuals to routine positions, assign them only for short, temporary periods. You should know which positions are most likely to develop into bottlenecks. Assign only the best qualified men to these positions.

### 24. WORKING CONDITIONS

Working in a communications center is not particularly attractive. When operators must remain on their feet and cannot sit down while operating their equipment, it is downright physically tiring. The constant machine operation makes the commcenter one big babble of noise. For the most part, commcenter jobs become monotonous after operators have once become skilled. With good management, these unattractive features can be overcome by other considerations; with poor management they become unbearable. When working conditions reach that low degree, your people simply quit. One large STARCOM commcenter in the United States had an alarming turnover rate. A survey was conducted to permit each individual, military and civilian, to express his opinion without fear of jeopardizing his position. In spite of the fact that completion of the questionnaire was not compulsory, 66 out of 67 were completed and turned in. Two questions in the questionnaire requested employees to give their ideas as to how working conditions might be improved and how other aspects of commcenter operations might be bettered. One hundred and nineteen (119) separate responses or suggestions were obtained to these two questions! Of these, 44 pertained to working conditions and 36 were divided among only four recommendations:

Short morning and afternoon breaks.

Forty-five minute lunch period.

Maintaining clean and sanitary latrines.

Providing a combination coffee room-lunch room.

These are problems which your personnel consider important; you must also ascribe to them the same degree of importance.

#### a. Rest periods and breaks.

- (1) Fatigue may be defined as a reduction in the ability to do work, because of previous work. Though a person may feel completely rested, his work record may show a rapid decline. When the amount of work to be done is left largely to the individual and is not paced by the speed of a production line, hourly production gradually falls off both during the morning and afternoon periods.

- (2) Whether or not they are permitted to do so, the fact remains that men will find opportunities for rest. When rest periods are unauthorized, men will take them by hiding in washrooms or furtively "skipping out." Under these conditions the men get no real rest since they are unable to relax. A good supervisor will see that rest periods are permitted and will encourage his personnel to take advantage of them.
- (3) Introduce rest periods just before production and efficiency begin to fall off. Experiments show that for an 8-hour shift a rest period at the end of the second hour of work and at the end of the sixth hour results in an increase in production and efficiency. It is usually desirable to have a meal break after four hours of work. The duration of the rest period should be determined with respect to the degree of inherent boredom involved in the job. A 10-minute rest period has been shown to increase production from 10-20 percent. However, because of the monotony of routine commcenter work a 15-minute break is preferred.

b. Meal breaks. A 30-minute lunch period is usually inadequate. This time limitation can be observed only by rushing -- rushing to the cafeteria, rushing to complete the meal, and rushing to get back to work. This is not conducive to relaxation during the lunch period. Most employees prefer at least a 45-minute lunch period even if the working day has to be extended by 15 minutes.

c. Lounges and latrines. Rest facilities should be made available and located nearby to reduce the time lost in moving to and from the break. A comfortable lounge with associated washroom and latrine facilities is highly desirable.

## 25. COMMUNICATIONS CENTER SHIFT PLANNING

a. Closely related to intelligent use of rest periods is a proper shift system. Commcenters operate 24 hours a day, 7 days a week. Under such conditions, multiple-shift operation becomes a must. World War II provides a broad field of experience in multi-shift operation with many variations. These systems are described below:

- (1) Overlapping-Shift System. This system has proven successful in many commercial communications concerns where the peak load exists during the latter part of the day. By staggering the starting time for personnel to report to work, you can have a sufficient force available to handle peak loads. The reporting times will be dependent upon the load curve. As an example, one communications center has basic work shifts from 0800 to 1600, 1600 to 2400, and 2400 to 0800. To handle the peak load, an overlapping shift is made up of the best qualified and most skilled individuals in the center; this shift reports to work without a duty officer of its own. The overlapping shift works under the command of the duty officers already present and is used to handle the traffic load on the busiest circuits. The hours of the overlapping shift are arranged to cover the period of peak load. There is a variant to this system which permits workers to eat their meals without an interruption in operations by having the day shift work from 0800 to 1700 and the swing shift from 1700 to 2400.
- (2) Split-Shift System. Often you will find that two definite peak loads occur: one when the men are going to work, the other when they are going home at night. If you have enough people on the job to handle these peak loads, during the slack periods there will be more than are actually needed. To improve this situation, use of split shifts is required. Shift A, the split shift, can work from 0730 to 1230 and from 1800 to 2400. Shift B, the short shift, would work from 1230 to 1800 hours, and shift C from 2400 to 0730 hours. Under this system, shifts occur at mealtime so that working time is not interrupted for meals.

