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ASSESSING MARINE CORPS READINESS

by

Zeev Barzily
Lt. Col. Paul R. Catalogne, USMC
W. H. Marlow

Serial T-430
26 September 1980

The George Washington University
School of Engineering and Applied Science
Institute for Management Science and Engineering

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The Marine Corps Combat Readiness Evaluation System (MCCRES) uses simulated combat to evaluate the readiness of Marine Corps units. Resulting data provide vital inputs to command and management at all levels. The present paper proposes a new way to interpret results from MCCRES evaluations of infantry battalions. The basis is a categorization scheme for requirements which leads to an accurate and easily implementable method for orienting remedial training.

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Introduction and summary

A major difficulty in measuring the readiness of a military unit is the fact that it cannot be done under actual combat conditions. It must be evaluated instead through exercises consisting of typical operations it is supposed to be able to execute. And more than this, it is generally necessary to evaluate in terms of "How closely did execution conform to doctrine?" rather than directly in terms of "Can the unit do its job?" This is true because it is generally simpler to decide how successful an operation was, and what were the strong and weak points of execution, than it is to decide exactly why a unit performed as it did, and what this foretells for its many required capabilities.

The Marine Corps Combat Readiness Evaluation System (MCCRES) uses simulated combat to evaluate the readiness of Marine units. Specific tests have been designed to evaluate infantry units, rotary wing and observation squadrons, fixed wing squadrons, combat support elements, combat service support elements, and so on, covering all units in the Corps. In the present paper we confine our attention to infantry units, and we address two questions.

- A. How can results from MCCRES evaluations--on how well the exercises were performed--be used to measure how well the unit can do its job?
- B. How can units best train in anticipation of their formal evaluations, and also in response to results from their completed evaluations?

Our approach is based on a categorization scheme which identifies ten fundamental activities required for an infantry battalion to be able to do its job and consequently to be ready for combat.

Section 2.A Standards applicable to all evaluations

- 2.A.1 CONTINUING ACTIONS BY MARINES
- 2.A.2 COMMAND AND CONTROL
- 2.A.3 FIRE SUPPORT COORDINATION

Section 2.B Standards applicable to amphibious assault and normal combat operations ashore

- 2.B.1 SURFACE ASSAULT
- 2.B.2 HELICOPTERBORNE ASSAULT
- 2.B.3 MOVEMENT TO CONTACT
- 2.B.4 ATTACK
- 2.B.5 NIGHT ATTACK
- 2.B.6 DEFENSE
- 2.B.7 RETROGRADE OPERATIONS

Section 2.C Standards applicable to specialized combat operations

- 2.C.1 TANK-INFANTRY OPERATIONS
- 2.C.2 MECHANIZED OPERATIONS
- 2.C.3 MILITARY OPERATIONS IN BUILT UP AREAS
- 2.C.4 EVACUATION OPERATIONS
- 2.C.5 AMPHIBIOUS RAID

Section 2.D Standards applicable to operational actions dependent upon outside assets

- 2.D.1 AMPHIBIOUS ASSAULT PLANNING
- 2.D.2 EMBARKATION FOR AMPHIBIOUS ASSAULT
- 2.D.3 SEA TRANSIT AND REHEARSAL FOR AMPHIBIOUS ASSAULT
- 2.D.4 AIR ASSAULT USING FIXED WING TRANSPORT AIRCRAFT

Figure 1. Mission Performance Standards for Infantry units

We find that MCCRES data--especially when they are supplemented by the new evaluation measures we advocate--are ideally suited for helping experienced commanders evaluate readiness and plan training programs. These new measures help explain why units performed the way they did, and what specific remedial training actions are called for.

In the end, combat readiness is achieved through a combination of two functions, namely, training management and asset allocation. One cannot neatly separate these functions and therefore a system such as MCCRES, which involves both, is particularly useful. MCCRES can be employed at the unit level or at the level of Force planning, and consequently, answers for Questions A and B are important at all levels in the Marine Corps.

