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ODDR&E ltr, 20 Jan 1976

A Perceptual Evaluation of the CONUS Installation Maintenance Support Structure by Application of the Contingency Theory of Management-An Exploratory Study

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Final report 6 June 1975

29 SEP 19

A thesis presented to the faculty of the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas 66027

Unclassified
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER
2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle)
A Perceptual Evaluation of the CONUS Installation Maintenance Support Structure by Application of the Contingency Theory of Management-An Exploratory Study

5. TYPE OF REPORT & PERIOD COVERED
Final report 6 Jun 75

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)
Griffith, Luther J., LTC, USA

8. CONTRACT OR GRANT NUMBER(s)

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Student at the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas 66027

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

11. CONTROLLING OFFICE NAME AND ADDRESS
US Army Command and General Staff College
ATTN: ATSW-DD
Fort Leavenworth, Kansas 66027

12. REPORT DATE
6 Jun 75

13. NUMBER OF PAGES
106

14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)

15. SECURITY CLASS. (of this report)
Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)
Distribution limited to U.S. Government agencies only: Proprietary Information. Other requests for this document must be referred to U.S. Army Command and General Staff College, Fort Leavenworth, Kansas 66027.

20 SEP 1975

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES
Master of Military Art and Science (MMAS) Thesis prepared at CGSC in partial fulfillment of the Masters Program requirements, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas 66027

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
See reverse.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

Unclassified
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Military tradition and Army regulations have established decentralization as the basic concept for organization design for the Army down to the lowest practicable organizational level. However, contemporary views of organization design are drawing away from the universal "one best way" to "using what works" in recognition of an appropriate match between specific concepts and variables of the situation. In support of this trend, CONUS installation maintenance organization planners are beginning to explore the use of consolidation and centralization as a positive means of gaining a more efficient and effective organization for maintenance.

The results of the study concluded:

1. The categories of organizational, direct, and general support for NON-TOE activities should be consolidated and centralized under a single manager at installations in CONUS.

2. Deployable TOE units should not be included in the consolidation and centralization.

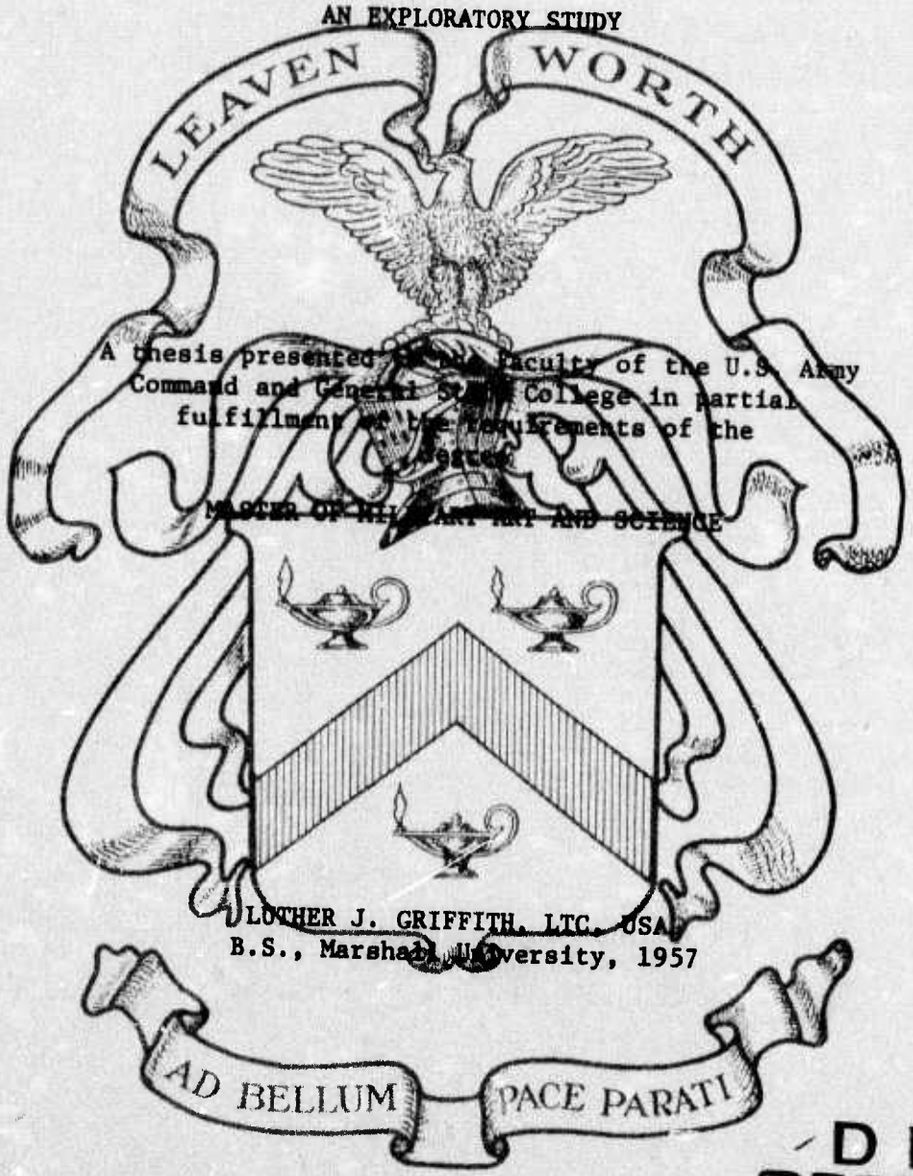
3. The traditional Army Maintenance Structure with its inherent decentralization is not applicable to the peacetime environment of a CONUS installation.

4. A conceptual model for structuring CONUS installation maintenance organizations was devised.

With the recommendation of a totally centralized conceptual model for installation maintenance support structuring, there remained a requirement to find an alternative to support a rapidly deploying TOE unit. The Tactical Maintenance Concept was recommended to meet the needs of TOE units in the combat zone. The concept is based on providing total maintenance support to the battalion or equivalent sized unit by attaching Direct Support Maintenance Detachments to the supported unit.

A PERCEPTUAL EVALUATION OF THE CONUS INSTALLATION MAINTENANCE SUPPORT STRUCTURE BY APPLICATION OF THE CONTINGENCY THEORY OF MANAGEMENT

AN EXPLORATORY STUDY



A thesis presented to the faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements of the degree

MASTER OF MILITARY ART AND SCIENCE

LUTHER J. GRIFFITH, LTC, USA
B.S., Marshall University, 1957

Fort Leavenworth, Kansas
1975

5L5-3150

THESIS TITLE: A PERCEPTUAL EVALUATION OF THE CONUS INSTALLATION MAINTENANCE SUPPORT STRUCTURE BY APPLICATION OF THE CONTINGENCY THEORY OF MANAGEMENT -- AN EXPLORATORY STUDY.

AUTHOR : LTC Luther J. Griffith

DATE : 6 June 1975

TOTAL PAGES : 106

ABSTRACT

This study was a perceptual evaluation of the CONUS installation maintenance support structure by application of the contingency theory of management. Decentralized maintenance support was evaluated against centralized support to determine the most efficient and effective concept for organizational structuring at installations in CONUS. The study concluded that centralization was the appropriate structural concept. As a result, a conceptual model was devised for structuring installation maintenance organizations that provided for centralized support of NON-TOE activities and TOE units.

ABSTRACT

Military tradition and Army regulations have established decentralization as the basic concept for organization design for the Army down to the lowest practicable organizational level. However, contemporary views of organization design are drawing away from the universal "one best way" to "using what works" in recognition of an appropriate match between specific concepts and variables of the situation. In support of this trend, CONUS installation maintenance organization planners are beginning to explore the use of consolidation and centralization as a positive means of gaining a more efficient and effective organization for maintenance.

Relevant management and organization literature and military documents indicate that:

1. There is a modern view of organization design that management concepts are not universally applicable. Different situations call for different concepts and the utilization of a concept is contingent on the situation.

2. The prescribed organization for CONUS installations is based on the traditional concept of decentralization. The regulations assert that garrison administrative and logistics functions may most effectively be accomplished by utilizing decentralized organization.

3. The consolidation in 1963 of the direct support and general support categories of maintenance into a single TDA installation support maintenance activity was a break with the tradition and custom of decentralization. Since that time consolidation and centralization have been mildly supported in Army literature as an approach to a more efficient and effective organization design for CONUS installation maintenance support.

4. Current testing of the concept at Fort Ord and Fort Gordon indicate that further consolidation and centralization of CONUS installation maintenance support functions may be justified.

This study focused on the problem of determining the organizational concept for maintenance support most applicable to the CONUS installation environment. For this study, decentralization was defined as a condition in an organization when the authority to make decisions is broadly delegated to lower units. Centralization is the opposite condition where the upper hierarchy of an organization retains most decision-making authority.

The research took the form of an exploratory study using the descriptive and historical methods. The primary source information was gathered by questionnaire survey and telephone interviews and was largely perceptual in nature. Opinions and attitudes of CONUS maintenance managers based on their expertise and professional knowledge were the principal means of evaluating the problem. Historical sources

including information concerning the Fort Ord and Fort Gordon Test Consolidations and the Fort Knox Maintenance System Simplification Study were helpful in the study of Army trends in organization design.

Four research questions were posed for this study. They were:

1. Should the maintenance categories of organizational, direct, and general support for NON-TOE activities be consolidated and centralized under a single manager at installations in CONUS?

2. Should both NON-TOE activities and deployable TOE units be included in the consolidation and centralization?

3. Is the Army Maintenance Structure (echeloned by degree of complexity) applicable to the peacetime environment of a CONUS installation?

4. Can a model be devised for structuring installation maintenance organizations in CONUS?

The results of the study concluded that the answers to the research questions were as follows:

1. The categories of organizational, direct, and general support for NON-TOE activities should be consolidated and centralized under a single manager at installations in CONUS.

2. Deployable TOE units should not be included in the consolidation and centralization. The study identified the major obstacle of centralized support to TOE units as the deployment requirement and the need to maintain a combat ready

unit with all organic support to include maintenance. The study also disclosed that if a suitable augmentation or other method of maintenance support could be found, a trade-off might be feasible to having organic maintenance elements within the combat unit TOE.

3. The traditional Army Maintenance Structure with its inherent decentralization is not applicable to the peacetime environment of a CONUS installation. Study results indicate centralization as the optimal concept. However, as indicated in question 2, deployable TOE units must not be deprived of their organic maintenance elements while stationed at CONUS installations, even though duplication of maintenance capability with the garrison maintenance activity will occur.

4. A conceptual model for structuring CONUS installation maintenance organizations was devised. The model encompassed both TOE units and NON-TOE activities stationed at CONUS installations. Analysis of the study findings and conclusions revealed that if a suitable trade-off could be found to meet deployment requirements of TOE units, there was a basis for providing centralized maintenance support for all types of units.

With the recommendation of a totally centralized conceptual model for installation maintenance support structuring, there remained a requirement to find an alternative to support a rapidly deploying TOE unit. The Tactical Maintenance Concept was recommended to meet the needs of TOE units in the combat zone. The concept is based on providing total

maintenance support to the battalion or equivalent sized unit by attaching Direct Support Maintenance Detachments to the supported unit. The Detachment would perform all maintenance, organizational and direct, and would carry all repair parts to support the battalion. The tactical maintenance and CONUS installation maintenance concepts would have a common manpower and training base to optimize the structuring of maintenance organizations for each environment.

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CHAPTER I

INTRODUCTION

STATEMENT OF THE PROBLEM

The problem is to evaluate decentralized maintenance support against centralized maintenance support to determine the most efficient and effective organizational structure for installations in CONUS.

QUESTIONS TO BE ANSWERED BY RESEARCH

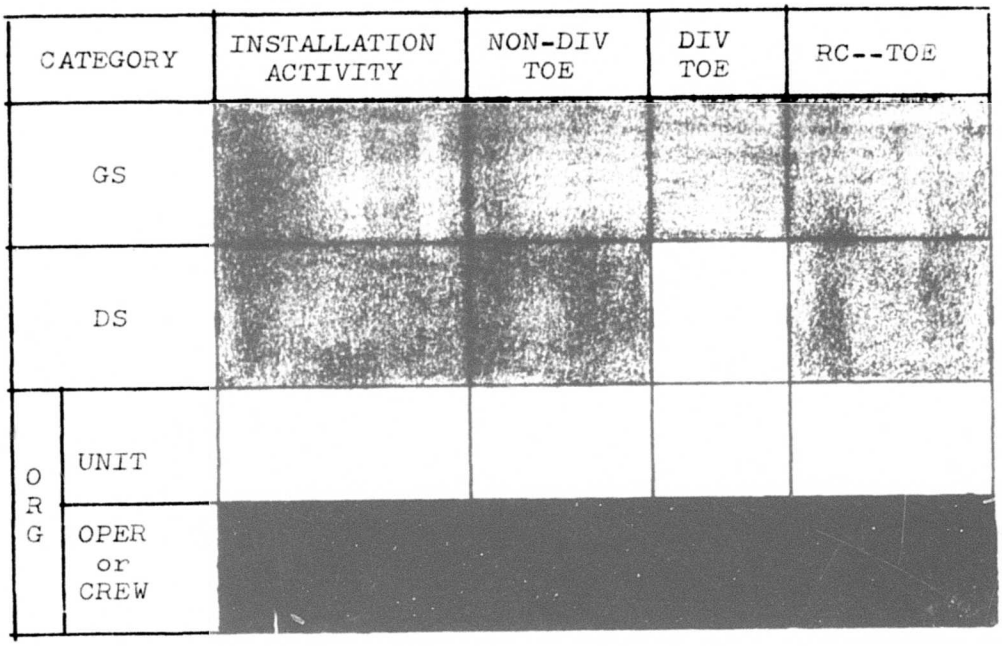
As formulated for this research, the questions to be answered are as follows:

a. Should the maintenance categories of organizational, direct, and general support for NON-TOE activities be consolidated and centralized under a single manager at installations in CONUS? (Figure 1).

b. Should both NON-TOE activities and deployable TOE units be included in the consolidation and centralization?

c. Is the Army Maintenance Structure (echeloned by degree of complexity) applicable to the peacetime environment of a CONUS installation?

d. Can a model be devised for structuring installation maintenance support organizations in CONUS?



CODE:

Categories of maintenance performed by Installation TDA Consolidated Activity.

Category or portion of category to be performed by TDA Consolidated Activity. (Proposed additional consolidation).

Operator or crew maintenance to be performed at unit or activity level.

FIGURE 1

CONUS FIXED INSTALLATION MAINTENANCE ORGANIZATION

(PROPOSED)

BACKGROUND OF THE PROBLEM

The Army Maintenance Structure was developed in 1963 to provide maintenance support to the Army in the field. The decentralization of the structure was designed for the combat environment and facilitates accomplishing maintenance support as far forward as the tactical situation will allow. CONUS installation support activities and units were also decentralized.[1]

The size and composition of CONUS installations vary according to the number of assigned units and activities. Therefore, the CONUS installation is essentially an administrative base organization with base operations support activities tailored to support a mix of TOE (Table of Organization and Equipment) and TDA (Table of Distribution and Allowances) organizations. The installation garrison force is assigned the mission of supporting the resident units and activities.[2]

The concept for the current CONUS installation TDA DS/GS consolidated maintenance activity was established in 1963. The principal innovation of the change was the consolidation of direct and general support maintenance for NON-TOE organizations into a single activity under one manager.

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[1]Department of the Army, Organization and Functions, Class I Installation Organization, AR 10-10 (May 1970), p. B-1.

[2]Ibid, p. 2.

This activity also furnishes support to TOE units who do not have a DS/GS capability. Formation of this activity was a step toward centralization and allowed the installation commanders a greater flexibility than previous organizations.[3]

The influence of the traditional concept of decentralization on CONUS installations was reflected in AR 10-10, Class I Installation Organization which states, "The prescribed directorate-type organization of Class I installations is based on the concept of decentralization of responsibilities and concomitant delegation of appropriate authority to the lowest practicable organizational level. Under this concept garrison administrative and logistics functions may be most effectively accomplished."[4] However, AR 10-10 does include a brief caveat against inflexible management thinking by noting that, "Convention and tradition must not be allowed to stifle the adoption of valid improvements in management technology."[5]

DA Pamphlet 750-13, Operating Guide For TDA Support Maintenance Activities encourages consolidation and functionalization at all levels of the maintenance organization and urges application of modern industrial management principles and techniques for installation support maintenance activities.

