# Regenerating Combat Power at the National Training Center

by Lieutenant Colonel Wayne D. Taylor, Major Tina Johnson, and Captain Clay Hatcher

### The Nightmare: Combat Power Has Slipped Away

*The Armor task force executive officer (XO), "Earthquake 5," stood at the base of the Arrowhead in the middle of his Unit Maintenance Collection Point (UMCP) shaking his head. The combat power of his task force — his M1/2/3 fleet — had just dropped to 58% after the move from force-on-force to live fire at the National Training Center (NTC). He had received his 0500 combat power update from his Battalion Maintenance Officer (BMO) that morning and was shocked at the 22% decrease. Before the move, his combat power had been 80%, but now he had 24 non-mission capable (NMC) M1 and M2/3 armor combat systems. He reflected on the past six days to try to identify what had gone wrong.*

*The combat power of Earthquake 5's task force had degraded slowly at first. He was down 8 to 10 combat systems per battle since the move-out day. The maintenance teams had repaired more than six vehicles each day, but the rugged terrain of the NTC consumed an equal number of vehicles daily. Arrival of parts was slow, and his BMO had not set up the UMCP in one place long enough to completely diagnose all the systems reported NMC. Now the situation had become much worse. After performing the fire control checks required prior to shooting ammunition during NTC live-fire training, it was painfully obvious that the crews' Preventive Maintenance Checks and Services (PMCS) during the force-on-force training had not included M1/2/3 turrets.*

Although the XO was shocked at the steep fall-off in his combat power, his predicament occurs all too often at the NTC. His battalion's combat power had shrunk because of several serious but addressable problems in his maintenance and repair parts distribution operations. For the past 12 months, the Forward Support Battalion (FSB) logistics trainers, called the Goldminers, have worked with maneuver task force trainers to document systemic maintenance failures of the rotational units, as well as a number of crucial activities that lead to higher combat power across a rotation.

We begin this article with an overall view of the Army's maintenance and repair parts distribution "process" in the deployed, austere environment of the National Training Center. We then present recent data on how well, on average, units have made this process perform to provide combat power. Throughout, we provide examples of proven techniques and procedures that will lead to significant improvements in maintenance and repair parts distribution at the NTC. Key among these techniques is the preparation for an effective Brigade Combat Team (BCT) maintenance meeting, which we address in some detail. The payoff for implementing these suggestions is increased combat power, and more fully mission capable M1s and M2/3s crossing the Line of Departure (LD) in each battle.

### Maintenance and Distribution Process: The Big Picture

Figure 1 represents the brigade maintenance process. (The illustration is generic — particular units may have variations on this basic scheme.) This process starts when the crew performs Preventive Maintenance Checks and Services (PMCS) and identifies a NMC fault. This fault is noted on the maintenance forms 2404/5988E. The maintenance process ends when the fault is repaired or a part is applied to the combat system to render it FMC. Although this appears simple at first glance, the process has many substeps that can strongly affect the time it takes to regenerate combat power at the NTC.

Based on a 12-month analysis of available data at the NTC, it takes an average of 6.7 days from when a com-

bat system is observed NMC until it is observed FMC. This time breaks down into three measurable segments: NMC to the document number (2.1 days), document number to release for issue (RFI) (1.7 days), and RFI to FMC (2.9 days). This analysis is based on a sample of 50 randomly selected, high-priority repair part requisitions from each of the past 12 NTC rotations. For a requisition to be included in the sample, the requested repair part had to be on hand at the FSB or MSB. Thus, in this average of 6.7 days, we have not included backorders, shipments from a rotational unit's home station, or depot-to-NTC deliveries.