MPS 2.A.1 Continuing Actions by Marines

- 2.A.1.1 DISCIPLINE
- 2.A.1.2 DISPERSION
- 2.A.1.3 USE OF COVER
- 2.A.1.4 USE OF CAMOUFLAGE AND CONCEALMENT
- 2.A.1.5 SECURITY ACTIONS
- 2.A.1.6 RECONNAISSANCE PATROLLING
- 2.A.1.7 COMBAT PATROLLING
- 2.A.1.8 RESPONSE TO ENEMY ELECTRONIC WARFARE CAPABILITIES
- 2.A.1.9 RESPONSE TO ENEMY CHEMICAL WARFARE CAPABILITIES
- 2.A.1.10 RESPONSE TO ENEMY AIR CAPABILITIES
- 2.A.1.11 HANDLING OF PRISONERS OF WAR
- 2.A.1.12 CASUALTY HANDLING

MPS 2.B.1 Surface Assault

- 2.B.1.1 DEBARKATION
- 2.B.1.2 ASSAULT ACROSS THE BEACH
- 2.B.1.3 SEIZURE OF OBJECTIVES
- 2.B.1.4 BUILDUP OF COMBAT POWER ASHORE

MPS 2.B.4 Attack

- 2.B.4.1 PLANNING
- 2.B.4.2 PREPARATION
- 2.B.4.3 PRELIMINARY OPERATIONS
- 2.B.4.4 MANEUVER FORWARD OF LOD AND SHORT
OF FINAL COORDINATION LINE
- 2.B.4.5 ASSAULT FROM FINAL COORDINATION
LINE THROUGH THE OBJECTIVE
- 2.B.4.6 CONSOLIDATION
- 2.B.4.7 EMPLOYMENT OF THE RESERVE
- 2.B.4.8 RESPONSE TO COUNTERATTACK
- 2.B.4.9 COMMAND POST DISPLACEMENT

Figure 2. Tasks for three Mission Performance Standards

Evaluating infantry units

Formal evaluations of infantry units are designed by first choosing applicable Mission Performance Standards (MPS) from the list given in Figure 1. As shown in this figure, there are four sections which cover everything a Marine infantry battalion could be expected to be able to do. The three standards in Section 2.A represent the most

fundamental capabilities; these must be tested in every MCCRES evaluation. Most of the standards in Section 2.B are also compulsory but it is in general optional whether or not any of those in Sections 2.C or 2.D are tested. As a practical matter, it would be impossible to test all of the MPSs in a single evaluation. The MPSs, and other elements of MCCRES, tested in an evaluation are called "applicable" and the ones omitted are said to be "nonapplicable." These choices are made by the command conducting the evaluation.

Each MPS consists of a number of specific tasks. Figure 2 lists all tasks for three MPSs. The first, MPS 2.A.1, comes from the compulsory Section 2.A. Tasks from the second and third, 2.B.1 and 2.B.4, are discussed below.

Each task consists of a number of requirements. Figure 3 lists the five requirements which compose the fourth task in the compulsory MPS 2.A.1, namely Task 2.A.1.4, Use of Camouflage and Concealment. Entries "KI" in Figure 3 denote Key Indicators for the evaluators. These introduce objectivity and uniformity so as to assure quality in the evaluations. Wherever appropriate, KI contain quantitative criteria; for example, in order to satisfy Requirement 2.A.1.4.4, it is necessary that

"No more than 25% of the positions can be detected from an enemy vantage point 50 meters forward of the ground occupied by the unit."

Task 2.A.1.4 Use of Camouflage and Concealment

- 2.A.1.4.1 Individual Marines demonstrate attention to detail (KI).
- 2.A.1.4.2 Vehicles are prepared for concealment with garnished netting and natural camouflage (KI).
- 2.A.1.4.3 Equipment and tentage are provided with appropriate netting or are concealed with natural material.
- 2.A.1.4.4 Individual firing positions and those chosen for crew served weapons are camouflaged to prevent detection by the enemy (KI).
- 2.A.1.4.5 Organization stresses placement of men and material in areas that are concealed from casual detection by enemy air assets.

