UNITED STATES
GENERAL ACCOUNTING OFFICE

Improving Depot Maintenance Of Combat And Tactical Vehicles

Department of Defense

Repairing and overhauling Army combat and tactical vehicles is a costly program. GAO reviewed maintenance workloading, scheduling, and inventory management practices at the Red River Army Depot and made recommendations to improve operations.

LCD-75-424

SEPT. 3 1975

UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

LOGISTICS AND COMMUNICATIONS
DIVISION

B-160075

The Honorable
The Secretary of Defense 5

Dear Mr. Secretary:

This report points out opportunities for improving the Army's depot maintenance of combat and tactical vehicles.

We invite your attention to the fact that this report contains recommendations to you which are set forth on pages 6, 10, and 18. As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions he has taken on our recommendations to the House and Senate Committees on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Director, Office of Management and Budget; the Secretary of the Army; and the Chairmen and ranking minority members of the House and Senate Appropriations, Government Operations, and Armed Services Committees.

Sincerely yours,

T. G. Rothwell

for Director

Contents

ABBREVIATIONS

AMC	Army Materiel Command
GAO	General Accounting Office
MAP	military assistance program
MIDA	Major Item Data Agency
RRAD	Red River Army Depot
TACOM	Tank-Automotive Command

GENERAL ACCOUNTING OFFICE
REPORT TO THE
SECRETARY OF DEFENSE

IMPROVING DEPOT MAINTENANCE OF COMBAT AND TACTICAL VEHICLES

D I G E S T

The Red River Army Depot is the Army's prime repair and overhaul facility for combat and tactical vehicles. Since this is a costly program, GAO reviewed not only selected maintenance programs there, but also workloading and scheduling as well as inventory management practices.

RECOMMENDATIONS

GAO recommends that the Secretary of the Army improve maintenance programs at the Red River Army Depot by

--controlling repair parts through tighter security and records keeping,

--administering costs of maintenance programs to reflect true depot efficiency,

--controlling the component count when more than one program is being worked at the same time,

--limiting quality assurance rework on U.S. Forces' equipment to that consistent with safe operating condition,

--following established repair or overhaul cost ceilings unless specific approval is requested by the depot and granted by the Army, and

--requiring the Army Materiel Command to closely relate workloads assigned to depots to their capacity and capability.

Areas for Depot Maintenance Improvements

Because of changes in workload assignments, the Tank-Automotive Command did not

accurately predict the repair parts needed for the maintenance programs which GAO reviewed. This caused the depot to experience considerable work stoppages.

The Red River Army Depot accepted all work offered by the Major Item Data Agency even though it knew the programs could not be completed during the maintenance execution time frame.

The depot's internal management of repair parts needs improvement. Costs associated with maintenance are not administered to reflect efficient depot maintenance management.

Too much rework was being done after vehicles had been repaired or overhauled. Much of this rework had little to do with the equipment's operating condition; it was instead concerned more with esthetics.

The depot also exceeded the amount of funds authorized for repairing or overhauling vehicles without specific Army approval.

CHAPTER 1

INTRODUCTION

The Department of Defense spends approximately $20 billion annually on various levels of maintenance of its equipment.

The Red River Army Depot (RRAD) is the Army's prime facility for repair and overhaul of major end items and components. We reviewed the inventory management of combat and tactical vehicles and workloading and scheduling agencies responsible for programs worked by the depot.

THE U.S. ARMY TANK-AUTOMOTIVE COMMAND

THE U.S. Army Tank-Automotive Command (TACOM), Warren, Michigan, is responsible for managing the inventory of tactical and combat vehicles. Along with its reporting headquarters, the Army Materiel Command (AMC), TACOM develops the annual depot repair and overhaul requirement for these vehicles. They consider factors such as the total number of vehicles needed, the number procured, the number that should become unserviceable during a year, the number to be purchased, and the quantity of unserviceable but repairable vehicles that can be programed into the depot.

Depot repair of tactical wheeled vehicles is limited to repair rather than complete overhaul since it has been shown that replacing these vehicles is generally cheaper than overhauling them.

THE MAJOR ITEM DATA AGENCY

After TACOM and AMC develop the annual workload of tactical and combat vehicles that should be repaired or overhauled, the requirement is referred to the Major Item Data Agency (MIDA) for scheduling the workload into the depots. The depots can accept or renegotiate the workload.

MIDA is a central bank of logistics information on the capabilities and capacities of all the Army's maintenance depots. The depots determine and report their maintenance capacity monthly to MIDA by an automated procedure known as the capability engineering data reporting system.

RRAD

RRAD is one of two major depot maintenance facilities for tactical and combat vehicles. In addition to supporting the Army's maintenance requirements, it rebuilds equipment for the military assistance program (MAP), and is the only combat vehicle roadwheel 1/ and track-rebuild facility in this country.