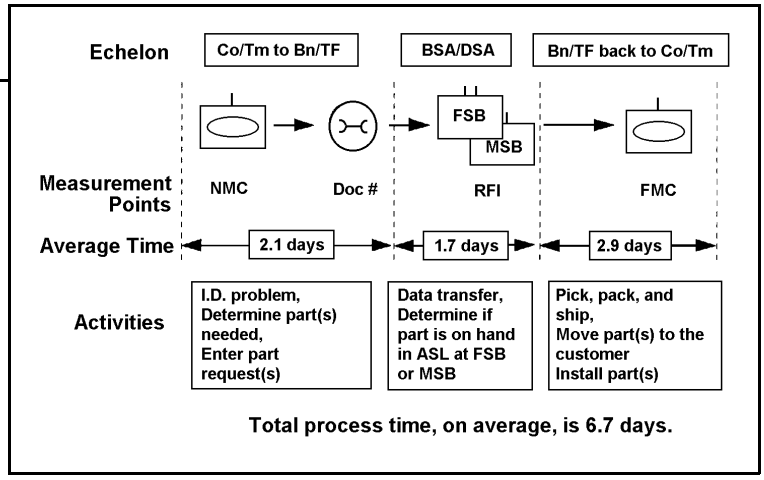


**Figure 1.** The maintenance and distribution process at the NTC.

A system that performs at this level, supporting vehicles operating in a rugged environment like the NTC, has a major impact on combat power in the course of a 14-day NTC rotation. Figures 2 and 3 show the average M1 and M2/3 combat power, based again on 12 NTC rotations. Note the dip in combat power at training days 6 and 7, when the change to live-fire training normally occurs. This is where we left a stunned "Earthquake 5" contemplating his situation.

By studying the maintenance processes of 12 units at the NTC, we have documented a number of key problems that lead to poor performance and grouped them into four categories:

- Poor or no initial maintenance planning.
- Poor adherence to unit SOPs in preparation and communication of maintenance information via 2404/5988E (PMCS reporting).
- Poor visibility over Class IX repair parts flow.
- Poor synchronization and management of maintenance activities, including ineffective BCT maintenance meetings.

We will address these general activities as we work through the different segments of the maintenance pipeline pictured in Figure 1. Along the way, we will not only discuss how the system should function, we will also discuss the errors made by Earthquake 5's task force, and specifically what actions could have minimized the loss of combat power. We will end with a summary of the ways in which maintenance operations at the NTC can be decidedly more effective — which means more vehicles FMC, and thus more combat power.

## Critical Points in the Army's Maintenance System at the NTC

Our segmentation of the maintenance process at the NTC is based on the critical points where the Goldminers can make observations and collect hard, reliable data. These observation points also mirror the SOPs of virtually every rotational unit. Below, we examine each of the three segments.

### NMC to Document Number

The first segment for analysis is the piece of the process that begins when a combat system is observed NMC and ends when a document number is produced in the Unit Level Logistics System (ULLS) box and the ordering process is initiated. This segment is expanded in Figure 4. On average, combat systems at the NTC take 2.1 days

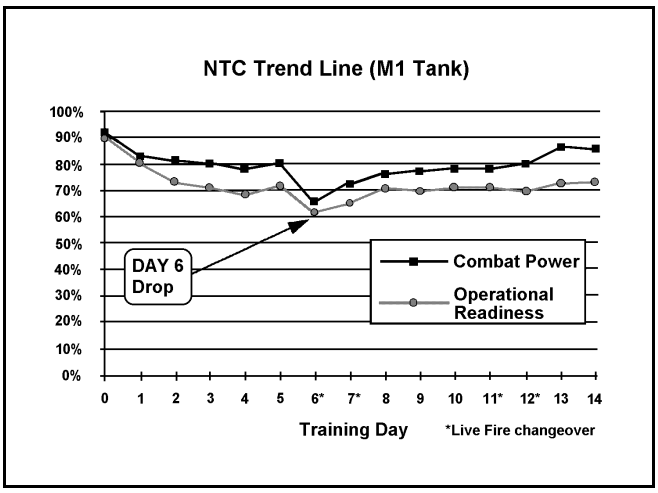


**Figure 2.** M1 Operational Readiness and Combat Power as a Percentage of Mission Capable Vehicles ("Combat Power" includes both FMC and "Circle X" vehicles).

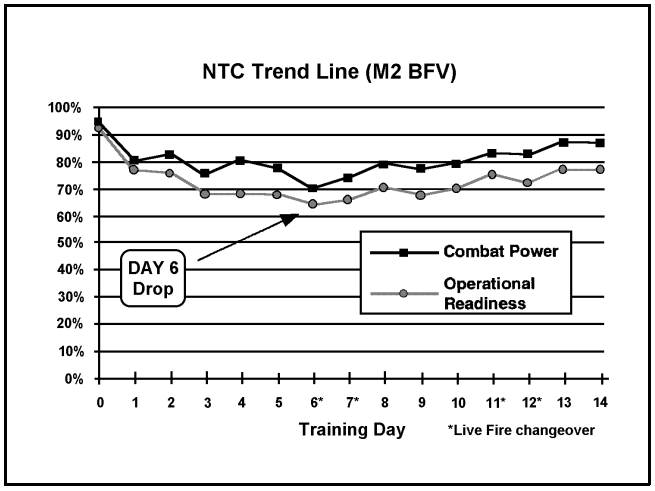


**Figure 3.** M2 Operational Readiness and Combat Power as a Percentage of Mission Capable Vehicles (again, "Combat Power" includes both FMC and "Circle X" vehicles).

