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WASHINGTON, D.C. 20548

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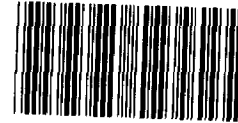
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LOGISTICS AND COMMUNICATIONS  
DIVISION

B-200456

SEPTEMBER 29, 1980

The Honorable Clifford L. Alexander, Jr.  
The Secretary of the Army



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Dear Mr. Secretary:

Subject: [Problems With Commercial Vehicles When Used  
In Tactical Environments] (LCD-80-114)

We have completed our assessment of the Army's use of commercial trucks in tactical environments and found that they were performing tasks for which they were not intended or designed. As a result, mechanical problems are limiting the vehicles' durability, performance, and availability. Most of the problems noted could have been avoided or eliminated if the Army assigned commercial vehicles as intended--selectively to units that infrequently operate in combat support environments.

SCOPE OF REVIEW

We made this study to determine (1) how commercial vehicles assigned to tactical units were used and (2) how the vehicles performed in tactical areas. Our findings are based on information obtained at the Department of the Army Headquarters, Washington, D.C.; the Army Tank-Automotive Materiel Readiness Command (TARCOM), Warren, Michigan; the Army Training and Doctrine Command, Fort Monroe, Virginia; and Army installations at Fort Bragg, North Carolina, and Fort Hood, Texas.

Our review covered the M-880/890 series commercial 1-1/4-ton cargo trucks assigned to tactical units. At Fort Bragg and Fort Hood, we obtained users' opinions on the operational value of the vehicles and their driveability, durability, and maintainability; reviewed user readiness and maintenance records; and evaluated the physical condition of the vehicles. We also reviewed TARCOM's April 1980 assessment report on commercial vehicle performance.

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ARMY'S EXPANDING USE OF  
COMMERCIAL VEHICLES

During 1971-72 the Army conducted an analysis of its wheeled vehicle fleet (referred to as the wheels study) and concluded that commercial vehicles could be substituted, if done selectively, for military design vehicles without adversely affecting combat capability. The objective of commercialization was to avoid procuring high cost, military-designed vehicles when commercial vehicles possess acceptable characteristics and capabilities.

The M-880/890 series trucks, which the Army began buying in 1976, is an application of this approach, as is the M-900 series--10-, 15-, and 20-ton trucks--which the Army recently started to acquire. The M-880/890 trucks were brought into the Army as replacements for the military designed M-37 3/4-ton and M-715 1-1/4-ton vehicles that were assigned to units that operated between division and brigade rear units. The M-37 and M-715 vehicles that were assigned to units that operated in rough terrain environments were to be replaced by a high mobility designed vehicle, such as the M-561 Gama Goat.

This action stemmed from the wheels study analysis which showed that a commercial vehicle could satisfy the requirements of the M-37 and M-715 vehicles assigned to units that operated infrequently in rough terrain areas. The wheels study stated that the commercial vehicles could basically be used over selected terrain with the preponderance of movement on primary and secondary roads. The study recommended that the Army authorize a 1-1/4-ton commercial vehicle (M-880/890 series) for all 1-1/4-ton applications, other than those requiring a high mobility vehicle.

The Army's Materiel Fielding Plan, dated December 1975, and its required operational capability instructions provide details to installations on the use, mission, and logistics support for the M-880/890 trucks. According to these documents, the vehicles are to be used for light ground transport tasks such as command, control and communication, cargo and personnel transport, and movement of medical casualties.

The required operational capability instructions advise that the commercial vehicles in performing their tasks be used infrequently over rough terrain in support of units that habitually operate in combat support environments. The fielding

plan notes that the commercial vehicles have lighter gauge metal and other inherent characteristics which limit their use.

The Army assigned the commercial M-880/890 trucks to tactical and nontactical units as replacements for the M-37 and M-715 vehicles on a one-for-one basis. The assignment of commercial trucks to units that operate in rough terrain contributed significantly to the mechanical problems the vehicles are incurring. The Army has about 34,400 M-880/890 commercial trucks assigned to its active and reserve units.

