



# **NAVAL POSTGRADUATE SCHOOL**

**MONTEREY, CALIFORNIA**

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## **MBA PROFESSIONAL REPORT**

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**Cost Management in a Tactical Environment:  
A Case Study of the 316<sup>th</sup> Expeditionary Support  
Command (ESC) in Iraq, 2007–2008**

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**By: Matthew B. Mixa and  
Michael J. Williams  
June 2010**

**Advisors: Dale R. Geiger  
Lawrence R. Jones**

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**COST MANAGEMENT IN A TACTICAL ENVIRONMENT:  
A CASE STUDY OF THE 316<sup>TH</sup> EXPEDITIONARY SUPPORT  
COMMAND (ESC) IN IRAQ, 2007–2008**

Matthew B. Mixa, Major, United States Marine Corps  
Michael J. Williams, Major, United States Army

Submitted in partial fulfillment of the requirements for the degree of

**MASTER OF BUSINESS ADMINISTRATION**

from the

**NAVAL POSTGRADUATE SCHOOL  
June 2010**

Authors:

---

Matthew B. Mixa

---

Michael J. Williams

Approved by:

---

Dale R. Geiger, Lead Advisor

---

Lawrence R. Jones, Support Advisor

---

William R. Gates, Dean  
Graduate School of Business and Public Policy

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This project investigates the distinction between cost-benefit analysis and cost management. Although there exist several precedents in which elements of the Department of Defense have practiced cost management, nowhere to be found was an example of applied cost management in a theater of combat. This project provides a case study of the 316<sup>th</sup> ESC, which may begin to fill that void. The 316<sup>th</sup> ESC's staff forecasted future consumption, supervised the execution of operational missions, measured the consumption of resources, and reviewed variances between what was planned and what actually happened. These steps raised questions that fed continuous improvement. Of the many projects initiated by the 316<sup>th</sup> ESC, the two that best exemplified the cost-management process were the institution of supply referrals and the reductions of Meal, Ready-to-Eat (MRE) inventories. Supply referrals significantly reduced inventories, lowered transportation costs, and improved customer wait time. The reduction of MRE inventories saved over \$4.8 million in direct costs, and saved Soldiers' lives by reducing supply convoys. By planning, executing, measuring, and reviewing the consumption of resources, the 316<sup>th</sup> ESC was able to target inefficiency and overconsumption, while providing better service to its customers. It accomplished its mission at the right cost.

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## TABLE OF CONTENTS

|                                                                                     |    |
|-------------------------------------------------------------------------------------|----|
| EXECUTIVE SUMMARY .....                                                             | 1  |
| I. INTRODUCTION.....                                                                | 3  |
| A. BACKGROUND .....                                                                 | 3  |
| B. PURPOSE .....                                                                    | 4  |
| C. RESEARCH QUESTIONS .....                                                         | 5  |
| D. METHOD .....                                                                     | 5  |
| E. SCOPE AND LIMITATIONS .....                                                      | 5  |
| 1. Scope of Project.....                                                            | 5  |
| 2. Limitations of Project.....                                                      | 6  |
| II. BACKGROUND AND HISTORY .....                                                    | 7  |
| A. COST MANAGEMENT TERMS DEFINED .....                                              | 7  |
| 1. Cost Management—Broadly Defined .....                                            | 7  |
| 2. Cost Management—Narrowly Defined.....                                            | 8  |
| 3. The Components of Cost Management.....                                           | 10 |
| a. <i>Leadership-Driven Management</i> .....                                        | 10 |
| b. <i>Cost Measurement</i> .....                                                    | 11 |
| c. <i>Cost Staff</i> .....                                                          | 11 |
| d. <i>Cost Review Process</i> .....                                                 | 12 |
| e. <i>Integration of the Cost Management Components</i> .....                       | 12 |
| 4. The Relationship Between Cost Management and Productivity...12                   |    |
| B. USE OF COST MANAGEMENT IN PRIVATE INDUSTRY .....                                 | 13 |
| 1. Simple Cost-Management Systems Before the Information Age ..13                   |    |
| 2. High-Tech Cost-Management Systems During the Information Age.....                | 16 |
| C. ORGANIZATIONAL-BASED COST MANAGEMENT (FORT HUACHUCA CASE STUDY).....             | 17 |
| D. ROLE-BASED COST MANAGEMENT (NRAD CASE STUDY) .....                               | 19 |
| E. OUTPUT-BASED COST MANAGEMENT (BUREAU OF ENGRAVING AND PRINTING CASE STUDY) ..... | 20 |
| III. METHODOLOGY .....                                                              | 23 |
| A. REVIEW OF THE ISSUE .....                                                        | 23 |
| B. RESEARCH QUESTIONS .....                                                         | 24 |
| C. PROCESS .....                                                                    | 24 |
| D. SUBJECT IDENTIFICATION .....                                                     | 25 |
| E. INTERVIEWS.....                                                                  | 25 |
| F. ANALYTICAL METHOD .....                                                          | 26 |
| G. SELECTION OF SUBJECTS .....                                                      | 26 |
| H. INTERVIEW PROCEDURES AND DATA COLLECTION .....                                   | 26 |
| I. LIMITATIONS .....                                                                | 27 |
| IV. RESEARCH DATA AND ANALYSIS .....                                                | 29 |

|    |                                                                                                         |    |
|----|---------------------------------------------------------------------------------------------------------|----|
| A. | BACKGROUND OF THE 316 <sup>TH</sup> EXPEDITIONARY SUSTAINMENT COMMAND (ESC).....                        | 29 |
| B. | THE PRODUCTION OF THE 316 <sup>TH</sup> ESC .....                                                       | 30 |
| C. | COST MANAGEMENT WITHIN THE 316 <sup>TH</sup> ESC.....                                                   | 33 |
|    | 1. Leadership-Driven Management.....                                                                    | 33 |
|    | 2. Cost Measurement .....                                                                               | 34 |
|    | 3. Cost Staff.....                                                                                      | 34 |
|    | 4. Cost Review Process .....                                                                            | 35 |
| D. | COST CASE STUDIES OF THE 316 <sup>TH</sup> ESC .....                                                    | 36 |
|    | 1. Instituting Supply Referrals Among the Supply Support Activities (SSAs) in Iraq .....                | 37 |
|    | a. <i>Background</i> .....                                                                              | 37 |
|    | b. <i>Requirements for the Referral Process</i> .....                                                   | 37 |
|    | c. <i>Referral Planning</i> .....                                                                       | 38 |
|    | d. <i>Referral Execution</i> .....                                                                      | 38 |
|    | e. <i>Initial Resistance</i> .....                                                                      | 39 |
|    | f. <i>Measured Results of the Referral Process</i> .....                                                | 40 |
|    | 2. Reducing MRE Stockage in Iraq.....                                                                   | 42 |
|    | a. <i>Background</i> .....                                                                              | 42 |
|    | b. <i>MRE Shelf-Life, Inspections, and Condemnations</i> .....                                          | 43 |
|    | c. <i>MRE Planning</i> .....                                                                            | 43 |
|    | d. <i>MRE Execution</i> .....                                                                           | 46 |
|    | e. <i>MRE Results</i> .....                                                                             | 47 |
|    | 3. Cost-Benefit Analysis of Cost Management Within the 316 <sup>th</sup> ESC.....                       | 49 |
| V. | CONCLUSIONS AND RECOMMENDATIONS.....                                                                    | 51 |
| A. | CONCLUSIONS .....                                                                                       | 51 |
| B. | RECOMMENDATIONS.....                                                                                    | 52 |
|    | 1. Recommendations for the Department of Defense .....                                                  | 52 |
|    | a. <i>Sustainment Units Should Refine and Review Methodology for Determining Inventory Levels</i> ..... | 52 |
|    | b. <i>Logistic Planners Should Account for Cost Savings When Assessing Risks</i> .....                  | 53 |
|    | c. <i>Leaders Need to Establish MOE Objectives and Targets</i> .....                                    | 53 |
|    | d. <i>Leaders and Staff Need Better Training in Managerial Accounting and Cost Management</i> .....     | 54 |
|    | 2. Recommendations for Further Study .....                                                              | 54 |
|    | a. <i>Can the Lessons From 316<sup>th</sup> ESC Be Applied to Afghanistan?</i> .....                    | 54 |
|    | b. <i>What Is the Current Status of the Initiatives Started Under the 316<sup>th</sup> ESC?</i> .....   | 54 |
|    | LIST OF REFERENCES.....                                                                                 | 57 |
|    | INITIAL DISTRIBUTION LIST .....                                                                         | 61 |

## LIST OF FIGURES

|            |                                                                                                      |    |
|------------|------------------------------------------------------------------------------------------------------|----|
| Figure 1.  | Department of Defense Budget (From Office of the Secretary of Defense, 2009) .....                   | 3  |
| Figure 2.  | Productivity Equation (After Jacobs, Chase, & Aquilano, 2009).....                                   | 13 |
| Figure 3.  | Productivity Formula (After Jacobs, Chase, & Aquilano, 2009).....                                    | 30 |
| Figure 4.  | 316 <sup>th</sup> ESC Output—Distribution.....                                                       | 31 |
| Figure 5.  | 316 <sup>th</sup> ESC Input—Distribution Costs (From Peltz, Girardini, Robbins, & Boren, 2008) ..... | 32 |
| Figure 6.  | 316 <sup>th</sup> ESC Productivity .....                                                             | 32 |
| Figure 7.  | Cost Review Process (From Geiger, 2009, p. 77).....                                                  | 36 |
| Figure 8.  | Referral Effectiveness ( From 316th ESC, 2008) .....                                                 | 41 |
| Figure 9.  | Referral Volume and Value (From 316th ESC, 2008) .....                                               | 42 |
| Figure 10. | MRE Stockage Objectives (From 316th ESC, 2008) .....                                                 | 48 |
| Figure 11. | IED Attack on STRYKER in Iraq .....                                                                  | 48 |

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## LIST OF ACRONYMS AND ABBREVIATIONS

|         |                                                                                            |
|---------|--------------------------------------------------------------------------------------------|
| 1LT     | First Lieutenant                                                                           |
| AAR     | After Action Review                                                                        |
| ACE     | Assistant to the Commander for the Enterprise                                              |
| AO      | Area of Operation                                                                          |
| BEP     | Bureau of Engraving and Printing                                                           |
| BG      | Brigadier General                                                                          |
| C4ISR   | Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance |
| CENTCOM | United States Central Command                                                              |
| COGS    | Cost of Goods Sold                                                                         |
| CONUS   | Continental United States                                                                  |
| COSCOM  | Corps Support Command                                                                      |
| CPT     | Captain                                                                                    |
| CW2     | Chief Warrant Officer-2                                                                    |
| CWT     | Customer Wait Time                                                                         |
| DASA-CE | Deputy Assistant Secretary of the Army for Cost and Economics                              |
| DFAC    | Dining Facility                                                                            |
| DoD     | Department of Defense                                                                      |
| DOS     | Day of Supply                                                                              |
| EPG     | Electronic Proving Ground                                                                  |
| ERP     | Enterprise Resource Planning                                                               |
| ESC     | Expeditionary Support Command                                                              |
| FOB     | Forward Operating Base                                                                     |
| FY      | Fiscal Year                                                                                |
| GM      | General Motors                                                                             |
| IRB     | Institutional Review Board                                                                 |
| IT      | Information Technology                                                                     |
| JITC    | Joint Interoperability Test Command                                                        |
| LTX     | Logistics Training Exercise                                                                |
| MARS    | Army Military Affiliate Radio System                                                       |

|          |                                                                  |
|----------|------------------------------------------------------------------|
| MKT      | Mobile Kitchen Trailer                                           |
| MNC-I    | Multi-National Corps-Iraq                                        |
| MND      | Multi-National Division                                          |
| MOE      | Measure of Efficiency                                            |
| MRE      | Meal, Ready-to-Eat                                               |
| MRX      | Mission Rehearsal Exercise                                       |
| NETCOM   | U.S. Army Network Enterprise Technology Command                  |
| NPS CMCC | Naval Postgraduate School's Cost Management Certification Course |
| OEF      | Operation Enduring Freedom                                       |
| OIC      | Officer in Charge                                                |
| OIF      | Operation Iraqi Freedom                                          |
| ORM      | Overhead Review Meeting                                          |
| R&A      | Review and Analysis                                              |
| ROI      | Return on Investment                                             |
| RWT      | Requisition Wait Time                                            |
| SARSS    | Standard Army Retail Supply System                               |
| SCE      | Sustainment Command, Expeditionary                               |
| SPAWAR   | Space and Naval Warfare Systems Center                           |
| SPO      | Support Operations Officer                                       |
| SSA      | Supply Support Activity                                          |
| TSC      | Theater Sustainment Command                                      |
| TTP      | Tactics, Techniques, and Procedures                              |
| USPS     | United States Postal Service                                     |

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## EXECUTIVE SUMMARY

This project investigates the distinction between cost-benefit analysis and cost management. The literature review traces the history of cost management as it was developed in the private sector and has been sparingly applied within the public sector. Although there exist several precedents in which elements of the Department of Defense have practiced cost management as a persistent and continuous process, nowhere to be found was an example of applied cost management in a theater of combat. This project provides a case study that may begin to fill that void.

The 316<sup>th</sup> Expeditionary Sustainment Command (ESC) was a logistical headquarters that commanded six sustainment brigades in Iraq during the surge of 2007–2008. Assigned to Multi-National Corps-Iraq (MNC-I), the 316<sup>th</sup> ESC was responsible for the sustainment of all coalition forces. The 316<sup>th</sup> ESC was not the first headquarters to possess this mission. However, unlike its predecessors, it had a reduced structure that was designed to improve logistical support—not by having larger, more costly, static, in-theater inventories, but by leveraging an increasingly dynamic transportation network.

