DEPARTMENT OF DEFENSE

AUDIT REPORT

MANAGEMENT OF LABOR STANDARDS
FOR AIRFRAMES AT AERONAUTICAL DEPOTS

No. 91-039

January 31, 1991

Office of the
Inspector General

January 31, 1991

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (FINANCIAL MANAGEMENT)
ASSISTANT SECRETARY OF THE NAVY (FINANCIAL MANAGEMENT)
ASSISTANT SECRETARY OF THE AIR FORCE (FINANCIAL MANAGEMENT AND COMPTROLLER)

SUBJECT: Report on the Audit of the Management of Labor Standards for Airframes at Aeronautical Depots (Report No. 91-039)

We are providing this final report on the Audit of the Management of Labor Standards for Airframes at Aeronautical Depots for your information and use. Comments on a draft of this report were considered in preparing the final report. The audit was made from November 1989 to July 1990. Our overall audit objective was to determine if the Military Departments' Aeronautical Depot managers had an effective program to monitor and update labor standards. Specifically, we determined if labor standards for airframes were engineered, supporting documentation for the labor standards was available, standards were kept current, labor standards were accurate, and variance analyses were performed. We also determined if applicable internal controls were adequate. DoD planned to spend about $1.2 billion on 21.6 million direct labor hours for depot maintenance of aircraft airframes during FY 1990.

Labor standards form a critical basis for determining the capabilities of the Military Departments' depot maintenance activities. Therefore, the accuracy and reliability of labor standards plays a major role in determining the efficient redistribution and consolidation of depot maintenance work loads as directed by the Deputy Secretary of Defense on June 30, 1990, to reduce the cost of DoD maintenance operations. The Army's overall work measurement program for labor standards was generally effective. The Navy and Air Force were also improving policies and procedures over their work measurement programs for developing and updating labor standards in response to audits by the General Accounting Office and the Air Force Audit Agency. These audits focused on deficiencies in managing labor standards for aircraft components and engines. Our audit showed that the Military Departments had weaknesses in their internal controls for establishing, reviewing, and updating labor standards for the maintenance and repair of aircraft airframes. Further

improvements were needed in developing and updating labor standards and in performing variance analyses of differences in actual labor hours expended versus standard labor hours for airframe maintenance and repair operations. The results of the audit are summarized in the following paragraphs, and the details, audit recommendations, and management comments are in Part II of this report.

The Military Departments were not developing and updating labor standards affecting 10.3 million direct labor hours of airframe maintenance and repair operations in the FY 1990 work load. Our sample results showed that the Military Departments had overstated labor standards by an average of 34 to 65 percent. Although our sample size was not sufficient for statistical projection purposes, we believe that the sample results are indicative of the inaccuracies of the labor standards for the airframe workloads. We recommended that the Military Departments improve their work measurement programs by developing and updating labor standards for airframes. The three findings on the Military Departments and each of the recommendations are shown in Part II of this report (Air Force on page 5, Navy on page 11, and Army on page 19).

The Navy and the Air Force were also not fully using variance analyses to evaluate the efficiency and effectiveness of their work measurement programs. As a result, The Navy and the Air Force could not determine the accuracy and reliability of standards used to charge maintenance customers, budget for maintenance and repair operations, measure productivity, determine staffing requirements, ensure work centers were fully work loaded, and evaluate work performance by personnel. We recommended that the Navy and the Air Force issue specific guidance requiring depots to perform variance analyses (page 25).

The audit identified internal control weaknesses as defined by Public Law 97-255, Office of Management and Budget Circular A-123, and DoD Directive 5010.38. Procedures were not implemented to ensure that engineered labor standards were established, reviewed, and updated and that variance analyses were performed. All recommendations in this report, if implemented, will correct these weaknesses. A copy of the final report will be provided to the senior officials responsible for internal controls within the Military Departments.

On October 1, 1990, a draft of this report was provided for comments to the addressees. Comments were received from the Assistant Secretary of Defense (Force Management and Personnel) on January 10, 1991, the Special Assistant to the Deputy Chief of Staff for Logistics, Department of the Army, on December 28, 1990, the Assistant Secretary of the Navy (Manpower and Reserve Affairs) on December 6, 1990, and the Deputy Chief of Staff

(Logistics and Engineering), Department of the Air Force, on December 5, 1990. The complete texts of management comments are provided in Appendixes C, D, E, and F, respectively.

Although no recommendations were specifically addressed to the Assistant Secretary of Defense (Force Management and Personnel), the Assistant Secretary concurred with all findings and recommendations. The Assistant Secretary stated that the actions recommended are necessary if cost controls and improved manpower utilizations are to be realized.

The Special Assistant to the Deputy Chief of Staff for Logistics, Department of the Army, nonconcurred with Recommendations C.1. and C.2. Concerning Recommendation C.1., the Army stated that the Corpus Christi Army Depot (the Depot) improved its maintenance standards effort as the result of a 1988 review by the U.S. Army Depot System Command. Although improvements have been made, we believe that further improvements can be made by taking steps to ensure that the Depot has a system for selecting labor standards that should be reviewed because their performance efficiencies exceeded the criteria established in Depot System Command Regulation 5-10. The Army nonconcurred with Recommendation C.2., stating that the Depot has initiated actions over the past 2 years which demonstrated a renewed commitment to aggressive maintenance of standards at the Depot. As detailed in Part II of this report, we found that the Depot did not have adequate procedures for reviewing performance efficiencies and reevaluating labor standards of airframe maintenance and repair operations. We believe our recommendations are still valid. Therefore, we request that the Army reconsider its position and provide revised comments in its response to this final report.

The Assistant Secretary of the Navy (Manpower and Reserve Affairs) nonconcurred with Recommendation B.1.a.; concurred in part with Recommendations B.1.b. and B.2.; and concurred with Recommendations D.1.a. and D.1.b. Management actions on Recommendations D.1.a. and D.1.b. are responsive and no additional comments are required.

Concerning Recommendation B.1.a., the Navy nonconcurred by stating that engineering standards for 80 percent of the airframe work load was not economically achievable without a significant increase in staffing. The Navy stated that a more practical, cost-effective approach is for each depot activity to identify and develop engineered standards for its own high volume, high payback operations. We partially agree. Although relative criteria at the Naval Aviation Depots may be appropriate, the Naval Air Systems Command and the depots had no specific goals for engineered labor standards. Therefore, the 80-percent criterion that was previously used by the Navy, and is being used by the Army and Air Force, provides the only quantified criterion

for measuring progress of the depots in engineering labor standards. We consider our recommendation still valid and request that the Navy reconsider its position on Recommendation B.1.a. and provide additional comments in response to this final report.

Concerning Recommendation B.1.b., the Navy stated that the new Naval Air Systems Command Instruction 5220.16, issued August 15, 1990, provides that standards should be reevaluated and updated when there is a significant change in work content or when statistically significant variances (greater than 10 percent over or under) exist for high volume, high payback work load. The Navy took exception with our recommendation that standards should be reevaluated every 2 years or at some specific, reasonable interval. We agree with the Navy's position because the procedures in the new Naval Air Systems Command Instruction 5220.16 provide criteria for reevaluating standards. The Navy's comments satisfy the intent of the recommendation. We revised Recommendation B.1.b., accordingly, and additional comments on this recommendation are not required.

Concerning Recommendation B.2., the Navy stated that the Headquarters, Naval Air Systems Command, had sufficient staff to review quarterly reports from the Naval Aviation Depots and to chair annual reviews of the depots policies and procedures for work measurement. The Navy agreed that additional personnel would enhance the program, but stated that DoD personnel policies do not permit hiring of additional headquarters staff. We disagree on the adequacy of staffing. Naval Air Systems Command instructions provide for annual command inspections of depots that include reviews of their work measurement programs. We understand, however, that at present there is only one person assigned to perform these work measurement inspections. We believe that a single person will not be able to adequately review the work measurement program at six depots each year. Sufficient personnel need to be provided to this critical task either through reassignment of current personnel or through seeking relief from any hiring restrictions. Therefore, to satisfy the intent of the recommendation, we request that the Navy provide in its response to the final report, the steps being taken to reassign personnel or to obtain a waiver from hiring restrictions. Additionally, the Navy should provide the inspection plan or guide, and the estimated dates for completing an inspection at each of the six depots.

The Deputy Chief of Staff (Logistics and Engineering), Department of the Air Force, concurred in principle with Recommendations A.1., A.2., D.1.a., D.1.b., and D.2. Management's actions on Recommendations A.1., D.1.a., D.1.b., and D.2. are responsive; but, the Air Force did not provide target dates for completing the planned actions for these recommendations. Therefore, we request that the Air Force

provide estimated completion dates for the planned actions for Recommendations A.1., D.1.a., D.1.b., and D.2. in its response to this final report.

Concerning Recommendation A.2., the Air Force stated that Air Force Logistics Command Regulation (AFLCR) 66-4 addresses procedures for nonengineered standards. In addition, personnel are trained in the methods for setting standards at DoD and local schools. We disagree with the Air Force's comments because AFLCR 66-4 did not have detailed procedures for setting nonengineered standards. Technicians at an Air Logistics Center used different procedures to set essentially the same nonengineered standard. We believe that each of the Air Logistics Centers should have standard operating procedures that implement guidance from AFLCR 66-4 at a more detailed level. These procedures should incorporate methods learned at DoD schools on industrial engineering techniques and operations unique to each of the Air Logistics Centers to avoid the confusion by technicians in setting nonengineered standards that were shown in our report. We request that the Air Force reconsider its position on Recommendation A.2. and provide a revised response to the final report.

DoD Directive 7650.3 requires that all audit recommendations be resolved promptly. Accordingly, final comments on unresolved issues in this report should be provided within 60 days of the date of this memorandum. Management comments should describe the corrective actions taken or planned, the completion dates for actions already taken, and the estimated dates for completion of planned actions. If appropriate, you may propose alternative methods for accomplishing desired improvements. This report claims no monetary benefits (Appendix G).

The courtesies and cooperation extended to the staff during the audit are appreciated. Audit team members are listed in Appendix I. If you have any questions on this audit, please contact Mr. Dennis E. Payne on (703) 614-6227 (AUTOVON 224-6227) or Mr. Tilghman A. Schraden on (703) 693-0624 (AUTOVON 223-0624). Copies of this report are being provided to the activities listed in Appendix J.

Edward R. Jones
Deputy Assistant Inspector General
for Auditing

cc:
Secretary of the Army
Secretary of the Navy
Secretary of the Air Force
Assistant Secretary of Defense (Force Management and Personnel)
Assistant Secretary of Defense (Production and Logistics)

REPORT ON THE AUDIT OF
THE MANAGEMENT OF LABOR STANDARDS
FOR AIRFRAMES AT AERONAUTICAL DEPOTS

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Prepared by:
Logistics Support Directorate
Project No. 0LB-0022

REPORT ON THE AUDIT OF THE MANAGEMENT OF LABOR STANDARDS FOR AIRFRAMES AT AERONAUTICAL DEPOTS

PART I - INTRODUCTION

Background

The Military Departments use labor standards to measure the aeronautical depots' efficiency and effectiveness in overhauling, modifying, and repairing aircraft airframes, engines, and components. Labor standards measure the time it takes a trained worker, working at a normal pace and according to specific methods and working conditions, to produce a prescribed unit of acceptable quality maintenance work. There are two types of labor standards, engineered and nonengineered. Engineered standards are a series of observations and analyses of the performance of work, which result in a specific time for a recorded method of work. Nonengineered standards are estimates of the time required to perform a specified amount of work. In some cases, nonengineered standards may be based on the previous actual amount of time in which a given task was performed. The Army has a goal to engineer 80 percent of the standards for 50 percent of its programmed work load, while the Navy and the Air Force had a goal to engineer 80 percent of the standards in their total programmed work loads.

DoD Directive 4151.16, "DoD Equipment Maintenance Program," August 23, 1984, requires that the Military Departments develop an industrial standards program to plan and measure performance of maintenance industrial activities.

DoD Instruction 5010.34, "Productivity Enhancement, Measurement and Evaluation -- Operating Guidelines and Reporting Instructions," August 4, 1975, requires that DoD Components periodically evaluate actual labor performance against preestablished standards for work covered by detailed labor performance standards (covering individual tasks, jobs, and operations).

DoD 7220.29-H, "Department of Defense Depot Maintenance and Maintenance Support Cost Accounting and Production Reporting Handbook," October 21, 1975, provides that DoD depot maintenance activities will establish work measurement standards for labor costs; work measurement standards will be based on industrial techniques where high-value, high-volume work is involved; and work measurement standards must be reevaluated at least once every 2 years to ensure that the standards remain current.

DoD 7220.9-M, Chapter 76, "Accounting Manual," March 23, 1990, replaced DoD 7220.29-H. The Manual incorporates guidelines from DoD 7220.29-H, including the reevaluation of work measurement standards. However, the Manual does not state specific time requirements for reevaluating work measurement standards.

Objective and Scope

The audit objective was to determine if the Military Departments' Aeronautical Depot managers had an effective program to monitor and update labor standards. The audit also evaluated the adequacy of applicable internal controls.

The Command Headquarters responsible for oversight of the Military Departments' work measurement programs did not collect and evaluate data necessary to determine the total universe of operations for the maintenance and repair of aircraft airframes needed for a statistical sample. Therefore, we judgmentally selected and reviewed 47 airframe maintenance and repair operations in the FY 1990 work load for 12 types of aircraft that were being serviced at 5 aviation depots and logistics centers. We examined the FY 1990 maintenance and repair operations to determine if labor standards were engineered, the required backup documentation was available, standards were kept current, standards were accurate, and variance analyses were performed.