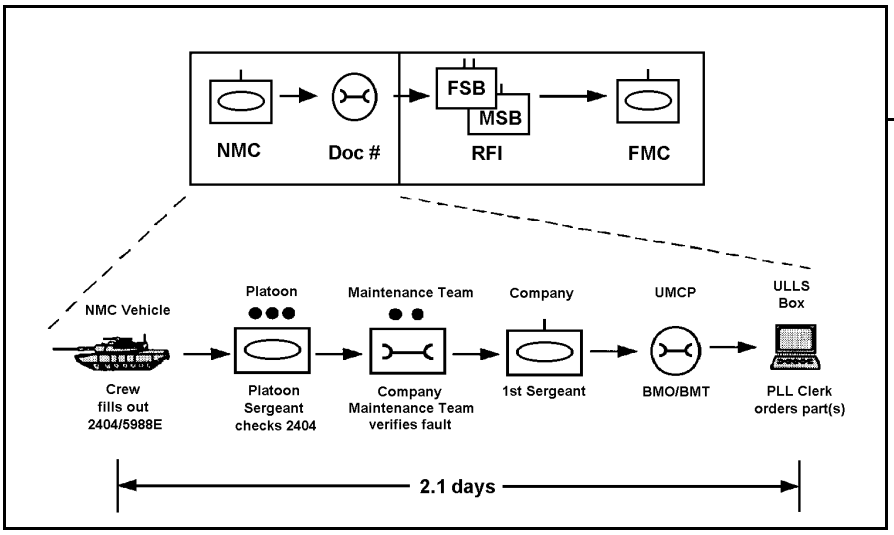


**Figure 4.** Maintenance process segment from report of fault to requisition.

from the time they are observed NMC by trainers until a Class IX requisition document number is produced in the ULLS box. The 2.1 days are further subdivided into 1.4 days for the combat systems to gain visibility on the task force DA Form 2406 (deadline report) and 0.7 day for fault diagnosis, troubleshooting, and inputting a Class IX requisition document number to the ULLS computer.

Several factors contribute to the 2.1-day time. First, battalion XOs and BMOs at the NTC routinely do not know how many 2404/5988Es are required per day, per combat system. Their SOPs usually specify one per day; however, there are no systems in place to check the efficiency or performance of this turn-in requirement. Our experience is that units turn in an average of 60% of the required 2404/5988Es per day. Of those turned in, only 63% are "to standard," that is, containing the information required to get the part successfully ordered. Common shortfalls include no National Stock Numbers (NSNs), missing bumper numbers, operator faults with no action taken, and no fault verification and NSN identification by mechanics. Not only do units not enforce reporting standards, (both frequency and completeness), task force operations orders never establish a specified time to perform PMCS.

This reporting is the foundation of the maintenance process. Missing or incomplete PMCS or 2404s add unnecessary time to the repair cycle, and obscure the visibility of combat power to higher echelons.

Also contributing to the problems with reporting and diagnosing faults are decisions about the movement of the UMCP. On average, the UMCP moves every other day. This does not allow adequate time for mechanics to troubleshoot and diagnose NMC combat systems. It appears that XOs and BMOs choose to move the UMCP this frequently because they are not effectively planning and carrying out forward recovery of vehicles. The price of such frequent UMCP movement is a less stable and less effective maintenance operation.

Another area for improvement by crews is to focus better on preventive maintenance as part of the PMCS process. If a part that is beginning to fail can be detected and reported, a replacement part can often be enroute to the vehicle *before* the fault deteriorates to the point where the vehicle becomes inoperable. Repairs can then be made without a long wait for parts to arrive, and in some cases this could also avoid the need to recover the vehicle to the UMCP.

