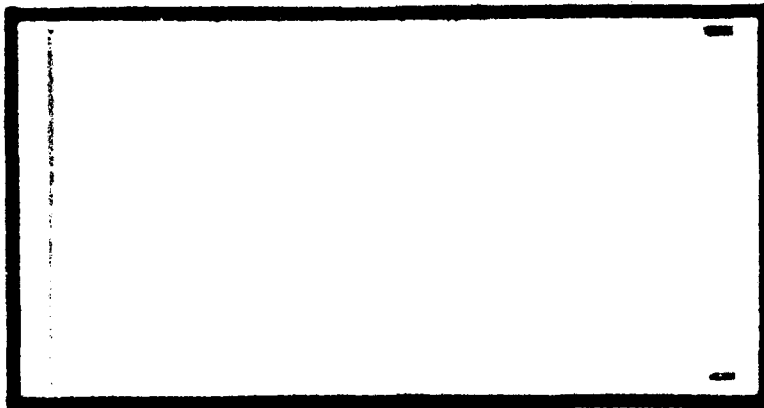


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**A COMPARATIVE ANALYSIS OF THE  
RELATIONSHIPS OF TOTAL DISTRIBUTION  
COSTS BETWEEN AIRLIFT AND SEALIFT**

**Lionel A. Boudreaux, Captain, USAF  
Thomas J. Cooper, Lieutenant, USAF**

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DISTRIBUTION COSTS BETWEEN AIRLIFT AND SEALIFT**

**A Thesis**

**Presented to the Faculty of the School of Systems and Logistics  
of the Air Force Institute of Technology**

**Air University**

**In Partial Fulfillment of the Requirements for the  
Degree of Master of Science in Logistics Management**

**By**

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Captain, USAF**

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**January 1974**

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## CHAPTER I

### INTRODUCTION

#### Problem

Airlift and sealift services are provided for the Department of Defense (DoD) through single manager agencies. Airlift services are provided by the Military Airlift Command (MAC) and sealift services are provided by the Military Sealift Command (MSC). Airlift and sealift services are paid for by the user through separate industrial funds. Both MAC and MSC compute transportation rates based upon specific cost variables. However, when attempting to compare the two systems, one finds that each agency maintains its own unique costing criteria which establish the cost variables used in determining billing rates to their users. A comparison of these costing criteria, showing the relationships of airlift and sealift costs to the user, should provide a sound basis from which to measure true military transportation costs. One approach for this comparison could be accomplished by analyzing the industrial funds of both MAC and MSC to determine specific costing criteria used by both agencies. The problem, then, centers on the lack of useable decision making transportation cost/time variables; implicit in the solution

is an analysis of the primary transporters, MAC and MSC. The aim of this study is to analyze the costing criteria of the industrial funds which finance both MAC and MSC.

### Background

The basis for present airlift and sealift forces is the foreign policy of the United States. The scope of the present policy focuses on doctrines prescribed by President Richard M. Nixon. The Nixon Doctrine is composed of three basic elements: (1)

- (1) The United States will keep all of its treaty commitments.
- (2) We shall provide a shield if a nuclear power threatens the freedom of a nation allied with us or of a nation whose survival we consider vital to our security.
- (3) In cases involving other types of aggression, we shall furnish military and economic assistance when requested in accordance with our treaty commitments.

Reinforcing the Nixon Doctrine is the concept of strategic mobility. Strategic mobility is the ability to deploy large military forces to selected areas of the world as rapidly as necessary to achieve strategic objectives.

(51:3) An integration of the Nixon Doctrine and the strategic mobility concept results in the following patterns of defense strategy:

(1) Limiting the use of American fighting forces in offshore conflicts. American involvement would be limited to advice, weapons, and financial support.

(2) Development of highly mobile, quick reacting, hard hitting general purpose forces. (10:313)

Directly related to such defense patterns is the policy of maintaining a capability to conduct a "90-day defense" of Europe. (3:14) The feasibility or credibility of such a policy is not of central importance to this thesis. The applicability of the necessary components (i.e., airlift and sealift forces) are, however, important. The foundation for such a policy is the ability to react immediately providing the necessary troops, fuel, armament, and helicopters. The early phases could be accomplished primarily by air. A follow-up response by sea would have to include reinforcements of both men and materials. Mobility, then, requires long-range airlift forces and immediate as well as sustained sealift forces. The sources available to meet the airlift and sealift strategic mobility requirements of the United States are MAC and MSC. These agencies will be covered in more detail in a later section of this chapter. Before proceeding any further, a clarification of some of the terms used in this study will be covered to provide the reader with the intended definitions.

#### Clarification of Terms

The following list of phrases and terms vary as to

the connotation they hold depending on the background of the reader. The purpose of this section is to clarify, such that each phrase assumes the specific connotation intended.

(1) Industrial fund: Working capital funds for the operation of certain DoD industrial-type and commercial-type activities that provide common services within or among the DoD departments and agencies. Users of these activities contribute to the funds on a "user-pays" basis and the fund is managed on a "break-even" concept. The underlying objective of an industrial fund approach to fiscal control within DoD is to provide incentives for better management.

(2) Carrier Service vs. Terminal Service: MAC is responsible for both the method of transporting cargo (carrier), and the ports or facilities required for both aircraft maintenance and loading. MSC is responsible for carriers only. Military Traffic Management and Terminal Service has the responsibility for ocean terminals.

(3) Transportation Costs vs. Total Distribution Costs: Transportation costs include those costs associated with hauling and handling cargo at terminals. Total distribution costs include transportation costs plus inventory, packaging, documentation, and procurement costs.

(4) Variables: Reference to cost variables refers to individual cost items such as POL, aircraft

maintenance, loading equipment, and terminal maintenance.

- (5) **Criteria:** Reference to criteria refers to cost categories encountered in providing a transportation service, i.e., tariffs, billing rates, etc.
- (6) **Unit Effective (UE):** Unit effective aircraft, for example, would include only those aircraft continuously useable because of long term maintenance requirements or as a result of a full time training mission. Unit effective, then, in this study refers to those vehicles actively engaged in cargo hauling.
- (7) **User:** A user of products or services of an industrial or commercial-type activity is any department or component, such as an operating-force command or activity, a commodity command, a weapon system manager, or other program manager, or system command that has been delegated the immediate and direct management responsibility for ordering such products or services to execute a program. In addition, military personnel, private individuals and concerns, and other government agencies may be a user. (26:3)
- (8) **Airlift Service:** The performance or procurement of air transportation and services incident thereto required for the movement of persons, cargo, and mail. (18:2)

- (9) Common User Airlift Service: The airlift service provided on a common basis for all DoD components and, as authorized for other agencies of the United States Government. (18:2)
- (10) Military Traffic: DoD personnel and material to be transported. (19:3)
- (11) Ocean Transportation Service: The performance or procurement of ocean transportation and services incident thereto required for the movement of persons, cargo, bulk, petroleum, and mail. (20:3)

Now that a commonality of language has been established between the reader and the authors, let us proceed with our discussion of MAC and MSC.

MAC is the airlift organization for the DoD. It provides airlift services to all agencies of the DoD and is charged with the responsibility for developing and maintaining a capability for providing effective logistic support in an emergency or war. To insure the capability to accelerate immediately to flying rates necessary to perform emergency and wartime missions, the entire military airlift system must be operated and exercised at a rate which will provide adequate training and realistic operational experience. MAC must have in being the necessary military airlift systems, supporting personnel, and equipment. The maintenance of high levels of training and readiness produces an airlift capability which, in the interest of economy, should be and is used to minimize DoD airlift and logistics costs. To be

prepared for its wartime mission, MAC operates a peacetime airlift service. The service includes: (a) established channel scheduled transportation of passengers, cargo, and mail; (b) joint service exercises and airborne training; (c) special assignment missions; (d) international and domestic aeromedical evacuation; and (e) special missions for the President of the United States and other U.S. and foreign dignitaries. (35:433)

In summary, MAC operates terminals and provides air transportation for cargo, passengers, and mail to and from the United States and within and between overseas areas. The active MAC UE fleet includes 70 C-5A aircraft and 234 C-141 aircraft. (35:433) (See Appendix A)

The DoD also has the Civil Reserve Air Fleet (CRAF) available for air transportation purposes during national emergencies. The CRAF is composed of designated civil jet aircraft for augmentation of the MAC fleet. (45) The CRAF includes aircraft from various airlines and is composed of 747, DC-10, DC-8, and 707 type aircraft. Appendix A covers CRAF carriers and representative numbers of each type aircraft. MAC and CRAF comprise the airlift capability for the DoD during peacetime and during national emergencies. While MAC and CRAF provide airlift capability, MSC provides the DoD with the sealift capability to meet its needs.

MSC is the single common ocean carrier for the DoD and is composed of UE government-owned ships and commercial ships to augment this fleet. MSC provides sealift support to

military installations throughout the world and is responsible for the employment of national sea transportation capacity for the armed forces during times of emergencies. (46:7) MSC's responsibilities do not include operation and maintenance of water terminal facilities. This responsibility is placed under the authority of the Military Traffic Management and Terminal Service (MTMTS), the single-service operating agency for continental United States (CONUS). The operational make-up of MSC differs somewhat from MAC's. While MAC operates with basically two aircraft fleets, UE aircraft and CRAF, MSC has five fleets of ships under its control. Appendix B shows the type ships and appropriate number of each within each fleet. The following paragraphs will discuss each of these agencies along with their relationship to MSC.

The first of these fleets is the active nucleus fleet. It is that fleet of ships operated by MSC for ocean cargo hauling. Due to the increasing age of this fleet it has dwindled in size over the last ten years. (28) Appendix B illustrates the number of MSC operated ships. It can be seen that since 1971, MSC has experienced a 20% decrease in total number of ships. The nucleus fleet is used in support of DoD installations throughout the world. In addition, a number of these ships are used for special projects (project ships). In this case the agency using the ship for a specialized purpose contracts with MSC for the duration of the project. To supplement the active nucleus fleet the National

Defense Reserve Fleet (NDRF) is also under the control of MSC.

The NDRF consists of government-owned ships that are either "in mothballs" (stockpiled) or are operating under a General Agency Agreement (GAA). Under a GAA the government pays the reactivation and operating expenses for a private operator to operate the ship for MSC. Nearly all of these ships are World War II Liberty and Victory ships. The value of a reserve fleet lies in its relatively quick (as compared to building new ships) accessibility to the National Command Authority. (46:8) The NDRF consists of 700 ships only 150 of which have any potential for support of the military. All except a few configured for special projects are over 25 years old, and by 1975 the NDRF will cease to exist as a viable and useful fleet. (4) (See Appendix B) In addition to these two fleets MSC also draws upon the capability of the United States Merchant Marine to augment its forces.

The United States Merchant Marine moves about 85 per cent of outbound military cargo. Commercial ships are chartered on contract by the DoD for each voyage or on time charters for periods up to five years. There are 107 time charter ships under contract today. The United States flag fleet now numbers 636 ships of over 1,000 gross tons: 402 freighters, and 234 tankers. Of this number only 200 are considered modern and average age is 23 years. (4) (See Appendix B) MSC also has a number of foreign registry ships that can be used for national emergencies.

The Effective United States Control Fleet comprises ships owned by U.S. private industry but under foreign registry. The ships can be requisitioned in time of emergency or war, but have no value for contingency operation unless a national emergency is declared. The bulk of these ships are registered under the flags of Panama, Liberia, and Honduras. (46:9) (See Appendix B)

In summary, then, MSC operates USN-owned UE ships and the NDRF, enters contractual agreements with commercial shipping companies to augment its active nucleus fleet, and reserves additional shipping capacity for national emergencies with commercial shippers under foreign registry. Through its operations, MSC provides sealift support for DoD installations throughout the world. While MSC does not operate ocean terminals, this responsibility is placed under the authority of MIMTS.

#### Distribution Process

The process by which cargo is handled within DoD is illustrated in Figure 1-1. MAC and MSC play the dominant roles in this distribution process. The initial step in the system is the receipt of a requisition by the depot or manufacturer. As mentioned before, MIMTS then transports the material within CONUS from the procurement source to an ocean or air port of embarkation (POE). The priority originally established for the shipment determines how this movement takes place. Normally, however, it is accomplished by commercial air or surface transportation. (Note: for a complete

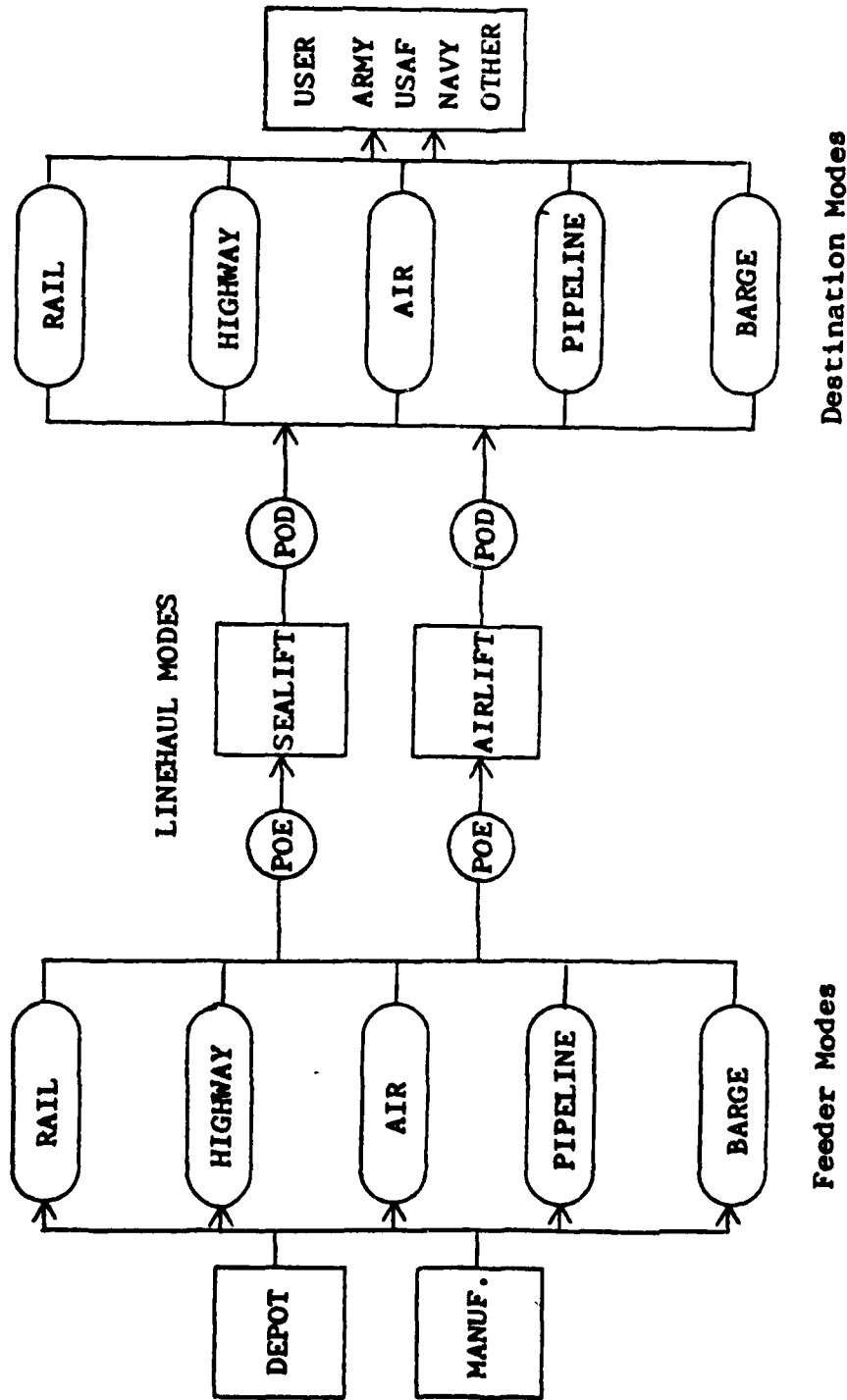


Fig. 1-1 Defense Transportation System (52130)

discussion of the DoD priority system see DoD Instruction 4410.6 which covers the Uniform Material Movement and Issue Priority System (UMMIPS). (17)

The next step in the process involves movement by air or sea depending again on the priority of the shipment. MAC or MSC at this point provides the carrier service for shipment to the overseas port of debarkation (POD). In the event the DoD carriers are saturated, a commercial carrier will be contracted for the necessary transportation services. (52:28)

The final step in the distribution process is shipment within the overseas theater. This step is accomplished by whatever means is available and/or required by the priority of the shipment. (52:29)

We made no attempt to determine optimum shipping mode (airlift vs. sealift) based on costs involved. The variables are so numerous that a true comparison would be difficult to establish. Several studies have been accomplished to determine air eligibility criteria, optimum inventory levels based upon pipeline shipping modes, and selection of optimum transportation mode based on cost and time criteria. Some of these studies are discussed in Chapter II.