The depot has two major functions--supply and maintenance. The supply function consists of (1) distributing stock and storing general supplies and ammunition and (2) storing strategic material for the General Services Administration. The maintenance function includes overhauling, modifying, converting, fabricating, and renovating (1) tactical and combat vehicles, (2) artillery and small arms, (3) fire control material, (4) vehicle secondary items, such as engines and transmissions, and (5) related components.

RRAD has prime maintenance mission responsibility for all tactical vehicle classes (major and secondary items) and several combat vehicles, plus secondary maintenance mission responsibility for the majority of the remaining combat vehicles for which it is not prime.

Although the depot repairs and overhauls several commodities, its primary costs are associated with combat and tactical vehicles, as shown by fiscal year 1974 programs.

Commodity	Cost	Percent
Aircraft	$ 5,882,025	14
Tactical vehicles	17,038,625	42
Combat vehicles	13,331,574	33
Missiles	1,889,181	5
Weapons	1,195,420	3
Commodities	711,176	2
Other	369,993	1
Total	$40,416,994	100

The depot maintenance facilities occupy approximately 750,000 square feet of floor space in buildings valued at $6.9 million with capital and production equipment valued at $8.9 and $6.9 million, respectively.

During fiscal year 1974, the Depot Maintenance Directorate worked 2.3 million staff-hours for total direct and indirect costs of $41,519,362.

1/Metal and rubber power wheels that revolve the tracks on tanks and similar vehicles.

CHAPTER 2

ASSIGNING AND SCHEDULING MAINTENANCE WORKLOAD

AMC and TACOM determine jointly and annually the number of combat vehicles that must be purchased or repaired and overhauled to complement the overall inventory. Once the decision is made, TACOM is responsible for ordering the repair parts. It does this by using repair parts usage data and also information from previous programs worked at the depot. MIDA is responsible for scheduling the workload into the depot.

IMPACT OF SPORADIC WORKLOAD ASSIGNMENT ON MANPOWER, REPAIR PARTS, AND EFFICIENCY

MIDA matches maintenance requirements with depot capacity and capability. MIDA normally workloads the depots using the prime and secondary depot concept. Under this concept, MIDA workloads the depots based on monthly available staff-hours by commodity category, reparable asset availability, and location. Assignment of workload is also based on negotiations with the depots.

During fiscal year 1974 and up to the second quarter of fiscal year 1975, MIDA assigned more work to the depot than it could accomplish with its workforce. The depot accepted this overprograming without question. This in turn resulted in extensive reprograming and a marked decrease in the overall efficiency of operations.

For example, during the first 5 months of fiscal year 1975 the depot accepted a workload amounting to about 4 million staff-hours. Yet it only had capacity for about 2.5 million staff-hours--an overprograming of approximately 60 percent' To make up the difference the depot hired an additional 300 employees or 510,000 productive staff-hours (300 personnel x 1700 productive staff-hours a year). This still left the depot overprogramed by about 40 percent.

Subsequently, MIDA removed 1.9 million staff-hours of work leaving the depot, with its newly hired personnel, underprogramed by about 30 percent.

In the meantime, TACOM was attempting to match the repair parts requirements with MIDA's changing workload assignments to the depot. Understandably, these fluctuated widely, as shown below.

Programs	Percent of parts Added	Deleted
Carrier, M113A1	86	17
Truck, tractor, 10-ton	53	18
Engine, 3/4-ton	54	72
Engine, 1790-6A	21	15
Engine, 5-ton M/F	74	61
Engine, 5-ton gas	7	6

Depot maintenance effectiveness

The depot has work measurement standards designed to determine manpower requirements and to evaluate the work force's productivity performance. A widely accepted method of measuring a labor force's performance is comparing actual-to-planned work. The depot uses this method in its work measurement program. Labor standards form the basis for planning the amount of work expected to be done during a specific period. Once the work is accomplished, standard staff-hours a unit are multiplied by the number of units produced, the result is earned hours. Earned hours are divided by actual hours to determine the rate of performance effectiveness--a measure of employee productivity. In computing this effectiveness, RRAD uses category one and two time standards. Category one standards are engineered standards developed from actual-time studies while category two standards are statistical based on descriptions of the work performed.

We examined the performance effectiveness rates for the four quarters of fiscal year 1974 and the first quarter of fiscal year 1975. The effects of fluctuating workload, imbalanced manpower, and parts availability on effectiveness are shown in the following table.

Maintenance Directorate Performance
Effectiveness By Quarter For RRAD

Quarter	Actual	Earned	Effectiveness rate
	(staff-hours)		
FY 74:			
First	383,709	315,132	82%
Second	354,811	300,765	85
Third	478,758	330,985	69
Fourth	608,040	408,987	67
FY 75:			
First	571,617	462,105	81

AMC considers a performance effectiveness rate between 80 and 120 percent acceptable. As appendix I shows, only three of the eight programs we reviewed had performance effectiveness rates within this level.

