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INITIAL ASSESSMENT OF MAINTENANCE TRAINING OF ARMY
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**INITIAL ASSESSMENT OF MAINTENANCE TRAINING
OF ARMY RESERVE COMPONENTS**

John Metzko

February 1987

Prepared for
Assistant Secretary of Defense
(Reserve Affairs)

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This report is a preliminary examination of maintenance training for the Army reserve components (RCs) to identify area(s) for analysis. Two options are indicated for improving maintenance training in the Army RCs: (1) regional training centers such as those included in the Army's recently-introduced Regional Maintenance Training Sites (RMTS) Program and (2) new training technology to provide maintenance training at the Guard armories and Reserve centers. A mix of hands-on training with RMTS simulators and almost-hands-on training that interactive video equipment could bring to the local armories and centers should be considered to improve Army RC maintenance training.				
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John Metzko

February 1987



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FOREWORD

This document is one of four reports on work performed by the Institute for Defense Analyses for the Office of the Assistant Secretary of Defense (Reserve Affairs) since August 1985 under Task Order T-M2-266, "Reserve Component Training Technology." While the task is concerned with the reserve components (RCs) of all the Services, our effort to date has been focused on the Army Guard and the Army Reserve.

The first report, IDA Paper P-1971, "Army Reserve Component Training Technology, A Progress Report" (1987), (1) describes the methodology of our investigation of Army RC training, (2) presents a statistical description of the environment for that training, and (3) provides other information that we expect to be useful in our continuing look at the Army RCs.

The second report, IDA Paper P-1972, "Training State of a Group of Army Combat Service Support Units (U)," (1987), is an assessment of the state of training of Guard and Reserve units that perform combat logistics functions, i.e., maintenance and movement of equipment, supplies, and personnel; it is the only one of the four reports that is classified (confidential).

An evaluation of tank gunnery devices is described in our third report, IDA Paper P-1973, "Simulation Trainers for Tank Gunnery," (1987).

This fourth report, IDA Memorandum Report M-255, is a preliminary examination of Army RC maintenance training to identify area(s) for analysis.

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I. THE PROBLEM

Reserve component (RC) soldiers who perform maintenance work on trucks, armored vehicles, helicopters, electrical and electronic equipment, and weapons of all kinds are nearly as numerous as maintenance personnel in the Active Army. Table 1 indicates that the total authorized strength devoted to maintenance in the RCs is 89,000 while the Active Army is authorized 101,000 maintenance personnel.

Although not a comprehensive survey, discussions during the past year with numerous Army officers,¹ who had RC experience, gave this investigator an impression of generally poor quality maintenance training in RC units. A concurrent investigation of the state of training of five combat service support branches (viz., Composite Service, Logistical Command, Ordnance, Quartermaster, and Transportation), which include most of the soldiers who perform maintenance work, the principal causes of training deficiencies were found to be lack of TOE² equipment and lack of skilled personnel (Ref. 1).³ The results came from an analysis of the Army's UNITREP⁴ data. While lack of training devices was not found to be an explicit training deficiency, the results of that investigation suggest that maintenance

¹ At Headquarters, Department of the Army; the Training and Doctrine Command; the Army Training Support Center; and the National Guard Bureau.

² TOE = table of organization and equipment.

³ A "branch" is an arm or service of the Army; a career management field (CMF) is a cluster of related Military Occupation Specialties (MOSs). Maintenance personnel are parts of both the branch and the CMF systems for personnel accounting and administration.

⁴ UNITREP = Unit Status and Identity Reporting System.

**TABLE 1. AUTHORIZED STRENGTHS OF MAINTENANCE
CAREER MANAGEMENT FIELDS**

Career Management Field ^a	Component ^b		
	Active	Guard	Reserve
23 Air Defense Systems Maintenance	2,655	66	7
27 Land Combat and Air Defense Intermediate Maintenance	4,589	838	83
28 Aviation Communications Electronics System Maintenance	1,927	692	250
29 Communication-Electronics Systems Maintenance	11,579	3,536	1,749
33 Electronic Warfare/ Intercept System Maintenance	1,493	33	167
63 Mechanical Maintenance	62,204	50,785	20,430
67 Aircraft Maintenance	16,754	8,484	2,326
Totals	101,201	64,434	25,012

^a CMFs identified in June 1985 update of Army Regulation 611-201.

^b Enlisted strengths for 30 September 1985 from Ref. 2.

simulators would be a useful substitute for TOE equipment--for improving the state of training but somewhat less for improving unit readiness to perform operational missions.

