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REPORT TO THE CONGRESS

Substantial Savings Available To The Military Services Through Increased Recapping of Aircraft Tires

B-146753

Department of Defense

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To the President of the Senate and the
Speaker of the House of Representatives

Aircraft tire recapping practices in the Department of Defense have been examined by the General Accounting Office. We have concluded that substantial savings can be realized by the Government if tires used on military aircraft are recapped as many times as practicable. Our findings are described in more detail in the accompanying report.

In the course of our review, we learned that by recapping aircraft tires as many times as the condition of casings permits, commercial airlines get more recaps per tire than the Air Force and Navy are obtaining.

We found that the Air Force and Navy do not recap tires as extensively as the airlines do because of arbitrary restrictions on the number of times a tire can be recapped and, in the case of the Navy, because of ineffective administration of the tire recapping program. The Army has not established a program for recapping aircraft tires.

Using recapped aircraft tires often saves as much as 50 percent of the cost of new tires and--as shown by the practices of the airlines--is considered consistent with safety requirements.

Our review of Air Force, Navy and Army recapping practices indicates that all three services could realize significant savings by recapping aircraft tires more extensively. These savings could be as much as \$1,650,000 annually for the Air Force and the Navy. If it were found to be practicable to increase the recapping of tires for high-speed and jet aircraft, substantial additional savings could be realized.

We could not assess the potential for savings through greater recapping of Army aircraft tires due to a lack of centralized records on the volume of recappable tires generated by the Army.

The Navy informed us of the following actions which have been taken in accordance with our suggestions:

- Low-speed tire casings are now authorized to be recapped more times, provided the condition of the casing permits.
- Evaluations are continuing to determine whether the number of authorized recaps could be further increased,
- Jet and high-speed aircraft tire management is under review, and it is anticipated that less restrictive specifications will be adopted.

The Air Force advised us that their tire recapping program had been considerably expanded since our field review and that additional actions were either underway or planned which should substantially increase savings in the future. Because the Army did not have a formal recapping program, we performed only a limited review of Army practices and we did not solicit their written comments on our findings.

The disparity in the aircraft tire recapping practices of the three military departments indicates a need for the Department of Defense to establish policy guidance,

We recognize that inflexible policies and procedures should not be established because of differences in aircraft and operating conditions both among the military departments and within each department, However, it appears that policy guidance should be given to ensure that each department will recap as many types of tires as possible and that each tire included in the recapping program will be recapped as many times as practicable. This would be consistent with the practice followed by the commercial airlines.

Therefore, we are recommending that the Secretary of Defense issue policy guidance to the military departments relative to the recapping of aircraft tires. We are recommending also that the Department of Defense periodically review the recapping policies and procedures established by the military departments to ensure that savings through recapping are realized to the maximum extent feasible.

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We are reporting this matter to the Congress because of the significant **savings** which may **be** attained if the military services more extensively recap aircraft tires.

Copies *of* this report are being sent to the Director, Bureau of the Budget, the Secretary of Defense, and the Secretaries *of* the **Amy, Navy, and Air Force**.

A handwritten signature in black ink, reading "Thomas B. Akers". The signature is written in a cursive style with a large initial 'T' and a prominent 'A'.

Comptroller General
of the United States

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REVIEW OF
SUBSTANTIAL SAVINGS AVAILABLE
TO THE MILITARY SERVICES
THROUGH INCREASED RECAPPING
OF AIRCRAFT TIRES
DEPARTMENT OF DEFENSE
INTRODUCTION

Under the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67), the General Accounting Office is charged with the responsibility of seeking out areas in which the effectiveness, efficiency, or economy of the various operations of the Government can be improved., As a part of our effort to carry out the responsibilities given us by these acts, we have reviewed the aircraft tire recapping practices in the Department of Defense.

We undertook this review for the purpose of determining whether the military departments could recap aircraft tires more times without compromising safety and whether such action would produce worthwhile savings. Our review **included** a comparison of the policies and **practices** followed by the Departments in the management of their aircraft tire recapping programs with **those** followed by commercial airlines in the United States. Our review primarily considered the feasibility of recapping tires used by the Navy and Air Force on land-based, nonjet, patrol, and support-type aircraft, which are similar to aircraft used by the commercial airlines. The scope of our review is described on page **24**.

The Department of Defense had not issued policies and procedures regarding aircraft tire recapping, Therefore, we reviewed the policies and practices of the Departments of the Navy, Air Force, and Army. Our review of the Navy's aircraft tire recapping policies and practices was conducted in greater depth than our review of those of the Air Force and Army. The major portion of the findings section of this report, therefore, is devoted to our findings with regard to the Navy's recapping program.

Our findings regarding the Air Force aircraft tire recapping policies and practices were the subject of our letter to the Secretary of the Air Force dated August 22, 1967. Our survey of the Department of the Army policies and

practices relating to aircraft tire recapping did not include an assessment of the significance of the potential for savings because of a lack of centralized records on the volume of recappable tires generated, We did not issue a separate report to the Army because of the limited amount of work we performed.

Our review of Navy and Air Force recapping programs was performed utilizing records applicable to the latter part of fiscal year 1965 and to fiscal year 1966. Information was obtained relative to the Army's program during fiscal year 1968.

The principal officials of the Department of Defense and the Departments of the Army, Navy, and Air Force responsible for administration of activities discussed in this report are listed in appendix I.

BACKGROUND

A recapped tire is one which has had the tread, and possibly the sidewall material, of the worn tire replaced by means of vulcanization. The practice of recapping used tires is based on the premise that the useful life of a tire can be extended, at less than the cost of a new tire, by reusing the tire casing which normally outlasts the tread surface. The commercial airlines have recognized that almost all aircraft tires can be recapped provided they have not been abused during operation and are removed from the aircraft before excessive tread wear occurs.

The differences in unit costs of new and recapped tires are substantial, as evidenced by our comparison of such costs for six Navy aircraft models that we selected for review. These differences, which are presented in appendix II, range from about \$10 to \$89, depending on the tire size,

The Department of Defense has not established a policy regarding aircraft tire recapping. Therefore, each military department has been in a position to establish its own policy. The recapping policies established by the three military departments, the organizations within each department responsible for the recapping program, and the amounts expended for aircraft tires during a recent period are discussed below.

NAVY

Navy policy in effect at the time of our review provided that every effort should be made to obtain maximum use from aircraft tires through recapping within limitations imposed by the Bureau of Naval Weapons,¹ hereinafter referred to as the Bureau. The principal limitations imposed by the Bureau were: (1) certain extra high pressure tire casings could not be recapped, (2) no tire casing could be recapped more than three times, and (3) no tire casings more than 4 years in age could be recapped.

Although the Bureau retained technical control of the Navy's recapping program, it delegated complete administrative control of the program to the Aviation Supply Office (ASO) in November 1961. The delegation included specific responsibilities for funding, allocation of recapped tires

¹The Bureau of Naval Weapons was disestablished on May 1, 1966, to form the Naval Air Systems Command and the Naval Ordnance Systems Command. Aircraft tire responsibility was assumed by the Naval Air Systems Command,

for rework and service, and the establishment of reporting and shipping procedures.

ASO had delegated authority for awarding recapping contracts to nine naval air stations and one Marine Corps air station. These air stations were authorized to solicit bids from about 30 Bureau-approved aircraft tire recapping companies. Those air stations not authorized to award contracts were to send recappable tires to the nearest of nine stations authorized to award contracts. (One station contracts only for its own tires,) ASO controls the tire recapping program by semiannually publishing instructions known as the "Aircraft Tire Recapping Program." These instructions list the tire sizes authorized to be recapped during the succeeding 6-month period by each of the 10 air stations.