We analyzed operating cost reports, product and standard distribution listings, labor standard indexes, program status reports, management plans, labor hour data sheets and work measurement program schedules related to the work measurement programs in each of the Military Departments. We also reviewed DoD and Military Department policies and procedures related to work measurement programs and labor standards to determine the adequacy of those policies and procedures.

Specialists in industrial engineering techniques from the Office of the Inspector General, DoD, assisted the auditors in evaluating the accuracy and reliability of the labor standards for the 47 maintenance and repair operations selected. The specialists used the Methods Time Measurement-Universal Analyzing System to evaluate the standards. The aircraft and airframe maintenance and repair operations evaluated are listed in Appendix A.

Activities visited or contacted during this audit are listed in Appendix H. This economy and efficiency and compliance audit was made from November 1989 through July 1990 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly included such tests of the internal controls as were considered necessary.

Internal Controls

An internal control objective was to ensure that labor standards for maintenance and repair of airframes at aeronautical depots were established, reviewed, and updated. In evaluating the development of labor standards at aeronautical depots, we assessed internal controls by determining if guidance was updated, standards were periodically reviewed by work measurement specialists who were independent of production functions, documentation of standards was complete, and variance analyses were performed. We found weaknesses in these internal controls, which ensure that labor standards are accurate and reliable. Details are provided in Part II of this report.

Prior Audit Coverage

The General Accounting Office issued two reports addressing problems in managing labor standards in the Navy, and the Air Force Audit Agency issued a report addressing problems in managing labor standards in the Air Force. The audit reports focused on deficiencies in developing and using labor standards for the maintenance and repair of aircraft engines and components. Appendix B contains a synopsis of these reports. The audit results discussed in Part II of this report address similar labor standard deficiencies for aircraft airframes.

PART II - FINDINGS AND RECOMMENDATIONS

A. Management of Labor Standards at Air Logistics Centers

FINDING

The Oklahoma City and Warner Robins Air Logistics Centers (ALC's) were not developing accurate and reliable labor standards for airframe maintenance and repair operations affecting 5.7 million direct labor hours that had an average total cost of $250 million annually. This condition occurred because ALC's did not use the Labor Standards Mechanization System (the E046B system) to develop and monitor airframe labor standards. Also, the Air Force did not include operations for the maintenance and repair of airframes in its Fast Access Computerized Time Standards initiative to improve its work measurement program. In addition, the Air Force did not have uniform procedures for developing labor standards. Based on the results of our audit sample, standards for direct labor hours of 22 airframe maintenance and repair operations for six types of Air Force aircraft could be reduced by an average of 34 percent. Although the sample size was not sufficient for statistical projection purposes, we believe our sample results are indicative of the inaccuracies of the standards for the airframe workload.

DISCUSSION OF DETAILS

Background. The Air Force Logistics Command (AFLC) Regulation 66-4, "Equipment Maintenance, Production Engineering/Planning," provides policy on the Air Force's work measurement program. AFLC Regulation 66-4 requires that 80 percent of the total direct product standard hours (standard labor hours computed for use by Air Force personnel in monitoring their work measurement program) in the baseline work load have engineered labor standards. The Regulation requires that engineered standards be accurate within ± 10 percent of the computed standard. The baseline includes permanent, recurring workload requirements performed on site and excludes nonrecurring work load requirements, such as temporary or nonprogrammed work load, modifications or other permanent work loads having a life span of 18 months or less, and support provided offsite. AFLC Regulation 66-4 also contains guidance on the E046B system. The E046B system provides a computerized data base for work measurement and includes statistical formulas for the classification of the various types of work measurement data, such as the classifying and analyzing of standards for high-value and high-volume determination.

On April 1, 1989, AFLC temporarily waived the work measurement provisions (including the 80-percent criterion) of AFLC Regulation 66-4. The waiver will be effective until March 31, 1992. The waiver was issued to help engineering personnel

concentrate on implementing the Fast Access Computerized Time Standards program (PACER FACTS II), which the Air Force expects will improve its work measurement program. The Air Force expects PACER FACTS II to improve the coverage for engineering labor standards by reducing the ratio of hours for developing engineered labor standards (staff hours required to engineer a 1-hour standard), developing standards for work processes instead of single operations, and structuring the data bases for standards to be compatible with work control documents used for processing aircraft.

The Air Force has five ALC's that have 38.5 million direct labor hours in maintenance work load projected for FY 1990. About 12.5 million direct labor hours (32 percent) were for the maintenance and repair of airframes, which have an annual estimated cost of $577 million.

Oklahoma City ALC had 8.1 million total direct labor hours that included 2.7 million direct labor hours for airframes. Warner Robins ALC had 7.6 million total direct labor hours that included 3 million direct labor hours for airframes. The 5.7 million direct labor hours for airframes at Oklahoma City ALC and Warner Robins ALC cost approximately $250 million annually.

Engineered Standards for Airframes. Oklahoma City and Warner Robins ALC's were not developing accurate and reliable labor standards for airframe maintenance and repair operations. AFLC summary reports for FY 1990 showed that the maximum amount of coverage for engineered airframe standards at the ALC's was 5.5 percent of the total airframe standards in the E046B system. The ALC's did not determine the direct product standard hours that were engineered for FY 1990 based on the scheduled work load. However, the direct product standards hours that were engineered would be significantly less than the 80-percent criterion prescribed in AFLC Regulation 66-4 because the majority of the scheduled work load and associated airframe labor standards were not included in the E046B system. Our analysis of the E046B system showed that the E046B system included less than 275,000 direct product standard hours (4.8 percent) of the 5.7 million airframe hours in the scheduled FY 1990 work load.

Labor standards for airframes are maintained in the Air Force's Mission, Design, and Series (MDS)/Project Work Load Planning System (G037E system). This computerized data base was managed by product division personnel at the ALC's and was used for assessing and reporting on the progress of aircraft processed through maintenance.

Product division personnel stated that the majority of airframe standards in the G037E system were not entered into the E046B system and monitored as part of the work measurement

program because these standards were subject to the baseline exclusions outlined in AFLC Regulation 66-4. The product division personnel considered each aircraft to have a unique set of maintenance and repair operations that required different, new standards for each aircraft.

Air Force work measurement personnel stated, and we agree, that airframe maintenance and repair operations (such as installing and disassembling airframe panels) that were excluded from the work measurement program were operations that recurred throughout the work load. These recurring operations should be included in the work measurement program and standards should be engineered for these operations if engineering the standards is cost-effective, that is, the operations satisfy the DoD high-volume, high-value criteria. With the PACER FACTS II initiative, engineering standards will be more cost-effective because less labor hours will be needed to engineer labor standards than were needed under previous Air Force methods. For example, work measurement personnel stated that 12 staff hours were required to engineer 1 standard hour. PACER FACTS II should reduce the ratio to 1 staff hour needed to engineer 1 standard hour. Consequently, we believe the airframe maintenance and repair operations that have been excluded from the E046B system and the Air Force work measurement program should be included in the PACER FACTS II initiative.

The Air Force work measurement personnel implementing PACER FACTS II were concentrating on the development and conversion of data tables and algorithms for the E046B system. Although we believe PACER FACTS II provides a cost-effective method of engineering the standards in the G037E system, the Air Force had no plans to apply PACER FACTS II to airframe labor standards not included in the E046B system. We believe the standards that reside in the G037E system should also be in the E046B system. If the standards are not in the E046B system, the Air Force will have no assurance that as much as 32 percent, or 12.5 million direct product standard hours costing about $577 million annually, of the airframe work load is being efficiently managed.

Evaluation of Standards. We selected 22 airframe maintenance and repair operations from the G037E system at the Oklahoma City and Warner Robins ALC's to determine the accuracy and reliability of the standards for these operations. Our specialists used industrial engineering techniques to evaluate labor standards and determine variances for 22 airframe maintenance and repair operations for the B-1, B-52, KC-135, C-141, F-15, and C-130 aircraft. The standards we selected were generally for recurring operations in the aircraft maintenance work load and were nonengineered. Nonengineered labor standards were selected for evaluation due to the limited number of documented engineered standards for airframe operations. We could not determine if these standards met the DoD high-volume,

high-value criteria because analysis of the standards was a function of the E046B system. To determine high-volume, high-value operations the E046B system requires data on the total universe of operations, the active standards in the FY 1990 work load, and the total extended hours of each of the operations in the FY 1990 work load. The Air Force did not include these data on the airframe operations in the E046B system.

We found that 22 airframe labor standards were overstated by an average of 34 percent. Although there is no required accuracy for nonengineered standards, we noted this average exceeded the Air Force's criteria of ± 10 percent accuracy specified in AFLC Regulation 66-4 for acceptable engineered labor standards. In one operation, maintenance personnel were allotted 42 minutes to remove a pilot's chair from a KC-135 aircraft. When our industrial engineering specialists observed this operation, they determined that the chair could be removed in less than 5 minutes. Of the 22 airframe labor standards we engineered, 15 standards exceeded the accuracy criterion and could have been reduced between 29 and 90 percent (Appendix A).

A contributing cause to the inaccuracy of the nonengineered labor standards was that industrial engineers, technicians, and analysts in product divisions did not have uniform procedures for estimating labor standards. For example, the standard time to remove a left anti-collision light on an F-15 aircraft was 30 minutes while the standard time to remove the right anti-collision light was 54 minutes. We determined that the variance in these similar operations was caused by two different interpretations by the technicians of what should have been included in the standard. One technician included the preparation time to remove the light in his estimate while the other technician did not. We believe that the Air Force needs to develop standard operating procedures for estimating nonengineered labor standards to avoid creating unreliable standards. The procedures should be included in interim guidance until PACER FACTS II is fully implemented in FY 1992.

Conclusion. The Air Force planned to expend about 12.5 million labor hours costing about $577 million for airframe maintenance and repair operations in FY 1990. We found that the labor standards for the operations included in our sample were overstated by about 34 percent. Although our sample size was not sufficient for statistical projection purposes, we believe our sample results are indicative of the inaccuracies of the standards for the airframe workload. Therefore, we believe airframe maintenance and repair operations should be part of the Air Force work measurement program.

RECOMMENDATIONS, MANAGEMENT COMMENTS, AND AUDIT RESPONSE

We recommend that the Commander, Air Force Logistics Command:

1. Issue specific guidance emphasizing that the Air Logistics Centers include airframe maintenance and repair operations in the Air Force Fast Access Computerized Time Standards initiative and in the Labor Standards Mechanization System to improve the work measurement program. The guidance should specify that airframe maintenance and repair operations will be evaluated to ensure labor standards are engineered for 80 percent of the work load for consistency with the Air Force Logistics Command Regulation 66-4.

Air Force Comments. The Deputy Chief of Staff (Logistics and Engineering) concurred in principle with the recommendation stating that efforts were underway to correlate E046B and G037E to select engineered time values using codes to access PACER FACTS II data and put it on work cards in the airframe operations. This action is an interim solution until the Depot Maintenance Management Information System (DMMIS) becomes operational. The intent is to have a work measurement capability in the DMMIS for all labor standards including airframe operations. The complete text of the Air Force comments are in Appendix F.

Audit Response. The Air Force's actions satisfy the intent of the recommendation, however, the Air Force did not provide target dates for completing the interim solution and for completing the work measurement capability in DMMIS. Therefore, we request that the Air Force provide the dates for completing these actions in its response to this final report.

2. Issue interim guidance establishing uniform procedures for the Air Logistics Centers to use in developing nonengineered labor standards for airframe maintenance and repair operations.

Air Force Comments. The Deputy Chief of Staff concurred in principle with the recommendation stating that AFLC Regulation 66-4 addresses procedures for nonengineered standards. In addition, personnel are trained in the methods for setting standards at DoD and local schools.

Audit Response. AFLC Regulation 66-4 does not have detailed procedures for setting nonengineered standards. Consequently, our audit showed that technicians at an Air Logistics Center used different procedures to set essentially the same nonengineered standard. We believe that each of the Air Logistics Centers should have standard operating procedures that implement guidance in AFLC Regulation 66-4 at a more detailed level. These procedures should incorporate methods learned at DoD schools on industrial engineering techniques and operations unique to each

of the Air Logistics Centers to avoid the confusion by technicians in setting nonengineered standards, as shown in our report. We request that the Air Force reconsider its position on this recommendation and provide additional comments to the final report.

Other Comments. The Deputy Chief of Staff stated that by going from nonengineered to engineered standards, as was done in the audit, there is usually a reduction in time of 25 percent or more. However, extrapolating the results from the limited sample in our audit to the FY 1990 work load for all five Air Logistics Centers was not statistically valid. The Deputy Chief of Staff also implied that we did not use the proper process for evaluating the removal of the pilot's chair cited as an example in our report.

Audit Response. We agree with the Deputy Chief of Staff that our sample of airframe maintenance and repair operations was not statistically valid for the entire Air Force work load. The sample was evaluated and the comparisons to the Air Force work load were made to reinforce and emphasize the effect the conditions that existed could have on the entire Air Force work load. Our conclusions that these conditions went beyond the sampled items were supported through discussions with Air Force officials and through prior audit reports on labor standards. Air Logistics Centers were not engineering labor standards for airframe maintenance and repair operations. Even if we accepted the "25 percent or more" suggested by the Deputy Chief of Staff as a basis for comparison instead of the 34 percent in our audit sample, there would still be a significant reduction in total labor hours. We believe our analyses were accurate, proper, and based on appropriate information. Our observations were compared to the time standard and the description of the task on the individual job cards. We also requested and collected any documentation supporting each task observed. In addition, we specifically confirmed with each artisan observed that the complete task was executed as required.