The purpose of this thesis, then, is to analyze the costing criteria used by both MAC and MSC to establish tariff rates. MAC requests appropriations from Congress each year for the support of a training program for its system that in actuality is utilized for training and hauling cargo. A recent study by Freer and Ohl indicates that 50% of the

flying hours accomplished by MAC in Fiscal Year 1973 was allocated to channel traffic. (45) Tariff rates are based upon total costs of operating the system; however, it was their (Freer and Ohl) contention that training costs should be separated from cargo hauling costs and tariff rates based on actual hauling costs, excluding training or readiness expenditures. In MSC, all indications are that the same situation does not exist. In Chapter IV the MSC system is completely developed and Chapter V discusses the differences in the two systems.

#### Scope

The underlying theme of this thesis is to evaluate cost considerations used in determining DoD transportation costs. Such costs are an integral part of the total distribution cost/time relationship. Specifically, we examine the costs that are included in the tariff rate structure of both the MAC and MSC industrial funds. Transportation costs for both airlift and sealift are related to commercial shipping prices, POL prices and consumption rates, terminal management and maintenance, and the airlift or sealift distance of shipment. (53) The prime area of interest in this thesis, then, is to discuss these transportation costs in the light of industrial fund tariff structures. If an accurate comparison and description of MAC and MSC transportation costs can be made, a more realistic determination of the actual composition of DoD transportation costs could follow.

Prior research in this field includes many analyses concerning airlift and sealift cargo criteria. These efforts have focused on time and inventory costs as a comparison of peacetime and wartime requirements. Studies of industrial fund concepts have not related to transportation cost criteria.

### Summary

MAC and MSC are the single-manager agencies for airlift and sealift support respectively for the DoD. The requirement for the present capacity of airlift and sealift forces stems from the foreign policy established in the Nixon Doctrine. In order to meet the specific needs of DoD and support the Nixon Doctrine concept, MAC and MSC were organized to include UE forces and commercial augmentation, through contractual agreements with commercial companies, to meet the increased cargo hauling requirements during national emergencies.

The underlying theme of this thesis is to evaluate the cost considerations in determining DoD transportation costs. Analyses of both MAC and MSC industrial funds are covered in Chapters III and IV.

## CHAPTER II

### PROCEDURES

#### Introduction

The purpose of Chapter II is to identify the basic approach utilized in the formulation of this research effort. Conceptually, it involved a literature review, a selection of pertinent data, and the acquisition of such data. Following a discussion of data sources and related studies are the predetermined assumptions and limitations. The final portion develops a valid justification for completing this research and presents the objectives of the overall project.

#### Data and Related Studies

The primary sources for data collection were MAC and MSC documents, telephone interviews, personal interviews, and written correspondence. Obviously, the major contributors were the Office of the Comptroller at both MAC and MSC.

Included in the analysis of the cost criteria used by both agencies is a determination of excluded costing criteria that should be considered when establishing a rate structure. In order to accurately recover operating costs involved in hauling cargo, MAC and MSC must consider all relevant criteria. A prior study in a related area (47) revealed

alternative methods of meeting military transportation requirements for the 1970's. Another study (45) looked closely at the ASIF and made recommendations for an alternative method of charging MAC users. We collected information from the aforementioned sources and developed the tariff rate structure of both systems, MAC and MSC (Chapters III, IV). A comparison of the two systems is covered in Chapter V.

A review of the literature in the area of economic cargo transportation yielded a variety of studies including models used in determining cargo eligibility and mixes of transportation modes. One, a thesis, completed by Galyen and Krebs, at the Air Force Institute of Technology (AFIT), entitled "A Study of the Alternative Methods of Meeting the Military Requirements for Strategic Airlift in the 1970's," examines various aspects of strategic airlift including cost. However, a major assumption was that tariffs are set at "the minimum required to enable MAC to maintain the necessary readiness." Determining the validity of such an assumption is related to this thesis. "The Military Airlift Command's Industrial Fund: Can it be Structured to Better Serve the Overall DoD Transportation Needs?" by Freer and Ohl, encompasses a study of airlift transportation costs as charged by MAC. The results of this study are included in Chapter III.

A thesis by Moe and Inguoldstad entitled "An Analysis of the Impact of the C-5 on the Tariff Structure of the Airlift Services Industrial Fund," which was completed in early

1970, studies the probable impact of the C-5 on the tariff structure. This thesis develops the criteria used by MAC when establishing billing rates.

Another key reference is a study by the Air Force Logistics Command entitled "The Economics of Cargo Shipments: Airlift versus Sealift." This study illustrates the economic benefits to be derived from extensive use of airlift. The study develops mathematical models which are used in determining total distribution costs.

The thesis by Bennet and Abel entitled "An Evaluation of the Cost Effectiveness of Transporting Air Eligible Cargo by Air versus Surface Modes of Transportation," was a valuable resource in terms of establishing cost criteria as related to air transportation. The surface modes in that particular thesis, however, refer to rail and truck.

Other useful studies include a study of airlift eligibility of DoD cargo by the Logistics Management Institute, and a study of the economic use of airlift and sealift for overseas shipments in peacetime by the Research Analysis Corporation. Both studies were completed prior to 1971. While most of the research projects developed distinct topics, there were several underlying assumptions in each. This thesis, too, must make such basic assumptions.

#### Assumptions

The following assumptions are general in nature; however, their pertinence provides the foundation upon which this thesis is built.

- (1) The DoD desires to minimize transportation costs.
- (2) Policies such as strategic mobility and strategic deterrence serve as a primary basis for airlift and sealift. The continuation of such policies is assumed.
- (3) The most appropriate cost optimization process involves the "user-pays" concept currently utilized by the industrial funds of both MAC and MSC.

The following discussion is intended to clarify the three assumptions, simply by showing their interrelationship.

The critical assumption in this study evolves around the use of industrial fund criteria for a determination of transportation costs. The assumption begins with the concept that DoD does in fact intend to minimize transportation costs. Included here is the idea of insuring that the user of a service pays for the cost of the service, i.e., the industrial fund concept. If DoD were not utilizing such a concept, it would face even more extensive optimization problems. Conceivably, each service would provide its own transportation vehicles and facilities, which, while such a system could be optimized on an individual basis, the cost of the total system would be exorbitant. The return to the free transportation era of the 40's and 50's is another conceivable, but rather unlikely, possibility. (52:13) If the user must pay for required services out of a predetermined budget, then actual costs should be forced by economic pressures into

the tariff structure. The question of whether or not this occurs is central to this thesis. Without the added pressure of the "user-pays" concept, it is very unlikely that the full status of transportation costs would surface. Given this basic approach is acceptable, let us then examine appropriate justification for research in this area.

### Justification

In 1965 the Office of the Assistant Secretary of Defense for Systems Analysis [OASD(SA)] requested a study be accomplished on the economic utilization of air and sea transportation for overseas shipment of military items in peacetime. The Research Analysis Corporation (RAC) was tasked with the assignment and completed the project in 1969. (44:1) One important area of consideration which presented an obstacle to completion of their work was differences between MAC and MSC's (called Military Sea Transport Service (MSTS) at the time of study) costing criteria. Quoting the RAC study,

It was found that air-eligible requirements for air-lift increase considerably when the higher commercial rates are used. This exercise was not meant to depreciate the economic soundness of MSTS tariffs. Rather, it was intended to point out the importance of constructing MAC and MSTS tariffs on the same cost basis so that meaningful cost comparison for shipments can be made, allowing for the most economical routing. [Underscoring not in the original] (44:35)

In order to promote effectiveness and efficiency within the DoD a performance control type management system has been implemented. (14:Ch. 21) This system establishes responsibility and cost centers within DoD to more accurately

establish costs within each center. (14:Ch. 21) In order for this system to operate functionally within all departments, accurate cost criteria must be established. Both agencies presently base tariff structures on distinct criteria; however, the adequacy and accuracy are questionable, as the above quotation points out. Since MAC and MSC are comparable agencies within DoD, the criteria used to establish individual tariff rates should be consistent between the two departments. If comparable criteria can be established which represent valid cost considerations within each, more accurate transportation costs can be calculated. With more accurate and consistent costing at responsibility and cost centers, effectiveness and efficiency will be enhanced within DoD. Justification of this type leads us to the objectives of this thesis.

#### Objectives and Research Questions

The following objectives provide the guidance needed in approaching the problem of comparing airlift and sealift transportation costs. The objectives of this thesis are:

- (1) Identifying the relevant costs of transportation associated with the industrial funds of MSC and MAC.
- (2) Evaluating the billing criteria of both industrial funds.
- (3) Make recommendations concerning an integration of the costs of airlift and sealift into a compatible rate determining process.

With these objectives in mind, the following research questions will be used to develop the remainder of this thesis. Chapters III and IV pertain to question number one; Chapter V pertains to question number two; and Chapter VI pertains to question number three. The three questions are:

- (1) What are the cost variables and criteria used by the MAC and MSC industrial funds?
- (2) Are transportation costs accurately reflected?
- (3) Can a system of criteria consistent to both airlift and sealift be developed?

#### Summary

Chapter II provides information concerning data collection, related studies, assumptions, justification, and objectives. The primary information sources were, of course, the industrial fund personnel at both MAC and MSC. The material used provides both the assumption of utilizing the industrial fund concept and justifies the need for a comparison of the two systems. The comparison will be developed, based on the stated objectives which begin with identifying the relevant cost criteria. Chapters III and IV detail such criteria.

## CHAPTER III

### MILITARY AIRLIFT COMMAND AIRLIFT SERVICE INDUSTRIAL FUND TARIFF RATES

#### Introduction

The information in this chapter was obtained from the research work accomplished in a thesis by Freer and Ohl. (45) The purpose of Chapter III is to explain the Airlift Service Industrial Fund (ASIF) organization and to develop the construction of ASIF rates charged users by MAC for airlift. Before discussing the ASIF rates, a brief examination of the Air Force Industrial Fund and particularly ASIF should prove enlightening.

#### Airlift Service Industrial Fund

The Air Force Industrial Fund is used to finance services, usually of an industrial or commercial type, that serve various users. Development of the Air Force budget estimate and operating program is based on users' stated requirements. (50:44) The Airlift Services Industrial Fund (ASIF) was established in 1958 to finance the airlift services provided by MAC. This fund is a sub-function of the general Air Force Industrial Fund. (40) ASIF provides the working capital to MAC for the costs of military airlift

operations. In turn, the users repay MAC for the services they receive and the revenue thus earned by ASIF is applied to offset the costs of operations. The tariff system is designed to comply with a "break even" policy whereby the ASIF has tried to balance its revenue and expense through tariff rate changes in order to break even. (7:2-3) Figure 3-1 depicts the Air Force Industrial Fund system including ASIF. With this background in ASIF, an examination of tariff rate construction is required. To begin a discussion of rate construction, the basic inputs should first be considered. There are three inputs to the construction of these rates: requirements, capability, and expenses (costs).