In fiscal years 1965 and 1966, the Navy expended \$10.4 and \$9.6 million, respectively, for the procurement of all types of new aircraft tires. Of these amounts, approximately \$2.6 and \$1.7 million, respectively, were for tires for land-based, nonjet, patrol, and support-type aircraft. During fiscal years 1964 and 1965, the latest years for which figures were available at the time of our review, the Navy incurred aircraft tire recapping costs of approximately \$185,000 a year for all tires.

AIR FORCE

Air Force policy at the time of our review provided for the recapping of aircraft tires, subject to various limitations. The principal limitations were: (1) certain high-speed-tire casings could not be recapped, (2) no tire casing could be recapped more than three times, and (3) casings within 3 months of the maximum age limit could not be recapped.

Responsibility within the Air Force for the supply management and operational engineering support of aircraft tires is assigned to the Ogden Air Materiel Area (Ogden). Ogden's supply management functions include the determination of needs, storage and **distribution, repair,** and the disposal of excesses. Ogden's operational engineering responsibility includes evaluating, ensuring, and improving the reliability and safety of aircraft tires **used** by the Air Force,

The Air Force computed a new tire purchase requirement of about \$23 million for fiscal year 1966. In addition, the Air Force spent about \$1.6 million in fiscal year 1966 to recap aircraft tires,

ARMY

Within the Department of the Army, the responsibility for establishing policies relative to the recapping of aircraft tires is with the Army Materiel Command (AMC). We have been informed by an official at AMC headquarters that the Army has no stated policy regarding the recapping of aircraft tires.

An official of the Army Aviation Materiel Command, a subordinate command of AMC, informed us that an aircraft tire recapping program had not been established. He stated that, although Army organizations were not required to recap aircraft tires, they were not precluded from doing so. Therefore, the decision as to whether or not to recap **was** left to the organizations that operated the aircraft. It was the opinion of this official, however, that most Army organizations left tires on the aircraft until they wore out and then scrapped them.

Figures on the volume of tires procured by the Army were not obtained; however, recent figures compiled by the Army show that it operates over 2,500 fixed-wing, propeller-driven aircraft.

FINDINGS AND RECOMMENDATIONS

SAVINGS OBTAINABLE BY INCREASING NUMBER OF TIMES AIRCRAFT TIRES ARE RECAPPED

Substantial savings could be realized by the Government if aircraft tires used on military land-based, nonjet aircraft were recapped more times. Commercial airlines recapped tires as many times as the condition of the casing permitted and thus were able to get more recaps per tire than the Air Force and Navy were obtaining. Using recapped aircraft tires often **saves** as much as 50 percent of the **cost** of new tires and, as evidenced by the practices of the airlines, is considered consistent with safety requirements*

The Navy **has** not recapped aircraft tires as extensively **as** the airlines because (1) the recapping program has not been effectively administered and (2) arbitrary restrictions have been placed on the number of times that a tire **may** be recapped. We estimate that the Navy could have saved about \$400,000 in fiscal year 1965, if **the** management of the tire recapping program had been more **effective**, and an additional \$350,000 to \$390,000, if its recapping policies **had** been comparable to those of commercial airlines. These savings were computed for tires used on land-based, **nonjet**, patrol, and support-type aircraft. We believe that significant additional savings could be realized if the Navy changes its policy relative to tires used on jet-engine aircraft.

The Air Force had, at the time of our review, placed restrictions on the number of times that a tire could be recapped. Because of the lack of data on the number of potentially recappable tires that would be available, it was not possible to accurately estimate the savings that might be **obtained** by expanding the Air Force recapping program. However, on the basis of fiscal year 1966 requirements, we estimated that, if each tire **now** included in the recapping program were allowed to **be** recapped one more time, the potential annual savings would be around \$900,000. Further, if the high-speed tires not now included in the recapping program were **allowed** to **be** recapped one time, the additional potential annual savings would be around \$1 million.

At the time of OUE review, the **Army** had not established a tire recapping program. In view of our findings relative to the **Navy** and Air Force, it appears that there also is an opportunity **for savings** by the **Army** through establishment of such a program.

The details of our findings are presented below,

Review of the Navy aircraft
tire recapping program

Savings obtainable by eliminating recapping
restrictions on selected aircraft tires

At the time of our review, the Navy's policy relative to the recapping of aircraft tires had remained substantially unchanged since June 26, 1961, when the Bureau of Naval Weapons issued an instruction titled Accessories Bulletin No. 17-61. This instruction stated the aircraft tire recapping policy as follows:

"After thorough visual inspection and screening *** all casings, except as stipulated below for type VII (extra high pressure) casings, may be considered eligible for recapping.

"Except for emergency reasons and when so authorized, no casing will be recapped more than three (3) times. After normal usage of a tire which has been recapped three times, the casing shall be scrapped."

* * * * *

"Type VII, extra high pressure casings, *** will not be recapped more than two (2) times. After normal usage of these tires which have been recapped twice, the casing shall be scrapped."¹

We were informed that the records supporting the decision to adopt the above recapping restrictions were destroyed in accordance with the Navy's record retention policy. Thus, we were unable to examine basic documentation supporting these restrictions. However, available evidence indicates that the practices being followed may have been designed to satisfy the more stringent requirements for tires used in landings on aircraft carriers and may be unnecessary for aircraft which are land-based. In this respect, Bureau officials informed us that the restrictions were, in part, based on a composite of all aircraft flown by the Navy, which includes both land- and carrier-based models. Carrier landings, because of the severely limited runway and necessary arresting gear, place greater stress on tires than landings at naval air stations.

¹This restriction applied to 15 tire sizes which were specifically identified.

To determine whether the Navy could recap tires used on land-based, nonjet aircraft more than the maximum of two or three times authorized by Accessories Bulletin No.17-61, we selected for review the six aircraft of this type used by the Navy that had commercial counterparts. The Navy aircraft and the names of the commercial version of the same aircraft are as follows:

<u>Navy version</u>	<u>Commercial version</u>
C-47 Skytrain (note a)	DC-3
C-54 Skymaster	DC-4
C-118 Liftmaster	DC-6
C-121 Warning Star	Super Constellation
C-131 Convair Liner	Convair 340 and 440
P-3A Orion	Electra

^aAlso designated the C-117

The Navy has authorized all of the various tires used on these aircraft to be recapped three times except those used on the P-3A. The tires used on the P-3A main landing wheels are authorized to be recapped twice, and those used on the nose wheels are not authorized to be recapped,

We visited five airlines which operate one or more of the aircraft models selected for review to obtain data on how many times they recapped tires used on these aircraft. The airlines provided us with information on all of the selected aircraft models with the exception of the DC-4 which was not used by any of them.¹

During our visits we found that the airlines are successfully recapping tires used on the five aircraft, and in all cases the tires are recapped as many times as the tire casing will pass a prerecapping inspection. We were informed that some tires had been recapped as many as 16 times. Nearly all the airlines informed us that they were averaging four or five recaps per tire. At each airline, responsible officials informed us that their experiences with recapped tires were satisfactory; in fact, officials

¹The C-54 and the C-118 use the same nose tire and the same size main tire although the C-118 main tire has a higher ply rating. Accordingly, we believe the results of our review can be applied to the C-54 although we were not able to compare it directly to the DC-4. Statistics applicable to C-54 tires used by the Navy have been included in this report,

at one airline stated that the airline obtained more wear from recapped treads than from original treads.