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[3]Department of the Army, Operating Guide for TDA Support Maintenance Activities, DA Pam 750-13 (March 1970), p. 1.

[4]Department of the Army, Organization and Functions, Class I Installation Organization, AR 10-10 (May 1970), p. B-1.

[5]Ibid.

This pamphlet also calls for duplication of materiel maintenance resources to be held to a minimum at installations. However, the pamphlet is only a guide for maintenance managers.[6]

The stable CONUS installation environment has led to limited consolidation and centralization of the TDA consolidated maintenance activity since 1963. Perhaps, further consolidation and centralization of the maintenance structure is justified.

RATIONALE FOR THE THESIS

Army budget cuts demand that maintenance managers get the most out of every resource. Accordingly, installation maintenance must be organized to provide adequate support at the lowest cost. With that objective in mind, a review of literature concerning CONUS installations revealed functional integration and consolidation as a positive means of gaining a more efficient and effective organization for maintenance.[7] This is an indication of the growing recognition of the environmental difference between the CONUS installation and the mobile combat situation of the Army Maintenance Structure.

The investigation reported in this paper was designed to gather and analyze data concerning the effect of the stable

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[6]Department of the Army, Operating Guide For TDA Support Maintenance Activities, DA Pamphlet 750-13 (March 1970), p. 2.

[7]Ibid.

environment of CONUS installations on the organizational variables selected for evaluation. The objective of this study was to determine the organizational concept best suited for CONUS installations.

THEORETICAL FRAMEWORK

Concepts

This study centers on two concepts:

1. Decentralization is defined as a condition in an organization when the authority to make decisions is broadly delegated to lower units.[8]

2. Centralization is the opposite condition where the upper hierarchy of an organization retains most decision-making authority.[9]

Variables

Research questions 1, 2, 3, and 4 as formulated, establish the organizational structure for CONUS installation maintenance support as two dependent variables:

1. Decentralized maintenance structure.

2. Centralized maintenance structure.

The independent variables are as follows:

1. Basic purpose and goals of the structure.

2. The knowledge and skill of the supervisors.

3. The skill, knowledge, and attitudes of subordinates.

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[8]Howard M. Carisle, "A Contingency Approach To Decentralization," Advanced Management Journal, 29:3, July 1974, p. 13.

[9]Ibid.

4. The scale and size of the structure.

5. The technology of the tasks to be performed.

6. The geographical dispersion of the structure.

7. The degree to which subordinates will accept and are motivated by the structure.

8. The status of the structure's planning and control system.

9. The status of the structure's information system.

10. The degree of the conformity and coordination required in the tasks or operations of the structure.

11. The deployment status of supported units.

12. The time frame of decisions to be made.

13. The significance of decisions to be made.

14. The status of external environmental factors such as government regulation and labor unions.[10]

Environmental Delimitations

As the general direction of the study was developed and the type of evidence required became apparent, it became necessary to consider how to collect the evidence most economically within the severe constraints of time and resources. To assure the least chance of being led to incorrect conclusions, the descriptive survey--utilizing the telephone interview technique to collect evidence at CONUS

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[10]Carisle, p. 15.

installations and an attitude questionnaire to collect evidence at Fort Leavenworth, was selected.

In reducing the problem to a manageable size that could be handled in a single study, it was decided to limit exploration of the problem to installations in CONUS.

Research Program

The methodology for the study is a combination of the historical and descriptive methods. The historical data was gleamed from available literature on the problem. These secondary sources proved to be very limited, however tests of consolidation are being conducted at Fort Ord and Fort Gordon. Information on these tests is included in Chapter II of this study.

The descriptive survey was used to gather primary source evidence and a phased outline follows:

PHASE I

RESEARCH INSTRUMENT SELECTION AND DESIGN

1. Two research instruments were selected to gather data.

   a. Questionnaire

   b. Telephone Interview

2. Design of instruments: Both instruments were prepared using a variation of the structured question technique--the rating scale. The rating scale presents the respondent with a statement and asks him to indicate the extent to which the statement is descriptive of his feelings. The Likert Scale

was selected. This scale is an ordinal, summated scale that makes possible the ranking of individuals in terms of degree of favorable or unfavorable attitudes.[11]

PHASE II

PILOT PROJECT

1. The initial instruments were administered to a small sample of respondents similar to the sample population to be surveyed.

2. Purified, revised, and edited the instruments to eliminate ambiguous, irrelevent, and otherwise faulty items.

PHASE III

ADMINISTERING THE INSTRUMENTS

1. Questionnaire: This instrument was administered to a group of officers with CONUS maintenance management expertise stationed at Fort Leavenworth, Kansas.

2. Telephone Interviews: A sample group of CONUS installation maintenance officers were interviewed.

3. Scoring of the instruments: The instruments were scored for each respondent by assigning arbitrary weights of 1, 2, 3, 4, 5, and 6 to the six-point "forcing" scale.[12] The response categories of the scale were as follows:

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[11] M. H. Remmers, Introduction to Opinion and Attitude Measurement (New York: Harper and Brothers, 1955), p. 94.

[12] Ibid., p. 131.

RESPONSE CATEGORIES	DEGREE OF AGREEMENT
1	Strongly Agree
2	Agree
3	Mildly Agree
4	Mildly Disagree
5	Disagree
6	Strongly Disagree

The statements were formulated so that for approximately half of them an "agree" response represented a favorable attitude toward the statement, and for the other half a "disagree" response represented a favorable response. The highest weight value of (6) was always assigned to the favorable end of the attitude continuum. Centralization was selected as the favorable end of the continuum. The respondent's score is the sum of the weights to the responses which he made.[13]

PHASE IV

PROCESSING DATA

Processing the data for analysis: Hand-tabulation was used to prepare the gathered data for analysis.

PHASE V

STATISTICAL ANALYSIS

Statistical analysis of the tabulated data: Analysis was performed through associations in cause and effect relationships of dependent and independent variables.

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[13] Ibid., pp. 94-95.

PHASE VI

INTERPRETATION

Interpretation of results and formulation of answers to the research questions.

1. Significant associations.
2. Significant variations.
3. Implications for further research.

DEFINITIONS

The following definitions are presented to enhance reader appreciation.

The Army Maintenance Structure:

> The materiel maintenance function is a component of the Army Logistics System (AR 11-8). Therefore, the Army Maintenance Structure parallels the overall Army Logistics Structure. It encompasses the materiel maintenance organization and activities of the three major segments of the Army Logistics System. These are the Army Wholesale Logistics System, the Army in the Field Logistics System, and the CONUS Installation Logistics System.[14]

Army in the Field Materiel Maintenance:

> The materiel maintenance activities of the Army in the field are those internal to theaters of operations and/or performed by and in support of the missions of commands and activities in CONUS.[15]

CONUS Installation Materiel Maintenance:

> CONUS installation materiel maintenance activities are those maintenance services provided by or the responsibility of CONUS installations in support of installation operating equipment, direct exchange program and active Army or U.S. Army Reserve (USAR) activities assigned to, tenant on, or satellited upon the installations.[16]

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[14] Department of the Army, Army Materiel Maintenance Concepts and Policies, AR 750-1 (May 1972), p. 1-32.

[15] Ibid.

[16] Ibid., p. 1-33.

Installation Support Maintenance Activity:

A maintenance organization with facilities under operational control and supervision of one maintenance officer/manager. Such an organization is assigned the mission of performing direct and/or general support maintenance on troop and/or installation operating equipment. This organization operates at fixed locations and is not organized under a TOE.[17]

TDA Support Maintenance Activity:

A functionally integrated organization and facility under the control of one maintenance officer, assigned equipment repair missions to perform direct and general support maintenance as set forth in AR 750-7.[18]

Functional Integration:

The merging of organizational elements and facilities due to similar work, skills, and equipment.[19]

The following terms are defined as listed in Webster's New World Dictionary:[20]

Centralization: a concentration of power or authority; systematization under one control.

Centralize: to organize or systematize under one control.

Consolidate: to combine into one; merge, unite.

Decentralization: to decentralize; to break up the centralization of authority, as in a government or industry, and distribute among more places, local authorities, etc.

System: a set or arrangement of things so related or connected as to form a unity or organic whole: as, a solar system, irrigation system, supply system.

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[17]Department of the Army, Installation Support Maintenance Activities, AR 750-7 (February 1971), p. 1-1.

[18]Department of the Army, Operating Guide for TDA Support Maintenance Activities, DA Pam 750-13 (March 1970), p. 1.

[19]Ibid.

[20]Webster's New World Dictionary, College Edition, (New York: The World Publishing Company, 1964).

Systematize: to make into a system, arrange according to a system.

CHAPTER II

REVIEW OF RELATED LITERATURE AND RESEARCH

OVERVIEW OF LITERATURE

The review of literature revealed a large number of books, government publications, and periodicals dealing with organization and management. The published material is "chockfull" of policies and principles for effective organizational structuring. Each author, in his turn, has applied common sense and the practical experience of successful organizations and managers to develop a new theory, redefine terms, and come up with a new list of universal management principles. As March and Simon surmised:

> Any attempt to bring together this scattered and diverse body of writing about organizations into a coherent whole must surmont two serious problems. The Literature leaves one with the impression that after all not a great deal has been said about organizations, but it has been said over and over in a variety of languages . . . The second problem is that there is in literature a great disparity between hypotheses and evidence . . . The literature contains many assertions, but little evidence to determine . . . whether these assertions really hold up in the world of fact.[1]

To effectively review the literature, the reader must first deal with the organization and management jargon. This

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[1] James G. March and Herbert A. Simon, Organizations (New York: John Wiley & Sons, Inc., 1970), p. 5.

linguistic phenomenon of many different terms for a common meaning makes communication very difficult. Concerning this problem Spriegal and Lansburg said, "The study of the managerial and administrative phases is so new that as yet there is no emerging standardized terminology that is generally accepted."[2]

The impact of the uncommon language of organization and management was also encountered by this writer while conducting interviews during this study. To convey or receive communication of a management idea it was first necessary to have a semantic discussion of terms. Examples are the terms; consolidation, centralization, functionalization, and integration. These terms were commonly used interchangeably. These terms and most other management terms are not listed in military dictionaries, so it was necessary for the author to use the definition of terms as listed in Webster's Newworld Dictionary as a common base for understanding.[3]

Review of books related to military organization reveal that until recent times armies were small, judging by modern standards. Battle formations were compact, a condition that was prevalent for centuries until the advent of gunpowder. For example, at Waterloo it was still possible for

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[2]William R. Spriegal and Richard H. Lansburg, Industrial Management (New York: John Wiley & Sons, Inc., 1957), p. 1.8

[3]Webster's New World Dictionary, College Edition, (New York: The World Publishing Company, 1964).

Napoleon to view the entire battlefield.[4]

The size and the nature of the battlefield changed greatly during World War I and II. World War II involved worldwide deployment of allied armies and navies carrying on coordinated offensives in Europe, Africa, Asia, and the Pacific. Concerning the principles of organization used during World War II, Mooney said:

> The conduct of such warfare involved no new principles of organization, for they are all old. But it demanded an application of the principles more advanced then anything ever required in warfare of the past. These problems were solved . . . by a system of centralized control and decentralized operations; in other words, by the centralization of command and decentralization of execution.[5]

Mooney goes on to say:

> The problems of centralized control and decentralized operations . . . can only be solved . . . through an advanced application of the principle of delegation. We call it an advanced application, for delegation is always inherent in the principle of leadership, The relation of the leader, however, to those entrusted with delegation duties alters with the growth of an organization and the widening of its field of operations. With such growth leadership is able to operate less and less through direct contacts, and must depend more and more on the application of general principles. In warfare, general principles are another name for military doctrine.[6]

Mooney credits Napoleon as the real father of modern military doctrine. According to Mooney, "The doctrine of decentralization in the execution of plans became manifest in

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[4]James D. Mooney, The Principles of Organization (New York: Harper and Brothers Publishers, 1957), p. 130.

[5]Mooney, p. 130.

[6]Ibid.

the French revolutionary armies, and was formulated by Napoleon as a military principle." Mooney goes on to assert, "The causes that were to impose the same necessities on modern industry trace back to the industrial revolution that began in the same period."[7]

The military or line organization with its inherent decentralization has been the model for most modern armies to include the United States Army. The principle of decentralized operations rests on the fact that no commander of a modern army can personally see and supervise everything, and the same is true of each descending link in the chain.[8]

AR 5-1, Army Management Doctrine, seems to advocate flexibility in management and organization thinking. One of the Army principles of organizing states, "Establish organizational relationships using optimum span of control; eliminate as many layers, deputies, and administrators, and paper hangers as possible."[9] However, this same regulation also charges, "Decentralize authority to the maximum."[10] AR 5-1 lists one of its management policies as decentralization. The regulation directs that, "Delegation of authority commensurate with the assignment of responsibility should be made

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[7]Ibid., pp. 131-132. [8]Ibid., pp. 134-135.

[9]Department of the Army, Army Management Doctrine, AR 5-1 (August 1973), p. 1.

[10]Ibid., p. 2.

down to the lowest practicable level within an organization."[11] This regulation reflects the tradition and custom of decentralization in organizational structuring of the U.S. Army. In fact, AR 5-1 contains a management policy discouraging central control and establishes strict limits for its use. The regulation states that,

> Centralized control or decentralized operation should be limited to the extent required to--(1) establish priorities of centrally directed programs; (2) to allocate critical resources; (3) to identify and correct basic deficiencies.[12]

Command and General Staff College RB 20-5, Management Theory, in discussing organizational structuring says:

> In the normal day to day operations of a military organization, the degree of centralization or decentralization is not so much a matter in which a commander has organized his subordinate units as it is a matter of the policies that he establishes to guide the daily operations of the unit as a whole. Thus, there may exist two identically organized units, one highly centralized, and the other highly decentralized in its operations . . . In the final analysis centralization and decentralization are extensions of delegation.[13]

The degree of delegation of authority to CONUS installations is not specifically outlined by Army Regulation, AR 10-10, Organization and Functions, Class I Installation Organization, states:

> It is pointed out that delegation of authority is a prerogative of command; therefore, . . . the basic

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[11] Ibid., p. 2.

[12] Ibid., p. 3.

[13] Command and General Staff College, Management Theory, RB 20-5, Vol. I (July 1973), pp. 3-13 & 3-14.

> regulation establish a logical pattern from which, along with tradition and customs of the service, it can be deduced that such authority resides with the official. To this extent, conventional and traditional organization and delegation of authority are encouraged. Conversely, convention and tradition must not be allowed to stifle adoption of valid improvements in management technology.[14]

With the above liberal view of delegation of authority, AR 10-10 goes on to direct: "The prescribed directorate-type organization of Class I installations is based on the concept of decentralization of responsibilities and concomitant delegation of appropriate authority to the lowest practicable organizational level." The regulation further prescribes, "Under this concept (decentralization) garrison administration and logistics support functions may be most effectively accomplished."[15]

The Army organizational structure prescribed by Army regulation is a decentralized structure. Tradition and custom along with past success of this structure are recorded in U.S. military history. In fact, there is no reason to challenge the structure for combat operations. However, is a decentralized structure the most effective organization for installation logistics support functions?

The Army Structure with its inherent decentralization encompasses the Army Maintenance Structure and regulations

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[14]Department of the Army, Organization and Functions, Class I Installation Organization, AR 10-10 (May 1970), p. B-2.

[15]Ibid., p. B-1.

prescribe the division of maintenance tasks into categories. AR 750-1 states:

> Maintenance operations are divided into categories organizational, direct support, general support, and depot support. These categories:
>
> (1) Relate maintenance operations to other military operations.
>
> (2) Facilitate assignment of responsibilities for specific maintenance tasks for specific levels of command.
>
> (3) Permit an orderly and efficient distribution of Maintenance resources.[16]

Delegation of maintenance authority and responsibilities is normally parallel to these categories and they also serve as the basis for the structuring of TOE maintenance support units at various levels of command.