Figure 3. Requirements for one task

All applicable requirements pose questions that can be answered by Yes or No. A unit scores Yes if all conditions of the requirement are satisfied, and otherwise it scores No.

After the applicable MPSs have been determined, the second phase of a MCCRES evaluation consists of briefing the evaluators. They are usually officers and senior enlisted men whose battalions are to be evaluated in the near future. At the briefing they are assigned to the component parts of the unit to be tested, informed of the applicable parts, instructed how to observe details of performance and how to decide between Yes and No for individual requirements.

The third phase is the simulated combat. During this phase the evaluators must pay attention to numerous aspects of the execution and they must make many quick judgments. They are guided by the Key Indicators and they evaluate all applicable MCCRES requirements with either Yes or No.

When the simulated combat is finished, the evaluators gather and under the supervision of the senior evaluator they decide on a single final Yes or No for each requirement. Where originally there were evaluations for companies, and other units of the battalion, the end result is a single answer of Yes or No for the entire battalion.

The next phase consists of computing numerical scores. Official weights of relative importance have been assigned to each element in MCCRES. Weights for nonapplicable elements are allocated over the applicable ones. For example, and in terms of percentages, 55% is assigned to the compulsory Section 2.A and 25% is assigned to Section 2.B. If these are the only applicable sections in an evaluation-- that is, if 2.C and 2.D are not tested--then 55/80 or 68.75% of the total 100 points for the entire evaluation goes to 2.A and 25/80 or 31.25% goes to 2.B. There are relative weights for each MPS, each task, and each requirement. Consequently each applicable requirement has its own share of 100%, namely the appropriate share that comes down by inheritance from section to MPS to task to requirement.

Requirements evaluated with No score 0% and those with Yes score the full amounts. Tasks are then evaluated by summing only their Yes requirements. For example, a task would receive an evaluation of 75% if its Yes requirements accounted for 75% of the total found by summing over all of its applicable requirements. Each applicable MPS and section, and finally the entire battalion, in this same way receives an evaluation of up to 100% maximum through accumulation from its component elements. For another example, a score of 92% for the battalion means that 92% of the applicable requirements weights were evaluated Yes.

The ultimate result of the MCCRES evaluation is the judgment "Combat Ready" or "Not Combat Ready" which is made by the senior evaluator. There are several follow-up reports including lists of comments on requirements evaluated No; these furnish considerable information on weaknesses and strengths of the battalion. There is also the list of

individual evaluations, including the single final percentage score for the entire battalion.

Figure 4 illustrates such a list of individual evaluations. In actual cases there may be 50 - 80 applicable tasks and more than 500 applicable requirements.

Our objective is to use the data of Figure 4 to answer Question A. These data are most clearly related to how the exercises were performed but we intend to use them to measure--and hence to help answer--how well the unit can do its job.

A categorization of MCCRES requirements

During the MCCRES evaluation the evaluators continuously observe the performance of the unit, take notes, and finally decide on the evaluations Yes or No. The process requires constant attention to the details of the unit's performance. Since observing details and deciding between Yes and No is very tedious, the requirements are grouped so

Battalion	92%
Section	
2.A	89%
2.B	94%
2.C	96%
2.D	N/A
MPS	
2.A.1	93%
2.A.2	86%
2.A.3	87%
2.B.1	94%
.	.
.	.
.	.
Task	
2.A.1.1	100%
2.A.1.2	75%
.	.
.	.
.	.
Requirement	
2.A.1.1.1	Yes
2.A.1.1.2	Yes
.	.
.	.
.	.

Figure 4. A set of scores from a MCCRES evaluation

that the scoring is simplified as much as possible. Thus, rather than assessing the performance of the unit's command, its staff elements, its technical members, and its individual Marines, the evaluators grade the success the unit had in performing the different MPSSs. As we observed at the outset, it is much simpler to decide how successful an operation is, and what were the strong and the weak points of execution, than it is to decide exactly why a unit performed as it did.

