

CHAPTER 6

BDAR PROCEDURES

BDAR procedures apply at all levels from crew through DS maintenance, depending on the extent of the damage, time available, skills required, parts, components, tools, and materials available. Within these limits, each maintenance level will act rapidly to restore the vehicle to the combat-ready condition required to continue the mission.

Crew/operator BDAR kits consisting of essential tools and materials should be carried on board each vehicle to enable the crew to fix the simplest and most common types of damage and random failures rapidly.

PRINCIPLES OF BDAR

To be effective, BDAR should follow certain guiding principles. Remember standard maintenance is the first choice. Decisions on BDAR versus standard maintenance will normally be based on availability of parts and METT-T.

ACCURACY OF BDA

BDA is the necessary first step. If not done correctly, time, manhours, and parts will be wasted. The objective of BDAR is to get a system safely back into operation quickly. The assessment determines the extent of damage as well as the time and materials required for repair.

ECONOMY OF MAINTENANCE EFFORT

Maintenance assets will be heavily taxed on the battlefield. The shortages of people, tools, and parts

make it vital that maintenance resources are not wasted.

MULTIFUNCTIONAL SKILLS MUST BE TRAINED

Personnel shortages and battlefield casualties mandate that maintenance team members have some knowledge of each other's jobs. Lack of knowledge or lack of key repairmen must not deter a team from performing battlefield repair. Whenever possible, cross training of personnel should be done.

REPAIR ONLY WHAT IS NEEDED

The old saying "If it ain't broke, don't fix it" applies here. On the battlefield, the objective is to get the system back into the battle with enough capability to get the job done.

Cosmetic repair is not necessary and is a waste of time. Good looks are wasted on the enemy.

BE FLEXIBLE

Priorities of repair; lack of personnel, parts, and time; a chaotic battlefield; change of mission; lack of

a weapon systems crew, and a host of unforeseen circumstances demand a flexible approach to BDAR. It is possible that specific repair techniques may not be in manuals. Ingenuity must be the byword of the soldier doing BDAR.

BASIC RULES OF ASSESSMENT

THINK SAFETY!

Personnel must be on the lookout for fuel/oil spills, damaged electrical cables and wires, live/loaded ammunition, and damaged weapons and ammunition. Look for unexploded ordnance in the area. Do not move or otherwise disturb unexploded ordnance or any ammunition which has been fixed, armed, ignited, or involved in an accident until qualified personnel have rendered it safe. When possible, use EOD personnel to make this determina-

tion. Check the area for chemical contamination when appropriate, such as damage from unknown enemy weapons. Check the area for possible depleted uranium contamination, (radiac meter) such as from damaged ammunition or armor that contains depleted uranium.

All practical efforts should be made to avoid environmental contamination spills of fuel or oil of over one gallon should be reported through the chain of

command to the unit's logistical element, such as the batallion S4.

BEWARE OF BOOBY TRAPS!

If equipment was abandoned in enemy territory and was unsupervised by friendly forces, the possibility of booby traps is high.

THE SENIOR MAN PRESENT DECIDES WHEN AND IF TO DO BDAR

His decision is based on what resources are available (tools, personnel, parts), the time available, and the tactical situation.

DO ASSESSMENT FIRST

Do not attempt to operate systems or subsystems until an assessment has been made. Further damage to equipment or personnel may result.

In the forward battle area, it is imperative that the crew attempt to move the vehicle to a covered or concealed position to prevent additional damage. This is the first priority. If the vehicle is not capable of self-recovery, use any vehicle, including other combat

vehicles, to recover the vehicle or to conceal it. If this is not possible, then turn the turret (if the vehicle is so equipped) in the direction of engaging fire in order to limit damage and return fire. BDAR assessment forms are provided in BDAR TMs to permit a systematic assessment by crew and maintenance personnel. Assessment checks include:

- Inspecting damaged parts and systems. Performing a self-test.
- Making tests with organizational test equipment, if required.
- Performing additional vehicle operational tests, if necessary.

Based on the METT-T, the MT using this information will--

- Determine what must be repaired or replaced.
- Determine sequence and priority of repair actions.