AR 750-7, Installation Support Maintenance Activities, applies to support maintenance activities worldwide. The scope of this regulation includes only the direct and general support categories of maintenance. It does not apply to organizational maintenance operations. Also, maintenance of engineer equipment is excluded from the jurisdiction of AR 750-7. The principal innovation brought about by this regulation was the consolidation of the direct and general support categories into a single DS/GS consolidated maintenance activity. The regulation prescribes a single installation maintenance officer,

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[16]Department of the Army, Army Materiel Maintenance Concepts and Policies, AR 750-1 (May 1972), p. 1-25.

but only over the DS/GS activity, not over the entire installation maintenance support structure.[17]

In contrast to the Army Regulations, Department of the Army Pamphlet 750-13, Operating Guide for TDA Support Maintenance Activities, encourages flexible thinking toward management doctrine for maintenance support at installations. However, it must be noted that a DA pamphlet is strictly a guide and can be used or disregarded as managers choose. Four examples of the untraditional approach of this pamphlet are:

> (1) Consolidation and functionalization should be accomplished at all levels of the maintenance organization and in all physical facilities consistent with the most effective accomplishment of the assigned maintenance mission.
>
> (2) Modern industrial management and industrial engineering principles and techniques should be applied to the operation of TDA support maintenance activities.
>
> (3) Duplication of materiel maintenance resources on an installation should be held to a minimum.
>
> (4) The TDA support maintenance organization should provide on-the-job training opportunities for personnel of TOE support maintenance units.[18]

If the doctrine (principles of organization) of the current Army Maintenance Structure is focused on the battlefield, how can a more suitable maintenance structure be designed for CONUS installation support?

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[17]Department of the Army, Installation Support Maintenance Activities, AR 750-7 (February 1971), pp. 1-2.

[18]Department of the Army, Operating Guide for TDA Support Maintenance Activities, DA Pam 750-13 (March 1970), p. 2.

A modern view of organization design is that there is a middleground between, "The view that there are universal principles of organization and the view that each organization is unique and that each situation must be analyzed separately."[19]

Traditional organizational and management theory is centered on three primary concepts, (1) scientific management, (2) the bureaucratic model, and (3) administrative management theory. Collectively, they were the major concepts for organization design during the first part of this century. The traditional viewed organization as a closed, mechanistic system isolated from environmental factors.[20]

In the past, attempts have been made to make an organizational structure decision based on one or two factors and, thereby, tend to simplify a situation that has many complexities. The contigency approach provides a way to evaluate these complexities rather than ignore them. The objective of the contingency approach is to classify situations and variables into common types so that conclusions can be reached regarding appropriate management concepts.[21]

Concerning the contingency approach to organization structuring, Carlisle said, "The gist of this approach is that management concepts are not universally applicable, but are only appropriate if the right conditions exist in a given situation."

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[19]Fremont E. Kast and James E. Rosenzweig, Contingency Views of Organization and Management (Chicago: Science Research Associates, Inc., 1974), p. ix.

[20]Kast and Rosenzweig, p. 6. [21]Ibid., p. ix.

He further said, "Different situations call for application of different concepts, and thus the utilization of any specific concept is contingent on the situation."[22]

With another view of the contingency theory, Kast and Rosenzweig say that:

> The contingency view suggests that there are definable patterns of relationships for different types of organizations and that we can improve our understanding of how the relevant variables interact. Moreover, the contingency view suggests that different approaches may be appropriate in subparts of the same organization.[23]

During this study, the contingency theory or approach was used as a framework for the survey administered to the study sample subjects.

RELATED RESEARCH

A search of the various bibliographies of logistics led to only one study relating to the CONUS installation support structure. The study that was listed as "in process" is titled, "CONUS Installation Maintenance/Supply Support," was to be conducted by the U.S. Logistics Center at Fort Lee. The project officer for the study was Mr. Gill Thorpe, Logistics Research Analyst in the Doctrine Branch of the Directorate of Concepts and Doctrine. Mr. Thorpe said in an interview with this writer, that the study draft directive is

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[22]Howard M. Carisle, "A Contingency Approach To Decentralization," Advanced Management Journal, 29:3, July, 1974, p. 9.

[23]Ibid., p. 11.

being staffed within TRADOC and a date to begin the study has not been determined. Mr. Thorpe also stated that he knew of no studies, past or current, relating to centralization or consolidation of maintenance support at CONUS installations. He did recall that Department of the Army had in the past put out some correspondence concerning consolidation and referred me to Mr. G. R. Christensen, Chief Industrial Engineer for DCSLOG, Department of the Army for more information on the subject.[24]

Mr. Christensen confirmed that in his 25 plus years with the Army, he could not recall any studies of consolidation of maintenance support at CONUS installations. He did recall that the 1962 reorganization of the tech-services TDA activities into a single activity had been developed and implemented through correspondence mainly at the action officer level between DA, CONARC, CONUS Armies, and CONUS Installations. He further stated that the Logistics Evaluation Agency (LEA) was currently preparing a new regulation directing CONUS installation commanders to consolidate all installation maintenance under the control of a single maintenance officer. According to Mr. Christensen, all Army Materiel Command installations are presently consolidated and have been for some years. The AMC consolidation includes consolidation of general support, direct support, and organizational maintenance into a single

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[24]Statements by Gill Thorpe, personal telephone interview, December 18, 1974.

organization.[25]

To follow up on the regulation mentioned by Mr. Christensen, he referred me to Mr. Samuel Aiello, Maintenance Systems Analyst for LEA. Mr. Aiello said that there would not be a new regulation as Mr. Christensen had thought. AR 750-1, Army Materiel Maintenance Concepts and Policies, is being updated because of the many changes brought about by the "STEADFAST" reorganization of the Army. The directed implementation of the Single Manager Concept will be include in the update of AR 750-1. AR 750-7, Installation Maintenance Support Activities, is also being updated for the same reasons. Mr. Aiello pointed out that both of these regulations require all maintenance under the control of a single installation maintenance officer, but do not require specific integration or consolidation of subordinate activities. He also stated that engineer equipment will remain excluded from control by the provisions of AR 750-7.[26]

Another study not directly related to the CONUS maintenance structure, but showing a trend in thinking to centralization of maintenance functions of TOE units was conducted by the U.S. Army Armor Center at Fort Knox, Kentucky. The study titled, "The Armor Center Team Study on Army

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[25]Statements by G.R. Christensen, personal telephone interview, December 19, 1974.

[26]Statements by Samuel Aiello, personal telephone interview, December 19, 1974.

Maintenance System Simplification," was performed by the Armor Center Team Maintenance Simplification Committee.

The study was initiated in July 1971 by the Commanding General, U.S. Army Armor Center and Fort Knox, in response to continuing criticism against the Army Maintenance System. The purpose was to examine maintenance from the user point of view, identify problems and recommend solutions. The study was limited to organizational maintenance at brigade and lower units. The study not only considered forms and records, but all of the aspects of organizational maintenance, with a goal of system simplification. One of the study conclusions asserted:

> A semicentralized maintenance organization, with an increase in concentration of maintenance resources in the battalion maintenance platoon, can provide the most effective organizational maintenance for TOE battalions.[27]

The study team reached the above conclusion after consideration of various organizational concepts. The semicentralized concept does not deprive the commander of responsibility for maintenance of his equipment, but does relieve him of some of the burden of maintaining it. One of the considered approaches suggested that all the maintenance personnel assets be centralized at battalion level and all the organizational maintenance be performed there. The semicentralized approach would leave a limited capability with

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[27] "The Armor Center Team Study on Army Maintenance System Simplification," U.S. Army Armor School, (August 1972), p. 13.

the company commander, giving him expertise for advice and influence over maintenance in the unit. Battalion would perform all periodic services, and would provide contact teams and other maintenance support to the companies.[28]

TEST CONSOLIDATION - FORT ORD

The Single Manager Concept was first established at Fort Ord in 1963. The objective was to consolidate all maintenance support to the maximum extent under a single installation activity responsible to the installation commander. The concept was implemented when the six tech-service shops were eliminated and the functions consolidated into a single TDA installation maintenance support activity. The activity was under the control of the Chief, Installation Maintenance Division. This experimental organization contributed to the DA guidance later published in DA Pam 750-13. This pamphlet was first published in 1970.

From 1963 to 1970, the Installation Maintenance Division performed all organizational and DS/GS maintenance for:

(1) Directorate of Facilities Engineering.

(2) Directorate of Communications and Electronics.

(3) Criminal Investigation Division (CID).

(4) Recruiting Service.

(5) Administrative Vehicle Fleet.

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[28] Ibid., p. E-4.

(6) Camp Roberts (until leased to California National Guard in 1970).

(7) Reserve Components Branch of Supply Division.

(8) Transient and ISSA Customers.

In 1971, Sixth Army directed that the Administrative Vehicle Fleet organizational maintenance support be re-established as a separate organizational element. The change was made to make Class I Installation Motor Transport officers directly responsible for organizational maintenance support of commercial vehicles which were identified as part of the installation motor pool fleet. This was done despite protest by the Commander of Fort Ord.

In 1972, Fort Ord requested permission from Sixth Army to again consolidate Administrative Vehicle Fleet organizational maintenance under the control of the Installation Maintenance Division. On 2 January 1973, permission was granted by Sixth Army for the Installation Maintenance Division to provide organizational maintenance support for the Administrative Vehicle Fleet on a test basis for a period of one year. This change reestablished the Fort Ord maintenance structure formed in 1963 (Figure 2).[29]

At the end of the first year of the test, calender year 1973, Fort Ord summarized the analysis of the test as follows:

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[29]"Resume of Accomplishments and Significant Events in Maintenance Division for FY 1973," John J. Robotti, DAC, Chief of Maintenance Division, Fort Ord, California, 20 July 1973.

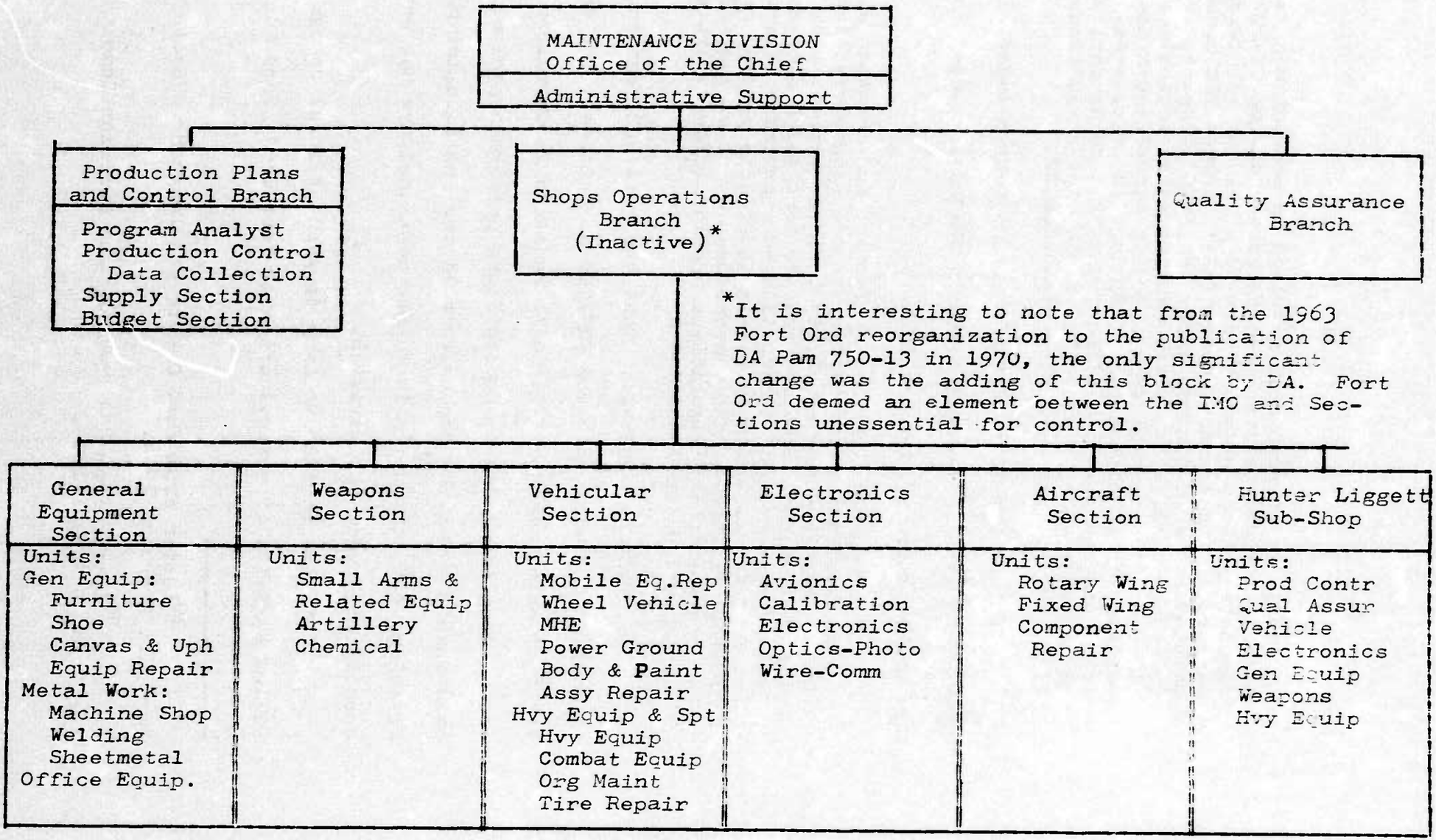

FIGURE 2. Maintenance Support Structure - Fort Ord

> Analysis of each area involved in maintenance management of Administrative Fleet Vehicles, during CY-1973, has demonstrated the effectiveness of providing maintenance support to the Administrative Fleet through the consolidated maintenance organization under the IMMOC Concept. Based on proven results, complete mission satisfaction and overall reduction in maintenance and personnel costs has resulted in significant cost savings in every area. This is considered the most effective method to accomplish maintenance at this installation in view of continued effectiveness and declining resources.[30]

In February 1974, Fort Ord requested an indefinite extension of the test organization. TRADOC commented on the test and Fort Ord request as follows:

> The reports submitted by letter, and comments offered by representatives of the Army Audit Agency visiting Fort Ord in May 1974 are conclusive. These reports show that the test of consolidation must be considered successful. The current method of consolidated maintenance operations at Fort Ord is approved for an indefinite period, pending further testing of these procedures at other installations or changes to the regulations providing for separate organizational maintenance activities.[31]

It must be emphasized that the Fort Ord test consolidation included only the NON-TOE activities. The organizational maintenance of TOE units remained decentralized. The Fort Ord Military Police Company does perform organizational maintenance under the supervision of the Installation Maintenance Division, but the unit maintenance personnel are not considered consolidated into the division.

Why did it take so long to gain official recognition of the benefits of consolidation at Fort Ord? Some insight

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[30]Letter from Fort Ord to USA Training & Doctrine Command, 11 February 1974.

[31]Letter from USA Training and Doctrine Command to Fort Ord, 9 August 1974.

into this question can be perceived from a comment by John J. Robotti, Chief of the Maintenance Division at Fort Ord. Concerning the consolidation he said:

> The reorganization wasn't easy due to the numerous traditional ways of past years that had to be overcome. Naturally, personalities entered into the picture from all levels. However, as time went on and the rough spots smoothed, attitudes changed when it was realized that this was the only way to go in view of declining resources in personnel and funds.[32]

Due to the success of the Fort Ord test, TRADOC requested and received permission from DA to conduct an additional test at Fort Gordon, Georgia. The Fort Gordon test results will be used by TRADOC and DA to validate the Fort Ord test and determine if this type consolidation and centralization should be accomplished at all CONUS installations.

TRADOC selected Fort Gordon to determine if the Fort Ord concept of consolidation would apply to an installation with a different type mission. Fort Gordon is a service school installation and has few TOE units. TRADOC approved the Fort Gordon test for one year from 1 July 1974 to 1 July 1975.[33]

On 19 March 1975, the TRADOC Commander in a message to subordinate commands authorized and encouraged installation commanders to consolidate maintenance support for NON-TOE

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[32]Memorandum by John J. Robotti, DAC, Chief of the Maintenance Division, Fort Ord, California, 26 August 1974.