#### Requirements

Each year requirements estimates are submitted to MAC by all DoD agencies, i.e., Army, Navy, USAF, and other DoD authorized agencies. These requirements are in terms of four categories: cargo, passenger (PAX), air evacuation (A/E), and special assignment airlift movement (SAAM). Cargo estimates are further broken down into normal and TP-9 requirements. Normal requirements are estimates of what the user specifically wants to move by scheduled airlift, both inbound and outbound. (See Appendix D) TP-9 requirements are an estimate or opportune inbound airlift that the user will move by air at a reduced retrograde rate. The Joint Chiefs of Staff (JCS), the individual service's Commander-in-chief, and the Army submit additional requirements estimates for Exercises (Ex) and Airborne Training (ABT). These estimates are

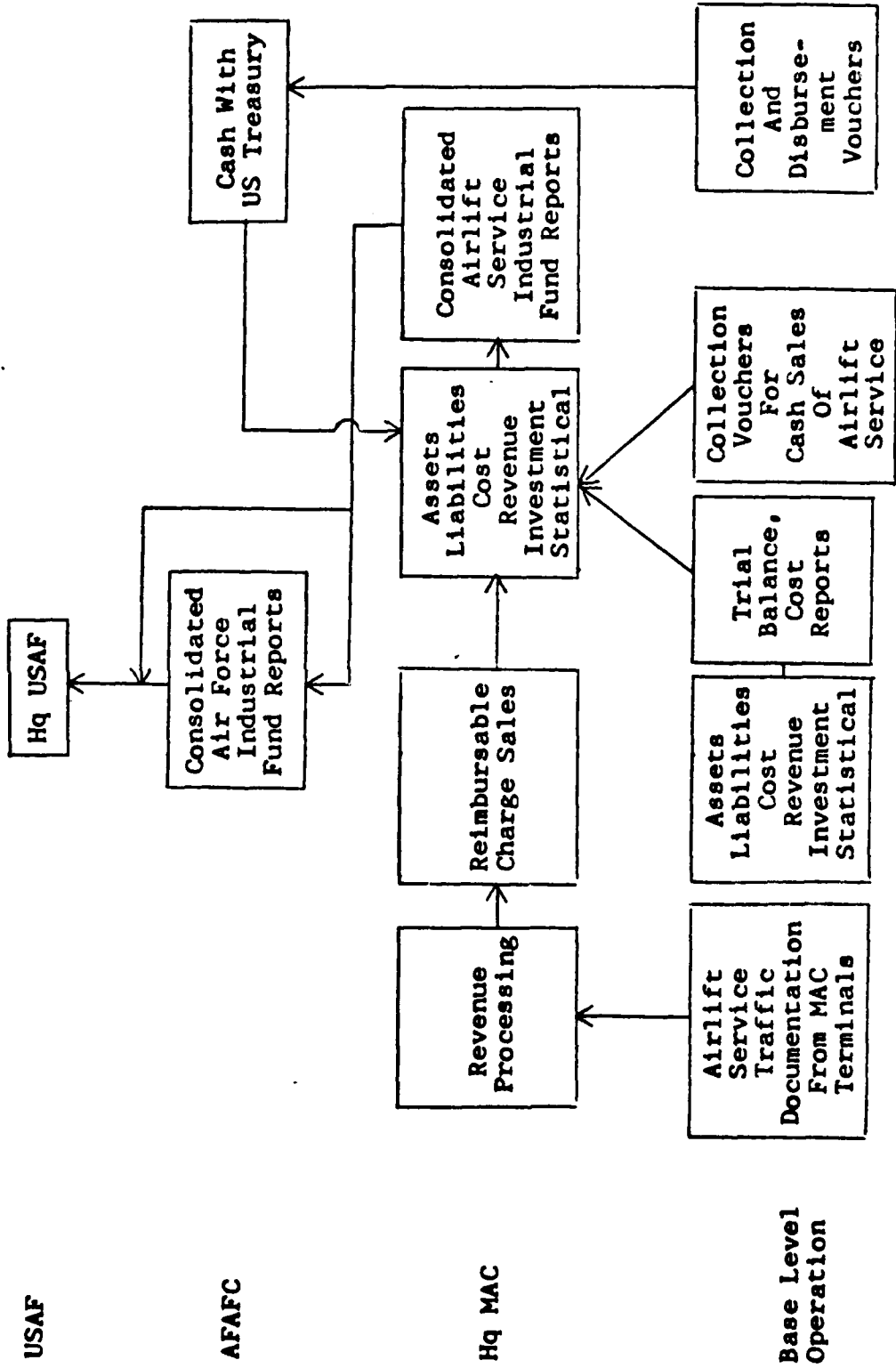


Fig. 3-1 ASIF Accounting and Finance Systems Flow Chart (161A2-1)

all submitted in terms of ton miles. After these requirements have been submitted, MAC will analyze them for completeness and consistency. If adjustments must be made, agreement is reached between MAC and the requesting agency. The finalized requirements estimates are published in the annual MAC Airlift Operations Directive (AOD). The requirements are in terms of Passenger/Air Evac outbound/inbound, cargo outbound/inbound, Normal and TP-9, and SAAM/Ex/ABT. The total requirements must then be compared to existing capabilities.

#### Capabilities

The capability generated by MAC's portion of the USAF Flying Hour Program determines the capability of MAC. The flying hour program is derived from an estimate of the number of flying hours required to train MAC's aircrews and support personnel in order to maintain world-wide strategic airlift capability. By deduction, then, that capability which is applied to users' requirements is that capability generated by accomplishing the training requirements. Of course, the USAF can adjust these training requirements to satisfy fluctuating DoD airlift as desired. The commercial augmentation capability is that amount of civilian airlift capability assigned to CRAF. (See Appendix E)

The MAC and commercial augmentation capabilities are entered into the AOD where they are adjusted by average utilization factors, compared to the requirements, and allocated to meet each requirement. Utilization factor adjustments are

applied to the capability data based on operational experience which has shown that on the average the entire capability of an aircraft is seldom utilized due to the nature of air cargo shipments.

Figure 3-2 depicts how the capability (military and commercial) is assigned. The military capability is assigned to PAX-A/E, Cargo, SAAM/Ex categories while the commercial augmentation capability is assigned to PAX, Cargo, and SAAM. Commercial augmentation is contracted for most of the passenger requirements and that portion of cargo requirements which exceeds military capability. The totals derived from these three categories are used as a basis for prorating the various costs to be used in the rate determination. Of primary importance in tariff rate construction is, of course, a determination of the costing criteria.

#### Expense Criteria

There are two categories of ASIF costs. The first, commercial costs, is based on rates derived from Civil Aeronautics Board (CAB) rates. These rates are then applied to commercial requirements previously identified by AOD. There is a different CAB rate for Passenger, Cargo, and Mixed Categories of airlift. Organic costs are based on three categories of military costs which have been prorated according to the percentages of capability generated. The three categories include: (a) administration and communication expenses, (b) terminal and support expenses, and (c) direct operating expenses. (See Figure 3-3) Total costs are then

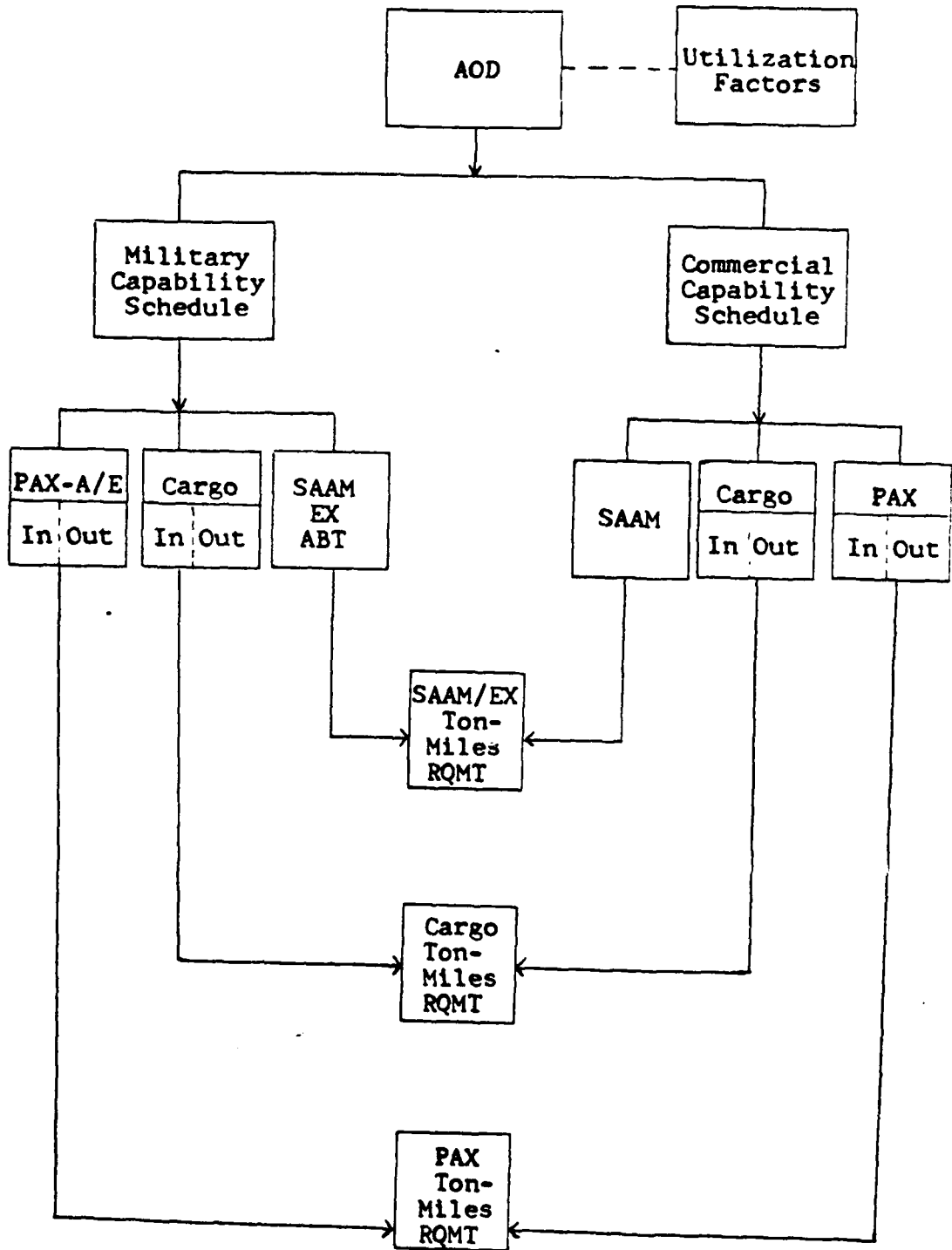


Fig. 3-2 AOD Assignments

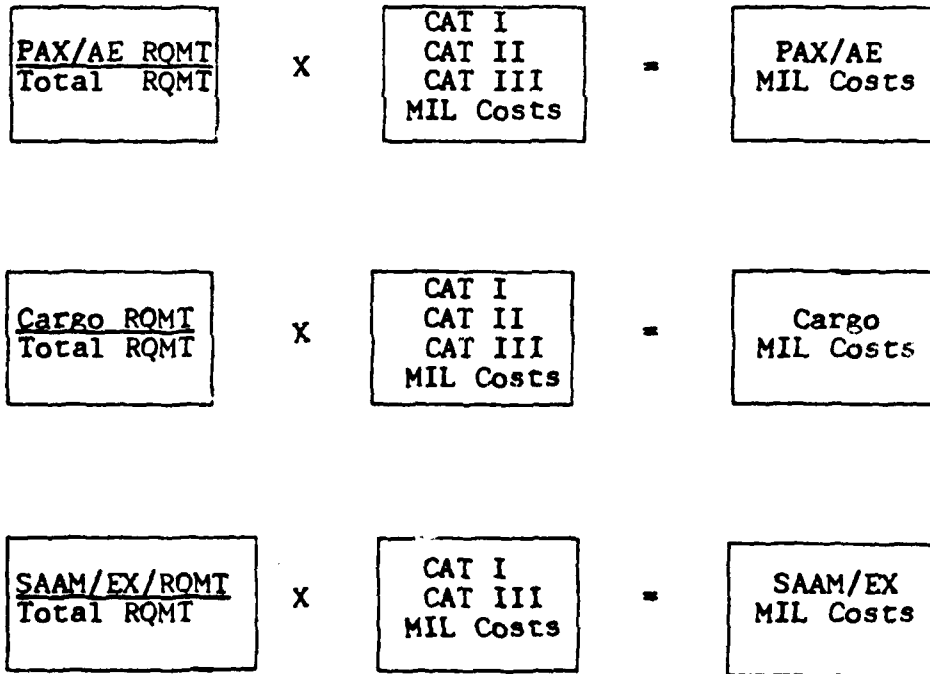
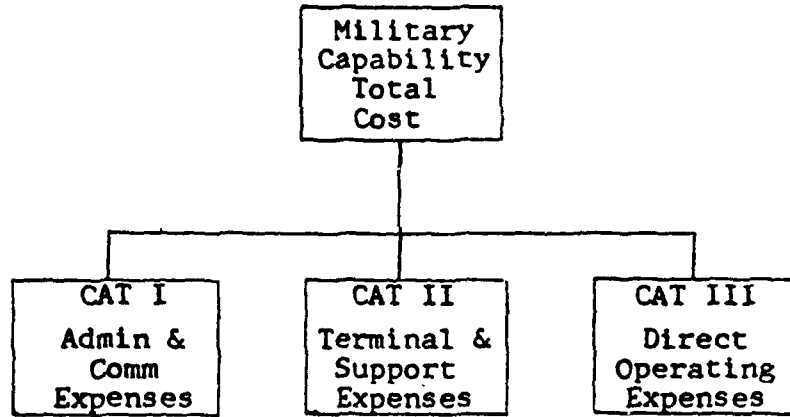


Fig. 3-3 Organic Expense

based on a summation of organic and commercial costs. Figure 3-3 summarizes the cost compilation of organic expenses, while Figure 3-4 shows the commercial expenses. Following an aggregation of the two expenses, rates are computed for the three categories. Figure 3-5 details the actual rate computation process for the categories. A step by step rate calculation process is developed in the Freer and Ohl thesis. (45)

At this point, several factors extraneous to rate computation enter into the expense defining process. The first is that of actual versus optimal aircraft location. Optimal location would require that if most aircraft utilization was in Southeast Asia, then, the aircraft should be based on the west coast of the United States. Actual location, however, is not based on an economics principle of optimization, but rather on the strategic mobility concept of which MAC is a major contributor. This provides for a balanced distribution of aircraft on each coast. Cost compensation is made as single tariff rates are established between two points without regard to original aircraft location. The costs, then, are based on the category of airlift performed and the flying hours required, not the shuffling of aircraft.

Another factor relating to actual expense is the composite rate used for both commercial and military aircraft. Such a rate is required as it allows MAC to make the mode utilization decisions demanded. Additionally, such a composite rate facilitates both MAC and user planning and budgeting.