TABLE 6-1. SUMMARY OF BDAR TIME GUIDELINES

LOCATION	ELEMENTS PERFORMING BDAR	TIME (IN HOURS)
Breakdown Site	<ol style="list-style-type: none"> 1. Operator/Crew 2. Co/Bn Maint TM 3. DS MST from Fwd Spt Co 	2
Battalion Trains (UMCP)	<ol style="list-style-type: none"> 1. Bn Maint Plt 2. MST from Fwd Spt Maint Co 3. MST from Maint Bn 	6
Brigade Support Area (BSA)	<ol style="list-style-type: none"> 1. FSB Maint Co 2. MST from Maint Bn 3. MST from COSCOM 	24
Division Support Area (DSA)	<ol style="list-style-type: none"> 1. Maint Bn 36 2. MST from Corps Support Command (COSCOM) 	
COSCOM	<ol style="list-style-type: none"> 1. COSCOM Maint Co 	96

- Estimate repair times for each repair task.
- Total the repair task times if the repairs can be performed in the time available.

Determine repair location and, if other than on site, arrange for recovery of the vehicle to the repair site. See Table 6-1.

Make the following safety checks to identify any obvious hazards:

- Is there an ammunition round in the tube?
- Are any ammunition rounds in a critical state due to shock, fire, or physical damage?
- Have any combustibles such as fuel, hydraulic fluid, or oil accumulated?
- Does wiring appear to be safe? Could arcing to stored ammo or leaking combustibles occur?

- Is the fire-extinguishing system operational? If not, station a crew member in the vehicle, either with a hand-held fire extinguisher or prepared to operate the on-board fire extinguishing system manually. Station a second crew member outside the vehicle with the other fire extinguisher and be prepared to actuate the engine compartment fire extinguisher manually.

For systems with built-in, self-test procedures, perform a functional/operator test on those systems which appear undamaged.

THE VEHICLE COMMANDER

The vehicle commander will report the results of the crew/operator damage assessment to the platoon leader. He will name the major known causes of the vehicle's immobility and/or lack of firepower. If repair by crew is possible, he will report a total estimated repair time and what functions may be restored.

THE PLATOON LEADER

The platoon leader will respond with directives and, if required, will call a Company Maintenance Team to the location of the damaged vehicle for assistance. If possible, he will provide sufficient information to enable the CMT to bring any needed repair parts, special tools, or recovery assets to the site.

THE CREW

The crew, if directed shall proceed to make any possible field-expedient repairs to restore firepower, communications, and/or vehicle mobility to the limit of their skills, materials, and tools available.

MAINTENANCE PROCEDURES AND BDAR

The operator/crew makes the initial damage assessment and reports to the platoon leader. They describe the inoperable conditions to include NBC condition and circumstances. When the inoperable equipment is subjected to or in danger of hostile fire, another vehicle can be used to recover it to a secure location. The operator/crew makes an estimate of the situation and what maintenance support is required. Self-recovery, BDAR, and other technical assistance are considered as options. If repairs are

beyond their capability, they must request assistance as per unit SOP.

If this is not possible, a recovery vehicle may need to be employed or BDAR techniques used. Equipment that is damaged, but mobile, may be used to move disabled equipment. If recovery vehicles are not available, and as the tactical situation permits, like vehicles may be used to recover disabled equipment (that is, an M1A1 towing an M1A1).

When the platoon/section leader determines that repairs are beyond the crew/operator capability, he will contact the company executive officer or first sergeant. That person in turn will contact the BMO or maintenance sergeant, who will dispatch an MT or MST. Organizational maintenance personnel will assess the equipment to verify the operator/crew's assessment of damage. Based on the MT assessment, the decision will be made to attempt an on-site repair or to request recovery assets to move the vehicle to a forward maintenance collection point. Repair time guidelines will determine whether on-site repair or evacuation is necessary.

Unit and DS repair teams will perform BDAR, using approved ground vehicle BDAR kits and any other field-expedient material on hand. Since standard maintenance repairs usually offer the best repair, maintenance personnel will strive to perform such repair if time, resources, and the tactical situation permit.

If all critical repairs can be made within the available time with the skills, materials, tools, and equipment at hand, the MT, assisted by the crew, will

proceed with the on-site repair. If the damage exceeds the repair capability of the MT, and time is available for a Maintenance Support Team on-site fix, the MT will call the MST.

If time for an MST on-site fix is not available, but the vehicle is repairable, the MT will recover the vehicle to a designated collection point.

If the vehicle is not repairable, the MT will provide--

- Recovery to a maintenance collection point for evacuation to the rear.
- On-site stripping (cannibalization), if approved by the commander and coordinated with support maintenance.
- Other needed replacement parts.
- If the vehicle is contaminated, the MT will mark the vehicle with contamination markers and arrange for recovery to a decontamination site.