The 316<sup>th</sup> ESC improved the effectiveness and efficiency of distribution by routinely monitoring logistics data. The staff forecasted future consumption, supervised the execution of operational missions, measured the consumption of resources, and reviewed variances between what was planned and what actually happened. These steps, when performed cyclically, raised questions, which in turn fed continuous improvement. Of the many improvement projects initiated by the 316<sup>th</sup> ESC during its year-long deployment, the two which best exemplified the cost-management process were the institution of supply referrals and the reductions of Meal, Ready-to-Eat (MRE) inventories.

1. What the private sector calls transshipments, the U.S. Army calls referrals. When a requisition is not in stock at a warehouse, instead of the supply support activity (SSA) ordering new stocks from the source of supply, it refers the item to the nearest warehouse that has adequate stocks. Previous to the 316<sup>th</sup> ESC's deployment, the supply

infrastructure was digitally networked to refer outstanding requisitions internal to Iraq. However, it was the 316<sup>th</sup> that initiated the actual movement of supplies across unit boundaries and throughout most of Iraq. The 316<sup>th</sup> ESC regularly monitored and reviewed the consumption of cost drivers associated with the distribution of referrals. This practice had the effect of significantly reducing inventories, lowering transportation costs, and improving customer wait time (CWT).

2. When the 316<sup>th</sup> ESC arrived in theater, large quantities of MREs were being condemned each month due to poor storage conditions and overstockage. The 316<sup>th</sup> ESC addressed this problem by reducing the amount of MREs being stored through application of cost-management principles. The 316<sup>th</sup> ESC first determined demand for MREs in Iraq to establish a new stockage objective, then developed and implemented a plan to reach the new objective. Once the 316<sup>th</sup> ESC began executing the plan, it periodically reviewed the plan to analyze variances between forecasted demand and what was actually consumed. By doing this, the 316<sup>th</sup> ESC reduced on-hand stocks in Iraq from 168,000 cases to 110,000 cases, saved over \$4.8 million in direct costs and, most importantly, saved Soldiers' lives by reducing the number of supply convoys on the road moving what would inevitably become excess MREs.

The 316<sup>th</sup> ESC shows that efficiency and effectiveness need not be at odds. By planning, executing, measuring, and reviewing the consumption of resources, the 316<sup>th</sup> ESC was able to target inefficiency and overconsumption, while providing better service to its customers. It accomplished its mission at the right cost.

# I. INTRODUCTION

## A. BACKGROUND

According to Figure 1, from the *U.S. Department of Defense (DoD) National Capital Region PDI Budget Overview* (2009), the DoD base budget and annual war funding Supplemental grew steadily from fiscal year (FY) 2001 to FY 2008. Although the defense budget decreased in FY 2009, as the military transitions its efforts from Iraq to Afghanistan, the budget will spike in FY 2010, fall in FY 2011, and then rise incrementally with inflation. The trend seems to indicate that costs grew rapidly when Operation Iraqi Freedom (OIF) was the DoD's top priority, but costs may grow less dramatically after the transition into Operation Enduring Freedom (OEF) becomes the main effort.

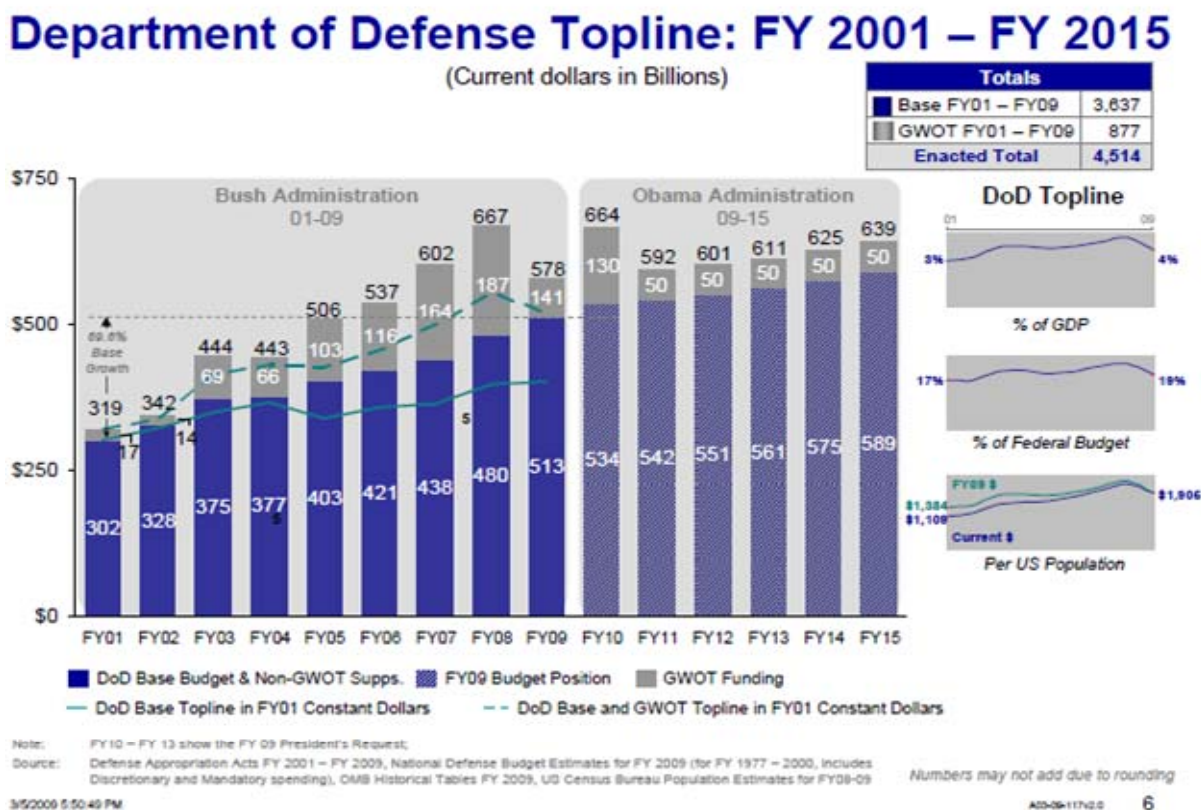


Figure 1. Department of Defense Budget (From Office of the Secretary of Defense, 2009)

Because Afghanistan is a landlocked nation with relatively few natural resources, and because it is difficult to access lines of communication there, logistical functions that support Operation Enduring Freedom cost significantly more than the same functions that support Operation Iraqi Freedom. The costs of fuel, water, food, and maintenance are all greater in Afghanistan than they are in Iraq. Because the unit cost of logistical operations is greater in Afghanistan, it may be a significant challenge for deployed military leaders to stay within the constraints of future budgets.

The information in Figure 1 raises several interesting questions. During the steep budgetary climb during FYs 2003–2008, the environment in Iraq changed in at least three significant ways: (1) overall, the security environment improved; (2) Iraqi forces assumed battlespace and tactical tasks formerly reserved for U.S. forces; and (3) the number of U.S. forces in Iraq eventually fell (after brief surges in 2004 and 2007). A safer environment, less battlespace, displaced tasks, and fewer troops are all factors that could have explained decreasing costs during FYs 2003–2008. Why, then, did costs increase, and at a rate faster than inflation? Further, how can the financial costs of military operations from FYs 2011–2015, which will be largely based in landlocked Afghanistan, avoid a similar fate? Finally, what can military leaders learn about financial costs that would allow them better to control and manage their expenses? Successful corporations become more efficient each year. Could the deployed U.S. military do the same?

The private sector has been learning about costs for almost 200 years. Companies thrive or become extinct as a result of their ability or inability to manage costs. To what extent does the public sector manage its costs? What initiatives has the DoD developed to control its costs? Are there precedents for cost management and control in a deployed environment?

## **B. PURPOSE**

The purpose of this research is as follows: (1) tell the story of the 316<sup>th</sup> Expeditionary Support Command (ESC) during its deployment to Iraq from November 2007 through May 2008; (2) demonstrate how the ESC was able to learn about its

financial costs; and (3) document the effects of that learning. This research can serve as a reference for future deployed leaders, who may need to operate under increasingly tight financial constraints.

## **C. RESEARCH QUESTIONS**

The primary research question is:

- How can deployed units learn about financial costs and reduce expenditures without adversely affecting operations?

Secondary research questions include the following:

- What was the role of leadership in learning about financial costs?
- What was the role of the staff in learning about financial costs?
- How did the staff measure financial costs?
- What process did leaders and the staff use to review financial costs?
- How did the 316<sup>th</sup> ESC apply cost-learning, and what were their results?

## **D. METHOD**

The method used in this MBA project is consistent with case-study research and includes the following: (1) a literature review of books and journal articles relevant to cost management; (2) interviews with personnel within the organization in question; (3) identification of how the organization learned about its financial costs; and (4) development of a case study that portrays financial learning and cost management in a deployed environment.

## **E. SCOPE AND LIMITATIONS**

### **1. Scope of Project**

The project includes six main parts: (1) a summary description of cost management and its components; (2) an explanation of the applicability of cost management in the commercial sector; (3) anecdotal summaries of how cost management has been used by non-profit organizations with organizational-based, role-based, and

output-based control processes; (4) a discussion of how the 316<sup>th</sup> ESC achieved a form of cost management in Iraq; (5) an analysis of the 316<sup>th</sup> ESC's achievements; and (6) recommendations that units deployed in the future can apply the financial lessons developed by the 316<sup>th</sup> ESC.

## **2. Limitations of Project**

Inputs and outputs typically are unique within an organization. Therefore, in a case study, the findings and conclusions supported by the research may prove to be specific to the military unit that was studied, limiting the potential applicability of the research findings for other organizations.

## **II. BACKGROUND AND HISTORY**

### **A. COST MANAGEMENT TERMS DEFINED**

#### **1. Cost Management—Broadly Defined**

“Cost management” is a commonly used term and may have a different meaning for different authors. Robin Cooper and Robert S. Kaplan broadly define cost-management systems as having three functions, namely to: (1) partition expenses between costs of goods sold and inventory, (2) estimate the costs of activities, products, or services, and 3) provide economic feedback about processes and expense control (1999). Under this broad definition, every business or organization that generates either external or internal cost reports performs at least one function of cost management.

The first function of a cost-management system as applied by Cooper and Kaplan (1999) is to allocate expenses between the cost of goods sold (COGS) and inventory. Manufacturing companies require this function to report their profits accurately. For example, a factory incurs monthly costs for the production of new goods. Some goods sell during the month the costs are incurred and others remain in the inventory. The factory’s monthly profit on the goods sold would be the difference between its revenue and the costs of those goods sold, at the exclusion of the costs that increased inventory. The cost information affects financial statements, which are used by capital markets and external auditors. Financial accounting is the field that satisfies these external cost-reporting requirements.

The second function of a broadly defined cost-management system is to estimate the costs of activities, products, or services (Cooper & Kaplan, 1999). The purpose of cost estimation is to inform a cost-benefit analysis, compare the cost of alternatives, and make one-time, quantitative business decisions. Whereas cost allocation typically benefits *external* investors and auditors, cost estimation benefits an organization’s *internal* managers. Cost estimation assists managers in many different ways, including

selecting contractors, determining product mix, negotiating, and designing goods and services. Managerial accounting is the field that satisfies internal cost-reporting requirements.

The third function of Cooper and Kaplan's (1999) cost-management system is "to provide economic feedback to employees and operators about process efficiencies and expense control" (p. 1). The purpose of economic feedback is to learn about costs, evaluate past decisions, and make continuous improvements. The objective of cost-learning is to become more efficient and effective. Whereas cost estimation typically informs one-time decisions, cost-learning is continuous. Managerial accounting is the field that enables internally driven cost-learning requirements.

Obviously, all accounting methods are not the same. For example, financial accounting and managerial accounting serve two separate purposes. Financial accounting is "the accounting for *assets, equities, revenues, and expenses* of a business; primarily concerned with the historical reporting, to external users, of the *financial position* and operations of an *entity* on a regular, periodic basis" (Stickley & Weil, 2007, p. 778). Financial accounting may develop trust with investors, determine taxes, and provide feedback on government policies. Managerial accounting, on the other hand, enhances "the ability of management to do its job of decision making, planning, and control" (Stickley & Weil, 2007, p. 794). Stickley and Weil's definition of managerial accounting encapsulates the second and third functions of Cooper and Kaplan's view of cost-management systems. These last functions are arguably more important than the first, because they inform and enable more efficient and effective operations. As Vatter writes, "The kind of accounting that is of real importance to the business firm is the kind of accounting that 'gets things done'" (1950, p. 510).

## **2. Cost Management—Narrowly Defined**

The parts of Cooper and Kaplan's cost-management system that offer the most benefit to an organization are the managerial functions. Dale Geiger, in his unpublished work, *Leadership Driven Management: Proven, Practical Approaches to Fighting the Cost War in Government*, draws a distinction between single-use cost estimation and

continuous cost-learning. Geiger considers single-use cost estimation to be “cost-informed decision making.” Cost-informed decision-making supports cost-benefit analysis, in which the costs of a decision must be counted and compared to their benefits. Since different courses of action will likely have different costs and different benefits, managerial accounting informs at least half of the cost-benefit equation. Once a manager makes a decision, that cost-benefit equation is relatively obsolete. Future decisions likely will have unique costs and benefits. For this reason, Geiger states that ad hoc “cost-informed decision making should be thought of as a starting point.”

