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AN ANALYSIS ON THE APPLICABILITY OF A PRIVATE FINANCE INITIATIVE TO MEET USMC ENGINEER EQUIPMENT NEEDS

by

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December 2003

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The purpose of this report is to investigate the feasibility of supporting United States Marine Corps Engineering Equipment operation and maintenance requirements through a Private Finance Initiative (PFI). The reason for this comparison is that the Marine Corps has realized that the current operating structure is not cost effective. This report evaluates what a PFI is and how it is structured. Information is provided by the United Kingdom Ministry of Defense (UK MOD), which is considering a PFI solution to its engineer equipment needs. The UK Ministry of Defense has used PFI's extensively over the past decade to meet a variety of service support requirements. Next, the report will analyze the mission, requirements, operations, structure, and emerging concepts of the USMC engineer community to determine what functions the Marine Corps does well and which are core to its business. Based on this information, the report will propose a PFI structure that would meet all USMC engineer equipment operation and maintenance needs. The draft PFI attempts to address all of the particular requirements that the Marine Corps would need to consider in this type of contractual relationship.

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ABSTRACT

The purpose of this research paper is to determine the feasibility of supporting United States Marine Corps Engineering Equipment operation and maintenance requirements through a Private Finance Initiative. The reason for seeking this comparison is that the Marine Corps has realized that the current operating structure is not cost effective and that resources are used up that could be better spent elsewhere. This study will first evaluate what a PFI is and how it is structured to operate, using information provided by the United Kingdom Ministry of Defense, which is considering a PFI solution to its engineer equipment needs. The UK Ministry of Defense has used PFI's extensively over the past decade to meet a variety of service support requirements. Next, the thesis will analyze the mission, requirements, operations, and structure of the USMC engineer community to determine what functions the Marine Corps does well and which are core to its business. With this information, the thesis will propose a draft PFI structure that would meet all USMC engineer equipment operation and maintenance needs. The draft PFI will attempt to address all of the particular requirements that the Marine Corps would need to consider in this type of contractual relationship.

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LIST OF ACRONYMS AND ABBREVIATIONS

AAAV	Advanced Assault Amphibious Vehicle
ACE	Air Combat Element
AGS	Aviation Ground Support
AIS	Automated Information System
AMC	Air Mobility Command
AO	Area of Operation
AOR	Area of Responsibility
APOD	Aerial Port of Debarkation
APOE	Aerial Port of Embarkation
ATLASS	Asset Tracking Logistics and Supply System
ATRA	Army Training and Recruiting Agency
BOO	Build, Own, and Operate
BOOT	Build, Own, Operate, Transfer
CARC	Chemical Agent-Resisting Coating
CEB	Combat Engineer Battalion
CINC	Commander-In-Chief
CLI	Contractor Logistics Support
CONUS	Continental United States
COTS	Commercial-of-the-Shelf
CSS	Combat Service Support
CSSD	Combat Service Support Detachment
DBFO	Design, Build, Finance Operate
DCMF	Design, Construct, Manage and Finance
DFAR	Defense Federal Acquisition Regulations
DLA	Defense Logistics Agency
DOD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EA	Evolutionary Acquisition
EMC	Engineer Maintenance Company
EOD	Explosive Ordnance Disposal
EOM	Echelon of Maintenance
ES	Engineer Systems
ESB	Engineer Support Battalion
FACE	Forward Aviation Combat Engineering
FAR	Federal Acquisition Regulation
FASA	Federal Acquisition Streamlining Act
FCM	Field Capable Maintenance
FMF	Fleet Marine Force
FSSG	Force Service Support Group
GAO	General Accounting Office
GTES	Ground Transportation and Equipment Section
HCE	Heavy Construction Equipment
HMMWV	High Mobility Multi-Wheeled Vehicle

HMT	Her Majesty's Treasury
I&L	Installation and Logistics
ILC	Integrated Logistics Concept
IMA	Intermediate Maintenance Activity
IPMT	Integrated Project Management Team
IPT	Integrated Product Team
ITS	Individual Training Standard
LCC	Life Cycle Cost
LHA	Landing Helicopter Assault
LHX	Landing Helicopter Experimental
M&RA	Manpower and Reserve Affairs
MAGTF	Marine Air Ground Task Force
MAW	Marine Aircraft Wing
MCLB	Marine Corps Logistics Bases
MCLC	Marine Corps Logistics Command
MCMC	Marine Corps Material Command
MCWP	USMC War Publication
MEB	Marine Expeditionary Brigade
MEF	Marine Expeditionary Force
MEP	Mobile Electric Power
MEU	Marine Expeditionary Unit
MHE	Material Handling Equipment
MIMMS	Marine Corps Integrated Maintenance Management System
MIS	Management Information System
MOD	Ministry of Defense
MOS	Military Occupational Specialty
MPF	Maritime Preposition Force
MSC	Major Subordinate Command
MSR	Main Supply Route
MTM	Motor Transport Maintenance Company
MWSG	Marine Wing Support Group
MWSS	Marine Wing Support Squadron
NCF	Naval Construction Force
NFCM	Not-Field Capable Maintenance
NPS	Naval Post Graduate School
NPV	Net Present Value
NSN	National Stock Numbers
O&M	Operation and Maintenance
OBC	Outlined Business Case
OCONUS	Outside the Continental United States
OJT	On the Job Training
OMB	Office of Management and Budget
OMFTS	Operational Maneuver from the Sea
PFI	Private Finance Initiative
PM	Preventive Maintenance
POD	Port of Debarkation