COMMERCIAL VEHICLES NOT INTENDED  
FOR CONTINUOUS TACTICAL USE

Users told us that the commercial vehicles were adequate and performed well when operated as intended--on hard surface roads for light transport purposes. However, we found that tactical units at two installations were extensively operating most of their M-880/890 trucks in off-the-road environments, for which the vehicles were not designed. Also, the units were using the trucks to haul and pull cargo that exceeded their maximum weight capacity.

As mentioned earlier, the M-880/890 trucks were to be used infrequently over rough terrain in support of units that habitually operate in combat support environments. However, these trucks replaced the military designed M-37 and M-715 vehicles which were used and designed for the rough terrain. Many of the replaced vehicles were assigned to tactical units that operated on rough terrain. For instance, we found the tactical units at Fort Bragg and Fort Hood used their M-37 and M-715 primarily in off-the-road environments. These units should have received high mobility type vehicles to replace their M-37 and M-715 vehicles.

Army officials told us that because the Army did not have enough Gama Goats or other high mobility type vehicles to replace all of the M-37 and M-715 vehicles that operated in rough terrain, the M-880/890 commercial trucks were assigned as substitutes.

✓ A recent TARCOM assessment of M-880/890 truck performance concluded that the commercial vehicles performed well when used as intended. However, the vehicles' performance in off-road areas was reduced. The assessment was made by asking selected units for their opinion of vehicle performance. Fort Bragg and Fort Hood were not included in the assessment.

Details of our visit to the two Army installations and TARCOM's assessment are discussed below.

#### VISIT TO ARMY INSTALLATIONS

Fort Bragg and Fort Hood had 710 and 850 M-880/890 trucks, respectively. We reviewed tactical units at Fort Bragg and Fort Hood that had a large number of these trucks. These units operated mainly in rough terrain areas and at one time had the M-37 and M-715 vehicles.

Comments by user personnel and our observations and review of maintenance records identified recurring design and mechanical problems that limited commercial trucks' durability, performance, and availability. Most of the personnel at the tactical units said the body construction of the vehicles was too weak to withstand the rough terrain environments. For instance, the trucks' cargo beds and body welds came loose or cracked from the frame, thus requiring extensive reinforcement.

At a Fort Bragg unit, the cargo beds and body welds had been reinforced twice in the last 3 years. Also, the vehicles' rear bumpers had been damaged and were falling off which required straightening or replacement.

These problems were caused by driving the vehicles over rough terrain and by overloading the vehicles. The vehicle's maximum payload capability is 2,500 pounds and its towing capacity is 3,000 pounds. Some of the equipment that the vehicles hauled, especially the communications shelter kits, weighed over 2,900 pounds.

At Fort Bragg, a unit recently sent a deficiency report on the communications shelter weight problems to TARCOM. The report explained the hazards of hauling such cargo. This unit requested that its commercial vehicles be replaced by a truck designed for adverse terrain use.

Personnel at Fort Hood told us that their commercial 880/890 trucks also pulled cargo that weighed over 3,000 pounds. In addition, these trucks had excessive damage to the body (fenders, doors, front bumpers, tail gates, grills, and hood) that required straightening or replacement. Most of the trucks were rundown because they are made of light gauge sheet metal which damages easily, especially when used in rough terrain environments.

We noted other problems with the commercial trucks:

- Springs, axles, and shocks were too weak to withstand continuous off-road use.
- Cross-members (located underneath the engine to protect against transmission damage) were damaged when the vehicle was used where the ground clearance was too low.
- "U" joints could not withstand excessive movement over rough terrain that had chuck holes.
- Tires were not sufficient for off-the-road use.

In addition to the above problems, the commercial vehicles needed frequent maintenance and repairs to keep them operational. Motor pool personnel complained that the maintenance problems resulted from the type of use and environments the vehicles were subjected to. Some of the problems motor pool personnel revealed and their maintenance records supported include:

- Leaks in the master cylinder, transmission, exhaust system, and transfer cases.
- Frequent brake work. Brakes were replaced or repaired every 2,000 or 3,000 miles.
- Frequent tune-ups. Vehicles that averaged 1,200 to 2,000 miles during a 12-month period required two and three tune-ups.
- Frequent breakdowns of differentials and transmissions. Since January 1980, the transmission on eight different trucks has been overhauled or replaced. The vehicles had between 7,500 and 20,000 miles on their original transmissions.

