

THE GENERAL BOARD

United States Forces, European Theater

SIGNAL SUPPLY, REPAIR AND MAINTENANCE

MISSION: Prepare Report and Recommendations on Signal Supply, Repair and Maintenance in the European Theater.

The General Board was established by General Orders Number 128, Headquarters, European Theater of Operations, United States Army, dated 17 June 1945; as amended by General Orders 182, dated 7 August 1945, and General Orders 312, dated 20 November 1945, Headquarters United States Forces, European Theater, to prepare a factual analysis of the strategy, tactics, and administration employed by the United States Forces in the European Theater.

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UNITED STATES FORCES EUROPEAN THEATER  
APO 408

REPORT ON  
SIGNAL SUPPLY, REPAIR AND MAINTENANCE  
IN THE EUROPEAN THEATER

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SIGNAL SUPPLY

## INTRODUCTION

1. The signal supply system used in the European Theater of Operations did not, in many instances, produce the desired results of placing equipment and supplies in the hands of using organizations in a minimum of time. This study is to determine the deficiencies of the supply system used and to recommend changes to correct these faults. The problem will be considered in four steps, namely, (a) determining of supply requirements, (b) procuring the necessary supplies and equipment, (c) receiving, storing, and issuing the supplies and equipment, and (d) supply control.

SECTION 1DETERMINATION OF SUPPLY REQUIREMENTS

2. Basic Planning Data. a. The basic planning data for determining supply requirements is a summation of the quantity and types of equipment necessary for the initial equipping of the troops to be employed plus the necessary supplies and equipment required to support such troops in the performance of their assigned mission.

b. The initial equipment of the troops is that authorized by Tables of Organization and Equipment, Tables of Equipment or Tables of Basic Allowances plus such additional equipment as is necessary for the accomplishment of the assigned mission. Recommendations for changes in authorized equipment allowances have been furnished the War Department periodically as conditions indicated.<sup>2</sup> All such recommendations have not been favorably acted upon.

c. War Department Replacement Factors are established for planning purposes to determine quantities of supplies and equipment required for maintenance. Based on experience in the North African Theater that War Department Replacement Factors were generally low, a liberal safety factor was used in determining requirements for the European Operation.<sup>3</sup> The War Department's lag in keeping replacement factors current tended to discount confidence in the adequacy of such published authorizations.<sup>4</sup> Replacement factors must not be considered by any echelon of supply as static or infallible. They must be constantly reviewed by the War Department in the light of latest consumption figures and changed when necessary to meet operational requirements. The inherent lag in changing replacement factors must be held to a minimum. This can be done if accurate usage figures are promptly sent to an active War Department study and procurement section.

3. Level Of Supply. a. The establishment of an adequate level of supply to support an operation is of great importance and the determination of an adequate level is difficult as most replacements in combat are for losses due to enemy action rather than normal wear and tear. There are so many inter-related factors and conditions which enter into the problem that an approximation only can be made. Theoretically the number of days of supply adequate for theater requirements may be computed by totaling the operational

requirements, the reserves necessary and the anticipated expenditures for the resupply cycle time. The answer however, is not a simple arithmetical summation as each of these quantities is a variable dependent upon enemy operations and the fortunes of war. The solutions must in any case be a compromise based on past experiences, present conditions and estimated future situations and requirements.

b. War Department Replacement Factors are based on past experiences and a considered estimate of future requirements. They are the logical basis for determining daily theater requirements. Too much reliance in replacement factors should not be made however if a safe and adequate supply level is to obtain. Good judgment is a large part of maintaining such levels.

c. The number of days of supply necessary to be maintained should be sufficient to provide a safe margin against all tactical requirements. It should not be so large as to break down the production scheme within the Zone of Interior or the transportation system to and within the theater. The 45 day reserve level authorized the European Theater would have been adequate if the resupply cycle time had not frequently exceeded the authorized 30 days operating level.<sup>5</sup>

d. War Department Replacement Factors figured on a theater basis cannot be applied directly to the stockage of individual armies without many resulting discrepancies.<sup>6</sup> The breakdown of the theater level of supply should not be on a straight fractional basis for each of the several echelons being supplied, but must be made to fit the existing needs and conditions. Enemy operations, transportation and the efficiency of the responsible supply organization all have an intimate bearing on the level of supply needed by an army. An army that is closely supported by a Communications Zone depot with adequate and balanced stocks, can successfully operate with minimum supplies whereas one which does not have reliable support must carry reserves sufficiently large to meet all contingencies. The several armies in the European Theater of Operations due to the extended lines of communication were never afforded this ideal support by Communications Zone depots and were therefore forced to carry heavy stocks at the expense of mobility.<sup>7</sup> Prior to V-E Day, work was in progress to devise a system of determining army supply levels in terms of definite quantities of individual items, rather than in terms of days of supply.<sup>8</sup> This plan offered the promise of being readily adjustable to the needs of the individual armies and of easier stock control. War Department Replacement Factors formed the basis of the list. The adjustments to fit local requirements of the individual armies would not have greatly upset the overall theater level of supply since a larger requirement by one army would usually have been counterbalanced by a smaller need in another. Any overall theater discrepancies that would have developed could have been made the basis for revision of War Department Replacement Factors.

e. An efficient supply organization exercising strict stock control can play a major role in efficient handling and usage of supplies and will have a definite effect in making a lower level of supply adequate for the needs.<sup>8</sup>

#### 4. Issues Over and Above Basic Authorizations.

a. Needs for additional equipment caused by the geographic location or the assigned mission of an organization were frequent in the European Theater of Operations. Equipment and supplies to fill such needs are not provided

under standing authorizations, such as the Table of Organization and Equipment, but must be secured by special Authorization. If the need is to be constant or frequently recurring, authorization for additional equipment must be secured from the War Department in the form of an approved special list of equipment (SLOE) to assure maintenance of adequate theater supply. Extra equipment for use on a specific mission may be issued from working stocks to be returned upon completion of mission or end of need. Since in combat only a small part of equipment issued would ever find its way back to stock, the requirement should be covered by a project on the War Department to assure replenishment of stocks.

b. Issues over and above basic authorization are not always approved as requested by combat units, or are slow in being approved. Army Signal Supply Officers have been criticized for allowing issues not authorized by higher headquarters, but the policy of furnishing the combat unit what it needs when it needs it is a sound one from the Army level. The authorized supply cushion for the lower units to fall back on is thin indeed and should be so for maximum unit mobility. Experience in this Theater demonstrated that an organization in combat will usually provide itself with as much equipment as is thought necessary to accomplish its mission and will not carry more than it considers necessary.<sup>9</sup> The best supply control is an active supply organization that keeps abreast of the needs of the organization it serves, provides for them, and reports accurate information to higher supply echelons as to what these needs are.

5. Theater Reserve. a. A reserve of equipment and supplies is just as vital in military operations as is a reserve of men. The necessity for a reserve is universally recognized but the control, maintenance and use of the reserve is a controversial subject. Final control of such reserve must therefore be exercised by the Theater Commander thru the Chief of Service.

b. War Department provision for a Theater Reserve is found in the number of days of supply authorized based on War Department Replacement Factors for reserve, in addition to the days of supply authorized as an operating level. In the European Theater of Operations this authorization for reserves was a 45 day level. This quantity, if it had been physically available on the continent, would have been adequate as a pure reserve but the authorized level was never fully reached. The stock that was available therefore often had to be dipped into for normal operations since resupply delays frequently made the 30 days operations level inadequate. Prior to "D Day", it was recognized that this condition would likely exist, so provisions were made for a SHAEF or Emergency Theater Reserve. This reserve was built up in phases to a predetermined level from a percentage of supplies reaching the continent.<sup>10</sup> Included in this reserve, in addition to the normal tactical equipment authorized by replacement factors, was project equipment particularly of the fixed plant type. These supplies and equipment were actually set aside in the various Communication Zone depots and marked "SHAEF RESERVE". Release was controlled by the Theater Signal Officer, and usually made on the recommendation of an Army Group Signal Officer or the Communications Zone Signal Officer.

c. The SHAEF Reserve and its administrators were targets for some criticism. Of the reserve itself, it was thought to be too large and not flexible enough. The original

quantities were fixed prior to "D Day" and were purely estimates of requirements. Revisions in the light of experiences were slow in being made. The administrators were criticized when it was found that under the existing supply policy high pressure was frequently as effective as a good reason to secure equipment. The administrators were accused of having frozen the equipment and supplies for the exclusive use of SHAEF Headquarters. Apparently there was some truth in these accusations, for urgent requests for materials, bearing the approval of the Army Group Signal Officer, were sometimes returned marked "no stock" when it was known that the requested items were in the SHAEF Reserve.<sup>10</sup> This indicated either a bias or a lack of knowledge of true conditions on the part of the administrators.

d. There is no serious argument against the necessity for a theater reserve but such reserve should be a flexible one varied to fit actual conditions and so administered that it can serve the purpose of being a pool of supplies and equipment available for emergency use. The administrators should be fully cognizant of current conditions and needs throughout the theater. Since this last condition is hardest to meet, a possible solution would be to make a percentage of the reserve available to the army groups to meet emergencies.

6. Conclusions. a. Reliable and current information on signal supply expenditures and requirements, particularly requirements for maintenance, should be furnished to the War Department more rapidly for use as a basis for the revision of War Department Replacement Factors.

b. Current War Department Replacement Factors are suitable as a basis for initial establishment of theater supply levels, but do not reflect supply requirements of the individual armies. Experience would appear to indicate that army supply levels might better be on a basis of a list of items by quantities in accordance with the requirements.

c. A theater reserve is necessary, but control such as that exercised over the "SHAEF Reserve" is too remote and inflexible.

7. Recommendations. It is recommended: a. That a supply control be set up in the theater, in close coordination with the senior field force headquarters, to collect and furnish current information to the War Department on signal supply expenditures and requirements. The report should be directed to the Chief Signal Officer through technical channels.

b. That policies incident to theater reserve be liberalized to the extent that the level of the reserves is in accordance with requirements and that the control of at least a reasonable percentage of the supplies be at army group level.

#### NOTES:

- 1 See Appendix 1, Paragraph 1
- 2 See Appendix 5, Paragraph 2
- 3 See Appendix 3, Paragraph 1
- 4 See Appendix 2, Paragraph 2
- 5 See Appendix 5, Paragraph 2
- 6 See Appendix 7, Paragraph 1
- 7 See "Report on Supply of Signal Equipment to Armies of 12th Army Group", Appendix "D", paragraph 4, 3 Feb 1945.
- 8 See Appendix 5, Paragraph 8
- 9 See Appendix 7, Paragraph 7
- 10 See Appendix 4, Paragraph 1

## SECTION 2

### PROCUREMENT OF SUPPLIES

8. General. The major task of procuring military supplies for the European Theater of Operations was primarily a function of the Army Service Forces in the Zone of the Interior and was outside the jurisdiction of the Theater Commander except for making known the theater operational requirements. Only a limited local procurement program, in relation to overall supply, was conducted within the European Theater of Operations. The Communications Zone Headquarters was the theater agency responsible for obtaining adequate supplies and equipment to meet theater needs. The several armies were authorized to procure locally limited amounts of certain items to fill immediate needs when such procurement was possible.