The airlines, of course, are interested in the safety of their crews and aircraft, as is the Navy. In addition, the airlines must be concerned with the safety of their passengers and in the maintaining of passenger confidence. Therefore, the airlines would not, in our opinion, adopt a policy of unlimited recapping if **it were not a safe one.**

In addition, the Federal Aviation Administration (FAA), formerly the Federal Aviation Agency, sets standards for all tires used on civil aircraft and **sets** safety standards for the airlines. Our review disclosed that **FAA** had not placed a limitation on the number of times a tire might be recapped. This is a further indication that recapping, limited only by the Condition of the casing, **has** proven to **be** a safe practice. We conclude, therefore, that the Navy could, without jeopardizing the safety of its aircraft, revise its policy to permit tires **for** land-based, nonjet, patrol, and support-type aircraft to be recapped as many times as the condition of the tire casing permits.

The savings that the Navy could be expected to realize by changing its recapping policy are dependent upon the average number of recaps per tire that can be attained, **As** stated previously, **the** airlines reported that they were averaging four or five recaps a tire. To determine whether the Navy could be expected to average this number of recaps, we analyzed the major differences (1) between the **commercial** and Navy versions of the five aircraft models, (2) in the conditions under which the airlines and the Navy operate their aircraft, and (3) in the logistical requirements and methods of the commercial airlines and the Navy. Our findings relative **to** these factors were as **follows:**

Aircraft differences--The five Navy aircraft models are authorized to take off and land with heavier **loads** than their commercial equivalent. The tires used on the Navy aircraft have a higher ply rating and use a greater amount of air pressure **to** compensate for the extra weight. A Bureau official, who is an aviation engineer responsible for landing-gear systems, informed us that these differences in aircraft weight and tire characteristics would have no significant effect on the recappability of the tires.

Operating condition differences--The operating conditions **which we** considered were the aircraft landing and takeoff speeds, pilot proficiency in handling **the** aircraft, and the physical condition of the runways and taxiways. The consensus among knowledgeable airline and Navy

personnel was that there are no significant differences in these conditions between the Navy and the airlines. We conclude, therefore, that the conditions under which the Navy operates would not preclude its obtaining as many recaps **per tire as are being** obtained by the airlines,

Logistic differences--The airlines have adopted **procedures** which permit tires that are removed from aircraft to be recapped and returned to service within a relatively **short period** of time. A limited examination of tire history records at one airline **showed** that tires were being removed **from** aircraft, recapped, and returned to service within **1 month** in many **cases**. Conversely, **Navy** aircraft **tires** are usually in storage for long periods of time both before they are initially installed on an aircraft and **after** removal from the aircraft because of wear. The issuance and the recovery of tires used at overseas stations also contribute to the length of time tires are out of service where they are transported by ship. Navy aircraft **generally** make relatively fewer takeoffs and landings than their **commercial** counterparts; therefore, the Navy tires remain on aircraft for longer periods before removal due to wear ■

Although the length of time tires remain on aircraft and logistics delays due to overseas operations cannot be easily changed, several Navy practices which contribute to the long periods of time that tires removed from aircraft are out of service can be corrected. The **more** important of these are related in a later section of this report dealing with improvable management practices. The length of time tires are out of service is particularly significant because Navy policy prohibits the recapping of tires over 4 years old and the placing of any tire over 5 years old on an aircraft.

The possibility of obtaining **four** or five recaps **per** tire, as is done by the airlines, would be enhanced if these age limitations were removed or extended. In this respect, we found indications that the age limitations imposed by the Navy **may** be **too** stringent. The age **limitations** were established by Accessories Bulletin No. 17-61, which states as follows:

"No naval aircraft tires shall be recapped which are within one (1) year of their shelf/service life expiration date. Such tires shall be scrapped.

* * * * *

"Aircraft Tire Shelf/Service Life: A shelf/service life of five years from date of manufacture is hereby established for all naval aircraft tires. Unless sooner disposed of *** all aircraft tires shall be scrapped upon expiration of their shelf/service life."

We were informed by Bureau personnel that the age limitation was imposed in 1961 because of a high rate of failure of recapped aircraft tires in 1960. They said that the Bureau conducted an investigation into the causes of the failures and found that: (1) tires as old as 13 years were being recapped, (2) there was no set program for first-in, first-out issues of tires from inventory, and (3) a quality control problem existed with some recappers. We were informed that documentation relative to the investigation had been destroyed in accordance with the Navy's record retention policy.

In addition to establishing the tire shelf/service life as a result of the investigation, the Bureau instructed all installations to issue tires from storerooms strictly on the basis of age from the date of manufacture. The Bureau also established a listing of qualified tire recapping companies. As stated previously, contracts for recapping can be awarded only to these companies.

Because the primary causes of the high rate of failure of recapped tires in 1960 have been corrected through improved inventory management and qualification of recappers by the Bureau, it may now be possible for the Navy to remove the restrictions on or to extend the shelf/service life. We noted that the Air Force technical manual governing inspection and age control of tires allows a longer life than that permitted by the Navy. In this respect, the Air Force permits a 6-year shelf/service life on the tires we selected for review.

We obtained opinions on shelf life from officials of one of the leading aircraft tire recapping companies. One official informed us that the Navy's age restriction was arbitrary and could not be supported. He said that the company had not seen any indication that age was a factor in determining the recappability or usability of a tire. In this regard, a comprehensive article on aircraft tire recapping, which had been written by two officials of

the company and published by the Society of Automotive Engineers, Inc.,¹ included the following statement:

"*** casing life for most all aircraft tires is limited only by the initial tire quality and the exercise of proper maintenance and operational practices while the tire is in use."

Another official of the company informed us that tires which had been properly maintained could probably be recapped from 8 to 10 years after manufacture. Both officials emphasized, however, that the condition of the tire casing, as determined from a prerecapping inspection, was the governing factor in determining tire recappability,

At the time of our review, we concluded that, until the Navy reevaluated the necessity for the age restriction and imposed and implemented the management improvements discussed in the latter part of this report, it would not be possible to determine the maximum number of times it could **recap** tires.

Assuming that the Navy could have achieved an average of four recaps per tire, we estimate that approximately \$750,000 would have been saved in fiscal year 1965 on tires **for land-based, nonjet aircraft**,² If an average of five recaps a tire could have been attained, we estimated that the savings would have amounted to approximately \$790,000.³ Of these amounts, we attributed \$400,000 to deficiencies in

¹A professional society of engineers whose objectives are to promote the arts, sciences, standards, and engineering practices related to the design, construction, and utilization of self-propelled mechanisms, prime movers, components thereof, and related equipment. Publication of articles by the Society **does** not necessarily indicate endorsement of the contents.

²Fiscal year 1965 was used to determine the additional costs incurred during a 1-year period because information relative to tires issued and recapped in 1966 was not available at the time of our review,

³Because the Navy does not maintain records segregating amounts applicable to tires purchased or recapped for overseas use, we computed the **savings** based on all the tires procured for patrol and support-type aircraft in fiscal year 1965. An indeterminable portion of the computed savings may **not** be realizable because of supply problems associated with remote overseas installations.

program management which are discussed in the latter part of this report. Our computations took into consideration tires lost through condemnation and handling costs associated with the return of tires ~~for~~ recapping.

The significance of the savings that can be realized by adopting the airlines' recapping criteria is also demonstrated by projecting the future utilization of tires procured by the Navy in fiscal year 1965 for land-based, nonjet, patrol, and support-type aircraft. Approximately 22,400 such tires were procured at a cost of about \$2.6 million. We estimate that the savings could amount to \$4.9 million if an average of five recaps a tire is attained.