B. Management of Labor Standards at Naval Aviation Depots

FINDING

The North Island and Alameda Naval Aviation Depots were not developing accurate and reliable labor standards for airframe maintenance and repair operations affecting 2.1 million direct labor hours that cost $108 million annually. Although the Navy was improving its work measurement program, the Aviation Depots were not following the draft Naval Air Systems Command (the Command) Instruction 5220.XX and Naval Aviation Logistics Center Instruction 5220.7A for engineering labor standards and DoD Instructions 7220.29-H and 7220.9-M for reevaluating labor standards. Also, Headquarters, Naval Air Systems Command, was not sufficiently staffed to monitor and enforce the Navy's guidance for the work measurement program. Based on the results of our audit sample, standards for direct labor hours of 19 airframe maintenance and repair operations for 4 types of Navy aircraft could be reduced by an average of 65 percent. Although the sample size was not sufficient for statistical projection purposes, we believe our sample results are indicative of the inaccuracies of the standards for the airframe work load.

DISCUSSION OF DETAILS

Background. The Command issued draft Instruction 5220.XX, "Process and Productivity Enhancement Program," on January 31, 1990. The Instruction replaces, after October 1, 1989, the Naval Aviation Logistics Center Instruction (Naval Instruction) 5220.7A, "Performance Standards Program for Naval Air Rework Facilities," May 14, 1984. The draft Instruction is intended to satisfy the 1989 General Accounting Office (GAO) audit recommendations on Navy's management of labor standards. The draft Instruction 5220.XX incorporates several previous Navy work measurement instructions. The Instruction was not finalized as Command Instruction 5220.16 until August 15, 1990. The deficiencies in managing labor standards cited in the GAO report were caused, in part, by the Command's suspension of the oversight of the Navy work measurement program in the mid-1980's.

The Navy has six Naval Aviation Depots (NADEP's), which projected 22.8 million direct labor hours in their FY 1990 maintenance work load. About 6.6 million of the 22.8 million direct labor hours were for the maintenance and repair of airframes, which have an annual estimated cost of $495 million. The North Island NADEP had 4.4 million direct labor hours that included 1 million direct labor hours for airframes. The Alameda NADEP had 3.9 million direct labor hours that included 1.1 million direct labor hours

for airframes. The 2.1 million direct labor hours for airframes at North Island and Alameda cost approximately $108 million annually.

North Island NADEP. The North Island NADEP did not develop engineered labor standards for airframe maintenance and repair operations, as required in Naval Instruction 5220.7A. This condition existed because of the Command's suspension of the oversight of the work measurement program in the mid-1980's and the restructuring of the total work measurement program by operations personnel at North Island. The Command estimated that North Island had engineered about 18 percent of all the airframe labor standards for its aircraft. However, neither the Command nor the NADEP could determine the total engineered airframe labor hours in the FY 1990 work load. Because only 18 percent of the airframe labor standards were engineered, we believe the extended total hours covered by engineered standards would be significantly less than 80 percent of the total airframe labor hours in the work load, the previous goal of the program.

Work measurement personnel at North Island stated that their work measurement program needed to be restructured before standards for airframe operations could be evaluated and engineered. In order to achieve the restructuring, the depot personnel were refining and consolidating Navy policies and procedures for workload standards at the depot; hiring and training sufficient work measurement specialists; reviewing the master data records and data bases of component standards to determine their status (that is, engineered versus nonengineered and high-value, high-volume labor standards); and planning computer methods for developing standards, creating central data libraries and establishing internal audit teams.

Work measurement personnel at North Island were concentrating first on engineering standards for reparable components before engineering airframe standards. Standards for reparable components were addressed first because component standards were addressed in the 1989 GAO report; the computerized data base for component standards was more suitable for analyzing standards; and provisions in the outdated policies excluded some airframe standards, such as field modifications and low volume aircraft conversions, from the data base for evaluating standards coverage. Although the depot personnel stated that airframe standards would be part of the restructuring process, we found no formal Navy policy or NADEP guidance that explicity detailed plans for engineering standards for airframe maintenance and repair operations. Also, the Navy was not planning to implement Navy guidance specifically addressing airframe operations. Therefore, Navy had no assurance that engineered labor standards would be developed for airframe operations.

Evaluation of Standards at North Island. We selected eight airframe maintenance and repair operations at North Island NADEP to determine the accuracy and reliability of the standards for these operations. Our specialists used industrial engineering techniques to establish the accuracy of eight airframe maintenance and repair operations for the F-14 and F-18 aircraft. The standards we selected were for nonengineered, recurring operations in the aircraft maintenance work load. In selecting these standards, however, we could not determine if they met the high-volume, high-value criteria of DoD Instructions 7220.29-H and DoD 7220.9-M because Navy personnel did not analyze these airframe standards as part of the Navy's work measurement program.

We found that the eight standards we selected were overstated by about 74 percent. This average exceeded the Navy's criteria of ± 10 percent accuracy specified in Naval Instruction 5220.7A for acceptable engineered labor standards. In one operation, maintenance personnel were allotted over 3 hours to install a strut, brake, and wheel assembly on an F-14 aircraft. When our industrial engineering specialists observed this operation, they determined that the installation could be done in less than 32 minutes, or an 83-percent decrease in the standard time.

We noted that all eight standards we engineered exceeded the Navy accuracy criterion and could have been reduced from 46 to 83 percent (Appendix A). We believe this overstatement of standards was an indication of the potential inaccuracies that existed in the total NADEP work load of airframe operations. Therefore, depot personnel at North Island need to include the analysis of airframe standards in the Navy's improvement of the work measurement program by issuing specific guidance on airframe standards.

Alameda NADEP. The Alameda NADEP was not reevaluating and updating labor standards for airframe maintenance and repair operations, as required by DoD 7220.29-H. DoD 7220.29-H required that work measurement standards be established for labor costs and that these standards be reevaluated at least once every 2 years. The Alameda NADEP reported that 52 percent of the total labor hours for airframe maintenance and repair operations in the FY 1990 work load were covered by engineered standards. Although the 52-percent coverage was less than the 80-percent goal for engineered coverage of standards in Naval Instruction 5220.7A, Alameda's engineered airframe labor standards was significantly better than the North Island NADEP's estimate of 18-percent coverage.

From Alameda's 1.1 million labor hours in the FY 1990 work load, we selected for analysis 11 labor standards for airframe maintenance and repair operations for the A-6 and P-3 aircraft. Our audit of the records for the 11 labor standards showed that

only 2 standards had any documentation to support the methods used for establishing the standards. The two standards that had documentation were not being periodically updated and the available documentation was inaccurate. For example, one airframe operation for installing a shroud on the A-6E aircraft was dated January 1975. The documentation for this operation accounted for time to install twice as many screws as were required. Also, the time allotted for the operation was more than the sum of the time of the individual tasks of the operation. Depot personnel could not explain the difference in time allotted and the sum of the time of the tasks.

The depot personnel could not explain the discrepancies noted in the supporting documentation for installing the A-6E shroud because the standard had not been updated in over 15 years. Depot personnel stated that the standards had not been updated because Navy guidance did not require that standards be reevaluated at any specific interval. This Navy policy was inconsistent with DoD Instruction 7220.29-H, which required a reevaluation of labor standards every 2 years. Although this Instruction was replaced on March 23, 1990, by DoD Instruction 7220.9-M, which deleted the specific 2-year interval for reevaluation of labor standards, we believe Navy guidance should include a criterion for reevaluating and updating standards which implements the intent of the current DoD policy for updating labor standards when significant variances or changes in work methods occur.

Our specialists used industrial engineering techniques to establish the accuracy of the 11 airframe maintenance and repair operations (6 engineered, 5 nonengineered) we selected for analysis. We determined that the 6 engineered standards could have been reduced by about 32 percent, and all 11 standards could have been reduced by about 60 percent. The two averages did not meet the Navy's criteria of ± 10 percent accuracy specified in Naval Instruction 5220.7A for acceptable engineered labor standards. For example, in one operation, maintenance personnel were allotted 30 minutes to install the outboard flap of an A-6E aircraft. When our industrial engineering specialists observed this operation, they determined that the operation could be accomplished in less than 11 minutes, or a 64-percent decrease in the engineered time standard.

Of the six depot engineered airframe labor standards that we evaluated, five did not meet the accuracy criterion and could have been reduced from 16 to 64 percent. We also noted that all five of the depot nonengineered standards did not meet the accuracy criterion and could have been reduced from 63 to 81 percent (Appendix A).

Oversight. After Command Headquarters suspended oversight of the Navy-wide work measurement program in the mid-1980's, NADEP's did not follow Navy guidance for work measurement and began managing labor standards independently. Consequently, the NADEP's had wide variations in managing standards such as the difference in North Island's engineered coverage of airframe standards as compared to Alameda's coverage. As a result, standards for airframe maintenance and repair operations were not accurate and reliable at the NADEP's.

Command Headquarters was not sufficiently staffed for the oversight of the NADEP's, which was needed to monitor and enforce its guidance for the work measurement program. When the Command assumed oversight of the work measurement program in 1987, the Commander assigned two persons to monitor the program. These two Command personnel have been unable to provide effective oversight for the six NADEP's. For example, although these two Command personnel have been concentrating on implementing the new guidance for Navy's work measurement program since July 1989, the new guidance had not been formally implemented as of July 1990. Also, the Command had not scheduled any audits or reviews for the NADEP's, and the Command had not received and reviewed any quarterly reports on the depots' work measurement programs. We believe that increased staffing of Headquarters, Naval Air Systems Command, will improve the oversight and regulation of the NADEP's and ensure standards for airframe maintenance and repair operations are reviewed, engineered, and updated.

Conclusion. Until the work measurement program is improved in the Navy, labor standards will be unregulated at the NADEP's, and the Navy will have no assurance that maintenance and repair of airframes, costing $495 million dollars annually, is being efficiently managed. We found that the airframe maintenance and repair operations included in our sample could be reduced by an average of 65 percent. Although the sample size was not sufficient for statistical projection purposes, we believe that the sample results are indicative of the inaccuracies of the standards for the airframe workload. We believe the Command needs to expedite updated guidance that ensures airframe standards are evaluated for engineered coverage. The guidance also needs to specify requirements for priorities and criteria at the depots for reviewing and updating standards. In addition, the staff at Command Headquarters needs to be increased to ensure oversight reviews of the aviation depots are planned, scheduled, and executed to evaluate the adequacy of the work measurement program in the Navy.

RECOMMENDATIONS, MANAGEMENT COMMENTS AND AUDIT RESPONSE

We recommend that the Commander, Naval Air Systems Command:

1. Issue specific guidance emphasizing that Naval Aviation Depots:

a. Develop engineered labor standards for 80 percent of the work load of airframe maintenance and repair operations consistent with the Navy's previous goal for labor standards.

Navy Comments. The Assistant Secretary of the Navy (Manpower and Reserve Affairs) nonconcurred with the recommendation stating that engineering standards for 80 percent of the airframe workload was not economically achievable without a significant increase in staffing. According to the Navy, a more practical, cost-effective approach is for each depot activity to identify and develop engineered standards for its own high volume, high payback operations. The complete text of the Navy's comments is in Appendix E.

Audit Response. We agree that the cost-effective approach is for each depot activity to develop engineered standards for its own high volume, high payback operations. Maintenance workloads do have variability among the depots. However, we found that neither the Naval Air Systems Command nor the two depots we audited had specific goals identified for engineering labor standards. North Island NADEP did not identify any standards that were being engineered for airframe operations and made no analysis of the work load to determine its high volume, high payback operations. We believe a quantifiable goal needs to be set for measuring progress of the depots in developing engineered standards. Otherwise, efficiency measures for setting standards are arbitrary and subjective. The 80 percent criterion is a goal in the Air Force and Army (the Army restates the criterion as 80 percent of the top 50 percent of the aircraft operations). The Air Force is attempting to develop a more economical method for engineering labor standards to attain, rather than eliminate, the 80-percent criterion, which we believe to be a more reasonable approach. We consider our recommendation still valid and we request that the Navy reconsider its position and provide revised comments in response to the final report.

b. Include in their implementing depot guidance, provisions for reevaluating and updating labor standards when significant variances or changes in work methods occur affecting airframe operations.

Navy Comments. The draft report recommended that the guidance contain provisions for reevaluating labor standards at least every 2 years, or at a specific, reasonable interval.

Although the Assistant Secretary concurred in part with the draft recommendation, she took exception with the reevaluation of standards every 2 years, or at some specific, reasonable interval. The Assistant Secretary stated that the new Naval Air Systems Command Instruction 5220.16, issued August 15, 1990, provides that standards should be reevaluated or updated when there is a significant change in work content or when statistically significant variances (greater than 10 percent over or under) exist for high volume, high payback work load.

Audit Response. The procedures in the new Naval Air System Command Instruction 5220.16 provide criteria for reevaluating standards and satisfy the intent of the revised recommendation. No further comments are required.

2. Staff the Headquarters, Naval Air Systems Command, with sufficient personnel to ensure that reviews and audits of the work measurement programs at each of the Naval Aviation Depots are planned, scheduled, and executed.