9. Procurement of Initial Equipment. In the early planning stages for the continental invasion, the equipment for most troops sent over to the United Kingdom came force marked. This system caused considerable confusion because usually the troops and equipment were not on the same boat and the time and place of arrivals of troops and equipment varied widely.<sup>1</sup> This meant that much time and effort had to be expended in trying to assemble the often widely scattered equipment and the unit for which it was marked. Frequently the delay in accomplishing this was so great that equipment marked for one unit had to be given to another to avoid loss of training time. This mixing of issues sometimes resulted in double issues to some units while other units received none. To rectify this situation a recommendation was made that all equipment, other than that actually accompanying the troops, be shipped in bulk. This policy was adopted and proved satisfactory except that the margin of reserve equipment was not adequate to properly equip provisional units and at the same time give the leeway needed in preparation for the invasion. Thus, extra needs had to be met by denying equipment to low priority units and giving it to high priority units.

10. Making Requirements Known. a. Signal supplies from the Zone of Interior were generally procured and furnished on the basis of requirements, either anticipated or real. The actual supply from the Zone of Interior was either as an automatic issue, based on status reports, or in response to a requisition for nonstatus report items. In either case there was usually a delay of 90 to 120 days or more between the time the need was made known and the time the supplies were received. This delay, although probably unavoidable, led to the padding of reports and the boosting of safety factors to assure having ample supplies to meet such emergencies as might arise within the re-supply cycle time.

b. Automatic issues were based on status reports such as the Monthly Material Status Report which was a consolidation of loss reports and other supply status information. The items on which automatic issues were made were specified by the War Department and reports on the status of these items were required at monthly intervals. This system of supply was never entirely satisfactory primarily because of the excessive time lapse between the making of the report and the receipt of supplies. Since re-supply was primarily on the basis of replacement of losses, the plan



was fallacious in theory in that replacements were received 90 to 120 or more days after reported loss. Actual shortages in the hands of the troops were avoided by the use of reserves and by padding the reports to boost the reserves. As pointed out in paragraph 4b of Section 1, above, troops in combat will usually find ways and means to secure the supplies and equipment they need, so too much weight should not be placed on loss reports particularly when the Supply system behind them is over extended.

c. Stocks for normal needs of non-status-report items were requisitioned from the Zone of Interior 90 days prior to the beginning of the month for which supplies were needed. The quantities to be requisitioned were obtained by multiplying the total quantities of supplies issued to the troops by the current War Department Replacement Factors. Requisitions for emergency items were placed on the War Department by rapid electrical means.

d. Equipment and supplies needed for a special operation or for a specific job were secured from the Zone of Interior by submitting a theater approved project giving the justification for the project. Project requirements were submitted, as far in advance of the actual requirements date as possible to allow time for the material to be made available.<sup>2</sup> The slowness and difficulty in getting projects approved sometimes forced the diversion of material procured for another purpose and tended to cause reserves to be built up for use in normal projects as well as for emergencies.

e. Items which are in critically short supply should not be handled in the regular manner or they will tend to become even more critical. The fact that an item is in critical supply is an indication that it is needed and this should be sufficient justification for special expediting. The army groups are in a favorable position to secure current information from the armies on items in short or critical supply. They can readily pass this information back through the Communications Zone Headquarters to the War Department where positive and immediate action should be taken to improve the situation. On the other hand, the War Department should keep the armies informed through Communications Zone Headquarters of any shortages likely to develop because of procurement difficulties so that immediate steps can be taken to economize in the use of existing stocks of those items.<sup>3</sup>

11. Newly Standardized Items. a. Newly standardized items not available in sufficient quantities for general distribution were a source of considerable difficulty for most supply officers.<sup>4</sup> Such items were often shown in tables of authorizations, such as Tables of Organization and Equipment, many months before they were actually available even in limited quantities. The appearance of such an item in a table of authorization results in a flow of requisitions and reports of shortages. A great deal of time was wasted explaining to G-4's why organizations continued to have unfilled shortages week after week when nothing could be done about these shortages. Although theater instructions were issued that newly standardized items should not be requisitioned nor reported as shortages, the items still appeared on requisitions and shortage reports.

b. Several explanations have been offered as to why items known to be in short supply, and likely to remain so for several months, are included in tables of

authorizations months prior to availability. The most plausible explanation is that listing in current tables of authorization is necessary before money can be obligated to procure the item. Any minor problem such as this that has caused and continues to cause so much trouble deserves further study at the source.

12. Signal Supply for the Air Forces. a. The Communications Zone Signal Supply Officer procured and had transported to the European Theater only common user items of signal equipment and supplies for the Air Force. Items peculiar to the Air Force were procured through Air Force channels. In plan "OVERLORD", First US Army was made responsible for supply of all common user items to the Ninth Air Force on the continent during Phase One of the operation. Upon establishment of an Army rear boundary this responsibility was placed on the Commanding General, Communications Zone. This plan was followed and was found satisfactory in most cases. At times when certain units of the Air Force were established near army depots, supplies were furnished them by the armies to meet immediate needs. This procedure was followed as a matter of convenience and to save transportation. It was a matter of local arrangement between the Air Force unit and the local army signal supply officer. The chief complaint registered by Communications Zone against supplying Air Force needs was that their requests were at times greater than their proportionate share of available supplies. These requests were normally scaled down without serious detriment to either the Air Force or the Ground Force.

b. The procuring of common user items for the Air Force by the Signal Corps is considered satisfactory in that such procurement is more efficiently performed by a single agency. It was commonly recognized that the Air Force frequently placed a higher priority on manufacturers for their supplies than was allowed the Ground Force. If common user items had been procured by the Air Force, it is probable that the Ground Force would have had some difficulty obtaining required quantities of these items. On the other hand, items peculiar to the Air Force are designed to meet Air Force specifications and requirements, and there would be no advantage to either the Signal Corps or the Air Force in changing the procurement procedure.

13. Shipping Practices and Priorities. a. The Communications Zone Signal Supply Officer had no authority over the agency responsible for shipping supplies from the Zone of the Interior, but he was able by pertinent recommendations and reports to affect shipments to meet the anticipated theater requirements. It is recognized that shipments involved a multitude of problems such as shipping spaces and loadings, convoy movements, etc., and that the movement of the supplies of the other services may have had equal or higher priority. However, a greater flexibility in transportation practices would have materially eased critical supply problems within the European Theater of Operations.

b. One of the problems in supply is the assembling of all components of a piece of equipment that are necessary to make a working unit. Because of bulk or weight many items of signal equipment are packed in several cases all of which are required to assemble a workable unit. It was the standard operating procedure that all multi-packaged items should be complete before any shipment was made. However, departures from this procedure were not infrequent and components of equipment were separated, resulting in items being received

short certain parts. An example of this was radio sets SCR-694 which were received on the continent less the essential power supply units. Little use was ever made of these sets because of this shortage, which was caused by the loading of the sets on one boat and the power units on another. The sets arrived, but the power units did not arrive until about "VE-Day" when it was too late to use the sets for the purpose intended. Part of the responsibility for such separation of components was undoubtedly due to the system of marking packages. Boxes frequently were marked with several sets of numbers. While these numbers may have been needed at the several steps of procurement and shipping they were thoroughly confusing to any other than a shipping specialist.<sup>2</sup> It must be recognized that personnel available to handle supplies, particularly box handlers, are not such specialists and that chances of making specialists of them are neither practicable nor likely. Any marking system used should be as simple as possible. All unnecessary markings should be eliminated. Boxes containing components of larger items should be so marked that recognition and assembly of components will be simple. In ship loading the components should be kept as closely associated as possible.

c. Although the tonnage of signal supplies never represented more than one to two percent of the total tonnages shipped, the importance of these supplies far outweighed this ratio. Without adequate signal communication all operations are slowed down. Supplies cannot be readily controlled and distributed without communication. Coordination of forces is impossible without proper communication. A commander cannot adequately follow his operations without communication. Overall efficiency of any unit is in direct ratio with the quality of communication. Priorities for movements of signal supplies should be based on a consideration of these statements.

14. Local Procurement. a. Local procurement was particularly important in supplying small quantities of badly needed items when they could not be obtained within a reasonable time from the Zone of the Interior. Local procurement was effective as a stop gap and important in total operations even though it did not involve great numbers, large bulk or high cost. Most of the local procurement was on the basis of reverse lend-lease with no monetary transaction taking place. Some of the items procured locally were panel sets, radio tubes, special telephone equipment, photographic materials and supplies, mast sections, etc. Much of the telephone equipment procured was for use with the existing continental systems and was in accordance with local specifications. It was found impracticable to try to perfectly match components being procured locally for American equipment. However, acceptable substitutes were usually produced and in some cases worthwhile improvements were suggested. Substitutes for the AN-131 radio antenna were a definite improvement over the American design.

b. Local procurement was necessary in providing certain items in critically short supply which could not be procured in time from the States. Even when air priority was granted for shipments of items from the Zone of the Interior, delays of five to seven weeks were common and local procurement was turned to as an emergency measure in spite of the difficulties involved. An example of a requirement filled by local procurement, after an attempt

was made to obtain the item by air shipment from the States, was a bullet connector for radar set SCR-584. This set was in need of constant maintenance. The bullet connectors were not as durable as had been expected and the demand for replacements was much greater than the supply. First United States Army had used the entire Theater stock and a request was placed on the Zone of the Interior for 2,000 to be air shipped immediately. Of the 2,000 requested 20 were received. Local procurement was turned to and production placed on a 24-hour basis. The connectors were gold plated by a local firm instead of being silver plated, as the American products were, and the finished item was found to be the equal of or superior to those procured in the Zone of the Interior.

c. Local procurements were not consummated without solving many problems which seemed to pyramid as requirements arose.<sup>6</sup> The field armies using direct methods in local procurement secured prompt results. The items secured by field armies were usually made up from materials already available at the plants and in accordance with designs previously in production at such plants. Procurement by Communications Zone was more complicated both because of involved procedures and because it was necessary to furnish raw materials to the plants before any work was started on the product desired. Briefly, procurement by Communications Zone was along the following pattern. The general purchasing agent presented his problem to the government representative of the country in which the product was to be made. This representative referred the requirement to an industrial committee where a decision was made as to which of the several manufacturers would be given the contract for the work. The contractor chosen by the committee was not always the best prepared to produce the product desired, but the general purchasing agent could do little about this because of the political situation involved. Direct contact with the named contractor was difficult and slow. It was frequently found that all raw materials, including fuel, had to be furnished to the contractor before any work could be started. In at least one case it was necessary to make provisions for local transportation for workmen who were to be employed in producing the product. All of these problems so delayed procurement that the immediate need had sometimes passed before the desired product was obtained. However, in spite of this handicap considerable benefit was derived from local manufacturing facilities.

d. Procurement within Germany was on a different basis from that in the liberated countries. The lend-lease program, of course, did not apply and no money could be paid by the purchasing agent for the finished product. Two methods of procurement were available, namely (1) the product could be requisitioned from the manufacturer in exchange for a procurement form which called for repayment by the German Government; and (2) the factory could be taken over and operated by the American Forces using German labor. Direct payment was permitted to the workmen.