COST IMPACT OF NOT HAVING REPAIR PARTS AVAILABLE

There were 133,702 staff-hours of delay time at RRAD in fiscal year 1974 resulting from repair parts not being available when needed. This delay time in dollars represented a $1.8 million loss. Some of the delay time is salvaged by reassigning workers to such tasks as shop cleanup, tool care, and other overhead functions, while much of it is lost as idle time.

For the eight programs we reviewed, there were 38,700 staff-hours of delay time at a cost of $524,392, as shown below.

RRAD, Maintenance Directorate
Nonproductive Time Fiscal Year 1974

Program	Nonproductive Hours waiting for parts and material	Cost of hours waiting for parts and materials
Total for all maintenance programs	133,702	$1,811,662
Wrecker, 5-ton	10,737	$ 145,393
Recovery vehicle, M88	10,730	145,392
Carrier, M113A1	3,431	46,490
Truck tractor, 10-ton	22	298
Engine, 3/4-ton	882	11,951
Engine, 1790-6A	7,733	104,782
Engine, 5-ton M/F	3,861	52,317
Engine, 5-ton gas	1,304	17,669
Total	38,700	$ 524,392

An example of faulty forecasting and resulting parts shortage that created a work stoppage was a parts kit for the M113A1 armored personnel carrier program. This kit (FSN2520-882-1371) was supposed to be ordered to repair the differential, steering gasket, and shim system for the armored personnel carrier. The program was scheduled for production over a 13-month period. Since this kit was not available after production started, the program had to be put aside to await the part.

CONCLUSIONS

MIDA assigned 4 million staff-hours to RRAD although it had existing capacity for only 2.5 million staff-hours. The depot accepted the workload; hired 300 additional personnel for the increased workload; and later, when the 1.9 million staff-hours were removed, the 300 personnel remained, causing a workforce excess and a marked decrease in efficiency. These changes in workload assignments made it extremely difficult for TACOM to adequately forecast the repair parts requirements, thereby contributing to 133,702 lost staff-hours valued at about $1.8 million.

RECOMMENDATIONS

We recommend that the Secretary of the Army improve depot maintenance operations by requiring AMC and its subordinate organizations to closely relate workloads assigned to depots to their capacity and capability. TACOM and MIDA should also assign firm workloads to depots with enough leadtime to allow the depots to organize their workforce and other resources with minimum changes.

CHAPTER 3

MATERIEL MANAGEMENT AT RRAD

Efficient depot maintenance management depends largely on the way repair parts for maintenance programs are controlled once they are received at the depot.

A means of determining depot maintenance effectiveness is evaluating costs associated with completing the maintenance programs.

RRAD can improve in both of these areas.

INTERNAL PROBLEMS INVOLVING REPAIR PARTS

Army supply accounting procedures provide for a physical count of repair parts received at the depot to insure that correct quantities and types of repair parts are received.

During our review, some of the material received in the central receiving branch was not physically counted to verify the items or quantities. Also, there were instances where material bypassed central receiving and was delivered directly to a parts expeditor for the production line. At the same time, files in central receiving showed the items to be due-in.

Access to central receiving's temporary storage area for incoming material was not controlled. Also, the material is not stored in a secure area and can be randomly picked up, especially on the second shift when supply personnel are not on duty.

Shop personnel told us that it was not uncommon for mechanics to pick up required parts from storage racks on one line and use them on another program being worked. For example, a foreman cited instances where mechanics took transmissions and transfer cases that were rebuilt for the supply or component program and used them on the vehicle repair or overhaul program.

These irregularities not only distorted repair parts consumption records but also vehicle program costs.

Cannibalization program

Cannibalization is the process of removing usable parts from unserviceable and nonrepairable vehicles. A record is

supposed to be kept on repair parts removed and used so that consumption or usage data is available for future programs.

Repair parts were not properly accounted for under the cannibalization program. For example, on the 5-ton wrecker program, we noted on preinspection reports that several wheels were missing from the vehicles before they were repaired. Since the wheels were on the vehicles after they were repaired, we checked the Parts Analysis Report to see where they came from. The report showed that no wheels had been issued and that the replacement wheels had been removed from salvaged trailers. This information had not been recorded as consumption information for future mortality reference.

Exchanging repair parts on MAP and regular Army programs

MAP equipment is repaired or overhauled to a like new condition in contrast to equipment repaired for the U.S. Army, which is to be repaired or overhauled to a serviceable or operational status. Depot maintenance for MAP is also done on a reimbursable basis.

Components were being interchanged between MAP and regular Army programs without documentation. AMC discourages this practice because accurate parts consumption data is not developed and could result in parts shortages and production delays on future programs. It also provides opportunities for understating maintenance costs for MAP reimbursement purposes.

Maintenance programs cost accounting

For the Army to keep abreast of depot maintenance efficiency costs, programs must be managed so that accurate cost data can be obtained and used for planning purposes.

RRAD transferred costs between programs in a manner that made it difficult for the Army to adequately justify maintenance program costs. In some instances, program costs exceeding their funded limits were transferred to programs that were running under the programed costs. In other instances, costs were transferred from direct to indirect labor, thereby spreading costs from one program to all programs, but at a lesser amount.