POE	Port of Embarkation
PPP	Public Private Partnership
RCI	Residential Communities Initiative
SASSY	Support Activity Supply System
SMU	Sassy Management Unit
SOR	Schedule of Requirements
SR	Sponsored Reserve
T/E	Table of Equipment
T/O	Table of Organization
TAM	Table of Authorized Material
TCO	Total Cost Ownership
TMO	Traffic Management Office
UK	United Kingdom
USMC	United States Marine Corps
VFM	Value for Money

I. INTRODUCTION

A. BACKGROUND

The 1990's saw a decrease in the budget for the Department of Defense (DOD) as well as a reduction in manpower, a sharp contrast to the defense-spending boom of the 1980's. The reason for the decrease was the end of the cold war. The American taxpayer and policy makers expected a peace dividend that could address other concerns facing the nation. The 1990's however, saw not a decrease in the need for the military, but rather an increase in operational requirements to deal with a plethora of conflicts and contingencies around the world that posed new challenges to the DOD. These increased requirements put tremendous pressures on the DOD and strained its resources, both monetary and manpower. The New World Order it seemed was going to pose new challenges.

As a result, the DOD began to look for ways and areas where it could cut costs and increase efficiencies. There was a clear realization within the DOD that the military was lagging behind the private sector in its business and operational processes, especially in the area of logistics. This realization led to a number of reform attempts within each branch of the DOD. The reforms attempted to adapt best business practices to DOD processes and operations, especially those aimed at increasing sustainability and reducing total cost ownership (TCO).

The DOD outlined its new vision for dealing with the New World Order challenges in the Joint Vision 2010 document and subsequently the Joint Vision 2020. These documents offered a guide of how the DOD would have to transform itself to meet the challenges of the new century. They offered not only a roadmap to the transformation of the war fighter component, but also the necessary transformation of the logistics processes that would enable the services to operate much more effectively and efficiently than in the past. In the year 2000, DOD outlined its adoption of Evolutionary Acquisition (EA) philosophy, through its DOD 5000 series. It stated, "Evolutionary acquisition strategies shall be the preferred approach to satisfying operational needs"[1].

[1] Department of Defense, *Department of Defense Directive 5000.1*, pp.4, 2000.

At the same time that the DOD was seeking to transform itself, the Federal Government procurement process was also being transformed so that the government could adopt more effective commercial practices and take advantage of the advanced technologies available in the commercial sector. Following the defense boom of the 1980's, the federal procurement process had become to be seen as wasteful, full of fraud and abuse and unresponsive to the needs of the war fighter. The federal government acquisition process, like the DOD was had come to be seen as lagging behind the private sector. As a result, two major pieces of legislation where passed in the 1990's to help increase the efficiency and responsiveness of the federal government acquisition process. These were: the Federal Acquisition and Streamlining Act (FASA) of 1994 and the Clinger-Cohen Act of 1996. These laws introduced the "use of credit cards, electronic contracting, increased purchase of commercial-off-the-shelf (COTS) instead of "mil-spec" commodities and a relaxation or elimination of many rules.[2]"

These laws in addition to increased emphasis on outsourcing from executive branch directives such as Office of Management and Budget (OMB) Circular A-76 opened the way to many reforms. Reforms that have sough to increase the efficiency on how the DOD does business by using products, services, and processes from the private sector. This increase realization that the military can learn from the private sector and use it to fulfill many of its requirements has opened the door to using it to fulfill many DOD needs. Initially, the focus was on using commercial off the shelf (COTS) and best business practices. However, it was soon realized that the private sector itself could be used to fulfill all military requirements directly. This led to a wave of outsourcing initiatives that sought to use the private sector to cut cost, improve responsiveness, and to free up military personnel for military tasks. While initially the outsourcing was limited to non-military tasks such as landscaping or messing facilities, it has over time evolved to include tasks that directly support military operations such as maintenance or security functions.

This move towards outsourcing what was once considered as inherently governmental functions has occurred through a variety of Public Private Partnerships

[2] Pegnato, J.A., "Assessing Federal Procurement Reform: Has the procurement Pendulum Stopped Swinging?," Journal of Public Procurement, Volume 3, Issue 2. p.147. 2003.

(PPP) arrangements that seek to take advantage of private sector efficiencies. The scope of the PPP being used over time has grown resulting in an increased reliance of the military on the private sector. This reliance has forced the DOD to deal with the issue of having contractors on the battlefield and the implications that this has on policy and the rules of war. In addition, by relying on the private sector the DOD limits its own options and ability to change because most PPP are long term commitments by both parties and they are difficult to stop or reverse once they are in motion. Despite these issues, today, all of the services are pushing forward varying PPP as a means to save costs, increase responsiveness, and to achieve their transformation to the force outlined in Joint Vision 2020.

In this setting, the United Stated Marine Corps (USMC) has been experimenting how to achieve its transformation, to become the future war fighting force outlined in Joint Vision 2010 and 2020. In particular, the Logistics community of the USMC has spent the last decade attempting to evolve its logistics processes to meet the challenges of the future. Its three primary logistics commands, Installation and Logistics Department (I&L), MARCORSYSCOM (Marine Corps System Command), and the recently formed MARCOMLOGCOM (Marine Corps Logistics Command) have undertaken numerous initiatives and experiments in its attempt to modernize and improve the USMC logistics processes and operations. A particular method that all three USMC logistics commands are pursuing is PPP as a means to increase efficiency and responsiveness.

The purpose of this thesis will be to analyze the applicability of a particular PPP for the USMC that will permit the outsourcing of its engineering equipment requirements. The particular PPP will be the Private Finance Initiative (PFI) concept used by the United Kingdom Ministry of Defense (UK MOD), who has used them to meet a variety of needs over the past decade. The UK MOD is currently considering a bid to outsource its engineer equipment requirements to the private sector via a PFI arrangement[3].