Navy Comments. The Assistant Secretary concurred in part with the recommendation. The Assistant Secretary stated that Headquarters, Naval Air Systems Command, had sufficient staff to review quarterly reports from the NADEP's and to chair annual reviews of the NADEP's policies and procedures for work measurement. The Assistant Secretary agreed that additional personnel would enhance the work measurement program, but stated that DoD personnel policies did not permit hiring of additional headquarters staff.

Audit Response. We disagree on the adequacy of staffing. The new Naval Air Systems Command Instruction 5220.16 provides for annual command inspections of the NADEP's that include reviews of their work measurement programs. We understand that there is presently only one person assigned to perform these inspections. We believe that a single person will not be able to adequately review the work measurement programs at six NADEP's each year. Sufficient personnel need to be provided to this critical task either through reassignment of current personnel or through seeking relief from any hiring restrictions. Therefore, to satisfy the intent of the recommendation, we request that the Navy provide in its response to the final report, the steps being taken to reassign personnel or obtain a waiver from hiring restrictions. Additionally, the Navy should provide the inspection plan or guide, and the estimated dates for completing an inspection at each of the NADEP's.

Other Comments. The Assistant Secretary nonconcurred with the finding that Naval Aviation Depots were not following specific instructions for reevaluating labor standards. The Navy also stated that our sample sizes were too small for making

statistically valid inferences about inaccuracies of labor standards throughout the depots' airframe work load. In this regard, the Navy stated that performance evaluation reviews at the program and subprogram levels contradicted our findings. In addition, the Navy response implied that the method we used to evaluate the Navy's standards was flawed.

Audit Response. We believe our examples in the report support the conclusion that the Naval Aviation Depots were not following Navy or DoD guidance for reevaluating standards. We agree that our sample size was too small to make statistically valid projections for the Navy depots. We do, however, believe that the sample results are indicative of the inaccuracies of the standards for the airframe work load. Although we requested that the Naval Air Systems Command and the NADEP's included in our audit provide all applicable reports, reviews, and audits of the work measurement program, we were provided no performance evaluation reviews that contradicted our findings. Concerning our methods for evaluating Navy standards, the operations were selected randomly, included appropriate supplemental factors, and were computed using accepted industrial engineering techniques by our industrial engineering specialists. Therefore, we believe our analyses were accurate and valid.

C. Management of Labor Standards at Corpus Christi Army Depot

FINDING

The Corpus Christi Army Depot (CCAD) was not developing accurate and reliable labor standards for airframe maintenance and repair operations affecting 2.5 million direct labor hours that cost $115 million annually. This condition occurred because CCAD did not regularly review performance efficiencies for airframe maintenance and repair operations to determine which standards needed to be reevaluated and updated as required by U.S. Army Depot System Command (DESCOM) Regulation 5-10. Based on the results of our audit sample, standards for direct labor hours of six airframe maintenance and repair operations for two Army helicopters could be reduced by an average of 56 percent. Although the sample size was not sufficient for statistical projection purposes, we believe our sample results are indicative of the inaccuracies of the standards for the airframe workload.

DISCUSSION OF DETAILS

Background. DESCOM oversees the work measurement program within the Army. This responsibility includes formulating and disseminating policy to Army depots, monitoring the Army's overall work measurement program, and auditing each Army depot's work measurement program biennially.

DESCOM Regulation 5-10 "Methods and Standards Program," March 25, 1987, establishes policies, responsibilities, and procedures for developing, implementing, and maintaining the work measurement program within the Army. Specifically, the Regulation requires that work measurement specialists review only those active, high-volume labor standards that are outside the acceptable performance efficiency (standard hours divided by actual hours for a given task or operation) range for maintenance operations. The Regulation also states that when standards are evaluated, they must be accurate within ± 10 percent. In addition, the Regulation requires shop foremen to report to work measurement specialists improvements or deviations in the standard methods of repair and maintenance operations, in shop layouts, or in equipment use or design.

CCAD projected 5 million direct labor hours in its FY 1990 maintenance work load. About 2.5 million of the direct labor hours were for overhauling, modifying, and repairing helicopter airframes. The 2.5 million hours had an annual estimated cost of $115 million. CCAD had engineered about 46.1 percent (2.3 million hours) of the 5 million direct labor hours in the FY 1990 work load. Airframe end items had about 54 percent (1.4 million hours) of the total direct labor hours engineered.

Reevaluating Labor Standards. CCAD work measurement personnel were not reevaluating and updating labor standards for airframe maintenance and repair operations, as required by DESCOM Regulation 5-10. Work measurement specialists are required to review labor standards (engineered and nonengineered) that are active and high-volume if their performance efficiencies were outside the acceptable range for maintenance operations. DESCOM established the acceptable performance efficiency ranges of 90 to 110 percent for engineered standards and 80 to 120 percent for nonengineered standards.

We selected six labor standards (three engineered and three nonengineered) for airframe maintenance and repair operations; three for the UH-1H and three for the OH-58 helicopters. The six labor standards that we selected for review were active operations in the aircraft assembly and disassembly work centers. We selected these standards for review from CCAD's FY 1990 high-volume, high-value maintenance and repair operations to determine if the work measurement personnel were reevaluating and updating the standards in accordance with DESCOM Regulation 5-10.

One of the six airframe maintenance and repair operations we selected had insufficient documentation to determine when the standard was established. Analysis of the documentation for the remaining five operations showed that none of the five labor standards for these operations had been evaluated and updated since between 1981 to 1986. Consequently, the standards did not reflect changes made to tasks or material affecting operations. For example, we reviewed the documentation for installing five floor panels in the UH-1H helicopter. The documentation for this operation specified that rivets were required for the panels and preparation time was allowed for installing each of the five panels. However, when we evaluated the overall operation, we did not observe that rivets were used or that preparation time was required for each of the panels as part of the work process.

We determined that work measurement personnel were not using reports showing performance efficiencies of maintenance and repair operations for determining labor standards that should be reevaluated. The CCAD Maintenance Directorate periodically generated reports to show those work operations that were not within acceptable performance efficiency ranges. However, the work measurement personnel at CCAD did not have a system for selecting labor standards that should have been reviewed after receiving the reports on the performance efficiencies of airframe maintenance and repair operations. Consequently, the work measurement personnel did not reevaluate standards according to a schedule or priority. The work measurement personnel explained that the emphasis at CCAD was on engineering additional labor standards; therefore, they did not review the performance

efficiencies of the airframe operations and reevaluate standards in accordance with DESCOM Regulation 5-10.

Our specialists used industrial engineering techniques to establish the accuracy of the standards for the six selected operations. We determined that the six standards could be reduced by an average of 56 percent. The average exceeded Army's criterion of ± 10 percent accuracy specified in DESCOM Regulation 5-10 for acceptable engineered labor standards. For example, in one operation, maintenance personnel were allotted over 3 hours to install panels on the UH-1H helicopter. When we observed this operation, we determined the operation could be accomplished in less than 31 minutes, an 86-percent decrease in the engineered time standard.

We noted that all three of the engineered airframe labor standards we evaluated were overstated, exceeded the ± 10 percent accuracy criterion, and could have been reduced 41 to 86 percent. We also noted that two of the three nonengineered standards had wide variations, the two standards were either overstated or understated and exceeded the Army's ± 20 percent accuracy criterion (Appendix A). The significant overstatement and understatement of the CCAD standards is an indication of the potential inaccuracies that exist in the total CCAD work load of airframe operations. Therefore, we believe CCAD needs to establish a method of identifying the labor standards that should be reevaluated to ensure standards are kept accurate and reliable.

Conclusion. CCAD needs to reevaluate and update labor standards periodically to ensure that maintenance and repair of airframes, costing $115 million annually, are being efficiently managed. The standards for the maintenance and repair operations included in our sample were overstated by 56 percent. Although our sample size was not sufficient for statistical projection purposes, we believe our sample results are indicative of the inaccuracies of the standards for the airframe workload. We believe CCAD work measurement personnel should monitor and perform reviews of those standards that are active, high-volume, high-value, and have a significant variance and update the standards within the criteria established in DESCOM Regulation 5-10.

RECOMMENDATIONS, MANAGEMENT COMMENTS, AND AUDIT RESPONSE

1. We recommend that the Commander, U.S. Army Depot System Command, evaluate procedures at the Corpus Christi Army Depot for reviewing and updating labor standards to determine the Depot's compliance with the Depot System Command Regulation 5-10 during the Command's biennial audit of the Depot.

Army Comments. The Special Assistant to the Deputy Chief of Staff, Department of the Army, nonconcurred with the recommendation stating that CCAD procedures were reviewed in 1988 by a DESCOM Evaluation Review team. As a result of this review, CCAD established joint maintenance directorate work measurement teams to review out-of-tolerance performance efficiencies of operations. The review and CCAD changes improved the depot's maintenance standards effort. The full text of the Army's comments is in Appendix D.

Audit Response. We agree that the CCAD's work measurement program was generally effective. Our recommendation is directed toward further improving its effectiveness. The major deficiency we found in an otherwise well run program was that the depot did not have a system for selecting labor standards that should be reviewed when their performance efficiencies exceeded criteria established in DESCOM Regulation 5-10. Labor standards with performance efficiencies that were out-of-tolerance were not being reviewed. One major factor that has contributed to the success of the Army's work measurement program has been the DESCOM's oversight and scheduled biennial audits of the programs at each of the Army depots. To help bring about the needed improvements, we continue to believe that the next scheduled biennial audit should include steps to evaluate procedures for reviewing and updating labor standards. We, therefore, believe our recommendation is still valid. We request that the Army reconsider its position and provide revised comments in response to this final report.

2. We recommend that the Commander, Corpus Christi Army Depot, issue procedures for work measurement personnel to review the performance efficiencies of airframe maintenance and repair operations to determine the operations that have an unacceptable range and reevaluate the standards for those operations to ensure the standards reflect current shop layouts, work content, and equipment changes.

Army Comments. The Special Assistant nonconcurred with the recommendation stating that CCAD has initiated actions over the past 2 years which demonstrated a renewed commitment to aggressive maintenance of standards at the depot.

Audit Response. As detailed in this report, our audit showed that CCAD did not have adequate procedures for reviewing performance efficiencies and reevaluating labor standards of airframe maintenance and repair operations. We determined that the work measurement personnel at the depot did not have a system for sampling and selecting labor standards that have performance efficiencies reported as out of tolerance with Army criteria. Consequently, the personnel were not periodically reviewing and updating labor standards that were inaccurate. We believe our

recommendation is still valid. Therefore, we request that the Army reconsider its position and provide revised comments in its response to this final report.

Other Comments. The Special Assistant stated that the very limited sample of work standards reviewed is not sufficient to support the conclusions that CCAD was not developing accurate and reliable labor standards. In addition, the Army questioned the accuracy of the report by stating that the audit team observed only part of the UH-1H panel installation - the three panels that do not require rivets or extensive preparation time.

Audit Response. We agree that the sample size was not sufficient for statistical projection purposes. We do, however, believe our sample results are indicative of the inaccuracies of the labor standards for the airframe workload. We also believe our analyses of the operations were accurate. We observed five panels being installed in the UH-1H helicopter.

D. Performance of Variance Analyses

FINDING

The Navy and the Air Force were not performing variance analyses to evaluate the efficiency and effectiveness of their work measurement programs, as required by DoD Instruction 5010.34. The Navy and the Air Force did not include specific requirements in their work measurement guidance for depots and logistics centers on the frequency of detailed analyses of labor standards and assignment of the analysis responsibility to an organization independent of the production function. Also, the Air Force did not require personnel at ALC's to record actual labor hours. As a result, the NADEP's and ALC's could not determine the accuracy and reliability of their labor standards used to charge maintenance customers, budget for maintenance and repair operations, measure productivity, determine staffing requirements, ensure work centers are fully workloaded, and evaluate work performance by personnel.

DISCUSSION OF DETAILS

Background. GAO reported in July 1989 that NADEP's did not routinely identify variances between standard hours and actual hours for the maintenance and repair of components in the component repair program. The Naval Air Systems Command instituted the Variance Improvement Program for Expenditure Reconciliation (VIPER) in May 1989 in response to the GAO report. VIPER establishes internal procedures for reevaluating aircraft component operations that consistently show significant variances in the actual labor hours compared to the workload standards. VIPER requires the NADEP's to review the 10 most significant components in each quarter that are over and under (positive and negative variances) the labor standard to determine the reason for the variances and to make appropriate adjustments in the component repair process or in the labor standards to reduce the variances. VIPER does not include requirements for airframe standards.

DoD Instruction 5010.34 requires that DoD components periodically evaluate actual labor performance against preestablished standards for work covered by detailed labor performance standards. Naval Aviation Logistics Center Instruction 5220.7A implements DoD Instruction 5010.34. Navy's draft Instruction 5220.XX, which replaces Naval Instruction 5220.7A, incorporates the requirements for variance analyses outlined in VIPER. The draft Instruction requires periodic analyses of feedback reports for examining variances.

AFLC Regulation 66-4 requires that engineering and planning technicians analyze the variance between the projected labor efficiency and the actual labor efficiency for each Resource Cost

Center. The technicians use the variance analyses to determine if operations need to be evaluated for changes in standards or methods that affect operations. Labor efficiency is the earned standard hours divided by the actual hours.