RECORDING BDAR REPAIRS

Attach a DD Form 1577 (or similar conspicuous tag) to all vehicle components (Figure 6-1) which are repaired using BDR or other expedient techniques. It is not necessary to fill out the form. The purpose of marking the parts is to enable mechanics to recognize them quickly when the equipment is subsequently returned for permanent repair, if required.

Since it is impractical to attach tags to expediently repaired parts located on the outside of the vehicle, note the fix on a DD Form 1577 or similar tag. Store this tag in the compartment normally reserved for the equipment record folder.

Place a tag conspicuously in the vehicle commander or driver position when a BDAR procedure has resulted in a degraded operating capability. Mark this tag "BDAR," and note its specific limitations or cautions.

When a component is cannibalized from a reparable vehicle, attach a tag in the space created

WARNING Unauthorized persons removing, affixing, or tampering with this tag will be punished under Article 134, UCMR, or Article 134, USC (1341), one year or both.	NSN, PART NO. AND ITEM DESCRIPTION		UNSERVICEABLE (CONDEMNED) TAG-MATERIEL	
	SERIAL NUMBER, LOT NUMBER		INSPECTION ACTIVITY	CONDITION CODE
	UNIT OF ISSUE	QUANTITY	REASON OR AUTHORITY	
	REMARKS		INSPECTOR'S NAME OR STAMP AND DATE	

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Figure 6-1. DD Form 1577

by the missing part and near the master power switch to alert downstream repair personnel readily that the part has been removed.

When the vehicle is recovered/evacuated for permanent "standard" repair, and DA Forms 2404 (Figure 6-2) and 2407 (Figure 6-3) are used, add the notation "BDAR" in the space provided for description of deficiencies.

Communication Damage Report Form, DA Pam 738-750, Maintenance UPDATE, (refer to Figure 1-1) provides for disposition of DA Form 2404 and Copy 3 of DA Form 2407 (Figure 6-3). When "BDAR" is noted on these forms, mail them to:

**Survivability/Vulnerability
Information Analysis Center,
WL/FIVS/SURVIAC,
BLDG 45,
2130 8th Street,
Suite I,
Wight Patterson AFB,
Dayton, Ohio 45433-7542.**

The information on these forms will provide data for designing vehicles to be less susceptible to combat damage and easier to repair when damaged.

BATTLEFIELD DAMAGE ASSESSMENT AND REPAIR FORMS

This section illustrates and describes the forms used in BDA. These forms are designed to assist personnel in rapidly assessing battlefield damaged

**BY RECORDING BDAR REPAIRS,
DATA CAN BE ACCUMULATED TO
HELP DESIGN VEHICLES LESS
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DAMAGE AND EASIER TO REPAIR
WHEN DAMAGED**

ASSESSING BATTLEFIELD DAMAGE
SYSTEM ASSESSMENT SUMMARY

Can Vehicle Be Repaired? - Recovery Status

Yes No SERIAL NO. _____

1. Vehicle Status

Move _____ Self Recover Yes No
 Shoot _____ Can be Towed
 Communicate _____ Transportable

2. Sub System Estimated

	Repair	Recover	Limitations	Time	Personnel
Engine	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
Transmission/Final Drive	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
Fuel System	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
Electrical System	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
Track & Suspension	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
Hydraulic System	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
Armor & Ammunition Storage	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
Armament & Fire Control	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
Communication	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
Other	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
			Total	_____	_____

3. Material Requirements

	Expendables	Parts	NSN	Tools	NSN
1	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____
5	_____	_____	_____	_____	_____

4. Remarks

Figure 6-4. System Assessment Summary Form

equipment, systematically assessing equipment to determine which subsystems are affected, and the time, personnel, and materials required for repair.

These forms will also assist in performing "vehicle triage." Vehicle triage is a system of deciding in which order battlefield damaged equipment will receive repair. This determination is based on time, urgency, material, and personnel required to accomplish the repair.

The forms illustrated are to be used in assessing battlefield damage (Figures 6-4 through 6-8). Assessment forms can be found in all BDAR TMs.

NOTE: These forms can be reproduced locally.

BDA forms are designed to ensure that all necessary aspects of combat capability are evaluated during assessment.

All assessment procedures follow this sequence:

- Inspect (repair, if necessary).