The interested agency of this topic is the Engineer System (ES) section within the Ground Transportation Equipment Section (GTES) of MARCORSYSCOM, which is

[3] Colby, I. RE: PRIVATE FINANCE INITIATIVE INFORMATION REQUEST. Available E-mail from EVPWFM@dpa.mod.uk. 9 September 2003.

looking for an analysis of PFI applicability to meet USMC engineering equipment[4]. Another thesis[5], June 2003, concluded that the USMC had excess engineering equipment on hand, and that there are cost benefits that can be achieved through an outsourcing solution[6].

B. PURPOSE

This thesis will investigate the feasibility of using a PFI to meet USMC engineer equipment requirements. Specifically, the intent is to determine how such a PFI should be structured to meet USMC engineer equipment needs and the particular requirements that it should address. The proposed PFI would need to meet both the USMC garrison and expeditionary engineer equipment requirements. This concept would offer engineer planners a flexible template that can serve as a planning document to decide whether form an Integrated Product Team (IPT) to look assess this concept further.

C. SCOPE

The scope of this project is to provide MARCORSYSCOM with recommendations related to the following three objectives:

- Determine if a PFI form of PPP is a viable alternative to meeting USMC engineer equipment needs.
- Outline how a proposed PFI solution would work.
- Outline the contract requirements that MARCORSYSCOM would need to address in a proposed PFI solution.

This analysis will first define the structure of a PFI to define what it is, how it operates, how it is structured to support services and requirements. It will examine key aspects of a PFI, to include its potential benefits and associated risks; it will also explain how it differs from other outsourcing options currently being used by the DOD. The

[4] Michael J. Farley. THESIS TOPIC. Available E-mail from FarleyMJ@mcsc.usmc.mil. 9 May 2003.

[5] Blaxton, A.C., Fay, M.J., Hansen, C.M., Zuchristian, C.M., *An Analysis of USMC Heavy Construction Equipment (HCE) Requirements*. MBA Professional Report, Naval Post Graduate School, Monterey, California, June 2003.

[6] Ibid

model of the PFI considered in this thesis will be the one used throughout the past decade by the UK MOD; one of the many PPP arrangements that they have used to meet a variety of their equipment and services requirements both within country and throughout the world. A decade ago, the UK MOD found itself in a similar position to that which the DOD faces today: increasing commitments and falling resources. The UK MOD is currently analyzing a PFI project designed to meet all of their engineer equipment requirements. They are currently deciding between using a PFI or their current in house alternative. A decision is expected early in 2004.

Next, the thesis will describe USMC engineer equipment requirements in terms of supporting structure, maintenance processes, life cycle management, missions and capabilities, and emerging concepts. The objective is to define what the actual USMC requirements are in each of these areas to ensure that they can be addressed in a proposed PFI. It will be determined what are the USMC core competencies (those things it either does well or needs to do in-house) and were there is room for improvement. Equipment requirements will be addressed in terms of the amount that is needed to meet day to day-operational requirements in normal peacetime condition and those that are required to meet contingency operations. Capability requirements will be defined in terms of what the USMC needs the equipment for in terms of missions, what those missions are, and how they contribute toward the USMC accomplishing its mission.

Once a PFI has been thoroughly defined and USMC engineer requirements determined, the analysis will attempt to determine if a PFI is a viable alternative. It is the intent of this thesis to propose a PFI solution that is structure to meet USMC engineer requirements. It is also important to identify all of the particular capability and contractual requirements that the USMC will need to address in a proposed PFI. The objective is not to find specific solutions but rather to identify the salient issues and potential problems associated with each requirement. For some, the private sector approach is feasible while for others it is not.

D. METHODOLOGY

We will analyze information provided by the UK MOD on their experience with PFI over the past ten years and with the requirements they have outlined for their current proposed PFI. There was also a literature review that covered DOD acquisition and procurement reform reports, General Accounting Officer (GAO) reports, UK government resources, USMC and DOD doctrinal publications, previous graduate-level thesis, web resources, contacts with private industry, inquiry with engineer equipment units within the USMC, and Manpower information was gathered from Manpower and Reserve Affairs (M&RA).

Next, is an analysis of USMC engineer community. Topics covered include the current organizational structure, the support infrastructure, manpower and equipment needs, as well as maintenance processes, life cycle management, missions and capabilities, and emerging concepts within the community.

Once USMC engineer requirements are analyzed, a PFI solution is proposed, which addresses all of the relevant requirements. The intent of that section is to determine the feasibility of the PFI concept to meet USMC engineer equipment needs.

Finally, findings, conclusions, and recommendations to MARCORSYSCOM are addressed.

E. REPORT ORGANIZATION

The remainder of this thesis is organized as follows: Chapter II analyzes what a PFI is and how it is intended to operate. The basis for the chapter is the experience that the UK MOD has had with PFI. Chapter III analyzes the USMC engineer community and its requirements. Chapter IV outlines a proposed PFI solution that meets USMC engineer equipment needs as well as all of the capabilities and contractual requirements that it would need to address. Chapter V presents the findings, conclusions, and recommendations.

II. WHAT A PFI IS

A. INTRODUCTION

Private Finance Initiative (PFI), a form of PPP was a concept developed in United Kingdom (UK) and initially launched in 1992. "Its aim is to bring the private sector more directly into the provision of public services" while "exploiting private sector management, commercial and creative skill.[7]" In the ensuing decade, the PFI concept has been widely used in the UK for assets and services like buildings, transport infrastructure, information systems, vehicle and equipment maintenance, and training.