The idea of our approach is to classify all 800 MCCRES requirements according to the set of categories in Figure 5 where, it is to be stressed, the numbering has no significance. Originally Z. Barzily proposed nine categories; Category 10 was added during the course of an audit-- of both the concept and the actual assignment of requirements into categories--by instructors of the Infantry Officers Course at the Basic School, Quantico.

1. REPORTING to higher levels of command
2. PREPARING for operations
3. COMMUNICATING (including Communications SOPs)
4. PERFORMING as Marines (discipline, dispersion, camouflage, concealment, using weapons, and so on)
5. DELIVERING supporting fire
6. PLANNING of operations
7. CONFORMING to doctrine
8. EXECUTING operations
9. PROVIDING combat service support (including medical support)
10. SUPERVISING required actions of individual Marines

Figure 5. Ten categories of MCCRES requirements

Consider Figure 6 where all requirements and associated categories are listed for two tasks. Notice first how the different categories cut across task, and even MPS, boundaries. For example, even though the second task in Figure 6, namely Task 2.B.4.2, is itself "preparation," only two of its requirements--2.B.4.2.2 and 2.B.4.2.3--are categorized as Preparing. The remaining six requirements fall under Executing, Providing, Conforming, Supervising, and Communicating.

Task 2.B.1.2 Assault across the beach

- | | | |
|------------|--|---------------------------|
| 2.B.1.2.1 | Preparatory fires lifted or shifted in accordance with fire plan as assault touches down on the beach. | (Category 5 - DELIVERING) |
| 2.B.1.2.2 | Assault elements deploy from assault amphibians and landing craft to attack enemy forces on the beach (KI). | (Category 8 - EXECUTING) |
| 2.B.1.2.3 | FAC'S included with assault elements to direct air against appropriate targets. | (Category 6 - PLANNING) |
| 2.B.1.2.4 | NGF Spot teams included with assault elements to direct fires against appropriate targets. | (Category 6 - PLANNING) |
| 2.B.1.2.5 | 81mm Mortar Plt FO's included with assault elements to control mortar fires as soon as weapons are emplaced. | (Category 6 - PLANNING) |
| 2.B.1.2.6 | Attack inland characterized by aggressive movement and use of firepower. | (Category 4 - PERFORMING) |
| 2.B.1.2.7 | Unit forward command group and FSCC land at time chosen by commander. | (Category 8 - EXECUTING) |
| 2.B.1.2.8 | CF location reported to higher hq. | (Category 1 - REPORTING) |
| 2.B.1.2.9 | Delivery time of planned fires is adjusted to coincide with actual progress on the ground (KI). | (Category 8 - EXECUTING) |
| 2.B.1.2.10 | Unit provides reports to higher hq as situation develops. | (Category 1 - REPORTING) |

Figure 6. Lists of requirements for two tasks

Task 2.B.4.2 Preparation

- | | | |
|-----------|---|------------------------------|
| 2.B.4.2.1 | Unit organizes for combat (KI). | (Category 8 - EXECUTING) |
| 2.B.4.2.2 | Subordinate leaders prepare and issue operation orders. | (Category 2 - PREPARING) |
| 2.B.4.2.3 | Individual Marines and their equipment inspected and weapons checked. | (Category 2 - PREPARING) |
| 2.B.4.2.4 | Ammunition stocks distributed and additional ammunition for indirect fire weapons positioned. | (Category 9 - PROVIDING) |
| 2.B.4.2.5 | Security patrolling effort increased to protect unit as it concentrates on assembly areas. | (Category 7 - CONFORMING) |
| 2.B.4.2.6 | Vehicles checked for fuel state and refueled. | (Category 10 - SUPERVISING) |
| 2.B.4.2.7 | Communications readiness, to include proper distribution of communications security material checked. | (Category 3 - COMMUNICATING) |
| 2.B.4.2.8 | Supplies and equipment to be moved to the objective after seizure prepared for movement. | (Category 9 - PROVIDING) |

Figure 6 (continued)

Let us now explain in some detail the meaning of the categories. Six of the categories together, namely Categories 6 (Planning), 2 (Preparing), 8 (Executing), 1 (Reporting), 7 (Conforming), and 10 (Supervising) mainly evaluate the performance of the command. Category 4 (Performing) evaluates the performance of individual Marines. The third collection, consisting of Categories 3 (Communicating), 5 (Delivering supporting fire), and 9 (Providing combat service support) evaluate the performance of some special groups.