Cost transfers had been made on seven of the eight programs we reviewed. As can be seen by the table below, three of the programs had cost transfers exceeding $100,000. Approximately 300 cost transfers involving labor and material costs were made in fiscal year 1974.

	Amount of transfers		
End item nomenclature	Debit	Credit	Total
5-ton wrecker	$150,569	$50,365	$100,204
M-88 recovery vehicle	170,522	-	170,522
M113A1 APC	3,427	742	2,685
3/4-ton Dodge engine	28,231	810	27,421
10-ton truck	-	-	-
1790 6A engine	810	4,494	3,684
5-ton M/F engine	244,232	-	244,232
5-ton gas engine	15,103	30,794	15,691

Some of the journal vouchers examined had no supporting documentation attached showing the reason for the transfer or how the amount transferred was computed. A statement such as, "Review of material cost, down time and waiting parts has been made and correction/adjustments as indicated above should be accomplished," does not constitute adequate justification for cost transfers unless supported. We believe this is especially true when the transfer is from one commodity command customer program to another; for example, a transfer from a vehicle maintenance program to an armament subsystem. An Army Maintenance Staff official said they authorized program cost transfers only in conjunction with detailed and good justification.

Although such cost transfers may keep programs within funded limits, they also effectively negate the value of depot cost records in terms of measuring cost performance on completed programs and planning and scheduling future work.

CONCLUSIONS

RRAD can improve depot maintenance operations by exercising more stringent controls over the receiving, storing, issuing, and recordkeeping of repair parts for maintenance programs.

The depot is transferring costs between maintenance programs in such a manner that makes it difficult to measure actual maintenance costs. Accurate cost accounting is

important for future programs, as well as for current programs.

RECOMMENDATIONS

We recommend that the Secretary of the Army improve depot maintenance operations at RRAD by:

--Placing increased emphasis on management of repair parts for maintenance programs. Better management should include safekeeping of the repair parts until they are used, as well as recording issue transactions as they occur.

--Maintaining cost integrity for programs worked. Accurate cost accounting should depict cost overruns, as well as experience data for future programs.

We also recommend further that the Secretary review maintenance procedures at other Army maintenance depots to insure that the same deficiencies outlined above are not occurring.

CHAPTER 4

VEHICLE REPAIR AND OVERHAUL PROCESSING

The Army has a policy, as outlined in Technical Bulletin 750-98-23, that restricts expenditures for repair or overhaul to no more than 65 percent of the vehicle's standard cost.

We reviewed this policy as well as other depot maintenance operations policies at RRAD to see if there were areas for improvements. We believe improvements in these areas can be made.

PRODUCTION COUNT IRREGULARITIES

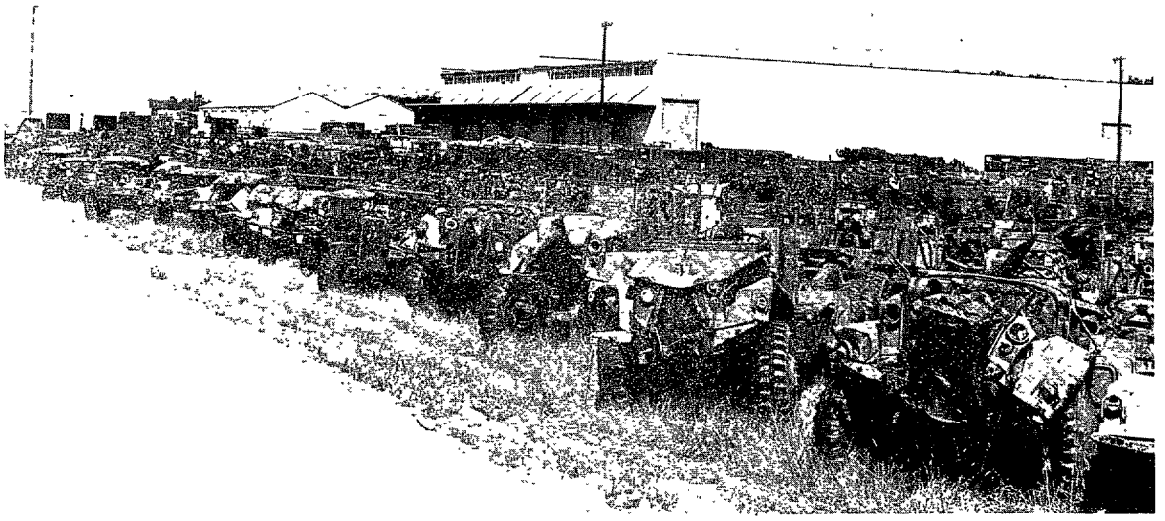
Most mechanical components, such as engines, transmissions, and drive trains, are removed from vehicles before their repair or overhaul processing. Pictures on page 12 show examples of vehicle conditions while being stored and immediately before processing. These vehicles are disassembled and routed to component processing lines where they are rebuilt with similar or like items for specific maintenance programs or depot supply programs. Pictures on pages 13 and 14 show engines and component parts being disassembled and reassembled.