A PFI is an arrangement designed to "increase the involvement of the private sector in the provision of public services"[8] by providing an incentive to the private sector to provide a product or service that the public sector then agrees to purchase. In this manner, the private sector Designs, Builds, Finances, and Operates (DSFO) the service for the government. A PFI is defined as a form of PPP arrangement that is

> about creating a structure in which improved Value For Money (VFM) is achieved through private sector innovation and management skills in order to deliver performance improvement and efficiency savings[9]. Bidders in PFI competitions are therefore encouraged to find the best cost-effective solution and are not restricted to a single pre-determined option. This will normally mean that bidders come forward with different technical solutions for the provision of the assets required for service delivery.[10]

However, because "the significant size of many PFI projects, it will often be necessary to involve a wide range of interests within the authority to establish a corporate approach to the project from the beginning[11]." In the United States, this can include Congress, other branches of the DOD, private sector interest, public opinion, and other

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[7] Chancellor of the Exchequer, *Private Opportunity, Public Benefit: Progressing the Private Finance Initiative*, pp. 1, Her Majesty's Treasury, November 1995.

[8] Ibid, pp.2.

[9] Defense Logistics Organization, *Private Involvement Sector Handbook*, pp. 4, Defense Logistics Organization, Ensleigh, Bath, UK., July 2002.

[10] The Scottish Office, *Planning Advice Note PAN 55: The Private Finance Initiative and The Planning Process*. http://www.scotland.gov.uk/library/pan/pfip-00.htm, November 2003.

[11] Ibid.

Federal Agencies. Something that is not unusual for other large projects within the DOD. PFI characteristics include:

- They are long-term contracts, up to 30 years, which must deliver benefits to both parties.
- They entail a joint approach to establishing common objectives, problem identification and solution with incentives for both parties to deliver ongoing improvements and savings.
- They require both parties to be transparent (as far as both parties are able).
- They must operate in a culture that embraces change and develops mutual trust.
- They need clear lines of communication and levels of delegated authority.
- They often require a lengthy negotiating and approvals process.
- They are used when in house bids are found not be cost effective or efficient (UK MOD standard[12]).

B. HOW IT DIFFERS FROM OTHER PRIVATIZATION PROJECTS

PFI's

> differs from privatization in that the public sector retains a substantial role in the PFI projects, either as the main purchaser of the services provided or as an essential enabler of the project. It differs from contracting out in that the private sector is involved as a provider of the capital asset as well as a provider of services[13].

The attractiveness of the concept is that it promises to provide a better service to the public at lower cost and that the risk is placed on the private sector.

C. TYPES OF PFI

There are three main types of PFI projects, although each has many deviations in the manner in which they can be implemented.

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[12] United Kingdom Ministry of Defense, "PFI Guidelines: Procurement Issues General." www.mod.uk/business/ppp/guidelines/general, November 2003

[13] Chancellor of the Exchequer, *Private Opportunity, Public Benefit: Progressing the Private Finance Initiative*, pp. 2, Her Majesty's Treasury, November 1995.

1. Financially Freestanding Projects

Defined as "where the private sector undertakes the project on the basis that costs will be recovered entirely through charges to the final user[14]". In this case, the final user is usually the public who pays for the service such as for toll bridges, municipal public parking, and ferry services. The public sectors (government) role is mainly involved in the regulatory and approval process for such projects.

2. Services Sold to the Public Sector

Defined as "where the cost of the project is met wholly or mainly by charges from the private sector service provider to the public sector.[15]" The private sector assumes all of the risks of providing the service. In this case the public sector buys the service. Examples of such a system include privately operated prisons or hospitals.

3. Joint Ventures

Joint Ventures are defined as "where the cost of the project is met partly from public funds and partly from other sources of income, with overall control of the project resting with the private sector.[16]"

An example of such an arrangement would be the DOD Residential Communities Initiative (RCI) which is a joint venture between the services and a private sector company to provide military housing on base.

D. WHY CONSIDER A PFI

The main reason for looking at outsourcing options is, for a number of services the public sector is not as efficient as the private sector. The private sector uses incentives to achieve or exceed the required performance. On the other hand, "in house provisions for civil servants are neither rewarded for good performance nor penalized for poor performance.[17]"

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[14] Ibid, pp. 1.

[15] Ibid, pp. 2.

[16] Ibid, pp.2.

[17] Palmer, Keith, Chairman of the Cambridge Economic Policy Associates LTD, Institute for Public Policy Research Commission on Public Private Partnerships, *Contract Issues and Financing in PPP/PFI (Do we need the 'F' in 'DBFO' Projects)*, pp. 3, Cambridge Economic Policy Associates LTD, 2000.

For the Marine Corps, PFI offers the possibility of increased efficiencies at lower costs. The utilization of equipment is well below commercial standards because there is too equipment much to meet daily needs. Also, because of continuous need to rotate personnel, the USMC is not as efficient in maintenance tasks as the private sector. Finally, changing rules and regulations governing civil service make it hard to quickly adjust to changing needs and requirements. These factors coupled with increased requirements placed on a reduced military force have forced the USMC to look at ways to increase efficiencies through such things as a private finance initiative.

E. POTENTIAL ADVANTAGES OF PFI TO THE UK GOVERNMENT

- Increased quality of service and responsiveness at a lower cost. The private sector is better at allocating resources to needs. It is hoped that through the private sector, better service will be achieved because either poor performance or potential competition can cause a firm to lose business opportunities. For the USMC this can mean increasing readiness or maintaining readiness with fewer resources dedicated to the maintenance of equipment.

- "Greater flexibility in project planning".[18] The government acquisition process makes it difficult to quickly adjust requirements in terms of buying additional equipment to meet contingency needs. In these cases, funds are authorized on short notice to meet these needs through outsourcing options at a considerable expense. The private sector's flexibility allows for short notice changes of direction unlike with the public sector[19].