According to Geiger, cost management goes well beyond cost-informed decision-making. It is “an institutionalized process of systematically looking at costs and cost stimulated innovation.” This compares with Cooper and Kaplan’s third function of a cost-management system, which is “to provide economic feedback to employees and operators about process efficiencies and expense control” (1999, p. 1). Geiger holds that cost-management systems raise questions that should drive the continuous improvement process. Thus, cost management must also be a continuous process, not to be confused with single-use, cost-informed decision-making. Almost 60 years ago, Vatter wrote nearly the same thing:

The accounting system is valuable to management not because it answers questions, but because it raises them. [...] Management is never sure that the answers it has adopted in the form of plans for operations are the right ones [...]. The deviations from planned performance (in the form of budget estimates that are not matched by actual costs and revenues, or in the form of variances from standard costs) are question-raising data. From the intelligent raising of questions as to why such deviations occur may be found better ways of accomplishing the tasks that are to be done in the firm. From the managerial viewpoint, the accountant should be the source of questions for management to answer, not in the sense that the accountant requires an “accounting” from operating executives, but in a broader sense of asking the questions that management is curious enough in its own right to want answered. (1950, p. 509, emphasis in the original)

### **3. The Components of Cost Management**

Vatter's description of cost management mentions four ingredients, which precisely match with Cooper and Kaplan's third function as well as the four components of Geiger's model of a cost-managed organization. Geiger's four components of a cost-managed organization are leadership-driven management, cost measurement, a skilled cost staff, and a review process. Each component is so interconnected with the others that it is difficult to discuss one without mentioning the others.

#### ***a. Leadership-Driven Management***

Transitional change, which results from continuous improvement, requires active management. To effectively manage costs, leaders must be accountable for the use of resources. Leaders at all levels should form a "cost chain of command" in which the links are held accountable for the consumption of resources (Geiger). If a leader is not held responsible for the consumption of a resource, he may treat that resource as a "free good" and, therefore, over-consume the resource. One of the purposes of cost management is to locate and reduce over-consumption. If efficient consumption of resources is important to an organization, then leaders at all levels should be involved. If an organization's leaders want to cut costs, then they must motivate, educate, and supervise their workforce, with cost management as a priority. Vatter writes of the relationship between management and accounting:

Management is the making of decisions and the exercise of control; accounting is neither a maker of decisions nor the enforcer of orders nor the disciplinarian of business. Accounting for management is not management, and it should not be thought of as such. But accounting can be made to serve managerial purposes; it can be used to facilitate managerial control; and it can help management to do a better job than could be done without it. (1950, p. 510, emphasis in the original)

Accounting (i.e., cost measurement) never displaces the role of leadership-driven management.

**b. Cost Measurement**

For the purpose of this research, managerial accounting is cost measurement in support of cost management. Cost measurement is one of the key components of a cost-managed organization mentioned by Geiger. The cost accountants, to whom Vatter (1950) makes reference, measure past and current costs. In more mature organizations, they may also predict or forecast future costs. Other common terms for cost accountants in the field of managerial accounting are *cost analysts* or *costers*. Although measuring costs usually is easier than measuring benefits, the discipline of cost analysis can sometimes be as much an art as it is a science. There are as many ways to measure costs as there are costs themselves. Cost accountants have traditionally allocated overhead costs based on a single cost driver, such as “direct labor hours.” However, in the past couple decades, cost accountants have developed activity-based costing, which traces overhead costs to individual products or product lines (Cooper & Kaplan, 1999, p. 210). Whichever method accountants use to measure costs, it is important that they follow the guidance from management. Because the job of measuring costs is endless, if uncontrolled or unconstrained, only leaders can strike the balance between measuring as many costs as needed to feed continuous improvement projects and measuring as few costs as needed to keep the overhead accounting costs at a reasonably low level.

**c. Cost Staff**

A cost-managed organization requires more than just leaders with management skills to provide guidance and make decisions, and more than just accountants to collect cost data. Geiger writes, “Effort and skill is required to transform raw cost data into actionable management information.” The enabler of the cost-management process is the management accountant, the cost analyst, the managerial coster, or the cost controller. Whatever title this person holds, the cost staff must be able to explain historical costs, future costs, cost relationships, and cost tradeoffs (Geiger).

**d. Cost Review Process**

Reviewing and explaining historical costs, future costs, cost relationships, and cost tradeoffs requires a unique process. During the cost review process, the management and staff raise questions based on cost data that target the variances between expected and actual costs. Geiger explains, “Significant differences beg for answers as to why things went worse than expected and what can be done to improve or for answers as to why things went better than expected and what can be done to permanently capture or to expand its impact.” Variances in cost data generate questions. The managers, who compose the “cost chain of command,” provide answers (Geiger). If their answers imply that potential solutions might enable the organization to execute more efficiently, the continuous improvement process could then investigate those solutions as potential changes to an organization’s business plan or strategy.

**e. Integration of the Cost Management Components**

The components of a cost-management system are closely intertwined. If managers do not care to be a part of the process by setting cost goals, establishing the parameters for analysis, and answering questions, then the staff will not know which costs to measure, and no one will hold the cost chain of command accountable for expended resources. If managerial accountants do not measure costs, then there will be no cost data to analyze or compare. If the staff is not trained to understand and explain costs, tradeoffs, and relationships, then the cost-management process may not progress past the identification of problem areas.

**4. The Relationship Between Cost Management and Productivity**

As seen in Figure 2, productivity is a measure of how an entity uses its resources: A student’s time, an investor’s capital, a company’s labor, and a manufacturer’s raw materials all are examples of resources for which productivity can be measured (Jacobs, Chase & Aquilano, 2009).

$$\text{Productivity} = \frac{\text{Outputs}}{\text{Inputs}} = \frac{\text{Goods \& Services}}{\text{Resources}}$$

Figure 2. Productivity Equation (After Jacobs, Chase, & Aquilano, 2009)

Increased output connotes effectiveness. Decreased input connotes efficiency. Both increased effectiveness and efficiency improve productivity. An entity that finds a way to do both—producing more of an output while cutting inputs—ultimately is productive.

How does an organization improve its productivity? While successful research, development, and innovation may generate more outputs, learning about inputs may lead to the more efficient use of resources. The typical measure of inputs is cost. Time, capital, labor, and materials are all resources measured as costs. Learning to consume resources more efficiently is the purpose of cost management. If cost management enables an organization to be more productive through increased efficiency, then that same organization could also become more effective by reinvesting its savings to achieve more output. In this sense, efficiency does not have to come at the expense of effectiveness. Gains made through improved efficiency can promote greater effectiveness. Through cost management, an entity can become both more efficient and more effective. “Doing more with less” should be possible for all organizations that seek greater productivity through cost management.

## **B. USE OF COST MANAGEMENT IN PRIVATE INDUSTRY**

### **1. Simple Cost-Management Systems Before the Information Age**

Before the current Information Age, American firms spontaneously developed cost-management systems to help management make the most effective business decisions. Landmark examples are the textile industry in the early to mid-1800s, American railroads in the mid- to late-1800s, and the birth of the large, multidivisional organization, such as General Motors, in the 1920s. All of the following information

regarding these early and simple cost-management systems comes from H. Thomas Johnson and Robert S. Kaplan's book, *Relevance Lost: The Rise and Fall of Management Accounting* (1991).

Managerial accounting for internal cost management began long before the advent of financial accounting in order to meet external requirements. As American textile companies grew in the early 1800s, they developed economies of scale by moving away from contracting day-laborers to maintaining their own permanent internal workforce and paying the workers a fixed wage. Previously, a textile manufacturer would contract a worker for a fixed quantity of output, not caring how long the worker took to finish the job, because the worker already possessed the incentive to work efficiently. The sooner the worker completed his contracted task, the sooner he could obtain another contract and make more money. The transition to a permanent internal workforce reduced the incentive of textile workers to be productive. Therefore, management searched for and discovered slack by measuring the productivity of its human resources. Accountants measured productivity by dividing an individual's output by his salary. The simple application of the productivity formula worked well because outputs were standardized and slow to change. The resulting cost data enabled managers to learn more about their individual workers and to make quantitative, human resource decisions.

Not only did 19th-century firms develop cost-management systems to become more efficient at producing goods like textiles, but also they eventually used cost systems to develop prices for services. Albert Fink, a senior vice president of the Louisville & Nashville Railroad in the 1860s, devised a cost-management system that allocated 68 different costs to develop the cost per ton-mile. By dispersing his cost staff across numerous locations, "Fink not only could monitor costs per ton-mile for the entire road and each of its subunits, but he could pinpoint reasons for cost differences among subunits" (Johnson & Kaplan, 1991, p. 36). The Louisville & Nashville Railroad had all four components of the Vatter/Geiger model of a cost-managed organization: an involved manager, a skilled staff, effective cost measurement, and a continuous process to examine cost variances.

By the 1920s, increasingly big multidivisional firms, like General Motors (GM), had two problems: the increased complexity of operations, and managerial indifference to the owners' goals. Needing to set goals and to evaluate performance, GM established a managerial accounting system that calculated the return on investment (ROI) for each of its divisions. The cost-management system accomplished three tasks. First, the system compared "each division's operating goals with top management's financial goals" (Johnson & Kaplan, 1991, p. 101). Second, "The system provided sales reports and flexible budgets that indicated promptly if actual results were deviating from planned results. They further specified the adjustments to current operations that division managers should make to achieve their expected performance goals" (Johnson & Kaplan, 1991, p. 101). Third, top management aligned compensation with each division's ability to accomplish high-level financial goals (Johnson & Kaplan, 1991, p. 102). These techniques bridged the gap between owners and managers and created a *cost chain of command* throughout the organization.

Not only did the managerial accounting system facilitate teamwork between owners and managers, but also management used the cost system to better understand their operating environment and to moderate production. Each division had annual and monthly ROI goals. Top managers used sales reports and flexible budgets to determine why ROI was exceeding or falling short of forecasts. The sales report explained to what extent customer sales affected ROI. The flexible budget focused internally to determine to what extent changes in production affected the ROI. When profit targets fell short, managers needed to know where to look to regain the lost ground. For example, if the variance was in sales, then the solution might have been to make changes in the marketing plan. If the problem was in the rising costs of production, then the solution might have been to find different suppliers. The cost-management system helped to identify problems and suggest solutions.

## **2. High-Tech Cost-Management Systems During the Information Age**

The case studies of the textile industry, the railroads, and General Motors apply to business models in which firms mass-produced relatively few types of outputs. By the 1940s, businesses had changed substantially. Johnson and Kaplan wrote the following:

Procedures that seemed simple and sensible for decision making with a handful of products could not be applied to organizations that had grown substantially in size and complexity. It would have been impossible for organizations producing thousands of products through complex multistage production processes to have undertaken the data collection, storage, and processing required for the economists' models. (1991, p. 158)

We can illustrate this by drawing on the analogy of a cost-benefit analysis. By the mid/late 1900s, the cost of cost measurement had overtaken the benefits of managerial accounting. In place of accurate cost estimations, complex companies allocated overhead costs based on simple cost drivers, like direct labor hours (Johnson & Kaplan, 1991, p. 187). It was not until the proliferation of the Information Age in the 1980s that cost management once again became cost effective.

Cooper and Kaplan explain that cost management will once again overcome the technological complexity of modern cost-management systems through the integration of cost measurement systems with enterprise resource planning (ERP) systems (Cooper & Kaplan, 1999, p. 492). The desired end state is to “tightly integrate” cost measurement systems and operational-learning processes so that managers can use cost information for both external and internal reporting requirements (Cooper & Kaplan, 1999, p. xi). As financial and managerial accounting systems merge under a single ERP system, managers within a cost-managed organization will be able to monitor in the short-term “the capacity of the resources supplied, the cost of supplying an hour of productive time on the resource, or the efficiency (time required) in performing the activity” (Cooper & Kaplan, 1999, p. 498).

ERP systems help complex organizations integrate two of the four key components of a cost-management system—cost measurement and the cost-review process. The ERP system can consolidate cost information, making it more available to

both financial and managerial accountants. This is not to say that the employment of an ERP system is a requirement for modern-day cost management. Although an ERP system may be practical for many complex business organizations, the basic foundation for a traditional cost-management system, as described by Vatter and Geiger, remains unchanged: cost-concerned management, a cost staff, effective cost measurement, and a cost review process. Less-complex organizations still can perform cost management without an ERP system.

Organizations currently use three basic types of cost control processes (Geiger). The three types, as detailed by Geiger, are as follows: organizational-based control processes, role-based control processes, and output-based control processes. These next three cases discuss the use of the cost-management process in organizations with each of the three basic control processes.

### **C. ORGANIZATIONAL-BASED COST MANAGEMENT (FORT HUACHUCA CASE STUDY)**

The information for this section relies heavily on the unpublished book *Leadership Driven Management: Proven Practical Approaches to Fighting the Cost War in Government* by Dr. Dale Geiger.

Fort Huachuca employs an organizational-based control process called the “Garrison Management Review.” The Garrison Management Review began as an activity-based costing system and evolved into a successful cost-management process in which planned and actual costs (and their variances) were routinely addressed by the garrison commander and his staff. The Garrison Management Review is used by the Fort Huachuca leadership to find ways to improve the efficiency and effectiveness of the garrison support through learning and continuous improvement.