In our initial investigation of the Army RC training environment, we found the dominant characteristic to be a dispersion of many small training target populations. To illustrate, let's consider MOS 63B1, which is a skill level 1 Light Wheel Vehicle Mechanic¹--one of 30 MOSs that make up CMF 63, Mechanical Maintenance. The following tabulation compares the number of stations² and their average 63B1 populations in the three Army components (from Ref. 3). These statistics illustrate a marked contrast between training target populations--concentrated in the Active Army and dispersed in the RCs.

Component	Total MOS 63B1 Authorized Strength	Number of Stations	Average 63B1 Population Per Station
Active	10,521	60	175
Guard	8,529	737	12
Reserve	4,222	515	8

¹The skill level identifies the level of qualification in the total MOS. There is a direct relationship between grade and skill level (sl): sl 1 ~ E3 and E4; sl 2 ~ E5; sl 3 ~ E6; sl 4 ~ E7; and sl 5 ~ E8 and E9.

²"Station" means Guard armory or Reserve center.

II. POTENTIAL SOLUTIONS

Our prior analysis of the capabilities and costs of interactive video and telecommunications indicates that these technologies would be especially well suited for Army RC training; these technologies can deliver high-quality, individualized, standardized training to geographically dispersed locations (Ref. 3). Interactive video, the product of merging video and the microcomputer, can show step-by-step servicing and repair processes with detailed two or three-dimensional graphics that depict a training object from any view. Feedback and control capabilities of interactive video systems can give the viewer the perception of active participation in the servicing or repair process, even though he or she controls the training device but not the training object.

With telecommunications, expert, charismatic instructors could--live or by tape-- simultaneously teach several dispersed groups. Arrangements could be made for student-instructor interaction as in the Army's "School of the Air" concept.

In recognition of the need to improve year-round training of combat service support units, the Army initiated action over two years ago to develop a regional training center concept (Ref. 4). Each center would house appropriate devices and simulators for hands-on maintenance training. During the past year that concept has been transformed into the Regional Maintenance Training Site (RMTS) Program, whose objective is to provide fully trained maintenance units that are capable of performing wartime missions. The Program is expected to provide individual training, sustainment training, and transition training (on new systems) for the 22 MOSs listed in

Table 2 at 19 sites indicated in Table 3. These 22 MOSS constitute the training requirement for "standard" RMTS. Another dozen MOSS will be trained at two sites equipped for "high-tech" training (9 of the first 22 MOSS are also considered "high-tech"; their training will be provided by standard RMTS).

TABLE 2. MOSSs TO BE TRAINED
UNDER RMTS PROGRAM^a

A. Standard RMTS^b

27E TOW/Dragon Repairer
31E Field Radio Repairer
41C Fire Control Instrument Repairer
43M Fabric Repair Specialist
44B Metal Worker
44E Machinist
45B Small Arms Repairer
45G Fire Control System Repairer
45K Tank Turret Repairer
45L Artillery Repairer
52C Utility Equipment Repairer
52D Power Generator Equipment Repairer
52F Turbine Engine Driven Generator Repairer
62B Construction Equipment Repairer
63B Light Wheel Vehicle Mechanic
63G Fuel and Electrical Systems Repairer
63H Track Vehicle Repairer
63J Quartermaster and Chemical Equipment Repairer
63W Wheel Vehicle Repairer
76C Equipment Records/Parts Specialist
76P Materiel Control/Accountability Specialist
76V Materiel Storage and Handling Specialist

B. High-Tech RMTS

26C Target Acquisition/Surveillance Radar Repairer
29J Teletype Equipment Repairer
29M Tactical Satellite/Microwave Repairer
29N Telephone Center Office Repairer
31J Teletype Repairer
34L Field Artillery Digital Systems Repairer
34T Tactical Computer Systems Repairer
34Y Field Artillery Fire Direction Center Repairer
35E Special Electronic Devices Repairer
36L Transportable Electronic Switching Systems Repairer
41B Topographic Instrument Repair Specialist
41E Audio-Visual Equipment Repairer

^a Source: Ref. 5.

^b Following MOSSs will receive high-tech training at standard RMTS: 31E, 41C, 44B, 44E, 52C, 52D, 76C, 76P, and 76V.