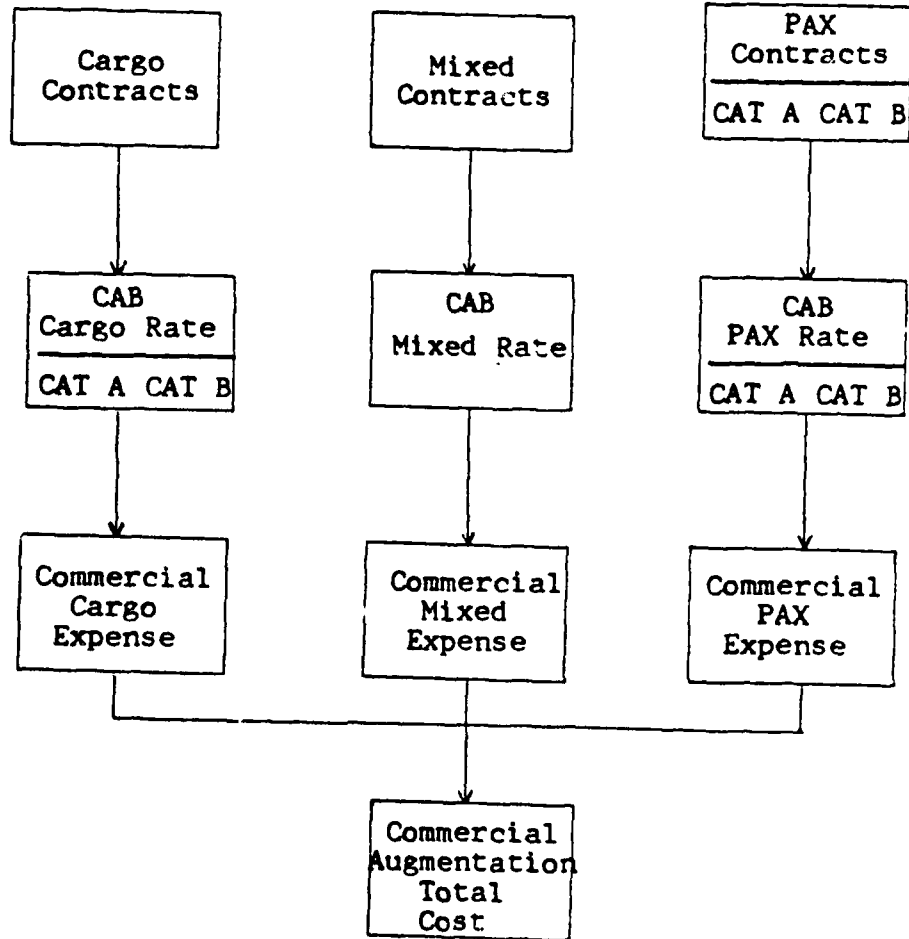
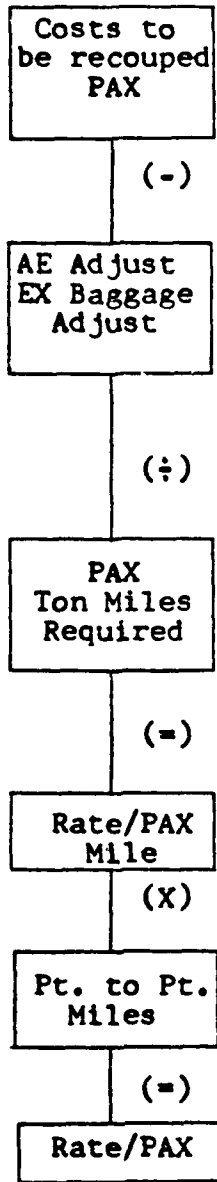
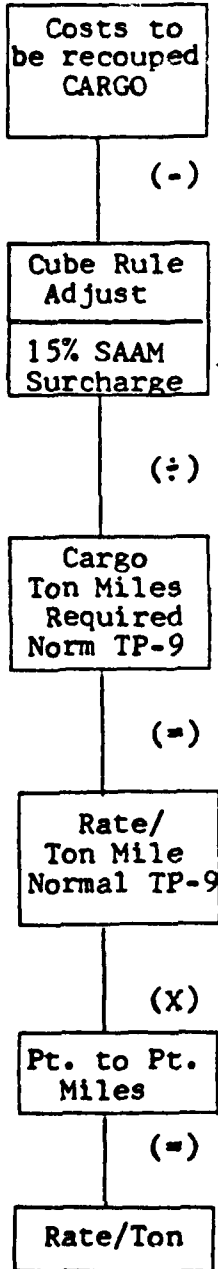


Fig. 3-4 Commercial Expense

Passenger Rate Computation



Cargo Rate Computation



SAAM/EX Rate Computation

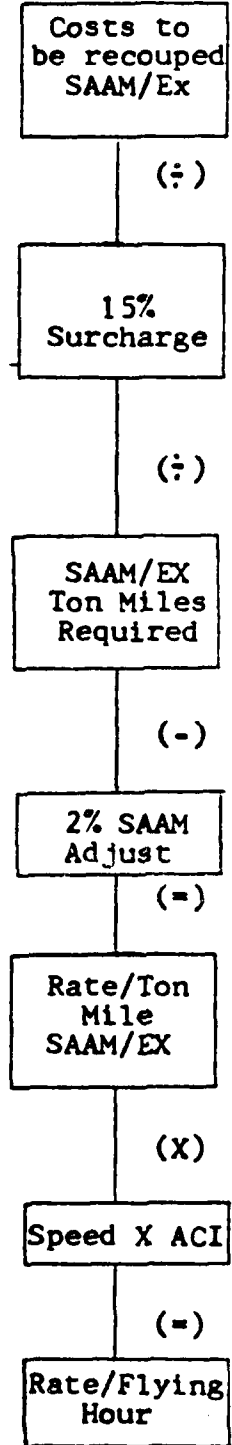


Fig. 3-5 Rate Computations

Actual utilization of aircraft is another important factor. Rate structure costs must necessarily be based on capacity generated rather than capacity utilized, if total costs of creating capacity are to be recouped. The 1973 ASIF Revised Operating Budget clearly shows that outbound traffic utilized only 64% of available capacity. Retrograde movement was even less efficient, showing a utilization of barely 44%.  
(30)

A factor which is used to equalize costs among users is the utilization of basing points. Current rates are developed using standard mileage from a basing point following a standard route. Depending on the actual route flown, however, there may be a large variation in distance flown. For example, the standard for the west coast to Japan route is listed as 4,955 miles, yet following the North Pacific Route requires 5,922 miles. (See Appendix C for MAC routes) The result is that users must submit their cargo to specified ports for given destinations.

A final factor for consideration is the fund's (ASIF) requirement to break even. Basically, the break even requirement has the effect of amplifying rate changes. Further, if estimates are lower than actual requirements, then succeeding rates are lowered. If estimates are higher than actual requirements, then succeeding rates are raised. Having examined the general relationship of expense to the rate construction process, some insight as to specific expenses will prove beneficial.

ASIF Expense Categories (1973)

The MAC ASIF Revised Operating Budget published annually depicts the following expense categories.

- (1) Pay of Civilians--This represents compensation and benefits paid to Department of the Air Force (DAF) civilians and direct line hire foreign nationals who are coded ASIF in the Unit Detail Listing. (16:2-1)
- (2) Aircraft Depot Maintenance--Depot maintenance costs include airframe, engine, gas turbine units, exchangeables, area support, and inservice engineering support costs. These costs are paid to ASIF by Depot Maintenance Industrial Fund (DMIF) as reimbursement for depot services.
- (3) Base Maintenance--These are non-ASIF maintenance facility costs such as maintenance on ASIF aircraft, engines, or equipment; included is ASIF maintenance support at locations where Air Force capability does not exist.
- (4) Terminal Support--These costs include reimbursement for services received from appropriated fund activities at enroute locations where MAC has regularly scheduled channel flights. (16:2-5)
- (5) Contract Fleet and Traffic Service--These costs are for contracts involving fleet and traffic service in support of airlift service missions. (24:2-3)

- (6) Aviation POL--This is the cost of aviation POL used in Industrial Fund aircraft and in aircraft ground equipment, engine tests, inspections, repairs, and buildups. (16:2-1)
- (7) Supplies and Materials--These are supplies and materials charged upon issue to the ASIF organization from the AF Stock Fund, since ASIF funds are not normally used for procurement of such items. (16:2-1)
- (8) Equipment--This expense consists of tools and equipment having a unit cost of less than \$1,000 which are issued to ASIF from the AF Stock Fund. (16:2-2)
- (9) Administrative Expense--This element of cost is the reimbursement to appropriated funds for a proportionate share of the administrative cost of Headquarters MAC, Numbered Air Forces, Wings, and Groups. (16:2-5)
- (10) Temporary Duty (TDY)--TDY expenses include transportation, per diem, excess baggage, and other incidental costs of travel for: (a) personnel assigned to the ASIF organizations basically without regard to the purpose of travel; (b) personnel assigned to MAC non-industrial fund units when traveling on airlift services business; (c) medical attended personnel not assigned to MAC A/E units. (16:2-3) The largest expense in this

category is the per diem paid to the aircrews while they are away from home flying MAC missions.

- (11) Wake Island--Wake Island is a stopover point on MAC's MIDPAC cargo route to the Far East. Most facilities on the island are operated by a private concern under contract to MAC. The contractor supplies MAC with all enroute services required. This includes but is not limited to servicing the aircraft, maintenance and repair of aircraft, and flight planning and weather service.
- (12) Communications--MAC leases private lines through the Defense Commercial Communications Office, obtains certain services from Air Force Communications Service (AFCS) and other agencies to establish a communication network for world-wide control of its aircraft.
- (13) Real Property Maintenance--Costs incurred from maintenance and alteration of industrial funded facilities whether performed by the Base Civil Engineer or by contract are included here.
- (14) Foreign Nations-Indirect Hire--The indirect hire system provides that the host government assume the responsibility for meeting the needs of the USAF. Rates conform to local government rates.  
(16:2-4)
- (15) Engineering Technical Services--These costs are those resulting from engineering services provided

in connection with equipment assigned to an airlift service organization. (16:2-4)

- (16) Utilities--These are expenses incurred in the purchase of gas, electric power, water, and heat for ASIF facilities. (16:2-5)
- (17) Other--Included here are Automatic Data Processing Equipment (ADPE) rentals; equipment maintenance; laundry and dry cleaning; landing, parking, diversion and overfly fees; border clearance charges; reimbursement to other services; transportation of things; civil engineering service by contract; service contracts; and miscellaneous. (16:2-3)
- (18) Commercial Augmentation--This is commercial airlift purchased to augment the military airlift capability. Augmentation includes costs for planeload and less-than-planeload purchases of passengers, cargo, and mail.

Given the preceding list of ASIF expenses Figure 3-6 depicts the actual costs involved in fiscal year 1973 funding. An analysis of ASIF industrial funding as well as a comparison of MAC and MSC billing rates appears in Chapter V.

<u>Detail</u> (1)	FY 1974	
	<u>Bud</u>	<u>Est</u>
	(5)	
Pay of Civilians	\$ 43,326	
Aircraft Depot Maintenance	(150,546)	
Airframes	37,260	
Engines	24,758	
GTUs	1,037	
Exchangeables	65,665	
Area Support	360	
In-Service Engineering Support	21,466	
Base Maintenance	(1,847)	
Cross Service Agreement	499	
By Contract	1,348	
Terminal Support	6,387	
Contract Fleet & Traffic Service	1,727	
Aviation POL	101,924	
Supplies & Materials	40,261	
Equipment	1,773	
Administration Expense	12,733	
TDY	11,987	
Wake Island	2,487	
Communications	1,072	
Real Property Maintenance	1,720	
Foreign Nationals-Indirect Hire	3,882	
Engineering Technical Services	998	
Utilities	2,945	
Other	10,303	
	<hr/>	
TOTAL ORGANIC EXPENSE	\$395,918	
Commercial Augmentation	228,666	
	<hr/>	
GRAND TOTAL	\$624,584	
Non-Ad. Military Personnel Services (Includes Direct & Indirect Expenses)	\$226,283	

Fig. 3-6 Airlift Service Industrial Fund FY 1973  
 Revised Operating Budget/FY 1974 Budget  
 Estimate Expenses--Transport Mission (30)

Summary

Chapter III developed the ASIF specifying the "user pays" and "break even" policies of the industrial fund concept. Secondly and most importantly, the process of tariff rate construction was described. Generally, the process involves matching requirements (total DoD) with capability (MAC and commercial) and then structuring a funding system based on expenses created in providing the service. Lastly, specific expense categories are listed.

## CHAPTER IV

### MILITARY SEALIFT COMMAND INDUSTRIAL FUND TARIFF RATES

#### Introduction

The purpose of this chapter is to develop the rate structure of MSC. The majority of the information contained herein was the result of personal interviews held at Headquarters MSC, Washington, D.C. The comptroller at MSC has the overall responsibility of coordinating the budget estimates for a particular fiscal year. (23) As such his office is the focal point in the determination of actual MSC tariffs. This chapter, then, will present a discussion of MSC requirements determination, tariff rate structure, and budget expenses. As was the case in the preceding chapter, a brief indoctrination as to the MSC industrial fund organization should prove worthwhile. The official title of this fund is presently the Navy Industrial Fund-MSC (NIF-MSC). (24:102)

#### Navy Industrial Fund-MSC

The NIF was established under the same provisions as the Air Force Industrial Fund. Eligibility of an activity for operation under the NIF is subject to the following basic criteria: (25:3)

- (1) The installation is an industrial-type or commercial-type activity engaged in producing goods or providing services that are common to requirements of more than one department or agency or ordering activity.
- (2) A "buyer-seller" or a "contractual" relationship exists between the industrial-type or commercial-type activity and those activities that require and order end-products or services from it. (26:3)

The MSC was established as a component of the United States Navy by the Secretary of the Navy Instruction 5430.11A of 6 July 1956. The initial working capital for MSC was provided by an allocation of funds from the cash balance of the Navy Industrial Fund and by a capitalization of the inventories of materials and supplies. The net amount of this working capital was utilized by MSC as a revolving fund to finance the costs of producing the goods and services ordered by customers. The industrial fund is reimbursed by billing the appropriations of the customer for the costs of goods and services furnished.

(39) The liability of the customer is limited by the amount and terms of the order. Appendix F shows the relationship of MSC to the total NIF budget. Figures 4-1 and 4-2 depict the NIF-MSC industrial fund process. With this basic understanding of NIF-MSC let us proceed with a discussion of MSC requirements determination and tariff structure.