Variance Analyses. Army's CCAD was performing variance analyses that met DoD guidelines, while the Navy NADEP's and the Air Force ALC's were not performing the variance analyses of airframe maintenance and repair operations. DoD Instruction 5010.34 requires periodic evaluations of actual labor performance against preestablished standards for work covered by detailed labor performance standards (covering individual tasks, jobs, and operations). Without these periodic evaluations, managers have no procedures to evaluate the operating efficiencies of depot work centers and to correct deficiencies in standards or methods of the work centers.

Alameda NADEP. The Alameda NADEP did not fully implement procedures for variance analyses. The VIPER program was created to improve deficiencies in variance analyses identified by GAO for aircraft component maintenance and repair operations. However, the NADEP was not performing variance analyses because management suspended the VIPER program for 1 year to make personnel available for a higher priority project. We also determined that when NADEP personnel do implement VIPER, they plan to review only 10 component maintenance and repair operations per year, instead of 20 each quarter, as intended by the Command in their guidance on the VIPER program.

Although the VIPER program was instituted for aircraft components only and Naval Instruction 5220.7A did not specifically require variance analyses for aircraft airframes, the Alameda NADEP was identifying those aircraft airframe operations in which the actual hours exceeded standard hours. NADEP personnel evaluated the airframe operations to determine the performance efficiencies of the operations (negative variances) to identify potentially understated standards. However, the NADEP's computer system did not identify airframe operations in which the standard hours exceeded the actual hours expended (positive variances) to identify potentially overstated standards. Therefore, variance analyses were not used to determine overstated standards that needed to be corrected.

North Island NADEP. The North Island NADEP instituted the VIPER program for aircraft components, but did not analyze aircraft airframe operations at the detailed level (specific tasks or operations), as required by DoD Instruction 5010.34. Instead of work measurement personnel at the NADEP performing variance analyses for aircraft airframes, engineers in the airframe production divisions were tasked to do the analyses. These production personnel evaluated the progress of the aircraft, but were not evaluating detailed airframe maintenance

and repair operations to determine their performance efficiencies (standard earned hours divided by actual hours). For example, none of the eight operations we engineered and determined to be inaccurate at the North Island NADEP had performance efficiencies that showed the variances between standard earned hours and actual hours. Consequently, the production personnel had no indicator (such as significant variances between standard hours and actual hours) to select the eight operations for reevaluation of their methods and work processes. As a result, the labor standards for the eight operations we determined were inaccurate could have gone undetected indefinitely.

We found that, instead of variance analyses at the detailed operation level, production personnel evaluated the progress of work on aircraft by comparing the percentage of the current work completed with an estimate developed from a history of the previously completed aircraft for the same stages of development. If the actual hours of a work center exceeded the historical estimate for a given period (for example, 2,000 actual hours during 1 month compared to 1,500 historical hours for processing an F-14 aircraft), the supervisor would investigate the problem. However, we determined that the supervisor would be unable to isolate the problem to a particular operation or an inaccurate standard because no analysis was performed at the detailed, operational level. Consequently, because the variance analyses performed by production personnel will not result in correcting inaccurate standards, inefficiencies that have evolved in maintaining and repairing aircraft will be incorporated into the standards, and these inefficiencies will go undetected indefinitely. We believe the Navy should have an organization independent of the production function to monitor the evaluation of variances of actual hours and standard hours for maintenance and repair of airframe operations to ensure standards are kept accurate and reliable.

Air Force ALC's. Personnel at the Oklahoma City and Warner Robins ALC's were not isolating variances at the detailed level (specific tasks or operations) as required by DoD Instruction 5010.34. Air Force work measurement personnel were not performing detailed variance analyses because AFLC Regulation 66-4 did not require that level of analysis. When we evaluated Air Force labor efficiency reports, we found that depot personnel were complying with AFLC Regulation 66-4 by comparing the total actual hours for each work center to the total earned standard hours (direct product standard hours per end item times the number of end items completed) of that center to determine the labor efficiency of work centers and divisions such as the aircraft division.

In reviewing the labor efficiency reports, we determined that the reports did not provide the detail necessary to identify significant differences in actual hours and earned standard hours

for specific airframe maintenance and repair operations. For example, for the 22 operations we engineered (Appendix A) at Oklahoma City and Warner Robins ALC's, we found 18 labor standards were inaccurate. However, the labor efficiency report did not show the labor efficiencies for these operations. Consequently, work measurement personnel had no indicator that would warrant selecting these operations for reevaluation. As a result, the 18 labor standards we determined were inaccurate could have gone undetected indefinitely.

We also noted that production workers did not record the actual hours to perform specific operations. Instead, the daily hours production workers worked were prorated to maintenance operations based on the standard hours for those operations. Therefore, the detailed information on actual hours needed to perform accurate variance analyses of airframe maintenance and repair operations was not properly recorded. We were informed by AFLC officials that the new Depot Maintenance Management Information System will include procedures to record actual hours for maintenance and repair operations.

Guidance. The NADEP's were not in compliance with DoD Instruction 5010.34 because they did not require variance analyses be performed at specific frequencies at the detailed level. We believe the Navy depots were not fully implementing variance analyses as intended because Navy guidance needed to be clarified. The Navy guidance was confusing because Naval Instruction 5220.7A, draft Instruction 5220.XX, and Navy VIPER guidance each had different requirements for variance analyses. Naval Instruction 5220.7A did not require the performance of variance analysis at specific frequencies. Navy draft Instruction 5220.XX did not incorporate any parameters for selecting the standards that should be reviewed at any particular frequency (as required in DoD 7220.29-H). The VIPER program only applied to aircraft components and did not specifically require analysis of positive and negative variances. To fully comply with DoD guidance, the Navy should issue guidance that variance analyses of the actual labor hours versus standard hours be performed at the detailed labor standard level for airframe maintenance and repair operations; at specific, reasonable frequencies; and covering both positive and negative variances from the standards.

Also, we determined that the Navy, and the Air Force, guidance did not assign responsibilities for monitoring the performance of variance analyses to organizations that were independent from the production and the standard-setting functions at NADEP's and ALC's. The separation of duties among the functions provides an internal control which would ensure that variance analyses are performed periodically and monitored by personnel not directly influenced by inefficiency indicators.

Conclusion. Labor standards form a critical basis for determining the efficiency and effectiveness of the Military Departments' depot maintenance activities. Therefore, the accuracy and reliability of labor standards were essential because the depots relied on the standards for charging maintenance customers, budgeting maintenance and repair operations, measuring productivity, determining staffing requirements, ensuring work centers were fully workloaded, and evaluating work performance by personnel. Because the Navy and the Air Force were not performing variance analyses, they had no assurance of the accuracy and reliability of their labor standards.

RECOMMENDATIONS, MANAGEMENT COMMENTS, AND AUDIT RESPONSE

1. We recommend that the Commander, Naval Air Systems Command, and the Commander, Air Force Logistics Command, issue specific guidance:

a. Requiring depots to perform variance analyses:

(1) At the detailed standard level.

(2) At specific frequencies.

(3) Covering both negative and positive variances.

Navy Comments. The Assistant Secretary of the Navy (Manpower and Reserve Affairs) concurred with the recommendation. The recommended guidance was included in Naval Air Systems Command Instructions 5220.15 and 5220.16 issued on August 15, 1990. The full text of the Navy's comments is included in Appendix E.

Air Force Comments. The Deputy Chief of Staff (Logistics and Engineering), Department of the Air Force, concurred in principle with the recommendation stating that references to variance analysis within AFLC Regulation 66-4 should be performed at the detail level. However, variance analysis cannot be accomplished across the board at a detailed level until actual hours to perform operations are available in the the DMMIS system. The full text of the Air Force's comments is in Appendix F.

Audit Response. The Navy's actions and the Air Force's planned actions satisfy the intent of the recommendation. However, the Air Force did not specify a target date for incorporating the capability to collect actual hours of detailed operations in the DMMIS. Therefore, we request that the Air Force provide an estimated completion date in its response to this final report.

b. Assigning responsibilities for monitoring variance analyses to an organization independent of the production function at aviation depots.

Navy Comments. The Assistant Secretary concurred with the recommendation stating that the monitoring of variance analyses is being assigned to activities not involved in the production function at the depots. Further transitions are planned during the next 2 years.

Air Force Comments. The Deputy Chief of Staff concurred with the recommendation stating that AFLC plans to investigate the feasibility of assigning responsibility for monitoring variance analyses to the newly-formed Financial Management Directorate.

Audit Response. The Navy and Air Force's planned actions satisfy the intent of the recommendation. We request the Air Force provide an estimated date for completing the feasibility study and followon action in its response to this final report.

2. We recommend that the Commander, Air Force Logistics Command, issue specific guidance to the Air Logistics Centers to establish standard operating procedures for production workers to record actual labor hours for maintenance and repair operations to allow for the performance of accurate variance analyses.

Air Force Comments. The Deputy Chief of Staff concurred with the recommendation stating that guidance will be issued in conjunction with the implementation of DMMIS.

Audit Response. The Air Force's planned action satisfies the intent of the recommendation. We request the Air Force provide an estimated date of completion for the DMMIS guidance in its response to this final report.

COMPARISON OF DEPOT LABOR STANDARDS AND AUDIT-DEVELOPED LABOR STANDARDS

OKLAHOMA CITY ALC 1/

Aircraft	Airframe Operation	Standard E=Engineered N=Nonengineered	Standard Depot Time (Minutes)	Standard Audit Time (Minutes)	Variance Between Depot & Audit Standard (Percent) 2/
B-1-B	Install Access Panel	N	42.0	42.3	+ .7
B-52	Install Stabilizer Hinge Access Doors	N	60.0	32.6	- 45.7
B-52	Replace Boot - Spoiler Actuator	N	42.0	25.5	- 39.3
B-52	Hook Up Wire Harness	N	48.0	26.8	- 44.2
KC-135	Remove Receptacle Terminal Cover	N	12.0	3.0	- 75.0
KC-135	Remove Pilot Chair	N	42.0	4.2	- 90.0
KC-135	Remove Access Doors	N	60.0	30.7	- 48.8
KC-135	Remove Main Landing Gear Accumulator	N	30.0	21.3	- 29.0
KC-135	Torque Tube Drive	N	60.0	28.6	- 52.3
KC-135	Install Bolts In Flap Track	N	42.0	20.3	- 51.7
KC-135	Install Aft Engine Mount	N	102.0	22.8	- 77.6
KC-135	Clean and Inspect Forward Body Fuel Cell	N	78.0	83.5	+ 7.1
	Depot Total		618.0	341.6	

See footnotes on last page of appendix.

COMPARISON OF DEPOT LABOR STANDARDS AND AUDIT-DEVELOPED LABOR STANDARDS (continued)

WARNER ROBINS ALC 1/

Aircraft	Airframe Operation	Standard E=Engineered N=Nonengineered	Standard Depot Time (Minutes)	Standard Audit Time (Minutes)	Variance Between Depot & Audit Standard (Percent) 2/
C-141	Install Ventilation Access Doors On Right Wing	N	42.0	25.6	- 39.0
C-141	Inspect and Replace Filler Caps "O" Rings	N	24.0	38.0	+ 58.3
C-141	Install Spoiler Panel	N	60.0	64.8	+ 8.0
F-15	Remove Left Anti-Collision Light	N	30.0	34.8	+ 16.0
F-15	Remove Right Anti-Collision Light	N	54.0	34.8	- 35.6
F-15	Remove Fairing Door	N	48.0	14.9	- 69.0
F-15	Replace Air Filter Elements	N	18.0	57.5	+ 219.4
C-130	Install Right Inspection Window	N	42.0	39.6	- 5.7
C-130	Remove Panels Pilots & Co-Pilot Sides	N	60.0	31.0	- 48.3
C-130	Remove Servomotor and Bracket	N	108.0	44.6	- 58.7
	Depot Total		486.0	385.6	
	Air Force Total		1104.0	727.2	- 34.1 (Average)

See footnotes on last page of appendix.

COMPARISON OF DEPOT LABOR STANDARDS AND AUDIT-DEVELOPED LABOR STANDARDS (continued)

ALAMEDA NADEP 3/

Aircraft	Airframe Operation	Standard E=Engineered N=Nonengineered	Standard Depot Time (Minutes)	Standard Audit Time (Minutes)	Variance Between Depot & Audit Standard (Percent) 2/
A6E	Install Shroud	E	34.8	12.6	- 63.8
A6E	Clean and Lubricate Outboard Flap	E	7.2	7.4	+ 2.8
A6E	Install Outboard Flap	E	30.0	10.7	- 64.3
P3A	Clean Secure Area	E	55.8	45.0	- 19.4
P3A	Lubricate Leading Edge Hinges	E	18.6	15.6	- 16.1
P3A	Install Forward and Aft Doors	E	66.6	52.7	- 20.9
P3A	Install Forward and Inboard Access Doors	N	72.0	13.6	- 81.1
P3A	Install Cool Scoop	N	30.0	9.4	- 68.7
P3A	Install Aft Thermo Doors	N	69.0	25.2	- 63.5
P3B	Open Aileron	N	180.0	42.6	- 76.3
P3B	Remove Nose Landing Gear Piston	N	120.0	41.2	- 65.7
	Depot Total		684.0	276.0	

See footnotes on last page of appendix.