Production reports on repair of these components do not always agree with end-item quantities. For example, we reviewed the production reports for the 5-ton wrecker overhaul program. Major end-item components were stripped from each of the 89 wrecker vehicles and processed to coincide with vehicle final processing. There should have been 89 of each component. Instead there were 94 engines disassembled, 73 engines reassembled, and 60 engines dynamometer tested. There were also processed 96 crankshafts, 72 transmissions, 78 radiators, and 84 engine blocks. Similar discrepancies were noted in production reports for rebuilt tires, as shown below.

Rebuilt Tires For 5-Ton Wreckers

Dismounted	Repaired	Remounted	Required for program
1,014	992	1,137	979

Shop personnel said some items are repaired on the assembly line or obtained from storage and not reported.

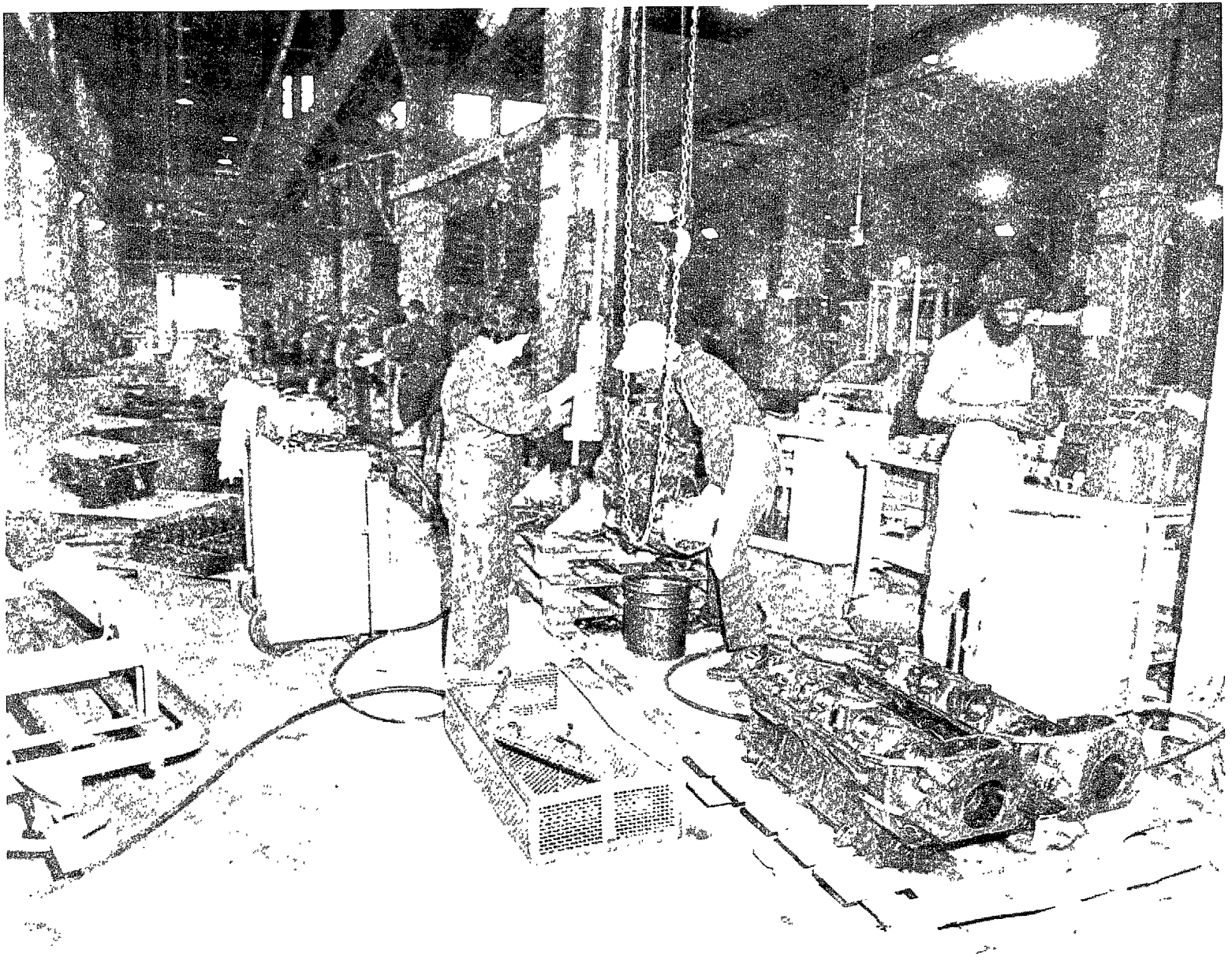


U.S. ARMY PHOTOGRAPH

Ten-ton trucks in storage before maintenance

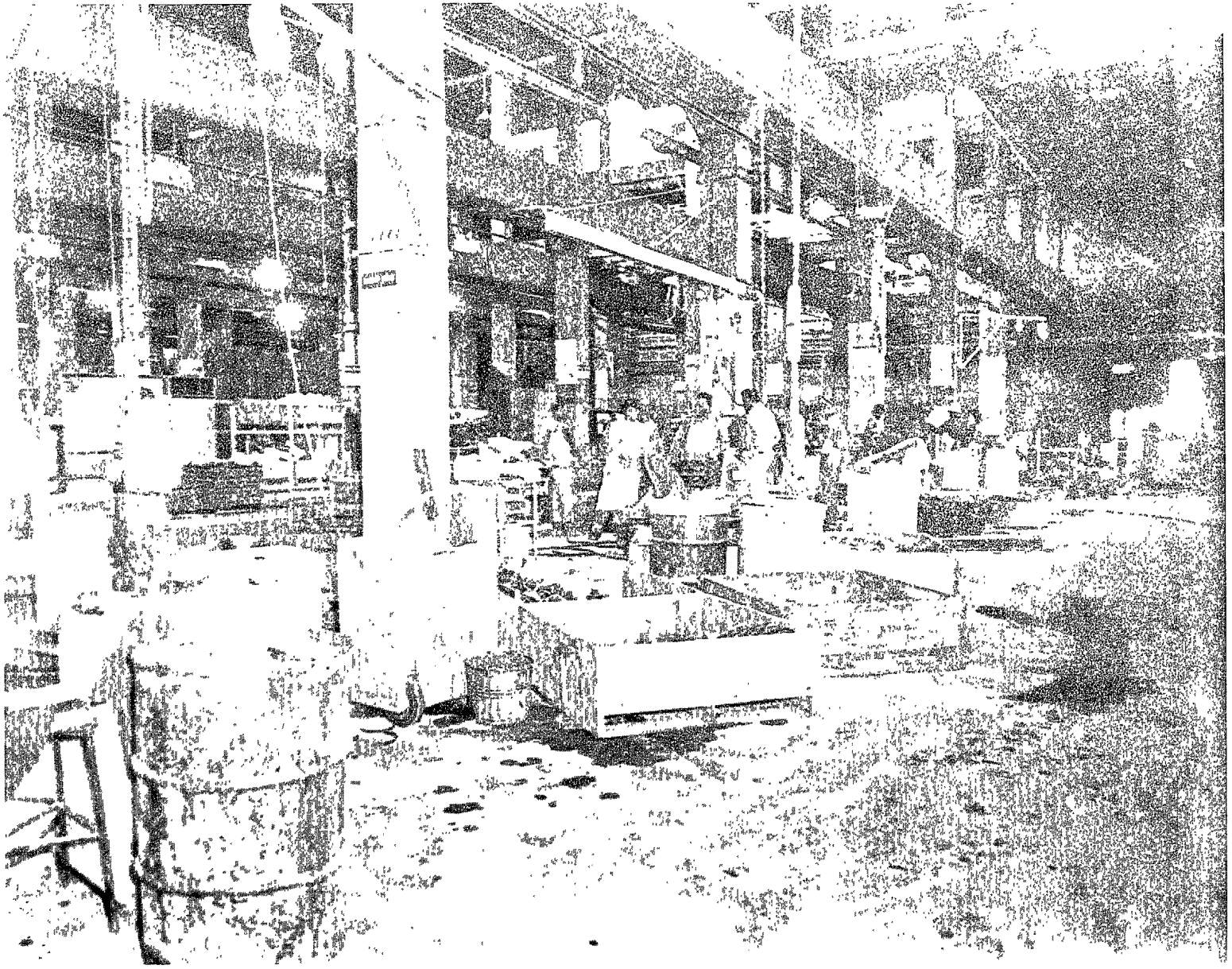
U.S. ARMY PHOTOGRAPH

Five-ton trucks in storage before maintenance



U.S. ARMY PHOTOGRAPH

Engine disassembly area



U.S. ARMY PHOTOGRAPH

Engine disassembly area

Based on the above production reports, apparently some repaired items were counted more than once and some were not counted at all. The reports would also lead one to believe that more engines were disassembled than were available.

Regarding the rebuilt tires, the vehicle has 11 wheels, including the spare. Therefore the program required 979 tires. Thus, as previously stated, production is being reported more than once, or incorrectly reported.