Fort Huachuca, located in the southern part of Arizona along the U.S./Mexico border, is home to the U.S. Army Intelligence Center and the U.S. Army Network Enterprise Technology Command (NETCOM). Fort Huachuca is also the headquarters of Army Military Affiliate Radio System (MARS), the Joint Interoperability Test Command (JITC), and the Electronic Proving Ground (EPG) (U.S. Army, 2009). Fort Huachuca’s

garrison support system is organizationally structured, with its resources and support allocated through a “chain-of-command.” At the top of the organization is the garrison commander, who has various directorate managers working for him. These directorate managers have subordinates who work for them, etc. Due to the structure of Fort Huachuca, the cost-management structure that evolved there was one based on this inherent organizational structure. As Geiger states, “All organizations have organizational charts and they are powerful things. [...] As such, the organization chart provides a natural basis for financial management and control.”

The cost-management process at Fort Huachuca began in 1997, and after some initial growing pains, it gained momentum and acceptance. It survived several garrison-level changes-of-command, and through the last 10 years, the system evolved as the various garrison commanders modified it to fit their needs. The Garrison Management Review is now an institutionalized process that the garrison staff uses to seek continuous improvement while sustaining quality support with ever-shrinking resources.

There are several key components to its survival and evolution to an institutionalized cost-management process. First, the initial leadership saw the benefits of the system and had the foresight to see it through. Subsequent leaders were shown the successes of the process and built upon those successes. Second, Fort Huachuca had a staff that was capable and competent enough to conduct the cost measurement and planning needed for the reviews. Fort Huachuca’s staff “provided critical support, particularly during the early years” (Geiger). Third, the measurement process evolved over the 10 years to fit the needs of the commander and his staff. The measurement process did not stay rigid and unresponsive. Initially, the staff measured 350 cost activities, but it now measures only about 35 (Geiger). Finally, the after-action review process provided a routine forum in which costs variances could be investigated and used to seek improvement and learning.

#### **D.     ROLE-BASED COST MANAGEMENT (NRAD CASE STUDY)**

The information for this section relies heavily on two works by Dr. Dale Geiger—the book, *Leadership Driven Management: Proven Practical Approaches to Fighting the Cost War in Government*, and the article “Practical Issues in Managerial Cost Accounting” (Geiger, 1998).

This case involves a governmental organization, Space and Naval Warfare Systems Center (SPAWAR), facing budgetary cuts and increased competition from the private sector in 1994. Due to this increased competition, SPAWAR changed its cost measurement process from one that was exclusively externally focused to one that also measured and analyzed internal costs. SPAWAR implemented this process to better understand its internal costs. SPAWAR needed to better understand these internal costs in order to remain viable through submission of more accurate and competitive bids on research contracts.

SPAWAR Systems Center–Pacific is a research center for the Navy located in San Diego, CA. The mission of SPAWAR Systems Center–Pacific is to “Deliver FORCEnet by inventing, acquiring, developing, delivering and supporting integrated and interoperable C4ISR, Business IT and Space Capabilities in the interest of national defense” (SPAWAR, 2009). The San Diego facility employs approximately 7,550 personnel (a mix of government and military), with 4,000 supporting contractors worldwide (SPAWAR, 2009).

SPAWAR is organized generally into support functions and research divisions. This organizational structure can be understood in terms of the roles that each division plays; managers of the overhead support functions have the role to provide a service (e.g., buildings, maintenance) to their customers (the research divisions); the managers of the research divisions conduct research for the Navy and other various governmental organizations (Geiger). Hence, the organization uses a role-based control process for its financial accounting system.

SPAWAR’s cost issues revolved around the allocation of overhead support costs to the research divisions. An example of inaccurate overhead allocation involves the

traditional method SPAWAR used to allocate facility costs. Facility costs were traditionally allocated based on labor dollars spent, not square footage occupied by each division. Because facility costs were allocated based on how many employees a division had versus how much square footage it occupied, some research divisions were occupying buildings they did not use or need.

To address this issue and get a better handle on their costs, SPAWAR implemented an Overhead Review Meeting (ORM) that focused on ensuring costs were allocated accurately to reduce inefficient consumption of resources. As a result of the ORM, managers no longer make decisions based off inaccurate cost information. Additionally, research managers now take a closer look at the overhead support functions since they now pay for these support functions. This cycle of improvements has been so effective that the ORM now occurs monthly and provides a place in which the leaders of SPAWAR can discuss issues, reach agreements on methods to solve problems, and locate and address problem areas.

#### **E. OUTPUT-BASED COST MANAGEMENT (BUREAU OF ENGRAVING AND PRINTING CASE STUDY)**

The case of the Bureau of Engraving and Printing (BEP) involves an organization with output-based control processes. The information for this discussion relies heavily on the research and writings of Dale Geiger in his book, *Leadership Driven Management: Proven, Practical Approaches to Fighting the Cost War in Government*.

The BEP is controlled by the Secretary of the Treasury and organized as a revolving fund enterprise. The mission of the BEP is “to design and manufacture high quality security documents that meet customer requirements for quality, quantity and performance, including counterfeit deterrence” (Olijar, 2007). According to its mission, the BEP not only designs and prints money for the United States but also designs, prints, and produces Federal Reserve notes, Treasury securities, identification cards, naturalization certificates, and other special security documents (Bureau, 2009).

Because of the unique nature of the revolving fund, the BEP’s customers (agencies of the federal government) are not required to buy from the BEP. In the 1990s,

this resulted in the BEP losing its stamp-making contract with the United States Postal Service (USPS) to lower-cost competitors. The loss of the USPS contract was the result of the BEP not accurately allocating costs for producing stamps. Instead of tracking stamp cost by type (simple one-color stamps versus complex commemorative stamps), the BEP simply tracked the average cost for all stamps it produced. Tracking the average cost of all stamps was what external government reports required and so that was the only information the BEP had available. Using the average cost of stamps as the basis for its bid was ineffective, because the BEP's bid for the simple stamp was too high, and the bid it placed for the more-complex commemorative stamps was too low (Geiger). The loss of the USPS contract forced the organization to begin to look at how it was accounting for costs. The BEP felt that if it did not improve its internal cost-management systems, then it would lose more business. If it did not know how much things cost, then it would not be able to bid competitively on future contracts (such as making money) (Geiger).

Today, the BEP uses two meetings that occur monthly. The first meeting is the Pre-Cost Meeting. The focus of this meeting is on manufacturing costs and performance, and the leadership responsible for manufacturing is in attendance. During the meeting, the attendees look at key metrics and variations in those metrics for producing and delivering money.

The second monthly meeting is the Director's Cost Meeting. This meeting is run by the director of the BEP and "is attended by all executive level staff and their key subordinates" (Geiger). During this meeting, attendees cover some of the same ground as that covered in the Pre-cost Meeting, but attendees also look at (for each facility) cost per 1,000 notes produced and security costs per 1,000 notes delivered for the month (Geiger). Attendees also analyze the performance of each facility in the areas of material, labor, overhead, and volume as compared to the standard (Geiger). During this meeting, the leadership discusses and asks questions that are "centered around the root causes of the variances seen, the corrective actions being implemented, and the month to date indicators that might signal a turnaround" (Geiger).

The BEP's cost-management process has been proven to work. The BEP has been cited by the federal government as one of the few government organizations to

receive a favorable opinion on the effectiveness of internal controls over financial reporting (Department of the Treasury, 2007). The BEP's continuous improvement and information exchange allows it to focus its limited resources on problem areas, resulting in the continual streamlining of its process and an overall reduction in costs. As noted in the *Department of the Treasury Budget in Brief FY 2007* report, "Through monthly reporting and analysis of production and cost performance data, program managers receive timely and effective feedback that they use to continually adjust and fine-tune production processes to achieve continuous improvement" (2007, p. 88).

### **III. METHODOLOGY**

#### **A. REVIEW OF THE ISSUE**

The current economic crisis has forced our government to operate with tremendous budget deficits in an attempt to “jump start” the nation’s sagging economy. As a result of this crisis, coupled with an evermore-expensive war in Afghanistan and Iraq, the DoD is going to be faced with the challenge of doing more with less. The DoD must maintain the ability to conduct current operations, train forces, and transform the military. This mission will place unprecedented challenges at the feet of our fiscal resources. How we meet that challenge will determine not only the future methods with which we prosecute the wars in Iraq and Afghanistan, but also how—and to what extent—we transform a Cold War-era military into a 21st-century, technologically advanced Department of Defense.

One approach to answering this fiscal challenge is to become better stewards of the taxpayer’s money. A method to accomplish this that is commonly used by industry is a cost-management approach that looks internally at an organization. This differs from the current government systems that tend to be more externally and regulatory focused. Looking internally forces the organization to measure its costs accurately (by including not only direct costs but also by factoring in indirect costs, such as overhead), plan out what it anticipates its future costs will be, review those anticipated costs to identify any variances, and then focus its limited resources (both personnel and budget) on those variances for improvement. This process enables an organization to produce a culture that routinely looks at costs, learns from them, and then continuously seeks improvement based on that information.

The critical question is how to introduce this form of cost management into an organization. How do you introduce internally focused cost measurement and systematic review in organizations that are operating in one of the most difficult environments in which to conduct cost management—a theater of war? One way is to look at units that have applied some aspects of cost management, and find out why they did what they did.

Ask them how they did it. Then, use their experiences and build on those to implement cost management theater-wide. One unit that conducted cost management steps was the 316<sup>th</sup> ESC that deployed to Balad, Iraq, from July 2007 to August 2008. The 316<sup>th</sup> ESC conducted routine Review and Analysis meetings that regularly reviewed cost data. As a result of the cost reviews, the 316<sup>th</sup> was able to improve the effectiveness of logistical support in Iraq, while simultaneously generating financial savings.

## **B. RESEARCH QUESTIONS**

The 316<sup>th</sup> ESC's Review and Analysis meetings were critical steps in moving toward a new and different approach to cost management in theater. Our research questions focused on these Review and Analysis meetings to gain an understanding of why they conducted these meetings, and, more importantly, how the military can apply the 316<sup>th</sup> ESC's cost lessons to other deployed units in the CENTCOM Area of Responsibility.

## **C. PROCESS**

A case analysis of the 316<sup>th</sup> ESC cost-management process was conducted in order to answer our research questions. The research first focused on what defines the principles of cost management. Next, the history and evolution of cost management was addressed in an effort to understand why organizations developed cost accounting systems from an internal cost-management approach. In researching other organizations, various case studies in industry and the federal government were studied. One difficulty that was discovered when looking at organizations from a cost-management angle is that internally focused cost management in industry is so common that there are not a lot of published case studies on this topic. Adding to the burden, this information is an internal function of the commercial organization and, hence, not a lot of companies have a desire to discuss publicly the methods and systems they use to control costs. The difficulty, when looking at Federal agencies, is the lack of organizations that truly execute cost management. Many organizations make cost-

informed decisions (and mistakenly think that this is cost management), but they do not routinely measure and track costs in order to learn from them and improve upon them.

#### **D. SUBJECT IDENTIFICATION**

The personnel interviewed initially were identified by the authors through contacts made by students attending the Naval Postgraduate School's Cost Management Certification Course (NPS CMCC). An initial teleconference with personnel identified through the student contacts at the NPS CMCC assisted the authors in further identifying individuals associated with the 316<sup>th</sup> ESC Review and Analysis meetings.

#### **E. INTERVIEWS**

The research was based on face-to-face interviews and teleconferences with key personnel from the 316<sup>th</sup> ESC. All personnel were sent a read-ahead that included information on cost-management theory, definitions of various cost management and cost accounting terms, and the interview questions. All interviews and data collected from the interviews were handled in accordance with the policies of the NPS Institutional Review Board (IRB) for the Protection of Human Subjects. The authors received IRB approval to move forward with this project. The interview questions were derived from the research conducted, and the questions have been reviewed by experts in the cost management field. The critical questions asked during the interviews were the following:

1. Why did the 316<sup>th</sup> ESC initiate these Review and Analysis meetings? What was the process? What did they measure? (i.e., What was their methodology?) What was the role of the commander? What tasks did the staff perform?
2. What resources did the 316<sup>th</sup> ESC save as a result of their cost-management system?
3. Did the savings make them more effective? How so? Did they reinvest/spend the money saved on other priorities?
4. How did the 316<sup>th</sup> ESC re-organize itself to conduct cost management?
5. What are some ways that they (the 316<sup>th</sup> personnel) recommend implementing their process in other units? What personnel are needed? What type(s) of skills are needed for the staff?

## **F. ANALYTICAL METHOD**

The research draws on the explanation-building method for analyzing data for a case study, as explained by Robert Yin (2003) in his book *Case Study Research Design and Methods*. The explanation-building method proved the most useful method for analyzing the data due to the qualitative nature of the interview questions and case study (Yin, 2003).

In addition to using the information from interviews, data provided by the 316<sup>th</sup> ESC's PowerPoint presentation *Review and Analysis Year in Review* was used. This presentation contained quantitative data on the Review and Analysis briefings conducted throughout the deployment of the 316<sup>th</sup> ESC, and the information from that brief was used to verify cost savings and logistical improvements made by the 316<sup>th</sup> ESC during its deployment.

## **G. SELECTION OF SUBJECTS**

Subjects were selected for this case study due to their knowledge of the Review and Analysis process conducted by the 316<sup>th</sup> ESC while in Iraq. All human subjects selected for interviews deployed with the 316<sup>th</sup> and contributed to the Review and Analysis meetings in some manner. The subjects' contributions ranged from collecting and preparing the data for the meetings, to participating directly in the meetings, to fixing or investigating areas of concern identified by the commander during the meetings. Subjects were either top-level managers or members of the cost staff.

## **H. INTERVIEW PROCEDURES AND DATA COLLECTION**

The subjects initially were contacted through e-mail to ascertain their level of knowledge of the Review and Analysis meetings, and to ascertain their consent to be part of the project. Once the subjects were identified and had consented to being interviewed, the subjects were sent a read-ahead packet, which contained the initial

questions to be asked, some background information on our case study, and information on cost management, to ensure that we were on the standard theoretical base with the subjects.