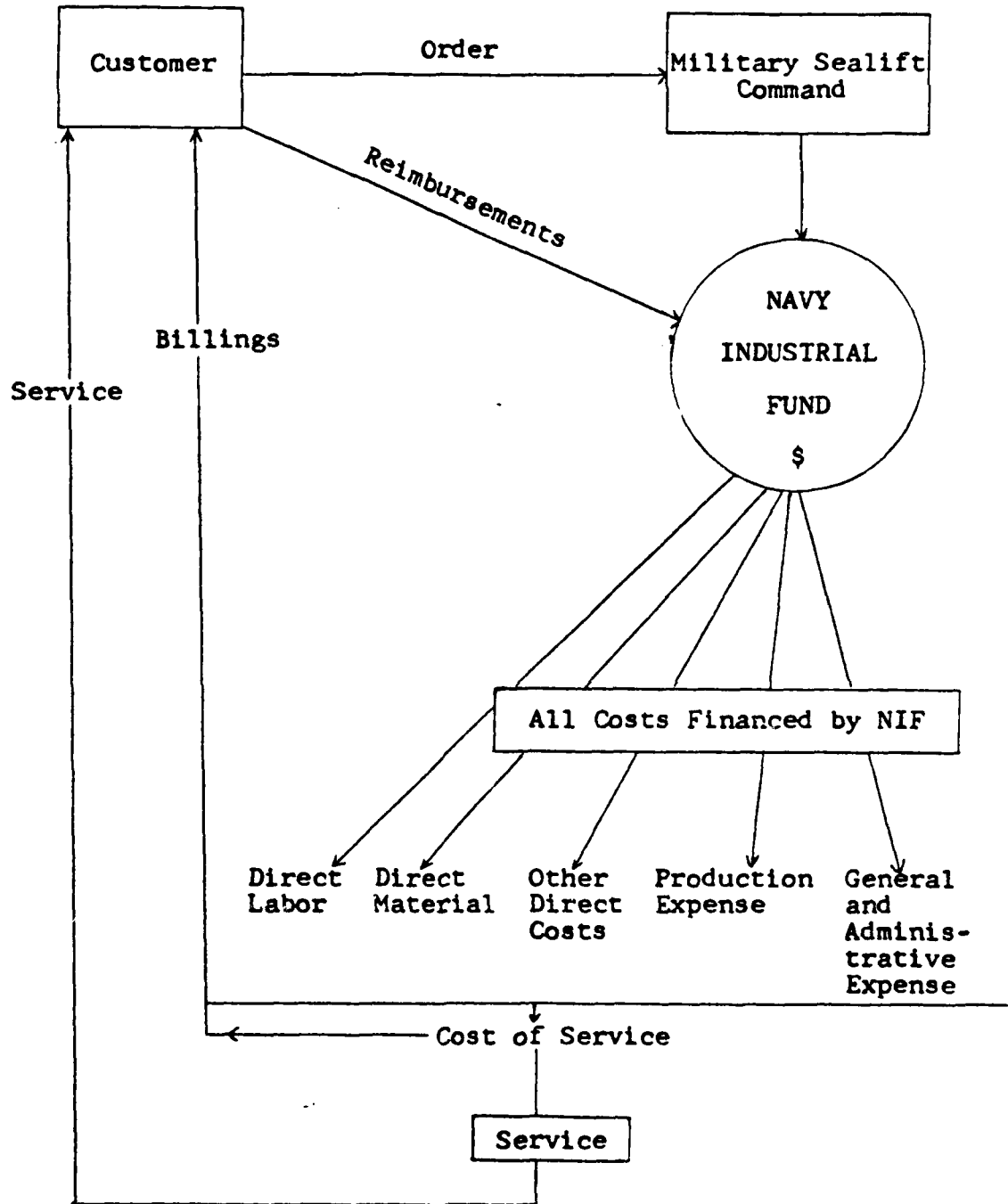


Fig. 4-1 Cycle of Operations Under Navy Industrial Fund Financing (26:5)

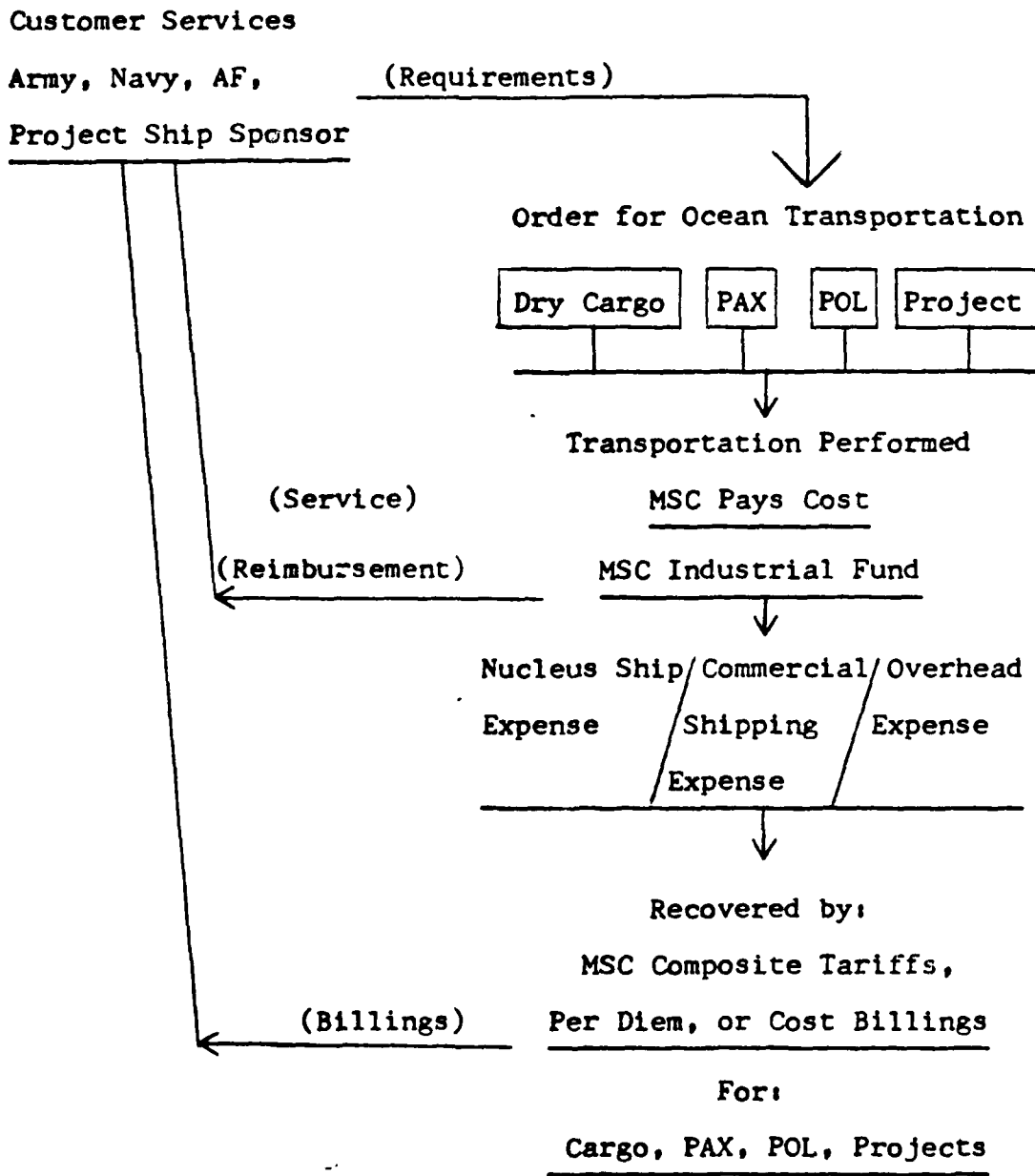


Fig. 4-2 MSC Industrial Fund Concept

Requirements

Prior to the preparation of the operating budget, the Commander of MSC (COMSC) requests the shipper services to submit their estimates of lift requirements. These estimates should be submitted by type of sponsorship (i.e., troop support, route, and commodity classification). (See Appendix G for MSC 1974 Lift Requirements) After review of the estimated lift requirements by the Comptroller and operating divisions (see Figure 4-3), the operating divisions prepare for approval of the "Operating Force Plan." The "Operating Force Plan" sets forth proposed methods of meeting shipper services' lift requirements, (i.e., available time and space of controllable shipping, route and commodity and proposed method of lifting requirements beyond the capability of controlled shipping). Subordinate commands then submit estimates of overhead and ship operating expenses (for each ship type and augmentation for each ship to be engaged in a project or special mission) which COMSC studies for approval. The Comptroller (MSC), then, reviews the submitted costs, which include estimates of commercial shipping services maintenance and repair. After approval of the Comptroller's recommendations, COMSC submits his operating budget to the Department of Navy, in support of proposed tariffs. (24:2-3) (See Figure 4-4) Upon receipt of the operating budget, the Comptroller develops billing rates sufficient to produce income equal to the budgeted expense, utilizing the lift requirements on which the operating budget is based. These rates are designed to recover costs equitably

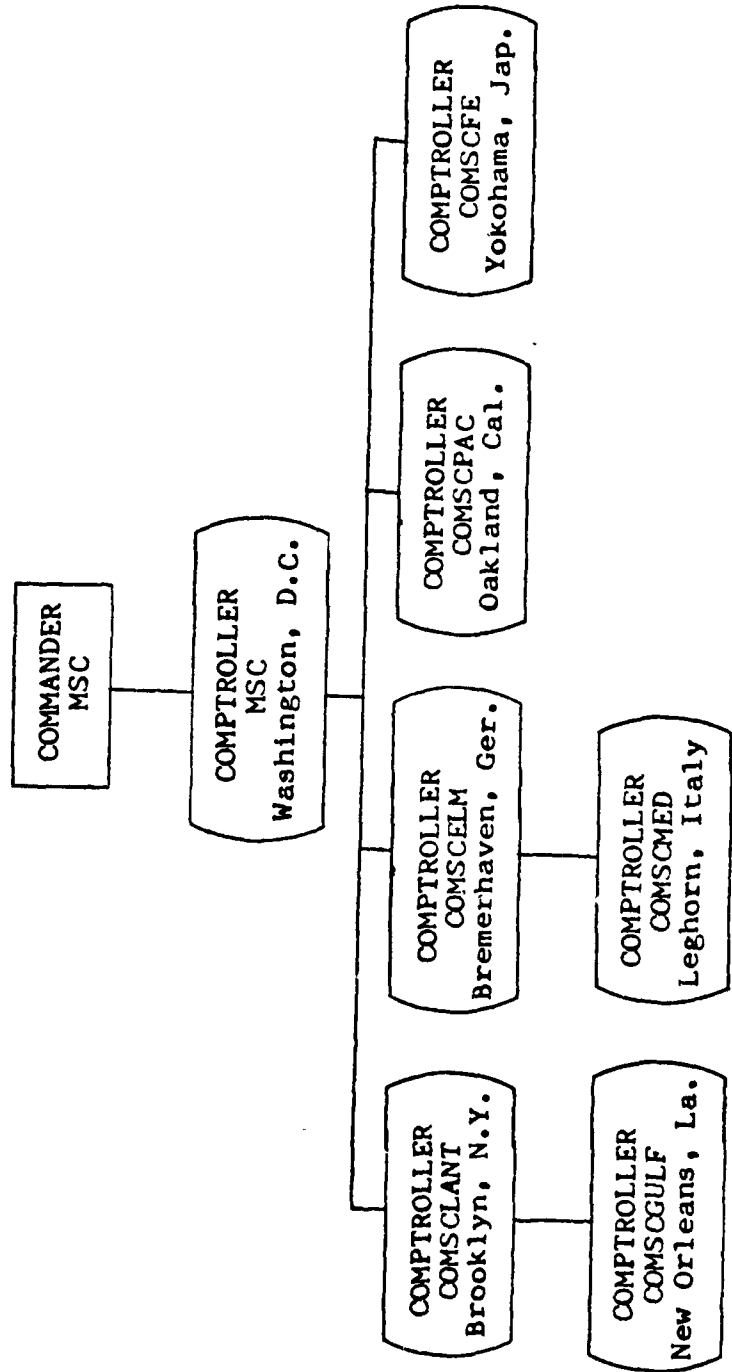


Fig. 4-3 Comptroller Organization Operating Divisions

ARMY, AIR FORCE, NAVY, AND OTHER  
DOD REQUIREMENTS FOR SHIPPER SERVICE

COMPTROLLER AND OPERATING DIVISION REVIEW

OPERATING DIVISIONS PREPARE

"OPERATING FORCE PLAN"

COST ESTIMATES; OVERHEAD, SHIP EXPENSE,  
COMMERCIAL SHIPPING SERVICES, MAINTENANCE AND REPAIR

COMPTROLLER REVIEW AND RECOMMENDATIONS

COMMANDER MSC APPROVAL

DEPARTMENT OF NAVY APPROVAL

DEPARTMENT OF DEFENSE APPROVAL

OPERATIONAL BUDGET INCLUDING BILLING RATES

Fig. 4-4 Requirements and Budget Sequence

by commodity and service (e.g., cargo, passenger, petroleum). The Comptroller, MSC, continually reviews the billing rates and compares them with MSC shipping contract rates and other commercial rates. (24:07) All rates are reviewed at least once during each fiscal year.

For the purpose of administration, the budget is controlled by three types of expenses, namely, MSC nucleus ships expense, charter and ship contract expense, and overhead expense. (24:04) MSC nucleus ship expense and overhead expense are recouped via the rate composition structure on a "break even" basis. In order to meet total lift requirements MSC has charter and ship contract options with commercial shipping companies. Following a brief discussion of charter and contract definitions, MSC tariff rate composition will be developed.

#### MSC Contract Agreements

- (1) Time Charter: A charter under which the ship is at the disposal of the government (MSC) for a specified time. (13:3280)
- (2) Voyage Charter: A charter in which there is an agreement (rate) for a defined voyage. (13:3413)
- (3) Government Bill of Lading Shipments (GBL): A memorandum or acknowledgment in writing of receipt of cargo with agreement to deliver at a designated destination to an appointed consignee for a specified rate established by MSC. (13:355)

Utilization of such agreements is closely tied to various

billing rates. The following discussion of billing rates develops this relationship.

#### Billing Rates

After approval of the detailed rates, the Comptroller arranges for publication. These rates are published in COMSC Instruction 7600.3E, "Billing Rates," which describes the MSC billing rate structure. The MSC cargo rates are developed by adjusting the previous year's rates to compensate for swings in revenue realized from the preceding year. The data used in the analysis is based on historical data developed from adjustments in a base year structure. Several years ago an independent consulting firm made an across the board analysis of MSC's rate structure and developed a data base that has hence been adjusted each succeeding year to account for deficiencies. (42) Billing rates are established based on the following breakdown of composite rates:

- (1) Break-bulk cargo rates
- (2) Passenger rates
- (3) POL rates
- (4) Ship per diem rates
- (5) Container rates
- (6) Project ship rates

A closer examination of these rates is required. The break-bulk cargo rates are normally applicable to ocean transportation service for break-bulk shipments provided by MSC between ports located within MSC "Traffic Areas." These areas have been established for the purpose of combining certain ports

or regions for billing requirements and statistical purposes. These areas are illustrated in Appendix H. In certain instances, the nature of the shipment may necessitate a negotiation of the billing rate between MSC and the shipper service. This negotiated rate may take the form of either a measurement ton rate or a lump sum. (22) The rates as described in the break-bulk category are not applicable to per diem shipments (described later in text) or GBL (government bill of lading) shipments. For the purpose of applying the break-bulk cargo rates, commodity classifications are established for considerations of commodity size, weight, bulk, special characteristics, etc. Commodities are divided into eight well-defined classifications as follows:

- (1) Ammunition/Hazardous Cargo: Includes explosive projectiles, bombs, mines, hand grenades, small arms, small arms ammunition, inflammable liquids, radio active waste, powder, dynamite, or any other hazardous commodity which requires specialized handling or stowage.
- (2) Reefer: Perishable commodities such as meats, vegetables, fruits, butter, eggs, and poultry which require refrigerator (chill or freeze) storage. It does not include semi-perishable cargo stored in ventilated holds.
- (3) Special: All wheeled and trucked vehicles and any commodity which weighs more than 10,000 pounds or measures more than 35 feet in any

dimension. Does not include privately-owned vehicles (POV), uncrated aircraft, or stake/van type cargo-carrying trailers.

- (4) Privately-owned Vehicles: Vehicles belonging to an individual rather than to a government agency.
- (5) Cargo-carrying Trailers (CCT): Van, stake, or platform type trailers lifted on MSC controlled "Roll-on/Roll-off" type ships, whether full, partially loaded, or empty. Billing is based on overall outside cube (M/T).
- (6) Bulk: Unpacked dry or liquid cargo such as coal, grain, ore, sulphur, fertilizer, and edible oils.
- (7) Aircraft: Whole aircraft or complete fuselage, whether or not engines are installed. Does not include spare parts, engines, aircraft repair supplies, or boxed aircraft.
- (8) General: Commodities other than those defined above. Includes CONNEX boxes (reusable metal containers not designed for intermodal transportation).