- Better incentives to perform. The profit motive is a main driver in the private sector. Under a PFI, a potential contractor would have strong incentives to operate in a manner that would maximize its profit, such as agreeing to provide the service at lower cost than the government in-house option and the incentive of receiving a share of any savings below government operating costs.

[18] United Kingdom Ministry of Defense, "PFI Guidelines: Procurement Issues General." www.mod.uk/business/ppp/guidelines/general, November 2003

[19] Greenway, Mike, "A Joint Up Response to PFI." www.copybook.com/publications/article.asp?pubID=15&catID=248&artID=466. November 2003.

- Generation of third party revenues[20]. Contractors can gain an additional financial incentive by being allowed to sell spare capacity to other private or public sector customers, which would provide additional revenue. There would of course be provisions stipulating the need to meet government surge requirements, which depending on the equipment or service could be easy or hard.

- Allows the public sector to concentrate on core tasks or those functions classified as inherently governmental in nature. For the USMC this can be defined as the operation of engineer equipment in support of military operations and performing their immediate maintenance of equipment in forward areas. More complicated depot level maintenance tasks can then be left to contractors in a rear area facility.

- Transfer of risk to the private sector. Because the private sector undertakes the capital outlay, programs can be brought on-line quicker than with conventional procurement. Through a PFI type structure, the private sector would assume the risk of meeting government requirements at predetermined cost rates.

F. UK MOD WORKER PROVISIONS

Under certain provision, employees of the private firm could be transformed into employees of the Armed Services to meet certain operational requirements.[21] The UK MOD has made this a part of some of their PFI contracts. Contractors on the battlefield become part of the sponsored reserves[22] in time of conflict. Sponsored reserves operate as members of the armed services in times of conflict.

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[20] Ibid

[21] Speller, John, "Private Sector May Provide Front Line Tank Transporter." http://213.38.88.195/coi/coipress.nsf/0/44b28936d7269a6e802566db005a51ea?OpenDocument. November 2003.

[22] Hartley, Keith, "Military Outsourcing Experience.", http://www.york.ac.uk/depts/econ/rc/outsourcing.pdf. November 2003.

The UK MOD defines sponsored reserves as[23]

> a service normally provided in peacetime by contractor staff is provided on operations by staff drawn from the contractor's workforce who are reservist members of the Armed Forces. The SR concept envisages letting contracts for services on condition that the contractor maintains in his workforce an agreed element who have volunteered to become members of a reserve force. The Sponsored Reserve (SR) concept has been identified as a means by which support services to the Armed Forces could be performed effectively and cost-effectively by contractors so allowing regular Servicemen and women to focus on core military activities and ensure maximum value for money from the Defense Budget.

Currently the DOD already has contractors that operate in the battlefield environments in support of military operations. While contractors support has been a success, the DOD doesn't have any regulations that address contractor operations in support of deployed forces. A recent GAO report recommended that the DOD developed wide guidance that[24]:

- Establish baseline policies for the use of contractors to support deployed forces
- Delineate the roles and responsibilities of commanders regarding the management and oversight of contractors that support deployed forces.
- Integrate other guidance and doctrine that may affect DOD responsibilities to contractors in deployed locations into a single document to assure that commanders are aware of all applicable policies.

G. UK MOD TRANSFER AND MITIGATION OF RISK

The transfer of risk comes in the form of the incentive for the private sector to provide the service with the greatest efficiency (in order to maximize their profit potential). In addition, the private sector is better able to meet fluctuations in demand by quickly expanding or reducing capacity; in stark contrast, the public sector's whose civil service rules make it hard to adapt quickly to changes in demand. Simply, the private

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[23] United Kingdom Ministry of Defense, "PFI Guidelines: Procurement Issues General." http://www.mod.uk/business/ppp/reserves.htm, November 2003

[24] General Accounting Office, *Military Operations: Contractors Vital Services to Deployed Forces but are no Adequately Addressed in DOD Plans*. June 2003.

sector has "better incentives to perform[25]". The following types of risks are those that can be transferred to the private sector under a PFI.[26]

1. Design and Construction Risk (To Cost and Time)

PFI's can be complex because of the large uncertainty in the requirement they address. This means that implementing a PFI that addresses all potential requirements can be time consuming and expensive. These requirements are risk factors in them selves; once a considerable amount of effort and resources have been put into the process, it could be hard to stop or reverse if it proves unsuccessful. The monetary cost of failing to meet the requirement will primarily fall on the contractor, but the government can be affected as well by delays.

To minimize design and construction risks, it is important that the public sector outline a service requirement such as an availability rate to the private sector, "not an asset or equipment requirement"[27]. This gives the private sector maximum flexibility in designing and constructing a structure that will meet the requirement.

2. Commissioning and Operating Risks[28] (Including Maintenance)

Will the contractor be able to support a complex PFI arrangement during the performance phase? This can be a real problem, because once the PFI is implemented, the contractor will be expected to meet operating cost and availability requirements that might be hard to maintain in a changing environment. For example, if oil prices rise resulting in increased transportation costs.

Building flexibility into the PFI schedule can provide some protection for the contractor, with increased risk for the government by providing a mechanism to cover increase cost. Yet this flexibility is important to ensure that the contractor will be able to continue to meet its obligations in an uncertain environment. To protect its interest, the government can stipulate clauses that any costs adjustments will not result in changes to the profit structure.

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[25] Chancellor of the Exchequer, *Private Opportunity, Public Benefit: Progressing the Private Finance Initiative*, pp. 3, Her Majesty's Treasury, November 1995.

[26] Ibid, pp.13.

