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Report to Secretary, Department of the Army; by Robert G. Rothwell (for Fred J. Shafer, Director, Logistics and Communications Div.).

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In 1972, the Department of Defense (DOD) issued a directive requiring the military services to establish work measurement systems for real property maintenance based on engineered performance standards and to prepare timely and meaningful reports for evaluating performance. The use by the U.S. Army in Europe (USAREUR) of its work measurement system for real property maintenance was reviewed at two installations. At the two military communities, engineered performance standards were being used for less than half of the maintenance and repair workload. In some instances, the communities were using non-engineered performance standards, but many of these standards were inaccurate and improperly applied. The Army has specific guidelines for using work measurement data to evaluate the efficiency of its maintenance operations. At the two facilities, internal controls were inadequate to insure that labor hours were correctly reported. USAREUR's work measurement system has not provided the benefits such systems offer for evaluating the performance and improving the productivity of the work force. The Secretary of the Army should require USAREUR to: establish appropriate controls over the recording of estimated hours and actual hours of maintenance work orders; and compile, summarize, and analyze the productivity data in evaluating work performance. (RRS)

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

LOGISTICS AND COMMUNICATIONS DIVISION

B-163762

FEB 16 1978

The Honorable
The Secretary of the Army

Dear Mr. Secretary:

We have reviewed the use by the U.S. Army in Europe (USAREUR) of its work measurement system for real property maintenance. Our objective was to see if the work measurement system had provided the benefits such a system offers for evaluating the performance and improving the productivity of the work force. We made our review at USAREUR headquarters, Heidelberg, Germany; the headquarters of VII Corps, Stuttgart, Germany; and the Army communities located at Stuttgart and Augsburg, Germany.

In 1972 the Department of Defense (DOD) issued a directive requiring the military services to establish work measurement systems for real property maintenance based on engineered performance standards and to prepare timely and meaningful reports for evaluating performance. Although the Army required implementation of this requirement, it exempted USAREUR from using engineered performance standards. We found that USAREUR's work measurement system consisted of a variety of engineered and non-engineered standards which were of little value. Even though some work measurement data was being reported by the communities, USAREUR did not use it for evaluating work force performance.

BACKGROUND

USAREUR manages over 260 million square feet of building space, plus roads, airfields, and other property at over 800 installations, all with a combined replacement value estimated at about $22.6 billion. About 90 percent of the installations are located in Germany.

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In fiscal year 1976, USAREUR employed over 14,000 persons and spent about $526 million to operate and maintain real property. About $221 million of this amount was for maintenance and repair. USAREUR officials estimate that the documented and reviewed backlog of maintenance and repair work was about $296 million in May 1977.

Real property maintenance budget limitations make it essential that Government agencies obtain maximum productivity from resources. A work measurement system is one way of insuring this.

The essential ingredients of a work measurement system are adequately maintained engineered performance standards, properly applied standards for planning and estimating work, useful work measurement data, and effective use of the data to evaluate and improve the performance of real property maintenance operations. A weakness in any one of these areas could adversely affect the entire system, which would result in less than optimum benefits.

DOD has required the military services to use work measurement systems in real property maintenance since 1955, and in March 1972, DOD issued a directive requiring them (1) to establish systems using engineered performance standards for estimating labor requirements and for scheduling work and (2) to prepare timely and meaningful reports for measuring and evaluating performance.

In our report "Major Cost Savings Can Be Achieved By Increasing Productivity In Real Property Management" (LCD-76-320, Aug. 19, 1976), we pointed out that the military services had some serious problems in systems for measuring and evaluating how productive their labor forces were in real property maintenance. We stated that the services' work measurement systems were seriously deficient because

--the engineered performance standards were allowed to deteriorate and become obsolete,

--performance standards were used very little, or not at all, for estimating costs and scheduling work,

--work measurement data was not adequately compiled and analyzed to identify and correct the causes of differences between actual performance and standard work performance, and

--management was not required to use productivity data in preparing budgets and in allocating resources.

INCONSISTENT USE OF PERFORMANCE STANDARDS

Proper use of engineered performance standards in estimating how much time a project should take is critical for an effective work measurement system. As stated in our August 1976 report, both the managers of the non-Federal systems we reviewed and the various consultants we contacted stressed that these standards must cover about 75 to 80 percent of the work to provide consistent and meaningful work measurement data. Otherwise, the basis for making accurate estimates and analyzing the actual efficiency of the work force is not valid.

At the two military communities we visited, engineered performance standards were being used for less than half the maintenance and repair workload. In some instances the communities were using non-engineered performance standards, but many of these standards were inaccurate and improperly applied.

Engineered standards were not applied to either maintenance and repair work under service orders or preventive maintenance, but were sometimes applied to maintenance and repair work under job orders. As shown below, job orders represented only 38 percent of the total maintenance and repair work from July through September 1976.