Each interview began with a review of the consent form to ensure compliance with IRB protocol. Interviews were open-ended and the subjects' answers to the questions guided any follow-on questions. Once the interviews were complete, data were sent to the Acquisition Research Program's transcription service to be transcribed for follow-on analysis.

## **I. LIMITATIONS**

The biggest limitation for this case study involved the time between the 316<sup>th</sup> ESC's deployment and the interviews with the subjects. Ideally, the interviews would have occurred either during their deployment or shortly after their return home in 2008. This lag in time, the time between redeployment in 2008 and the interviews in 2010, led to some difficulty in ensuring that all key personnel were interviewed and that the subjects' recall of the deployment was accurate. This limitation was partially mitigated by interviewing as wide a range of personnel involved with the Review and Analysis briefings as possible, and by subsequent follow-on interviews to clarify any informational discrepancies between interview subjects. Information that could not be verified, appeared anecdotal, or was contradictory in nature, was annotated in the write-up.

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## **IV. RESEARCH DATA AND ANALYSIS**

### **A. BACKGROUND OF THE 316<sup>TH</sup> EXPEDITIONARY SUSTAINMENT COMMAND (ESC)**

The 316<sup>th</sup> ESC was the first of the reconfigured expeditionary sustainment commands to deploy to Iraq (P. Oppenheim, personal communication, February 4, 2010). The ESC was designed to employ new distribution management concepts and tasks. As the 316<sup>th</sup> ESC Support Operations Officer (SPO), COL Oppenheim related the following:

The focus was on reducing the amount of supplies we had on hand. We wanted to get rid of the “iron mountains” that General Pagonis wrote about in Desert Storm and get this stuff to where we needed it when we needed it. What this requires is an extremely robust transportation system built with massive “pipes”. You need huge transportation pipelines by sea, by air, and by truck to pull this off, and for the most part, we had this. By combining this capability with accurate asset visibility information systems, we were able to achieve greater efficiencies and effectiveness by operating a Pull-oriented versus Push-oriented system. (personal communication, February 4, 2010)

With a headquarters significantly smaller than its predecessors, the unit was responsible for overall logistics operations in Iraq.

Doctrinally, the 1<sup>st</sup> Theater Sustainment Command (TSC) in Kuwait would have controlled the ESC. However, not wanting to relinquish control of logistics internal to Iraq, Multi-National Corps-Iraq (MNC-I) maintained ownership of the logistics processes within the borders of Iraq. Underneath the 316<sup>th</sup> ESC was a single, stand-alone, general support transportation battalion and six sustainment brigades aligned with each Multi-National Division (MND).

Reservists from at least 36 states and four countries provided the bulk of the personnel that belonged to the 316<sup>th</sup> ESC (K.F. Walter, personal communication, January 20, 2010). Many late-comers joined the unit amidst the pre-deployment work-up period, which lasted 10 months. Immediately prior to the deployment, 75 personnel departed the ESC for various reasons. According to the 316<sup>th</sup> ESC’s G-1, last-minute adds and

deletions to their end strength brought the final deployed numbers to approximately 375 personnel (K.F. Walter, personal communication, January 20, 2010).

The 316<sup>th</sup> ESC maximized pre-deployment opportunities to achieve unit cohesion and to prepare for deployed operations. Key staff members conducted site surveys to Iraq, working alongside the unit they eventually would replace. Brigadier General (BG) Couch, the unit's commanding general, had previously served in Iraq as the commanding officer of a Corps Support Group, a predecessor of the sustainment brigades that would later support the MNDs. Unlike the leadership of a typical active duty unit, the leaders of the 316<sup>th</sup> ESC had significant experience in the private sector. Some key billet holders had full-time jobs with companies like IBM, Capital One, or Union Pacific. Not only did some officers possess mindsets influenced by the private sector but also some enlisted soldiers had business backgrounds. One officer related that he had an E-5 with a Master's degree in economics from George Washington University (R. Hohman, personal communication, January 19, 2010). Both the collective training and the diverse experiences of the 316<sup>th</sup> ESC personnel contributed to the outcomes of their deployment.

## **B. THE PRODUCTION OF THE 316<sup>TH</sup> ESC**

As Figure 3 demonstrates, productivity follows a simple formula in which outputs are divided by inputs. Outputs are either produced goods or services. Inputs are the consumed resources in generating production. In the case of the 316<sup>th</sup> ESC, their output was the distribution of supplies. The costs of that output were the costs of distribution.

|                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $\text{Productivity} = \frac{\text{Outputs}}{\text{Inputs}} = \frac{\text{Goods \& Services}}{\text{Resources}} = \frac{\text{Distribution}}{\text{Distribution Costs}}$ |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Figure 3. Productivity Formula (After Jacobs, Chase, & Aquilano, 2009)

Hence, outputs, inputs, and productivity are related. If outputs remain constant but inputs are reduced, then productivity goes up. Similarly, if inputs remain constant but outputs rise, then productivity also goes up. In either case, increased productivity is usually a result of learning. If an organization learns about its output processes, then it often can

increase its outputs. If it learns about its inputs, then it can then find ways to reduce the consumption of its resources. The optimal outcome is to learn about both the output processes and the consumption of resources. To improve both the numerator and the denominator simultaneously has the greatest impact on an organization's productivity. Figure 4 portrays distribution as the networking of transportation and inventory (Peltz, Girardini, Robbins & Boren, 2008, p. iii). Although the 316<sup>th</sup> ESC measured its outputs in various ways, it was concerned mostly with its responsiveness to supported units. Therefore, they sought to reduce customer wait time (CWT). The 316<sup>th</sup> only pursued cost-savings initiatives that either improved CWT or had a neutral effect on CWT.

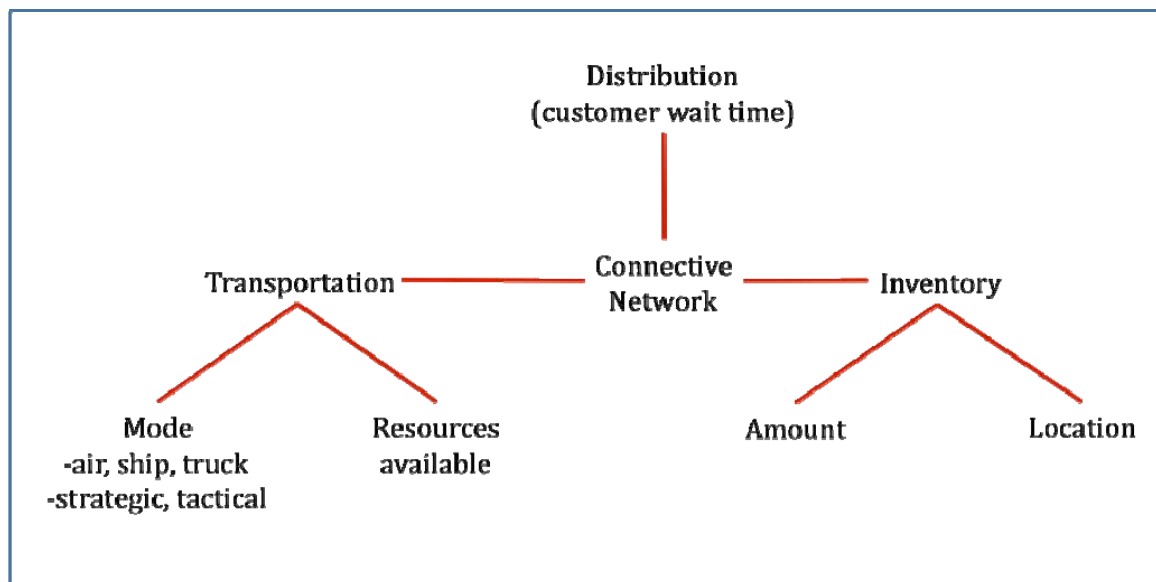


Figure 4. 316<sup>th</sup> ESC Output—Distribution

Customer wait time largely depends on the location of inventories, the size of inventory stocks, the quantity of transportation assets available, and the modes of transportation that are chosen for particular re-supply missions. All inventory and transportation decisions should aim toward providing timely support to customers at the right cost.

As Figure 5 demonstrates, distribution costs include transportation costs, holding costs, and material handling costs (Peltz et al., 2008, p. viii). The weight and/or size of supplies often drive transportation costs. Procurement prices and stock levels affect holding costs. Requirements for packaging and bundling drive material handling costs. In

Iraq, distribution costs could be traded-off in order to optimize both response time and cost. As Peltz et al. (2008) explain, small, expensive items tend to have low transportation costs and high holding costs. Meanwhile, bulky, cheap items have relatively high transportation costs and lower holding costs. The 316<sup>th</sup> ESC targeted all distribution costs. They reduced transportation costs by better utilizing tactical re-supply convoys and by referring outstanding supply requisitions among theater warehouses. They reduced holding costs by eliminating excess inventories. Subsequently, they minimized material handling costs by leveraging intra-theater lift, and often by simplifying and shortening the pipeline between the warehouses and warfighters.

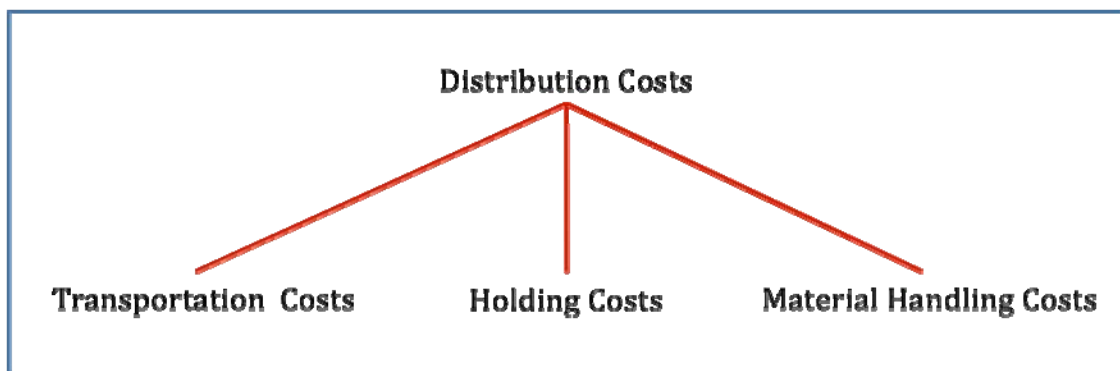


Figure 5. 316<sup>th</sup> ESC Input—Distribution Costs (From Peltz, Girardini, Robbins, & Boren, 2008)

Figure 6 encapsulates the 316<sup>th</sup> ESC's two productivity initiatives: (1) to improve CWT and (2) to reduce transportation, holding, and material handling costs. The 316<sup>th</sup> ESC believed that distributing goods and services throughout Iraq while managing the costs were complementary goals (G.E. Couch, personal communication, February 26, 2010).

$$\text{316}^{\text{th}} \text{ ESC Productivity} = \frac{\text{Customer Wait Time (CWT)}}{\text{Transportation Costs, Holding Costs, Material Handling Costs}}$$

Figure 6. 316<sup>th</sup> ESC Productivity

## **C. COST MANAGEMENT WITHIN THE 316<sup>TH</sup> ESC**

The term *cost management* can have different meanings to different writers. This research, as applied to the 316<sup>th</sup> ESC, adheres to the definition given by Dr. Dale Geiger: cost management is “an institutionalized process of systematically looking at costs and cost stimulated innovation” (2009, p. 64). A cost-management system includes four components: leadership-driven management, cost measurement, a skilled cost staff, and a review process (Geiger). Each interconnected cost management component was present in the 316<sup>th</sup> ESC during its deployment to Iraq during the 2007 surge.

### **1. Leadership-Driven Management**

Cost-management systems do not exist to serve accountants and staff officers. They serve leaders. They assist those who are ultimately responsible for the allocation and consumption of resources. The leader who understands that a cost-management system informs better decision-making by raising questions about operations will want to be closely involved in the process. The commanding general of the 316<sup>th</sup> ESC was a good example of an involved leader-manager within a cost-management system.

BG Gregory Couch’s intentions were clear: “I owe it to my leadership and to the American public to meet my mission, but still be cognizant of the funds that are given to me to do the job” (G.E. Couch, personal communication, February 26, 2010). Nested within those two broad objectives were more specific goals, such as (1) continually improving CWT, (2) increasing utilization of intra-theater airlift and surface convoys, and (3) eliminating excess inventory. Each goal was broken into parts. Each part had its own set of metrics and cost drivers, which the 316<sup>th</sup> ESC reviewed daily, and discussed weekly. LTC Robert Hohman, the theater supply officer of the 316<sup>th</sup> ESC, had this to say about BG Couch’s reliance on quantitative performance metrics and cost drivers: “He’d go and get a chart and he could read it like nobody I’ve ever seen. He’d see a spike where you wouldn’t see a spike and you had to justify it because ninety-nine percent of the time he was right” (R. Hohman, personal communication, January 19, 2010). The 316<sup>th</sup> ESC routinely forecasted demand for its services, monitored CWT, watched inventories, and tracked the utilization of transportation. In the leader’s presence, the staff explained

variances, isolated problems, and proposed solutions. Not only did BG Couch provide clear guidance to his staff, but also he stayed engaged in the routine efforts to improve the effectiveness of their services and to do it at less cost.