[27] United Kingdom Ministry of Defense, "PFI Guidelines: Procurement Issues General." www.mod.uk/business/ppp/guidelines/general, November 2003

[28] Chancellor of the Exchequer, *Private Opportunity, Public Benefit: Progressing the Private Finance Initiative*, pp. 13, Her Majesty's Treasury, November 1995.

3. Demand (or Volume/Usage) Risks

If the service or equipment is unique to the government, there is a risk that the government will not be able to meet the demand requirement it in the PFI arrangement. In this case, the contractor can lose revenue. This can place contractor finances in jeopardy, forcing the government to increase expenditure in order to maintain the contractor's position.

4. Residual Value Risks

What value will assets have at the end of the contract term and how will the value be accounted for? Will assets be returned to either the contractor or the government and can a fair valuation be achieved in the present. These costs are subjective and can vary widely depending on the usage of the equipment, obsolescence, or future needs. Again, this presents risk to both the contractor and the government that cannot be fairly evaluated in the present, but a flexible arrangement must be put in place to do so in the future. The recent Air Force tanker deal, which has been heavily scrutinized by congress, can attest to this risk. Small differences on the residual value placed on the aircraft can change the net present value of the deal in favor of purchasing instead of leasing[29].

5. Fair Valuation of Government Resources in a Transfer

If the government transfers assets to the contractor, what value will be placed on them and how will this be achieved? The government has probably spent considerable resources on the acquisition and maintenance of equipment. Commercial valuation models might not be fair or accurate, considering that the government might use the assets differently. Consequently there will probably be a need to establish a new matrix that places a fair value on the equipment. The UK MOD's PFI approach proposes the use of using fair market value obtained through a survey of all equipment and infrastructure. As a general rule, methods that it uses to obtain transfer value include[30]:

- Market value where comparators or independent expert valuation are readily available.

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[29] Government Accounting Officer, *Military Aircraft: Observations on the Proposed Lease of Aerial Refueling Aircraft by the Air Force,* pp.17, September 2003.

[30] United Kingdom Ministry of Defense, "PFI Guidelines: Procurement Issues General." www.mod.uk/business/ppp/guidelines/general, November 2003

- Establishing the transfer value within the original competition, which could include an incentive on the first supplier to refresh and improve assets over the initial contract period.
- Optimized "deprival" value based on the difference between the net present cost of providing the service by using the current asset, and the net present cost of the best alternative method of meeting the service without the benefit of using the particular asset.
- Potential suppliers could be invited to bid for the residual value as part of tendering for the follow on contract in cases where the future revenue streams are understood so that bidders can place a value on the cash flow.

6. Technology/Obsolescence Risks

This risk refers to the fact that "the assets will cease to be the technically best way of delivering services during the life of the contract[31]". Will the government have to pay for new technology or will the contractor have to absorb the costs? Will the government want to use new technologies or will the contractor want to retain old technologies to reduce costs? There are risks to both parties that likely cannot be addressed until the problem arises.

7. Regulation Risks

Today, PFI's are possible because of relaxed government regulations. PFI's are themselves a flexible contractual arrangement built on trust between the public and private sector. Should government regulations become more restrictive in the future because of potential abuses or perceptions of the same, this could pose a major risk for both the government and the contractor that cannot be discounted entirely.

United States Federal Government is no exception to the regulatory risks, "since the Revolutionary War, the federal procurement system has oscillated between two extremes[32]". On the one hand, there has been the need to maintain accountability by implementing restrictive rules and regulations governing procurement. On the opposite

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[31] Chancellor of the Exchequer, *Private Opportunity, Public Benefit: Progressing the Private Finance Initiative*, pp. 19, Her Majesty's Treasury, November 1995.

[32] Pegnato, J.A., "Assessing Federal Procurement Reform: Has the procurement pendulum stopped swinging," Journal of Public Procurement, Vol 3, Issue 2, pp. 146, 2003.

extreme, the government has relaxed rules to allow for greater responsiveness from the procurement system, mainly in times of national emergency.

8. Personnel Issues

If the Government transfers equipment or services to a contractor via a PFI, what happens to the associated government personnel that used to the job? Civil service rules and regulations usually restrict personnel reductions. Not to mention that civil service jobs have strong political backing that can block attempts at reform or change. If civil service employees are applied in the PFI, the contractor could be forced to operate at a non-optimum point. This can decrease profits or force the government to pay a higher fee for the service or equipment (which defeats the original purpose of seeking a PFI solution in the first place).[33]

9. Default Risk

The contractors may default and go bankrupt, and be less able to respond to emergencies[34]. Low bids can be used to buy in and because of the complexity of PFI contracts, and end up costing more forcing the government to increase its costs to support to service provider. This consideration must be built carefully into the source selection and evaluation process.

10. Changing Requirements Risk

Requirements may change substantially and the PFI may need to be modified. This modification could add to costs upsetting the initial cost benefit analysis that favored the PFI. Changes are sure to happen in a PFI type arrangement. This is a very real risk. It is virtually impossible to prepare a contract that covers all future contingencies, changes in a PFI structure may well be a necessity.

H. UK MOD VALUE FOR MONEY (VFM)[35]

The UK MOD uses the term Value for Money which is the same as the DOD's Net Present Value (NPV) to determine whether or not to use a PFI for a project. If the

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[33] United Kingdom Ministry of Defense, "PFI Guidelines: Procurement Issues General." www.mod.uk/business/ppp/guidelines/general, November 2003

[34] Hartley, Keith, "Military Outsourcing Experience.", http://www.york.ac.uk/depts/econ/rc/outsourcing.pdf. November 2003.

