

The A-Rating

Improved data from depot to unit

by Maj Amber Coleman

The Marine Corps currently uses readiness reporting metrics that are lacking in historical context, which renders them as poor indicators from which to base future maintenance and operational planning. Supply (S-rating), readiness (R-rating), and materiel readiness (MR-rating) ratings, defined in *Marine Corps Order 3000.11E, Ground Equipment Condition and Supply Materiel Readiness Reporting Policy*, represent readiness levels at a snapshot in time, yet they can change daily.¹ The R-rating assesses maintenance readiness by subtracting the number of deadlined assets from the number of possessed assets and dividing by the total possessed (see Figure 1). This metric provides no additional information regarding the overall availability of equipment, performance trends, or indicators for which serial numbers have a history of poor performance. It merely provides a binary view of what assets are currently operational. Augmenting this suite of metrics with the operational availability (A-rating) calculation will provide historical context to readiness metrics and will enhance operations and maintenance planning in the Operating Forces as well as provide Marine Corps Logistics Command (LOGCOM) with the level of detail necessary to appropriately allocate the Marine Corps' limited depot maintenance resources.

The R-rating, even at the Table of Authorized Material Control Number (TAMCN) level, only enables commanders to analyze performance across a TAMCN or commodity group. Since the R-rating is only a maintenance snapshot in a specific period of time, additional research is required to determine if specific serial numbers consistently affect unit readiness. However, the A-rating provides a better assessment of

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$$R = \frac{\text{Possessed} - \text{Deadline}}{\text{Possessed}}$$

Figure 1. Readiness Rating calculation as defined in MCO 3000.11E.

$$\text{A-rating} = \frac{365 - \# \text{ days deadlined}}{365}$$

Figure 2. Simple equation for operational availability.

readiness because it contains historical context that enables data-driven decisions which are specific to each serial number. In its simplest form, operational availability is either the percent of time an asset is available for use or the ratio of asset uptime to asset uptime plus downtime.² More complicated explanations of operational availability exist which will require detailed metrics such as the mean time between failures and time to repair, but the enterprise does not have the capability or data quality to calculate these metrics across all TAMCNs. However, the Marine Corps already captures the components required for a simple calculation of operational availability within the Global Combat Support System Marine Corps (GCSS-MC). Key data fields include TAMCN, serial number, operational status, service request open date, and service request close date. By consolidating these variables, we can count the total days deadlined annually

to calculate the percent of time the asset was available for each year (see Figure 2).

The A-rating immediately provides better historical context than the R-rating because it leverages performance throughout the year. Analyzing the A-rating for a minimum of three years enables trend identification and in-depth analysis by serial number, all of which provide commanders with the information necessary to make decisions that are more informed. Optimizing readiness and minimizing risk to mission are both complicated Marine Corps maintenance problems that will benefit from the straightforwardness of the basic A-rating calculation.

Complex problems do not necessarily need complex solutions. The approach should be to find the inherent simplicity that exists in the system and then to focus all efforts toward capitalizing on this simplicity.³ The A-rating is the simple solution to many of our complex maintenance planning and execution problems.

Until recently, counting the number of days deadlined by serial number was a tedious and error-prone task. However, Marine Corps analysts can easily complete this job using open source or free software that is currently available for download on the Marine Corps Enterprise Network, and this simple calculation opens the doors to a range of data-driven decisions.

Commanders can use A-ratings to develop exercise or deployment equipment density lists and ultimately reduce the chance of equipment failures during exercises or operations. This metric will also better inform military equipment rotation in support of contingency operations. Units deployed in support of SP-MAGTF or with the MEU need quality equipment to complete their missions,

yet are typically not collocated with robust supply and maintenance capabilities like garrison units. Deployed units need a high level of equipment availability. The A-rating provides both the unit and their higher headquarters better data to monitor their equipment status. This will potentially prevent catastrophic failure of low-density high demand items by rotating stock before it falls below a certain availability rating. Once the A-rating reaches this threshold, these deployed units will have justification to request a rotation of equipment. The A-rating also allows their higher headquarters to ensure the replacement equipment is an approved asset compared to what the unit currently has. This concept serves a similar purpose when temporarily loaning equipment for major exercises. Requiring an A-rating at or above the enterprise average will reduce the likelihood of receiving substandard equipment in support of major exercises. The equipment ultimately belongs to higher headquarters, so requiring a certain A-rating allows a commander to allocate higher quality equipment according to his priorities.

Calculating the A-rating at the serial number level also enables analysts to identify trends across the Service. For example, calculating an annual enterprise-wide A-rating for each TAMCN will highlight poor performing serial numbers. Through iterative improvements, analysts could also develop tools to compare the A-rating to equipment age, equipment operating time codes, or total dollars spent in repair parts to provide further context to highlight additional trends at specific units or geographical locations. Additionally, commanders at all levels will clearly recognize their poorest performing assets, allowing them to quantitatively identify potential depot-level maintenance candidates.