15. Conclusions. a. Signal equipment not accompanying troops should be bulk shipped rather than force marked.

b. The listing of newly standardized items in Tables of Organization and Equipment when such items are not in sufficient supply for general distribution confuses the supply picture.

c. The procuring of common-user items of signal equipment by the Signal Corps for the Air Forces was a satisfactory arrangement.

d. A simplified and uniform marking system to aid in identifying and classifying packages of signal equipment is a requisite for efficient supply handling.

e. The shipping priority normally accorded signal equipment and supplies does not reflect the true importance of signal communication in operations.

f. Local procurement is not a consistent or reliable source of supply and should be used primarily as a stop-gap.

16. Recommendations. It is recommended: a. That the announcement of newly standardized items be withheld from published Tables of Organization and Equipment until the items are in adequate supply for immediate distribution.

b. That the marking system for packages of signal equipment be simplified sufficiently to eliminate classification errors when segregation is performed by persons of little signal experience.

c. That signal equipment and supplies be accorded higher priority in shipment.

#### NOTES:

1. See Appendix 3 paragraph 2.
2. See Appendix 5 paragraph 3.
3. See Appendix 2 paragraph 1.
4. See Appendix 7 paragraph 4.
5. See Appendix 3 paragraph 7.
6. See Appendix 7 paragraph 3.

### SECTION 3

#### RECEIVING, STORING AND ISSUING

17. General. Receiving, storing and issuing of signal supplies involves most of the physical aspects of Signal Corps logistics in a theater of operations. In addition to the actual availability of materials, supply efficiency hinges on such factors as personnel, physical facilities, transportation, supply policies and over-all supply control. All of these factors are of importance but, since supply policies and control have more general implications in signal supply, these items will be discussed in detail in Section 4.

18. Personnel. a. Signal Corps service units in the European Theater of Operations were inadequate in quantity and generally not organized or trained for work in an active theater. 1 The practice of diverting to depot and truck companies that personnel not considered suitable for other assignments has been a definite handicap to efficient supply. There appears to have been a failure to appreciate the fact that supply troops are as necessary to a successful campaign as combat troops. They must be just as capable of making correct decisions as the front line soldier. Decisions in combat must be fast and accurate. Likewise decisions made at the supply echelon must be fast and accurate, otherwise the combat soldier may be denied the opportunity of even making a decision. Supply is not a simple mechanical process that may be set in motion by a few high level decisions and then left to run of its own accord attended only by a handful of poorly trained and inept persons. Theater of operations supply cannot be reduced to a simple set of routine

## operations.

b. In general the training given signal depot personnel in the Zone of the Interior did not fit them for the job to be done in the European Theater of Operations. The procedures taught were primarily for posts, camps and stations and not flexible enough for field use. The men had too little opportunity to handle the actual equipment and to learn what it looked like and was used for. The few depot companies that handled other than imaginary stocks either handled them under the ideal conditions of a big general depot or in such small quantities that they had little conception of the vast job before them. Field training under combat conditions was lacking altogether, and the few maneuver problems were too short to give any simulation of the continuous supply problems that exist in a theater of operations.

(1) A procedure used in the United Kingdom to quickly orient a new depot company was to split it in half, putting half at an established supply point with a trained group, and to open a new supply point with trained troops from the established point supplemented by the other half of the new unit. After a reasonable orientation period, the new organization was then reassembled and given an independent assignment. This practice was also followed to a limited extent on the Continent after "D-Day".

(2) Even the training given in the United Kingdom did not prepare the personnel of the signal depot companies for the job ahead of them. In England, large warehouses with handstandings were usually available for signal depots. The highway and railway systems were widespread and operating efficiently. Little training was afforded for the operations to come, operations where depots would be large fields stacked with boxes, roads would be poor and traffic-laden and the whole area frequently churned to a sea of mud. Problems then arose that had no answers in the books.

c. Even prior to "D-Day" the available depot personnel was inadequate for the job to be done. Large installations were operated with only a handful of men. Equipment suffered from the lack of care due to this shortage and the whole supply process was slowed. One of the worst of the signal supply bottlenecks was the shortage of trained personnel at the ports of entry to quickly segregate incoming bulk supplies and route them to their proper destinations. There were no provisions made for service personnel to do the actual lifting and moving around of boxes of equipment and supplies. The 18 men provided in each storage and issue section by Table of Organization are hardly enough to supervise this necessary work at a supply point. If these men attempt to work as porters, the little specialized training they have is lost. The problem was partially solved by the use of Quartermaster service companies, (wherever these were available), local personnel, displaced persons, and prisoners of war. The use of other than military personnel was a necessary expedient. Their use, however, increased supervisory responsibilities almost beyond capabilities and was undoubtedly expensive of equipment and supplies. The need was constantly felt for service personnel with Signal Corps background but they were never available.

d. The Signal Depot Company and the Signal Repair Company are the two service organizations set up to provide and maintain signal equipment and supplies. The regular Signal Depot Company contains a Repair Section and has both supply and repair functions. Theoretically, fourth

echelon repair is handled by the repair section of the Depot Company and third echelon repair and maintenance is a function of the Signal Repair Company. Actually, the line of demarcation in repair responsibilities is not always apparent or desirable to follow, so both echelons of maintenance are performed by each organization. It was recognized by most Signal Supply Officers that two repair organizations were neither necessary nor desirable and varying local reorganizations were made to effect a more efficient organization. The solution adopted by the Communications Zone appears the logical one, i.e., organize the depot companies for storage and issue only and concentrate all repair personnel in repair companies. In the case of the several armies, the two organizations need to be located close together for mutual aid and to best serve the supported units.

19. Facilities. Supply facilities may be thought of as the buildings and grounds used for the supply installation and as the tools and materials available to operate the supply installation.

a. Ideal supply facilities in a theater of operations rarely exist. Those facilities that were present during peace time have usually been destroyed or damaged by the war. Criteria have been set for desirable closed and open storage space for type armies, but the truth is that those criteria did not help in finding usable depot sites during the European operations. The approaches, both highways and railroad, are more important in the selection of a depot site than the buildings themselves. Closed storage is highly desirable but not absolutely essential. In searching for a suitable depot location, the following factors should be considered:

- (1) Availability to a usable all weather highway;
- (2) Availability to a usable railroad siding on a line that is operating or will soon be operating;
- (3) Convenience to troops or organizations being supported and safety from surprise enemy attack;
- (4) Proximity to a main supply route and/or communications axis;
- (5) Availability of closed storage space;
- (6) Availability of hardstanding and open storage space.

b. Table of Organization and Equipment 11-107 for the Signal Depot Company provides almost no equipment and materials for the actual operation of a depot. The operation of a signal depot is a manually difficult job which involves the handling of hundreds of thousands of pounds of equipment. All kinds of warehousing equipment are needed by a Signal Depot Company and should be included in their Table of Organization and Equipment. Tarpaulins for example are necessary to protect outside stacks of equipment from the elements.

20. Transportation. There is seldom enough transportation. The transportation problems of Signal Supply involve both the lack of sufficient organic transportation for the operation of depots and of organized transportation for long distance hauling. Supplies are of no value unless they can be placed in the hands of the using unit.

a. Organic Transportation. Table of Organization and Equipment 11-107, dated 6 February 1945, authorized a total of two (2) 2½ ton, 6 x 6 cargo trucks; four (4) 3/4 ton weapons carriers; one (1) ½ ton truck, and seven (7) machine shop and repair vehicles as normal transportation for

the Signal Depot Company. When outside the continental limits of the United States, if authorized by the theater of operations commander, three (3) each 4/5 ton, 4 x 4 tractors and eight (8) each 6 ton, 2 wheel vans are authorized as additional equipment. Of all this transportation only the two 2½ ton cargo trucks are adaptable for use in general hauling incident to depot operations. Because of this lack of authorized transportation, it was necessary in the European Theater of Operations to obtain Quartermaster truck companies for this work. The several armies each required a minimum of one such truck company for a signal depot operations.<sup>3</sup> The Communications Zone depots also used the Quartermaster truck companies whenever obtainable, but all of the depot operations were constantly hampered by transportation shortages.

(1) From "D-Day" on it was as much a problem to move the incoming signal supplies forward to the using units as it was to obtain the supplies from the Zone of the Interior.<sup>3</sup> Much of the supply difficulties were not in the actual shortage of items but in the inability to place the items where they were needed. This difficulty existed from the time supplies were dumped on the beach or off-loaded at the port. Incoming supplies were normally in bulk and required classification after discharge from ships to place them in the proper depot for supplying requirements. When the first depots were set up on the beaches tremendous difficulties were experienced in moving stocks to a location where they could be systematically stored and issued. This condition existed even after the large base depots were established. Proper warehousing requires the segregating of supplies by items and classes; without transportation this is impossible. One of the main difficulties in filling requisitions of the armies was the lack of balanced stocks at any of the supporting depots.<sup>4</sup> This lack of balanced stocks was a direct reflection of transportation inadequacies. In the army areas it was sometimes impractical to place the army signal depots at railheads because of delays in rehabilitating such railroads and lack of proper sidings. In these cases it was frequently necessary to haul supplies several miles from the offloading railhead to the depot location. This operation had to be performed as expeditiously as possible both because of the limited railhead space and the need of the materials by the armies. Lack of organic transportation made it necessary for the Army Signal Supply Officer to secure transportation from whatever source it could be obtained in order to perform this operation as well as to assure that minimum signal requirements of the troops be met.<sup>5</sup>

(2) Another requirement for transportation found to be a necessity within the army signal depots was that incident to the establishment of forward dumps. Trucks and trailers, bin stocked, were used for this purpose. In the fast moving situations such as characterized World War II, continued advance of the combat troops was dependent on adequate supply support. It was the policy therefore to move these bin stocked trucks and trailers as close behind the using unit as reasonable safety permitted.

b. Theater Transportation. Theater transportation used, as its three principle carriers, railroads, trucks, and airplanes. Because of the inadequacy of all means of transportation throughout the most of the European operation, it was necessary to use a system of



allocations to control the movement of supplies. The allocation system is sound in theory, but the actual discharge of some of the commitments was not all that could have been desired.<sup>6</sup> The tonnages for the various classes and types of supplies were agreed upon by the commanders primarily interested. Coordination of tonnage allocation was a function of the G-4 Section. There was considerable complaint, much of which was justifiable, that the tonnage allocations were not being met or that the supplies being shipped were not those requisitioned and needed. The charge that tonnage allocations were not being met was partially due to the arbitrary assumption that the 2½ ton truck was capable of carrying five (5) long tons. Because of the bulkiness of certain supplies this was often impossible. The result was that in some instances as much as fifty per cent of the allotted tonnage was not shipped. Another reason for shortages in delivered tonnage was sometimes found to exist in the failure of the Transportation Officer to dispatch sufficient trucks to carry the allotted tonnage even on the basis of five tons per 2½ ton truck. The answer to the second charge, that unwanted supplies were shipped instead of those requisitioned, was due to lack of control at the loading point. Pressure brought to bear on the limited depot personnel to meet the allotted shipping tonnages often resulted in shipping items not desired. The 24 hour deadline set for most movements resulted in heavy shipment of items readily available and easily handled. This condition can only be dealt with and cured by a strict control within the theater signal service. Control of shipments through the established command channels proved too slow and cumbersome to be of value.