[33]Statement by LTC James Brewer, Fort Gordon Installation Maintenance officer, personal telephone interview, February 28, 1975.

activities, if a local study would indicate a savings. The message stated that the first two quarterly reports of the Fort Gordon Test indicated a potential savings and efficiencies to include:

a. Manpower savings.

b. Dollar savings for utilities.

c. Dollar savings for equipment.

d. Dollar savings for personnel.

e. Dollar savings for maintenance costs.

The message also stated that DA regulatory changes would eventually be made when the Fort Gordon Test has been completed and the changes are approved by DA and sent to the field for implementation.[34]

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[34]TRADOC TWX Message, "Consolidation of NON-TOE Activities at TRADOC Installations," 19 March 1975.

CHAPTER III

RESEARCH METHODOLOGY

METHODS OF RESEARCH

Historical

The Historical Method was used to a limited degree to study documents and past writing on the subject of organization and management. Although the documentary data directly related to the CONUS installation maintenance structure is very limited, it was possible to trace the evolution of the maintenance structure since the last major reorganization of the Army in 1962-63. Eye-witness accounts and letters were particularly helpful in serving as a functional guide in analyzing current problems and conditions of the CONUS maintenance support structure.

Descriptive Survey

The Descriptive Survey was used for factfinding and gathering new knowledge about the research problem and to attempt to draw valid conclusions from the facts discovered. An opinion/attitude questionnaire was used to gather facts relating to the problem. In their book, Methods of Research, Carter V. Good and Douglas E. Scates assert, "Opinions and attitudes are facts, in so far as the responses are typical

of the individuals, but they are facts of opinion. They represent the learnings or attitudes of a person, whether right or wrong."[1]

METHODOLOGICAL ASSUMPTIONS

This study was conducted under four methodological assumptions. First, that attitudes/opinions are measurable. Second, that attitudes/opinions vary along a linear continuum. Third, that measurable attitudes/opinions are common to the group to be surveyed. Fourth, that attitudes/opinions are held by many people.

SAMPLING PROCEDURES

The attitude or opinion survey was selected as the research technique for gathering the descriptive data for this study. Sampling units were selected for both the questionnaire and the telephone interview. The sample population consists of Army officers and Department of the Army civilians with CONUS installation maintenance management expertise.

Type of Sample

The sample for the questionnaire administered to the officers at Fort Leavenworth was a purposive selection sample based on the criteria controls established by the author.

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[1]Carter V. Good and Douglas E. Scates, Methods for Research (New York: Appleton-Century-Crofts, Inc., 1964), p. 613.

The criteria was an expertise in CONUS installation maintenance management. The sample used for the telephone interview was also a purposive selection sample since only CONUS installation maintenance officers or maintenance division chiefs were selected for interview.

Methods of Selecting Subjects

Questionnaire: The subjects were selected in two ways. First, Project "SAFE," which is an automated information storage and retrieval system, was used to identify personnel in the Fort Leavenworth community who had an expertise in CONUS installation maintenance management. Secondly, the author reviewed ST 600-1, Faculty-Student Data Book, Regular Course 1974/75, for additional officers with expertise in CONUS installation maintenance management.

Telephone Interview: The subjects to be interviewed were selected according to the scope of the maintenance missions performed at the installations. AR 750-7, Installation Support Maintenance Activities, was used to identify CONUS installations that have DA authorized primary equipment maintenance missions for automotive equipment, combat vehicles, and general equipment. The names of the maintenance officers or maintenance division chiefs for each of the selected installations were identified by telephone contact by the author with the installations.

Sample Size

Questionnaire: The total population that met the sample criteria was surveyed--66 officers at Fort Leavenworth

Telephone Interview: 30 CONUS installations were selected and the incumbent installation maintenance officers or maintenance division chiefs were interviewed.

RESEARCH TECHNIQUES

Research Instruments

The research instruments used for this study were formulated using the attitude scale method generally associated with the work of Rensis Likert. Likert's method is an application to attitude scaling of the item-analysis borrowed from test-construction techniques.[2] The questionnaire and interview instruments were constructed as described on page 8 of chapter one. A copy of the questionnaire is included as Appendix A to this study.

The independent variables listed on page six of this study and the continuum model (Figure 3) were developed in consonance with the conceptual model of the contingency views formulated by Kast and Rosenzweig in their book, Contingency Views of Organization and Management[3] and the situational variables (factors) proposed by Howard M. Carlisle in his article, A Contingency Approach to Decentralization.[4] According to Carlisle:

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[2]M. H. Remmers, Introduction to Opinion and Attitude Measurement (New York: Harper and Brothers, 1955), pp. 94-95.

[3]Fremont E. Kast and James E. Rosenzweig, Contingency Views of Organization and Management (Chicago: Science Research Associates, Inc., 1974), pp. 315-18.

[4]Howard M. Carlisle, "A Contingency Approach to Decentralization," Advanced Management Journal, 29:3, July 1974, p. 15.

Independent Variables (Contingency Factors)	Continuum of Structural Concepts CENTRALIZATION	DECENTRALIZATION
1. Basic purpose and goals.	Single, Clear-cut.	Multiple, complex.
2. Knowledge and skill of supervisors.	Top managers more knowledgeable than lower level managers.	Knowledge and skill at lower levels of management.
3. Skill, knowledge, and attitudes of subordinates.	Lack of trained and knowledgeable subordinates committed to the goals of the organization.	Trained and knowledgeable subordinates committed to the goals of the organization.
4. Scale and size of structure.	Within capabilities of single manager to make major decisions.	Large organization must delegate to function.
5. Technology of tasks.	Routine, repetitive tasks.	Specialized and sophisticated tasks.
6. Geographical dispersion of structure.	Close proximity - local.	Widely scattered - remote.
7. Acceptance and motivation of subordinates.	Subordinates acceptance not significant.	Acceptance of subordinates is important.
8. Status of planning and control system.	Few goals or planning guidelines.	Clear-cut goals and procedures.
9. Status of information system.	Real-time electronic data processing.	Most current and accurate information at lower levels.
10. Degree of conformity and coordination required.	Conformity and coordination required in tasks and operations.	Tasks that tend to be independent, e.g., selling.
11. Nature of organizations supported.	Fixed installation units and activities.	Deployed TOE units.
12. Time frame of decisions.	Routine, deliberate, and long range.	Capability for quick on-the-spot decisions.
13. Significance of decisions.	Significant impact decisions.	Minimal impact decisions.
14. Status of external factors (labor union & government).	Central points of contact.	Decentralized points of contact.

FIGURE 3. Contingency Theory Model.

> Contingency theory holds that organization structure is normally a dependent variable and other factors in the situation are independent variables. Accordingly, the assumption is that there are a number of conditions relative to an organization that determine whether centralization or decentralization will be effective in any particular circumstance.

The research instruments used in this study were designed by the author based on the continuum model, Contingency Theory Model (Figure 3, page 37). They were designed to measure the opinions/attitudes of professional maintenance managers toward the independent variables and structural alternatives in relation to the concept of centralization. The variables and alternatives were represented in the questionnaire and interviews by item statements and were analyzed by the sample groups based on their knowledge and expertise in CONUS installation maintenance management and the present organizational structural.

Data Collection

The procedures for collection of data are outlined in Chapter I (pages 8- 11). However, in summary, the data was collected by the following process.

The questionnaires were distributed and the sample subjects returned their responses through CGSC distribution channels back to the author. To maximize accurate and honest response, anonymity of respondents was assured and stated in the cover letter. For the telephone interviews, each respondent was contacted by phone and asked to respond to the

structural alternative item statements (15-20) as listed in the questionnaire. Their responses were recorded by the author (interviewer) and the responses processed in the same manner as the questionnaire.

Statistical Techniques

The statistical techniques for presenting and describing the data gathered by this study involved the measures of central tendency: the mean, median, and the mode. These three averages are shown in Tables D-1, D-2, and D-3 of Appendix D.

To measure the relative tendency of weighted value scores to cluster closely about the mean score or scatter out from the mean score, grouped frequency distribution was used. This method illustrates to the reader the variance in distribution of scores. The distribution is shown in Tables C-1, C-2, and C-3 of Appendix C.

Analytical Model

The general features of the analytical design used for this study are depicted in the graphic model in Figure 4.

VARIABLES

INDEPENDENT VARIABLES SURVEY ITEMS 1-14	STRUCTURAL ALTERNATIVES SURVEY ITEMS 15-20
STEPS IN ANALYSES	
1. Determine item statement scores for each respondent. 2. Determine cumulative weighted scores on each variable for all respondents. 3. Determine the mean average and supportively the median, the mode, and the frequency distribution of each variable. 4. Determine the index position of the sample group with respect to the rating scale for each of the variables. 5. Determine the central tendency (average) opinion/attitude rating for the sample group for each of the variables.	

FIGURE 4. Analytical Model of Analyses

CHAPTER IV

ANALYSES AND RESULTS

PROCESSING THE DATA

The information and tables included in this chapter and appendices A through D reflect the study sample groups' responses to the independent variables (contingency factors) and the structural alternatives as listed in questionnaire item statements 1 through 20. For reference, see Appendix A. The Questionnaire Survey.

The rating scale scores indicate the opinion/attitude of the sample groups. The questionnaire and telephone interview raw response data is contained in Appendix B, Master Data Sheet. Direct correlation of the weighted value scores contained in Appendix C, Weighted Value Scores - Grouped Frequency Distribution - The Questionnaire Survey and The Telephone Interviews with the questionnaire item statements is not possible unless the questionnaire scoring design is applied to the raw response data.

For clarification of this process, an example of the manipulation of the raw data obtained from the research instruments into an opinion/attitude rating for the sample groups is explained in the following paragraphs.

Scoring Example

Item Statement	Response Categories
1. At CONUS installations, the basic purpose and mission of the maintenance support structure are clear-cut and well defined by regulation.	1 (2) 3 4 5 6

Item statement - 1 was constructed by the author to represent a condition concerning independent variable - 1 as listed on page 6 - Basic purpose and goals of the structure. This statement was written to favor the centralization end of the centralization to decentralization continuum (see continuum on page 37 - Contingency Theory Model). Assuming the respondent indicates "agree" by circling response category 2 as shown by the example above, the weighted value score would be determined by applying the weighted value scale to the response category. In this case:

	Response Categories					
	1	[2]	3	4	5	6
Weighted Value Scale	6	[5]	4	3	2	1

The weighted value score for this respondent for item statement 1 is 5. It must be emphasized that the highest value (6) is always assigned to the favorable end of the continuum. If the item statement had been written to be unfavorable to centralization, the weighted values would have been reversed and a response of 2 or "agree" would produce a weighted value score of 2. Weighted value scores are necessary to normalize the data for cumulative summation and statistical calculations.

After the weighted value scores have been determined for item statement 1 for all respondents, the total score is calculated and the central tendency (average) for the sample group is determined. The central tendency score is then applied to the scale index points to determine the sample group's central tendency opinion/attitude rating for the item statement. In this example, assuming that all respondents selected response category 2, the central tendency (average) weighted value score would be 5 and the rating for the group would be determined as follows:

Degree of agreement of the sample group for centralization as the appropriate structural concept for CONUS installation maintenance support organizations.		Average Weighted Score
(SA)	Strongly Agree	6
(A)	Agree ◀	(5)
(MA)	Mildly Agree	4
(MD)	Mildly Disagree	3
(D)	Disagree	2
(SD)	Strongly Disagree	1

The rating for item statement 1--At CONUS installations the basic purpose and mission of the maintenance support structure are clear-cut and well defined by regulation--would be (A) Agree which would indicate that the sample group favors centralization in relation to the condition presented in the item statement.

A numerical listing of all the item statements and their (F) Favorable or (U) Unfavorable relation to centralization on the centralization to decentralization continuum including the appropriate weighted value scale is provided below:

Item Statements	Relationship to Centralization	Weighted Value Scale
1	F	6 5 4 3 2 1
2	U	1 2 3 4 5 6
3	U	1 2 3 4 5 6
4	F	6 5 4 3 2 1
5	F	6 5 4 3 2 1
6	U	1 2 3 4 5 6
7	U	1 2 3 4 5 6
8	F	6 5 4 3 2 1
9	F	6 5 4 3 2 1
10	F	6 5 4 3 2 1
11	U	1 2 3 4 5 6
12	U	1 2 3 4 5 6
13	U	1 2 3 4 5 6
14	F	6 5 4 3 2 1
15	F	6 5 4 3 2 1
16	F	6 5 4 3 2 1
17	F	6 5 4 3 2 1
18	F	6 5 4 3 2 1
19	F	6 5 4 3 2 1
20	U	1 2 3 4 5 6

Scale Scores: Questionnaire Survey

66 questionnaires were distributed to the sample group. 62 of the questionnaires were completed and returned for a 94 percent response.

The raw data from the questionnaire is included as an appendix to this study (Appendix B - Master Data Sheet). The weighted value scale was applied to the raw data and through statistical manipulation as previously described in the scoring example, opinion/attitude ratings were determined. The frequency distribution of weighted scores in relation to each of the response categories is shown in Table C-1 and C-2 of Appendix C. The averages, the mean, median, and mode are listed for each of the independent variables and structural alternatives in Tables D-1 and D-2 of Appendix D.

Scale Scores: Telephone Interviews

30 Installation Maintenance Officers were interviewed. Only the structural alternatives (item statements 15 through 20) were used for the interviews. The raw data from the interviews is included in Appendix B. The data was manipulated in the same manner as the questionnaire and the frequency distribution of weighted scores is shown in Table C-3 of Appendix C. The averages are listed in Table D-3 of Appendix D.

Quantitative Data

The quantitative data from the research instruments, the questionnaire survey and telephone interviews, is presented in Tables 1, 2, and 3. The central tendency opinion/attitude rating of the sample groups is shown for each of the independent variables and structural alternatives in relation to the concept of centralization. It is the composite interrelationship of the variables (factors) and alternatives that determine

the need for a particular organizational concept.

Table 1 shows the questionnaire sample group's central tendency opinion/attitude concerning centralization as the appropriate structural concept for CONUS installation maintenance organizations. Each of the independent variables selected for evaluation is listed in column one of the table. Column two shows the favorable or unfavorable reaction of the group based on their analysis and response to the questionnaire item statements representing each of the variables. Column three indicates the degree of agreement or disagreement.

The questionnaire sample group rated all variables as favoring centralization except numbers 7, 8, and 11. In selecting centralization as the appropriate structural concept for CONUS installation maintenance organizations, the variables which were rated as unfavorable to centralization must be considered for trade-off impact. The variables rated as unfavorable will be discussed later in this chapter in answering the research questions.