Improved management necessary to achieve
maximum utilization of aircraft tires

Although the Navy allowed aircraft tires to be recapped two or three times, our review showed that relatively few tires were being recapped. For example, out of a total of 4,319 tires removed from the selected aircraft models during a recent 1-year period, only 988, or 23 percent, were subsequently recapped. In addition, very few recapped tires were in service or in the supply system. Our examination of almost 4,000 tires on hand and in use at three air stations showed that only about 5 percent of the tires had been recapped. ASO does not distinguish between new and recapped tires when replenishing station stock, We believe, however, it is reasonable to assume that these stations are representative of conditions throughout the Navy ■

ASO has recognized that aircraft tires are not being recapped to the maximum limitations as evidenced by its use of system recovery factors in computing procurement requirements. These factors, which are based on past experience, are applied to the number of tires in the supply system to determine the number that are reusable. The factors were recently reduced by ASO to 10 percent for 31 of 37 aircraft tire sizes selected for review and range up to only 25 percent for the other sizes. If an average of one recap per tire was being attained, the recovery factor would be 50 percent.

We estimate that approximately \$400,000 of the \$750,000 to \$790,000 previously discussed can be saved annually on tires for land-based, nonjet, patrol, and support-type aircraft if the Navy improves its management of the aircraft tire recapping program. Our computation was based upon the number of tires that were removed from the

selected aircraft models during a recent 1-year period and subsequently recapped. We compared the quantity that were recapped to the quantity that **would** have been recapped if the **Navy** had been attaining an average of one recap per tire. We believe that the Navy could reasonably have attained an average of at least one recap per tire because **nearly all** tires used on the aircraft models selected **for** review have been authorized to be recapped three times.

In our opinion, the failure to achieve the maximum two or three recaps per tire authorized by the Bureau **was** due to (1) restrictive administrative procedures and practices and (2) inadequate training of station personnel responsible for maintaining and inspecting tires.

Restrictive administrative procedures and practices -- In our opinion, administrative procedures and practices of the Bureau, ASO, and air stations have significantly **reduced** the number of tires that have been recapped. Restrictive procedures and practices, in addition to the Bureau-imposed shelf/service life, resulted in the following circumstances noted during our review,

1. ASO semiannually authorizes the sizes of tires which can be recapped by issuing aircraft tire **recapping programs**. These recapping programs **inform** the authorized **air** stations which sizes of tires to **recap** during the next 6-month period. Tires are included in the program when ASO's **records** indicate that a sufficient quantity of **recappable** tires are on hand to realize a saving of \$1,000 by recapping rather than purchasing. Air stations having **recappable** tires of those sizes are authorized to recap as many such tires as are available. If the air station **has** **recappable** tires that are not on the **currently** authorized program, **it** must retain them **for** future recapping unless the tires are **over 4** years old, in which case recapping is no longer permitted,

Under this procedure tires taken off **an** aircraft after the **cutoff date** for reporting recappable tires to ASO may not be authorized **for** recapping. **As** a result, many months elapse **from** the time the tires are removed from aircraft, recapped, and returned to service,

2. The type of contract awarded to recapping contractors **by** the air stations is another factor which influences the length of time tires are out of service. **Some** stations award continuing-type contracts for estimated quantities of the designated tires covering a 6-month period, extendable to a year, and tires are sent **for** recapping as they **become available**. Other stations award **contracts for** stipulated

quantities of tires that are already available for recapping. Several of the activities awarding contracts for stipulated quantities have made a practice of allowing up to 6 months to elapse between contract awards. This latter practice results in recappable aircraft tires being retained by the stations for extended periods of time.

3. An additional circumstance deterring the achievement of maximum recapping resulted when tires for at least one aircraft model were not recapped for an extended period of time after the aircraft entered the system because the Bureau did not take timely action to determine whether the tires could be recapped. The Navy completed testing of the P-3A aircraft in June 1962 and introduced it into the Navy system in July 1962. In March 1963 the Bureau indicated that it was considering recapping a limited quantity of P-3A tires for test evaluation; however, tests were not undertaken until the following March.

Test results released in July 1964 showed conclusively that recapped tires could be used on the P-3A main landing wheels. The Bureau then removed the restriction against recapping and authorized the tires to be recapped a maximum of two times. We estimated that the Navy would have saved about \$60,000 by promptly initiating this evaluation when it was first considered in March 1963 instead of waiting a year.

During most of the period that recapping of P-3A tires was not authorized, the Navy sold the used tires as surplus. We were able to trace one such sale of 216 tires to a recapping company which recapped 181 of these tires and sold them to an airline. The foreman of the airline's tire shop could not identify the specific tires involved in this sale; however, he stated that the company's experience with used military tires was satisfactory and that there was no distinction as to utilization and performance between the military tires and new tires purchased directly from manufacturers.

Inadequate training of personnel--Since the condition of the tire casing is the governing factor in determining whether a tire can be recapped, it is imperative that responsible personnel be thoroughly familiar with proper inspection, maintenance, handling, and storage techniques.

During our visits to four naval air stations, we noted several practices which, in our opinion, contributed to the Navy's failure to obtain the maximum authorized number of recaps. We believe that these practices were caused by a

lack of understanding of the Navy's aircraft tire maintenance instructions by responsible personnel.

At one naval air station, our review disclosed that over 900 tires used on land-based, nonjet, patrol, and support-type aircraft, representing 96 percent of the tires removed from aircraft, were determined, during fiscal year 1965, to be unrecappable. The Navy allows these tires to be recapped two or three times, depending on their type, if they are in a recappable condition. When we called this high rejection rate to the attention of the local supply officer, he began an investigation to determine if irregularities were involved. The tentative decision was that the individual inspecting the tires was not technically qualified. Corrective action was being taken at the time our visit was completed.

At another station, which is an aircraft tire recapping contracting activity, the tire inspector was not passing used tires for recapping if they were more than 3 years old. It is the Navy's policy that acceptable aircraft tires may be recapped up to 4 years from the date of manufacture. The justification of the inspector was that the tires would remain in the supply department warehouse a year before being shipped out for recapping,

When we informed station officials that our aircraft tire transaction studies indicated that recappable tires did not remain at the station for a year prior to shipment for recapping, 330 previously inspected aircraft tires over 3 and less than 4 years of age were reinspected. The reinspection disclosed that 252 tires, or 76 percent of the 330, were in a recappable condition. We estimated that the difference between the cost of new tires and the cost of recapping these 252 tires, after allowing for rejections by the recapper, amounted to approximately \$13,800. We estimated also that the Government incurred unnecessary costs of approximately \$40,300 during the first 7 months in 1965 through the early disposal of recappable tires by the station, prior to our review.

An aircraft tire inspector at another station informed us that his interpretation of the Navy's recapping policy was that no aircraft tire could be recapped more than two times. Navy policy actually provides that certain classes of aircraft tires may be recapped three times. At still another station, the aircraft tire inspector informed us that he believed the tires used on the main landing gear of the most prevalent aircraft attached to his station could be recapped only one time. Navy policy allows the tires to be recapped twice.

At one of the air stations, our review disclosed that squadron personnel were not removing tires from aircraft soon enough. As a result, the predominant reason for rejecting tires for recapping was that not enough rubber remained on the casing as was necessary for the recapping process. We were advised that maintenance personnel were not properly trained as to when to remove tires,

Report by Navy Auditor General

The Navy Auditor General reported several deficiencies in the management of the aircraft tire program in an audit report issued in May 1963. The report included a recommendation that the aircraft tire recapping program be restudied with a view toward relaxing the current restrictions on the number of times that tires for land-based aircraft may be recapped.

