



Sgt. Thomas Bruce, the 35th Theater Tactical Signal Brigade motor sergeant, helps with maintenance during his unit's biannual field training exercise at Fort Gordon, Ga., on Nov. 5, 2017. (Photo by Sgt. Victor Everhart Jr.)

The Anatomy of Two-Level Maintenance in Multi-Domain Battle

■ By Brig. Gen. David Wilson

In Multi-Domain Battle (MDB), maintenance will remain the cornerstone of readiness and logistics will remain the muscle that enables the fist to strike. MDB will require the logistics professionals responsible for maintaining the force to master two-level maintenance (TLM) processes. These processes will enable them to maintain forces at the tip of the spear using capabilities that allow them to fix far forward.

To do this, maintainers and logisticians will be required to execute an enterprise maintenance process across five domains (air, land, maritime, space, and cyberspace) that will allow the Army to meet expeditionary, operational, and home-station requirements simultaneously. This process will ensure that maintainers in all components are ready to operate anywhere, anytime, and in any environment.

This will require rigorous training and discipline in maintenance management operations. In order to master TLM, Army organizations and personnel must understand its anatomy.

The Anatomy of TLM

It has now been more than a decade since Army maintenance officially morphed from four levels to two. So what is TLM? Why did we change the maintenance process? What is the standard? Are we spending too much time on maintenance? Are we over-maintaining our equipment?

The TLM system is how the Army delegates the responsibility of specific tasks to ensure weapons and equipment are maintained effectively and efficiently. The system separates Army maintenance into two categories: field-level maintenance and sustainment-level maintenance. Field-level maintenance is an on-system or near-system repair process that returns equipment to the user. Sustainment-level maintenance is an off-system repair process that returns equipment to the supply system.

Implementing TLM reduced the Army's logistics footprint and allowed for a swift maintenance response in any environment. TLM repairs equipment at the point of need. It uses fewer maintenance echelons, which eliminates duplication of work and procedural steps. The result is increased productivity and combat power. The commander's ability to build and preserve combat power in MDB will be enhanced by maintainers' mastery of TLM.

Commanders at all levels are mandated by Army Regulation (AR) 750-1, Army Materiel Maintenance Policy, to maintain equipment to the maintenance standards specified in paragraph 3-2. The Army maintenance standard has not changed from when it was first implemented in 1979. It is defined by the equipment's technical manual (TM) 10 series or TM 20 series or technical data plan. What has changed is the echelon at which the standard is achieved.

Field-level Maintenance

Field-level maintenance is performed by individual units, or their supporting units, on their own equipment. Systems are repaired in maintenance facilities, motor pools, mobile shops, or the tactical environment.

Duties for this level of maintenance include approved field-level modification work orders, fault and failure diagnoses, battle damage assessment and repair, recovery, calibration, and replacement of damaged or unserviceable parts and components. Other duties include the manufacturing of critical unavailable parts and inspecting, servicing, lubricating, adjusting, and replacing parts, minor assemblies, and subassemblies.

Two groups perform maintenance actions at the field level: crews/operators and maintainers. Each maintainer is responsible for specific functions at a certain level of maintenance according to a maintenance allocation chart found in the TM for each piece of equipment. All TM

Operators and maintainers must be well-versed in two-level maintenance processes in order to keep pace with the demands of Multi-Domain Battle.

Two-Level Maintenance <i>(Effective 2005)</i>	Four-Level Maintenance <i>(Before 2005)</i>	Maintenance Level	Types of Organization <i>(Not all inclusive)</i>
Field <i>(Includes operator and maintainer levels.)</i>	Operator/Crew	10	All
	Organizational	20	Forward Support Company Field Maintenance Company Support Maintenance Company Logistics Readiness Center
	Direct Support	30	
Sustainment <i>(Includes below depot and depot levels.)</i>	Direct Support	30	Logistics Readiness Center with approval
	General Support	40	
	Depot	50	Army Depots Anniston, Alabama Corpus Christi, Texas Red River, Texas Letterkenny, Pennsylvania Tobyhanna, Pennsylvania

Figure 1. Two-level maintenance realigned maintenance tasks into field-level and sustainment-level maintenance.

10 series and TM 20 series tasks and 70 percent of TM 30 series tasks are aligned under field-level maintenance. (See figure 1.)

For example, a brigade combat team, the Army's primary combat formation, has the full complement of maintenance capabilities within its organic units. If a brigade weapon system is damaged and is repairable using field maintenance, there is no need to evacuate that system to another unit or echelon. The forward support companies and field maintenance company within the brigade support battalion have the ability to do all field-level repairs.

Another example is the combat sustainment support battalion's support maintenance company. Army Techniques Publication 4-93, Sustainment Brigade, says that the support maintenance company provides field maintenance and technical assistance support to echelons-above-brigade units on an area basis.

The support maintenance company's capabilities include communications, electronics, small-arms, radar, and missile repair, welding, fabrication, and recovery assistance to units within its area. When attached to the combat sustainment support

battalion, this unit does not provide sustainment maintenance.

Sustainment-level Maintenance

Some maintenance tasks that had been performed at the unit level were moved to the sustainment level. In fact, 30 percent of TM 30 series and all TM 40 series and TM 50 series tasks are performed at this level.