Finally, there are substantial inaccuracies between what the Goldminer trainers observe as combat power and what is reported to the brigade maintenance managers. When trainers compare what the task force reports NMC at the Brigade Combat Team (BCT) maintenance meeting, there are, on average, eight combat systems inaccurately reported by each task force. Poor reporting and failure to conduct continuous updates (verbal or hard copy 2406s) to FSB maintenance managers hinder their visibility of the necessary Class IX repair parts requirements. Such reporting inaccuracies also result in an inaccurate report of combat power to the maneuver commanders.

In sum, problems with reporting faults and requesting parts in this segment of the process fall into the following categories:

- Poor planning for and enforcement of accurate and timely reporting of faults.
  **Fix:** Specify a time in the operations order for PMCS and establish a quality-control system that systematically tracks the quality and reliability of 2404 turn-ins.
- Too-frequent movement of the UMCP to allow maximum diagnosis and repair time.
  **Fix:** Move the UMCP only when forward recovery and FM communications are beyond their capacities.

- Not identifying and reporting problems before the vehicle becomes NMC.
  **Fix:** Ensure that soldiers are properly trained in accordance with the "-10" manuals, and enforce key "leadership" involvement by section sergeant, platoon sergeant, platoon leader, company commander.

Once a part is on order, the next segment of the process begins. The requisition passes from the ULLS computer to the FSB or MSB, and the part is released for issue.

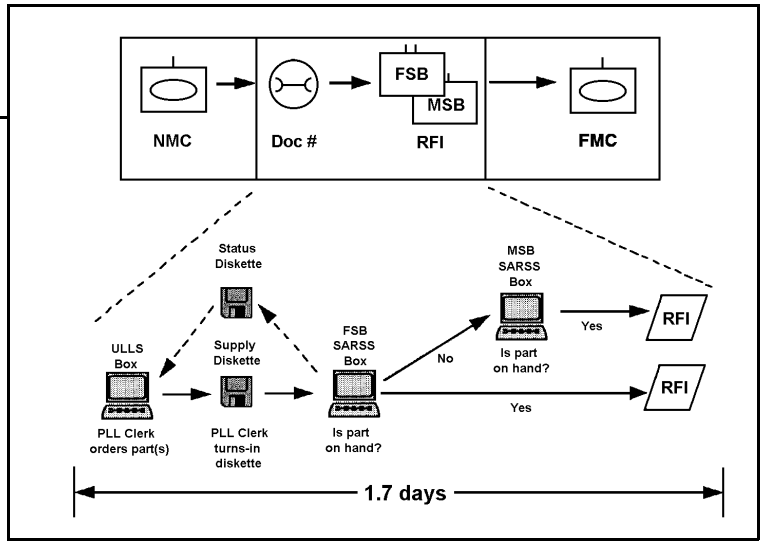


**Figure 5.** Maintenance process segment from requisition to when the part is released for issue at the first available source of supply.

## Document Number to Release for Issue: Moving Information

The next performance measure is the time it takes to move information from the UMCP to the final source of supply. Figure 5 represents this segment of the process. On average, this segment takes 1.7 days from the initiation of the ULLS requisition document number until there is an RFI at the FSB or MSB.

The primary system failures that lead to 1.7 days for this segment are:

- low numbers of ULLS supply disk turn-ins.
- no reconciliations of parts received from the units, FSB, and MSB automation sites.

The NTC average over a year is that 52% of the required ULLS supply disks are turned in to FSB Tech Supply each day. Command emphasis at the brigade and task force level has a dramatic impact on a higher percentage of disks turned in. A recent rotation had an 85% turn-in rate of ULLS supply disks when senior commanders recognized the importance of ordering parts. Many BCTs have no mechanism in place to check the performance of this task. The SOPs of a typical rotational unit direct the turn-in of two disks per day, per ULLS box. Compliance with the SOP is a critical action to synchronize efforts to build combat power. However, brigade maintenance managers seldom have a mechanism in place to check daily disk turn-in performance.

Delays also often occur when PLL clerks drop off ULLS disks but do not stay and verify that their Class IX requisitions are 100% downloaded to the Standard Army Retail Supply System (SARSS) box. By not waiting, they miss the first step in the Class IX reconciliation process. Without this initial check, the requisitions not processed at the FSB SARSS box will not be reconciled until 24 hours later, when the ULLS status disk is processed back into the ULLS box. In addition, the PLL clerks receive a hard copy DMMC-generated C110 report, which reconciles the previous day's requisitions with the document control register (DCR). Additionally, this automated status, downloaded from SARSS, updates the ULLS DCR, the ULLS commander's NMC report, and eventually the SAMS2 C026, which is the BCT consolidated maintenance document.