- (3) Four-Shift System. A system using four shifts, where three shifts are employed on the job and one shift is off duty, has also been successful in many communications centers. During the off-shift time, military personnel can be used for military functions such as KP, guard duty, etc., although it is felt that such details should be kept to a minimum. While not on shift and not performing other military duties, individuals have free time for personal affairs, for recreation, and for rest. There are variants to this system using five shifts.
- (4) Three-Weighted-Shift System. Use of weighted shifts has also proven valuable in some communications centers. Under such a plan, you can divide the work force into three permanent shifts and assign each shift a number of persons apportioned according to the traffic load experienced during the shift's hours of operation. You can also assign additional workers to offset the requirement and demands made by military duties and details and by recreational and rest time. The shift assignments are on a permanent basis and any rotation of individuals between shifts is made on the basis of seniority and the vacancies available. Since rotation of shifts is always a complicated process in military organizations because of frequent changes in personnel, the weighted shift system relieves the command of the complicated job of planning shift rotation.

b. Regardless of the shift system you use, the basic considerations you must make in any multi-shift plan are:

- (1) You must have enough people on duty at all times for adequate processing of the message traffic.
- (2) You should not have too many people on duty during slack periods. This results in poor economy, boredom, and loss of traffic consciousness.
- (3) You should not change during peak periods. The operating day should be divided so that the load in each period is light, moderate, and heavy.
- (4) You should plan your shifts so that everybody can have normal meal hours. The best shift planning permits people to have their meals either before reporting for work or after finishing work. Since you can not always do this, your alternate plan may be to cut the meal time to 30 minutes and relieve workers in small groups. In this way the meal time is spread out at most over two to three hours. Bear in mind the inadvisability of a 30-minute meal period.

c. The question of rotating people from one shift to another is still a subject for argument. Some commands look favorably upon such a rotation plan, while others prefer to operate without a rotation plan. Where rotation is desired, you must give some thought to the frequency of rotation; it is preferable to rotate once a month or twice a month rather than each week. Most surveys indicate that most people do not favor a weekly rotation plan, feeling that they no sooner accommodate themselves to a one-time schedule than they find themselves on a different schedule. In the survey referred to earlier concerning working conditions, 48 of the 61 persons who answered the question concerning shifts preferred a permanent shift to a rotating shift.

d. A permanent shift is highly recommended, not only as being conducive to good employee morale but also as contributing to efficiency of operations. Variations in amount and type of daily work flow are such that each shift is confronted with problems different from those of every other shift. When a group handles one shift permanently, it will become expert in the problems peculiar to that shift.

e. An objection to the permanent-shift system is usually raised. Someone gets stuck with the undesirable shifts (swing and graveyard). In the same survey referred to above, 39 of the persons who answered indicated a preference for the day shift, 13 for the swing shift, and 6 for the graveyard shift. Strangely enough, this distribution corresponds very closely to that which would be required by the work load.

## Section VI. SUPERVISORY PERSONNEL FUNCTIONS

### 26. GENERAL

To assure good management, you must assign specific responsibilities to the various supervisory positions. The supervisory functions discussed in this section are generally adaptable to most large fixed station communications centers but can be changed to meet local conditions.