## **2. Cost Measurement**

The 316<sup>th</sup> ESC used simple managerial accounting tools to follow output and to track cost drivers. In terms of measuring performance, they used the Standard Army Retail Supply System (SARSS) to track CWT throughout the area of operations (AO). In terms of measuring costs, staff officers used Excel worksheets to chart the consumption of cost drivers. The 316<sup>th</sup> ESC forecasted and graphed inventories, followed the utilization levels of transportation assets, and monitored bottlenecks in the supply pipeline. Since the 316<sup>th</sup> ESC's main objective was to improve responsiveness to supported units, and since higher headquarters did not give them specific goals, targets, or quotas regarding cost-cutting, the staff did not explicitly count direct and indirect costs. Instead, they measured the consumption of costly resources. It was only toward the end of the deployment that the staff went back and tried to quantify the financial savings resulting from the improved management of cost drivers. Not many soldiers are trained to allocate direct and indirect costs to units of production, but as LTC Hohman said, "Everybody had the innate abilities to use a spreadsheet" (personal communication, January 19, 2010).

## **3. Cost Staff**

In emerging U.S. Army cost management practices, developed by the Deputy Assistant Secretary of the Army for Cost and Economics (DASA-CE), the staff officer in charge of the cost-management system is called the Assistant to the Commander for the Enterprise (ACE). The ACE's role resembles that of a controller in the private sector. He is not one who himself collects and presents cost data. Instead, he is a mentor who coaches and guides the staff and/or sub-unit commanders to track, measure, and report their own costs.

The 316<sup>th</sup> ESC had a staff member who unknowingly functioned in the role that later became known as ACE. His name was COL Paul Oppenheim. COL Oppenheim, as the SPO, managed all external support missions, to include current operations, future operations, and plans. He was the staff officer who set the agenda for the Operations Review and Analysis (R&A) meetings within the 316<sup>th</sup> ESC staff. At these meetings, the staff would brief the leadership regarding routinely collected performance and cost metrics.

#### **4. Cost Review Process**

The true value of routinely collected performance and cost information is revealed by the process in which leaders review completed actions. Most U.S. military organizations in Iraq conduct after-action reviews (AARs) as a standard operating procedure (SOP) after completing combat operations. The purpose of the AAR is to ask questions about what transpired and to evoke collective learning in which new tactics, techniques, or procedures (TTPs) can be developed and applied to future operations. Tactical units always seek improvement because there is never a positive amount of casualties or a satisfactory number of mistakes. MajGen Graves Erskine said at the dedication of the 3rd Marine Division cemetery on Iwo Jima in March 1945, “Victory was never in doubt. Its cost was.” This idea about the human costs of war can be equally applied to the financial costs of OIF.

It is the cost review process that the commander and his staff should use to doubt, question, challenge, and explain costs. Through this process, like a tactical AAR, units can learn about their costs and subsequently work to reduce them. Figure 7 portrays the basic steps of the process. Each of the red arrows pointing back to the preceding boxes represents feedback loops by which leaders could learn about their ability to plan costs, execute costs, and measure costs. Cutting costs should never be arbitrary. Cost-cutting should always be based on knowledge and understanding about why costs are what they are. Reviewing costs encourages questions. Questions encourage answers. Answers imply learning.

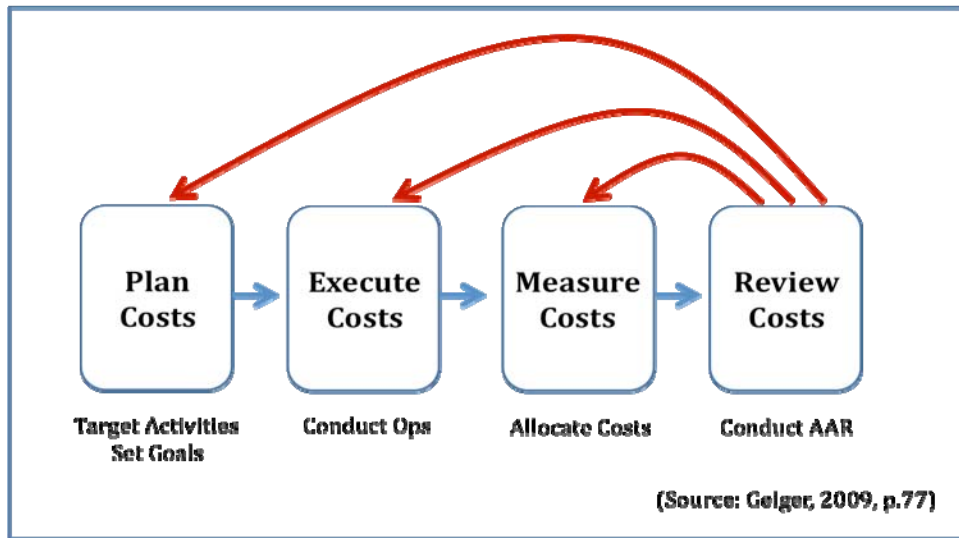


Figure 7. Cost Review Process (From Geiger, 2009, p. 77)

The 316<sup>th</sup> ESC staff participated in several training exercises prior to their deployment. In none of these training evolutions did they exercise any form of a cost review process. The first unit-level training evolution was a Logistics Training Exercise (LTX) at Fort Lee. Subsequently, the 316<sup>th</sup> ESC participated in two Mission Rehearsal Exercises (MRXs) at Fort Bragg. It was not until arrival in Iraq that they began a routine review and analysis process that examined past performance and cost drivers. COL Oppenheim said, “The R&A process is one that is inherent to our military organizations. The 13<sup>th</sup> Sustainment Command, Expeditionary (SCE) before us had an R&A process as well, so we didn’t invent the process. Quite frankly, I don’t remember doing any R&As prior to us going over there, primarily because we didn’t have any data to work with” (P. Oppenheim, personal communication, February 4, 2010).

#### D. COST CASE STUDIES OF THE 316<sup>TH</sup> ESC

BG Couch had many different logistical processes that he and his staff reviewed and analyzed. Two examples were (1) the institution of supply referrals among Supply Support Activities (SSAs) in Iraq and (2) the reduction of on-hand inventories of rations. These examples serve as small case studies in themselves that show how an R&A process can lead to improved conditions for supported units at significantly less cost.

**1. Instituting Supply Referrals Among the Supply Support Activities (SSAs) in Iraq**

***a. Background***

Each military base in the United States has one or more SSA that either carries inventories in support of individual units or an entire region. The SSAs develop re-order points that account for both safety stock and pipeline stock. If an SSA cannot meet the requirements of a requisition with on-hand supplies, then the requisition often is referred to another SSA. The SARSS provides inventory visibility across the networked SSAs, showing on-hand quantities of various inventories. Because the transportation network in the United States is very robust and reliable, and because many SSAs are near one another, referred supplies can move between the SSAs more quickly than an SSA could requisition shortfalls from the U.S. Army's contracted sources of supply. The referral process in the United States shortens supply pipelines and reduces customer wait time.

***b. Requirements for the Referral Process***

Standard operating procedures in the United States often are a bad fit for expeditionary operations in a combat zone. Whereas supply referrals work well in the continental United States (CONUS), various obstacles can hinder the ability to refer supplies during the early phases of combat operations: shortage of transportation assets, immature transportation networks, lack of supply infrastructure, segmented or separated SSAs, communication incompatibilities, a close sense of ownership for on-hand supplies, etc. However, as a theater becomes more mature, these early obstacles may erode, as they did in Iraq. If the sustainment brigades and sustainment commands were designed to reduce inventories through an increased reliance on distribution-based logistics, then it was sensible for leaders to initiate improvements that would rely more on "massive pipes" and less on "iron mountains" (P. Oppenheim, personal communication, February 4, 2010). As the surge was beginning in 2007, the Iraqi theater already had SSAs networked in SARSS, reliable multi-mode transportation

networks, excess transportation capacity and, in some cases, excess inventories (G.E. Couch, personal communication, February 26, 2010).

***c. Referral Planning***

When the 316<sup>th</sup> ESC arrived in Iraq, the SSAs were networked, but they were not referring supplies to/from one another (G.E. Couch, personal communication, February 26, 2010). The idea of initiating referrals originated when BG Couch and Chief Warrant Officer-2 (CW2) Brooks noticed that an SSA had ordered urgently needed tires from the United States when excess tire inventories were on hand at a nearby SSA G.E. (Couch, personal communication, February 26, 2010). According to Peltz et al. (2008, p. viii), the most cost-effective distribution option for high-demand, inexpensive, and heavy items, such as tires, is to ship them into theater via sealift and then forward-position them in stocks nearest the units in need. BG Couch commented:

We realized that if the referrals had been turned on and if that unit had gotten tires from this other SSA [...] we could have saved quite a few dollars. That started this whole me-forcing-the-issue of having referrals turned on, certainly within all the SSAs that I controlled. It was a significant dollar figure that we saved by just turning on referrals which would eventually lead to closing some SSAs and consolidating them. (personal communication, February 26, 2010)

Of the 24 SSAs in Iraq, the 316<sup>th</sup> ESC, through its sustainment brigades, controlled 11.

***d. Referral Execution***

The MNDs owned the remainder of the SSAs. Instituting referrals among both subordinate and adjacent SSAs required persuasion. CW2 Brooks was the class IX officer for the 316<sup>th</sup> ESC. His duties included briefing and explaining metrics, such as customer wait time, requisition wait time, and fill rates during the R&A meetings (J.R. Brooks, personal communication, January 22, 2010). As the lead action officer for the referral process, he also told the story about how difficult a job it was in the beginning to persuade subordinate SSAs to participate fully in the referral process:

I developed a report where every day I could see what referrals were due. Different units would go through the process of making it seem as if they had shipped it, but then they kept that item in their warehouse. They wouldn't actually release it. But if you went into SARSS, it would appear as if it had shipped. So then we instituted a policy where any referral leaving the warehouse had to have an RF tag on it. That way we could track it from the time it was shipped to where it was received by the customer. That's when people started coming on board. (J.R. Brooks, personal communication, January 22, 2010)

COL Oppenheim described how the referral network grew to include some SSAs that belonged to the MNDs.

The first thing we did was to turn our own referrals on within the SSAs that the 316<sup>th</sup> controlled. Then the 1<sup>st</sup> Armored Division at the time, which was up north, was interested in it, saw the sense of it, and said, "Hey, sign us up. We'd like to experiment with this and see if it works." Well, it worked for them and then the word got out and pretty much everybody else said, "Sign us up too." And then we started fine tuning it. (personal communication, February 4, 2010)

By the end of the 316<sup>th</sup> ESC's deployment, 17 out of 24 SSAs in the Iraqi Theater of Operations were participating in the referral process (316<sup>th</sup> ESC, 2008, Slide 49). Initial resistance eventually gave way to positive results, which further drove the growth of the referral network.

#### ***e. Initial Resistance***

Because the referral process was foreign to OIF, some resistance was only natural. CW2 Brooks relayed that "nobody thought referrals would work—not one person that I spoke to. People want to hoard their stuff" (J.R. Brooks, personal communication, January 22, 2010). The 316<sup>th</sup> ESC speculated that some SSAs felt that the new system would be to their disadvantage, assuming they referred more supplies *out* than were referred *in* (G.E. Couch, personal communication, February 26, 2010; J.R. Brooks, personal communication, January 22, 2010). Units also thought that the referral process would take away supplies that they would one day need. One way the 316<sup>th</sup> ESC overcame the pessimism was by instituting a policy to protect supplies below the re-order points (J.R. Brooks, personal communication, January 22, 2010). Safety stock and

pipeline stock were not touched. The other way was to shorten the pipeline and prove that increased speed would improve requisition wait time.

Another source of pessimism was the new requirement for SSAs to bear new material handling costs. Since the time SSAs were first established in Iraq, they had grown accustomed to receiving a one-way flow of containers and pallets of supplies. The new referral process would task them with putting supplies in containers or pallets for intra-theater shipment to adjacent SSAs. BG Couch's opinion about the pessimism surrounding the new material handling costs was as follows:

I think what they were feeling was: "there is a lot of extra work here that we're either going to have to get LOGCAP to do, pay for more LOGCAP employees to go to the SSAs, or I'm just going to be overwhelmed by all this extra stuff that we're going to have to get ready and get out of here." It really turned out to not be that much extra work. (personal communication, February 26, 2010)

In an effort to mitigate the extra material handling costs for subordinate SSAs, BG Couch worked with the Air Force to create a *hub-and-spoke* out of Balad to ship pure pallets to receiving SSAs, which included many referrals. "The Air Force was telling us that their flights were about thirty to forty percent efficient. I think we got up to somewhere around sixty percent at one point. The hard part was how do you get everything to Balad, repackage it, and then get it back out on that spoke. But, we did it" (G.E. Couch, personal communication, February 26, 2010). Receiving fewer, larger pallets of supplies may have reduced the material handling costs at the receiving SSAs, but it likely transferred those costs to Balad where the supplies were reconfigured into pure pallets. As the 316<sup>th</sup> ESC looked at the issue using a cost-benefit approach, it is likely that any extra costs in material handling were more than off-set by increased utilization of C-130s and reductions in convoys (G.E. Couch, personal communication, February 26, 2010).

#### ***f. Measured Results of the Referral Process***

Referrals affected productivity because the system improved both operational effectiveness and logistical efficiency. Figure 8 compares the requisition wait time (RWT) for referrals with that of all classes, all issue priorities, and all sources of

supply. The referral process saved approximately 7 days in wait time (316<sup>th</sup> ESC, 2008, Slide 54). For class IX repair parts, which were 82% of all referrals, the process saved 2–3 days RWT, per item (316<sup>th</sup> ESC, 2008, Slide53).