COMPARISON OF DEPOT LABOR STANDARDS AND AUDIT-DEVELOPED LABOR STANDARDS (continued)

NORTH ISLAND NADEP 3/

Aircraft	Airframe Operation	Standard E=Engineered N=Nonengineered	Standard Depot Time (Minutes)	Standard Audit Time (Minutes)	Variance Between Depot & Audit Standard (Percent) 2/
F-14	Disassemble Hub, Wheel, Brake, and Coupling	N	109.8	37.4	- 65.9
F-14	Install Strut, Brake, and Wheel Assembly	N	183.6	31.2	- 83.0
F-14	Replace Tubing Cluster Mounting Bracket	N	120.0	23.1	- 80.8
F-14	Stop Drill Cracks on Data Plate Bracket	N	30.0	4.9	- 83.7
F-18	Remove Left Door	N	18.0	9.7	- 46.1
F-18	Remove Left Door	N	18.0	9.4	- 47.8
F-18	Remove Left Outer Door	N	18.0	9.0	- 50.0
F-18	Remove Left Inner Door	N	18.0	9.4	- 47.8
	Depot Total		515.4	134.1	
	Navy Total		1199.4	410.1	- 65.8 (Average)

See footnotes on last page of appendix.

COMPARISON OF DEPOT LABOR STANDARDS AND AUDIT-DEVELOPED LABOR STANDARDS (continued)

CORPUS CHRISTI ARMY DEPOT

Aircraft	Airframe Operation	Standard E=Engineered N=Nonengineered	Standard Depot Time (Minutes)	Standard Audit Time (Minutes)	Variance Between Depot & Audit Standard (Percent) 2/
UH-1H	Remove Panel	E	15.4	9.0	- 41.6
UH-1H	Remove Panel	E	14.2	7.5	- 47.2
UH-1H	Panel Installation	E	229.7	30.6	- 86.7
OH-58	Disassemble Rotor Blade	N	15.0	40.8	+ 172.0
OH-58	Remove Pilot Seat	N	7.7	2.1	- 72.7
OH-58	Install Crew Door	N	45.0	52.3	+ 16.2
	Army Total		327.0	142.3	- 56.5 (Average)

1/ Air Logistics Center

2/ Variance between Depot and Audit Standard equals Standard Depot Time minus Standard Audit Time divided by Standard Depot time. A minus indicates that the audit-developed standard is less than the depot-developed standard and a plus indicates that the audit-developed standard is more than the depot-developed standard.

3/ Naval Aviation Depot

PRIOR AUDIT COVERAGE

General Accounting Office (GAO) Report No. GAO/NSIAD-89-171 (OSD Case No. 7949), "Navy Maintenance, Aviation Component Repair Program Needs Greater Management Attention," July 6, 1989, stated that component repair prices were not adequately supported, audits and reports were not made, and variances between actual and billed labor hours were not analyzed. As a result, significant gains or losses on individual component repairs continued year after year. GAO recommended that the Secretary of the Navy instruct the Commander, Naval Air Systems Command, to direct the Naval Aviation Depots (NADEP's) to comply with requirements that component repair prices are supported with updated and auditable documentation, audit the NADEP's standards program, obtain quarterly reports from NADEP's on their standards program, ensure NADEP's perform variance analyses comparing standards to actual labor hours and make appropriate adjustments to standards, identify causes for decreases in productivity, establish performance goals, and improve efficiency and productivity at the NADEP's. The Navy concurred with the recommendations and initiated corrective action to revise its workload standards program and implement a variance analysis program.

GAO Report No. GAO/NSAID-90-193BR (OSD Case No. 8381), "Navy Maintenance, Improvements Needed in the Aircraft Engine Repair Program," June 18, 1990, stated that significant differences existed in the labor hour estimates developed by different depots to perform the same repair tasks on dual-sited engines (engine models repaired by two depots). GAO reported that labor hour estimates were not reviewed in Navy's engine repair program and the estimates were based on outdated, unsupported labor standards. GAO recommended that the Commander, Naval Air Systems Command, periodically report to the Secretary of the Navy on the status of corrective actions that management was taking to improve the management of labor hours and material costs in the engine repair program. The corrective actions included implementing improvements to the NADEPs' labor standards program and issuance of new program guidance by the Naval Air Systems Command. Also, Navy management teams were formed to study ways to improve the process the NADEPs' used to develop labor hour estimates for engine repairs. In addition, new emphasis was being placed on the need to coordinate dual-sited engine repairs to ensure that the most efficient processes are used at both NADEP's performing the same repairs.

Air Force Audit Agency Report No. 7106211, "Development and Use of Air Force Engineered Maintenance Labor Standards," June 28, 1989, identified significant weaknesses in the implementation of policy, procedures, and controls used to manage labor standards. Consequently, Air Force Audit determined that

engineered labor standards were inaccurate, scheduled reviews of labor standards were not accomplished, and documentation of engineered labor standards was inadequate. The Air Force Audit Agency recommended that the Air Force Logistics Command provide criteria for developing occurrence factors of maintenance operations in setting labor standards, set controls for determining and acting on the effect changes in work methods and facilities have on labor standards, change computerized procedures to ensure the accuracy of labor standards, establish a central management function to monitor and review the labor standards process at Air Logistics Centers, and establish procedures for prioritizing the standards selected for review and for determining the frequency, required documentation, and follow-up actions on the reviews of standards. The Air Force generally concurred with the recommendations and responded that a computerized standard-setting system called Fast Access Computerized Time Standards would be developed; policies and procedures at Air Logistics Centers would be updated; the computerized data base for labor standards would be changed; and Air Logistics Centers would be reorganized to form central groups to upgrade, set, and monitor work measurement goals.

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301-4000

10 JAN 1991

FORCE MANAGEMENT
AND PERSONNEL

MEMORANDUM FOR DOD INSPECTOR GENERAL (LOGISTICS SUPPORT DIRECTORATE)

SUBJECT: DoD Inspector General Draft Audit Report, "Management of Labor Standards for Airframes at Aeronautical Depots," (Project No. OLB-0022)

The Office of the Assistant Secretary of Defense for Force Management and Personnel (FM&P) concurs in the findings and recommendations of the proposed draft audit report. While the corrective actions recommended by the subject report are necessary if cost controls and improved manpower utilizations are to be realized, FM&P thinks that additional actions are required. The high costs associated with the development of accurate and useful labor standards along with the application procedures necessary has deterred many organizations from initiating and maintaining a comprehensive program.

The Defense Productivity Program Office (DPPO) manages a system known as the Defense Industrial Engineering Support System (DIESS) that provides automated work measurement tools to DoD components. Currently, this system is only used by the Naval shipyards and facilities maintenance activities, not the myriad of other functional areas where use of work measurement would improve overall operations.

So that all DoD activities have the capability to more accurately determine and modify manpower requirements and staffing standards in support of unit cost resourcing, FM&P will issue policy and guidance to support an initiative to implement a common uniform approach to work measurement that would support the Defense Management Report consolidation initiatives, development of corporate information management systems, and the establishment of unit costs.

This initiative shall utilize the system developed by DPPO as the vehicle to provide this common approach.

Christopher Jehn

DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF FOR LOGISTICS
WASHINGTON, D.C. 20310-0501

DALO-ZD

26 DEC 1990

MEMORANDUM THRU

~~DEPUTY CHIEF OF STAFF FOR LOGISTICS~~ 12/26/90

~~DIRECTOR OF ARMY STAFF~~ JOSEPH P. DONNELLY, LTC, GS, ADJ 12/27/90

ASSISTANT SECRETARY OF THE ~~ARMY~~ (INSTALLATIONS, LOGISTICS AND ENVIRONMENT) Eric S. Orsini 12/26/90
Deputy Assistant Secretary of the Army
(Logistics)

FOR ACTING DIRECTOR, LOGISTICS SUPPORT DIRECTORATE, INSPECTOR GENERAL DEPARTMENT OF DEFENSE (ANALYSIS AND FOLLOW-UP)

SUBJECT: Draft Report on the Audit of the Management of Labor Standards for Airframes at Aeonautical Depots (Project No. OLB-0022)

1. Reference memorandum, DOD IG (Analysis and Follow-Up), dated 1 October 1990, SAB (Tab B).

2. This memorandum forwards the Army's response (Tab A) to Finding C, Management of Labor Standards at Corpus Christi Army Depot (CCAD).

Joseph P. Cribbins

Encls

JOSEPH P. CRIBBINS
Special Assistant to the Deputy
Chief of Staff for Logistics

CF:
SAIG-PA
DAIG-PA

LTC Chatman/70487

DAIG # 0738

DRAFT REPORT ON THE AUDIT OF THE MANGEMENT OF LABOR STANDARDS FOR AIRFRAMES AT AERONAUTICAL DEPOTS (PROJECT NO. OLB-0022)

FINDING C

The Corpus Christi Army Depot (CCAD) was not developing accurate and reliable standards for airframe maintenance and repair operations affecting 2.5 million direct labor hours that cost $115 million annually. This condition occurred because CCAD did not regularly review performance efficiencies for airframe maintenance and repair operations to determine which standards needed to be reevaluated and updated, as required by U.S. Army Depot Systems Command (DESCOM) Regulation 5-10. Based on the results of our audit sample, standards for direct labor hours of six airframe maintenance and repair operations for two Army helicopters could be reduced by an average of 56 percent. We believe our sample results are indicative of the inaccuracies of the standards for the airframe workload.

ARMY RESPONSE

1. The Department of Defense Inspector General (DODIG) audit team points out the need for aggressive maintenance standards, including regular reviews of standards with out-of-tolerance performance efficiencies.

a. The team examined six operations standards, comprising 5.45 hours, just .08 percent of the standard hours for the two aircraft involved. Extrapolating from this small sample to conclude that CCAD "was not developing accurate and reliable labor standards" overstates the results of the audit.

b. The team's data contain errors undermining the report conclusion. The most significant disconnect concerns the standard for complete panel installation in the utility helicopter (UH-1). The CCAD work measurement (WM) engineered standard allows 229.7 minutes (3.828 hours) for this operation. The audit team synthesized a standard of only 30.6 minutes (.510 hours), relying on observed work in process during on-site review. The audit team observed only part of the panel installation--the three panels that do not require rivets or extensive preparation time. The CCAD standard for installing just these three panels is 26.5 minutes (.442 hours), about 13 percent lower than the audit team's standard.

c. Data used by the DODIG team do not show that CCAD standards are too high (Encl 1). The CCAD standard for the disputed floor panel installation is 1.622 hours. The standard audit time was 111.7 minutes (1.862 hours). The audit time exceeded CCAD's standards by 14.8 percent, within the normal control range for a mix of engineered and non-engineered standards. Additional comments by CCAD, on the standards in question, are provided at Encl 2.

d. Despite repeated requests, the audit team refused to provide detailed analysis of work content or processes and standards computation either to CCAD or Headquarters, DESCOM.

2. During the last DESCOM evaluation review at CCAD in 1988, weak maintenance standards became a prominent issue. Following the review, CCAD established joint maintenance directorate WM teams to review out-of-tolerance performance efficiencies. This system has improved CCAD maintenance standards effort. The WM staff has also worked with the maintenance directorate on a series of work sampling studies in low performing work centers to identify and quantify productivity inhibitors.

3. The DoDIG acknowledged at the 29 August 1990 exit conference at HQ, DESCOM that their sample of observations at CCAD was not a statistically significant sample and they could not make any projections based on the sample results.

4. The draft audit report cites the results of a statistical sample of six operations and uses those results to project millions of dollars of unsubstantiated savings. This conclusion has resulted in potential adverse reactions of major consequence to depot systems command in the form of proposed budget reductions. This is evidenced by proposed Program Budget Decision No. 401, dated 2 Nov 90.

RECOMMENDATION 1:

We recommend that the Commander, DESCOM, evaluate procedures at CCAD for reviewing and updating labor standards to determine the depot's compliance with the DESCOM Regulation 5-10, 25 March 1987, Methods and Standards (M&S) Program, during the command's biennial audit of the depot.

ACTION TAKEN:

Nonconcur. The CCAD procedures were reviewed and changed since our 1988 evaluation review. The very limited sample of work standards reviewed is not sufficient to support the conclusions drawn in this finding.

RECOMMENDATION 2:

We recommend that the Commander, CCAD, issue procedures for WM personnel to review the performance efficiencies of airframe maintenance and repair operations to determine the operations that have an unacceptable range and reevaluate the standards for those operations to ensure the standards reflect current shop layouts, work content, and equipment changes.

ACTION TAKEN:

Nonconcur. CCAD initiatives over the past two years demonstrate a renewed commitment to the aggressive standards urged by the DoDIG audit team. The very limited sample of work standards reviewed is not sufficient to support the conclusions drawn in this finding.