### 27. RESPONSIBILITIES

Before assigning an individual to a specific supervisory duty position, consider his capabilities in relation to the responsibilities of that position. The following brief descriptions of supervisory functions will serve as a guide.

a. Officer in Charge. The OIC directs and controls communications center operations in accordance with policies set forth by current ACP's and JANAP's and by the senior signal officer of the headquarters concerned. The OIC maintains close liaison with other communications centers to achieve cooperation and to adjust minor procedural difficulties. This includes matters concerning messenger service to adjacent and major subordinate units if messenger service is necessary at that particular headquarters. He initiates necessary action to obtain security clearances for personnel engaged in commcenter operations. He is responsible for the storage and use of classified files governing the operation of the communications center. He maintains a continuous survey of the operations and recommends timely changes.

b. Assistant Officer in Charge. This officer assists the OIC in the performance of his duties and acts in place of the OIC during his absence. He is directly responsible for the proper operation of the Methods and Results Section. He supervises the communications center duty officers in the performance of their duties and recommends changes in operational procedures and policies.

c. Personnel and Administrative Officer. The personnel and administrative officer conducts a personnel training program. He is responsible for the efficient handling of all administrative matters, other than cryptographic, for all sections of the communications center.

d. Maintenance Officer. The maintenance officer is responsible for formulating a program of maintenance on all Signal Corps equipment used by the various sections of the communications centers.

e. Cryptosecurity Officer. The cryptosecurity officer is a commissioned or warrant officer appointed by the commander. He is responsible for the correct employment of cryptographic systems, for training cryptographic personnel, and for keeping the commander informed on cryptographic matters. He must have a security clearance for access to cryptologic material. In addition to his duty as cryptosecurity officer, he should be appointed custodian of cryptomaterial. See AR 380-40 and AR 380-41.



f. Custodian of Cryptomaterial. At each headquarters holding cryptomaterial, the commander will issue orders appointing an officer, commissioned or warrant, as custodian of cryptomaterial. This officer will be responsible for the physical security, storage, accounting, transfer, and destruction of cryptomaterial. A custodian of critical cryptomaterial will be cleared for access to the highest classification of information to be handled. The commander should also appoint an alternate custodian of cryptomaterial. See AR 380-40 and AR 380-41.

g. Communications Center Duty Officers. These officers, sometimes called the operations duty officers, provide over-all supervision of operations during designated tours of duty. They are required to give personal attention to the operation of the communications center and the enforcement of authorized procedure. They investigate any delays, difficulties, or unusual circumstances that arise; initiate corrective action; and maintain a journal of the circumstances for future reference. This journal is turned over to successive relieving duty officers. During tours when the OIC is not present, the duty officer acts in his behalf. It is advisable for communications center duty officers to be cleared for access to cryptomaterial. It should be considered here that the best way of learning is by doing.

h. Cryptoduty Officer. Cryptoduty officers supervise the operation of the cryptocenter during designated tours of duty. They must have crypto clearances and TOP SECRET security clearances.

i. Trick Chief, Tape Relay Station. The trick chief of a relay station is responsible for directing the operation of the relay station during his tour of duty and supervising all personnel assigned to his shift. He checks multiple-call records to ensure that multiple-addressed messages are properly handled. He also ensures --

- (1) That all messages receive expeditious processing and that each individual message is fully protected by required transmission.
- (2) That number sheets are kept and initialed by the supervisor at prescribed intervals.
- (3) That channel checks with distant stations are maintained as prescribed, that a follow-up is made on rerun requests, and that receipts for flash and emergency messages are sent and received.

j. Trick Chief, Terminal Station. The terminal station trick chief is responsible for informing relieving trick chiefs of changes in procedures, new or revised directives, any unusual occurrences affecting operations, and matters still requiring disposition. He has the following specific duties:

- (1) Directs the operation of the station during his tour of duty.
- (2) Supervises all individuals assigned to his shift.
- (3) Interprets, disseminates, and enforces the policies and procedures set forth in applicable JANAP's, ACP's, AR's, SR's, and any special orders, memoranda, and directives.
- (4) Accounts for all individuals on his shift.
- (5) Assigns positions and ensures that, once assigned, nobody leaves his position until properly relieved.
- (6) Cooperates with other communications centers and with other operating sections or branches of his communications center in the handling of traffic.