As a result of the report, the Bureau rewrote its tire handbook to emphasize the need for proper maintenance, storage, and repair of aircraft tires. However, the Bureau rejected the recommendation that recapping restrictions be relaxed,

Navy comments and actions

We brought our findings relative to the Navy's recapping program to the attention of the Secretary of Defense on March 2, 1967. At his request, the Assistant Secretary of the Navy (Research and Development) replied, on April 27, 1967, that the Navy was reviewing and evaluating the recapping program to determine what improvements are necessary and that they would advise us of the results when they became available. The Deputy Comptroller, Department of the Navy, submitted the results of the Navy's review and evaluation to us on August 14, 1967. The Navy's comments are included in full as appendixes III and IV,

We proposed that the Naval Air Systems Command review the management of the tire recapping program to determine the means by which it could be improved so that tires for land-based, nonjet aircraft would be recapped as many times as the condition of the tire casings permitted. We proposed also that ASO remove the additional limitations on recapping and allow the authorized stations to recap tires as they become available.

We proposed further that consideration be given to providing adequate training and supervision to maintenance personnel in the proper maintenance of tires on the aircraft and the timely removal of tires from service and that

tire inspection personnel be adequately supervised and be thoroughly instructed in the Navy's tire recapping policies and procedures.

In addition, we proposed that studies be conducted by the Navy to determine the means by which the length of time **that tires** were out **of service could be** reduced and to re-evaluate the prescribed limitations on the tire shelf/service life. Although the scope of our review did not include tires for jet-engine aircraft, airline officials **informed us** that they followed the same recapping policies and practices on tires **for jet aircraft** as they did on tires **for nonjet aircraft**. Accordingly, we suggested that the reviews and studies proposed relative to land-based, nonjet aircraft be extended to include all aircraft tires.

The Navy's reply to these proposals indicated that **the Naval Air Systems Command** had revised applicable specifications to authorize low-speed tire casings to be recapped **up to four** times, provided the condition of the casing permits, and that evaluations would continue in an effort to determine whether the number of authorized recaps could be further increased. We were also advised that procedures were being revised to provide for the use of open-end contracts for recapping which would **allow** worn tires to be recapped as they became available. The Navy stated that, on the basis of a recent survey, recappable tires were **being** cycled from removal to ready-for-issue status in approximately **6 weeks**.

In addition, the Navy stated that procedures have been revised to extend the shelf/service life of low-speed tires to 6 years. The Navy also informed us that jet and high-speed aircraft tire management **had** been under review, and that **it** was anticipated that less restrictive specifications **would** be adopted.

The Navy **stated**, with respect to training and supervision of maintenance personnel, that **it** considered the training **and** supervision to be adequate. The Navy cited a number of instructions relating to proper tire care and handling which **had** been issued or revised. **Training** courses which **were** provided to personnel responsible **for** tire maintenance and inspection were described. **The Navy** also indicated that a more comprehensive system of tire inspection and maintenance had been instituted. The Navy stated **also that** adequate supervision was being received by tire inspection personnel and that they were being thoroughly instructed in the Navy's tire recapping policies and procedures,

We subsequently contacted a Navy official to determine the basis for the Navy's statement. We were informed that the Navy's position was based on information that had recently been obtained from four naval air stations, including one at which we had noted weaknesses. We concluded that the improvement in the training and supervision of tire inspection personnel was due to the recent emphasis on the recapping program.

We believe that the Navy's actions indicate a concerted effort to improve the management of the aircraft tire recapping program.

Review of the Air Force aircraft tire recapping program

We found that the Air Force had restricted the types of tires that may be recapped. For those tires included in the recapping program, the Air Force had established limitations on the number of times the tires may be recapped. Low-speed tires were **allowed** to be recapped up to three times and high-speed tires were limited to from one to three recaps.

When Ogden Air Materiel Area was assigned **the** responsibility **for** operational engineering support of aircraft tires in 1958, only low-speed tires were being recapped. These tires, generally used on cargo aircraft, were being limited to three recaps. We were advised by Ogden officials that the limit of three recaps had been established prior to the time Ogden received the engineering responsibilities for the aircraft tire recapping program. They also advised us that they had no studies to indicate that the limitation was valid in light of the improvement in the state of the art of manufacturing and recapping aircraft tires.

Since Ogden **has** been assigned the responsibility **for** operational engineering support of aircraft tires, the most significant expansion of the recapping program **has** been the addition of selected high-speed tires. At the time of our review, **six** high-speed tires used primarily on the main landing gear of jet cargo and bomber aircraft were being recapped.

In its efforts to expand the recapping program, Ogden has relied on both Air Force and contractor testing facilities. We were advised by Ogden officials that further expansion of the program had been hampered by (1) the **inadequacy** of the existing Air Force testing facility at **Wright-Patterson Air Force Base**, (2) the limited availability of engineering test facilities at qualified aircraft tire manufacturers, (3) the lack of engineering personnel at Ogden to supervise the expansion of the recapping program with either contractor or Air Force facilities, and (4) the lack of sufficient information about tires to determine performance levels because of the inadequacy of the Air Force reporting system.

At the time of our review, Ogden's testing program was being accomplished at the Air Force Flight Dynamics Laboratory at Wright-Patterson Air Force Base by a contractor and **at** commercial facilities by other contractors.

The Flight Dynamics Laboratory has submitted a request for funds for a detailed study of future requirements within the Air Force for wheel, tire, and brake testing and for the development of a total Air Force plan to meet these requirements. At the conclusion of our review, the Air Force was preparing to award a contract for an independent study of these testing requirements and the facilities necessary to fulfill these requirements, Seven Air Force locations, including the present facility at Wright-Patterson Air Force Base and a proposed facility at Ogden, were to be considered in this study.

In regard to Ogden's statement that it lacked engineering personnel to supervise expansion of the recapping program, we found that it had four engineers and a branch chief who devoted from one third to one half of their time to this program. We were advised that additional manpower could be used only if additional testing facilities became available.

Because of the lack of data on the number of potentially recappable tires that would be available, it is not possible to accurately estimate the savings that might be obtained by expanding the recapping program. However, on the basis of fiscal year 1966 requirements, we estimated that, if each tire now included in the recapping program were allowed to be recapped one more time, the potential annual savings would be around \$900,000. Further, if the high-speed tires not now included in the recapping program were allowed to be recapped one time, the additional potential annual savings would be around \$1 million. These potential savings would be reduced by the number of tires condemned for reasons other than tread wear and by additional storage and distribution costs.

In a letter dated August 22, 1967, we requested the Secretary of the Air Force to comment on our findings. The reply from the Assistant to the Deputy for Supply and Maintenance, Office of the Assistant Secretary of the Air Force (Installations and Logistics), dated October 24, 1967, is included as appendix V.

The reply indicates that the tire retreading program has been considerably expanded since our field review. Specifically, the current Air Force policy places no limitation on the number of times that authorized tires may be retreaded. The condition of the tire carcass is now the determining factor,

Additional tires have been added to the Air Force program and studies are being conducted to determine the practicability of retreading other tires. The Air Force reply indicates **also** that improvements have been made in their engineering and testing capability.

Review of the Army aircraft tire recapping program

We were informed by an official at Headquarters, Army Materiel Command (AMC), that the Army had not established an aircraft tire recapping program. Headquarters, Army Aviation Materiel Command (AVCOM), which is a subordinate command of AMC, is responsible for procuring and managing tires for use on Army aircraft. We found that AVCOM had recently evaluated the Army position relative to recapping of aircraft tires and concluded that an Army-wide program for recapping should be held in abeyance. The decision as to whether or not to recap is left to the installations that operate the aircraft.