[35] Chancellor of the Exchequer, *Private Opportunity, Public Benefit: Progressing the Private Finance Initiative*, pp. 17, Her Majesty's Treasury, November 1995.

value for money is lower than the government option, then the project can be accepted[36]. It defines it as "the optimum combination of whole life costs and benefits[37]". It outlines three VFM decisions that need to be taken[38]:

- Whether to proceed with the project.
- Whether to proceed using PFI or traditional procurement route.
- What supplier to select to provide the asset/service.

The UK MOD's reason for using PFI is that,

> Through PFI, the Government is committed to seeking value for money by using private sector management expertise, innovation and capital investment in the delivery of services to the public sector. PFI involves the private sector in creating or buying a new asset or assets and then selling a range of services based on those assets to the MOD for an agreed cost over an agreed period of time[39].

Through the use of PFI, the UK MOD intends to obtain increased value (better service at lower costs) through[40].

- Focusing on the core task of delivering operational capability.
- Providing greater flexibility in planning our projects and our forward budget.
- Improving the quality of services by making best use of commercial expertise.
- Improving opportunities to generate third party revenue - sharing the costs with other customers - where appropriate.

Appendix A outlines the approaches that the UK MOD's uses to achieve improved value for money.

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[36] United Kingdom Ministry of Defense, "The Private Finance Initiative." http://www.mod.uk/business/ppp/guidelines/financial.htm. November 2003.

[37] Ibid, pp. 17.

[38] Ibid, pp.17.

[39] United Kingdom Ministry of Defense, "The Private Finance Initiative." www.mod.uk/aboutus/factfiles/pfi.htm. November 2003.

[40] United Kingdom Ministry of Defense, "The Private Finance Initiative." www.mod.uk/aboutus/factfiles/pfi.htm. November 2003.

I. UK MOD CONTRACT MANAGEMENT[41]

The role of contract management "is to ensure that the legitimate needs of the user of the service are satisfied within the agreed boundaries of the contract.[42]" Because a PFI is still a project and responsibility of the public sector, there must be some mechanism in place to oversee and supervise the private sector component to ensure that it is meeting the public policy objectives. Through proper contract management, the government can

> ensure that the legitimate needs of the user of the service are satisfied within the agreed boundaries of the contract. All user aspirations not covered by the contract will require contract amendments. Changes requested by the users will need to be considered on their merit with regard to the contract SoR (Schedule of Requirements), budgetary implications and the possible impact on other users[43].

The UK MOD has already spent four years negotiating a preliminary PFI arrangement for its engineer equipment requirements. To coordinate the efforts, it organized a full time IPT. In its PFI guidance, the UK MOD has outlined the following points to consider[44]:

- The form of the team required to manage the contract (size, skill set, roles and responsibilities, and relationships with other parts of the MoD).
- Contract change procedure.
- Performance monitoring arrangements and the associated information requirements.
- Mechanisms for problem solving and dispute resolution.
- Arrangements in the event of default or termination.
- Protection of the MOD's ability to re-tender at completion of the original contract.

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41 Chancellor of the Exchequer, *Private Opportunity, Public Benefit: Progressing the Private Finance Initiative*, pp. 24, Her Majesty's Treasury, November 1995.

42 United Kingdom Ministry of Defense, "PFI Guidelines: The Phases of a PFI Project – Contract management." http://www.mod.uk/business/ppp/contract.htm. November 2003.

43 Ibid

44 Ibid.

Last but not least in the UK MOD guidance on contract management for PFI's are periodic reviews of the contractor's performance. While reviews can be time consuming and burdensome, they are critical to ensure that the objectives of the PFI are being met and that the public interest is being protected. .

J. HOW DOES THE UK MOD IMPLEMENT PFI'S?

Appendix C outlines the UK MOD PFI decision making process. It has three phases[45]: feasibility, procurement, contract management. It is not the intent of this thesis to discuss in detail each of the phases of a PFI; rather, to show that there is a structured decision making process involved. Even though this process is a UK MOD implementation process, it is not dissimilar to the DOD decision making process.

1. Feasibility Phase

During the feasibility phase, the government puts together an IPT to do a detailed analysis of what product or service is required and if it can be met with a PFI. It is important that the basic principles of the required capability and requirements be sound, because everything that happens down the course will in some way depend on a decision that was made during this phase. It is important to remember that based on the basic principles outlined during the feasibility phase that "industry will judge whether or not to bid[46]."

Once the need has been determined, then a project management team is formed to guide the effort during the rest of the feasibility phase. The team should be a multi-disciplinary Integrated Project Management Team (IPMT), the "consist of representatives from all those branches with an interest in the service to be delivered[47]".

The feasibility phase ends in an outlined business case (OBC) that projects the advantages of a PFI. Because of the complexity and variability of PFI, it is "accepted that the OBC cannot provide firm costs for the PFI solution, it merely seeks, with

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45 United Kingdom Ministry of Defense, "PFI Guidelines: The Phases of a PFI Project" http://www.mod.uk/business/ppp/guidelines/phases.htm. November 2003.

46 Ibid.

47 United Kingdom Ministry of Defense, "PFI Guidelines: The Phases of a PFI Project – Feasibility." http://www.mod.uk/business/ppp/guidelines/feasibility.htm. November 2003.

reasoned argument illustrated where possible with examples and numbers, that PFI is likely to offer the best value for money solution[48]."

2. Procurement Phase

During the procurement phase, the government puts out a solicitation to industry requesting they formulate a plan to meet the government's requirement. The intent is to provide the private sector with the maximum flexibility to provide innovative ways to meet the government requirement. Once a contractor has been selected, then there must be a comprehensive determination of all of the requirements that need to go into the contract. This phase ends with contract award.