Community	Total workload hours	Job orders	
		Hours	Percent of total
Augsburg	68,600	34,600	50
Stuttgart	79,900	22,200	28
Total	148,500	56,800	38

To measure the use of engineered standards for job orders, we reviewed a selection of completed orders. As shown below, engineered standards were not used for much of the work under these job orders.

Community	Number of job orders	Total labor hours	Engineered standards used	
			Hours	Percent of total
Augsburg	17	820	344	42
Stuttgart	50	5,546	158	3
Total	67	6,366	502	8

The two military communities did use other performance standards for estimating how much time a job should take. These non-engineered performance standards were not consistently applied. They were based on Army non-engineered standards, locally developed standards, and even personal judgment. This use of inconsistent standards makes it virtually impossible to compare the performance of the work force.

Also, the time to complete projects was overestimated because the standards were inaccurate and were sometimes improperly applied. Following are some of the problems caused by using non-engineered standards.

--The communities used Army non-engineered standards for 17 recurring maintenance and repair tasks which we reviewed. A comparison with the engineered standards showed that the non-engineered standards allowed, on the average, 6 percent more time to complete the tasks.

--Communities developed local standards using past performance records instead of work sampling surveys--a technique which statistically measures the amount of time it should take to perform a task.

Why engineered performance standards were not implemented

When DOD reemphasized in 1972 that the military services establish work measurement systems based on engineered performance standards, the Army exempted USAREUR from using engineered performance standards because local national

estimators could not understand the English-written standards and had to be trained in the use of the engineered standards.

The engineered performance standards fill 32 volumes of Army technical manuals, which include narratives, charts, and tables. Currently, the Army's Office of the Chief of Engineers plans to have the engineered performance standards translated into German and metric by a German industrial engineering society, at no cost to the Army. The society will translate those standards which have been updated or are current and will translate other standards as they are updated. When the standards are translated, the Army will remove the exemption for USAREUR.

The Army also has trained in the United States two local national engineers in the application of the standards. These engineers will instruct other nationals in applying the standards.

LACK OF CONFIDENCE IN WORK MEASUREMENT DATA

Evaluating actual performance in relation to standards is the very essence of a work measurement system. Analyzing such data can help identify and correct the causes of inefficiencies and thus increase productivity. Because the two USAREUR communities were applying a variety of engineered and non-engineered performance standards, neither had a valid basis for evaluating actual performance. Although performance data on some of the maintenance work was being recorded in the communities, USAREUR officials lacked confidence in its validity and did not use it.

The Army has specific guidelines for using work measurement data to evaluate the efficiency of its maintenance operations. Workers or their supervisors record actual labor hours on maintenance assignments. The guidelines require Army installations to compare actual and estimated performance, and to evaluate the variances when actual hours exceed estimated hours by 10 percent.

At the two military communities we visited, internal controls were inadequate to insure that labor hours were correctly reported. Following are some illustrations.

--At the Stuttgart community, our review of 320 service orders for fiscal year 1976 showed that only 9 orders,

or less than 3 percent, contained data on actual hours. USAREUR officials said that supervisors did not require workers to gather the required information.

--A 1976 VII Corps headquarters' report on a survey of all Corps facilities engineering organizations disclosed that workers recorded the same actual hours as estimated for the jobs to avoid explaining deviations from the estimates.

--A 1976 Army Audit Agency report on the facilities engineering organization at the Augsburg community disclosed that, of 48 work orders reviewed on which estimators used personal experience to estimate the hours needed, 28 showed the same actual hours as the estimated hours. In some instances, the agency noted that maintenance workers had not performed any work on tasks shown on the work orders. The Agency recommended that the community require the units requesting maintenance work to record actual hours, but the community did not implement the recommendation.

--Our review of some work orders for July through September 1976 at the Augsburg community showed that actual hours varied at least 10 percent from the estimated hours on 12 work orders and that the estimated hours were arbitrarily revised by the estimators to agree or nearly agree with the actual hours reported.

CONCLUSIONS

USAREUR's work measurement system has not provided the benefits such systems offer for evaluating the performance and improving the productivity of the work force. The systems we observed at the communities were deficient in the key elements which DOD required of the Army. Moreover, even though some work measurement data was being reported, apparently in compliance with Army guidelines, the data was of little value because of inadequate controls over the actual hours reported.

We believe it is essential that the Army proceed with its plans for translating the engineered performance standards and removing the exemption for USAREUR.

RECOMMENDATIONS

In view of the Army's plans to translate engineered performance standards into German and to train local nationals in applying standards, we are making no recommendations at this time on these problems concerning USAREUR's work measurement system.

We do recommend, however, that the Secretary of the Army

--require USAREUR to establish appropriate controls over the recording of estimated hours and actual hours on maintenance work orders, and

--require USAREUR and its major commands to compile, summarize, and analyze the productivity data in evaluating work performance.

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 taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs 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 Chairmen, House and Senate Committees on Appropriations and Armed Services; the Chairmen, House Committee on Government Operations and Senate Committee on Governmental Affairs; and the Secretary of Defense.

Sincerely yours,

R. G. Rothwell

for F. J. Shafer
Director