COMMUNICATIONS DAMAGE REPORT			
ESTIMATED TOTAL TIME _____			
NO OF MECHANICS _____			
Exchange Parts	NSN	Cannibalized Parts	NSN
1 _____	_____	1 _____	_____
2 _____	_____	2 _____	_____
3 _____	_____	3 _____	_____
4 _____	_____	4 _____	_____
	Time	Personnel	
1 Intercom	_____	_____	
2 Receiver/Transmitter	_____	_____	
3 Antennas	_____	_____	
4 AM 1780	_____	_____	
5 Security	_____	_____	
6 Cables	_____	_____	
7 _____	_____	_____	
8 _____	_____	_____	
Total	_____	_____	

Figure 6-5. Communications Damage Report Form

TURRET DAMAGE REPORT				Serial No	
Estimated Total Time					
No Mechanics					
Exchanged Parts	NSN	Cannibalized Parts	NSN		
1 _____	_____	1 _____	_____		
2 _____	_____	2 _____	_____		
3 _____	_____	3 _____	_____		
4 _____	_____	4 _____	_____		
Electrical System Ch. 8	Time	Personnel	Hydraulic Systems Ch. 8	Time	Personnel
1 Turret Power	_____	_____	1 Aux Hydraulic Pump	_____	_____
2 Striping	_____	_____	2 Hydraulic Fluid	_____	_____
3 Circuit Breakers	_____	_____	3 Hydraulic Reservoir	_____	_____
4 Network Box	_____	_____	4 Tubes & Hoses	_____	_____
5 Wiring Harnesses	_____	_____	5 Accumulator	_____	_____
6 _____	_____	_____	6 _____	_____	_____
7 _____	_____	_____	7 _____	_____	_____
Total	_____	_____	Total	_____	_____
Armor & Ammo Storage Ch. 9	Time	Personnel	Fire Control Ch. 10	Time	Personnel
1 Blow off Plates	_____	_____	1 CMDR Control Handle	_____	_____
2 Ammo Storage Racks	_____	_____	2 GPS Extension	_____	_____
3 Ammo Ready Rack	_____	_____	3 CMDR Weapon Sight	_____	_____
4 _____	_____	_____	4 Gunners Primary Sight	_____	_____
5 _____	_____	_____	5 Gunners Aux Sight	_____	_____
Total	_____	_____	Total	_____	_____
Armament Ch. 10	Time	Personnel	Calculation (MMS)	Time	Personnel
1 Bow Evacuator	_____	_____	7 Calculator (MMS)	_____	_____
2 Gun Tube	_____	_____	8 Stabilization System	_____	_____
3 Breech Group	_____	_____	9 Cross Wind Sensor	_____	_____
4 Main Gun Mount	_____	_____	10 Wiring Harness	_____	_____
5 _____	_____	_____	11 Gunners Control Handle	_____	_____
6 _____	_____	_____	12 Manual Traversing & Elevation	_____	_____
Total	_____	_____	13 Loaders Panel	_____	_____
			14 Blasting Machine	_____	_____
			15 _____	_____	_____
			Total	_____	_____

Figure 6-6. Turret Damage Report Form

HULL DAMAGE REPORT

Estimated Total Time _____ Serial No. _____
 No. of Mechanics _____

Exchange Parts	NSN	Cannibalized Parts	NSN
1 _____	_____	1 _____	_____
2 _____	_____	2 _____	_____
3 _____	_____	3 _____	_____
4 _____	_____	4 _____	_____
5 _____	_____	5 _____	_____

Engine System Ch.3		Transmission & Final Drives Ch.4		Fuel System Ch.5	
Time	Personnel	Time	Personnel	Time	Personnel
1 Starter _____	_____	Transmission will not shift _____	_____	Fuel Tanks _____	_____
2 Engine Excrter _____	_____	Broken Linkage _____	_____	Fuel Lines _____	_____
3 Oil Tank _____	_____	Tank Will Not Start _____	_____	Fuel Filters _____	_____
4 Air Induction System _____	_____	Final Drive Locked _____	_____	Fuel Pumps _____	_____
5 Pre Cleaner _____	_____	Transmission Leaks _____	_____	_____	_____
6 Air Cleaner _____	_____	Parking Brakes _____	_____	_____	_____
7 Oil Filter _____	_____	Service Brakes _____	_____	_____	_____
8 Fuel Nozzle _____	_____	Oil Coolers _____	_____	_____	_____
9 Low Oil Pressure _____	_____	_____	_____	_____	_____
10 Drain Valve _____	_____	_____	_____	_____	_____
11 Accessory Drive Shaft _____	_____	_____	_____	_____	_____
12 Combuster Drain Valve _____	_____	_____	_____	_____	_____
13 Electronic Control Unit _____	_____	_____	_____	_____	_____
14 _____	_____	_____	_____	_____	_____
15 _____	_____	_____	_____	_____	_____
16 _____	_____	_____	_____	_____	_____