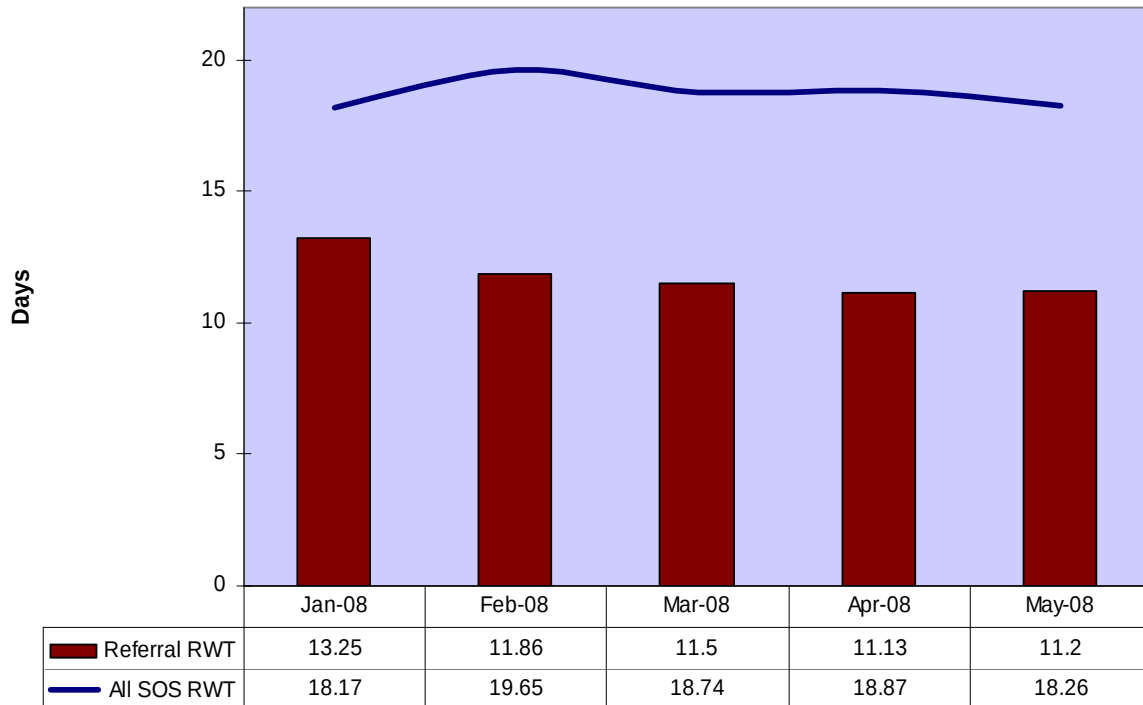


Figure 8. Referral Effectiveness ( From 316th ESC, 2008)

Some SSAs had more success than others. For example, the SSA in Taji reduced its wait time by 19 days over the course of a four-month period. RWT fell from 28 days in January 2008 to 9 days in May 2008 (316<sup>th</sup> ESC, 2008, Slide 55). Faster RWT reduces mean downtime (MDT). As MDT gets smaller, equipment availability, i.e., readiness, improves.

On the other side of the productivity equation, referrals reduced inputs by reducing the costs of distribution. Figure 9 shows the number of referrals during the first 7 months of the program, as well as the procurement portion of the holding costs (316<sup>th</sup> ESC, 2008, Slide 52). To compete with the speed of the referral process, these supplies would have required strategic air transportation at a cost of \$2.86 per pound (316<sup>th</sup> ESC, 2008, Slide 56). Over the past 10 months, the 316<sup>th</sup> ESC referred over 32 million pounds

of parts (316<sup>th</sup> ESC, 2008, Slide 56). Assuming that these supplies would likely have come into theater via strategic air transportation, the cost avoidance to CENTCOM may have been over \$65 million.

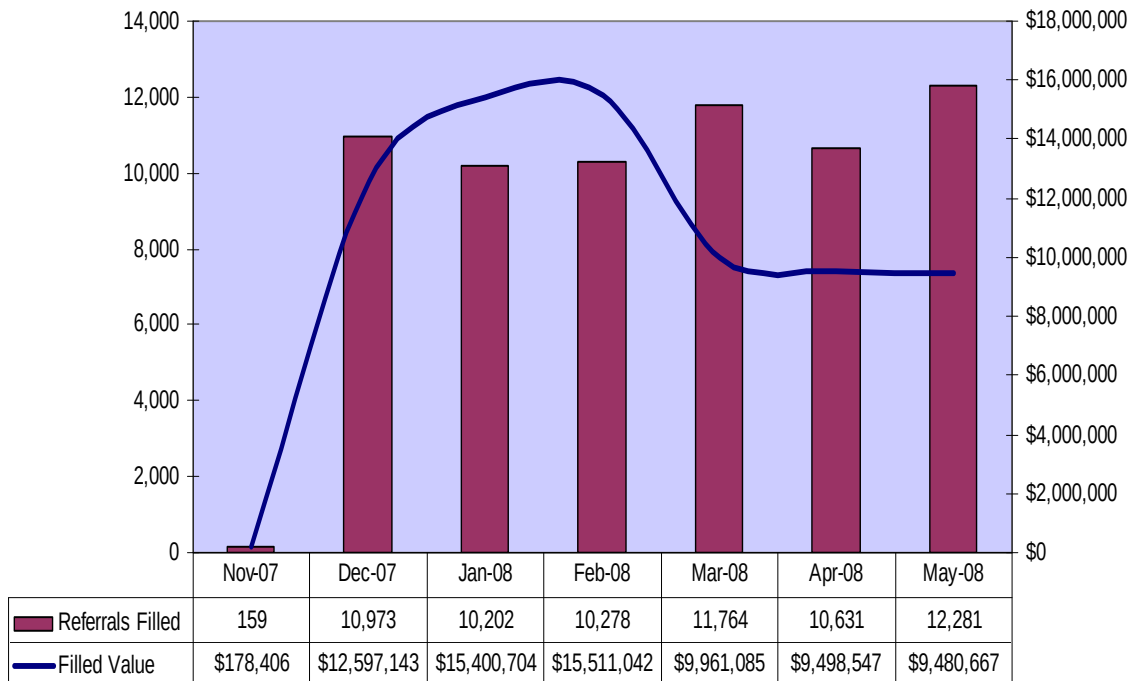


Figure 9. Referral Volume and Value (From 316th ESC, 2008)

## 2. Reducing MRE Stockage in Iraq

### a. Background

Napoleon Bonaparte is famously quoted as saying, “An Army travels on its stomach.” In the United States Armed Forces, this quote still holds true. How well a Soldier eats affects his morale and his ability to conduct operations effectively. The military’s standard is that Soldiers, Sailors, Airmen, and Marines will be provided three quality meals daily (Headquarters, United States Army, 2005). In the deployed environment, the meal staple is the Meal, Ready-to-Eat (MRE). The MRE is “designed to sustain an individual engaged in heavy activity such as military training or during actual military operations when normal food service is not available” (Defense Supply Center

Philadelphia Directorate of Subsistence Operational Rations Division, 2008). During Operation Iraqi Freedom (OIF), U.S. forces deployed with enough MREs to provide each Soldier with three MREs a day for as many days as designated by the commander. This stockage standard of three MREs per Soldier per day was continued after the initial invasion through the arrival of the 316<sup>th</sup> ESC in the summer of 2007.

***b. MRE Shelf-Life, Inspections, and Condemnations***

The MRE has a shelf-life of 3 years at 80 degrees Fahrenheit (Defense Supply Center Philadelphia Directorate of Subsistence Operational Rations Division, 2008). Storing MREs in cool, dry places can extend the MRE shelf-life. However, in Iraq, the MREs were being stored “out in the sun under no shade, no cover; they were out in the elements and that includes all the sun, sand, the germs” (J.J. Jones, personal communication, January 21, 2010). Under the conditions faced in Iraq, the MREs were good for two months before they needed to be inspected by the veterinarians (J.J. Jones, personal communication, January 21, 2010). After the initial inspection, the veterinarians re-inspected the MREs on a monthly basis, due to the poor storage conditions. During these inspections, the veterinarians condemned large quantities of MREs (\$31 million worth since 2003) due to exposure to heat, rodent infestations, germs, etc. (316<sup>th</sup> ESC, 2008).

***c. MRE Planning***

When the 316<sup>th</sup> ESC arrived in theater, MRE inventories averaged 168,000 cases. The average weekly issue for Iraq was 17,000 cases of MREs, roughly 10% of on-hand stocks (316<sup>th</sup> ESC, 2008). The veterinarians had been condemning a large quantity of MREs due to the fact that units were not issuing them out fast enough for the conditions in which they were being stored (J.J. Jones, personal communication, January 21, 2010). The 316<sup>th</sup> ESC set about solving the problem. The first course of action they looked at was improving the storage conditions. According to First Lieutenant (1LT) Jerry Jones, “We looked at getting climate control containers, CONEXes, just reefer vans that we could keep the temperature below 80 degrees to

store massive amounts of MREs” (J.J. Jones, personal communication, January 21, 2010). This plan to address the storage conditions of the MREs was not well-received by commanders in theater because it would involve bringing in/building hardstand structures. Commanders in theater were attempting to reduce their footprint, and building more hardstand structures would increase it. Also, attempting to fix the problem by building more storage capacity was not very cost effective since it cost roughly \$40,000 for a container that could hold only 1,000 cases of MREs (J.J. Jones, personal communication, January 21, 2010).

After determining that building better storage facilities was not a viable solution, the 316<sup>th</sup> ESC’s Class I section, Officer In Charge (OIC) Captain (CPT) Rusty Lepley and Deputy OIC 1LT Jerry Jones, looked at the problem from a different angle. Instead of building more storage capacity, they looked at reducing the stocks in theater, which would, in turn, reduce the amount that needed to be stored. By reducing the amount that needed to be stored, they felt they could reduce the amount condemned.

To be able to reduce the stocks in theater, CPT Lepley and 1LT Jones determined the actual demand for MREs in Iraq. The 316<sup>th</sup> ESC Class I section determined demand by looking at the past 30-, 60-, and 90-day averages of MREs issued, instead of simply using theater headcount (i.e., for every Soldier in theater, order three MREs per day) to determine demand. While reviewing usage data, they confirmed that support units in Iraq were storing more MREs than needed; CPT Lepley and 1LT Jones determined that the “issues [of MREs] did not add up to the stockage objectives” (J.J. Jones, personal communication, January 21, 2010). After collecting and analyzing the data, the 316<sup>th</sup> ESC switched to using the average number of MREs issued as the metric for determining and forecasting demand, rather than the old method of Soldier headcount. 1LT Jones commented, “We didn’t want to base it [demand] off of head count, because we knew that head count would lead to overages; we didn’t want to have that [overages]” (J.J. Jones, personal communication, January 21, 2010). Also, while looking at the last 90 days of data on MRE issues in theater provided the 316<sup>th</sup> ESC with a more accurate demand metric, 1LT Jones felt that it did not go back far enough to properly determine demand. 1LT Jones felt that, depending on the different operations occurring (such as

moving into or out of the cities), the demand for MREs could change and affect their efforts to determine a baseline for their plan (J.J. Jones, personal communication, January 21, 2010). 1LT Jones decided to use the data for issuing MREs from the previous six months to refine the demand metric used in forecasting future demand.

After determining demand for MREs, the next step was to determine what the metric day-of-supply (DOS) meant. When the 316<sup>th</sup> ESC arrived in theater, the metric for DOS was three MREs per Soldier per day. When 1LT Jones and CPT Lepley began looking at the data, they discovered that most Soldiers were eating a majority of their meals at the Forward Operating Base's (FOBs) Dining Facilities (DFACs) and not consuming MREs. Even those units that pushed out into the cities as part of General Petraeus' surge operations had the ability to feed themselves through Mobile Kitchen Trailers (MKTs) or meals pushed out from FOB DFACs. According to 1LT Jones,

When we started looking at it [the data] we noticed that what we're actually issuing out to the units that are going outside the wire, [which] are basically the only units using MREs, because we had MKTs, Mobile Kitchen Trailers, and we have the DFACs [to support those living on the FOBs]. We have Soldiers that are, even if they are going outside the wire for six, seven hours a day, they are still getting two, if not three, meals at a DFAC. (personal communication, January 21, 2010)

Based on the historical information, 1LT Jones re-calculated what the DOS for MREs was from the standard three MREs per Soldier per day and again used historical data and current operations to determine what a DOS would mean.

Armed with the information on actual demand in theater and the definition for the metric DOS for MREs, CPT Lepley and 1LT Jones developed a new plan and forecast for MRE stocks in Iraq. They briefed their plan to reduce MRE stocks to BG Couch during a Review and Analysis meeting, and received his approval to begin executing the new 30 DOS plan. The 316<sup>th</sup> also briefed both the 1<sup>st</sup> TSC and MNC-I (18<sup>th</sup> Airborne Corps at the time). Both 1<sup>st</sup> TSC and MNC-I approved the plan, with MNC-I actually ordering a reduction down to 25 DOS. The Class I section reworked the numbers and began reducing and restaging MRE stocks in theater.

***d. MRE Execution***

In the initial phase of executing the new MRE plan, 1LT Jones ran into some initial pushback from the sustainment brigades in Iraq. The plan called for a change to something the theater had been doing the same way for over five years. 1LT Jones had to overcome the sustainment brigade's arguments of not being able to support operations, the brigade's fear of having to tell a supported unit "no," and the "just in case" mentality ingrained in most support organizations. This pushback from the brigades was overcome through BG Couch and, in the case of units out west, the MNC-I C4 forcing the sustainment brigades to implement the new plan.