RIGID QUALITY CONTROL PROCEDURES

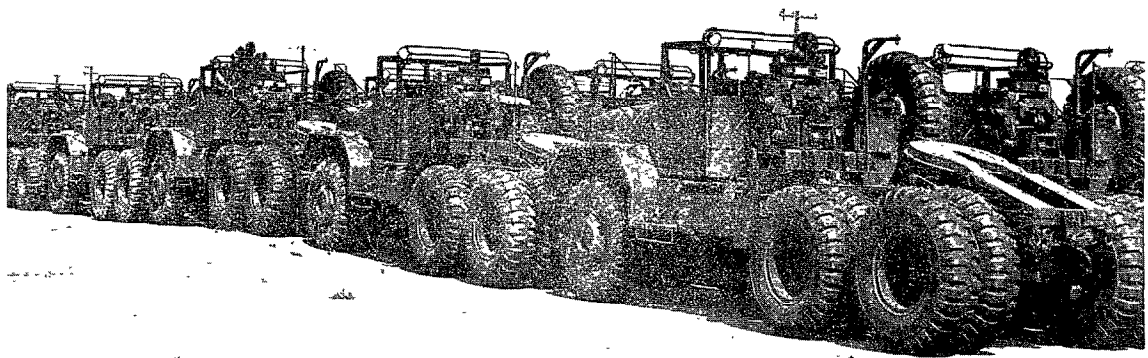
After the maintenance production process, quality assurance personnel make their inspection to insure that required work was done. The picture on page 16 shows a 10-ton truck awaiting quality assurance inspection. If these personnel are satisfied that quality work has been done, the vehicles are stored in open depot storage locations as shown on page 16.

For various reasons vehicles were rejected for either mechanical or nonmechanical defects. Many of these defects were minor and had little to do with the vehicles' safety aspects.

The table below shows some of the minor defects, and the action taken to correct them for the 11 5-ton wreckers we reviewed.

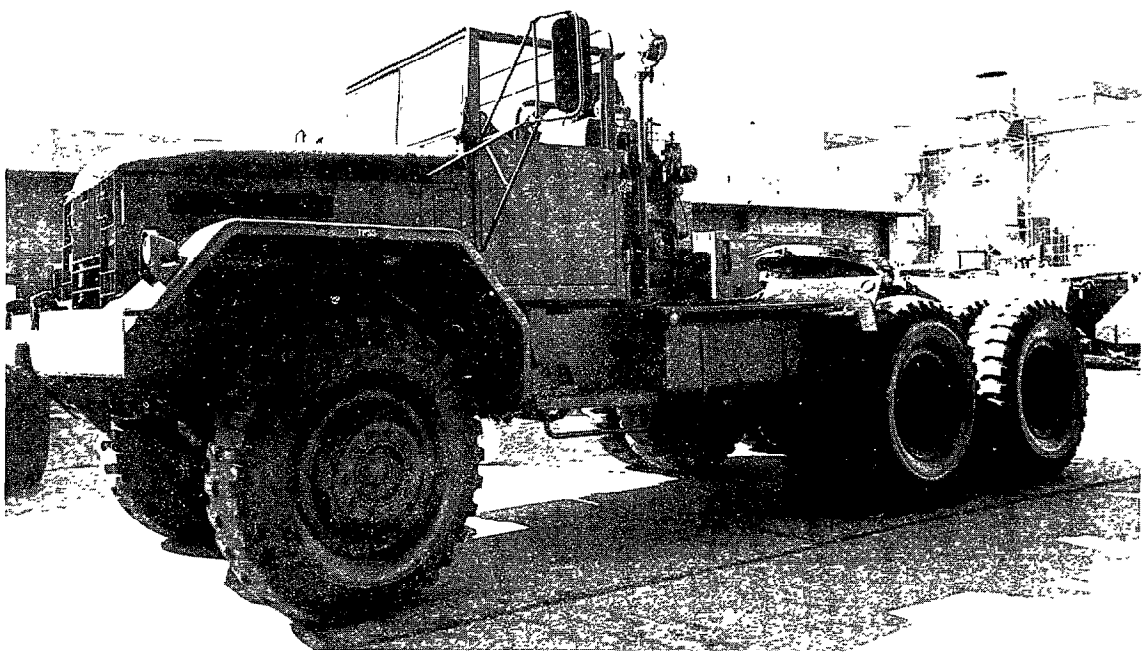
Defects	Corrective action taken
Grease on boom	Removed
Scaley paint on mud guards	Removed
Grease on boom operator's cab	Removed
Uneven coat underside of fenders	Painted
Touch-up underside of cab	Painted
Uneven coat on spare wheel bracket	Painted
Scaley paint on boom cable hook	Removed
Rust inside map compartment box	Removed
Touch-up under dash	Painted
Overspray on brake lining	Removed
Touch-up bracket on cab floor board	Painted
Paint underside of left cab door	Painted

Since this program involved equipment for U.S. Forces, some of the rejection actions were overly stringent. During fiscal year 1974, $824,000 was spent to correct rejects of this nature.



U.S. PHOTOGRAPH

Ten-ton truck awaiting inspection



U.S. ARMY PHOTOGRAPH

Ten-ton truck tractors in storage after overual

VEHICLE REPAIR EXCEEDING REPAIR OR OVERHAUL COST LIMITATIONS

In reviewing the completed 5-ton wrecker program, we found that repair costs exceeded the repair expenditure limit. The repair expenditure limit for this vehicle is $16,019; however, the computed cost for repairing each vehicle was about $18,000. On the basis of original cost estimates, this program had an overrun of approximately 20 percent. The repair expenditure limit for the 10-ton truck tractor is $22,895. Although this vehicle was still undergoing maintenance, the computed repair cost was running about $35,000 as of November 1974. This program, although only 15 percent complete, was operating at about 94 percent overrun on cost and 46 percent overrun on staff-hours.