HULL DAMAGE REPORT CONTINUED

Electrical System Ch.6		Track Suspension Ch.7	
Time	Personnel	Time	Personnel
1 Wiring Harness _____	_____	1 Compressing Idlers _____	_____
2 Spring _____	_____	2 Track Adjusting Link _____	_____
3 Batteries _____	_____	3 Road Wheel Arms _____	_____
4 Circuit Breakers _____	_____	4 Roadwheels _____	_____
5 Power Distribution Box _____	_____	5 Support Rollers _____	_____
6 _____	_____	6 Sprockets _____	_____
7 _____	_____	7 Shock Absorbers _____	_____
8 _____	_____	8 Torsion Bars _____	_____
9 _____	_____	9 Track Assembly _____	_____
10 _____	_____	10 _____	_____
11 _____	_____	11 _____	_____
Total _____	_____	Total _____	_____

Hydraulic System Ch.8		Other	
Time	Personnel	Time	Personnel
1 Hydraulic Lines _____	_____	1 Drivers Controls _____	_____
2 Hydraulic Manifold _____	_____	2 Drivers Instruments _____	_____
3 Hydraulic Fluid _____	_____	3 _____	_____
4 Hydraulic Reservoir _____	_____	4 _____	_____
5 Accumulator _____	_____	5 _____	_____
6 Auxiliary Pump _____	_____	Total _____	_____
7 Hydraulic Pump _____	_____	_____	_____
8 _____	_____	_____	_____
9 _____	_____	_____	_____
Total _____	_____	_____	_____

Figure 6-7. Hull Damage Report Form

- Functionally test (repair, if necessary).
- Assess the performance.

The assessment and field fixes will enable the vehicle to continue the mission or self-recover. They will typically be more useful to the MT/MST for scheduling and accomplishing both BDAR "quick fixes" and fix-forward repairs. BDA will provide the commander with the necessary information for timely decisions on whether to continue to "fight the vehicle" or recover it at the appropriate level.

Report battlefield damage in accordance with local SOP.

The System Assessment Summary Form is used to determine the following:

- Are the vehicle's systems operable?
- What subsystems are affected?
- Is the damage reparable?

- If reparable, are there limitations?
- What is the estimated repair time?
- What is the estimated number of personnel needed to effect repair?
- What materials are required?
- Recovery status. (Is a recovery vehicle required or can the vehicle self-recover?)

BDAR AND RECOVERY IN SPECIAL OPERATING ENVIRONMENTS

FMs cover doctrinal information in special operating environments. BDAR techniques will be more difficult in certain environments, such as cold climates. For example, certain molecular compounds may be difficult to apply in a cold environment. The instructions for these compounds specify special operating conditions for their use.

BDA will be used to determine the time required to repair a system, and whether repairs can be done on site or if recovery is necessary. Whenever possible, standard maintenance repairs should be attempted. If that is not possible, then BDR is applied to allow equipment to self-recover or continue the mission even though it may be at a reduced level of capability. Upon completion of the mission and at the first practical opportunity, more complete, standard repairs will be undertaken to return the equipment to as fully mission capable status as possible. Whether to use cannibalization or controlled exchange is a decision made by the commander owning the equipment.

Supervised battlefield cannibalization and controlled exchange may be employed when parts are not available. Conditions for cannibalization are usually strictly controlled by local policy and will be employed when addressed in an operations order by higher headquarters.

Cannibalization is the authorized removal of serviceable and unserviceable parts, components, and assemblies from materiel authorized for disposal. One

possible source of cannibalization is captured or abandoned enemy equipment.

Controlled exchange is the removal of serviceable parts, components, and assemblies from unserviceable, economically repairable equipment. These parts are for immediate use in restoring a like-item of equipment to a combat capable or serviceable condition. Cannibalization and controlled exchange can be done only when authorized by the commander.