MSC does provide its customers with reduced break-bulk rates as specified in CONSCINST 7600.3E such as space available and on deck rates. These rates are applicable only to limited commodities. In addition, generally when MSC provides services for which billings normally would be on the basis of MSC rates which necessitates expenditures over and above costs included in the rates due to circumstances beyond the control

of MSC, such additional costs are billed directly to the agency requesting the service.

The second composite that makes up the rate structure is passenger rates. Passenger travel on MSC nucleus ships and commercial passenger/cargo ships are billed to the sponsoring shipper service on a cost reimbursement basis. Also, passengers carried as supercargo will be charged for "out-of-pocket" costs at the rate of \$2.50 per day when subsistence is furnished.

The third group of the composite rate structure is a breakdown of POL rates. When applying these rates, POL products are divided into two classes as follows:

- (1) Black: Residual type products such as crude, asphalt, and Navy Special Fuel.
- (2) Clean: Refined type products such as kerosene, mogas, avgas, jet, diesel, and solvents-naphthas.

Unlike dry cargo POL rates are classed as "one rate." POL products are termed as "clean products" because of this one rate system. The difference in the rates is determined by the lot size of the shipment or tanker. While dry cargo billing rates are quoted in measurement tons (M/T), POL rates are based on long tons (L/T). Both dry cargo and POL rates govern all shipments which are not subject to either a per diem charge or other special rate. Per diem rates apply in the following situations:

- (1) Voyages on which shipper service requirements preclude a reasonable utilization of the ship either as to time or space.

- (2) Ship demurrage or detention.
- (3) Ship diversion. When a shipper service requests to divert a ship which results in additional cost to MSC (delay in excess of twelve hours), the shipper service will be billed at the applicable MSC per diem rate for MSC controlled ships (i.e., nucleus and chartered ships) and at the actual cost for all other ships.

The rates published for containers include loading and discharging the containers and local dryage at the loading and discharge ports, and are applicable to ports located in the MSC traffic areas described in Appendix H. Container services provided by MSC are classified as follows:

- (1) SEAVANS: These containers are owned and controlled by a commercial shipping company. Billings under this category are made to shipper services in proportion to percentage of container used and weight of cargo. Shipper services are billed additional charges for delinquent return dates for containers, contractor loading of containers, failure to make cargo available to contractor at the rate of 10 M/T per hour of container worked, and line haul service to or from inland points.
- (2) MSC VANS: These vans include commercial-owned containers but leased to MSC and government-owned containers loaned to MSC. These vans are also

billed according to percentage of container used and weight of cargo.

- (3) MILVANS: These include all government-owned containers other than those loaned to MSC. These containers have special rates which are included in COMSCINST 7600.3E.

The final rate category is for MSC project ships which comprise a major portion of the MSC fleet (35 ships). These ships are all civilian manned and are operated for various U.S. agencies such as NASA, Navy Oceanographic Service, USAF Test Range, Pacific Missile Range, etc. Project ships are billed to the user at cost or per diem in accordance with the agreement between the sponsor agency and MSC. In addition, the sponsor agency must defray the cost of any ship alterations and, upon project completion, the cost of returning the ship to its original condition. Having examined the various composite rates used by NIF-MSC, a discussion of the expense categories, previously mentioned, should provide integration of the rate determination process.

#### MSC Expenses (1974)

As previously mentioned the three primary expense categories of MSC are direct costs of nucleus ships, charter and ship contract expense, and general or overhead expenses. MSC also compiles expense data under an account titled Memorandum. Included in this expense category are such things as: acquisition cost of ships and equipment, provision for depreciation of ships and equipment, and estimated costs for

indirect and contributed military pay and allowances. While such information is not presently utilized by MSC in determining its rate structure, their applicability will be considered in Chapter V along with a comparative analysis of ASIF and NIF-MSc billing rate composition.

Direct costs of nucleus ship expenses include: salaries (civilian and marine), propulsion fuel, transportation and handling of supplies, maintenance and repair of ships, and activation and inactivation of ships. (See Figure 4-5) Charter and contract expense is further divided to distinguish between cargo ships, passenger ships, petroleum ships, and project ships. Time charters, shipping contracts, voyage charters, and container agreements are examples of expenses attributable to the contract category. (See Figure 4-6) The third category of MSC expenses is listed as overhead or general expenses. This category is generally defined as all costs of operation of the MSC shoreside establishment. (24:90) Included in this category are the following expenses: salaries and wages, office equipment, automotive equipment, occupancy of premises, and civilian medical. (See Figure 4-7)

DESCRIPTIONSalaries and Wages, Civilian & Marine

Regular Time. . . . .	\$ 34,470
Overtime. . . . .	14,935
Relief Officers . . . . .	7,830
Bonuses . . . . .	7,105
All Other Premium Pay . . . . .	923
Annual, Sick and Military Leave . . . . .	7,180
Shore Leave . . . . .	1,010
Indoctrination and Training . . . . .	400
Awaiting Assignment . . . . .	123
Indigenous Labor. . . . .	229
Employer Contributions. . . . .	3,753
Total Salaries and Wages, Civilian & Marine . . . . .	<u>\$ 66,815</u>

Other Expenses

Propulsion Fuel . . . . .	\$ 12,009
Subsistence Travel, Repatriation, Cash in Lieu of Subsistence, and Quarters,	
Medical and Dental Expenses . . . . .	2,160
Transportation and Handling of Supplies . . . . .	442
Laundry Expenses. . . . .	222
Repairs to Special Material in Store. . . . .	34
Loss on Special Material by Disposal. . . . .	60
Loss (Gain) on Spec. Material by Inv. & Acctg.. . . .	203
Ship Equipage . . . . .	858
Container and Related Equipment Costs	
Maintenance and Repair of Ships . . . . .	18,435
Accident and Damage Repairs . . . . .	315
Alteration of Ships, Unprogrammed . . . . .	1,320
Alteration of Ships, Programmed . . . . .	1,007
Activation of Ships, Inactivation of Ships . . . . .	2,547
Extraordinary Repairs, Claims. . . . .	4,610
Terminal Demurrage. . . . .	1,960
Miscellaneous . . . . .	4,003
Total Other Expenses. . . . .	<u>\$ 53,576</u>
GRAND TOTAL . . . . .	<u>\$120,491</u>

Fig. 4-5 Nucleus Ships Expense for the Period  
1 July Through End of Quarter (1974) (34)  
(000)

FY 1974  
Operating Budget

I.	Cargo Ships			
	A. GAA Ships		\$ -0-	
	B. Time Charter		74,698	
	C. USS Fleet LST's		-0-	
	D. Voyage Charter		3,890	
	E. Other Commercial Break-bulk		53,639	
	F. Other Commercial Container		133,195	
	G. Berth Term		<u>19,316</u>	
		TOTAL	<u>\$284,938</u>	<u>\$284,938</u>
II.	Passenger Ships		-0-	
III.	Petroleum Ships			
	A. Shipping Contracts		\$ 1,038	
	B. Voyage Charters		3,559	
	C. Long Term Consecutive Voyage		41,863	
	D. Time Charters		19,282	
	E. Contract Operated		<u>31,312</u>	
		TOTAL	<u>\$ 97,054</u>	<u>\$381,992</u>
IV.	Project Ships		\$ 8,757	
		TOTAL	<u>\$ 8,757</u>	<u>\$390,749</u>

Fig. 4-6 Charter and Ship Contract Expense (34) (000)

	FY 1974
<u>SALARIES, WAGES AND RELATED EXPENSE</u>	<u>OPERATING BUDGET</u>
Regular Time, Total. . . . .	\$13,243
Overtime, Total. . . . .	379
Annual, Sick and Military Leave. . . . .	1,896
Indigenous Labor . . . . .	2,078
Employer Contributions and FICA. . . . .	1,281
Other. . . . .	66
Total Salaries and Wages. . . . .	<u>\$18,943</u>
<u>INDOCTRINATION AND TRAINING EXPENSE.</u> . . . .	\$ 66
<u>DESIGN, DEVELOPMENT AND EXPERIMENTAL</u>	
<u>EXP. SHIPS</u> . . . . .	158
<u>TRAVEL</u> . . . . .	581
<u>OTHER EXPENSES</u>	
Occupancy of Premises. . . . .	838
Office Equipment Rental and Services . . . .	844
Office Expenses, Stationery and Postage. . .	760
Communications . . . . .	546
Office Equipment and Maintenance . . . . .	162
Cash in Lieu of Quarters . . . . .	168
All Other . . . . .	255
Total Other Expenses. . . . .	<u>\$ 3,573</u>
<u>TOTAL OVERHEAD EXPENSE</u> . . . . .	<u>\$23,321</u>

Fig. 4-7 Military Sealift Command FY 1974 Overhead  
Operating Budget Statement of Overhead  
Expenses Consolidated \$(000) (34)

Summary

A firm understanding of the NIF-MSC is paramount before analyzing the MSC rate structure. Chapter IV has developed the NIF-MSC and specific ship charter agreements held by MSC. All MSC billing rates are established based on either break-bulk, passenger, POL, ship per diem, container, or project ship rate categories. In order to compute shipping rates that satisfy the "break even" concept, specific costs must be considered, i.e., direct cost of nucleus ships, contract agreements, and overhead costs.

## CHAPTER V

### COMPARISON AND ANALYSIS

#### Introduction

The purpose of Chapter V is to compare and appropriately analyze the material presented in Chapters III and IV on the two transportation modes, MAC and MSC. Of primary concern in this chapter is the relationship of one system to the other, including questions such as the following:

- (1) Are requirements and capabilities generated in a similar manner?
- (2) How does billing rate structure compare?
- (3) Do the basic expense categories utilized in determining tariffs reflect similar costs in providing a transportation service?

While these questions will not be restated and answered directly, the analysis of each section will reflect such conclusions. Chapter V, then, initially examines requirements and capabilities by comparing the two determination processes; compares their respective billing rate structures; and finally makes an analysis of the expenses included by both agencies.

### Requirements and Capabilities

Each year MAC and MSC begin their respective preparation of the budget by receiving requirements estimates from their users. These requirements are in terms of normal inbound/outbound shipments and also include specialized shipping demands. These requirements are then compared to total lift capability of organic (MAC) and nucleus (MSC) fleets. The lift requirements over and above that which can be supplied by these fleets is contracted to commercial transporters. After final adjustments to these requirements are completed both agencies prepare their respective plans for satisfying those requirements; MAC publishes the "Airlift Operations Directive" and MSC publishes the "Operating Force Plan." A closer look at the categories in which the lift requirements are submitted to each agency will help in understanding a comparison of the rate structures of ASIF and NIF-MSC.

### Rate Structure

This section compares the categories of the rate structure of ASIF and NIF-MSC. Figure 5-1 presents the categories for each agency respectively. The chart shows that many of the categories are used in the same manner. Let us now take each one and compare the two systems.

ASIF uses a passenger category which includes all travel by DoD personnel except medical evacuation. Although NIF-MSC does not move a large number of DoD personnel it does provide the capability. (Note: MAC moved 1,634,000 passengers

MAC (ASIF)

1. PASSENGER (PAX)
2. AIR EVACUATION (A/E)
3. CARGO
4. SAAM/EX/ABT

MSC (NIF-MSC)

1. BREAK-BULK CARGO
2. PASSENGER
3. POL
4. SHIP PER DIEM
5. CONTAINERS
6. PROJECT SHIPS

Fig. 5-1 Billing Rate Categories

in 1973; MSC moved 37,802 or 2% of the total passengers moved.) (34, 30) As mentioned in Chapter IV, passenger rates are billed to users on a cost reimbursement basis. In the case of cargo rates, the two agencies use different procedures in identifying the lift requirement.

Dry cargo is separated into two categories under NIF-MSC: break-bulk and containers. In addition, POL shipments fall into a separate category, further illustrating the differences in the two processes. While NIF-MSC actually uses three categories for classifying lift requirements of cargo, ASIF simply has one--cargo. This dissimilarity is understandable when considering the type of cargo moved by each agency. Abnormal lift requirements are handled by separately named categories.

NIF-MSC provides two categories for specialized use by its users. These two categories include special project ships and ship per diem. While these two categories are used for establishing specialized rates, they provide NIF-MSC with flexibility in the rate determination process. ASIF uses the SAAM category to identify those cargoes that require specialized handling. The differences that have become apparent in this section are further magnified when discussed in the next section concerning expenses.

#### Expense Analysis

The purpose of this section is to analyze the expense criteria utilized by ASIF and NIF-MSC. Though each system has a unique label for their appropriate categories, most can

be matched with only a minimum of explanation. There are, of course, a few deviations and these will be examined in greater detail. Figure 5-2 summarizes expense categories while Figure 5-3 represents a comparison. These two illustrations provide a general outline for the following discussion.

Under ASIF the category for "Commercial Expenses" includes contracting for passengers, cargo, and mixed cargo/passenger loads. This relates directly to the NIF-MSC category labeled "Charter and Ship Contracts" which also includes cargo and passengers. The obvious difference is the inclusion of petroleum ship contracts and project ship contracts. Since the cost of moving POL products by air is generally prohibitive, the lack of any specific classification by ASIF is reasonable. Project ship contracts, however, do not appear to reflect a category that is unique to MSC. Figure 4-6 previously listed total project ship expenses at \$8,757,000 which represents approximately 1.5 per cent of the fiscal 1974 budget for NIF-MSC. In MAC, for example, neither the Aerospace Cartographic and Geodetic Service (ACGS) nor the Aerospace Weather Service (AWS) are industrially funded. Both would appear to serve a function similar to MSC's Project Ships (Navy oceanographic, NASA, USAF test range; refer to Chapter IV). This is the only apparent inconsistency in the first expense category. Let us now examine the second category, "Direct or Organic Expenses."