Further analysis of the 5-ton wreckers revealed that all the vehicles had been classified as economically reparable when received. However, when comparing the average actual repair cost to the average estimated repair cost of $9,799, as recorded by supply quality control on initial inspection reports, the cost escalation is 83 percent. If the original estimated repair cost of each vehicle was escalated by this amount, estimates on 73 vehicles would have exceeded the repair expenditure limit.

We also reviewed the M113A1 armored personnel carrier and M88 recovery vehicle programs and found that these programs were also exceeding the estimated bid cost and unit acquisition costs.

Some of the programs that were exceeding the repair limitations were in early production stages and could have been brought back in line with estimated and repair limitation costs before the programs were completed.

However, the completed 5-ton wrecker program that exceeded the repair limitation costs after completion should have had specific Army approval.

CONCLUSIONS

In reviewing depot maintenance procedures at RRAD we found that:

--Components for repair and supply programs were not adequately controlled since they were often counted more than once or not at all.

--Many of the quality assurance rejections were for minor defects that did not affect the equipment's safety aspect.

--RRAD exceeded the funding limitation on equipment repaired without specific Army approval.

RECOMMENDATIONS

We recommend that the Secretary of the Army require RRAD to:

--Improve its controls over components for various maintenance programs during production.

--Review its overhaul standards to insure that an acceptable overhaul or repair standard is not exceeded for equipment for U.S. Forces.

--Obtain specific approval for repairing or overhauling equipment exceeding funding limitations.

CHAPTER 5

SCOPE OF REVIEW

We reviewed the production activities of a depot maintenance activity which is responsible for repairing and overhauling major end-items--combat and tactical vehicles for the Army.

We examined agency records, held discussions with responsible officials, and obtained copies of pertinent documents. Although our major review efforts were concentrated at the depot, limited reviews of the other agencies associated with depot operations were made to follow through on selected maintenance programs. The activities reviewed follow.

U.S. Army Tank-Automotive Command, Warren, Michigan
U.S. Army Major Item Data Agency, Chambersburg, Pennsylvania
Red River Army Depot, Texarkana, Texas

PERFORMANCE EFFECTIVENESS RATIOS FOR SELECTED REPAIR PROGRAMS

Program	Earned hours	Category 1 and 2 hours	Performance effectiveness
5-ton Wrecker, M5 43A2	42,792	50,121	85%
Recovery vehicle, M 88	112,615	138,316	81
Carrier, M113A1	46,342	68,677	67
10-ton truck tractor M123AIC	2,762	5,483	50
Engine, 3/4-ton Dodge	37,475	48,525	77
Engine, 1790-6A, M88	53,056	68,525	77
Engine, 5-ton M/F, LDS465	50,926	59,984	85
Engine, 5-ton gas M54	23,136	30,601	76
Total	369,104	470,232	78%

PRINCIPAL OFFICIALS OF THE DEPARTMENT OF DEFENSE AND THE DEPARTMENT OF THE ARMY RESPONSIBLE FOR ADMINISTERING THE ACTIVITIES DISCUSSED IN THIS REPORT

	Tenure of office From	To
DEPARTMENT OF DEFENSE		
SECRETARY OF DEFENSE:		
James R. Schlesinger	July 1973	Present
William P. Clements, Jr., (acting)	Apr. 1973	July 1973
DEPUTY SECRETARY OF DEFENSE:		
William P. Clements, Jr.	Jan. 1973	Present
Kenneth Rush	Feb. 1972	Jan. 1973
ASSISTANT SECRETARY OF DEFENSE (INSTALLATIONS AND LOGISTICS):		
Dr. John J. Bennett (acting)	Apr. 1974	Present
Arthur I. Mendolia	Apr. 1973	Mar. 1974
DEPARTMENT OF THE ARMY		
SECRETARY OF THE ARMY:		
Martin R. Hoffmann	Aug. 1975	Present
Howard H. Callaway	May 1973	July 1975
Robert F. Froehlke	July 1971	May 1973
UNDER SECRETARY OF THE ARMY:		
Norman R. Augustine	May 1975	Present
Herman R. Staudt	Oct. 1973	Apr. 1975
Thaddeus R. Beal	Mar. 1969	July 1971

APPENDIX II

	Tenure of office	
	From	To
DEPARTMENT OF THE ARMY (cont.)		
ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS AND LOGISTICS):		
Harold L. Brownman	Oct. 1974	Present
Edwin Griener	Aug. 1974	Sept. 1974
Edwin Griener (acting)	May 1974	Aug. 1974
Vincent P. Huggard (acting)	Apr. 1973	Apr. 1974