(1) The several regulating stations within the European Theater of Operations were never able to operate as intended in Field Service Regulations 100-10. An opinion as to whether this organization, as originally planned, is adequate or desirable is not considered to be within the scope of this study. However, it is believed that continuous regulation of the theater transportation is necessary by some organization whose primary interest is in the cargo rather than in the rolling stock. The practice of putting riders on high priority shipments was found to be almost a necessity if a reasonable delivery time was to be expected. It is believed that it would prove economical of both personnel and supplies to have an organization whose sole responsibility would be expediting and assuring safe delivery of shipments from point of origin to destination.<sup>8</sup>

21. Conclusions. a. The signal service units in the European Theater of Operations were not efficient because:

- (1) Training of depot companies was not realistic and did not prepare the personnel for the work to be performed.
- (2) The service organizations were not in adequate number to properly man all installations.
- (3) The organization of Signal Depot Companies (T/O & E 11-107) and Signal Repair Companies (T/O & E 11-127) is not conducive to greatest efficiency.
- (4) The Signal Depot Company is not authorized adequate equipment to perform its functions.
- (5) The authorized organic transportation is inadequate.

b. Theater transportation was primarily interested in transportation of tonnage rather than the filling of requirements. There is a need for an organization to expedite and control cargo from the point of origin to destination.

22. Recommendations. It is recommended: a. That a Signal Supply and Maintenance Battalion be authorized on the basis of one per field army. Such battalion to consist of a battalion headquarters, a storage and issue company, a repair company equipped for both fixed and mobile shop operation, a truck company, and a service company.

b. That a regulating agency be established, to be responsible for expediting delivery of cargoes from the communications zone to army supply depots.

#### NOTES:

1. See Appendix 3, Paragraph 3,5.
2. See Appendix 4, Paragraph 4, 5, 6.
3. See File of G-4 Periodic Reports, 12th Army Group Aug 1944 to May 1945.
4. See Report on Supply of Signal Equipment to the Armies of 12th Army Group, paragraph 3c (1).
5. See Signal Corp Technical Historical Report, First US Army Signal Service, section V, c 1.
6. See Appendix 7, Paragraph 6.
7. See Appendix 7, Paragraph 5.
8. See Appendix 2, Paragraph 4.

### SECTION 4

#### SUPPLY CONTROL

23. General. Supply control involves both the establishment of sound supply policies and the intelligent application of these policies. The handling of signal supplies in the European Theater of Operations was not as efficient as might have been desired due to some uneconomical supply policies and because control was difficult due to the organizational structure through which supply was effected.<sup>1</sup>

24. Control. a. Many of the control difficulties were due to the division of the Communications Zone into the several base sections. This division made it impossible for the Communications Zone Signal Supply Officer to directly control either the signal supply installations or the personnel operating them.<sup>2</sup> Even prior to "D-Day" this decentralization of control was being felt. When Advance Section and Third US Army were in the initial stages of becoming operational, some of the ills of the lack of control planning and control became evident. The signal supply program had been thrown out of phase when the bulk of signal supplies was made available to First US Army without adequate preparations for equipping Third US Army or supporting it in the field.<sup>3</sup> Consequently one army starved for supplies while the other was amply cared for. In the early days on the continent, Advance Section was not able to function as a forward representative of Communications Zone but was itself dependent upon First US Army and virtually a subsidiary of it. Recognizing this serious supply situation, a series of signal supply conferences were called by the Signal Officer, 12th Army Group

in order to resolve some of the difficulties and to secure the transfer of some of the stocks required by Third US Army.<sup>3</sup> This system of arbitration was necessary throughout the European operation because no control organization, cognizant of the problems involved, had power to establish and enforce sound supply policies.

b. In the organization of the Communications Zone, the Signal Officer was under the direct control of G-4. If the Communications Zone had had but one area with complete central control, this organizational set up might have been better adapted to the purpose. However, the breaking down of the Communications Zone into the several base sections created a lateral cellular structure that effectively removed control of signal supply installations from the Communications Zone Signal Supply Officer and made him dependent either on command action through the G-4 Section for control of the several signal depots or on personal diplomacy.<sup>2</sup>

c. Advance Section was never able to fulfill its assigned mission of giving direct support to the several armies because it was unable to establish and maintain depots with adequate and balanced stocks. Advance Section had no command control over the Army Signal Supply Officers and could only fill requisitions as received within the limitations of existing supplies. Items in critically short supply could not be allocated by either Communications Zone or Advance Section under the existing supply policies. The status of such items became increasingly critical until allocations were taken over by the Signal Sections of the Army Groups.<sup>4</sup> Because of the unwieldy supply system the several Army Signal Supply Officers soon realized that the maintenance of an adequate stock of signal supplies was mainly dependent on personal initiative. This caused almost unrestrained requisitioning by the armies without regard to the overall theater supply situation or to the effect that such requisitioning would produce on the supply situation within other armies.<sup>5</sup> Each Army Signal Supply Officer realized that he personally must be prepared to meet all supply requirements that might arise and that procurement of these supplies rested on his ability to audibly make his needs known. The results were that much larger supply loads were carried by the armies than would have been necessary if close and adequate support had been available and proper supply control had been exercised. Periodic reports required to be submitted did not necessarily tell the whole truth or reveal this situation and the value of such reports was therefore negligible. The excessive stocks sometimes carried by the armies was not necessarily due to exaggeration of needs by Army Signal Supply Officers. Rather did this excessive build-up reflect the theater supply policy of filling army requisitions without question.<sup>6</sup> The matter of equity of distribution between armies was for the most part overlooked and little if any control exercised.

d. Supply control logically belongs in the tactical headquarters responsible for accomplishment of the overall mission. In the case of the European Theater Operations, this would have placed the control at ETOUSA or SHAEP level. However, these headquarters were too far behind the Combat Zone to be fully aware of the detailed supply situation. The next logical echelon of control is with the army groups. Army group headquarters are normally close enough to the combat zone to be acquainted with both

the logistical and tactical requirements and therefore to effectively operate supply control. Control of the theater supply system should be vested in agencies at two levels only, i.e., the Communications Zone Headquarters and the Army Groups in the combat zone.

(1) The control organization at army group (or equivalent) level should exercise command control of supply within the several armies, making necessary allocations of items in short supply and assuring equitable distribution of all supplies in accordance with the tactical requirements of the several armies. This signal supply control organization should, through liaison with the Communications Zone, be kept thoroughly informed as to the availability of all signal equipment and supplies and should furnish, through Communications Zone to the War Department, current and accurate information on requirements, expenditures and performance of signal equipment and supplies. In relation to the several armies under the army group, liaison should be of such quantity and quality that the control organization is kept constantly informed of the supply situation and requirements of each army. With army requisitions and levels of supply firmly controlled on a basis of equity consistent with missions assigned, there would be no question of competition among Army Signal Supply Officers, since they would be assured of sufficient supplies for planned operations. This plan would result in lower levels of supply being maintained by the several armies and would thereby cause fewer demands to be made on the theater transportation system. The transportation thus saved could be wisely used in stocking close support depots with adequate and balanced stocks in the rear of armies.

(2) Within the Communications Zone area, the Communications Zone Signal Officer, through the Communications Zone Signal Supply Officer, should exercise full and direct control of all signal supply and maintenance installations and all personnel employed in the operation of them. The locations of depots are, of course, dictated in large measure by the availability of depot sites and transportation, and cannot be logically set up as paper requirements without consideration of these physical conditions. Handling of supplies should, however, be kept to an absolute minimum and every movement should be a step in forwarding the supplies toward the using units. Emphasis should be placed on rapid and accurate classification of supplies at the port of entry so that minimum rehandling is necessary. Every effort should be made to support the armies as closely as possible with depots containing adequate and balanced stocks. Lateral movements of supplies from one depot to another purely because of space requirements should not exist. The transportation required in such a movement should be utilized in moving properly classified stocks to the close support depots. The Communications Zone Signal Supply Officer should establish a control organization with sufficient liaison to all Communications Zone supply and maintenance establishments to keep himself constantly and currently informed on the status of supplies. Records should be accurate and current at all times. The cooperation by the Communications Zone supply control organization and the Army Group supply control organizations should be such that each echelon of supply is constantly aware of the overall supply situation.

25. Policies. a. Most of the supply policies followed in the European Theater of Operations were sound with one notable exception, i.e., the filling of all requisitions

within the capabilities of existing supply without regard to quantity or justification.<sup>6</sup> This policy is probably sound when applied to smaller units in the combat zone which have little capacity for reserves and whose individual requests, because of transportation limitations, will in all probability not exceed actual requirements. But the same policy is unsound when applied to larger organizations such as armies, whose individual requests might and frequently did reduce theater stocks to a dangerously low level. Even before the invasion it was recognized that there would be items in critically short supply and plans were made looking forward to an equitable control and distribution of those items. However, the paper solution was ineffective because neither Communications Zone nor Advance Section had any authority to edit army requisitions or to control army supply levels. There was actually little coordination of the needs of the armies and as a result of the "first come, first served" policy, the Army Signal Supply Officers found it necessary to constantly bid against each other for needed supplies. In order to assure receipt of an adequate quantity of the items desired, requisitions frequently represented generous estimates of requirements.

(1) Until the responsibility for allocation of items in critically short supply was assumed by the 12th Army Group in December 1944, the status of these items was becoming progressively worse. The uncontrolled bidding of the armies against each other for supplies had badly distorted the general picture of signal supply conditions. After the Signal Section, 12th Army Group assumed the allocation responsibility for items in critically short supply, the armies felt that they each would receive a fair share and the demands became more reasonable. From this time until "V-E-Day", there was a gradual but steady improvement in the signal supply situation.

(2) The "first come, first served" policy of supply made it extremely difficult to maintain the necessary theater reserve of signal equipment and supplies. Recognition of this difficulty resulted in the establishment of the so-called SHAEF Reserve. To release an item from this reserve required the authority of the SHAEF Signal Officer or one of his representatives. The reserve itself was not susceptible to flexible use. Its control was so rigid that considerable resentment was created in the several armies because of the extreme difficulty and delay in securing equipment from it when needed in an emergency.<sup>7</sup> However, such control was essential under the existing supply policy if any reserve was to be maintained.

b. Under the proposed system of direct control of signal supplies and supply policies by the Army Group Signal Officer in the combat zone and by the Communications Zone Signal Officer in the Communications Zone, much more realistic signal supply policies would, it is hoped, evolve. Issues and usages could be controlled in accordance with availability and the list of items in critically short supply reduced by applying rigid economics to the available stocks. The theater reserve could be so established that the right to its use to meet emergencies would be quickly recognized and authorized, and the overall distribution of the signal supplies more equitably made.