ASIF uses the term "Organic Expenses" to include administrative and communication costs, terminal expenses,

ASIF

- I. Commercial Costs
  - a. Passenger
  - b. Cargo
  - c. Mixed (PAX/Cargo)
  
- II. Organic
  - a. Administrative and Communication
  - b. Terminal Expense
  - c. Direct Operating Expense

NIF-MSC

- I. Direct Cost of Nucleus Ships
  - a. Salaries and Wages
  - b. Other (Examples: fuel and maintenance of ships)
  
- II. Charter and Ship Contracts
  - a. Cargo
  - b. Passenger
  - c. Petroleum
  - d. Project
  
- III. General or Overhead (MSC Hqtrs)
  - a. Salaries and Wages
  - b. Other (Examples: public information and office equipment)

Fig. 5-2 Expense Categories

	BOTH	ASIF ONLY	MSC ONLY
<b>I. COMMERCIAL COSTS</b>			
Passengers	X		
Cargo	X		
Mixed (PAX/cargo)		X	
Petroleum			X
Project			X
<b>II. DIRECT OPERATING COSTS</b>			
Direct Operating Expenses	X		
Salaries and Wages (Civilian)	X		
Terminal Expenses		X	
<b>III. OVERHEAD COSTS</b>			
Administration and Communication	X		
Salaries and Wages (Civilian)	X		

Fig. 5-3 Comparison of Expense Categories

and direct operating expenses. NIF-MSC uses two terms, namely, "Direct Cost of Nucleus Ships" and "General or Overhead Expenses" to classify these expense items. ASIF's administrative and communication expenses relate directly to NIF-MSC's sub-category, "Other," which falls under "General or Overhead." In both cases, the cost of civilian personnel utilized in such administrative functions (Headquarters and Major Commands) is included. ASIF uses the sub-title, pay of civilians, while NIF-MSC uses salaries and wages. Terminal expenses are listed only for ASIF, since MTMS and not MSC has the responsibility for ocean terminals. Figure 3-6 listed terminal support costs at \$6,387,000 which represents approximately one per cent of the total budget for ASIF. These expenses include services at enroute facilities, and contract fleet and traffic support. MSC has similar functions performed for it at ocean terminals; however, the expense incurred is not included as part of the industrial fund billing rate criteria utilized by MSC. This major inconsistency can best be summarized by the following: for airlift, terminal storage, management, maintenance, and freight loading services are included as an integral cost of providing the transportation service; for sealift, terminal service is not considered to be an integral cost of providing that service. The remaining portions of expense are found in ASIF's "Direct Operating" and NIF-MSC's "Direct Cost of Nucleus Ships" expenses.

The direct costs incurred by both systems include: maintenance and repair of the specified carrier, propulsion

or aviation POL, transportation and handling of supplies and materials, and pay of civilians. While there are many more specific expenses listed for each, those just mentioned encompass the majority of the expense in the operating cost category. Maintenance and repair expenses of ships or aircraft for both ASIF and NIF-MSD are incurred as work is accomplished by either ASIF/NIF-MSD personnel or contract personnel. Again the relationship between the two systems is direct. Propulsion or aviation fuel is also an obvious expense for both, as is the transportation and handling of supplies and materials. Supplies and materials refer to supplies required in support of a given operation. The last area, pay of civilians, provides us with a major inconsistency between the two systems.

Both ASIF and NIF-MSD include the pay of civilian employees in their expenses but not the pay of military personnel, in accordance with DoD policy. The important difference is that MAC is less than fifteen per cent civilian (ASIF personnel) (30), while MSD is over ninety-three per cent civilian. (34) Specifically, ASIF has 4,463 civilians and 26,495 military personnel while MSD has 5,765 civilians and only 372 military personnel. (34) In terms of an expense item these figures represent seven per cent of the ASIF budget and sixteen per cent of the NIF-MSD budget. Again, the obvious inconsistency is that one carrier does not include a major portion of its costs (ASIF military) while the other is forced to include this cost almost totally (NIF-MSD civilians).

Speaking quite generally, we could say that ASIF does not include much direct labor in billing rate determination, while NIF-MSC does.

In summary, this section analyzed the specific expenses used by both ASIF and NIF-MSC. Many of the expenses were, in fact, similar (i.e., administrative, maintenance, and commercial contracts); however, there were several inconsistencies. The major inconsistencies included MSC's project ship costs, MAC's terminal costs, and MSC's significant civilian pay costs. Both agencies also consider other criteria in their determination of yearly billing rates.

#### Other Considerations

In addition to the preceding discussion regarding the comparison of ASIF and NIF-MSC, other factors should be considered. First, the requirement for both industrial funds to operate on a "break even" basis is consistent between the two agencies. (21) The comptroller of each fund must monitor the rates charged throughout the fiscal year and establish changes based upon estimated lift requirements and actual requirements. In both cases rates are computed on actual capacity generated not capacity used, allowing total operating costs to be recouped. The second factor which should be considered for this comparison is MAC's requirement to keep its aircraft fleet dispersed for strategic mobility purposes. As stated in Chapter III, MAC must keep a balanced distribution of aircraft on each coast to support this policy. MSC has no such requirement. Since the Nixon Doctrine calls for rapid

deployment of forces and MSC shipments require relatively longer periods for overseas shipping, MSC is not responsible for keeping a certain portion of its fleet in any area. (28) On-going logistics support could be provided by MSC ships after initial deployment by MAC. MSC ships would be diverted to assume the sealift support role. Normal operations dictate that the fleet size for each "traffic area" be dependent only on the lift requirements estimates submitted by MSC's users. (28) Although the costs for airlift shipments are computed on a point to point basis without regard to original aircraft location, the cost of supporting the strategic mobility policy is significant when considered in this light. As pointed out in the Ohl and Freer thesis (45), this difference should be excluded from the tariff rates and identified as "training costs." Using this approach, an accurate evaluation of DoD transportation costs could be separated from costs in support of national policy. Since MSC has no requirement to support this strategy, the costs included in the NIF-MSC rate structure does not include these "training costs." Finally, the aspect of cost/time must be considered when comparing airlift and sealift. The shipping time must be considered by the user in conjunction with the published billing rates. Cost/time models are presently available and are being used to establish optimum transportation (airlift versus sealift) modes. (41,43,44) In the final analysis, the time element becomes one of balancing airlift and sealift capability with the shipping priority established by the user.

Chapter VI will present the authors' conclusions regarding the ASIF/NIF-MSD comparison.

Summary

Chapter V covered a comparison and analysis of the industrial funds which support DoD airlift and sealift. A comparison of the lift requirements submission process by the users of MAC and MSD, including an analysis of the respective rate structures, showed a similarity between the two processes. Differences that exist between the two systems were depicted through an analysis of the expenses incurred by each operating agency. Finally, other factors, such as MAC's requirement to support the national policy of "strategic mobility" and the industrial fund "break even" policy, were analyzed.

## CHAPTER VI

### CONCLUSIONS AND RECOMMENDATIONS

#### Introduction

The purpose of this chapter is to assimilate the information generated from the analysis in Chapter V. Specifically, it is designed to complete the last objective of the thesis, which is "to make recommendations concerning an integration of the costs of airlift and sealift into a compatible rate determining process." The conclusions which follow represent our final considerations of the transportation service provided by MAC and MSC. Following the conclusions are the authors' recommendations which are intended as guides in developing compatible rate determining criteria for each agency.

#### Conclusions

As stated in Chapter II when attempting to perform a cost comparison between airlift and sealift shipping modes, the tariffs must be considered on the same basis. It is evident from our analysis that, in order to make a meaningful cost comparison of DoD shipments, construction of MAC and MSC tariffs on the same cost basis is indeed necessary. The difficulty involved in constructing such a cost foundation is

reflected in the inconsistencies between the two agencies, as brought out in Chapter V. However, the concept used by MAC and MSC to recoup the expenses involved in providing airlift and sealift services, the industrial fund concept, does provide a sound method for supporting the "break even" policy as established by DoD.

Chapter II developed the assumption that the use of the industrial fund concept was basic to an understanding of DoD transportation costs. Given that DoD intends to minimize all costs related to providing a transportation service, then the "user pays" philosophy and the "break even" policy presently incorporated in MAC and MSC provide a means for achieving these minimization objectives. Conceptually, the idea is to insure that the user of a transportation service pays for the costs incurred in providing that service. Our analysis has shown that the industrial fund concept can accomplish such objectives. The major problem associated with industrial funding is accurately determining the criteria to be used in establishing tariffs. It becomes important for logistics planners at all levels to be aware of which costs are incurred for a specific mode. Therefore, the establishment of sound cost criteria provides a necessary foundation for utilizing the industrial fund concept. We have reached the formal conclusion that DoD's use of industrial funding for transportation is appropriate. However, there remain several inconsistencies between the two systems as they exist today. If the logistics planner is to have adequate criteria

at his disposal from which he can make transportation related decisions, then the inconsistencies must be resolved.

Of primary interest in this section are these inconsistencies. Each incompatible area will be labeled as being pertinent to the cost of providing a transportation service, or as being a DoD responsibility and unrelated to the necessary costs incurred in providing such a service. Four major areas are discussed in Chapter V: MSC Project Ship funding, ASIF terminal expenses, civilian versus military pay, and strategic mobility and training cost considerations.

- (1) MSC Project Ships, which are primarily covered by the NIF-MSD industrial fund serve in a capacity similar to ACGS and AWS of MAC which does not recoup costs via ASIF. We contend that all such functions are strictly a DoD responsibility which is unrelated to the movement of passengers and cargo.
- (2) ASIF lists terminal support costs as a portion of its budget and, therefore, as part of the criteria used in determining billing rate structure, while NIF-MSD does not. We conclude that such support is an integral part of providing a transportation service. (Note: This means that a portion of terminal costs funded for by MMTS would have to be reassigned as NIF-MSD costs.)
- (3) Both ASIF and NIF-MSD include the pay of civilian employees in their expenses, but not the pay of

military personnel. We contend that all direct labor costs constitute an integral portion of the overall cost of providing a transportation service.

- (4) A major portion of MAC's operation is based on the strategic mobility concept and as such the costs related are classified as training costs. MSC, on the other hand, performs and controls DoD shipping whenever and wherever the requirement exists, but not specifically in support of the strategic mobility concept. We conclude that all such training costs should not be paid for through the industrial fund service. In order for the break even policy to recoup the costs involved in providing a transportation service, only those costs involved in transporting men and material should be paid for by the user.

Our analysis has pointed out that MAC and MSC are incompatible when one examines the national policy which dictates the existence and operation of each. While MSC provides sealift capability during periods of peace and war, the perpetuation of this agency is provided by the requirements of its users. On the other hand, MAC exists mainly for the purpose of supporting the national policy of strategic mobility. The airlift capacity generated by maintaining this viable airlift force is made available to DoD users for shipping. Of course, both agencies are responsible for transportation as

required by DoD. Because of this common bond, the necessity for developing compatible costing criteria has evolved. The following recommendations are intended as guides to be used in developing compatible criteria.

#### Recommendations

First, let us again define the area of prime concern to which our recommendations apply. Our research did not address the validity of all costs incurred in support of the strategic mobility policy, (i.e., investment costs of facilities and equipment); rather, it was directed toward an attempt at comparing sealift and airlift costs based on the criteria presently used by MAC and/or MSC. Therefore, if we exclude those "training costs" that are incurred as a result of our national policy of maintaining a strategic mobility posture, the remaining costs are those involved in providing a transportation service. Additionally, if these remaining costs are used in establishing MAC and MSC tariffs, then, airlift and sealift costs will be comparable. As previously mentioned, the recommendations in this section are intended as guidelines to be used in developing compatible criteria.

- (1) The most important aspect in using the industrial fund concept for both MAC and MSC lies in defining the cost criteria to be used in developing the necessary tariffs. Many of the expense areas presently considered by both agencies are compatible; however, it is our recommendation that all expense categories be made compatible. In

order to accomplish this compatibility the following specific recommendations are made.

- (a) The costs incurred in operating the Project Ships of MSC should not be considered when developing tariff rates. Since MAC possesses similar activities such as ACGS and AWS, which are not industrially funded and since activities of this nature are not directly involved in the movement of DoD men and material, these costs should not be considered in the determination of tariffs.
- (b) The costs incurred at MTMTS ocean terminals by MSC controlled ships should be included in the rate making process. Since these costs are included as part of MAC's rate determination process and since terminal costs are directly related to providing a transportation service, they should be included when establishing tariffs.
- (c) The cost of all direct labor (both civilian and military) should be included when developing tariffs. Since labor costs constitute a major portion of providing a transportation service, both MAC and MSC should include all of these direct labor costs when determining tariffs.

- (2) The use of the industrial fund concept is a sound practical method of controlling DoD transportation costs. Pinpointing specific costs and providing economy of operation are both achieved by utilizing this management concept. We recommend that the "user pays" concept be continued in DoD. The basic notion of the "break even" philosophy provides a logical foundation for providing effective DoD transportation.
- (3) The presently compatible categories, including administrative costs, maintenance and repair of ships and aircraft, and commercial contract and augmentation expenses should continue to be used as criteria when determining tariffs. These categories represent costs directly involved in providing a transportation service and as such, provide DoD with a reliable basis for determining transportation costs.

This study clearly established that the DoD airlift and sealift agencies provide comparable transportation services to their users. However, the cost criteria used in establishing billing rates for the logistics planner, who must make decisions on selection of one service over the other, are inconsistent between these two agencies. In order for accurate DoD transportation costs to be reflected in the billing rates charged the users of airlift and sealift services, these inconsistencies must be resolved. Our recommendations provide a feasible approach to the attainment of this goal.