- Engine parts (camshaft, lifters, and valves) wear out easily and have to be replaced or adjusted.
- Frequent replacement of canvas tops. The canvas tops on eight vehicles had to be replaced three times in the past 15 months.
- Constant replacement of electrical system parts (battery, alternator, ignition switch, ballast resistor, starter, and fuses). Since 1976, 129 vehicles at Fort Bragg have had their batteries replaced at least twice. These batteries had a 48-month warranty but lasted only 18 to 24 months.

The above problems have affected the vehicles' operational readiness. For example, for the second quarter of fiscal year 1980, the operational readiness rates reported for M-880/890 vehicles averaged 74 percent, versus the Army's standard of 89 percent.

User and maintenance personnel told us that commercial vehicles performed adequately when used on hard surface roads. However, the personnel stated that most of the body damage and mechanical problems occurred when vehicles were used in off-the-road environments.

#### TARCOM ASSESSMENT OF THE M-880/890 COMMERCIAL TRUCKS

In April 1980 TARCOM issued a report on its assessment of the M-880/890 commercial trucks. The report was based on a questionnaire sent to Army units in the United States, Europe, and Korea and National Guard units. It asked for comments on such matters as vehicle performance, logistics support, operational readiness, technical support, and needed equipment improvement.

A total of 153 units responded and reported on a number of problems with the M-880/890 commercial truck. They ranged from a weak frame and suspension system to steering gear failures, electrical system failures, fragile cargo covers, tire failures, and vehicles requiring too much maintenance. Many users commented that when the vehicle was used as intended, performance was satisfactory. However, when the vehicle was used in rough terrain, the body construction was too light to withstand the punishment.

The following are some statements made by units replying to the questionnaire.

- "The M-880 series vehicles do not hold up well to punishment and have a basic shortcoming in their application to field operations."
- "When used as intended, performance is satisfactory. However, lack of sufficient tactical design vehicles forces M-880 series use in terrain for which vehicle is not suited. Body construction is too light for rough terrain use."
- "Performance of the M-880 series vehicles is more than adequate when used on hard surface. However, performance is very limited when used in an off-the-road service."
- "Subject vehicle performs adequately in a garrison environment but does not perform adequately on rough terrain."
- "Past problems have included cargo beds coming loose, and the welds on the entire front bodies of the vehicles have needed rewelding after use."

These comments are similar to those heard during our visits to Fort Bragg and Fort Hood.

#### RECENT ARMY ACTIONS

We discussed our findings with various Army officials, and they agreed that the current M-880/890 commercial trucks are not durable or adequate for extensive off-the-road use.

Army headquarters officials advised us that in May 1980 the Army initiated a study of wheeled vehicles assigned to tactical units. The study, which is to be completed by May 1981, is to determine the kinds and number of vehicles which will best meet current, as well as future, needs of tactical units. They explained that many of the Army's vehicles, including the M-880/890 series commercial vehicles, were approaching their age/retirement criteria without adequate programs for replacement.

The existing M-880/890 fleet will reach its age/retirement criteria in fiscal year 1984. The problems discussed in this report should assist the study group in determining future commercial vehicle requirements for tactical use.

CONCLUSIONS AND RECOMMENDATIONS

Many of the Army's 880/890 commercial trucks are not being used as intended. The Army assigned these vehicles to units that used them for tactical, rather than commercial, purposes. Both our review and the findings of TARCOM's questionnaire assessment show that commercial trucks encounter recurring body and mechanical problems when used in an off-the-road environment. These problems affect the vehicles' durability, performance, and availability. As a result, the Army's efforts to keep the vehicles operational is extraordinary.

The recent Army study should address the kinds of problems discussed in this report that occurred when vehicles not designed for off-the-road use were assigned to units that habitually operated in such environments.

We recommend that you develop a vehicle replacement program, using study results, to match vehicle acquisitions and assignment with the environment in which the vehicles will be used.

As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement of actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee 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 Defense; and the Chairmen of the above-mentioned committees.

Sincerely yours,



R. W. Gutmann  
Director