Table 2 shows the questionnaire sample group's central tendency opinion/attitude concerning the structural alternatives selected by the author for evaluation. Each of the alternatives was constructed to offer the respondents a varying degree of centralization for the CONUS installation maintenance support structure. Column one of Table 2 lists the structural alternatives The numerical listing (15 through 20) corresponds to the manner they were listed in the questionnaire. Column two shows the favorable or unfavorable reaction

TABLE 1

QUESTIONNAIRE SAMPLE GROUP'S CENTRAL TENDENCY OPINION/ATTITUDE FOR CENTRALIZATION OF THE CONUS INSTALLATION MAINTENANCE SUPPORT STRUCTURE

Independent Variables (Contingency Factors)	Sample Group's Opinion/Attitude of Centralization	Degree of Rating
1. Basic purpose and goals.	Favorable	Mildly Agree
2. Knowledge and skill of supervisors.	Favorable	Mildly Agree
3. Skill, knowledge and attitude of subordinates.	Favorable	Mildly Agree
4. Scale and size of the structure.	Favorable	Mildly Agree
5. Technology of tasks.	Favorable	Mildly Agree
6. Geographical dispersion of the structure.	Favorable	Mildly Agree
7. Acceptance and motivation of subordinates.	Unfavorable	Mildly Disagree
8. Status of planning and control system.	Unfavorable	Mildly Disagree
9. Status of information system.	Favorable	Mildly Agree
10. Degree of conformity and coordination required.	Favorable	Agree
11. Nature of organizations supported.	Unfavorable	Disagree
12. Time frame of decisions.	Favorable	Mildly Agree
13. Significance of decisions.	Favorable	Mildly Agree
14. Status of external factors (labor union and government).	Favorable	Agree

TABLE 2

QUESTIONNAIRE SAMPLE GROUP'S CENTRAL TENDENCY OPINION/ ATTITUDE CONCERNING THE STRUCTURAL ALTERNATIVES FOR CENTRALIZATION OF THE CONUS INSTALLATION MAINTENANCE SUPPORT STRUCTURE

	Structural Alternatives	Sample Group's Opinion/Attitude for Centralization	Degree of Rating
15.	All NON-TOE maintenance including the categories of; organizational, direct, and general support should be consolidated and centralized under a single manager at installation level in CONUS.	Favorable	Mildly Agree
16.	Also, all TOE maintenance including the categories of; organizational, direct, and general support should be consolidated with the NON-TOE support and centralized under the installation maintenance manager.	Unfavorable	Disagree
17.	All TOE and NON-TOE maintenance, except the organizational maintenance elements of deployable TOE units, should be consolidated and centralized under a single manager at installation level in CONUS.	Unfavorable	Disagree
18.	Direct and organizational maintenance TOE manpower spaces in deployable units stationed at CONUS installations should be vacant and only authorized for fill as an augmentation during mobilization for deployment.	Unfavorable	Strongly Disagree

TABLE 1

QUESTIONNAIRE SAMPLE GROUP'S CENTRAL TENDENCY OPINION/ATTITUDE FOR CENTRALIZATION OF THE CONUS INSTALLATION MAINTENANCE SUPPORT STRUCTURE

Independent Variables (Contingency Factors)	Sample Group's Opinion/Attitude of Centralization	Degree of Rating
1. Basic purpose and goals.	Favorable	Mildly Agree
2. Knowledge and skill of supervisors.	Favorable	Mildly Agree
3. Skill, knowledge and attitude of subordinates.	Favorable	Mildly Agree
4. Scale and size of the structure.	Favorable	Mildly Agree
5. Technology of tasks.	Favorable	Mildly Agree
6. Geographical dispersion of the structure.	Favorable	Mildly Agree
7. Acceptance and motivation of subordinates.	Unfavorable	Mildly Disagree
8. Status of planning and control system.	Unfavorable	Mildly Disagree
9. Status of information system.	Favorable	Mildly Agree
10. Degree of conformity and coordination required.	Favorable	Agree
11. Nature of organizations supported.	Unfavorable	Disagree
12. Time frame of decisions.	Favorable	Mildly Agree
13. Significance of decisions.	Favorable	Mildly Agree
14. Status of external factors (labor union and government).	Favorable	Agree

TABLE 2

QUESTIONNAIRE SAMPLE GROUP'S CENTRAL TENDENCY OPINION/ ATTITUDE CONCERNING THE STRUCTURAL ALTERNATIVES FOR CENTRALIZATION OF THE CONUS INSTALLATION MAINTENANCE SUPPORT STRUCTURE

	Structural Alternatives	Sample Group's Opinion/Attitude for Centralization	Degree of Rating
15.	All NON-TOE maintenance including the categories of; organizational, direct, and general support should be consolidated and centralized under a single manager at installation level in CONUS.	Favorable	Mildly Agree
16.	Also, all TOE maintenance including the categories of; organizational, direct, and general support should be consolidated with the NON-TOE support and centralized under the installation maintenance manager.	Unfavorable	Disagree
17.	All TOE and NON-TOE maintenance, except the organizational maintenance elements of deployable TOE units, should be consolidated and centralized under a single manager at installation level in CONUS.	Unfavorable	Disagree
18.	Direct and organizational maintenance TOE manpower spaces in deployable units stationed at CONUS installations should be vacant and only authorized for fill as an augmentation during mobilization for deployment.	Unfavorable	Strongly Disagree

TABLE 2 (Cont'd)

19.	An augmentation of maintenance personnel to meet deployment requirements could be established by designating manpower spaces in the installation TDA consolidated activity as civil service/mobilization designee positions and requiring the incumbent to maintain this dual status as a condition of employment.	Unfavorable	Disagree
20.	The present CONUS installation maintenance support structure is suitable and adequate to meet maintenance requirements.	Neutral	Neutral

of the sample group to the alternatives. Column 3 indicates the degree of agreement or disagreement.

The same group responded with a favorable opinion/ attitude to the proposal of centralization for NON-TOE activities. However, centralization for TOE units in any form was not favored. Item statement 20 was constructed to measure the status quo. The central tendency of the group for the status quo was rated as neutral. The sample group responded to this alternative with a wide variance of opinion. The frequency distribution table, Table C-2 in Appendix C, shows that the responses ranged from strongly agree to strongly disagree. This would suggest that at least fifty percent of the respondents are discontented with the status quo.

The results shown in Table 2 clearly illustrate the traditional belief in decentralization as the "one best way" for TOE units. For a majority of experienced maintenance officers, any proposal for centralization can be expected to meet strong resistance to change unless the concept is convincingly field tested and sold to the maintenance managers and the supported units.

Table 3 shows the telephone interview sample group's central tendency opinion/attitude for the same structural alternatives evaluated by the questionnaire sample group in Table 2. Although the reaction was essentially the same, there were some significant variations between the two groups.

TABLE 3

TELEPHONE INTERVIEW SAMPLE GROUP'S CENTRAL TENDENCY OPINION/ATTITUDE CONCERNING THE STRUCTURAL ALTERNATIVES FOR CENTRALIZATION OF THE CONUS INSTALLATION MAINTENANCE SUPPORT STRUCTURE

Structural Alternatives	Sample Group's Opinion/Attitude For Centralization	Degree of Rating
15. All NON-TOE maintenance including the categories of: organizational, direct, and general support should be consolidated and centralized under a single manager at installation level in CONUS.	Favorable	Strongly Agree
16. Also, all TOE maintenance including the categories of: organizational, direct, and general support should be consolidated with the NON-TOE support and centralized under the installation maintenance manager.	Unfavorable	Strongly Disagree
17. All TOE and NON-TOE maintenance, except the organizational maintenance elements of deployable TOE units, should be consolidated and centralized under a single manager at installation level in CONUS.	Unfavorable	Mildly Disagree
18. Direct and organizational maintenance TOE manpower spaces in deployable units stationed at CONUS installations should be vacant and only authorized for fill as an augmentation during mobilization for deployment.	Unfavorable	Strongly Disagree

Table 3 (Cont'd)

19. An augmentation of maintenance personnel to meet deployment requirements could be established by designating manpower spaces in the installation TDA consolidated activity as civil service/mobilization designee positions and requiring the incumbent to maintain this dual status as a condition of employment.	Favorable	Mildly Agree
20. The present CONUS installation maintenance support structure is suitable and adequate to meet maintenance requirements.	Unfavorable	Mildly Disagree

The CONUS installation maintenance officers were strongly in favor of consolidation and centralization for NON-TOE activities. On the other hand, they were strongly in disagreement with any proposed change in decentralized structuring of TOE units. This is indicated by their strong unfavorable response to item statements 16 and 18. However, their reaction to item statement 19 indicated a potential trade-off to their previous hard stand against centralization. This response suggests that if a satisfactory augmentation could be devised for deployable TOE units, centralization of support might be feasible for these units while stationed at CONUS installations. Discussion of this alternative during the interviews provoked many comments by the respondents concerning the lack of consistency between the two support systems, TOE and TDA, on CONUS installations. The managers voiced a need for a single control and integration of the two systems. Their dissatisfaction is indicated by their response to structural alternative 20, the present structure is not suitable and adequate to meet the needs of the installations.

FINDINGS AND CONCLUSIONS RELATED TO THE RESEARCH QUESTIONS

Research Question 1

Should the maintenance categories of organizational, direct, and general support for NON-TOE activities be consolidated and centralized under a single manager at

installations in CONUS?

Findings. The historical data gathered during this study gives strong support to consolidation and centralization for NON-TOE activities. The Test Consolidation at Fort Ord gives field tested evidence of the advantages of this concept. The approval of the test results by The Army Audit Agency, TRADOC, and Department of the Army leaves little opposition to implementation of the concept at other installations. If the followup test at Fort Gordon is a success, regulations will be changed to standardize all installations to the concept. In fact, during the study interviews with Department of the Army and Logistic Evaluation Agency (LEA) personnel, the author was told that the regulations were already being revised to include the single manager concept.

For this study, Research Question 1 was posed for evaluation by the survey sample groups as a structural alternative (item statement 15) in the questionnaire and telephone surveys. The questionnaire sample group's opinion/attitude toward this proposal was rated as (MA) Mildly Agree. This indicated a favorable response to consolidation and centralization of NON-TOE activities. For this same alternative, the telephone interview sample group was rated as (SA) Strongly Agree, indicating an even more favorable response to the proposal.

Conclusions. Based on the results of this study, the answer to Research Question 1 is YES. The maintenance categories of organizational, direct, and general support for NON-TOE activities should be consolidated and centralized under a single manager at installations in CONUS.

Research Question 2

Should both NON-TOE and deployable TOE units be included in the consolidation and centralization?

Findings. This specific question was posed for evaluation as a structural alternative (item statement 16) in the questionnaire and the telephone survey. The questionnaire sample group's central tendency opinion/attitude for consolidation and centralization of maintenance support for TOE units was rated as (D) Disagree. The telephone interview sample group's opinion/attitude for centralization was rated as (SD) Strongly Disagree.

The overall reaction of the sample groups to the centralization of TOE unit maintenance support structural alternatives indicates the unfavorable response of the CONUS maintenance managers to the suggestion of the concept. They were all against it (See Tables 2 and 3, pages 48 and 51). Decentralization for TOE units in an environment otherwise suited for centralization was considered essential by the questionnaire sample group as indicated by their (D) Disagree

rating for centralization as related to the independent variable 11, Deployment status of supported units. The questionnaire item statement representing this variable clearly identified a duplication of maintenance capability and yet, 54 of the 62 questionnaire respondents registered a disagree response for centralization with 20 of those indicating (SD) Strongly Disagree.

Another indication of the split opinion concerning support of TOE and NON-TOE units was the questionnaire and telephone interview results to Research Question 1. The sample groups support consolidation and centralization for NON-TOE activities, but as discussed above, they equally or more strongly support decentralization for TOE units as shown by their responses to item statements 16 through 19 in Tables 2 and 3, pages 48 and 51.

The desire of the military maintenance managers to continue to have decentralized support for TOE units is understandable under the current Army concepts and policies. Army Regulations as cited in Chapter II of this study, encourage and require decentralized organizations. The tradition and custom of decentralization dates back to the time the concept was formulated as military doctrine by Napoleon for the French revolutionary armies as discussed on Page 16 of this study. The sample subjects surveyed during this study were trained to believe and most obviously did believe strongly that decentralization is the best way and in

some cases the only way to organize TOE combat units.

The cautious favorable reaction by the telephone interview sample group of CONUS maintenance managers to the structural alternative (item statement 19) which suggested an augmentation for deployment of TOE units, was the first indication to the author that a trade-off might be possible. The alternative offered an option for a ready augmentation to meet deployment requirements for organizational maintenance elements for TOE units. This was evidence of the deployment requirement being the primary obstacle to centralized maintenance support for TOE units while stationed at CONUS installations.

Another possible step in the trend to centralization dealt directly with the organization of TOE units. The Fort Knox Simplification Study which was discussed on page 25 of this study recommended a semi-centralized maintenance support structure for combat battalions. With the adoption of such a concept, the door would be open to restructuring the entire support structure to a less rigid framework and more oriented to using what works best.

The possibility of an augmentation or attachment of maintenance support elements to the Army in the Field combat structure indicates that new support concepts could be developed for the benefit of both TOE and NON-TOE activities. Mutual support and interface between the two concepts--Army in the Field and CONUS Installation Support Structures--would

lead to a more efficient and effective structure for both.

Conclusions. Based on the results of this study, the answer to Research Question 2 is NO. Deployable TOE units should not be included in the consolidation and centralization of maintenance support at CONUS installations. The possibility of a trade-off to meet the deployment requirements of TOE units and remove the primary objection to centralization is discussed in the study recommendations in Chapter V.

Research Question 3

Is the Army Maintenance Structure (echeloned by degree of complexity) applicable to the peacetime environment of a CONUS installation?

Findings. This question was posed for evaluation in two ways. First, the questionnaire sample group was surveyed for their opinion/attitude relating to the fourteen independent variables (contingency factors). The results are shown in Table 1, page 47 of this chapter. All the independent variables were rated for centralization except the following:

Independent Variable 7.

The degree to which subordinates will accept and are motivated by the structure.

The questionnaire sample group's central tendency opinion/attitude for centralization concerning this variable was rated as (MD) Mildly Disagree (Table 1).

Concerning this variable, Howard Carlisle, in his article "A Contingency Approach to Decentralization," asserted:

> Letting subordinates be included in or actually making decisions has been recognized as an important means of gaining their acceptance of decisions. When acceptance is extremely important, such as the case where subordinates must implement the decision, there is a great need to delegate authority (decentralize). In those decisions where subordinate acceptance is not significant, decisionmaking can be more centralized.[1]

Independent Variable 8.

The status of the structure's planning and control system.

The questionnaire sample group's central tendency opinion/attitude for centralization concerning this variable was rated as (MD) Mildly Disagree (Table 1).

Concerning this variable, Carlisle says:

> If decisionmaking is more structured because of existing procedures (standing plans) in relation to an issue, or if clear cut goals and objectives exist, the supervisor is more willing to let others make decisions (decentralize) because he can predict with a greater certainty how they will be made. However, if few goals or planning guidelines exist in relation to the decision area, there is more risk in delegating this authority.[2]

Independent Variable 11.

The deployment status of supported units.

The questionnaire sample group's central tendency

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[1]Howard M. Carlisle, "A Contingency Approach to Decentralization," Advanced Management Journal, 29:3, July, 1974, p. 17.

[2]Carlisle, p. 17.

opinion/attitude for centralization concerning this variable was rated as (D) Disagree (Table 1).

FM 38-1, Logistics Management, discusses this variable as follows:

> The management of Army operations in a peacetime environment can often involve practices that are difficult to sustain when combat operations must be supported. Consequently, management decisions that could be optimal for peacetime may be often modified by consideration of combat prospects. For example, the use of highly skilled civilian maintenance personnel may be limited, and the mobility of maintenance units must always be an important consideration.[3]

In attempting to determine whether an organizational structure should be centralized or decentralized, the status and significance of the independent variables must be evaluated. All 14 variables will not always reflect conditions that call for the same structural concept. Any structural decision can only be made after a comprehensive evaluation. Variables 7 and 8 represent trade-offs that must be made with the selection of centralization as the structural concept. However, since no organization is completely centralized or decentralized, the trade-off impact of these two variables should be minimal.

The study sample group's evaluation of the Independent variables clearly establish variable 11, Deployment status of supported units, as the controlling situational factor in this study and one which resists trade-off consideration.

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[3]Department of the Army, Logistics Management, FM 38-1 (March 1973), p. 11-6.

Therefore, the deployment status of TOE units on a CONUS installation dictate a concept of decentralization in an environment otherwise suited to centralization.

The second method of evaluating Research Question 3 was by posing a status quo item statement in the questionnaire survey for response by the questionnaire sample group and the telephone interview smaple group. The central tendency opinion/attitude of the questionnaire sample group (Table 2) for the status quo (decentralization) was judged as neutral. The rating for the telephone interview sample group (Table 3) for the status quo was (MD) Mildly Disagree.

Conclusions. Based on the results of this study, the answer to Research Question 3 is NO. The Army Maintenance Structure (echeloned by degree of complexity) is not applicable to the peacetime environment of a CONUS installation.

The collected data, both descriptive and historical support the concept of centralization as the currently favored CONUS installation maintenance support concept. This contradicts AR 10-10, Organization and Functions, Class I Installation Organization, that prescribes decentralization as the "one best way" concept for accomplishing logistics functions.[4]

The decentralized organization of deployable TOE units is recognized as an exception because those units are

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[4]Department of the Army, Organization and Functions, Class I Installation Organization, AR 10-10 (May 1970), p. B-2.

elements of the Army in the Field Maintenance Structure which must be mobile to operate in a combat environment. This gives deployable TOE units the status of "fish out of water" while stationed at CONUS installations. The organization of TOE units becomes the exception to the rule--not the rule as far as CONUS installation maintenance activities are concerned.