More frequent movement of requisitions from FSB to MSB can also help speed this segment of the process. We have observed that units who use communications technology (i.e., tactical FAX machines, FM, and EPLARS) to send information between the FSB and MSB tend to have faster movement of repair parts.

Without this critical step, many parts are not posted via the automation system. Observers found that only 41% of parts had status posted by automation, which forces the FSB SPT OPS to manage this critical Class IX status "offline." Manual status management slows down the Class IX process and breeds distrust and frustration with the automated systems.

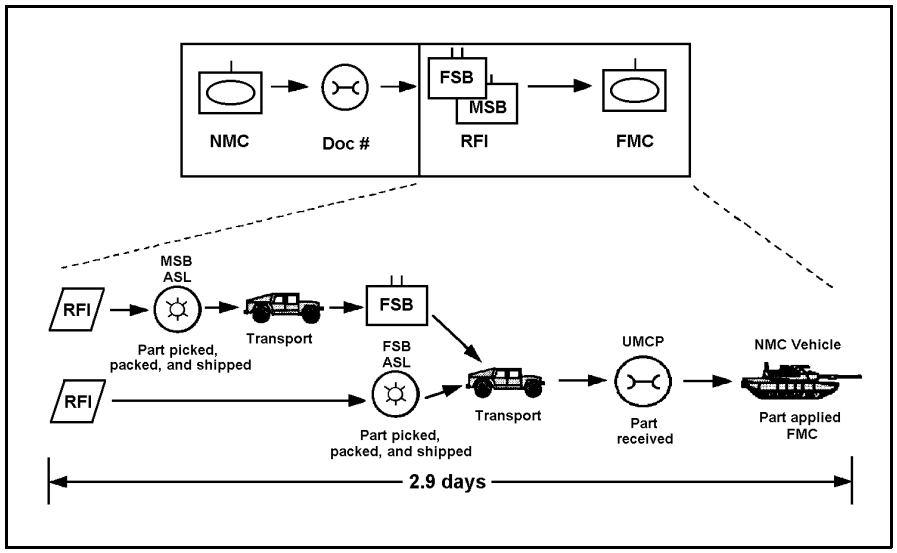


**Figure 6.** Maintenance process segment from issue of the repair part to installation on the vehicle and FMC status.

Improved performance in the document-number-to-RFI segment of the process includes addressing the following problems:

- Low ULLS supply disk turn-ins.
  **Fix:** Establish, track, and enforce requirements for daily ULLS disk turn-ins.
- No reconciliations of parts requests received from the units, FSB, and MSB automation sites.
  **Fix:** Require and enforce verification of ULLS downloads to SARSS at Tech Supply.
- Infrequent movement of requisitions from FSB to MSB.
  **Fix:** Use electronic data transfer for multiple "forward-to-main" SARSS transfers per day.

### RFI to FMC: Moving the Part Forward and Completing the Repair

The final segment of the process is from RFI to FMC: getting the part picked, packed, shipped, received, and installed. This segment, as shown in Figure 6, involves the movement of information, the physical movement of Class IX repair parts, and the final repair activities.

The NTC trend over the past year shows that this is the most time-consuming segment in the process. It takes 2.9 days from RFI until the combat system is rendered FMC. The primary system failures are:

- Poor visibility over forward flow of repair parts.
- Poorly planned synchronization of automation for batch processing and information movement.
- Poor management of UMCP and brigade maintenance operations.

Transportation and manifesting of repair parts are critical for the visibility of combat power regeneration. The DMMC maintenance managers, FSB SPT OPS maintenance managers, and the task force BMOs must gain visibility of the critical Class IX parts and expedite them to those who will repair NMC vehicles. Manifests often do not accompany the parts during movement, and the FSB has no visibility of their movement forward from the MSB.