APPENDIX A  
MAC AND CRAF AIRCRAFT FLEET

MILITARY AIRLIFT COMMAND (49)

Cargo/Passenger

C-141	234
C-5A	70

CIVIL RESERVE AIR FLEET

	<u>Cargo</u>	<u>Convertible</u>	<u>Passenger</u>
747		5	42
DC-10		5	
DC-8-60	13	49	36
B-707	42	69	38
DC-8	15	15	

CRAF CARRIERS

Airlift International	Reeve Aleutian (Alaska only)
Alaska Airlines	Saturn Airways
American Airlines	Seaboard World Airlines
American Flyers Airlines	Southern Air Transport
Braniff Int'l Airways	Trans Caribbean Airways
Capitol Airways	Trans International Airlines
Continental Air Lines	Trans World Airlines
Eastern Air Lines	United Air Lines
Flying Tiger Line	Universal Airlines
Northwest Airlines	Western Airlines (Stage III only)
Overseas National Airways	Wien Consolidated (Alaska only)
Pan American World Airways	World Airways

APPENDIX B  
MSC AND COMMERCIAL CONTRACT FLEET

MSC - SHIPS (34)

MSC - Ships (Number 30 June)	FY 1971	FY 1972	FY 1973	FY 1974 (Proposed)
Passenger Ships	2	2	0	0
Roll-on/Roll-off	2	2	2	2
FFD-Nucleus	3	3	3	0
AKFBM	4	5	5	5
Other Nucleus Cargo Ships	61	64	66	43
MSC & Contract Operated Tankers	24	19	16	16
Commercial Bareboat Charter Tankers	0	1	1	1
Project Ships	31	30	30	35
<b>TOTAL MSC SHIPS</b>	<u>127</u>	<u>126</u>	<u>123</u>	<u>102</u>

MSC NUCLEUS FLEET (12. Appendix)  
(Less Special Project Ships)

	1 July 1971				Total
	1 July 1960	1 July 1965	1 July 1970	Under 10 Yrs & Over 25 Yrs	
Dry Cargo (Totals)	<u>62</u>	<u>83</u>	<u>69</u>	<u>3</u>	<u>66</u>
General Cargo	31	31	29	2	29
Bulk	1	1	0	0	0
Container Ships (Full)					
Self Sustaining	0	0	0	0	0
Non-self Sustaining	0	0	0	0	0
Other	30	51	40	1	37
Tankers (Totals)	<u>22</u>	<u>25</u>	<u>25</u>	<u>6</u>	<u>24</u>
Oceangoing	19	20	19	4	18
Coastal Types	3	5	6	2	6
Special Products	0	0	0	0	0
Passenger/Cargo (Totals)	<u>16</u>	<u>16</u>	<u>2</u>	<u>2</u>	<u>2</u>
GRAND TOTAL	100	124	96	11	92

**NATIONAL DEFENSE RESERVE FLEET (12: Appendix)**  
**(Not Including GAAs Under MSC Control or Military Auxiliaries)**

	1 July 1971				
	1 July 1960	1 July 1965	1 July 1970	Under 10 Yrs	10-24 Yrs & Over Total
Dry Cargo (Totals)	1,488	1,092	606	0	429
General Cargo	1,394	1,021	550	0	389
Bulk	0	0	1	0	0
Container Ships (Full)					
Self Sustaining	0	0	0	0	0
Non-self Sustaining	0	0	0	0	0
Other	94	71	55	0	1
Tankers (Totals)	86	66	29	0	35
Oceangoing	64	53	20	0	26
Coastal Types	22	13	9	0	0
Special Products	0	0	0	0	0
Passenger/Cargo (Totals)	153	89	47	0	1
GRAND TOTAL	1,727	1,247	682	0	2
					506
					43
					35
					26
					9
					0
					42
					508

ACTIVE U.S. MERCHANT MARINE (12:Appendix)

(Not Including Ships Chartered to MSC, GAAs, or MSC Nucleus Fleet Ships)

	1 July 1971				Total
	1 July 1960	1 July 1965	1 July 1970	Under 10 Yrs 10-24 Yrs & Over	
Dry Cargo (Totals)	<u>618</u>	<u>609</u>	<u>439</u>	<u>62</u>	<u>382</u>
General Cargo	531	502	318	48	249
Bulk	51	68	37	2	29
Container Ships (Full)					
Self Sustaining	6	6	22	2	24
Non-self Sustaining	0	0	50	8	61
Other	30	33	12	2	19
Tankers (Totals)	<u>330</u>	<u>260</u>	<u>245</u>	<u>92</u>	<u>236</u>
Oceangoing	294	224	210	84	201
Coastal Types	29	28	21	7	20
Special Products	7	8	14	1	15
Passenger/Cargo (Totals)	<u>40</u>	<u>34</u>	<u>20</u>	<u>15</u>	<u>19</u>
GRAND TOTAL	988	903	709	169	637

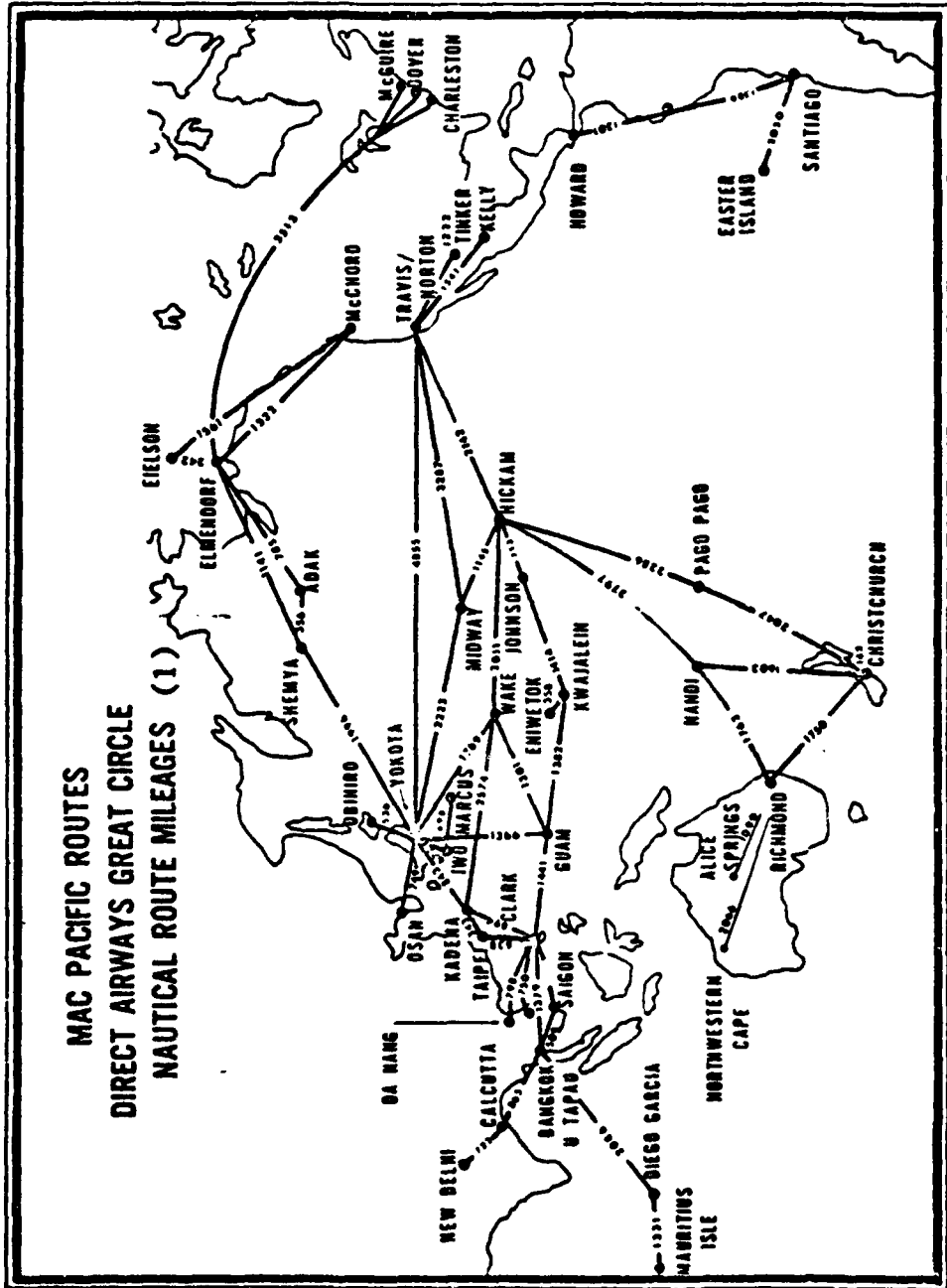
EFFECTIVE U.S. CONTROL FLEET (12, Appendix x)

	1 July 1971					
	1 July 1960	1 July 1965	1 July 1970	Under 10 Yrs	10-24 Yrs & Over	
Dry Cargo (Totals)	<u>191</u>	<u>173</u>	<u>120</u>	<u>29</u>	<u>44</u>	<u>123</u>
General Cargo	97	74	20	0	24	24
Bulk	72	86	87	29	39	16
Container Ships (Full)						
Self Sustaining	0	0	3	0	0	3
Non-self Sustaining	0	0	0	0	0	0
Other	22	13	10	0	11	12
Tankers (Totals)	<u>280</u>	<u>289</u>	<u>275</u>	<u>88</u>	<u>164</u>	<u>284</u>
Oceangoing	263	266	254	81	157	264
Coastal Types	15	11	8	0	3	8
Special Products	2	12	13	7	4	12
Passenger/Cargo (Totals)	<u>6</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>0</u>	<u>5</u>
GRAND TOTAL	477	467	400	117	214	412

MSC CHARTERED & GAA FLEET (12, Appendix)  
 (Excludes Foreign Flag & Special Project Ships)

	1 July 1971						
	1 July 1960	1 July 1965	1 July 1970	Under 10 Yrs	10-24 Yrs & Over Total		
Dry Cargo (Totals)	7	31	129	17	62	80	
General Cargo	4	22	120	16	0	57	73
Bulk	0	5	4	0	0	4	4
Container Ships (Full)							
Self Sustaining	0	0	0	0	0	0	0
Non-self Sustaining	0	0	0	0	0	0	0
Other	3	4	5	1	1	1	3
Tankers (Totals)	22	31	36	5	14	15	34
Oceangoing	22	31	36	5	14	15	34
Coastal Types	0	0	0	0	0	0	0
Special Products	0	0	0	0	0	0	0
Passenger/Cargo (Totals)	0	0	0	0	0	0	0
GRAND TOTAL	29	62	165	22	15	77	114

APPENDIX C  
MAC ATLANTIC AND PACIFIC ROUTES



3.03

DATE PUBLISHED: 30 JUN 1972 SOURCE: ACIS

**APPENDIX D**  
**MAC AIRLIFT REQUIREMENTS**

**ASIF AIRLIFT REQUIREMENTS (1973) (30)**

**Passenger (Ton/Mile)**

<b>Air Force</b>	<b>MAC</b>	<b>Commercial</b>
<b>Atlantic</b>	<b>10,297,904</b>	<b>34,209,999</b>
<b>Pacific</b>	<b>35,774,881</b>	<b>186,188,179</b>
<b>Army</b>		
<b>Atlantic</b>	<b>5,455,059</b>	<b>138,560,397</b>
<b>Pacific</b>	<b>4,926,863</b>	<b>371,410,318</b>
<b>Navy</b>		
<b>Atlantic</b>	<b>2,958,653</b>	<b>19,713,052</b>
<b>Pacific</b>	<b>9,057,811</b>	<b>121,675,492</b>
	<b>TOTAL 940,228,608</b>	

**Cargo (Ton/Mile)**

<b>Air Force</b>		
<b>Atlantic</b>	<b>243,307,481</b>	<b>13,526,913</b>
<b>Pacific</b>	<b>695,255,561</b>	<b>344,407,235</b>
<b>Army</b>		
<b>Atlantic</b>	<b>108,124,180</b>	<b>22,864,139</b>
<b>Pacific</b>	<b>295,657,274</b>	<b>240,327,232</b>
<b>Navy</b>		
<b>Atlantic</b>	<b>68,304,764</b>	<b>15,045,909</b>
<b>Pacific</b>	<b>191,696,268</b>	<b>96,174,061</b>
	<b>TOTAL 2,336,691,017</b>	

APPENDIX E  
MAC COMMERCIAL AUGMENTATION

CHANNEL TRAFFIC MOVEMENTS BY CARRIER (1)

30 June 1972

	<u>PASSENGERS</u>		<u>CARGO/MAIL</u>	
	<u>Numbers</u>	<u>Ton Miles (000)</u>	<u>Tons</u>	<u>Ton Miles (000)</u>
<u>ATLANTIC</u>				
MI1	53,692	17,666	132,087	397,038
Cmcl	541,163	192,484	17,976	51,437
ANG	668	119	2,910	4,267
RES	128	30	3,686	6,653
TAC	421	94	1,207	2,290
Other	<u>4,851</u>	<u>802</u>	<u>6,326</u>	<u>9,488</u>
TOTAL	600,923	211,195	164,192	471,173
<u>PACIFIC</u>				
MI1	130,637	46,698	229,533	1,157,155
Cmcl	1,166,657	679,274	115,374	680,909
ANG	136	29	1,168	3,803
RES	61	13	2,126	8,156
TAC	327	54	778	1,325
Other	<u>8,061</u>	<u>2,965</u>	<u>3,827</u>	<u>14,170</u>
TOTAL	1,305,879	729,034	352,806	1,865,518
<u>GRAND TOTAL</u>	1,906,802	940,229	516,998	2,336,691

**APPENDIX F**  
**NIF STATEMENT OF REVENUE AND EXPENSE BY ACTIVITIES**

NAVY INDUSTRIAL FUND

STATEMENT OF REVENUE AND EXPENSE BY ACTIVITIES (32,665)  
(In Thousands of Dollars)

FY 1971

	<u>Revenue</u>	<u>Expense</u>
Shipyards	\$1,089,648	\$1,088,945
Military Sealift Command	890,501	874,604
Aircraft Maintenance	567,548	567,331
Ordnance Plants	482,700	482,295
Research Plants	947,751	943,640
Base Services	168,561	168,576
Printing Plants	58,597	57,946
Polaris Missile Facilities	<u>26,249</u>	<u>26,498</u>
TOTAL	\$4,231,555	\$4,209,835

**APPENDIX G**  
**MSC 1974 REQUIREMENTS**

MSC 1974 REQUIREMENTS (34)

I. CARGO: Measurement Tons in Millions

Army. . . . .	7.0
Navy. . . . .	1.8
USAF. . . . .	1.4
Marine Corps. . . . .	0.3
Other . . . . .	<u>0.0</u>
Total. . . . .	10.5

II. PASSENGERS: 0.0

III. TANKERS:

Long Tons (000) - 14,165  
Long Ton Miles (000,000) - 36,555

IV. PROJECT SHIPS:

Shipdays - 16,965

**APPENDIX H**  
**MSC TRAFFIC AREAS**

MSC TRAFFIC AREAS (22)

- |  |  |
|--|--|
| 01. Atlantic Coast                     | 29. Marianas                           |
| 02. Gulf Coast                         | 30. Taiwan                             |
| 03. California Coast                   | 31. Bonin Islands                      |
| 04. Northwest Coast                    | 32. Philippines                        |
| 05. Newfoundland                       | 33. Thailand                           |
| 06. Labrador                           | 34. New Guinea/Australia               |
| 07. Pine Tree                          | 35. Lake Erie and Lake Huron           |
| 08. Thule                              | 36. Lake Michigan and<br>Lake Superior |
| 09. Iceland                            | 37. Aleutians                          |
| 10. West Mexico and<br>Central America | 38. North Central Pacific              |
| 11. Panama                             | 39. South Pacific                      |
| 12. Bermuda                            | 40. Palau Islands                      |
| 13. Lesser Antilles                    | 41. Lake Ontario                       |
| 14. Puerto Rico                        | 42. St. Lawrence River                 |
| 15. Caribbean                          | 43. Black Sea                          |
| 16. Bahamas                            | 44. West Coast South America           |
| 17. Europe                             | 45. East Coast South America           |
| 18. British Isles                      | 46. Azores                             |
| 19. West Mediterranean                 | 47. Antarctica                         |
| 20. East Mediterranean                 | 48. Vietnam                            |
| 21. West Africa                        | 49. Other Southeast Asia               |
| 22. South and East Africa              | 50. Ryukyu Islands                     |
| 23. Arabian Gulf                       | 51. Korea                              |
| 24. India/Burma                        | 52. Japan                              |
| 25. East Alaska                        | 53. Mississippi River                  |
| 26. West Alaska                        | 54. Rhine River                        |
| 27. Hawaiian Islands                   |  |
| 28. Marshall/Caroline Islands          |  |

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