DEPARTMENT OF DEFENSE INSPECTOR GENERAL REVIEW--
CORPUS CHRISTI ARMY DEPOT

After disregarding the time for the panel installation:

ENGINEERED STANDARDS/UTILITY HELICOPTER 1H

DESCRIPTION	STD TIME/DEPOT	STD TIME/AUDIT TEAM	VARIANCE
Remove Panel	15.4 mins.	9.0 mins.	-41.6%
Remove Panel	14.2 mins.	7.5 mins.	-47.0%
SUBTOTAL	29.6 mins. (0.493 hrs.)	16.5 mins. (0.275 hrs.)	-44.3%

NONENGINEERED STANDARDS/OBSERVATION HELICOPTER 58

DESCRIPTION	STD TIME/DEPOT	STD TIME/AUDIT TEAM	VARIANCE
Disassemble Rotor Blade	15.0 mins.	40.8 mins.	+172.0%
Remove Pilot Seat	7.7 mins.	2.1 mins.	- 72.7%
Installation Door	45.0 mins.	52.3 mins.	+ 16.2%
SUBTOTAL	67.7 mins. (1.128 hrs.)	95.2 mins. (1.587 hrs.)	+ 40.6%

COMPOSITE	STD TIME/DEPOT	STD TIME/AUDIT TEAM	VARIANCE
Engineered Standards	29.6 mins.	16.5 mins.	-44.3%
Nonengineered Standards	67.7 mins.	95.2 mins.	+40.6%
TOTALS	97.3 mins. (1.622 hrs.)	111.7 mins. (1.862 hrs.)	+14.8%

ENCL 1

LABOR STANDARDS

The DODIG selected six labor standards, three from UH-1H and three from OH-58 helicopters. The following is the comparison of CCAD and IG audit-developed standards times:

a. Std Acft	Description	Std E-Engr N-Nonengr	Std Depot Time Mins	Std Audit Time Mins	% Variance*
1. UH-1H	Remove Panel #92	E-MTM II	14.2	7.5	-47.0
2. UH-1H	Remove Panel #95	E-MTM II	15.4	9.0	-41.6
3. UH-1H	Installation of Panels (#82, 86, 88, 91, and 94)	E-Stopwatch	229.7	30.6	-86.7
4. OH-58	Disassemble Rotor Blade	N-Tech Estimate	15.0	40.8	+172.0
5. OH-58	Remove Pilot Seat	N-Tech Estimate	7.7	2.1	-72.7
6. OH-58	Installation of Pilot Door	N-Tech Estimate	45.0	52.3	+16.2

* A minus indicates that the audit-developed standard is less minutes than the CCAD developed standard. A plus indicates that the audit-developed standard is more minutes than the CCAD developed standard.

STANDARDS #1 and #2: UH-1H:

Removal of floor panels #92 and #95 require cleaning screw heads, removing screws, rivets, and vacuuming as necessary. Factors that impact on the completion of a unit and are included in performance standard (based on a percentage of occurrence) are as follows: punching out rivet centers more than once, removal of frozen screws, preparing air drill/apex tools on rework operations, prying panel from aircraft frame, shearing out nut plate(s) and rivets. The audit review team may not have taken this work into consideration or they may have observed an ideal operation on removal of these panels.

STANDARD #3: UH-1H:

The IG audit team used the MTM-UAS technique. This technique applies only to repetitive batch manufacturing operations with

ENCL 2

maximum cycle times of two to seven minutes. The operations observed by the IG team on the UH-1H aircraft, DEX-10, in Hangar 45, were selected on the basis of actual work progress. We believe the analysis of 30.6 minutes was based on a partial observation of the total time to install five floor panels. The IG team states they did not observe rivets or necessary prep time for each panel. Panels #86, #88, and #91 do not require rivets. CCAD's time standards for these three panels is 26.5 minutes. Installation of Panels #82 and #94 take 203.3 minutes. Each panel has a total of 196 rivets of various sizes and numerous screws and bolts ranging from 10/32" to 4 1/4". Prep time is required for each panel in the area of inspection, alignment, redrilling of holes on panel and gauging to check size of rivets. Factors built into the standard include holes not being the right size, panels previously repaired requiring additional drilling (partial or full), angle doubler/angle replacement, and replacement of nut plates on screws. All above operations are performed in accordance with tech manuals and Depot Maintenance Work Requirement (DMWR) procedures. In conversing with journeymen mechanics in Hangar 45, the time of 30.6 minutes as per IG review is incorrect.

STANDARD #4: OH-58:

The standard time to disassemble one OH-58 rotor blade is 15 minutes. The standard time of 15 minutes consists of removing one bolt from the main rotor hub. The time to remove the entire hub assembly with a hoist is not part of the 15 minute time standard.

STANDARD #5: OH-58:

CCAD asked the IG team if sufficiently complete documentation had been provided to support the standards. The IG team said they had all information required to support the operations observed. Documentation on removal of pilot seat was requested by phone three weeks later. CCAD asked the IG to be specific on what information was needed. The response was, "give us what you have". CCAD provided four tech estimates for pilot removal (armor plate 6.11 minutes, lower seat 4.69 minutes, back cushion 0.62 minutes, and reel straps 6.09 minutes). The IG audit developed standard of 2.1 minutes does not match any of the above elements. Again, these standards are only tech estimates.

STANDARD #6: OH-58:

Installation of OH-58 pilot door is a non-engineered standard (tech estimate). The 45.0 minutes to install and fit the door is reasonable. Again, this standard is only a tech estimate.

DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20350-1000

30 NOV 1990

MEMORANDUM FOR THE DEPARTMENT OF DEFENSE ASSISTANT INSPECTOR GENERAL FOR AUDITING

Subj: AIG(A) DRAFT REPORT ON THE AUDIT OF THE MANAGEMENT OF LABOR STANDARDS FOR AIRFRAMES AT AERONAUTICAL DEPOTS (PROJECT NO. OLB-0022)

In response to TAB A, we have reviewed the subject draft report. Detailed comments on the findings and recommendations are forwarded at TAB B.

The Navy concurs with finding D recommendations. However, for finding B, the Navy does not concur with recommendation 1A and concurs in part with recommendations 1B and 2.

Barbara Spyridon Pope

BARBARA SPYRIDON POPE
Assistant Secretary of the Navy
(Manpower and Reserve Affairs)

TAB A: DODIG memorandum of 01 Oct 90
TAB B: DON Comments

Copy to:
ASN(FM)
CNO(MR)
CMC
NCB(53)
NAVINSGEN
AUDGENAV
COMNAVAIRSYSCOM(09G)

NAVY COMMENTS
ASSISTANT INSPECTOR GENERAL FOR AUDITING
DRAFT REPORT ON THE AUDIT OF THE MANAGEMENT OF LABOR
STANDARDS FOR AIRFRAMES AT AERONAUTICAL DEPOTS
PROJECT NO. 0LB-0022

I. Finding B - MANAGEMENT OF LABOR STANDARDS AT NAVAL AVIATION DEPOTS

A. Summary of OAIG(A) Finding:

The North Island and Alameda Naval Aviation Depots were not developing accurate and reliable labor standards for airframe maintenance and repair operations affecting 2.1 million direct labor hours that cost $108 million annually. Although the Navy was improving its work measurement program, the Aviation Depots were not following the draft Naval Air Systems Command (the Command) Instruction 5220 and Naval Aviation Logistics Center Instruction 5220.7A for engineering labor standards and DOD Instructions 7220.29H and 7220.9M for reevaluating labor standards. Also, Headquarters, Naval Air Systems Command, was not sufficiently staffed to monitor and enforce Navy's guidance for the work measurement program. Based on the results of our audit sample, standards for direct labor hours of 19 airframe maintenance and repair operations for four types of Navy aircraft could be reduced by an average of 65 percent. We believe our sample results are indicative of the inaccuracies of the standards for the airframes workload.

B. Navy Comments to Finding B:

We nonconcur with the statement that Aviation Depots were not following specific instructions for reevaluating labor standards. NAVAIR ltr 11000 Ser AIR-4341B/189 of 31 Jan 90 provided interim policy until the issuance of NAVAIRINST 5220.16 on 15 Aug 90. This latter instruction consolidated all previous Naval Aviation Logistics Center directives applicable to the standards program. Further, it established policy and procedures for the improved operation of the Process and Productivity Enhancement Program (PPEP), formerly referred to as the Performance Standards Program. The NADEPS have expended considerable effort to update and enhance PPEP to ensure appropriate standards coverage, and to incorporate current engineering techniques and practices within the context of Total Quality Management (TQM). The TQM philosophy and principles are integral to the depot work measurement program as now constituted. This position neither preempts nor reduces the importance of incorporating improved methods and engineered standards for planning, scheduling, loading and staffing workload, but emphasizes their use when it makes good business sense; e.g. high volume/high payback operations.

It appears to be an erroneous conclusion that the 19 standards audited at the two depots are characteristic of the entire standards program in all six naval aviation depots. The audit further erroneously concludes that standards could be reduced by an average of 65 percent. The sample sizes from which audit inferences are made cannot be considered statistically valid. Performance evaluation reviews conducted at the program and sub-program levels do not support findings which imply that there are sweeping standards inaccuracies throughout the depots' airframe workload. In addition, standards data developed by the auditors are not supported with assumptions, calculations or equations, but were known to be synthesized using a pre-determined time system of Methods-Time-Measurement. This analysis was done off station after collecting the work content for the respective sample tasks. Since the operations were pre-arranged at specific times, the possibility exists that the standards may not have included appropriate Personal, Fatigue and

TAB B

Supplemental allowances and Job Preparation Elements normally included in all engineered standards. These factors alone typically account for approximately 25 percent of a given standard. For NADEP North Island, the sample size used by the audit team represents less than .01 percent [only 134 minutes of one F/A-18 (5,000 MHR workload) and one F-14 (15,000 MHR workload package)] of the maintenance hours for the aircraft reviewed.

At NADEP Alameda, six of eleven standards selected for audit were engineered. However, Alameda has nearly 17,000 and 13,000 operation documents (OPDOCs) on file for the P-3 and A-6 aircraft, respectively; each aircraft program has approximately 68,000 and 52,000 labor lines. Upon aircraft induction, an average of 2500 OPDOCs are issued containing an average of 10,000 labor lines.

C. OAIG(A) Recommendations and Navy comments:

OAIG(A) recommended that the Commander, Naval Air Systems Command:

1. Issue specific guidance emphasizing that Naval Aviation Depots:

a. Develop engineered labor standards for 80 percent of the work load of airframe maintenance and repair operations consistent with the Navy's overall goal for labor standards.

b. Include in their implementing depot guidance, provisions for reevaluating and updating labor standards at least every 2 years, or at a specific, reasonable interval.

2. Staff the Headquarters, Naval Air Systems Command, with sufficient personnel to ensure that reviews and audits of the work measurement programs at each of the Naval Aviation Depot's are planned, scheduled, and executed.

Navy Comments:

1a. Do not concur. The Navy was the first department within DOD to establish a requirement for 80 percent engineered standards coverage. An arbitrary assignment, the 80 percent requirement was removed in 1986 by NALC ltr 7501 Ser 70/20877 of 25 April 86 because limited engineering resources were being applied primarily to engineered standards development with minimal effort toward methods/process improvement - the true focus for productivity improvement/cost savings. In the former case, the premise is that engineered standards are an integral part of improved methods and, as such, would be applied subsequent to the improved process. In reality, a good standard which describes a poor method may be worse than no standard, since it tends to 'institutionalize' the method it describes. Engineered standards coverage for 80 percent of airframes workload cannot be economically achieved without a significant increase in staffing - an unnecessary luxury in today's environment of reduced budgets and competition driven workload assignments. Establishing and monitoring such coverage is estimated to require at least six hours of standard development for each labor hour. Thus, instead of saving 65 percent from the airframe programs as is contended by the audit, there will be enormous additional cost.

A more practical, cost-effective approach is for each depot activity to identify and develop engineered standards tailored for its own high volume/high payback operations. Due to variability in type and level of workload between each depot (and noting that approximately 60 percent of aircraft maintenance and repair operations are non-repetitive), the levels of

standard coverage will also vary. For example, airframe operations on the P-3 aircraft at NADEP Alameda consist of basic Standard Depot Level Maintenance (SDLM), 36 percent; Over and Above, 36 percent; and Component Repair, 28 percent. In relative terms, the workload variability is low and frequency of occurrence for task line operations is high in the basic SDLM. This is because SDLM workload is stable; the work content is structured, well defined and pre-negotiated. For this workload, engineered standards are easy to establish. The variability for Component Repair is somewhat higher. Work content for these is not pre-arranged nor well known in advance. They arrive at the depot in a variety of material conditions and configurations; providing engineered standards is typically not cost effective. In the Over and Above category, however, operations are essentially unique from aircraft to aircraft because of differences in material condition upon induction, e.g., degree of salt water corrosion. Therefore, developing and applying engineered standards for operations with a low frequency of occurrence is not considered economically prudent when compared to the SDLM portion of the workload and/or to other major induction programs when seeking optimal return on manhour investment. This position should not imply that there is little effort to improve the economy of operations for airframes. Competitive business pressures are driving process improvements in every functional area of the aviation depot community. Further, this policy is consistent with the TQM philosophy now being applied throughout the Department of Defense. In this context, NALC ltr 7501 Ser 70/20877 of 25 April 86 requires that continuous progress and maintenance of engineered standards be conducted on the basis of ongoing NAVAIR review of quarterly PPEP feedback reports which examine the variability, cost and effectiveness of engineered standards for scheduled workload.

1b. Concur in part. The new NAVAIRINST 5220.16, NALC ltr 7501 Ser 70/20877 of 25 April 86, states that standards should be updated when the conditions or methods on which the labor standard is based change; e.g., engineered standards should be reevaluated and/or updated when there is a significant change in work content or when statistically significant variances (greater than 10 percent over/under) on high volume/high payback workload exists. This may result in some standards being reviewed more or less frequently than a 2 year cycle. Continuous improvement under TQM has no set interval schedule. To compromise continuous review/improvement with set schedules is costly and unnecessary.

2. NAVAIR Headquarters has sufficient resources to monitor recurring quarterly performance reports submitted under the PPEP instruction, as well as host an annual PPEP program review to assess, modify and promulgate revisions to standards policies and procedures, as required. However, additional personnel trained and experienced in the performance/work measurement discipline would enhance the effectiveness of the PPEP program through more active involvement in day-to-day operations and performance issues. Current DOD personnel policies do not permit hiring of additional headquarters staff. In addition, constrained travel budgets prevent individual site visits to work directly with field activities at implementing and improving this program.