- (7) Maintains a constant check on all phases of operation, thereby ensuring an uninterrupted flow of traffic and accurate maintenance of records.
- (8) Records in the trick chief's log and reports to either the duty officer or the OIC all unusual conditions affecting the handling of traffic, such as heavy backlogs, equipment failures, circuit outages, delay in handling high precedence messages, alternate routes used, and other departures from normal operating procedures, with the reasons for such departure.
- (9) Ensures that all high precedence traffic is hand-carried and given expeditious handling through the station.
- (10) Determines the rerouting of messages and arranges for alternate routing as dictated by traffic and circuit conditions.
- (11) Spot checks incoming and outgoing procedure messages and takes necessary action on discrepancies.
- (12) Inspects the station frequently for proper police.
- (13) Supervises final closeouts, reviewing number sheets and other records for completeness and taking necessary action where discrepancies are disclosed.

k. Supervisor, Tape Relay Station. The supervisor fully cooperates with supervisory personnel of all stations in the interest of operational efficiency in traffic handling. He is responsible for being familiar with tape relay procedures as prescribed in ACP 127( ), Communication Instructions, Tape Relay Procedures. He is proficient in the use of procedure messages, prosigns and operating signals, and in the reading of perforated tape. He performs the following specific duties:

- (1) Ensures that all operating positions function as required for proper control and distribution of traffic and that an operator once assigned to a position does not leave that position without proper relief.
- (2) Completes the accurate handling of all message tapes referred to him.
- (3) Keeps informed on the current operational status of circuits.
- (4) Maintains a record of supervisory actions by completing DA Form 11-118 (Message Number Sheet) and rerun log entries as required, and ensures by frequent inspection that logs are neat, complete and legible.
- (5) Ensures that the operating area is properly policed at all times.
- (6) Reports all unusual outages, backlogs and circuit delays to the trick chief.
- (7) Reroutes heavy backlogs but only with prior coordination.
- (8) Investigates unusual or too frequent reruns or repunch requests to determine whether equipment difficulties exist.
- (9) Ensures by frequent inspection of multiple call records that multiple call messages are processed accurately.

(10) Ensures that high precedence messages receive expeditious handling.

(11) Informs operating personnel of any special instructions and procedural changes.

## 28. GRADE STRUCTURE FOR SUPERVISORY PERSONNEL

a. When employees are dissatisfied with their work, we immediately think of inadequate pay as the chief reason for the dissatisfaction. Actually, the pay of supervisory personnel in commcenters compares favorably with that of their counterparts in industry, and commcenter supervisors seldom make unfavorable comments concerning their pay in questionnaires and management surveys.

b. The grade structure for one of our STARCOM major relay stations and for a tributary of that relay station is given in Table III.

c. Although the general grade structure appears to be adequate, some inequities may exist from station to station. The difficulty in securing adequate grades for supervisory personnel is usually attributable, for the most part, to insufficient or obsolete job descriptions. The job description must reflect accurately what the supervisor does. Examine these job descriptions carefully and obtain the assistance of a representative of your local Salary and Wage Branch, Civilian Personnel Division, in writing up the proper job description.

TABLE III. GRADE STRUCTURE FOR CIVILIAN SUPERVISORY PERSONNEL

POSITION	STARCOM MAJOR RELAY STATION	STARCOM TRIBUTARY STATION
Chief Operator (Asst to OIC)	GS-9	GS-9
Commcenter Specialist (Asst to Chief Operator)	GS-7	GS-7
Trick Chief	GS-6	GS-5
Asst Trick Chief (Senior Operator)	GS-5	GS-4
Supervisor T/R	GS-4	NONE
Semi-Automatic T/T Operator	GS-3	NONE
Teletype Operator (Terminal)	GS-4	GS-3
Maintenance Personnel	Wage Board*	Wage Board*

\*Wage depends upon prevailing wage in industry in the locality of employment.