Category 6 (Planning) deals with the question "How well are the operations planned?" See Figure 6 for examples. Category 2 (Preparing) concerns activities which start after some phases of planning have been completed. Preparations include issuing orders, rehearsing, and accomplishing other preliminaries. Category 8 (Executing) contains requirements that measure the leadership of the unit's command and the teamwork. Category 1 (Reporting) includes acknowledgments of receiving orders, reports on progress of operations, and reports on information on the enemy. The next category which evaluates mainly the command is Category 7 (Conforming). Included here are requirements which are easy

to satisfy provided the command does not forget (or overlook) them. Again, see Figure 6 for an example. Last is Category 10 (Supervising) where requirements are satisfied through observation and appropriate direction, usually at company commander or lower levels.

The requirements in Category 4 (Performing) concern how well the Marines, as individuals, are prepared to execute their tasks. Most of these requirements come from MPS 2.A.1 but important ones are evaluated elsewhere; for example, see Requirement 2.B.1.2.b in Figure 6.

The remaining three categories evaluate special groups. Category 3 (Communicating) deals with the performance of the teams in charge of operating radio and wire communications. The question here is "Can the units transmit the required information in the proper manner?" Also included are communications SOPs. Category 5 (Delivering) evaluates the performance of the supporting fire units. Most of these requirements come from 2.A.3 but important instances come from other MPSS. Category 9 (Providing) evaluates the performance of logistics and medical groups.

Each category in Figure 5 corresponds to a vital aspect of the unit's performance during the evaluation and each requirement is assigned to the single category judged to most closely fit the most essential feature of the requirement. The ten categories have been chosen so that they not only make it possible to classify all the requirements but so that they correspond to special areas for training and remedial actions which can be used to improve combat readiness. Indeed, we take the ten categories as the distinguished set of activities that characterize the ability of Marine infantry units to do their jobs. This explains the essence of our approach to Question A--measuring the performance of the units in the individual categories will collectively measure the unit's ability to do its job.

Answering Questions A and B

We recommend calculation and use of a score for each of the ten categories, namely, the percentage of applicable requirement weights that were evaluated Yes. These scores are ten in number and we have found that they measure fundamental outputs from the units tested. Our conclusion is that such scores, namely category scores, show promise of being the individually most useful numerical measures coming from MCCRES to help answer "Can the unit do the job?"

The answer to the first part of Question B--How can units best train in anticipation of their formal evaluations?--is provided for in MCCRES. The standards are known to the units and routinely used as the basis for training in preparation for formal evaluations. In fact, this extends to use of special training materials for individuals, squads, and upwards through all levels.

The key assumption in our approach to the second part of Question B--How can units best train in response to results from their completed evaluations?--is that requirements belonging to the same category pose similar demands on the unit being tested. Thus, they have

equal probabilities of being scored Yes. We have tested the reasonableness of this assumption in two ways. First, we compared category scores for MPSs with category scores for entire evaluations (all applicable MPSs) and have found excellent agreement. Second, we have computed alternative evaluation scores through systematic removal of various sets of optional elements in data from actual evaluations and have found the same type of agreements.

On the strength of the preceding, we advocate use of category scores for isolating trends and for focusing training on fundamental aspects of performance that cut across numerous separate MPSs and tasks in MCCRES. Let us illustrate this by contrasting two sets of category scores.

Figure 7 displays a set of ten category scores from a MCCRES evaluation. The training program that would be recommended in this case would concentrate on MPS 2-A.1, Continuing Actions by Marines, and would place command emphasis on logistical planning and support. We state this because the score for Category 4 (Performing) is the lowest and, in particular, it is considerably lower than the score for Category 8 (Executing). This is usually a direct indication that small unit leaders are unable to carry out orders quickly and effectively.