26. Conclusions. a. The decentralization of supply control incident to the division of the Communications Zone into the several base sections was contrary to good practice.

It removed control of both signal supply installations and the personnel operating them from the direct supervision of the Communications Zone Signal Officer and thereby slowed the movement of signal supplies.

b. There was no effective coordination and control of signal supply as it affected the several armies. Army Signal Supply Officers were forced to bid against each other for supplies.

c. The theater supply policy of "first come, first served" caused many inequities in supply distribution.

27. Recommendations. It is recommended: a. That complete control of all signal supply installations in the Communications Zone and personnel operating them be vested in the Communications Zone Signal Officer.

c. That a supply control group be established within the theater to work in close coordination with the Signal Section of Army Group, or the equivalent tactical organization, to control the stock levels carried by the several armies, the allocation of supplies to the armies, and to expedite delivery of supplies from Communications Zone to the armies.

#### NOTES:

1. See Appendix 2, Paragraph 3
2. See Appendix 1, Paragraph 1c and 1d
3. See Technical Historical Report of Signal Section, 12th Army Group, Section III, Paragraph 2b
4. See Appendix 7, Paragraph 2
5. See Appendix 1, Paragraph 1b
6. See Appendix 3, Paragraph 6
7. See Appendix 4, Paragraph 1

## CHAPTER 2

### REPAIR AND MAINTENANCE

#### INTRODUCTION

28. One of the major factors of the supply program in the European Theater of Operations was the plan for maintaining signal equipment in service. Military equipment is subject to destruction due to both normal wear and to combat damage. In an active theater of operations such as the European Theater the loss from combat damage is usually far greater than from normal wear and tear.

29. To maintain signal equipment in operative condition an elaborate maintenance program was devised. Normal deterioration is generally retarded through first and second echelon maintenance by the using personnel; third and fourth echelon maintenance performed by trained repair personnel is largely to repair defects or damages beyond the normal capabilities and equipment of the using personnel. During the European operations, the greatest burden for returning damaged equipment to a serviceable condition rested with these trained repairmen and the third and fourth echelon repair shops played a major role in maintaining the efficiency of signal communications equipment. Fifth echelon repair shops in the Communications Zone had the task of re-building equipment that had been damaged beyond the repair capabilities of lower repair echelons.

30. In any repair and maintenance program, three factors are involved, namely: repair parts, repair shops, and repair personnel. These factors will be considered in detail in the following sections.

#### SECTION 1

##### REPAIR PARTS

31. Determination of Requirements. a. Accurate determination of spare and repair parts requirements is impossible without prolonged study of the item of equipment under the conditions to which it will be subjected in normal use. Time was not adequate in the hurried armament program of the United States Army to make this study of parts requirements prior to issuing of the equipment to the using units. Therefore, estimates based on general knowledge of equipment weaknesses were used as a basis for procuring the parts. As a safety factor the estimates were broadened to include some of practically all the component parts of each piece of equipment. This resulted in an excess of some more durable parts but was a necessary step to assure the availability of repair parts when needed.

b. Parts lists authorizations for first and second echelon maintenance parts were published in Sig 7 and for third and fourth echelon maintenance and repair parts in Sig 8. In preparation for the invasion of European Theater parts list was compiled, based on these two publications and on the maintenance lessons learned in the African campaign. This parts list was used as a basis for determining theater spare parts stock levels and was revised from time to time as experience dictated.

32. Procurement, Storage and Issue. a. When contracts for equipment were placed with the manufacturers, specifications for spare parts paralleled the requirements for completed items of equipment. These parts were put up in kits as maintenance parts for specific items of equipment, to be issued on a definite ratio with the units of equipment. Experience in the European Theater of Operations showed that requirements for some of these parts far exceeded that for others, and as a result it was found more feasible to stock individual parts rather than maintenance kits.<sup>2</sup> The maintenance kits were furnished to the repair sections of the units using the equipment, but replenishment was by individual parts. In the early days of the war some delays were experienced in procuring the parts from the manufacturers at the same time as the completed items of equipment. This led to the presence of some equipment in the Theater for which no maintenance parts were available. This condition was recognized as dangerous and expensive, and an attempt was made to adhere to the policy of obtaining and shipping maintenance parts along with the completed items of equipment.

(1) In the United Kingdom, where well-established depots were adequately organized and closed storage space was available, spare parts were stocked along with other items of signal equipment. However, when the invasion was started and the signal dumps were set up on the beaches, it was found impossible to keep track of the repair and maintenance parts because they became inter-mixed with other equipment and were virtually lost to use. Consequently on 26 August 1944 plans were made to withdraw repair parts from general stocks and set up repair parts depots.<sup>3</sup> Immediately orders were given to the several dumps to begin shipping all repair parts kits to a central location at Cherbourg where work was being done to arrange the stocks in some intelligible order so that requisitions might be filled. Prior to this the equipment in the hands of the troops had been kept in operative condition through use of spare parts carried by the individual units at the time of the invasion. However, these stocks were rapidly depleted and it became necessary to either cannibalize equipment for parts or else make issue of complete items because of failure of any part. The plan for the spare parts depots included delivery to the armies of the required parts as they became available. The first delivery was made on the 3d of October from Cherbourg. Shortly thereafter Signal Spare Parts Depot S-891 was opened in Paris. A weekly delivery service to each army was instituted which service received the immediate approval of the armies.

(2) The armies segregated spare parts in some degree from their normal supply stockage. It was found that in the interest of economy it was essential that specialists reasonably familiar with the parts be designated to handle them. This resulted in the establishment of army spare parts depots which were usually operated by the Repair Section of the Signal Depot Company. The quantity of parts was small enough that a compact binnage arrangement was possible in trailers with the result that the "spare part depot" was mobile.

c. All maintenance problems were not eliminated, nor were all repair parts requirements met, by the establishment of the Signal Spare Parts Depot at Paris. Certain badly needed items were not available on the Continent and



efforts to procure them quickly from the States were not always successful. A number of desperately needed repair items were either made locally, or arrangements made to repair the equipment locally, so that dead-lining would be kept to a minimum.<sup>4</sup> For example, a substitute for T-2 transformers for SCR-399 radios was procured locally and the design of several parts improved to eliminate recurrent troubles that had developed in standard parts. A number of items of test equipment, meters and so forth were procured which were superior in some respects to the standard issue items. Little attempt was made to exactly match the specifications of the standard parts because this would have further delayed and complicated an already difficult problem. Local procurement was not without its troubles; because raw materials such as copper, iron, coal, paint, insulation, etc., frequently had to be secured from other sources and supplied the manufacturer before work could begin. There were also many political angles that required careful handling. Local procurement should be regarded purely as a stop-gap to fill in where the normal system fails.

33. Conclusions. a. Experience in the European Theater of Operations showed that repair parts need not be procured for one hundred percent of the equipment authorized.

b. Repair parts are best handled in special depots.

c. Because of the great importance of spare parts to overall equipment efficiency, and the relatively small bulk and weight thereof, truck delivery to armies is both feasible and desirable.

34. Recommendations. It is recommended: a. That a revision be made of repair parts authorizations based on lessons learned in the European Theater of Operations.

b. That supply procedures, in so far as they apply to spare parts, be revised to include special handling of spare parts both in storage and issue.

#### NOTES:

1. See Appendix 6 paragraph 1.
2. See Appendix 6 paragraph 2.
3. See Appendix 6 paragraph 4.
4. See Appendix 6 paragraph 5.

### SECTION 2

#### REPAIR SHOPS AND POLICIES

35. Shop Facilities. This main consideration in setting up repair shops on the Continent were space, lighting facilities, and coverage. The repair organizations were reasonably well equipped with tools so that it was not necessary to depend upon local equipment. On occasion some heavier items of shop equipment were procured locally, but these were not an absolute necessity for operations. Best locations for facilities were usually found to be machine shops or airplane factories where ample floor space was available. There was some competition between the various services for such locations, but adjustments were always made. Establishments formerly engaged in making electrical equipment, even when available, were found to be no better suited for the work to be done than were some other facilities.

36. Shop Location. The geographical location of the shop was found to be important because its convenience to the armies governed, to a large extent, the amount of equipment returned for rehabilitation. The shop should preferably be located on a usable railroad and accessible to a good highway network. It should also be near or convenient to army supply and maintenance installations.

37. Army Signal Repair Shops. Maintenance installations of the armies were usually a combination of fixed shops adjacent to the army signal supply depots, and in mobile shops set up in repair trucks. This combination was necessary to handle the repair of equipment returned to the depot for exchange and to allow on-the-spot repairs for the units in the field. It was preferable to have both the fixed and mobile shops of the army under central control for the convenience of handling repair parts and to eliminate duplications of effort.

38. Repair Policies. The maintenance policies followed by the armies and the Communications Zone should be uniform. In the early stages of the European operations, stocks frequently were not available in sufficient quantity to issue replacements for those items returned for repair. This resulted in organizations retaining equipment in use beyond the point where repairs were needed, sometimes causing irreparable damage. This practice, coupled with the unavailability of repair parts, encouraged cannibalization of spare or dead-lined equipment for parts necessary to retain other equipment in service.<sup>1</sup> As quickly as adequate stocks were available it was found better to make direct exchanges for defective equipment rather than to accept the equipment for repair and return to the using unit. This policy saved transportation for the using unit, encouraged return of equipment for repairs when needed, and tended to cut down on the number of equipment spares carried by the using units. This policy was likewise found to be equally applicable to the fifth echelon shops under the Communications Zone in their dealings with the armies.

39. Conclusions. a. Repair shops should be conveniently located to the troops being served.

b. A policy of exchanging usable equipment for defective equipment saves both equipment and transportation.

40. Recommendations. It is recommended: a. That a standard policy of exchanging usable equipment for defective equipment be adopted.