BDAR IN JOINT OPERATIONS

Army units can expect to deploy as a component of a joint force. Army maintenance personnel should work closely with other services to make collective use of tools and supplies to perform BDAR. Despite differences in equipment and doctrine, there is much that the services have in common and can be shared. Navy Seabees, Air Force maintenance activities, and most Navy ships have a machine shop fabrication capability that would prove useful in supporting Army units. Prior joint-service agreements should be developed to make use of this capability between the

services. The same cooperation can be developed with allied nations. Most armies have a BDAR program. Much of their tools, materials, and techniques are similar to our own. In addition, some foreign armies use our equipment, especially vehicles, and are a possible source for repair parts if cannibalization is allowed by the host nation. Host nation agreements should outline what BDAR and other maintenance services can be provided and the procedures for obtaining support.

BDAR TOOLS AND EQUIPMENT

TACOM and Aviation Logistics Support Command have developed a variety of repair kits specifically designed for BDAR. Appendix A lists the various components of current ground repair kits. The ground kits were designed as stand-alone kits to allow a mechanic to perform BDAR without access to other tools. These kits will be allocated to MTs and MSTs. Aviation kits will be restricted to AVUM and AVIM units.

When possible, BDAR should first be performed by the crew using the crew/operator BDAR kit BII, COEI, AAL, and ESM list. Maintenance personnel will have access to the same items available to the crew as well as unit/DS BDAR kits, unit mechanic tools, and DS contact maintenance truck tools. Crew and mechanics are limited only by their imagination and local policy when applying BDAR.

In wartime, BDAR may have to be liberally applied at the direction of the commander. In peacetime, local command policy will direct the degree of BDAR to be applied and when standard maintenance will be used.

Ground Equipment BDAR Kits

BDAR kits were designed to allow repair in several critical areas: fuel, hydraulic, cooling, tires, and electrical systems as well as hull repair. While the contents of BDAR kits vary somewhat, their contents may be broken down into the areas mentioned previously.

Polymer Kit

It is critical to maintain hull integrity, especially during fording operations and when faced with an NBC threat. The super metal and fiberglass kit will ensure hull integrity for small-to-medium-sized holes and can be used anywhere on a vehicle to include radiators and gas tanks. When using this kit, it is important that you relieve water and/or fuel pressure before attempting the repair.

Hydraulic Fittings

The fittings in the BDAR kits enable the mechanic to repair low- and high-pressure lines in wheel and track vehicles. These same fittings can also be used on other ground equipment such as generators and compressors. Using the hacksaw, reamer, wrenches, hydraulic fittings, and extra hose, low- and high-pressure lines can be fixed in a short time. The heavy-duty wrenches in the BDAR kits were intended to act as vises.

Electrical Connectors

Simple electrical repairs can be accomplished with the multimeter, electrical pliers, electrical tape,

connectors, sixteen-gauge wire, and velcro strips and wire ties. A continuity check can be made quickly with the multimeter to check for breaks in electrical wire. The pliers act as a wire cutter, crimper, small bolt cutter, and wire stripper. The velcro and wire ties will hold wire in place during repair. It is important to disconnect vehicle power before working on any electrical wire.

Tire Repair Kit

The tire repair kit will usually be found in the M88 and M2/3 generic kit. The kit includes a hand-insertion tool, hand rasp, tube of cement, and 50 "plug-it" inserts. Fast and efficient tire repair can be accomplished with this kit if the hole was due to a nail or like item. If the tire damage was from shrapnel, a better method of repair (melt plastic from MREs in the hole) will need to be determined.

In peacetime, as a safety precaution, a whole tire should be dismounted and inspected off the wheel to ensure the damage is repairable.

Other Systems

Fuel cell patches are provided to patch holes in fuel tanks. The V-belt is for fan and alternator belts. Unit personnel are encouraged to add other items they feel are needed in their units' kits. Army personnel are only limited by their imagination and unit funding.

Electrical Repair Kit

This kit consists of four component kits (test kit, electrical; repair kit, wire (emergency); kit, wire repair; and electrical kit, maintenance). All four cases contain all the tools, test equipment, and consumable materials necessary to repair more than 85 percent of the connectors used in current Army aircraft.

Fluid Line Repair Kit

The two cases of this kit contain the tools and hardware required to repair more than 86 percent of the fluid lines on current Army aircraft. This kit utilizes flexible 3000 psi hoses, flareless fittings, and reducers.

Fuel Cell Repair Kit

The single case of this kit contains mechanical and rubber/epoxy patches capable of rapidly making temporary fuel cell repairs. The mechanical repair allows for a one-time evacuation flight, while the rubber/epoxy repair allows for 100 flight hours.