Research Question 4

Can a model be devised for structuring installation maintenance support organizations in CONUS?

Findings. Based on the clear-cut opinion of the sample groups, it would seem that a model should be devised embracing both structural concepts--centralization for NON-TOE activities and decentralization for deployable TOE units stationed at CONUS installations. However, to assume a halt in the trend to centralization of maintenance support for all types of units to include TOE units would not be realistic at this time. There is a growing trend in management and organization thinking to the concept of centralization.

The Test consolidations at Fort Ord and Fort Gordon as discussed on pages 27-32 of Chapter II, have started a flood of interest in consolidation and centralization of NON-TOE activities at CONUS installations. For example, the telephone interview respondents at the installations generally knew of the tests and gave a strong endorsement to the concept (structural alternative 15 - Table 3, page 51).

On the other hand, let there be no mistake, the survey results of this study indicate strong resistance to any consolidation or centralization for TOE units. This was rather forcefully shown by the responses to the structural alternatives (Tables 2 and 3, pages 48 and 51). One of the questionnaire respondents summed up the feelings of most of those in disagreement with any idea for centralization for TOE units as, "Totally unthinkable, could not provide quick response to contingencies."

Consideration of the "unthinkable" trend to consolidation and centralization for TOE units was addressed in the study titled, "The Armor Center Team Study on Army Maintenance System Simplification," which was conducted by the Armor Center Team Maintenance Simplification Committee in 1971-72. In discussing the most appropriate concept for organizational maintenance for TOE units, the study stated:

> After consideration of various organizational concepts, the committee proposed a semicentralized philosophy as the most effective approach, consistent with current problems and trends. This would retain a limited capability for the unit commander, giving him expertise and advice and some direct influence over maintenance, but relieving him of responsibility for significant quantities of equipment, tools, parts, and maintenance personnel. Those pooled at battalion level would perform all periodic services, and would provide habitual contact teams and reinforcing support to the companies.[5]

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[5] "The Armor Center Team Study on Army Maintenance System Simplification," U.S. Army Armor School (August 1972), p. 8.

If the trend to centralization continues, it follows that more pure maintenance elements could evolve as separate units. This would relieve the combat commander of the responsibility for training and supervising these elements and make it increasingly more feasible to provide this support as an augmentation or as a tailored combat service support unit or TDA activity attached or in direct support of combat units.

Conclusions. In answer to the previous research questions, centralization has been rated as the appropriate structural concept for CONUS installation maintenance organizations. However, the structuring of TOE units was identified as an obstacle to the concept due to the requirement for rapid deployment and maintenance support by echelon in combat. Based on analysis of the findings by the author, the answer to Research Question 4 is YES, a conceptual model (Figure 5) can be devised for structuring installation maintenance support organizations in CONUS. With trade-off consideration for support of deployable TOE units, the model would encompass both TOE units and NON-TOE activities. The conceptual model for CONUS installations and a recommended concept for tactical maintenance support for TOE units which would interface with the CONUS model are discussed in the study recommendations in Chapter V.

CHAPTER V

RECOMMENDATIONS AND IMPLICATIONS FOR OTHER RESEARCH

RECOMMENDATIONS

The purpose of this study was to evaluate decentralized maintenance support against centralized maintenance support to determine the most efficient and effective organizational concept for structuring maintenance support at installations in CONUS. The findings and conclusions related to the research questions posed in Chapter I have established the concept of centralization as the appropriate organizational concept for CONUS installations. It was also concluded that the TOE units must retain a deployment capability for combat even while stationed at CONUS installations. This means the TOE units must retain their organic maintenance elements at operational readiness, which would cause duplication with the post capability, or an alternative method of support for TOE units must be found.

During the analysis by the author, trade-off consideration was focused on exploring alternatives that would provide adequate support for TOE units to meet all contingencies and at the same time optimize the CONUS installation

support structure. As a result, there were two major recommendations--a conceptual model for CONUS installation support structuring and a concept for tactical maintenance support for TOE units in combat.

Conceptual Model - CONUS Installation Maintenance Structure

The conceptual model for structuring CONUS installation maintenance support is shown in graphic form in Figure 5. The conceptual model shown in Figure 5 was devised based on the following considerations:

Organization: The internal organization of the installation TDA consolidated activity should be patterned after the activity at Fort Ord (Figure 2, page 29). Realizing that all installations have a different number and mix of supported units and activities, exact implementation of the conceptual model would vary in application based on requirements. The organization of supported NON-TOE activities would be uneffected and can be supported as currently structured with elimination of any organic organizational maintenance capability in the activities. The organization of TOE units must be altered for application of the conceptual model. Discussion of the suggested tactical maintenance concept for TOE units is included later in this chapter. The categories of maintenance listed in the model have been modified and the organizational maintenance repair, periodic services, and repair parts management functions integrated into the direct support category.

CAT. OF MAINT	TYPES OF SUPPORTED UNITS AND METHOD OF SUPPORT NON-TOE ACTIVITIES	TOE UNITS GARRISON DUTY	TOE UNITS FIELD TRAINING	TOE UNITS DEPLOYMENT
GS	POST Consolidated Maintenance Activity (CON-MAINT)	POST Consolidated Maintenance Activity (CON-MAINT)	LOCAL: POST CON-MAINT Activity OFF-POST: COSCOM GS Unit	COSCOM GS Unit
DS	EVAC: To Base Shop CON-MAINT Activity On Site: Contact Tm from CON-MAINT Activity	EVAC: To Base Shop CON-MAINT Activity On Site: Contact Tm from CON-MAINT Activity	Attached: TDA Maint Det from CON-MAINT to Bn sized units. On Site: Contact Tm from TDA Maint Detachment.	Attached: TOE Maint Det to each Bn sized unit. On Site: Contact Tm from TOE Maint Detachment.
USER	NO REPAIR CAPABILITY - OPERATOR AND CREW SERVICES ONLY			

FIGURE 5

CONCEPTUAL MODEL - CONUS INSTALLATION MAINTENANCE SUPPORT STRUCTURE

Personnel: Personnel to staff the CONUS installation maintenance support structure is a key consideration. Personnel requirements will differ from installation to installation depending on the size of the installation and the mix of supported units --TOE or NON-TOE. Figure 6 provides a schematic/to illustrate the following discussion of the personnel requirements for the model.

Under the centralized concept there would be three categories of maintenance as indicated in the schematic shown in Figure 6. The personnel requirements are as follows:

(1) GS: Civilian or Military.

(2) DS:

a. Posts with deployable units: Military or fulltime civilians with mobilization designee employment contracts (not to be confused with present reserve mobilization designee program).

b. Posts with no deployable units: Military or civilian.

(3) USER:

a. Deployable TOE units: Military (limited to coordination and liaison personnel--see discussion of tactical maintenance concept).

b. NON-TOE activities: No maintenance personnel.

Equipment: The installation TDA consolidated maintenance activity must be equipped with the most modern and

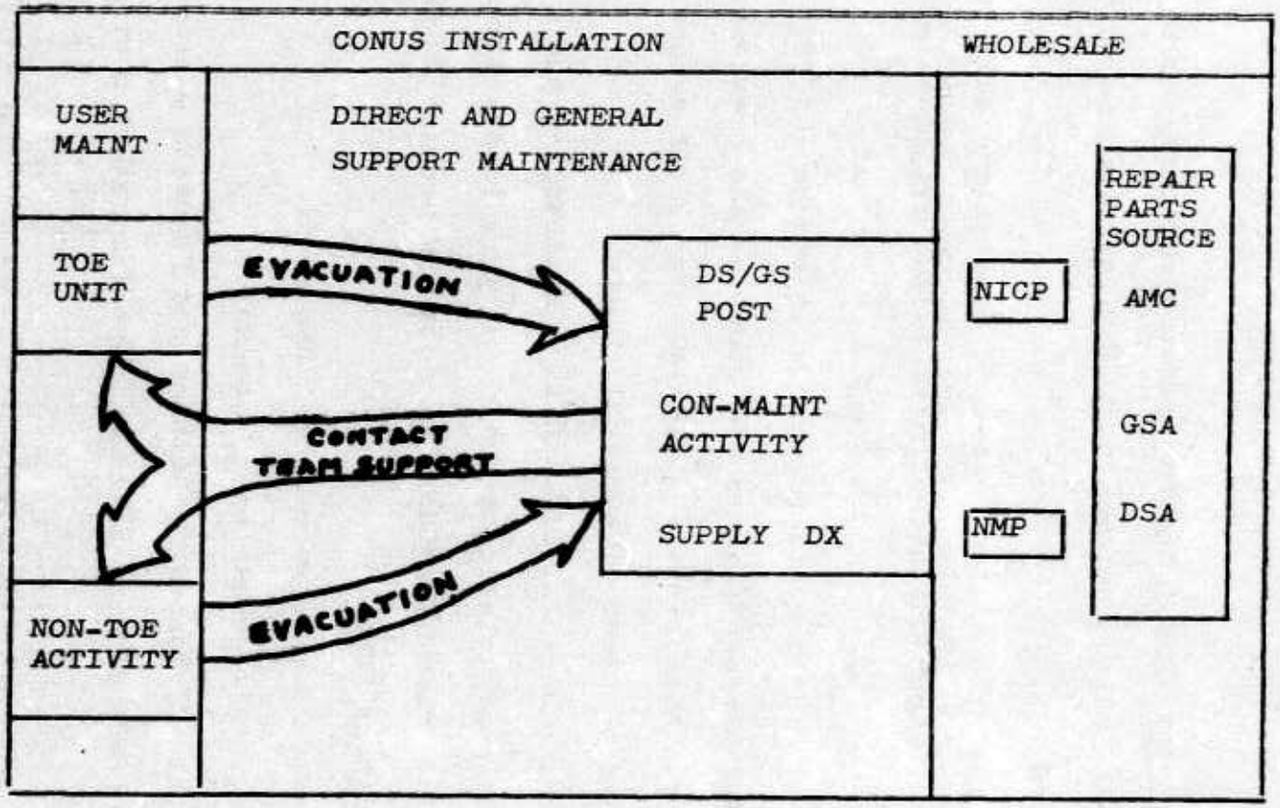

FIGURE 6

CONUS INSTALLATION MAINTENANCE SYSTEM

efficient equipment available. The equipment used by the contact teams must be the equipment authorized for the TOE detachments as proposed under the tactical maintenance concept.

Functions: The following general functions would be performed by the various elements of the installation maintenance structure.

(1) Installation consolidated maintenance activity.

a. Coordinate the installation maintenance effort.

b. Perform all support maintenance (DS/GS) except user maintenance (limited to operator and crew services).

c. Maintain all equipment historical records including those required of supported units.

d. Maintain DD 314 File (PM Schedule) and coordinate and perform all scheduled services (contact teams).

e. Maintain NORS/NORM data and prepare DA Form 2406, Materiel Readiness Reports.

f. All recovery operations.

g. All repair parts stockage.

h. DA Form 2407 Maintenance Requests - prepared by on-site contact team or initial inspection station at the TDA shop.

i. All calibration.

j. All Modification Work Orders.

k. EIR's - submitted by CON-MAINT activity to maintenance point.

(2) Contact Teams.

The contact teams will be organized as tailored organizations - drawing skills from the sections of the base shop tailored for the job to be done on site. Since the supported TOE unit will only have a coordinating and liaison maintenance capability, maximum use of on site maintenance must be emphasized. For installations with deployable TOE units, the direct support maintenance personnel in the TDA CON-MAINT activity must be military or deployable civilians to fill TDA maintenance detachments for attachment to units for extended field training or to fill the TOE maintenance detachments required for attachment to battalion sized units of a deploying division or other TOE units.

Training: One of the benefits of the centralization concept is the interface with the proposed tactical maintenance concept. The centralized installation support structure makes maximum use of resources and at the same time provides a training and manpower base for maintenance support of combat operations. This concept also relieves the combat and combat support commanders of much of their maintenance burden and allows them to concentrate on training for their primary mission--combat.

The Tactical Maintenance Concept

The tradition of decentralization was manifest in the opinions of the sample groups surveyed during this study. It was clear that the negative reaction to the suggestion of

centralized support for TOE units at CONUS installations was based primarily on respondent anxiety in the following areas:

(1) Loss of TOE unit organic maintenance personnel and immediate responsiveness of support.

(2) Concern that support by centralized civilian workforce would mean 8 AM to 4 PM weekday service.

(3) No support capability for extended field training.

(4) No ready support capability for deployment for CONUS based TOE units.

These concerns are legitimate shortcomings if you accept the fact that the Army in the Field must remain structurally decentralized to support combat operations, or if you consider centralization as synonymous with total civilianization.

In the findings and conclusions of this study it was suggested that perhaps there was a middle ground for peacetime and wartime maintenance structures to merge into an optimal mutual supporting concept for the benefit of both structures. The first question that comes to mind--is the current Army in the Field structure for maintenance suitable for today's battlefield? In the author's opinion, it is not. The formation of large semi-fixed support areas in the combat zone, such as the division support area, is ignoring the reality of the Soviet threat which should be the basis for U.S. Army force structuring. Dispersion is the current doctrine to reduce vulnerability of U.S. combat service

support units. However, in any training exercise, it is a simple process to predict where U.S. combat service support units would be located based on an analysis of the roadnet and terrian to the rear of the combat units. Because of the multiple echelones of support and the large number of units and troops, it would be relatively easy for the Soviets to destroy and disrupt these areas with their many area type weapons including artillery, rockets, missiles, airpower, and the potential Soviet nuclear and chemical capability which is presumed to be available and ready for use at any time.

The Soviet threat has been recognized, if not totally faced up to, in the training of combat troops and units. Service schools are taking a more direct approach to meeting the training needs of units that may face an equal or numerically superior Soviet force. Training reflects recognition of the danger of being detected or suspected on the battlefield. The combat units are emphasizing cover and concealment as necessary to survival. If you accept the philosophy that anything on the modern battlefield that can be seen can be killed or destroyed, the combat service support areas and their large concentrations of troops and equipment in the combat zone would be like shooting ducks on a pond.

The relative immobility and dispersion of combat service support units also make them highly vulnerable to enemy ground attack. Protection of large support areas

degrades the support mission and requires a large self-defense capability which adds even more troops and equipment to the area. Rapid movement of combat and combat support forces may result in unexpected separation between combat forces and their support. Faced with these circumstances, what are the alternatives? One alternative would be to move support areas further to the rear and increase the separation between the combat units and their support. Another alternative would be to hope for the best as we are now doing and sort it out when the flag goes up. Clearly neither of these alternatives is acceptable.

The author suggests that tactical considerations must play a more significant role in structuring combat service support for units in combat. Accordingly, it is recommended that a tactical maintenance support concept be adopted by the Army to provide close support and at the same time fit more realistically into the tactical pattern of mobility required for survival on today's battlefield.

The tactical maintenance concept would remove the area maintenance support function concentrated in the semi-fixed support areas, provide small unit dispersion, be 100 percent mobile, provide close support to the supported units, and minimize the danger of detection by the enemy. Under the recommended concept, the supported battalion or equivalent sized unit would be the pattern for maintenance support for the TOE combat units in the combat zone. Each battalion

would be supported by a TOE Direct Support (DS) Maintenance Detachment attached to the supported battalion, but not organic to the battalion. This detachment would function in a manner as described in the semi-centralized battalion maintenance platoon as proposed in the Fort Knox Simplification Study as discussed on pages 25 and 63 of this study. However, the detachment would perform a combination of the present organizational and direct support categories merged into a single category of direct support. The supported units would only have the coordinating and liaison maintenance personnel organic to the unit as proposed in the Fort Knox Study. To visualize the tactical maintenance concept a schematic is provided in Figure 7.

NOTES:

(1) DS Maintenance Detachment attached to each battalion sized element in the division support area.

(2) DS Maintenance Detachment attached to each battalion sized element in the brigade trains area.

(3) DS Maintenance Detachment attached to the supported tank battalion.

(4) DS Contact Team from the DS Maintenance Detachment in support of a tank company of the supported battalion.