#### NOTES:

1. See Appendix 7 paragraph 8.

### SECTION 3

#### REPAIR PERSONNEL

41. Shop Personnel. Personnel authorizations, through the division, included trained signal repairmen. The maintenance tools and equipment and the training of the personnel was in accordance with the echelon of repair and maintenance to be performed. At the army level both third and fourth echelon repairs were performed by the repairmen of the Signal Repair Company and the Repair Section of the Signal Depot Company. It was not always feasible or desirable to differentiate between the echelon of repair that

would be performed by the repairmen of these two organizations and in many respects it was found desirable to have the two organizations under central control. The mobile repair teams can be of immense assistance both to the combat units and to the fixed repair depot by assisting the field units in making adjustments and minor repair and by sending equipment back to the fixed repair shops when major repairs are needed. By their inspection of maintenance conditions and by giving assistance to the units, these mobile repair teams increased the efficiency of signal equipment in the field. Other mobile units stationed at ordnance collecting points repaired and salvaged signal equipment in damaged vehicles. The repair teams at the fixed repair shop were in a position to inspect and repair all equipment turned in by using units, and to return this equipment in a usable condition to depot stock. Recommendations have been made to the War Department from time to time for changes in both personnel and equipment for these units. These recommendations should be carefully considered in the light of lessons learned in this and other theaters, and a revised army signal repair organization authorized. At the fifth echelon level, in the Communications Zone repair shops, additional organizations are needed to support the armies. During the European operation much equipment was allowed to deteriorate or was salvaged for scrap because the armies were not supported closely enough by the fifth echelon shops. This lack of support was primarily due to the lack of adequate repair organizations to establish and maintain such shops.

42. Wire Recovery Teams. Two of the most critical items of signal supply throughout the European operations were wire and rubber covered cable. Hundreds of thousands of miles were expended and the demands normally exceeded the available stocks. Numerous attempts were made to alleviate this supply condition by recovering and reclaiming wire and cable as the combat units moved forward, but the program was never satisfactory due to the lack of adequate personnel.<sup>1</sup> A few provisional recovery and repair teams were organized, but no consistent program could be maintained because other pressing demands for the personnel usually prevented an aggressive recovery policy. Field wire in particular is damaged and rapidly deteriorates if left unused and unmaintained for any considerable period. Recovery of the wire and cable should be made as soon as possible after its use has ceased and should be performed by personnel trained for the job. Wire recovery teams should be organized and assigned at least down to division level.

43. Conclusions. a. The demarcation between third and fourth echelon maintenance in the division of work between the Signal Repair Company and the Repair Section of the Signal Depot Company is not always desirable.

b. A consistent program of wire and cable recovery is impractical without additional personnel to perform this work.

44. Recommendations. It is recommended: a. That the Repair Section of the Signal Depot Company and the Signal Repair Company be combined into a third and fourth echelon maintenance company. (See Chapter 1, STUDY OF SIGNAL SUPPLY, Section 3, Paragraph 22a.)

b. That wire recovery and rehabilitation teams be organized for use down to division level.

#### NOTES:

1. See Appendix 7 paragraph 9.

HEADQUARTERS  
THEATER SERVICE FORCES  
EUROPEAN THEATER  
OFFICE OF THE THEATER CHIEF SIGNAL OFFICER

(Rear) APO 887  
8 October 1945

SUBJECT: Recommendations for a Theater Signal Supply Organization and Procedure.

TO: President of the General Board  
APO 408, U. S. Army.  
Attention: Signal Officer (Major Allen)

1. The following observations, criticisms and recommendations of the Theater Supply Organization, Control and Procedures, as experienced by the Signal Service in the European Theater of Operations are offered:

a. The Signal supply system as used in this Theater is too cumbersome and detailed to produce the required results of placing supplies and equipment in the hands of the using organizations in a minimum of time.

b. Too great a responsibility for requisitioning supplies was placed on the Army Signal Officer and his supply representative in regards to the procurement, storage and issue of Signal supplies; also the Signal Supply Officer had available too many outlets to present requests for equipment and supplies, i.e., Advance Section, Army Group Headquarters and Com Zone. Inasmuch as none of these organizations assumed the authority and responsibility of editing the Army requisitions, the Army Signal Supply Officer necessarily took full responsibility for the Signal supply of Army troops and frequently placed exorbitant requisitions to insure receipt of adequate quantities of supplies. The lack of proper editing created an unfair unbalanced distribution of stock within the Armies. All too often the Army Signal Supply Officer who placed the largest requisition received a portion of available theater stocks greater than that Army's share of needs. This created and perpetuated a list of so called "Restricted" and "Critical" items in the other Armies and in the Theater. It also forced the Army Signal Supply Officers to bid against one another to acquire needed equipment.

c. Although Advance Section and the Regulating Stations were theoretically advanced organizations and instruments of Com Zone, in actual operations they functioned as separate entities. Their presence in the supply chain created an additional headquarters through which requisitions had to be processed and frequently created a delay of from seven (7) to fourteen (14) days in the movement and actual receipt of requisitioned supplies. The issue depots established by Advance Section to back up each Army were never filled with balanced stocks and consequently could not function as intended in accordance with Theater's administrative Standard Operating Procedure Number 7. In certain instances issue depots were not far removed from Com Zone filler depots, but the filler depots were not allowed to make direct shipments to Armies without the concurrence of Advance Section. The movement of supplies from the filler depots to the Advance Section issue depots was

a waste of time on an already overburdened transportation system in these instances. Advance Section was not able to assume full responsibility for the supply of Armies and had to be assisted by Com Zone, which lack of definite placement of responsibility frequently acted to the detriment of a rapid and satisfactory supply system.

d. The Base sections having control of depots and troops were another obstacle in the efficient storage, issue and movement of supplies. All corrections, orders and actions originating in the Chief of Service had to be disseminated through the Base sections for compliance. Concurrence had to be obtained for the transfer of troops, i.e., Depot and Repair Companies. Expedited movement of supplies requiring immediate action had to be processed through base sections thus causing in certain instances from three (3) to five (5) days delay.

e. The Signal Depot, Repair and Maintenance Troop Organization was inadequate. Repair personnel was divided between the Signal Repair Company and the Signal Depot Company. No service troops and only minimum organizational transportation was available. There was no Headquarters organization authorized to control these units.

## 2. Recommendations.

a. Abolish Advance Section organizations and incorporate into the Army Group Headquarters a Stock Control Section which would be operational and with the required authority to edit and screen Army requests based upon proposed operations and Theater stock available. This Group Stock Control Section would be the only outlet for Army requests. Close liaison between this section and the rear organizations would be mandatory. If the Regulating Stations are required, they also should be assigned to the Group and act as an expeditor of the movement of, and a point to which supplies are routed.

b. Depots and depot units be directly under the control of, and assigned to the Chief of Service. This eliminates one (1) step in the command channel.

c. Each Signal depot installation should have an organization consisting of a battalion headquarters, storage and issue company, a repair company, a service company and a truck company. This would enable the depot to have a commander and the necessary tools to accomplish his mission.

For the Chief Signal Officer:

/s/ W. J. Daw  
W. J. Daw  
Colonel, Signal Corps  
Director  
Signal Supply Division

SUBJECT: Resume of interview with Col. W. J. DAW, formerly Director, Sup Div, OCSigO, Communications Zone, later Director, Sup Div, OCSigO, TSFET, 5 October 1945.

The following is Col. Daw's summation of the Signal Supply problems encountered during the European operations:

1. One of the things that is needed in theater signal supply is a different system for notification in advance as to what items are likely to become critical. The system that was in effect provided no advance information as to status of supply in the Zone of the Interior and no control was put on items likely to become short in supply, because there was no way of definitely telling when this condition would exist. The Theater supply policy made us issue what we had in stock on the assumption that fulfillment of orders on the States was forthcoming. That is why we were constantly out of some items. The theater should be informed months in advance as to what items production difficulties are expected with, and a system of rationing and control should immediately be placed on those items.

2. Another difficulty was the long, laborious process of raising maintenance figures. There was too much lag in the War Department in changing these figures. Authority should be granted the theater to set up maintenance factors.

3. There is a definite need for some method of command control within the Signal channels. Control of critical items was finally established by 12th Army Group when the war was well along, but it should have been set up at the beginning. This control was forced on us by shortage of equipment. There were too many steps in supplying the armies' needs. There was the port, the base depot, the intermediate or filler depot, and Advance Section. Requisitions frequently had to go through these four steps before army received anything. If the control were set up right behind the armies and shipments were made direct from Communications Zone to the armies, the supply system would be more efficient.

4. There were actually three different people responsible for supplying the armies, often resulting in duplication of issues. We had conference after conference with Advance Section in an attempt to straighten this and other problems out. There was too much double handling. If Advance Section had been under control of the Chief Signal Officer, Communications Zone, it might have been a different story, but Advance Section was an independent headquarters. I suggest that you recommend that Advance Section be eliminated and that issues be made direct to the Armies; set up a control group similar to what we had at or near the end of the war. This control group should have command functions. All the depots behind the combat zone should be directly under the chief of service and not under the different base section commanders. The Regulating Station should be a traffic organization only and could have well been under Army Group. The excess handling of supplies both by the many depot echelons and by the inefficient traffic handling caused at least a fifty percent loss in supplies.

SUBJECT: Resume of interview with Col PIERSON A. ANDERSON, formerly Signal Supply Officer, Advance Section, 23 October 1945.

The following is a discussion of the Signal Supply problems encountered during the European operation:

1. The planning for the European invasion started a year before "D-Day". We were furnished with a troop list for the assault force and the follow-up, and used that as a basis for determining the required signal supplies. War Department Replacement Factors together with experiences from the North African campaign were used. The replacement factors had to be padded to some extent.

2. At the beginning troops coming to the United Kingdom had their equipment sent to them force marked. This caused great confusion in attempting to put the equipment in the hands of the proper troops and frequently issues had to be made to units other than those for whom the equipment was marked. We asked for bulk shipment of equipment and this system was ultimately adopted. However, a great deal of the critical supplies arrived just a few weeks before D-Day. There was not enough depot personnel to handle the material and get all of it in the hands of the troops in the short time allowed.

3. There were personnel shortages from the beginning and training difficulties were glaring. At one time I was operating eleven depots with four depot companies. One depot had only eight men and one officer to operate it. As additional depot companies arrived, we split them up to work with the more experienced companies until personnel could be oriented and trained in some of the depot procedures to be followed in the European Theater. The personnel was then reassembled and was able to function as an independent organization.

4. The British used a system of providing what they called beach reserves for assaults such as the invasion. It was difficult to get any interest in such a reserve for the American forces and no general pool of equipment reserve was provided other than the SHAEF Reserve which was under the control of the SHAEF Signal Officer.

5. Reports on equipment status were very slow in reaching the Chief Signal Officer in Washington. I discovered that the August report reached Washington in January. Thereupon, I followed the practice of airmailing a copy direct to the Chief Signal Officer's office. It was extremely difficult to build up a reserve of supplies in the United Kingdom, to provide for the troops that were expected because clerks in the New York Port of Embarkation would arbitrarily reduce requisitions to the basis of troops reported in the United Kingdom rather than those expected. As a result, I was never able to catch up on equipment. It would have been much better if the signal depots in the United Kingdom had been considered advance depots for the Philadelphia Signal Depot. Then issues could have been made as required by the Theater Commander. A number of officers came over from the War Department to determine what our trouble was when we complained so much about the non-receipt of adequate

supplies, but few of them stayed long enough or saw enough to be able to have any idea of the problems involved. When the invasion was undertaken on "D-Day" most of the surplus supplies had been taken over by the First Army Signal Supply Officer and a great deal of the equipment in the hands of lower priority units had been taken for reserve for First Army. When the dumps were set up on the beaches, great difficulties were experienced in trying to segregate the signal supplies and to put them in an orderly arrangement. The depot personnel had had little training in such an operation and were poorly equipped for such a job. However, after a few days they began to bring order out of the chaos and to get some of the signal supplies where they could be issued to the troops.