II. Finding D - Performance of Variance Analyses

A. The Navy and Air Force were not performing variance analyses to evaluate the efficiency and effectiveness of their work measurement programs, as required by DOD Instruction 5010.34. The Navy and Air Force did not include specific requirements in their work measurement guidance for depots and logistics centers on the frequency of detailed analyses of labor standards and assignment of the analysis responsibility to an organization independent of the production function. Also, the Air Force did not require personnel at ALC's to record actual labor hours. As a result, the NADEP's and ALC's could not determine the accuracy and reliability of their labor standards used to charge maintenance customers, budget for maintenance and repair operations, measure productivity, determine staffing requirements, ensure work centers are fully workloaded, and evaluate work performance by personnel.

B. Navy Comments to Finding D:

1. Concur.

C. OAIG(A) Recommendations and Navy Comments:

OAIG(A) recommended that the Commander, Naval Air Systems Command, and the Commander, Air Force Logistics Command, issue specific guidance:

a. Requiring depots to perform variance analyses:

(1) At the detailed standard level.

(2) At specific frequencies.

(3) Covering both positive and negative variances.

b. Assigning responsibilities for monitoring variance analyses to an organization independent of the production function at aviation depots.

Navy Comments:

1a. Concur. Previously, variance analysis was only being performed by the NADEPs for the Components Program under the Variance Improvement Program for Expenditure Reconciliation (VIPER), a reporting requirement which has been absorbed under the PPEP instruction. Variance analysis is currently being performed for all workload as tasked under NAVAIRINST 5220.16, p. 2-7, paragraph 2.3d. (2).

1b. Concur. NAVAIRINST 5220.16 directs that depot activities examine, evaluate, investigate, analyze and report production performance and efficiency. This required the review of multiple performance indices, one of which is labor standards. Under the PPEP instruction we are moving to establish an effective performance review function for variance analysis. Although the production-independent function is clearly desirable for the long term, the current focus is to create and administer a viable, variance analysis capability. Current organizational status (location) of the performance review function by depot indicates that transition of other than production codes has already occurred. Further transitions are planned over the next two years.

Navy General Comments:

In summary, under DMR 908 and DEPSECDEF memorandum of 30 June 1990, the NADEPS are under great pressure to better manage, utilize and perform their assigned work at a lower cost and within acceptable quality and schedule. With the emphasis on improved productivity and performance, it is inappropriate to add or increase functions which fail to add value to a product and only contribute to bottom line costs. The NAVAIR guidance articulated in NAVAIRINST 5220.16 of 15 August 1990, provides a clear and concise policy to the NADEP community which requires each activity to define, develop and implement a work measurement program. It is agreed that variance analysis within the context of TQM is appropriate, but the cost and labor intensity of developing engineered work standards to an arbitrary percentage level with an arbitrary review cycle is considered too costly and impractical as a sound business practice. In the future competition environment, the NADEPs will have to be competitive with the commercial sector. Failure to shed non-value added functions will place their business futures in severe jeopardy.

NAVAIR support both engineered and historically developed work standards, where appropriate. In the recent General Accounting Office report: 'NAVY MAINTENANCE: Improvement Needed in the Aircraft Engine Repair Program (GAO/NSIAD-90-193BR),' the conclusions and recommendations suggest that depots...'consider historical labor hour expenditures in developing labor hour estimates for future years.' Along this vein, it should be understood that the airframe workload program is not budgeted or funded on the basis of individual product standards. 'Negotiated' aircraft workload standards (norms) are derived from thousands of 'weighted' (occurrenced) product standards. Hence, there cannot be any direct correlation between the accuracy of individual 'unoccurred' product standards and the resultant negotiated aircraft workload standards which determine the cost of the program.

NAVAIR is totally committed to meeting the financial costs savings delineated in DMR-908 and 919. To this end, the aviation depots are defining and implementing improved efficiencies and productivity through a total, priority-based, value-added approach to doing business. Where development and maintenance of engineered standards can show value, they will be vigorously pursued/implemented.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON DC 20330-5130

30 NOV 1990

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING
OFFICE OF THE INSPECTOR GENERAL
DEPARTMENT OF DEFENSE

SUBJECT: DoD (IG) Draft Report, "Management of Labor Standards for Airframes at Aeronautical Depots," (Project OLB - 0022) - INFORMATION MEMORANDUM

This is in reply to your memorandum for Assistant Secretary of the Air Force (Financial Management and Comptroller) requesting comments on the findings and recommendations made in the subject report.

HENRY VICCELLI, JR, LT GEN, USAF
DCS/Logistics & Engineering

1 Atch
Comments

DoD (IG) Draft Report on Audit of Management of Labor Standards For Airframes At Aeronautical Depots (Project OLB-0022)

FINDINGS:

Finding 1. (Pg 7), The Air Force did not include operations for the maintenance and repair of airframes in its FACTS II initiative to improve its work measurement program.

MANAGEMENT COMMENTS:

Concur in principle. The Fast Access Computerized Time Standards program (PACER FACTS II) embraces all the industrial processes known to occur at an ALC, including those in an airframe area. For example, Assembly, Disassembly, Painting, and Fabrication are FACTS II processes that frequently occur in the airframe area.

Finding 2. (Pg 7), In addition, the Air Force did not have uniform procedures for developing labor standards.

MANAGEMENT COMMENTS:

Concur in principle. AFLCR 66-4, Section 1-11 addresses procedures and backup requirements for both engineered and nonengineered standards. In particular, paragraph 1-11 f states nonengineered standards (the kind addressed in the auditors statement above) should include any applicable backup material. The methods for setting standards are taught in the DoD Methods and Standards course and local training.

Finding 3. (Pg 7), Based on the results of the sample, standards for direct labor hours of 22 airframe operations could be reduced by an average of 34 percent. We believe our sample results are indicative of the inaccuracies of the standards for the airframe workload.

MANAGEMENT COMMENTS:

Concur in principle. By going from nonengineered to engineered standards as was done in the audit, there is usually a reduction in time of 25 percent or more. However, extrapolating from a small sample to "across the board" is not statistically valid. Based on FY 90 data, (through 31 August 90), both OC-ALC and WR-ALC airframe actual hours exceeded standard hours, indicating some standards may be inflated, and others deflated.

Finding 4. (Pg 12), Air Force had no plans to apply PACER FACT II to the airframe standards not included in the E046B system. We believe the standards that reside in the G037E system should also be in the E046B system.

MANAGEMENT COMMENTS:

Concur in principle. The Air Force intends to apply PACER FACTS II standards as widely as possible, beginning with the highest direct product standard hour processes. HQ AFLC/MA is working with the OC-ALC/SC systems community to systematize the application of engineered standards in the airframe area. This subject will be on the agenda of the next PACER FACTS II conference. The approach agreed to will be documented in the minutes, and OC-ALC/SC will be formally tasked based on the minutes.

FINDING 5. (Pg 13), In one operation, maintenance personnel were alloted 42 minutes to remove a pilot's chair from a KC-135 aircraft. When our industrial engineers observed this operation, they determined that the chair could be removed in less than 5 minutes.

MANAGEMENT COMMENTS:

Concur in principle. The technician removed the chair and placed it temporarily in the fuselage. The standard time includes time to carry the chair to a trailer, and secure it for shipment, which the man did not do in the observed example.

Finding 6. (Pg 14), We believe the Air Force needs to develop standard operating procedures for nonengineered labor standards to avoid creating unreliable standards. The procedures should be included in interim guidance until PACER FACTS II is fully implemented in 1992.

MANAGEMENT COMMENTS:

Concur in principle. See comment number 2. Procedures for developing nonengineered labor standards are addressed in AFLCR 66-4.

Finding 7. (Pg 14), If the incidence of overstated airframe standards is applied to the FY 90 workload for all five ALC's, the Air Force would have the potential for reducing airframe direct labor hours by about 34 percent, or 4.25 million hours costing about $196 million annually.

MANAGEMENT COMMENTS:

Concur in principle. Expanding the experience of a limited sample is not statistically valid. See comments number 3 and 5.

Finding 8. (Pg 40), Air Force work measurement personnel were not performing detailed variance analyses because AFLCR 66-4 did not require that level of analysis.

MANAGEMENT COMMENTS:

Concur in principle. The reference to variance analysis in AFLCR 66-4 is targeted at the detailed operation level. AFLC performs variance analysis in special study situations (high labor cost, production problems, etc.) using manual data gathering techniques. However, manpower constraints limit the ability to perform variance analysis across the board at a detailed level. Current Air Force systems compute variance at the organizational (RCC) level, but not at the detail level since actual times are not available at the detail level. DMMIS will provide actual hours for each operation by means of bar code wanding start and stop times.

RECOMMENDATIONS:

Recommendation 1. We recommend that the Commander, Air Force Logistics Command:

a. Issue specific guidance emphasizing that the Air Force Logistics Centers include airframe maintenance and repair operations in the Air Force Fast Access Computerized Time Standards initiative and in the Labor Standards Mechanization System to improve the work measurement program. The guidance should specify that airframe maintenance and repair operations will be evaluated to ensure labor standards are engineered for 80 percent of the work load for consistency with the Air Force Logistics Command Regulation 66-4.

b. Issue interim guidance establishing uniform procedures for the Logistics Centers to use in developing nonengineered labor standards for airframe maintenance and repair operations.

MANAGEMENT COMMENTS:

Recommendation 1a. Concur in principle. Efforts are currently underway to correlate E046B and G037F to select engineered time values using string codes to access PACER FACTS II data and put it on work cards in the airframe operations. This is an interim solution until DMMIS comes on line. DMMIS, Option 1 (OO-ALC/MAN), has one work measurement module that will replace E046B. DMMIS, Option 2 (OO-ALC Wide), is being designed. The intent is that all labor standards (airframe and others) will be in one subsystem. However, documentation is not yet available.

Recommendation 1b. Concur in principle. See comments on findings number 2 and 6.

Recommendation 2. AFLC Commander should issue guidance to:

a. Perform variance analysis at the detail level, at specific frequencies, and covering both negative and positive variances.

b. Assign responsibilities for monitoring variance analysis to an organization independent of the production function at aviation depots.

MANAGEMENT COMMENTS:

Recommendation 2a. Concur in principle. Variance analysis cannot be accomplished across the board at a detailed level until actual hours to perform operations are available in the Air Force systems (DMMIS).

Recommendation 2b. Concur in principle. Past attempts to have MET teams monitor direct labor standards have proved less than successful, due to turnover of personnel, and the extensive training requirements associated with staying competent in the labor standards discipline. AFLC will investigate the feasibility of having someone in the newly-formed Financial Management Directorate (FM) act as labor standard monitors.

Recommendation 3. We recommend that the Commander, Air Force Logistics Command, issue specific guidance to the Air Logistics Centers to establish standard operating procedures for production workers to record actual hours for maintenance and repair operations to allow for the performance of accurate variance analyses.

MANAGEMENT COMMENTS:

Concur. Guidance will be issued in conjunction with the implementation of DMMIS.

SUMMARY OF POTENTIAL MONETARY AND OTHER BENEFITS RESULTING FROM AUDIT

Recommendation Reference	Description of Benefit	Amount and/or Type of Benefit
A.1. and A.2.	Economy and Efficiency - Air Force guidance to include work load in "PACER FACTS II" initiative and establish uniform procedures for developing nonengineered labor standards.	Funds put to better use. Monetary benefits will occur, but cannot be quantified. The Air Force will develop more reliable labor standards, improve its work measurement program, and improve depot maintenance efficiency.
B.1. and B.2.	Economy and Efficiency - Navy guidance to engineer labor standards for airframes and to staff Headquarters, Naval Air Systems Command, to provide reviews and audits of the work measurement programs.	Funds put to better use. Monetary benefits will occur, but cannot be quantified. Developing engineered labor standards and providing staffing to review the work measurement program will result in improved depot maintenance efficiency.

SUMMARY OF POTENTIAL MONETARY AND OTHER BENEFITS RESULTING FROM AUDIT (continued)

Recommendation Reference	Description of Benefit	Amount and/or Type of Benefit
C.1. and C.2.	Compliance - Implement procedures for Army to be in compliance with Depot System Command Regulation 5-10 by reviewing standards that are not within established criteria.	Funds put to better use. Monetary benefits will occur, but cannot be quantified. Use of established efficiency ranges for engineered and nonengineered standards will result in a more efficient work measurement program and improved depot maintenance efficiency.
D.1.	Economy and Efficiency - Navy and Air Force improved guidance for performing variance analyses will result in valid labor standards to measure the efficiency and effectiveness of maintenance and repair operations.	Funds put to better use. Monetary benefits cannot be quantified. The benefit of performing analyses will promote improved efficiency of operations.
D.2.	Internal Control - Air Force improved guidance for recording accurate labor hours for variance analysis.	Nonmonetary. This is an internal control measure that will ensure production workers record accurate labor hours.

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Office of the Assistant Secretary of the Air Force (Financial Management), Washington, DC
Office of the Air Force Deputy Chief of Staff (Logistics and Engineering), Washington, DC
Headquarters, Air Force Logistics Command, Wright-Patterson Air Force Base, OH
Oklahoma City Air Logistics Center, Oklahoma City, OK
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