TABLE 3. PROPOSED REGIONAL MAINTENANCE TRAINING SITES

1. Fort Dix, NJ
2. Fort Hood, TX
3. Fort Bragg, NC
4. Fort Devens, MA
5. Fort McCoy, WI
6. Camp Shelby, MS
7. Capt Roberts, CA
8. Fort Custer, MI
9. Fort Indiantown Gap, PA
10. Camp Blanding, FL
11. Fort Stewart, GA
12. Weldon Springs, MO
13. Camp Ripley, MN
14. Camp Dodge, IA
15. Fort Riley, KS
16. Gowen Field, ID
17. Fort Ruger, HI
18. Aberdeen Proving Ground, MD
19. Fort Chaffee, AR
20. Tobyhanna Army Depot, PA
21. Sacramento Army Depot, CA

III. ANALYSIS NEEDED

In sizing the RMTS Program, the Army selected existing bases that were reasonably accessible to large numbers of RC units. After assigning units to these sites, a cluster analysis of MTOEs¹ and MOSs determined the target populations for each supporting site. The Army currently estimates that a total of 32,274 soldiers in 22 MOSs (indicated in Table 2) will be trained at 19 standard RMTS installations and 2091 soldiers in 12 other MOSs will be trained at the two "high-tech" RMTS facilities (viz., Tobyhanna and Sacramento Army Depots).

The overall training requirement to be accommodated by the RMTS Program appears to have been sized by the expected funds available to build and operate RMTS facilities and to transport RC users to the sites. A logical question at this point is: How many RC soldiers with the relevant MOSs will not receive RMTS training? A query of the Army's PERSACS² data base indicates in Table 4 that, based on end-of-FY 1986 authorized strengths, the number is about 52,000.³ Thus, 60 percent of the relevant maintenance personnel in the Guard and the Reserve are outside the RMTS Program.⁴

¹ MTOE = modified table of organization and equipment.

² PERSACS = Personnel Strength and Composition System.

³ Total population of 86,351 (Table 4) minus RMTS training load of 34,365.

⁴ PERSACS data base for end-of-FY-1986 indicates two MOSs indicated in Table 2, viz., 31E and 31J, are obsolete.

**TABLE 4. TOTAL POPULATIONS OF MOSs
RELEVANT TO RMTS PROGRAM^a**

A. Standard RMTS

MOS	Army Component		
	Active	Guard	Reserve
27E	1,182	787	42
41C	379	369	71
43M	253	501	568
44B	1,344	1,463	755
44E	836	760	401
45B	469	390	148
45G	251	183	30
45K	1,364	1,024	177
45L	432	332	97
52C	1,823	1,138	686
52D	7,142	4,586	2,510
52F	131	5	26
62B	4,007	4,251	2,838
63B	17,698	13,800	6,898
63G	869	877	188
63H	5,410	4,641	1,140
63J	1,422	1,174	879
63W	3,749	3,678	841
76C	6,944	5,203	2,349
76P	5,580	3,625	2,551
76V	6,386	3,983	6,937
Totals	67,671	52,770	30,132

^a Source: Ref. 6.

TABLE 4. CONTINUED

B. High-Tech RMTS

MOS	Army Component		
	Active	Guard	Reserve
26C	236	291	177
29J	1,116	536	264
29M	545	329	170
29N	994	553	140
34L	63	18	37
34T	34	0	27
34Y	249	217	44
35E	360	319	181
36L	370	12	31
41B	31	35	9
41E	25	35	24
Totals	4,023	2,345	1,104
Grand Totals ^b	71,694	55,115	31,236

^b Standard RMTS plus High-Tech RMTS.

And, thus, a useful study would consider alternatives for training those soldiers of the MOS populations that will not be affected by RMTS. The alternatives are (1) expanding the RMTS Program and (2) using new training technology to provide maintenance training at the Guard armories and Reserve centers. But rather than consider these alternatives only for those maintenance personnel who are currently outside the RMTS Program, a more useful study would consider a mix of hands-on training with RMTS simulators and almost-hands-on training that interactive video could bring to the local armories and centers for all relevant MOSs.

REFERENCES

1. "Training State of a Group of Army Combat Service Support Units (U)," IDA Paper P-1972, February 1987 (CONFIDENTIAL).
2. Data Printouts from the Army's Personnel Strength and Composition System (PERSACS) for 30 September 1985.
3. "Army Reserve Component Training Technology, A Progress Report," IDA Paper P-1971, January 1987.
4. Letter, ATTG-P, HQ TRADOC, 27 August 1984, subject: Army Action Plan for Reserve Component Training.
5. Letter, DAMO-TRI, HQ Department of the Army. 4 September 1986, subject: Regional Maintenance Training Site (RMTS) In-progress Review, 26 August 1986.
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