6. In the early days of the invasion, General Lee had said, "Whatever First Army wants you give them." We gave them fifty times what they required. When Third Army was made operational, First Army was cooperative in providing as much equipment as could be spared, so the scheme worked out all right, although it was a rather chaotic condition for a while.

7. One of the problems that was troublesome from the very beginning was the handling of signal equipment which was packed in several boxes. Usually if one of the boxes was missing, the entire equipment was worthless. The boxes were frequently so covered with markings and with mud that proper identification was extremely difficult. If a box were broken open to determine its contents, the equipment quickly deteriorated because of the weather condition. The marking system should be simplified and made more foolproof so that it can be followed by personnel with little training even under adverse conditions. Sometimes the boxes had a little envelope tacked on with a packing slip in it. But the packing slip was usually unintelligible because it only contained catalog numbers and catalogs were practically non-existent during those early days. The signal catalog could be greatly improved. It is too complicated for field use. If some lessons were taken from Sears, Roebuck or some other mail order house, I think the improvement could be made. Equipment, supplies, and parts should be simply marked so that they can be identified on the spot.

8. Transportation was another of the very serious problems in supply. Until we put soldiers on trains, shipments were delayed or lost. Truck drivers also need more definite instructions as to where they are going when they start out, as to what supplies they are carrying and to whom they are to report.



SUBJECT: Resume of interview with Major Lauren C. Bray, formerly Chief of Army Liaison Section, now Executive Officer, Supply Division OCSigO, TSFET; 2 October 1945.

The following is a discussion of Signal Supply problems encountered during the European operation:

1. Prior to the invasion a reserve officially known as the "Emergency Theater Reserve", better known as the SHAEF Reserve, was established as called for in Operation "Overlord". It provided that certain quantities of both Class II and IV items, thought to be strategically essential, be set aside and released only upon authority of the theater commander. The reserve was first set up in ADSEC stock and was built up as items were received on the continent. The quantities and types of items provided for were purely an estimation of what would be required to meet the situations that would arise on the continent. Prior to the invasion it was anticipated that the existing communication system in France would probably be stripped or wrecked by the Germans prior to withdrawal and heavy provisions were made for fixed telephone plant. Actually, much of the telephone facilities were found in a reasonably good condition. The reserve list could have been modified sooner, but since modifications were purely up to SHAEF, changes were slow in being made. It did work a hardship by keeping frozen a lot of equipment that could have been put to use, for example, when TC-10's came, the first fifteen would go in reserve no matter what project needed them. Sometimes requisitions were sent back marked "no stock" when the stock was in SHAEF Reserve. Spiral-four was in the reserve beyond requirements whereas it was short in the theater. The people at SHAEF didn't know much about the situation, although they sincerely wanted to do the right thing in releasing the material. However, two requests might come in for the same items and although the needs might be equal, the one with the stronger story got the release. Emergency reserves should be modified from time to time to meet actual conditions.

2. Prior to the time the army groups took over control of critical items (about December 1944) there was no allocation system. ADSEC did not have enough stock so the armies were being supplied by Com Zone. The pressure was on getting the tonnage shipped. The critical items would be included in the tonnage being shipped, but frequently it was not moved because of transportation shortage. When an allocation system was set up, it got results quickly. Prior to the allocation system it was impossible to make equitable distribution. We were in the position of trying to supply all the customers, but we were not informed of the critical situation and were not in a position to determine what allocations were to be made. In accordance with the theater supply policy, we had to fill requisitions as they were received. There was no editing of requisitions along the line.

3. As the armies advanced across France transportation

became more and more a problem. The daily (Red-Ball) express requisition system was set up whereby daily shipments were to be made to the armies. The actual operation was along this order: The requisitions were turned over to the army G-4 who sent them by courier to ADSEC G-4. ADSEC G-4 held a daily meeting where the requisitions were screened and then sent back to Com Z Headquarters. In theory, ADSEC was supposed to fill the requisitions, but insofar as Signal supply is concerned they did not have the stocks, so the requisitions became a Com Z problem entirely.

4. Tonnage allocations for transportation were made to the armies. First and Third Armies played safe by having plenty on their requisitions to fill all the tonnage allocations. There was always a deadline to be met in filling the requisitions, but actually instead of the supplies being rolling within twenty-four hours, there was usually a time lag of a few days. Another thing that confused the armies was the fact that although an allocation for transportation was made, there was still a priority system in effect, which meant that higher priority could stall our supplies. What we fought for was a daily allocation of tonnage of trains out of Normandy. We would schedule the trains as we knew they were needed and then set up the trains to each army according to back log of shipments due the army.

5. If the chief of service had had transportation himself, he could have expedited supplies. No matter where the depot was located, truck transportation is needed to ship within depot. Not only lack of organic transportation, but lack of proper facilities for receiving, identification, and classification of supplies was evident everywhere. Materials stood around before they could be checked in and in the meantime the demands for materials were growing. This caused a tendency to place larger requisitions on the States. In other words, it took too long to classify materials.

6. In Antwerp there was a very bad situation. Big boats were unloading rapidly and supplies were piling up at the docks. We had no means of controlling shipments because they were handled on cargo disposal instructions which specified which depots the shipments should go to. If there was an embargo on transportation to this depot, it meant that the supplies were piled up at the port. My suggestion was that we have a liaison officer from this office at the port to handle shipments of signal materials.

7. Another thing that was badly needed was better control of convoys and trains because shipments were constantly becoming lost. One of the basic troubles was that Signal Corps materials were relatively small in tonnage as compared with the other services but priorities for shipments seemed to go to the heaviest sort of materials.

SUBJECT: Resume of interview with Major Donnan E. Pasler, formerly Chief Program Section, Supply Division, Office of the Chief Signal Officer, Communications Zone, later OIC, Requirements Branch, Supply Division, OCTIGO, TSTET, 3 October 1945.

The following is a discussion of Signal Supply problems encountered during the European operations:

1. In preparation for the continental invasion War Department authorizations were the basis for equipment issues. In addition to this some of the units had special theater approved authorizations. First Army had submitted and received approval for project equipment based on its experience in landing exercises in the United Kingdom. Third Army submitted a similar project based on that of First Army. Subsequently similar projects were approved for the Ninth and Fifteenth Armies. These army projects amounted to army equipment pools and the issue was left to the judgment of the Army Signal Officer.

2. A 75-day level of supply based on War Department Replacement Factors was authorized for the Theater. This was set up as a 45-day reserve level and a 30-day operational level. We did not actually have this level of supply in stock and frequently the supply on certain items was very low. Also, some of the replacement factors proved inadequate. Reports were made to the War Department with recommendations for increasing the replacement factors. Some of these recommendations were acted upon while others were not. As consumption of materials rose, we made greater demands upon the States for equipment. Special requests were made on the States for authorization of certain equipment such as field wire and certain radio sets which were consumed at a high rate, for replacement to be on a consumption basis. Usually replacement factors for these items were altered in accordance to our recommendations.

3. Requirements for equipment for specific projects were coordinated with the Communications Division, Communications Zone, and the projects were submitted on the States. Since all project equipment was normally for one-time use, this did not present the problem of regular combat equipment.

4. Critical items fell into two categories, those in short supply in the theater, and those in short supply in the armies. There was a tendency for the armies to report all items which they were unable to obtain as critical whether they were necessary to combat efficiency or not. The theater list of critical items was compiled in a conference of the various representatives of the Communications Zone Signal Supply Division. They were able to tell from requisitions and stock record cards just what items were in demand and in short supply. Their list was usually considerably shorter than the combined list of the several armies. The director of the Signal Supply Division approved the

list, with the concurrence of the Army Groups. An effort was made to hold the list to as few items as possible, because in that way the items could be pushed to the armies faster.

5. Procurement from the Zone of the Interior at first was based on loss reports and on War Department Replacement Factors. As the war progressed various means were set up to expedite shipments such as air shipment, fast boat shipment, and special fast water shipment. A policy was set up with the New York Port that all shipments of certain items would be by express. On the continent of Europe, the "Red Ball" supply system was used for a while for giving special fast handling to requisitions. Early in January a special express train, called "Toot Sweet", was started. This system proved very satisfactory because special handling was given to the shipments. However, it was able to handle only a very limited tonnage of equipment. As an expedient, when critical items became available, trucks were secured from any possible source and the critical items were pushed forward to the army. This was not in accordance with the established system of supplying the armies through Advance Section, but the direct shipment saved several days in putting the material in the hands of the army.

6. I think that the source of many evils of the supply system was in the competition of armies for supplies. Army requisitions were not edited. Because of pressure from the armies on us, we put pressure on the Zone of the Interior and continually increased the amounts of supplies on requisition. Because of army's demands for larger quantities, we had shipped over here more than was actually needed. This system was extremely uneconomical and unsound. It placed a burden on transportation and on procurement in the States. It placed the European Theater in competition with the Pacific Theater. It also caused a tendency for a greater consumption of supplies and equipment by the using units. A system of editing and controlling army requisitions was needed and 12th Army Group thought all along they should do it, but were not in a position to do so because of an inadequate staff.

7. There were other faults in the mechanics of the supply system, one of which was the lack of a uniform method of requisitioning by the armies. First Army disregarded back orders entirely, on the theory that if back orders were filled and an excess stock was thereby created, the excess could be turned over to Advance Section or another army. Third Army applied their stock on hand against levels needed and ordered the difference, but because of a lax bookkeeping system, they were never certain as to the amounts due in. Ninth Army considered back orders as modified "dues in" and to a limited extent made allowances when placing requisitions. Little information is available on the Seventh US and First French Armies except that they were getting along on smaller quantities than the other armies. However, their operations might reflect a smaller need.

SUBJECT: Resume of interview of Lt Col R. L. HUGHES?  
OIC, Maintenance Branch, Sup Div, Office of  
the Chief Signal Officer, TSFET, 3 October 1945.

The following is a discussion of the repair parts and maintenance phases of Signal Supply in the European Theater.

1. In 1942 a calculated maximum-minimum list of repair parts was set up based on War Department publications of parts lists and on lessons learned from the African campaign. Repair parts for Class II items were based on War Department Replacement Factors, and for Class IV, on an initial allotment basis. When new equipment was shipped over, repair parts were normally furnished automatically along with the equipment. Replacements for these repair parts were requisitioned in accordance with the maximum-minimum list that had been set up. This list was approved by the War Department, and any adjustments necessary were made by recommendations to the War Department. Prior to this time a European Theater of Operations repair parts list had been compiled, based on conditions of equipment in the United Kingdom. As the European campaign progressed, we found that we did not use as many repair parts as we expected originally because the equipment stood up better than was expected, also because in combat conditions the equipment was frequently completely destroyed instead of wearing out. Therefore, there was a surplus of repair parts kits, caused by this replacement of complete items instead of parts. Reports have been made to the War Department on parts usage and for a comparable operation such as the one just completed, it should not be necessary to figure repair parts requirements on one-hundred percent of the equipment authorized.