AVCOM has not required aircraft tires to be recapped primarily because the unit cost of tires used on Army aircraft is relatively low and because transportation costs associated with the shipping of recappable tires from widely dispersed stations which generate requirements for small quantities of tires would negate savings.

Because of the lack of data at any central location, we did not obtain information relative to the volume of recappable tires generated by using installations during a given period or the savings that could be realized on each type of tire by recapping. Therefore, we did not compute the savings that the Army could realize by establishing an aircraft tire recapping program. However, in view of the large number of aircraft operated by the Army, we would expect to find that significant savings could be realized if the Army established a program.

In this regard, although a new tire costs only \$32, we found that the Navy was saving \$10, or 31 percent, by recapping the auxiliary landing wheel tire for the C-131 aircraft. By recapping the auxiliary landing wheel tire for the C-47 and C-117 aircraft, the Navy saved \$24, or 54 percent, of the \$44 cost of a new tire. (See app. II.)

In view of the above, we believe that the Army should reevaluate the problem of transporting tires to and from the recapping companies' facilities. It should be noted that the Navy has overcome this problem by directing its air stations to send recappable tires to the nearest of nine stations authorized to award contracts for recapping. (See p. 4.)

Conclusions

We believe that significant savings have been realized by the Navy and Air Force as a result of their respective

aircraft tire recapping programs. In addition, we believe that the actions that the Navy and Air Force have indicated are either underway or planned, should substantially increase savings in the future.

We believe **also** that the Army should consider establishing a tire recapping **program**. We recognize that the tires **used** on Army aircraft are relatively inexpensive, however, we have found that the Navy **has** realized significant savings by recapping such tires.

In our opinion, the disparity in **the** aircraft tire recapping practices of the military departments indicates a need **for** the Department of Defense to establish policy guidance. ~~We~~ recognize that inflexible policies and procedures should not be established because of differences in aircraft and operating conditions both among the military departments and within each department. However, **it** appears that policy guidance should be given to **ensure** that each department will recap as many types of **tires** as **pos-**sible and that each tire included in the recapping program will **be** recapped as many times as practicable. Such practice **is** consistent with that followed by the commercial airlines.

Recommendations

Accordingly, we recommend that the Secretary of **De-**fense issue policy guidance to the military departments relative to the recapping of aircraft **tires**. We further recommend that the Department of Defense periodically review the recapping policies and procedures established by the military departments to ensure that savings through recapping are realized to the maximum extent feasible.

SCOPE OF REVIEW

We visited **five commercial airlines**, where we examined aircraft tire recapping records and other data; **two aircraft tire recapping companies**, where we **obtained authoritative data** and publications; and the **Federal Aviation Agency**, where we reviewed regulations **and** written instructions. **The information furnished by the commercial airlines and recapping companies was given voluntarily and in confidence.** Accordingly, these companies are not **named** in this report.

The scope of work performed within **the Navy, Air Force, and Army** and the Locations visited **were as follows:**

NAVY

We **reviewed** Navy regulations and written instructions, examined **records** and contracts pertaining to the aircraft tire recapping **program**, and analyzed aircraft **tire inventory** and disposal records. Our **review was** conducted at the following offices and installations: Bureau of Naval Weapons, Washington, D.C.; **Naval Aviation Supply Office, Philadelphia, Pennsylvania;** Marine Corps Air Facility, New River, Jacksonville, **North Carolina;** **and** naval air stations at **Corpus Christi, Texas, Jacksonville, Florida, Norfolk, Virginia, and Patuxent River, Maryland.**

AIR FORCE

We **examined** available records relating to tire usage, **purchases,** and condemnations **and** discussed aircraft tire recapping practices with Air **Force** personnel. Our review **was** conducted at the Ogden Air Materiel Area, Hill Air Force Base, **Utah;** Headquarters, Air Force Logistics Command, Wright-Patterson Air **Force Base, Ohio;** **and** the Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson Air Force **Base, Ohio.**

ARMY

We **discussed** the Army's policies and procedures relating to recapping of aircraft tires with an official of **Headquarters, Army Materiel Command, Washington, D.C.,** and with an official at Headquarters, Army Aviation Materiel Command, St. Louis, Missouri. We also analyzed an **Army staff study** pertaining to recapping.

APPENDIXES

PRINCIPAL OFFICIALS
OF THE DEPARTMENT OF DEFENSE
AND THE DEPARTMENTS OF THE ARMY
NAVY, AND AIR FORCE
RESPONSIBLE FOR ADMINISTRATION OF ACTIVITIES
DISCUSSED IN THIS REPORT

	<u>Tenure of office</u>	
	<u>from</u>	<u>to</u>
<u>DEPARTMENT OF DEFENSE</u>		
SECRETARY OF DEFENSE :		
Robert S. McNamara	Jan. 1961	Present
DEPUTY SECRETARY OF DEFENSE :		
Paul H. Nitze	July 1967	Present
Cyrus R. Vance	Jan. 1964	June 1967
Roswell L. Gilpatric	Jan. 1961	Jan. 1964
ASSISTANT SECRETARY OF DEFENSE (INSTALLATIONS AND LOGISTICS) :		
Thomas D. Morris	Sept. 1967	Present
Paul R. Ignatius	Dec. 1964	Sept. 1967
Thomas D. Morris	Jan. 1961	Dec. 1964
<u>DEPARTMENT OF THE ARMY</u>		
SECRETARY OF THE ARMY:		
Stanley R. Resor	July 1965	Present
Stephen Ailes	Jan. 1964	July 1965
Cyrus R. Vance	July 1962	Jan. 1964
UNDER SECRETARY OF THE ARMY:		
David E. McGiffert	July 1965	Present
Stanley R. Resor	Apr. 1965	July 1965
Vacant	Jan. 1965	Mar. 1965
Paul R. Ignatius	Mar. 1964	Dec. 1964
Vacant	Jan. 1964	Feb. 1964
Stephen Ailes	Feb. 1961	Jan. 1964
ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS AND LOGISTICS):		
Dr. Robert A. Brooks	Oct. 1965	Present

PRINCIPAL OFFICIALS
OF THE DEPARTMENT OF DEFENSE
AND THE DEPARTMENTS OF THE ARMY
NAVY, AND AIR FORCE
RESPONSIBLE FOR ADMINISTRATION OF ACTIVITIES
DISCUSSED IN THIS REPORT (continued)

<u>Tenure of office</u>	
<u>From</u>	<u>To</u>

DEPARTMENT OF THE ARMY (continued)

ASSISTANT SECRETARY OF THE ARMY
(INSTALLATIONS AND LOGISTICS)
(continued):

Daniel M. Luevano	July 1964	Oct. 1965
A. Tyler Port (acting)	Mar. 1964	June 1964
Paul R. Ignatius	May 1961	Feb. 1964

DEPARTMENT OF THE NAVY

SECRETARY OF THE NAVY:

Paul R. Ignatius	Aug. 1967	Present
John T. McNaughton	July 1967	Aug. 1967
Paul E. Nitze	Nov. 1963	June 1967
Fred Korth	Jan. 1962	Nov. 1963

UNDER SECRETARY OF THE NAVY:

Charles F. Baird	July 1967	Present
Robert H. B. Baldwin	July 1965	June 1967
Kenneth E. BeLieu	Feb. 1965	July 1965
Paul B. Fay, Jr.	Feb. 1961	Jan. 1965