Once the transportation carrying the repair parts and manifests from the MSB to the FSB arrives, the Tech Supply often does not reconcile the parts physically shipped against the manifest document. Rarely do we see maintenance managers at the FSB receive advance copies of the manifest via FM, EPLARS, MCS, or MSE tactical fax. A knowledge of what critical repair parts are on their way allows the FSB managers to be proactive in planning how to move the part to the appropriate UMCP as quickly as possible. This might include having unit personnel and transportation meet the shipment at the FSB to move the part as quickly as possible to the NMC vehicle.

Optimal procedures for transportation and manifesting 02 PD parts include:

- Fax advance copies of manifests to the FSB.
- Report back to the DMMC manifested 02 PD parts not received for research.
- Notify BMO of 02 PD requisition arrivals.

These steps are often attempted but rarely conducted to standard. Failure to communicate "ahead of the part's arrival" forces maintenance managers to spend an exorbitant amount of time looking for 02 PD parts for combat systems; often they bypass the FSB and go to the MSB to expedite the parts flow.

Movement of the parts is a large portion of the 2.9 days of RFI to FMC. We do not have access to accurate data to break out the exact times spent in movement and repair; however, applying the part to the combat system and UMCP maintenance management both play critical roles in the RFI to FMC time. We have observed that BMOs are not well trained to anticipate and manage the large quantity of NMC combat systems generated by the OPTEMPO and rugged terrain at NTC.

Organizing UMCP priorities of work becomes an essential task for BMOs. This organization could take the following form:

- Conduct daily maintenance meetings that address:
  - Organization of workload (which mechanic or maintenance team is tasked to repair each combat system).
  - Analysis of cross-leveling/controlled substitution.
  - Determination of parts on hand (what parts are available to repair which combat systems the most quickly).
- Develop FM reporting system between company maintenance teams and the UMCP.
- Perform 2404/5988E tracking and quality assurance.
- Using ULLS automation to build the task force 2406 report.

Poor ability to provide this management is a major weakness in UMCP operations.

Improving this final segment of the maintenance process involves solving several important problems:

- Poor transportation and manifest tracking of the critical 02 priority requisitions.
  **Fix:** Ensure that manifests accompany parts from MSB to FSB to maintain visibility of parts flow.
- No visibility of what is coming forward to the SPT OPS managers.
  **Fix:** Use electronic communications (Tactical FAX, FM, and EPLARS) to send advance copies of manifests from MSB to FSB to allow preparation for expedited onward-movement of critical parts.
- No visibility of what arrived at the FSB Tech Supply.

| | Task Force Managers | FSB Managers | Brigade Managers | DMMC Managers |
|---|---|---|---|---|
| **WHO:** | Task Force BMOs & XOs, Separate COs XOs, FSB BMO & XO | FSB CDR & SPT OPS, Tech Supply, Shop Office | S4, Maintenance Manager | Bde representative, CL IX representative |
| **Maintenance Management Reporting Information** | ULLS CDR NMC report<br>Task Force 2406<br>- Updated<br>- Status | C026/2406 report<br>- Updated<br>- Status | C026/2406 report<br>- Track combat system status | C026/2406 report<br>- Updated<br>- Status |
| **Parts Status Information** | 02 part status<br>- C110 reconciliation<br>- Face-to-face reconciliation<br>- Total due-out reconciliation | 02 part information:<br>- AMDF of each 02<br>- Trans/status TCMD | | 02 part information:<br>- ILAP of each 02<br>- Trans status/ TCMD |
| **Recoverable Status** | Reconciled recoverables | Reconciled recoverables, provide Unmatched Recoverable list | | Unmatched Recoverable list |
| **Disk Turn-in Monitoring** | Daily disk turn-in records for:<br>- Maintenance disks<br>- Supply disks | Daily disk turn-in records for:<br>- Maintenance disks<br>- Supply disks | | |
| **AOAP Monitoring** | AOAP turn-in record | AOAP turn-in record | AOAP turn-in record | AOAP turn-in record |
| **Parts Availability** | PLL status list | Forward ASL list | | Main ASL list |
| **Automation Status** | ULLS box operational status | SARSS & SAMS status | | |

**Table 1.** Daily Homework Needed For Effective, Efficient Maintenance Meetings

**Fix:** When parts arrive, reconcile the manifest against parts shipped and report discrepancies to the DMMC.

- Units not notified of available parts at Tech Supply.
  **Fix:** When advance copies of manifests are received from the MSB, SPT OPS should notify units of anticipated parts and arrival times.
- BMO's UMCP maintenance operations unfocused.
  **Fix:** Conduct an effective internal UMCP daily maintenance meeting to coordinate activities and prioritize work.