Figure 8 displays a second set of scores. Although they are quite "different" from the set in Figure 7, it is important to note that both could arise from, say, Figure 4. That is, the same set of official evaluation scores could give rise to two sets of category scores that are as different as those in Figures 7 and 8.

1. REPORTING	91%
2. PREPARING	95%
3. COMMUNICATING	90%
4. PERFORMING	74%
5. DELIVERING	94%
6. PLANNING	91%
7. CONFORMING	77%
8. EXECUTING	98%
9. PROVIDING	76%
10. SUPERVISING	81%

Figure 7. A set of MCCRES category scores

1. REPORTING	94%
2. PREPARING	84%
3. COMMUNICATING	94%
4. PERFORMING	71%
5. DELIVERING	99%
6. PLANNING	96%
7. CONFORMING	94%
8. EXECUTING	90%
9. PROVIDING	94%
10. SUPERVISING	74%

Figure 8. A second set of MCCRES category scores

The set of scores in Figure 8 indicate need for a different kind of training program. We state this because these scores suggest more preparation for exercises. Command Post Exercises (CPX) involving sub-unit leaders and Battalion staff officers would be particularly appropriate. The score for Category 6 (Planning) is high and that for Category 2 (Preparing) is notably low. Whenever a unit does well in planning but falls short in preparation, its ability to execute drops sharply. For the case of Figure 8, considering the preceding and also the scores for Categories 4 and 10, CPX and limited field exercises would be the remedial actions most needed.

In summary, category scores provide the basis for an accurate and easily identifiable method for orienting remedial training most effectively to correct deficiencies. And this can be done at all levels--individual, team, crew, and maneuver element--so commanders can in this way direct training efforts at identified weaknesses. The progression from individual training through maneuver element would stress activities designed to exercise specific categories.

There are additional, more general, uses of the categorization scheme. For example, it can help in the determination of which MPSSs should be applicable in forthcoming MCCRES evaluations. Consider the question: How can some daytime MPSSs be selected that will also serve to train the unit for night attacks? Our approach is that two MPSSs can be considered to be "close" if they require similar efforts from a unit's components so that training for one will also improve the performance of the other. Let us next explain how we have implemented this approach.

We have used a natural method to measure "distance" between MPSs. First we represent each MPS by the set of ten percentages of numbers of requirements per category. For example, MPS 2.A.1 contains 90 requirements, of which 11 fall under Category 1, nine fall under Category 2, and so on. The percentages are distributed across Categories 1,2,..., 10 according to

(12, 10, 5, 21, 0, 3, 20, 15, 3, 11)

so this MPS can be represented by the preceding 10-tuple of percentages. Second, one reasonable measure of distance between two such 10-tuples is the sum of the absolute values of component-wise differences. This distance is well known and has useful mathematical properties; see (3, p.60), for example. Clearly such distances vary from zero, when two MPSs have the same composition, to 200.0 when they have no categories in common. If all categories are equally important, and if any two deviations of $x\%$ are as meaningful as a single deviation of $2x\%$, then this distance can logically be used. We believe that this makes sense and we have found that it yields significant sets of "closely related" MPSs. For example, 2.B.1 and 2.B.5 have many MPSs that are close while none are close to 2.A.3 or 2.D.3. The closest MPS to 2.B.2, Helicopterborne Assault, is 2.B.4, Attack. The closest to 2.B.5, Night Attack, is 2.B.6, Defense.

Concluding remarks

We believe that the preceding indicates how useful the categorization scheme can be for providing answers to A and B. In the present paper we have closely limited our attention to some of the most apparent methods of assessing readiness via MCCRES data. We have carried out additional analyses, and we have further indications that MCCRES as a whole possesses outstanding potential for answering a generalization of Question B, namely, how are resources and readiness related in specific quantitative ways?

See the survey (2) for background on theoretical approaches to readiness; in the present paper we take the "data analysis" approach which was the most promising approach found in (2). The article (4) is an informative account of MCCRES by a battalion commander. Reference (1) is a technical report which presents many details in support of the present paper.

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IN THE YEAR 2036

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