## Section VII. MESSAGES AND MANAGEMENT

### 29. GENERAL

The quantitative flow of work through a commcenter follows a definite weekly cycle. A certain relatively predictable percentage of the total weekly traffic occurs on each day of the week. While the total weekly quantitative level could rise or fall over a period of time, it is not probable that any sudden, permanent variation would occur. It is more probable that any such change would be the final result of a long-term trend. Similarly, the hourly flow of traffic through the commcenter follows a relatively definite pattern which repeats itself each day of the week.

### 30. CHARTING THE LOAD

You will undoubtedly -- and properly -- use your M&R Section to prepare charts of the message load of your commcenter. A typical distribution of weekly work load is shown in figure 2, and of the daily work load in figure 3. You might regard these as clinical charts of the patient. They visibly record the inaudible pulse beats of the center. You should know these characteristics of your center -- its highs and lows, and its changes from the normal. Just as a change in temperature charts of a patient broadcasts its warning to the physician, changes in these patterns will give you due warning when a permanent change in the trend of traffic flow is taking place. The work load charts will help you diagnose the ills that beset your center.

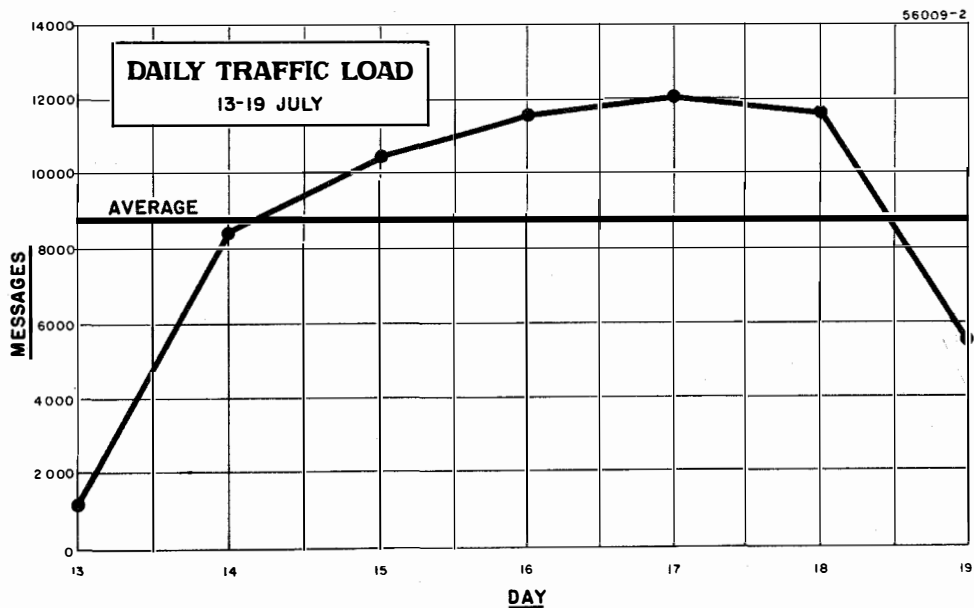


Figure 2. Work load chart: showing daily traffic load for one week.