## Daily Maintenance Meetings: Balancing Needs and Resources

BCT maintenance meetings are the "battlesight zero" for maintenance managers to regenerate combat power. All levels of maintenance managers gather to share information and ensure all are aware of repair parts status and maintenance posture. The meeting's primary purpose is to get a clear understanding of what vehicles are NMC and who has the resources to make the repairs. The effectiveness of a maintenance meeting depends strongly upon the "homework" done by its participants. The homework completed by BMOs, SPT OPS officers, brigade S4s, and DMMC/brigade maintenance managers provides the necessary maintenance management information from their respective areas. Table 1 shows the suggested participants and the homework that each should bring daily to the maintenance meeting.

The ability to shave NMC time off combat systems also depends upon the maintenance managers' ability to synchronize assets with resources to regenerate combat power. Critical for this synchronization is a well-thought-out plan for coordinating batches of information and materiel. An example is to ensure that the pulling of repair parts at the MSB is timed to be completed shortly before a convoy leaves the MSB for the FSB. Such attention to coordinating batches can save hours, and sometimes days, of NMC time for the weapon system awaiting parts.

## Strong Maintenance Practices Deliver Increased Combat Power

*Earthquake 5 glanced back at his UMCP: there were still 24 NMC combat systems. This wasn't a bad dream. The embarrassment of having to report 58% combat power to his higher headquarters was extremely irritating and certainly not the kind of visibility he needed from the brigade and division commanders. The unexpected drop in combat power forced him to accept that he had been managing in a vacuum and wasn't sure where his maintenance team had failed. He recognized that he had no daily maintenance indicators that would allow him to catch and forestall problems before they had turned into a catastrophe like the one he was facing. He would now have to immediately focus the task force on its maintenance posture and develop systems to regenerate combat power quickly. Because of poor planning and follow-up, Earthquake 5 had a very long, exhausting eight days of rotation still to go...*

If Earthquake 5's task force effectively had planned and executed its maintenance activities, it would have stood a far greater chance of being a high-performing unit at the NTC. The OPFOR is always tough to beat, but it is certainly even tougher to beat if you are only at 75% combat strength because of the poor performance of your maintenance systems. Units should aggressively pursue improved maintenance planning and practices before their NTC rotation, and they should practice these maintenance activities as part of their home station training:

- Carefully plan for maintenance activities and explicitly allocate time to carry them out.

- Establish standards and enforce adherence to them for preparing and communicating maintenance information via 2404/5988E.
- Synchronize maintenance management.
- Prepare for and utilize daily maintenance meetings as the "battle sight zero."

Commanders demand maximum combat power for each mission if they are to defeat the opposing forces at the NTC. Maintenance managers and soldiers are currently using the full 24 hours of the day to regenerate combat power but continue to struggle with operating their systems — and continue to achieve less than satisfactory performance. Units must find techniques and procedures to shave time off the 6.7 days by working smarter, not harder. The problems and solutions we have outlined are areas to start the search for the highest combat power available for battles at the NTC and ultimately prepare task forces for future deployments. Success in maintenance is not measured in wins or losses, but in the time it takes for units to regenerate combat power.

Lieutenant Colonel Wayne Taylor is attending the Industrial College of Armed Forces. He has served in various logistics command, training, and staff positions including senior logistic trainer, NTC; commander, Support Squadron, 11th Armored Cavalry Regiment, Germany, EVCOM, J4 joint logistic staff officer. He is a graduate of Command and General Staff College and completed the Army Comptroller Program.

Major Tina G. Johnson is the executive officer of the Support Squadron, 11th Armored Cavalry Regiment, Ft. Irwin, Calif. She previously served as the FSB, support operations trainer, NTC, and the support operations officer, 123rd Main Support Battalion, 1st Armored Division, Germany. She has a bachelor's degree from Seton Hall University, N.J.

Captain Clay B. Hatcher is currently the Maintenance/Class IX Trainer for the Forward Support Battalion at the NTC. He was the 199th FSB support operations officer, 1st Infantry Division, Germany. He has commanded B Company, 203rd and B Company, 47th FSB, 3rd Infantry Division, Germany. He graduated from Northwest Missouri State University.

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