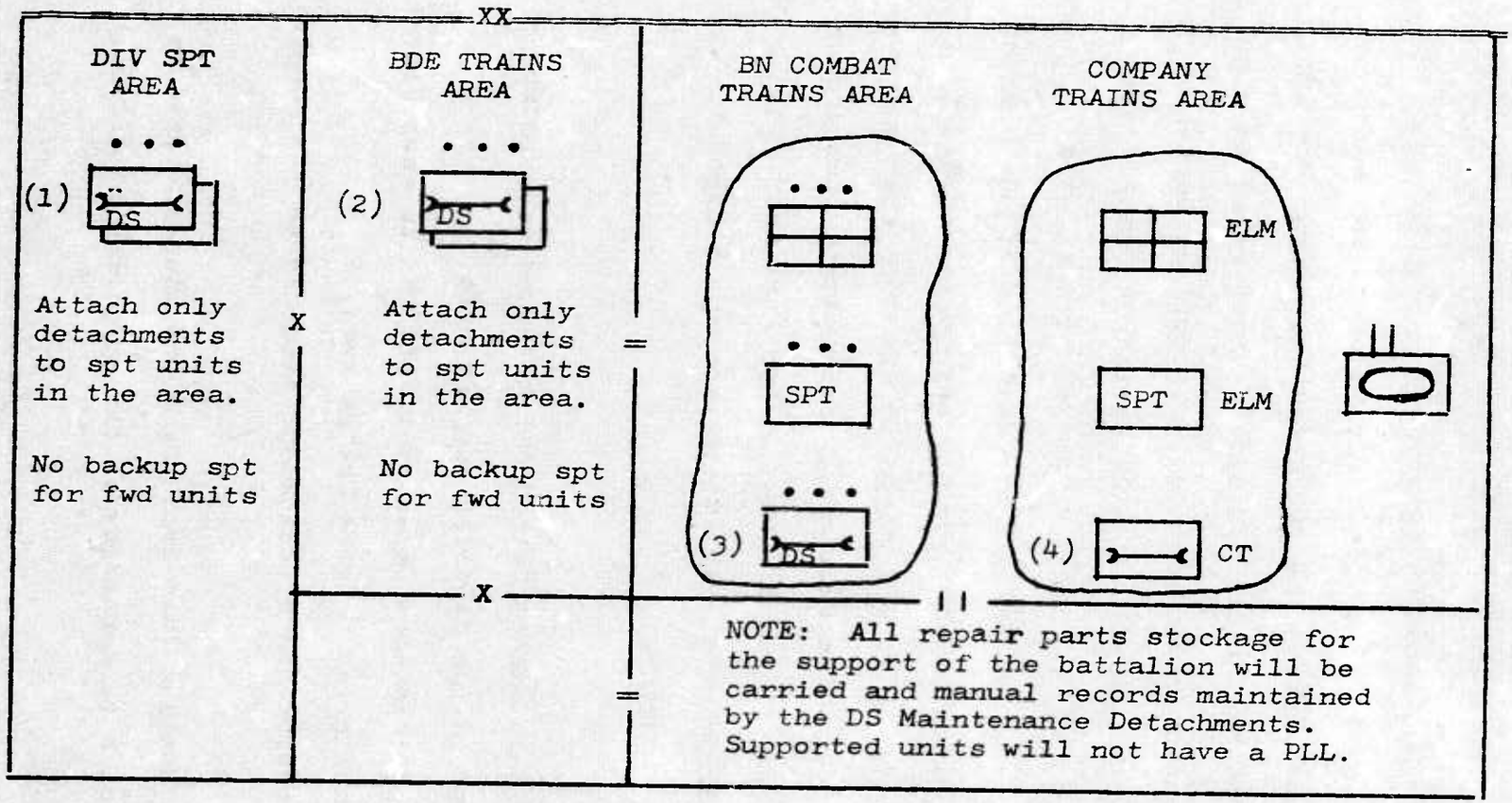

FIGURE 7

SCHEMATIC REPRESENTATION OF TACTICAL MAINTENANCE CONCEPT
DS MAINTENANCE DETACHMENTS IN SUPPORT OF AN ARMORED DIV

The Tactical Maintenance Detachments would interface with the Corps Support Command for repair parts supply, evacuation of unserviceables and closed loop items as shown in Figure 8.

The organizational structure, strength, and equipment for the Direct Support Detachments would be developed by a force development study. However, there would be several types of TOE detachments, each designed to support a given type battalion. By tailoring the detachments, they would be functionalized to support a limited mix of equipment and only carry the necessary manpower skills, tools, and repair parts to support the battalion. For mobility, the detachment vehicles must match the supported unit's vehicles, e.g., tracks for armored units. The detachment must be 100 percent mobile including repair parts and shop vans. Sufficient contact trucks must be in the detachment to perform on-site maintenance.

The detachment will evacuate all unserviceables and time consuming direct support work orders to the GS unit in the COSCOM. The closed loop system at GS will repair and return all repairable items, including those previously known as direct exchange, to the supply system.

The Detachment Commander, a captain or major will be responsible for total maintenance support of the battalion and will also act as the battalion maintenance officer on the battalion commander's staff. He will be the approving

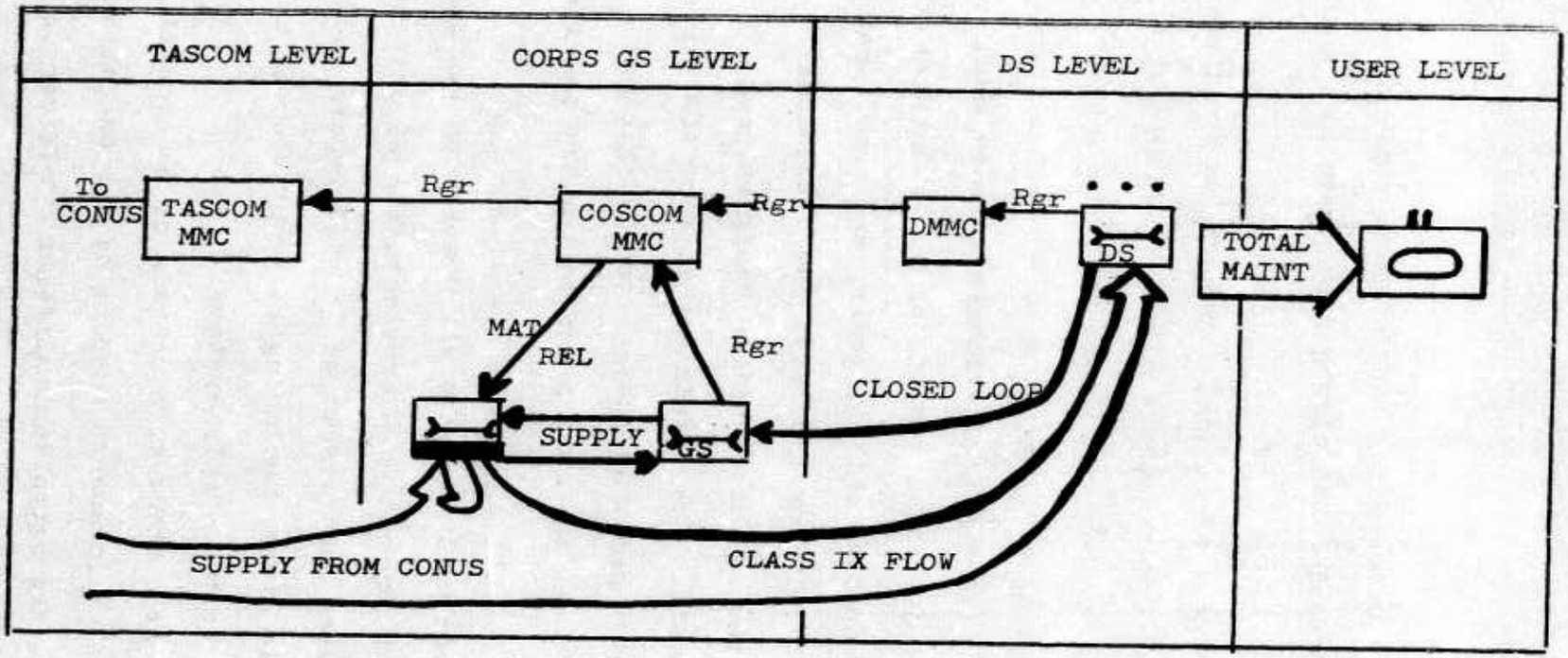

FIGURE 8

TASCOM AND COSCOM INTERFACE WITH THE TACTICAL MAINTENANCE CONCEPT

authority to stock the repair parts he desires and will be authorized to use cannibalization at his discretion. Repair parts management will be a manual system and the maintenance float will be maintained and issued at GS level as coordinated by the detachment commander.

In addition to the utility of the Tactical Maintenance Concept for the combat environment, the concept would also provide interface with the recommended conceptual model for CONUS installation maintenance support structuring. The CONUS installation's consolidated and centralized support structure as described on pages 66- 71 of this study would provide the manpower and training base for the tactical maintenance support structure for TOE units in combat. This inter-relationship would be maintained to realize the maximum efficiency for each of the concepts. In the author's opinion, implementation of these concepts would establish a base of mutual support between the CONUS and Army in the Field organizational environments.

IMPLICATIONS FOR OTHER RESEARCH

Some comments by this investigator are in order for anyone desiring to apply the findings of this study to future research. First, this study was largely perceptual in evaluating the research problem, however, the opinions and attitudes gathered were from those most qualified to comment--experienced and incumbent CONUS maintenance managers.

Secondly, this study was conducted during a very volatile period. The reorganization and realinement of the Army in July 1973 and the proliferation of new automated data systems and equipment had blurred the traditional concepts of materiel maintenance support. The CONUS installation maintenance management system was no exception. "Do more with less" was the watchword.

The contingency theory model used during this study was extremely helpful in evaluating centralization vs decentralization concepts in relation to the environment of the CONUS installation. Contemporary management scholars are beginning to use the theory as an analytical framework for the study of management concepts and practices. Past management studies have centered on the search for universal principles and concepts that could be used for all organization design. Relativism is the philosophy of this theory. Absolute principles and universal application are rejected in favor of "using what works." Application of the contingency theory allows the manager or analyst to determine which organizational concept is best in a given situation. The contingency theory, also known as the situational theory, makes the analyst aware of trade-offs involved when any specific concept is selected. The contingency methodology establishes a framework in which advantages and limitations of various management concepts can be related to conditions in the organization's environment.

The questionnaire used to gather data for this study was developed by the author and represents many hours of formulation and testing. The Likert scale used as the basis for the questionnaire was an effective method for measuring opinions and attitudes. However, caution must be taken in the construction of the item statements to offer the respondent a condition that he will clearly understand and that can be related to his experience.

The use of the scale for the telephone interviews was an unexpected bonus. The structural alternatives posed as item statements provided a consistent way to measure the interview responses. The telephone interviews were particularly useful because of the interaction between the interviewer and the respondents. The interviews were very time consuming and limited in the amount of information that could be covered, but it assures an accurate reflection of the attitudes that the researcher wants to measure.

Implications for future research include a recommendation that a force development study be made to determine the functional TOE for the Direct Support Detachments proposed by this study. Perhaps more than one type of detachment will be required to meet the specific needs of the supported battalions. For example, an armored battalion and a mechanized battalion would need a composite support detachment to provide support to the cross attachments that will result from task organizing for combat operations. Other combinations of

battalions would be suited to a common type tailored detachment. However, the need to keep the detachments small and highly mobile must limit wide ranged contingency loading of a single type detachment.

A field test of the Tactical Maintenance Concept would have to be conducted to validate the concept. This must be done prior to implementation of the CONUS installation concept for consolidation and centralization of support for TOE units. The test of the Tactical Maintenance Concept must consider the rather wide departure this concept takes from the traditional methods of maintenance support. From the results of this study it can be predicted that there would be resistance to the change unless there is a through explanation of the concept prior to any field validation testing. To enhance understanding, commanders and maintenance managers alike must be educated to the Soviet threat and not to rely on the unreal atmosphere of the United States dominated battlefield of past training exercises.

APPENDIXES

APPENDIX A. THE QUESTIONNAIRE SURVEY

RETURN TO:

LTC Joe Griffith, Section 8
Distribution Box #20

- -

APPROVED FOR DISTRIBUTION TO:

_____

CLASS DIRECTOR _____

18 February 1975

Dear

This survey is an important part of my Master of Military Art and Science research of the maintenance support structure at installations in CONUS. The research centers on two structural concepts and for the purposes of this study I define the concepts as follows:

1. Decentralization is defined as a condition in an organization when the authority to make decisions is broadly delegated to lower units.

The Army Maintenance Structure is an example of decentralization. Authority and responsibility to perform certain maintenance tasks are delegated to subordinate units to facilitate support as far forward in the combat zone as the tactical situation will allow. This is achieved by separation of maintenance tasks into four categories; organizational, direct support, general support and depot support.

2. Centralization is the opposite condition where the upper hierarchy of an organization retains most decisionmaking authority.

The service department of your local civilian automobile dealership is an example of centralized maintenance support. The manager of the service department has control over all the resources and facilities to perform the full range of maintenance on automobiles from oil change to major overhaul.

Data from this survey will be tabulated and included in my thesis. All your responses should be made in light of your personal experience. Your first honest reaction toward the item statement is the appropriate response.

To assure unhindered response, you are identified only for the purpose of statistical comparison. Your response is completely confidential and will only be examined by me.

Please return your response to me by 28 February through distribution. Your help is greatly appreciated and I thank you for your time and contribution to my study.

Thank you.

JOE GRIFFITH
LTC, OD

WHEN YOU HAVE COMPLETED THE SURVEY, FOLD TO - - - - LINE AT TOP OF PAGE, STAPLE OR TAPE AND RETURN TO ME.

INSTRUCTIONS: This survey contains twenty statements. Following each statement are the numbers 1 through 6. Circle the number that best indicates the degree to which you agree or disagree according to the following scale:

1 - means I strongly agree.
2 - means I agree.
3 - means I mildly agree.
4 - means I mildly disagree.
5 - means I disagree.
6 - means I strongly disagree.

1. At CONUS installations, the basic purpose and mission of the maintenance support structure are clear-cut and well defined by regulation. 1 2 3 4 5 6

2. At CONUS installations, the most skilled and knowledgeable supervisors are at the lower levels of the support structure. 1 2 3 4 5 6

3. Subordinates at the lower levels of the CONUS installation maintenance support structure are highly trained, knowledgeable, and committed to the goals of the organization. 1 2 3 4 5 6

4. The size and scale of CONUS installation maintenance organizations are within the span of control capability of a single installation maintenance manager. 1 2 3 4 5 6

5. CONUS installation maintenance tasks are mostly routine and repetitive in nature. 1 2 3 4 5 6

6. Wide geographic dispersion of maintenance support elements on CONUS installations is necessary to support resident units and activities. 1 2 3 4 5 6

7.	At CONUS installations, it is essential to delegate authority and let subordinates be involved in or actually making decisions as a means of gaining their acceptance.	1	2	3	4	5	6
8.	The CONUS installation maintenance support structure has few planning goals or guidelines.	1	2	3	4	5	6
9.	Real-time data processing makes installation level centralized decisionmaking feasible.	1	2	3	4	5	6
10.	CONUS installation maintenance support requires a high degree of conformity and coordination in work tasks and operations.	1	2	3	4	5	6
11.	Decentralized TOE DS units and organizational maintenance shops are required to support divisions stationed at CONUS installations even though duplication of capability with the garrison TDA maintenance activity will occur.	1	2	3	4	5	6
12.	CONUS installation maintenance management requires quick, on-the-spot significant decisions to be made at the lower levels of the support structure.	1	2	3	4	5	6
13.	Most significant maintenance management decisions at CONUS installations are made at the lower levels of the structure.	1	2	3	4	5	6
14.	It is desirable for the installation maintenance manager to centralize points of contact in dealing with labor unions and external inspections and visits.	1	2	3	4	5	6

15. All NON-TOE maintenance including the categories of; organizational, direct, and general support should be consolidated and centralized under a single manager at installation level in CONUS. 1 2 3 4 5 6

16. Also, all TOE maintenance including the categories of; organizational, direct, and general support should be consolidated with the NON-TOE support and centralized under the installation maintenance manager. 1 2 3 4 5 6

17. All TOE and NON-TOE maintenance, except the organizational maintenance elements of deployable TOE units, should be consolidated and centralized under a single manager at installation level in CONUS. 1 2 3 4 5 6

18. Direct support and organizational maintenance TOE manpower spaces in deployable units stationed at CONUS installations should be vacant and only authorized for fill as an augmentation during mobilization for deployment. 1 2 3 4 5 6

19. An augmentation of maintenance personnel to meet deployment requirements could be established by designating manpower spaces in the installation TDA consolidated activity as civil service/mobilization designee positions and requiring the incumbent to maintain this dual status as a condition of employment. 1 2 3 4 5 6

20. The present CONUS installation maintenance support structure is suitable and adequate to meet maintenance requirements. 1 2 3 4 5 6

THANKS AGAIN. If you desire to further comment on a statement or on the survey, please use the back of the cover letter.