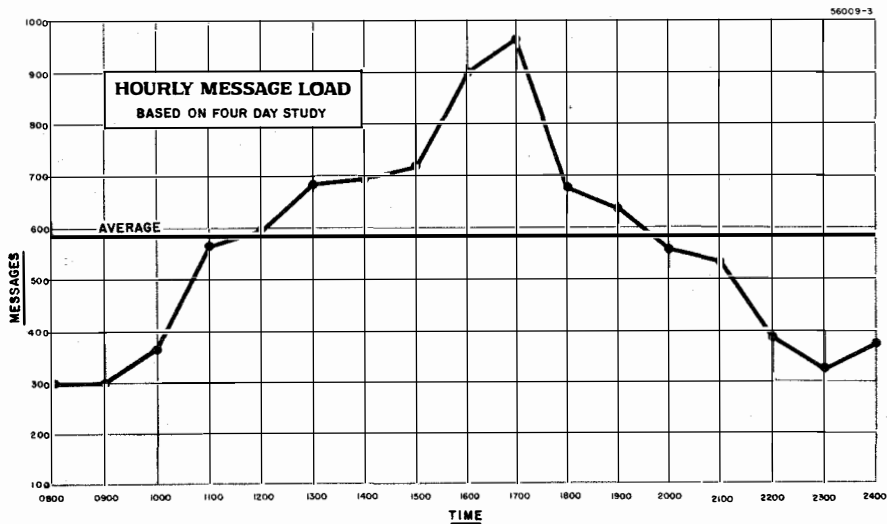


Figure 3. Work load chart: showing hourly message load for one day.

### 31. CHARTS AND SCHEDULES

You should schedule your commcenter personnel to provide the greatest working force during the period of the greatest work load, making your personnel schedules conform to the traffic flow as indicated by your work load charts. Of course, the extent to which you can do this depends upon the adequacy of your total work force. But, even where the adequacy of the work force is marginal, careful attention to scheduling is beneficial in insuring that no scarce manpower is wasted. You should graph the total number of manhours available throughout each week and throughout each 24-hour period, then compare them to the workload patterns. This will provide you with a good picture of the problem. You can then properly prescribe for and remedy any deficiencies. This procedure ensures best use of available manpower.

### 32. REDUCING THE LOAD

a. You will probably find that almost every commcenter is plagued by messages that shouldn't have required electrical transmission in the first place. In 1953, the commcenter serving Fifth Army Headquarters, Chicago, Illinois, made a study of the messages originating in its headquarters. The results of that study showed that 26 percent of the messages filed were not necessary, 23 percent were of doubtful necessity, and only 51 percent appeared to be essential. The advantages to be derived from reducing the workload to only essential messages is obvious. You should at least try to --

- (1) Maintain close liaison with AG Distribution Center, the Adjutant General, and releasing officers.
- (2) Prepare an orientation of the commcenter (tours and conferences) for all staff officers.
- (3) Coordinate with the AG in producing a memorandum regulating message writing.
- (4) Provide each staff section with an up-to-date schedule indicating --
  - (a) Time required to reach usual addressees by electrical transmission.
  - (b) Time required to reach the same addressees by mail.
- (5) Show the average cost for each message and include it in the schedule sent to the staff sections. As a variant, show the total message cost for each staff section for a certain period, say 30 days.

b. Educating the staff will bring large dividends. But do not make the usual mistake. After a successful educational campaign, don't sit back in the false notion that you have turned the trick, only to find the same problem a short time later. Educating the staff must be a continuing process. Only then can you maintain the results you desire in cutting down the workload.

### 33. COMMUNICATIONS OPERATIONS REPORT (COR)

a. General. Each terminal, tributary, and relay station of the Defense Communications System (DCS) will periodically prepare and submit a Communications Operations Report (COR) to Headquarters, Defense Communications Agency (DCA), in accordance with DCA Circular 55-7 (DCAC 55-7).

b. Purpose and Use. The COR is designed to provide data on system usage and operations for planning, management, and budgetary requirements; and to evaluate the effectiveness of operational procedures. It is used as a basis for determining traffic and operation characteristics and for comparison of performance factors.

c. Responsibilities. Each station is responsible for --

- (1) Scheduling preparation of the COR during a low workload period.
- (2) Establishing internal procedures for the compilation of data to be included in the report.
- (3) Ensuring that the report is accurate and complete.

d. Contents. The COR is a statistical sample of message traffic transmitted over common-user teletypewriter facilities of the DCS. The data to be included should be obtained from normal logs, records, monitor tapes, etc., and should involve no computations beyond limited summary data at the reporting level. Complete summarization and computation of derived factors will be accomplished by automatic data processing techniques at Headquarters, DCA.

NOTE: Effective 31 March 1964, the Telecommunications Engineering Report (TER) required by AR 105-43, US Army Strategic Communications Command (USASCC) is rescinded. If future reports of the USASCC are required, a new regulation covering their preparation and distribution will be issued.

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