Sustainment-level maintenance is performed at specific facilities that specialize in national-level maintenance. These facilities include the depots, Army field support brigades, Army field support battalions, and logistics readiness centers when granted authorization from the Army Materiel Command. The sustainment maintenance function can be employed at any point in the integrated logistics chain.

It is important to remember that when equipment is evacuated or sent to a depot facility, a supply transaction takes place. Once the equipment is received, repair or replace tasks are performed by personnel who have higher technical skills using specialized tools and equipment that are not available at the field level. Those tasks in-

clude inspection, test, repair, modification, alteration, modernization, conversion, overhaul, reclamation, and reconstruction of parts, assemblies, subassemblies, components, equipment end items, and weapon systems.

Readiness

Maintenance is the cornerstone of readiness. As long as you are good at maintaining the eight conditions of the maintenance standard described in AR 750-1, you are good at TLM.

Time. Are we spending too much time on maintenance? You be the judge. Before you decide, you have to understand the difference between the TM 10 series and TM 20 series standards.

PMCS. Readiness starts with preventive maintenance checks and services (PMCS). In order to achieve the Army's maintenance standard, every piece of equipment goes through the PMCS process. PMCS starts with the operator, the equipment, and the associated TM. It gives the operator or crew member a checklist that delineates an order of checks and services. Each step is clearly defined and tells the

user what to check, when to check it, and exactly how to check it.

According to TM 10 series manuals, PMCS is conducted before, during, and after any type of movement or use. On the other hand, TM 20 series manuals have the maintainer performing routine quarterly, semiannual, annual, and biennial services.

Both standards require the unit to conduct scheduled services, lubricate equipment, record and report deficiencies and shortcomings, and order replacement parts.

Through the PMCS process, all faults should be identified. Are Soldiers conducting their required inspections before, during, and after use?

Faults. Faults are listed in the equipment's TM, which tells the operator or maintainer if a fault makes the equipment not mission capable (NMC). According to AR 750-1, a fault indicates "that a piece of equipment has a deficiency or shortcoming." A deficiency is "a fault or problem that causes equipment to malfunction. Faults that make the equipment NMC are deficiencies." A shortcoming is "a fault that requires maintenance or supply action on a piece of equipment but does not render equipment NMC." So, deficiencies deadline equipment; shortcomings do not.

Reporting. The key to maintaining readiness is reporting—not just reporting, but reporting accurately and on time. Inaccurate or late reporting leads to limited resources and a false sense of readiness. Poor maintenance supervision contributes to a user's failure to check the condition of equipment and report faults accurately.

Leadership. Where are leaders throughout all of these processes? On the line! The commander's maintenance program is most successful when leaders at all levels are fully engaged. Their involvement in maintenance meetings underscores the principle that maintenance is the cornerstone of readiness and

readiness is a priority.

Complacency is the enemy of leaders, maintainers, and operators alike during routine actions in a non-combat environment. Therefore, a leader's presence on the line is critical to enforce standards of discipline, impart pride in ownership, and keep Soldiers engaged. Soldiers care when they see their leaders care. Is maintenance your priority? If so, it will be theirs.

Over-maintaining equipment. Are we over-maintaining our equipment? No. You can never over-maintain. Perhaps you can over-service. Scheduled and unscheduled maintenance are equally important. The more we touch our equipment, the more likely it is to be ready at a moment's notice.

The hard questions. I encourage you to ask the hard questions. Is my unit really ready? Can I do more? Your involvement is critical to building and preserving readiness.

TLM in MDB

TLM will be required to keep pace with the demands of MDB. When operational readiness rates are consistently above the Army standard, a commander has the flexibility and confidence to act immediately to create and exploit temporary windows of advantage, restore capability balance, build flexible and resilient formations, and alter force posture to enhance deterrence.

It is critical that operators and maintainers be well-versed in TLM processes as the Army begins to incorporate new technology in the maintenance arena. This will enable maintenance formations to preserve weapons and platform security, use condition-based maintenance (CBM) and CBM+, and employ additive and subtractive manufacturing. These promising capabilities will enhance maintainers' ability to support the demands of the warfighter on the multi-domain battlefield.

Emerging weapon systems and platforms demand a systematic approach to ensure security and protection against cyberthreats capable

of limiting, disabling, or destroying weapon systems and platforms.

CBM and CBM+ support predictive maintenance capabilities. According to the CBM+ guidebook, it uses a "systems engineering approach to collect data, enable analysis, and support the decision-making processes for system acquisition, sustainment, and operations."

Additive and subtractive manufacturing, such as 3-D printing and computer numerical control machining, provide unique or low-density parts at the point of need, reduce the demand on the supply chain, address parts obsolescence, and enhance on-system and off-system repairs forward.

Reliable access across space and cyberspace will be increasingly important to support emerging technologies that increase the Army's ability to sustain an expeditionary force across a distributed battlefield.

What risks are inherent with increased use of technology in the maintenance arena? How do we maintain readiness during periods of disconnected operations? Can we diagnose faults, manufacture parts at the point of need, or employ predictive analytics when satellites are down? These questions demand our consideration.

As we leverage technology to expand our maintenance capabilities, we are aware of the inherent risks. For this reason, we must never forget that our most critical, trusted assets are our maintenance professionals and the leaders who demand a disciplined approach to TLM. Through a disciplined approach to TLM, we will be able to fix far forward and provide service to the line, on the line, on time. Go Ordnance!

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