ASSISTANT SECRETARY OF THE NAVY
(INSTALLATIONS AND LOGISTICS):

Graeme C. Bannerman	Feb. 1965	Present
Kenneth E. BeLieu	Feb. 1961	Feb. 1965

DEPARTMENT OF THE AIR FORCE

SECRETARY OF THE AIR FORCE:

Dr. Harold Brown	Oct. 1965	Present
Eugene M. Zuckert	Jan. 1961	Sept. 1965

PRINCIPAL OFFICIALS
OF THE DEPARTMENT OF DEFENSE
AND THE DEPARTMENTS OF THE ARMY
NAVY, AND AIR FORCE
RESPONSIBLE FOR ADMINISTRATION OF ACTIVITIES
DISCUSSED IN THIS REPORT (continued)

	<u>Tenure of office</u>	
	<u>From</u>	<u>To</u>
<u>DEPARTMENT OF THE AIR FORCE (continued)</u>		
UNDER SECRETARY OF THE AIR FORCE:		
Townsend Hoopes	Sept. 1967	Present
Norman S. Paul	Oct. 1965	Sept. 1967
Dr. Brockway McMillan	June 1963	Sept. 1965
ASSISTANT SECRETARY OF THE AIR FORCE (INSTALLATIONS AND LOGIS- TICS) (formerly Materiel):		
Robert H. Charles	Nov. 1963	Present

APPENDIX II

COMPARISON OF AVERAGE COST OF NEW TIRES
 AND AVERAGE COST OF RECAPPING TIRES
 FOR SELECTED NAVY AIRCRAFT

AIRCRAFT MODEL:	Unit cost of tire			
	<u>New</u>	<u>Scrap value</u>	<u>Recap</u>	<u>Differ- ence</u>
Main landing wheel:				
P-3A	\$139	\$23	\$52	\$64
C-47 and 117	130	26	44	60
c-54	116	17	40	59
C-118	137	30	39	68
c-121	164	19	56	89
C-131	79	17	30	32
Auxiliary landing wheel :				
P-3A (note a)	-	-	-	-
C-47 and 117	44	3	17	24
C-54	117	3	44	70
C-118	117	3	44	70
C-121	51	5	31	15
C-131	32	6	16	10

^aNot authorized for recapping.



DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20350

27 APR 1967

Dear Mr. Fasick:

The Secretary of Defense has asked me to reply to your letter of 2 March 1967 which forwarded your draft report on significant savings attainable by improving the management of the aircraft tire recapping program in the Department of the Navy (OSD Case #2570).

The Navy *is* conducting a review and obtaining and evaluating additional information from field activities to determine what improvements are necessary in the tire recapping program. As a part of **this** review, a determination will be made as to actions that should be taken on the other recommendations in the draft report.

It is expected that you can be advised of the results of the review and evaluation in about three months.

Sincerely yours,

 A handwritten signature in black ink, appearing to read "Arthur J. Foy".

Assistant Secretary
THE NAVY

Mr. J. K. Fasick
Associate Director, Defense Division
U. S. General Accounting Office
Washington, D. C. 20548



DEPARTMENT OF THE NAVY
OFFICE OF THE COMPTROLLER
WASHINGTON, D C 20350

IN REPLY REFER TO

AUG 14 1967

Dear Mr. Fasick:

Assistant Secretary of the Navy letter of 27 April 1967 indicated that a **substantive** reply to the **General Accounting Office** draft report on the management of the aircraft tire recapping program would be forwarded upon the completion of a Navy review and evaluation of the program.

I am enclosing the Navy **reply** to the report.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Paul Masterton", written over a large, stylized flourish.

PAUL MASTERTON
Rear Admiral, USN
Deputy Comptroller

Mr. J. K. Fasick
Associate Director, Defense Division
U. S. General Accounting Office
Washington, D. C. 20548

Enclosure

(1) Navy Reply to GAO Draft Report of 2 Mar 1967 on Significant Savings Attainable by Improving the Management of the Aircraft Tire Recapping Program (OSD Case #2570)

Navy Reply
to
GAO Draft Report of 2 March 1967
on
Significant Savings Attainable by Improving the
Management of the Aircraft Tire Recapping Program
Department of the Navy
(OSD Case #2570)

I. GAO Findings and Recommendations

It is the opinion of the General Accounting Office that the Navy can realize significant savings without hazard to personnel or aircraft through improvement in the management of its tire recapping program for its land-based, non-jet aircraft tires. Under its present procedures, by improving the management of the tire recapping program, the Navy could reasonably expect to average one recap per tire. Had this been done, \$397,000 would have been saved in fiscal year 1965. From \$349,000 to \$392,000 additional could have been saved had the Navy followed the commercial airlines' practice of recapping its tires as many times as the condition of the casings permitted.

The General Accounting Office recommends that:

(1) the Naval Air Systems Command review the existing Navy management of its tire recapping program to determine the means by which it can be improved so that tires for land-based, non-jet aircraft are recapped as many times as the condition of the tire casings permit;

(2) the Aviation Supply Office allow authorized stations to recap tires as they become available.

(3) consideration be given to providing adequate training and supervision to maintenance personnel on the proper maintenance of tires on the aircraft and on the timely removal of tires from service and that tire inspection personnel receive adequate supervision and be thoroughly instructed in the Navy's tire recapping policies and procedures;

(4) studies be conducted by the Navy to determine the means by which the length of time that tires are out of service can be reduced and the limitation that is required on the tire shelf/service life.

Enclosure (1)

The General Accounting Office further suggested that the reviews and studies proposed relative to land-based, non-jet aircraft be extended to include all aircraft tires.

II. STATEMENT

A. Navy Position

The Navy started a comprehensive review of the management of the aircraft tire retreading program in the early part of 1965, with the result that the Navy has taken remedial action, following the lines of three of the General Accounting Office's recommendations (numbered in accordance with such recommendations) as follows:

Rec. #1. The Naval Air Systems Command has revised applicable specifications to authorize tire casings to be retreaded up to four times, provided the condition of the casing permits. The Aviation Supply Office is revising its procedure for retreading accordingly. Authorization of low speed tire cases to be retreaded up to four times is part of a program to determine, on an incremental basis, by actual experience and analysis of reports received from tire processing activities, whether the number of authorized retreads can be further increased. It is not considered advisable to remove the limitation on the number of times a tire can be retreaded until further experience is gained in managing the program.

Rec. #2. The use of open end retreading contracts which allow contractors to retread tires as they become available has been under consideration for sometime. ASO Field Instruction FASO 13490.3D is currently being revised. As part of the updating, it specifically recommends the use of open end contracts and requires retreading of any tire specified on the ASO retreading schedule regardless of whether or not a local requirement exists for retreading of particular tires.

Rec. #4. Through increased management attention, retreadable tires are being cycled from removal to ready-for-issue status in approximately six weeks according to recent surveys at several East Coast Naval Air Stations. Procedures have been revised extending to six years the shelf/service life of low speed aircraft tires.

With respect to recommendation number (3), the Navy currently considers that adequate training and supervision on the proper maintenance of tires on aircraft, and on the timely removal of tires from service is being provided maintenance personnel; adequate supervision is being received by tire inspection personnel and they are being thoroughly instructed in the Navy's tire retreading policies and procedures.

With respect to the suggestion that reviews and studies include all aircraft tires, jet and high speed aircraft tire management has been under review by the Naval Air Systems Command during this past year. It is anticipated that this review will result in specifications being issued by 1 December 1967 whereby the shelf/service life of selected jet and high speed aircraft tires will be extended to six years, with a maximum of four retreads, condition of casings permitting.