Over half of the Marine Corps' TAMCNs have a demand-based depot maintenance strategy, meaning they have no regular depot maintenance cycle. LOGCOM is responsible for managing the flow of equipment through the depot maintenance process and depends on Program Managers, Item Managers, and the Operating



Commanders are able to identify the poorest performing vehicles/equipment. (Photo by LCpl Margaret Gale.)

Forces to identify equipment in need of depot maintenance. These players communicate those needs to LOGCOM during the annual Enterprise Lifecycle Maintenance Program (ELMP) conference.⁴ The current readiness metrics fail to provide the level of detail needed to nominate items at the serial number level across all TAMCNs, so the items in most need of maintenance are not always the ones processed through the depot. Giving the ELMP the ability to identify the worst serial numbers across each TAMCN group simplifies depot maintenance nominations, reduces planning time, and helps streamline the depot maintenance execution phase.

Identifying the serial numbers of depot maintenance candidates before the year of execution gives the Marine Depot Maintenance Command more time to properly research, schedule, and resource the depot maintenance plan. Additionally, this information enables LOGCOM analysts to develop and implement predictive cost models that could improve repair cost estimates and depot maintenance planning, ultimately leading to better resource allocation and increased Marine Corps buying power. Furthermore, analysts could potentially determine if an asset is beyond economical repair and recommend disposal before it is shipped, thereby preventing

wasted transportation resources and reducing the likelihood of depot maintenance washouts—items that begin the maintenance process but do not result in a completed asset.

Moreover, ELMP planners use a suite of tools called the price and performance model to identify depot maintenance requirements.⁵ One of these models, the repair optimization materiel evaluator, depends on readiness ratings as inputs and ultimately determines how many of each TAMCN the Marine Corps must remanufacture each year to maximize enterprise readiness. In some cases, ELMP planners run a repair optimization materiel evaluator two years in advance of execution, making readiness snapshots a poor measure of what will meet Marine Corps readiness needs in the future. The A-rating is a better input to the price and performance model because it provides historical context, and this enables the Marine Corps to better allocate depot maintenance funds, which often exceed one billion dollars over the Future Years Defense Program.

Data quality will significantly influence the Marine Corps' ability to accurately calculate A-ratings. Currently, data quality standards are lacking and may lead to misleading A-rating calculations. However, even at the present state of data quality within the enterprise,



Better allocation of maintenance funding can help maximize equipment readiness. (Photo by Cpl Kevin Payne.)

A-ratings provide commanders more useful information in a single metric than the entire suite of current readiness metrics because the A-rating is more than just a snapshot in time. Furthermore, the A-rating will provide units incentive to maintain clean data. Failure to properly close service requests or erroneously opening multiple, simultaneous service requests are just two examples of how poor data will negatively affect A-rating calculations. Both of these occur often, but receive minimal attention under current readiness calculations. Measuring units with an A-rating gives maintenance personnel incentive to pay closer attention to the data they input

into GCSS-MC. Moreover, additional analysis of age and usage rates will begin to highlight erroneous entries such as illogical equipment operating time codes, which is another data quality issue that currently receives little attention.

The A-rating is simple to calculate and can be standardized throughout the enterprise by establishing simple business rules to guide its calculation. Furthermore, it enables the Marine Corps to conduct trend analysis and provides visibility at the serial number level—both of which the enterprise is currently lacking. Like all good analysis, it will require feedback loops and iterative improvements that could even-

tually involve more complicated math and detailed data. Using this analysis, the enterprise can effectively reduce the negative impacts of equipment failure and better allocate limited maintenance funding and resources to maximize readiness. Marine Corps analysts, both uniformed and civilian, already possess the skills and the tools to develop both data aggregation and decision support tools with little more than just the investment of their time. Implementing the A-rating will also foster a culture of data-driven decisions and foster a culture of quality data that enables predictive maintenance capabilities. Data is the only resource that is able to be used an infinite number of times without ever depreciating.⁶ The Marine Corps must take advantage of the wealth of available data and start making operational readiness decisions based on the A-rating and not simply continue to focus on whether a piece of equipment is available today.

Notes

1. Headquarters Marine Corps, *MCO 3000.11E, Ground Equipment Condition and Supply Material Readiness Reporting (MRR) Policy*, (Washington, DC: 2012).
2. Defense Acquisition University, *Defense Acquisition Glossary*, (Fort Belvoir, VA: 2018), available at <https://www.dau.mil>.
3. Mandyam Srinivasan, Melissa Bowers, and Kenneth Gilbert, *Lean Maintenance Repair and Overhaul*, (New York: McGraw Hill Education, 2014).
4. Headquarters Marine Corps, *MCO 4790.24, Enterprise Lifecycle Maintenance Program (ELMP)*, (Washington, DC: 2012).
5. Ibid.
6. Schmarzo, Bill, *Institute for Operations Research and Management Sciences (INFORMS)*, Business Analytics Conference Keynote Speaker, (Baltimore, MD: 2018).





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