Another issue discovered by the 316<sup>th</sup> ESC during the early execution of the plan was the communications breakdown between support units in Iraq and the support organizations stateside. The 316<sup>th</sup> ESC had briefed their plan and received approval to reduce the MRE stocks in theater from both 1<sup>st</sup> TSC and MNC-I. They did not, however, inform the stateside support organizations (the Defense Logistics Agency and the Defense Supply Center Philadelphia) of the change in the MRE plan. The stateside organizations were tracking status using the old metrics and when they saw that MRE stocks were reduced in theater, they saw the reduction as a potential supply/production issue and began inquiring if they needed to produce and ship more MREs to theater. The 316<sup>th</sup>, in conjunction with 1<sup>st</sup> TSC, quickly addressed this issue to ensure that all support organizations were aware of the new metrics being used for MRE management.

Once the plan was implemented and began being fully executed by the 316<sup>th</sup> ESC and their subordinate units, 1LT Jones reviewed the data on a monthly basis to look for variances in the plan and to continue to update the forecast for future consumption. To forecast future consumption, 1LT Jones relied on historical data (using a moving average) and also on any upcoming operations. 1LT Jones also briefed any variances between the planned and actual consumption to BG Couch once a month at the R&A briefing. The purpose of reviewing the plan and briefing results was to enable learning and improvement. 1LT Jones states:

What I really enjoyed about working for my command, in particular General Couch, was the philosophy of, “Okay, let’s come up with a plan and if something deviates from that plan, as long as we can figure out what that [the deviation] is, account for it later.” And when I say account for it later, [I mean] incorporate it into the plan and then move forward. (personal communication, January 21, 2010)

The plan was not a static plan but a dynamic one. The variances between planned and actual consumption were identified by the 316<sup>th</sup> ESC, explained, and lessons learned were incorporated into future forecasting and planning.

***e. MRE Results***

Figure 10 shows the results of the MRE stockage objective plan. On the left side of the graph is the number of MRE cases in theater, with the bottom of the graph representing time. The solid line is the number of MRE cases on hand in Iraq and the dashed line represents the 316<sup>th</sup> ESC’s stockage objective of 110,000 cases of MREs. The plan resulted in a reduction of on-hand stocks by 55,000 cases, resulting in a minimum savings of \$4,859,159 (316th ESC, 2008). The minimum savings figure only accounts for direct savings from not purchasing 55,000 cases of MREs. It does not account for the reduction in transportation costs, storage costs, etc. Even more importantly, the \$4.8 million does not account for the number of Soldiers’ lives saved by reducing the number of convoys put on the roads to haul around excess MREs and, therefore, avoiding attacks like the one seen in Figure 11.

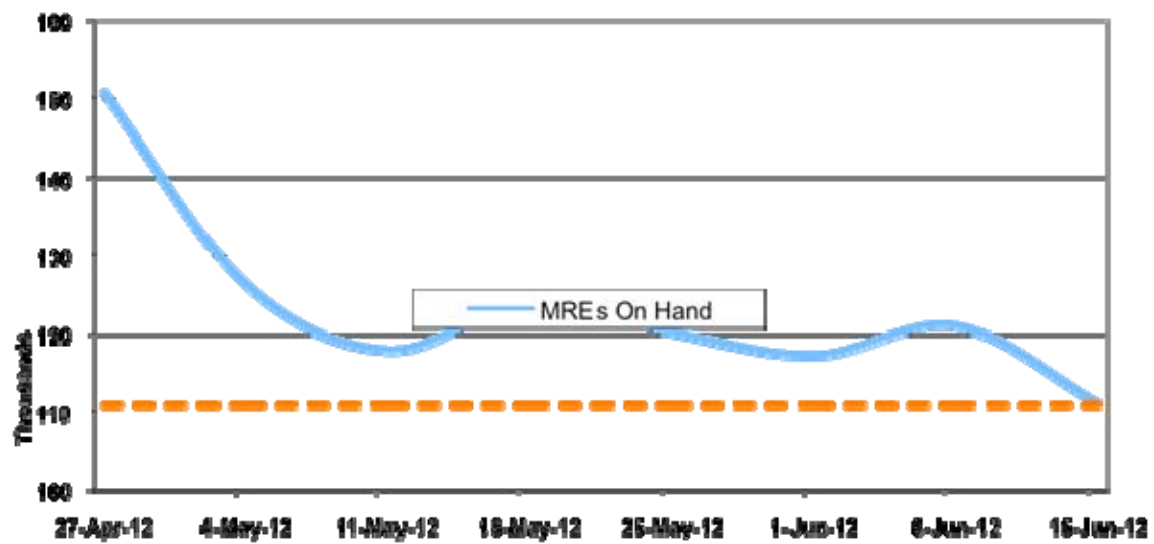


Figure 10. MRE Stockage Objectives (From 316th ESC, 2008)



Figure 11. IED Attack on STRYKER in Iraq

In addition to reducing the amount of MREs being stored in theater, and thus reducing the amount of MREs condemned, the MRE stockage plan enabled the 316<sup>th</sup> ESC to identify potential issues of fraud, waste, and abuse. Through analysis of planned versus actual consumption, the 316<sup>th</sup> ESC noticed that there was a sector of Iraq that was

consuming more MREs than what was planned. Upon investigation, it was determined by the 316<sup>th</sup> ESC that certain coalition forces were shipping MREs home and that was why their consumption levels were so much higher than what was forecast (J.J. Jones, personal communication, January 21, 2010). The identification of this waste would have been extremely difficult without the forecasting and subsequent review of variances. When asked if this spike would have been identifiable had the 316<sup>th</sup> ESC not measured and reviewed costs, 1LT Jones responded, “It would have been hard to track it” (J.J. Jones, personal communication, January 21, 2010).

### **3. Cost-Benefit Analysis of Cost Management Within the 316<sup>th</sup> ESC**

The consensus among those officers interviewed during the course of the research is that the review and analysis process was well-worth the effort. The benefits were greater than the costs. Among the numerous cost-saving initiatives that improved effectiveness, the referral initiative and the MRE reductions saved more than \$70M. Customer wait time (CWT) improved for referred supplies and service levels were not significantly affected by MRE stock reductions.

The 316<sup>th</sup> ESC’s leadership-driven management did incur an opportunity cost in diverting the staff and commander from other duties as they sought continuous improvement and cost control of logistical support throughout Iraq. During the initial part of their deployment, the Review & Analysis meetings were weekly. Staff officers soon complained that the meetings were too frequent: No sooner had one meeting ended than preparation for the next meeting had to begin. The opportunity cost of the meetings (and all the data-gathering required) was that it precluded the staff from conducting other important tasks properly. Therefore, the meetings became bi-weekly. This created a better balance between Review & Analysis meetings and other duties. As practiced by the 316<sup>th</sup> ESC, the cost-management process had no costs, in excess of opportunity cost. It required no additional personnel and no unique, external training.

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## **V. CONCLUSIONS AND RECOMMENDATIONS**

### **A. CONCLUSIONS**

The 316<sup>th</sup> ESC employed a cost-management system that resembled processes pioneered in the private sector. Their system's interconnected components included (1) leadership-driven management, (2) effective cost measurement, (3) a competent cost staff, and (4) a cost review process. All components working together raised questions and provided solutions that had a significant impact on both the effectiveness and efficiency of logistical operations in Iraq during the surge. As a result of increased output at lower cost, unit productivity significantly improved over the course of their deployment. This outcome was deliberate. The 316<sup>th</sup> ESC routinely planned operations, executed missions, measured cost drivers, and reviewed variances. The review process provided a feedback loop that was used by the staff continuously to modify future plans, operations, and the consumption of valuable resources.

Among the many accomplishments of the 316<sup>th</sup> ESC, two examples best illustrate their cost management approach to continuous improvement. Those examples are (1) the initiation of a referral process among several SSAs and (2) the reduction of MRE inventories in Iraq. By instituting referrals, the 316<sup>th</sup> ESC improved the CWT of supported units while consuming fewer resources, mostly in terms of reduced transportation and holding costs. Reducing MRE inventories maintained effectiveness, but at significantly less cost. Not only did the cost savings include easy-to-measure procurement costs, but also harder-to-measure cost avoidances, such as fewer battle damages and human casualties, as a result of fewer logistics convoys in a highly dangerous and tumultuous theater of war.

The 316<sup>th</sup> ESC was not manned, trained, or encouraged to conduct the tasks associated with cost management. Through responsible leadership, common sense, and utilization of the tools at-hand, the 316<sup>th</sup> ESC aggressively pursued simultaneous improvements in distribution and reductions in distribution costs.

## **B. RECOMMENDATIONS**

### **1. Recommendations for the Department of Defense**

The authors recommend that more military units implement a leadership-driven cost-management system in which they forecast, measure, and routinely review costs. This process may enable learning, through which they can become more effective and efficient. In addition to the above recommendation, we offer four specific recommendations: (1) Sustainment units should refine and review their models for determining supply inventory levels; (2) logistics planners should assess the risks of not being able to support operations due to inadequate inventories and compare the shortfalls with cost savings; (3) units should establish measures of efficiency (MOE) by which they can plan, execute, measure, and review costs; and (4) deploying leaders and staffs should be specifically trained in cost management.

#### ***a. Sustainment Units Should Refine and Review Methodology for Determining Inventory Levels***

Sustainment units should refine and periodically review their methodology (e.g., formulas, regulations, base-lines) for determining inventory levels. The method that sustainment units use needs to be dynamic and have the ability to change as the situation warrants. By reviewing the results of their methodology against what was forecast, units would see variances (either favorable or unfavorable) between planned and actual objectives. From these variances, units could determine if the formula (for example) used to achieve the planned objective was still valid and effective (i.e., using Soldier headcount and three MREs per Soldier per day in a theater in which a majority of personnel eat at DFACs). If during the review sustainment units determined that inventory levels were inadequate (too much risk or not meeting support objectives), inefficient (i.e., condemning millions of dollars of supplies due to overstocking), or that the inventory objective itself had changed, the command could then refine the formula to ensure inventory levels were aligned with forecasted objectives.

***b. Logistic Planners Should Account for Cost Savings When Assessing Risks***

Inventory risk needs to be scrutinized by leadership from a more holistic viewpoint, with all costs being considered when determining the level of acceptable inventory risk. This recommendation does not imply that risk play a less important role. Instead, it advocates that when determining the amount of supplies to keep on hand, the command consider the entire picture—that is, become less risk-averse. When considering inventory risk, commanders need to consider the true costs (in inventory level, putting Soldiers on the road to move supplies, condemnations due to overstocks, etc.) for an incremental decrease in risk. By considering all costs and becoming less averse to risk, commanders can keep inventories at more realistic and effective levels, allowing for sustainment units to become more effective and efficient in supporting the warfighter.

***c. Leaders Need to Establish MOE Objectives and Targets***

Leaders need to establish MOE (for example, wait time used by the 316<sup>th</sup> ESC for referrals) objectives and then forecast targets for their various MOEs. An MOE can be viewed in the same light as a measure of effectiveness; however, instead of informing a commander about how effective he is, the MOE is a measurement tool that provides the commander information on how efficient he is. Forecasting MOE targets forces the unit to develop a plan to achieve that target. This plan then provides the unit with a baseline to which they can compare planned versus actual results, and conduct variance analysis to increase efficiency and effectiveness. Another benefit in developing the plan is that it will enable learning. Personnel will learn as they develop the plan because they will need to understand what the target should be (15% reduction in wait times for referrals, as an example), what information is needed, how to collect that information, etc. Learning will also occur when actual results are reviewed against the planned targeted results. Those who developed the plan will learn if the assumptions they made were valid, if they are collecting the right data, etc. Finally, in establishing targets, leaders will force accountability into the process because personnel responsible for the plan will now have to explain why they did/did not meet their forecasted target.

***d. Leaders and Staff Need Better Training in Managerial Accounting and Cost Management***

In order to motivate commands to better understand their costs, leaders and staffs should be better trained in managerial accounting and cost management. Cost management is not just a field for comptrollers and financial managers. It is a field for all leaders in the chain of command who are responsible for the consumption and allocation of resources. Commands at all levels should be able to forecast costs, execute operations, measure actual costs, calculate variances, ask questions about those variances, and generate cost-informed solutions. For a deployed military that has grown used to getting everything it asks for, survival in an increasingly resource-constrained environment may require cost-management training and education that will help reverse habits that were formed during several years of rapidly expanding budgets.

**2. Recommendations for Further Study**

***a. Can the Lessons From 316<sup>th</sup> ESC Be Applied to Afghanistan?***

One area for further research is to determine whether what the 316<sup>th</sup> ESC did in Iraq is possible in Afghanistan. Afghanistan offers different challenges than what the 316<sup>th</sup> ESC faced in Iraq. The fact that Iraq's in-theater distribution network is more established, and that supplies can be shipped in via ground from several friendly neighboring countries, are just two of the many differences between the two theaters. However, the underlying philosophy that the 316<sup>th</sup> brought into theater (that of methodically improving effectiveness and efficiency) may still be applicable to sustainment operations in Afghanistan.

***b. What Is the Current Status of the Initiatives Started Under the 316<sup>th</sup> ESC?***

Another area for further research is to investigate if initiatives started under the 316th ESC have been sustained, improved upon, or expanded in the Iraqi theater. The 316<sup>th</sup> ESC redeployed over two years ago (2008) and, during that time, Iraq

has experienced a significant drawdown and change to the operating environment. The reduction in forces (along with the simultaneous build-up of forces in Afghanistan) provides opportunities for case studies of units continuing and expanding the application of leadership-driven management and cost control.

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