B. Discussion

It was recognized in the early part of 1965 that management of the Navy aircraft tire program needed strengthening. Because of the many and far-flung activities involved, a review of this program necessarily requires time. Although it is only currently being completed, certain corrective and updating actions have already been taken, based on various surveys made in the course of the review, as shown in the Navy's response to the GAO recommendations.

During 1966, the Navy and the Air Force coordinated the preparation of revision "C" to Specification MIL-R-7726, "Repair and Retreading of Used Aircraft Pneumatic Tires and Repair of Inner Tubes" for low speed aircraft (aircraft having ground speeds no greater than 139 knots, 160 MPH). The revised specification, recently issued, tightens up the inspection of aircraft tires, makes the repairing requirements and procedures more stringent, gives tighter controls over the contractor and provides an improved quality assurance. In addition, all retreading contracts currently being issued now require the Contractor to submit to the Naval Air Systems Command a report on all rejected casings. This report shows the number of times each casing was retreaded, the size, serial number, make of tire and reason for rejection. These reports are being reviewed to ascertain the number of casings rejected, the reason therefor, and to determine if the number of retreads can be raised above four.

The Navy's conclusions that adequate training and supervision on the proper maintenance of tires on aircraft, and on the timely removal of tires from service is being provided maintenance personnel, and that the tire inspection personnel are receiving adequate supervision and thorough instruction in the Navy's tire retreading policies and procedures are based on the following: The Bureau of Naval Weapons (now Naval Air Systems Command) issued for the first time Airframe Bulletin #59 for the F-4 and Airframe Bulletin 1/82 for the A-4 high speed jet aircraft on 21 May 1965 and 7 July 1965, respectively, in which specifications for a wear replacement program for tires were included. Airframe Bulletin #82 was recently revised and reissued on 21 April 1967. On 27 September 1965, a "Revised Curriculum Outline for the Aviation Structural Mechanics (Structures) Course, Class A", was approved by the Chief of Naval Air Technical Training. This curriculum, in conjunction with ASO Field Instruction 13490.2, 1 February 1964, entitled "Aircraft Tire Recapping Program", and Technical Manual NW 04-10-506, entitled "Maintenance, Storage and Repair Instructions for Aircraft Tires" calls for instructions in Tire Buildup, comprising wear and damage considerations, and procedures and safety precautions embracing wheel replacement, as a part of Unit 2, entitled "Operational Maintenance". The Class B Aviation Structural Mechanics course provides more specialized training in tire maintenance and inspection. It includes training related to BUWEPS Instruction 13420.1 "Aircraft Landing Gear, Overheated Wheels, Brakes and Tires, Safe Handling of". These two courses require formal training sessions devoted to aircraft tires and are mandatory requirements for all enlisted Naval and equivalent Marine Corps personnel of the AMS (Aviation Structural Mechanic (Structures)) rates.

Subsequent to the GAO review, the Navy instituted the 3M (Maintenance and Material Management) System. A sub-system of 3M is known as the PMS (Planned Maintenance System). A feature of PMS is the use of Maintenance Requirement Cards which provide detailed directions for accomplishing inspections on a daily, weekly, monthly, quarterly or annual basis, depending upon the need. Maintenance Requirement Cards governing preflight and daily aircraft inspection requirements call out the inspection of tires for cuts, excessive wear, slippage alignment and underinflation. Compliance with Maintenance Requirement Card requirements is recorded on the Preflight/Postflight Daily Maintenance Record Card, NAVAIR Form 4730/4.

On-site reviews indicate that civilian personnel employed by the supply departments as tire inspectors have adequate knowledge of the Navy tire retreading program and specifications. These personnel are found to be well informed of changes thereto by their supervisors.

DEPARTMENT OF THE AIR FORCE
WASHINGTON

OCT 24 1967

OFFICE OF THE SECRETARY

Dear Mr. Newman:

The Secretary of Defense has asked me to reply to your letter of August 22, 1967 on Air Force aircraft tire retreading practices, B-146753, (OSD Case #2652).

After receipt of your letter the current Air Force policies and practices in regard to aircraft tire retreading were thoroughly reviewed. Based on our review, it appears that your letter reflects conditions that existed in FY 1966. Since that time, however, our aircraft tire retreading program has been considerably expanded as a result of improved inspection techniques, more experience with the retreaded tire, and more confidence in retreaded tire performance. Specifically, where tires authorized for retreading were formerly limited to three retreads, our current policy places no limitation on the number of times that authorized tires may be retreaded. The condition of the tire carcass is now the determining factor.

Also, we are continuing to add high speed tires to the list authorized for retreading as testing and experience prove the action both practical and safe. Since FY 1966, tires for the C-141, T-33 and T-37 aircraft have been added to the program. Although the tires for the B-58 and fighter aircraft are not currently being retreaded, the Air Force, in conjunction with the tire industry, is conducting studies and tests to determine the practicability and safety impact of retreading these tires. It should also be noted that the Air Force is endeavoring to include retreading criteria as part of the original tire design parameters for new aircraft weapon systems. Additionally, our current policy requires that new tires proposed for Air Force use must prove to be retreadable prior to acceptance.

Regarding your reference to the lack of tire data in the Air Force, since FY 1966 more extensive use has been made of the tire performance information provided mainly by our AFM 66-1 Maintenance Data Collection System. The tire data reported by this system generally includes causes for removal, corrective actions taken, and number of occurrences. Use of this data has made a marked contribution in expanding our retreading program. However, we acknowledge that although the present reporting system is adequate for reporting on other aircraft systems, it can be

improved for purposes of the desired tire performance data program. At the present time, we are investigating the means to accomplish this end. Information desired includes the number of times a tire is retreaded, the type of aircraft on which it was installed and the original tire manufacturer.

In order to cope with our expanding retread program, we have significantly improved our aircraft tire engineering capability at the Ogden Air Materiel Area by incrementally increasing the number of authorized personnel from three in FY 1966 to eight in FY 1968. We consider the present tire engineering personnel complement adequate to handle any foreseeable growth of the tire retreading program. Our tire testing ability was also enhanced by improving the utilization of the testing facility at the Flight Dynamics Laboratory at Wright Patterson AFB. This provided an increased amount of meaningful information to our tire managers and engineers and contributed to increasing the scope of our retreading program. We agree, however, that our present tire testing capability is inadequate and have requested the expansion of this facility to meet our current and projected needs.

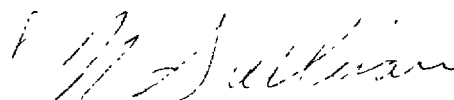
As a matter of information a review of aircraft tire expenditures and dollars expended for retreading shows that our efforts through the tire retreading program is expected to result in a saving of \$20.2 million over the period FY 66 through FY 68. Continued enhancement of our program is expected to result in additional savings in the future.

In summary, since FY 1966 the Air Force has pursued a more aggressive policy in expanding its aircraft tire retreading program and has made significant progress. It is our policy to retread **all** aircraft tires to the maximum permissible extent, where practicability and safety permit. As indicated above, we have taken positive measures to achieve this end and have already started to realize the financial benefits.

We are aware of your recent review of Navy policies and practices incident to retreading of aircraft tires. Some disparities between the Air Force and Navy experience and practices are noted. Accordingly, the matter is being referred to the DoD Equipment Maintenance and Readiness Council as an item for review and action to develop uniform DoD policies and criteria.

We appreciate your calling this matter to our attention.

Sincerely,



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