APPENDIX B. MASTER DATA SHEET

QUESTIONNAIRE SURVEY

(Questionnaire Respondents 1 - 62)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
QUESTIONNAIRE ITEM STATEMENTS	1 -	3	2	1	3	2	4	2	1	2	4	2	2	1	4	2	4
	2 -	4	5	3	2	5	4	5	5	3	6	5	5	2	3	5	4
	3 -	3	4	2	3	4	3	5	3	4	6	4	4	3	5	3	3
	4 -	3	4	1	5	3	5	5	2	5	4	4	2	2	2	1	4
	5 -	2	3	3	3	4	3	3	2	3	5	4	2	2	2	3	2
	6 -	5	4	3	5	5	5	5	2	4	1	2	5	2	5	5	4
	7 -	3	3	3	2	5	3	3	3	4	-	1	2	3	1	3	3
	8 -	5	5	4	5	4	3	2	3	2	4	5	5	5	5	6	3
	9 -	2	4	4	3	1	3	2	2	5	2	2	3	6	4	3	5
	10 -	3	4	4	2	2	4	2	2	5	2	3	2	2	3	2	2
	11 -	2	3	4	4	3	1	2	1	2	1	2	2	2	1	1	2
	12 -	3	3	4	5	4	4	2	4	2	5	2	1	2	2	4	3
	13 -	5	4	4	4	5	5	2	4	5	5	4	1	2	5	5	1
	14 -	2	2	2	1	1	1	2	2	2	1	2	1	2	1	1	1
	15 -	2	1	5	2	3	4	2	3	2	2	2	2	6	5	3	5
	16 -	2	4	5	6	3	6	5	6	5	2	5	2	6	6	5	5
	17 -	5	4	6	5	2	6	5	6	5	1	3	3	2	6	5	2
	18 -	5	4	6	6	3	6	6	6	6	1	6	5	5	6	6	5
	19 -	4	4	3	4	3	6	2	6	6	1	4	3	5	5	6	6
	20 -	3	3	1	5	2	3	4	3	5	1	3	3	4	3	5	4

Appendix B (Cont'd)

	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1 -	2	3	5	4	3	2	2	2	4	2	2	5	2	5	2
2 -	5	3	3	6	5	2	3	3	4	3	4	5	5	2	5
3 -	5	3	5	6	4	4	2	5	3	4	4	5	4	3	4
4 -	2	3	5	5	4	4	2	3	3	5	2	5	3	6	3
5 -	3	3	3	2	5	3	3	2	2	2	5	6	5	5	2
6 -	5	3	6	2	6	2	4	6	4	3	5	5	2	4	6
7 -	2	4	3	2	4	2	2	2	4	3	4	2	1	-	2
8 -	5	4	2	2	6	5	5	3	5	2	6	5	5	4	3
9 -	3	4	5	2	1	2	-	3	2	4	6	2	4	5	4
10 -	2	4	3	5	3	2	3	4	3	4	1	1	2	3	3
11 -	1	3	2	2	5	1	3	3	1	2	2	1	1	2	1
12 -	1	3	1	3	5	4	3	5	4	4	5	5	4	2	4
13 -	2	3	4	3	6	2	2	5	4	6	6	4	5	3	3
14 -	2	3	2	1	1	2	-	2	2	2	2	1	1	3	2
15 -	2	3	2	2	3	5	1	3	4	4	2	3	1	2	6
16 -	2	3	5	5	6	6	6	3	3	4	1	6	6	6	6
17 -	5	3	5	4	5	6	3	3	5	5	2	6	2	5	6
18 -	6	3	6	6	6	6	-	6	6	6	5	6	6	5	6
19 -	6	3	6	2	2	6	3	5	5	6	2	5	5	6	6
20 -	4	3	5	5	5	5	4	4	4	1	5	3	3	4	4

Appendix B (Cont'd)

	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
1 -	3	4	2	2	3	1	2	2	6	5	3	2	4	3	3	3
2 -	4	5	4	5	5	2	4	5	6	2	5	6	2	5	4	5
3 -	5	4	4	5	5	2	3	2	2	2	4	6	4	4	5	5
4 -	3	3	3	6	6	1	3	2	3	6	2	5	2	6	2	2
5 -	2	4	3	5	3	1	4	4	1	6	2	4	3	5	2	2
6 -	5	5	2	6	2	3	5	5	6	2	2	2	2	6	4	2
7 -	3	4	3	1	1	1	3	3	6	2	3	3	2	3	3	2
8 -	4	5	4	2	2	5	5	5	1	2	5	2	3	5	5	5
9 -	5	2	2	6	2	3	3	2	6	5	3	2	2	3	3	5
10 -	2	2	3	4	5	2	2	4	1	5	1	2	2	2	4	2
11 -	1	1	6	3	1	3	2	2	5	6	2	2	1	1	2	2
12 -	5	2	5	6	3	4	3	5	4	1	3	1	1	1	4	5
13 -	5	5	5	4	2	4	3	5	5	5	4	2	5	4	4	3
14 -	2	2	2	3	6	3	3	2	6	2	2	1	1	1	3	2
15 -	5	3	1	4	6	2	5	2	1	3	5	5	5	3	2	2
16 -	6	-	6	6	6	5	5	5	3	5	6	5	6	4	5	6
17 -	6	4	1	6	4	5	5	2	4	4	5	2	6	4	5	6
18 -	6	5	4	6	6	5	6	5	6	5	6	5	6	6	6	6
19 -	5	6	3	5	6	1	3	5	4	2	5	3	5	6	4	2
20 -	5	4	4	2	5	5	3	2	6	3	4	2	3	3	4	3

Appendix B (Cont'd)

	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
1 -	2	5	3	5	2	3	2	2	2	5	2	5	2	3	2
2 -	4	4	1	6	6	2	1	5	5	5	2	3	3	2	6
3 -	3	4	4	5	4	3	3	4	2	6	4	3	3	4	3
4 -	3	2	2	3	2	5	4	2	2	3	2	3	2	3	3
5 -	3	2	1	5	2	2	3	2	5	2	4	2	1	3	4
6 -	5	4	6	5	3	5	4	2	6	5	5	5	2	4	3
7 -	2	4	1	2	3	2	1	5	6	5	-	3	2	3	3
8 -	4	2	6	3	5	3	3	5	5	3	5	3	2	3	5
9 -	3	1	2	3	5	2	4	5	5	3	5	4	2	4	2
10 -	5	2	1	2	2	2	3	5	5	2	2	4	2	3	2
11 -	2	2	1	2	2	2	4	2	2	2	5	1	1	3	1
12 -	4	5	3	2	2	4	2	5	5	5	4	3	3	3	5
13 -	4	4	6	3	3	4	2	2	5	4	5	3	2	3	5
14 -	3	2	1	2	1	2	3	2	3	2	2	2	2	2	2
15 -	2	1	1	2	1	2	2	6	5	2	5	3	4	3	3
16 -	5	3	6	6	6	4	4	6	5	5	5	6	6	4	6
17 -	4	1	1	6	4	4	4	6	5	5	6	6	6	4	6
18 -	6	6	6	6	6	4	5	5	5	5	6	-	6	4	6
19 -	5	6	1	6	6	3	3	5	5	4	3	6	6	4	2
20 -	2	3	1	5	3	4	4	2	3	5	2	5	3	4	2

Appendix B (Cont'd)

TELEPHONE SURVEY

(Telephone Interviews 1 - 30)

STRUCTURAL ALTERNATIVE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
15 -	4	2	1	2	1	1	1	2	2	1	2	1	3	1	2	4
16 -	6	5	1	6	6	6	6	6	6	3	6	6	6	6	5	4
17 -	4	5	1	6	6	2	6	2	6	6	6	6	6	6	1	1
18 -	4	5	5	6	6	2	6	6	6	3	6	6	6	6	3	6
19 -	3	5	6	6	4	2	1	5	5	3	3	6	6	3	1	3
20 -	2	2	2	3	1	2	2	6	3	6	4	5	3	6	3	1

	17	18	19	20	21	22	23	24	25	26	27	28	29	30
15 -	3	2	1	1	1	1	1	1	1	1	1	1	1	1
16 -	3	6	6	1	1	6	6	2	4	6	4	6	6	6
17 -	3	6	3	1	1	6	3	3	3	3	4	4	1	6
18 -	6	6	6	3	3	5	6	4	3	6	1	1	6	6
19 -	3	6	6	3	1	3	2	3	3	1	3	6	5	3
20 -	3	6	3	3	4	2	4	6	4	5	1	6	6	3

APPENDIX C. WEIGHTED VALUE SCORES - GROUPED FREQUENCY DISTRIBUTION - THE QUESTIONNAIRE SURVEY AND THE TELEPHONE INTERVIEWS

TABLE C-1

Grouped Frequency Distribution - Scores of Respondents to Independent Variables 1-14

QUESTIONNAIRE SURVEY

Independent Variables	N	SA (6)	A (5)	MA (4)	MD (3)	D (2)	SD (1)
1	62	4	27	14	8	8	1
2	62	7	22	11	10	10	2
3	62	4	12	22	17	7	0
4	62	3	19	18	7	10	5
5	62	4	22	17	8	9	2
6	62	9	21	10	6	15	1
7	59	2	3	7	23	16	8
8	62	1	11	12	8	26	4
9	61	3	19	14	10	11	4
10	62	5	28	12	10	7	0
11	62	2	3	3	8	26	20
12	62	1	16	17	12	10	6
13	62	4	19	17	10	10	2
14	61	17	33	9	0	0	2

SOURCES:

Column 1: Independent variables (contingency factors).
Column 2: (N) Number of questionnaire respondents.
Columns 3 through 8: Distribution of weighted value scores for each variable grouped by opinion/attitude category--(SD) strongly disagree to (SA) strongly agree to centralization.

Table C-1 shows the grouped frequency distribution of the weighted value scores of the questionnaire sample group. The scores were calculated as explained on page 42 of this study. This table is presented to illustrate the variance of respondent opinion concerning each of the variables evaluated.

TABLE C-2

Grouped Frequency Distribution - Scores of Respondents to Structural Alternatives 15-20

QUESTIONNAIRE SURVEY

Structural Alternatives	N	SA (6)	A (5)	MA (4)	MD (3)	D (2)	SD (1)
15	62	8	21	13	5	11	4
16	61	1	4	6	6	18	26
17	62	4	7	5	12	17	17
18	62	1	0	2	4	15	38
19	62	3	7	11	8	14	19
20	62	1	14	16	19	8	4

SOURCES:

Column 1: Structural Alternatives posed by the author as item statements 15 through 20 in the questionnaire.

Column 2: (N) Number of questionnaire respondents.

Columns 3 through 8: Distribution of weighted value scores for each structural alternative by opinion/attitude category--(SD) strongly disagree to (SA) strongly agree to centralization.

Table C-2 shows the grouped frequency distribution of weighted value scores of the questionnaire sample group. The scores were calculated as explained on page 42 of this study. This table is presented to illustrate the variance of respondent opinion concerning each of the structural alternatives.

TABLE C-3

Grouped Frequency Distribution - Scores of Respondents to Structural Alternatives 15-20

TELEPHONE INTERVIEWS

Structural Alternatives	N	SA (6)	A (5)	MA (4)	MD (3)	D (2)	SD (1)
15	30	19	7	2	2	0	0
16	30	3	1	2	3	2	19
17	30	6	2	6	3	1	12
18	29	2	1	5	2	3	16
19	30	4	2	11	1	4	7
20	30	7	2	4	8	6	3

SOURCES:

Column 1: Structural Alternatives posed by the author as item statements for telephone interviews. The item statements were identical to the questionnaire item statements 15 through 20.

Column 2: (N) Number of telephone interview respondents.

Columns 3 through 8: Distribution of weighted value scores for each structural alternative by opinion/attitude category--(SD) strongly disagree to (SA) strongly agree to centralization.

Table C-3 shows the grouped frequency distribution of weighted value scores of the telephone interview sample group. The scores were calculated as explained on page 42 of this study. This table is presented to illustrate the variance of respondent opinion concerning each of the structural alternatives.

APPENDIX D. MEASURES OF CENTRAL TENDENCY (AVERAGES - WEIGHTED SCORES OF THE SAMPLE GROUPS - THE QUESTIONNAIRE SURVEY AND THE TELEPHONE INTERVIEWS

TABLE D-1

Measures of Central Tendency (Averages) - Scale Weighted Scores for Independent Variables 1 - 14

QUESTIONNAIRE SURVEY

Independent Variables	N	Mean	Median	Mode
1	62	4.1	4	5
2	62	4.0	4	5
3	62	3.8	4	4
4	62	3.7	4	5
5	62	3.9	4	5
6	62	4.0	4	5
7	59	2.8	3	3
8	62	3.1	3	2
9	61	3.7	4	5
10	62	4.2	5	5
11	62	2.2	2	2
12	62	3.5	4	4
13	62	3.9	4	5
14	61	5.0	5	5

SOURCES:

Column 1: Independent variables (contingency factors).

Column 2: (N) Number of questionnaire respondents.

Columns 3 through 5: Questionnaire sample group's average weighted value score. Used to indicate the degree of favorable opinion/attitude of sample group for each variable in relation to centralization. See calculation of ratings on page 42 of this study.

Table D-1 shows the measures of central tendency (averages), the mean, the median, and the mode for each of the variables. The mean average and supportively the median and the mode were used to determine the sample group rating (see page 42 for example).

TABLE D-2

Measures of Central Tendency (Averages) - Weighted Scores for Structural Alternatives 15 - 20
QUESTIONNAIRE SURVEY

Structural Alternatives	N	Mean	Median	Mode
15	62	3.9	4	5
16	61	2.1	2	1
17	62	2.7	2	2
18	60	1.6	1	1
19	62	2.7	2	1
20	62	3.5	4	3

SOURCES:

Column 1: Structural alternatives posed by the author as item statements 15 through 20 in the questionnaire.

Column 2: (N) Number of questionnaire respondents.

Columns 3 through 5: Questionnaire sample group's average weighted value score. Used to indicate the degree of favorable opinion/attitude of the sample group for each variable in relation to centralization. See calculation of ratings on page 42 of this study.

Table D-2 shows the measures of central tendency (averages), the mean, the median, and the mode for each of the variables. The mean average and supportively the median and the mode were used to determine the sample group rating (see page 42 for example).

TABLE D-3

Measures of Central Tendency (Averages) - Weighted Scores for Structural Alternatives 15 - 20

TELEPHONE INTERVIEWS

Structural Alternatives	N	Mean	Median	Mode
15	30	5.4	6	6
16	30	2.1	1	1
17	30	3.1	3	1
18	29	2.2	1	1
19	30	3.2	4	4
20	30	3.5	3	3

SOURCES:

Column 1: Structural alternatives posed by the author as item statements for telephone interviews. The item statements were identical to the questionnaire item statements 15 through 20.

Column 2: (N) Number of telephone interview respondents.

Columns 3 through 5: Telephone interview sample group's average weighted value score. Used to indicate the degree of favorable opinion/attitude of the sample group for each alternative in relation to centralization. See example of calculation of ratings on page 42 of this study.

Table D-3 shows the measures of central tendency (averages), the mean, the median, and the mode for each of the structural alternatives. The mean average and supportively the median and the mode were used to determine the sample group rating (see page 42 for example).

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