2. At first all repair parts were shipped as kits. It was found that there were recurrent needs for some of the items of the kits but few calls for others of the items, and as a result some of the more durable parts were on hand in surplus quantities. It was found more satisfactory to issue by parts rather than by kits.

3. The procurement of repair parts should be at the same time that the equipment is obtained. Some of the manufacturers were much more interested in shipping complete items than in furnishing the parts, and insisted on filling the repair parts portion of the contract at the end of the contract. This was not satisfactory because equipment for which there were no repair parts was shipped to the theater, resulting in excessive use of complete items of equipment or cannibalization of equipment to procure repair parts. This was soon recognized and it was insisted upon that the repair parts be furnished along with the equipment.

4. Shortly after "D-Day" there was a general dissatisfaction with the way repair parts were being moved forward. A study of the requisitions submitted by Third Army units for repair parts showed that less than five per cent of the items were being supplied, although at that time forty per cent of the theater requirements

for repair parts had been shipped to the continent. The study further revealed that supply of repair parts from the dumps was extremely haphazard because the repair parts were being so intermixed with other supplies that they could not be found for issue. A recommendation was made that all repair parts be withdrawn from the regular supply depots and dumps and concentrated in repair parts depots. This recommendation was approved and orders were issued to have the repair parts moved to a central location at Cherbourg. The plans were for a second depot at Le Mans or Paris. Paris was liberated about this time and Signal Repair Parts Depot S-891 was established there. To expedite setting up of the repair parts depot, trucks were run to the other signal dumps and all available parts concentrated first at Cherbourg and then at Paris. The plans were to establish other spare parts depots in closer support of the Armies, but this part of the plan was never completely carried out. A system of weekly requisitions and deliveries to the Armies was started on the 3d of October from Cherbourg. This delivery scheme was undertaken because it was realized that due to the small bulk and weight of the repair parts, they were likely to be lost in other shipments. Also, the situation was so urgent that the parts were needed as quickly as they could be pushed to the Armies. This delivery system proved popular with the Armies but was finally illegal under a Communications Zone rule because ADSOP Number 7 stated that the Regulating Stations would handle the Army requisitions, and that all supplies would be furnished through Advance Section. However, deliveries were continued until after VE-Day.

5. The procurement of repair parts locally was never entirely satisfactory. We tried desperately, but only in very rare cases and only when we could put two or three officers on the job would we get the desired result. It required continuous follow upon the part of the officers to be able to get delivery. Some contracts were finally cancelled because delivery was so slow that the need had passed. Even with this lag, it was sometimes the quickest way we could get service. On emergency shipments from the States, even with air shipments, delays of five to seven weeks were common. Shipping allocations by air for signal equipment were low and priorities were hard to get. Another difficulty was that some emergency requisitions placed on the States were trimmed in spite of our protesting. An example was the bullet connector for the SCR-584 radar set which needed constant maintenance. At one time 8,000 were requested by air shipment and only twenty were received. First Army had used the entire theater stock. We turned to local procurement as a last resort and by keeping machinists working twenty-four hours per day, we were able to fill immediate requirements. We did not always try to match parts exactly because that would further complicate the procurement process. In general the parts were of very good quality. The chief difficulty was the lack of materials and the political situations. Transformers for the SCR-399 Radio Set, several types of meters and test equipment, antenna sections, and a few other items were the outstanding examples of our procurement. In some cases the local manufacturer suggested improvements in design. The substitutes for the AN-131 antenna were a definite improvement over the standard item.

6. Local workmen were used to the maximum extent feasible. In England the labor situation was such that the British manufacturers were using practically all available personnel, but in France we found some very good workmen. At Depot S-891 over half of the workmen were local. Approximately four fifths of those engaged in making power unit repairs were local. On certain classes of work such as radar repair and crystal grinding practically no local help was used.

7. In setting up repair shops, the primary considerations were space, lighting, and cover. It was found impractical to try to insist on the use of electrical equipment manufacturing establishments because of the political aspects. We had our own tools and were usually able to get a good physical location. Machine shops or airplane factories usually were good selections because of available floor space. There was some competition for suitable shop locations between the several services and also with the French services, but suitable locations usually were found.

8. The repair policy changed in accordance with the supply situation. At first, equipment was accepted for repair and return to the user or returned to depot stock. As soon as adequate stock levels were present, we maintained sufficient equipment to make direct exchange with the unit, or else gave them a certificate authorizing replacement. It is preferable to make direct exchange because of the savings in transportation, the savings in time, and to encourage return of equipment to the shops for repair. In any case, even though the item is not in repairable condition, the unit should be given a replacement for it.

The following selected extracts from documents as indicated are quoted for reference convenience:

• 1. Extract from Ltr Sig Sec Hq 12th AGp to CSigO, Hq Comm Z Attn: Colonel Shearer: 28 February 1945.

"It is agreed that it would be desirable to think of army and advance section supply levels in terms of quantities of specific items rather than in terms of days of supply. However, the compilation of such a list is a large undertaking when you consider that the inter-army group and the inter-army troop basis is continuously changing. The differential in equipment authorized over and above WD tables of equipment to the various armies would cause further complications in the preparation of such a list. If you would provide some technical assistance especially from your Allowances Section of the Requirements Branch it is possible that we could undertake the job which should be started soon. Another factor which worries the armies is the basis of such a computation. Obviously War Department replacement factors are figured on a theater basis. When these replacement factors are applied to armies stockages they are in many cases inaccurate and instead of an army having a twenty (20) day supply on hand there may be only a ten (10) day supply on hand. When applied to army stockage, replacement factors should be figured on an army basis."

2. Extract from Memo, 3d US Army, Sig. Supply Off. to Sig O, 12th AGp 20 Jan 45:

"Allocations. Twelfth Army Group plan of allocating the thirty eight (38) critical items in the theater is definitely improving our supply. Although most of the allocations are small, because the incoming shipments are still small, we have received some items for the first time. The prospects of reaching a balanced supply is greatly enhanced by this procedure."

3. Extract from Historical Report, OCSigO SHAEF, Vol. II:

"Local Procurement. One of the major items procured from the British sources in the UK was 4,000 miles of four way multi-airline. Most all the requests upon the British were fulfilled, however. A requisition for 800,000 BA-38 Batteries was refused with the reason given as labor shortage. Due to the unavailability of raw materials in Belgium, some items could not be produced locally. Fuel, electricity, gas and gasoline shortages also made local procurement difficult."

4. "One cause of shortages in the ETO was the items not available for issue were included in T/E and T/BA or SLOE. An attempt to have such items deleted from authorized lists until available for issue was unsuccessful. The request, then, for availability dates was not given because only estimates were available and it was felt that this would increase the confusion."

5. Extract from Buck Slip, Signal Officer to G-4, 12 th Army Group 10 November 1944:

"2. b. The reasons why army signal tonnage allocations confirmed by Hq, Com Z, are not set-up for outloading



are as follows in estimated order of importance:

(1) Trucks are dispatched by Transportation Section of Normandy Base Section to Signal depots on the basis of five (5) long tons per 2½ ton truck. The average cubage of signal supplies prohibits the loading of five long tons of supplies on a 2½-ton truck, even with 1-ton trailer attached. The Office of the Chief Signal Officer, Communications Zone, reports that after prolonged discussion of this problem with G-4, Com Z, it is expected that the basis of three (3) long tons per 2½-ton truck will be used for movement of signal supplies.

(2) Armies occasionally under-allocate signal tonnages in that daily signal requisitions list more supplies than can be moved under that day's tonnages allocation. This is due in general to lack of information as to weight of signal equipment especially new items and items packed by a non-standard method.

(3) The Transportation Section of Normandy Base Section fails to dispatch sufficient trucks to signal depots to handle army signal tonnages allocations confirmed by Hq, Com Z even on the basis of five (5) long tons per 2½-ton truck. This is in effect an over-allocation of tonnage by Hq, Com Z."

6. Extract from Buck Slip, Signal Officer to G-4, 12th Army Group, 23 December 1944:

"Signal supply officers of the armies have been very active during this period in presenting urgent requests through their respective G-4 Sections for command action, which is necessary in order to obtain transportation for expediting the movement to armies of critical items. Headquarters, 12th Army Group, has been allocating the quantities of critical items, to be distributed to each army as unloadings are made. It is still reported difficult for Signal Supply, Com Z, to rapidly obtain needed truck and rail transportation without command action originating from the armies. Many complaints have been received through both technical and command channels as to the failure to receive as much as 50% to 75% of allocated tonnage. Conclusions reached by this Section are that transportation shortage rather than non-availability of stock of the large mass of general signal items and parts has been the primary cause of this condition. For example, flashlight batteries were, for a period, listed as critically short in army stocks although availability on the continent was reported as more than ample to supply all needs."

7. Extract from buck slip Sig O to G-4 12th Army Group, 23 Dec 1944:

"No organization will carry more equipment than it actually needs, but will usually manage to get all the equipment that it considers necessary to its mission. It is recommended that army supply officers be encouraged, through command channels, to report all holdings above authorized allowances in the form of recommended changes to T/O & E's."

8. Extract from Ltr, Hq 12th A Group, to CG, Com Z, ETO, APO 887, (R-2137). Subject: Inspection of Sig Equip Maint Activities in Third Army:

"As a result of this inspection, the following conclusions were reached:

a. Sig rep organizations of 3d US Army were not initially supplied with the spare parts required for the essential maintenance of the signal equipment of the

Third US Army.

b. As a result of this supply failure, cannibalization of signal equipment has been effected to the extent necessary to obtain parts for the repair of signal equipment."

9. Extract from Ltr, 16 February 1945, Hq 4th Inf Div,  
Subject: "Field Wire W-110;

"a. Wire recovery:

(1) The greatest loss is undoubtedly due to wire not being recovered. At present, there is no satisfactory solution to this problem. The fact must be faced that there is not sufficient personnel and equipment in a division to do the job. The Signal Company alone is able to pick up wire continuously. There are two teams of the 4th Signal Company who have no other job but to pick up wire. Under the most favorable conditions of restricted road net, traffic, and frozen ground, and intermingling of circuits in use and those not in use, 5 miles per day. In the past two days, five teams from the Signal Company, under officer supervision, were able to recover only 34 miles. In an attack, the Division Artillery headquarters, the Infantry Regiments, and the Artillery Battalions are able to install and maintain their necessary circuits only by the maximum use of wire personnel present. With a shortage of riflemen or cannoners, and transportation, it can hardly be expected that commanders of these units will augment wire crews with other personnel or vehicles.

(2) Unless wire is recovered immediately after it is no longer needed, it rapidly loses its serviceability. Damage by engineers on road work, vehicles, succeeding wire crews, and by the effects of the weather, greatly reduces the number of usable lengths that can be picked up later."