3. Contract Management Phase

The contract management phase can be complicated as well, but it will also require considerable effort in oversight to make sure that it works well. Because of the length of the standard PFI, it is important to have a contract management team composed of personnel that will be able to dedicate many years to the program to ensure continuity. Also, no matter how much preparation goes into the contract, there will always be required changes that must be addressed.

K. HISTORY OF PFI IN THE UK

Starting in the early 1980's, the UK government started to seek ways to improve efficiency and save costs. As part of this strategy, it encouraged competition in the private sector to meet its equipment and services requirements. The benchmark was to prove that money could be saved without degrading operational capabilities. Over the ensuing decade, the MOD used the private sector to meet increasing military service needs. This policy continuously pushed the envelope on functions that once were considered inherently governmental, proving that it was possible to achieve costs savings without endangering operational requirements.

In 1992, the UK government formally adopted the PFI concept encouraging the use of the private sector to meet public sector requirements. In 1997[49], the UK government re-launched the PFI program as a form of PPP. In the ensuing decade since

[48] Ibid.

[49] Hartley, Keith, "Military Outsourcing Experience.", http://www.york.ac.uk/depts/econ/rc/outsourcing.pdf. November 2003.

1992, the UK government has used over 563[50] PFI projects at a cost of over £35bn[51] (some 60 billion dollars) to meet a broad array of requirements, demonstrating the applicability of the concept.

L. WHERE IS PFI CURRENTLY BEING USED IN THE UK?

The UK government had used PFI's in a variety of military projects and throughout other government agencies for projects such as highways, dams, hospitals, roadways. These have proven popular and to meet the expectations, as demonstrated by the UK Governments willingness to continue to use them. The following are a few examples:

1. Training Tank

Currently, the UK MOD has three prospective bidders competing for a PFI contract to train its armored fighting vehicle crews using simulators. The main requirement is for the bidders to demonstrate that they can meet the same requirement as the current in house option at £140million[52] ($238 million) less. This savings will be achieved through the use of simulators, which will to save considerable wear and tear on its fleet of vehicles. Through a PFI, the government will not have to make a capital outlay to purchase expensive simulators[53].

2. Tank Transporter Contract

In January 2001, the UK MOD awarded Fasttrak ("a consortium led by Halliburton Brown & Root"[54]), a 20 year PFI contract to "support and maintain the Oshkosh Truck/King Trailers vehicles[55]" as well as supply the personnel to operate them. A key provision of this contract is that Fasttrak personnel will operate as sponsored reserves in time of war.

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50 Schlesinger, Larry, "Report Hainls Success of PFI Schemes." http://www.managementconsultancy.co.uk/News/1134199. November 2003.

51 Ibid.

52 Equipment, Training, and Support News, "Contractors line up for PFI Projects." www.ets-news.com/armoured_vehicle.htm. November 2003.

53 Ibid.

54 Ibid.

55 Ibid.

3. Flight Training

In August of 1998, the UK MOD awarded Aviation Training International, (GKN Westland/Boeing joint venture company) a PFI contract for £275m[56] ($475 million) to cover "air, ground and maintenance crew[57]" training for its new Apache helicopters. Through the PFI, the private sector makes the initial capital outlay to establish the training facility and agrees to provide the service at a lower cost than what it would cost the government.

M. UK MOD SUCCESS SO FAR

In a report release by the UK Treasury in July 2003, the government reported overall positive experiences with the PFI contracts that had been set up. It claimed that 89% of contracts had either been delivered on time or ahead of schedule "within budget and meeting the expectations of public sector clients."[58]

N. UK MOD LESSONS LEARNED

The UK treasury report[59] also mentioned a few recommendations for future PFI projects. Among these were:

- That flexibility to adjust for changes without incurring penalties must be built into the contract.
- That PFI projects aren't suited to situations where there is a fast changing environment such as in information technology.
- That because of their complexity, the government needs a cadre of experts to help draft, implement, and manage PFI contracts. This can mean that

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56 BBC News, "Business Targets Defense Contracts." http://news.bbc.co.uk/1/hi/business/1665955.stm. November, 2003.

57 Equipment, Training, and Support News, "Contractors line up for PFI Projects." www.ets-news.com/armoured_vehicle.htm. November 2003.

58 Her Majesty's Treasury, *PFI: Metting the investment challenge,* pp.4, London, July 2003.

59 Ibid.

personnel assigned to a PFI project might be assigned to the project for a considerable period of time.

The UK MOD has signed over thirty[60] PFI's by 2002 and plans on using them for future projects. However, the UK MOD has established strict criteria for their implementation[61], following the recommendations of the Paymaster General as outlined in **Appendix B**.

O. UNITED STATES REGULATORY REQUIREMENTS INVOLVING PFI?

1. Does the FAR and DFAR Allow a PFI?

Neither the Federal Acquisition Regulations (FAR) nor Defense Federal Acquisition Regulations (DFAR) specifically addresses the use of PPP. The use of PPP by the DOD has gone beyond the lease vs. buying statues outlined in FAR 7.4. While FAR 1.102-4 (e) states that "a policy or procedure, or a particular strategy or practice[62]" may be used if it is in the best interest of the government, this is very broad guidance. At the same time, the DOD has used and is planning on using different PPP arrangements to meet its need.

In both the Air Force tanker deal and the Army's Residential Communities Initiative (RCI), the respective Services have created private companies to manage the contract. In both cases, the government is the minority owner. While there is nothing particularly inappropriate with either of these arrangements, it demonstrates that PPP's are very complex contractual arrangements. The UK Government has found it necessary to provide adequate guidance for their PPP to protect the public interest because of the complexities involved. The US Government and the DOD in particular should do the same.

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60 Krahmann E., "Controlling Private Military Companies: The United Kingdom and Germany," pp. 6, Harvard University, paper presented at the International Studies Association Annual Convention, February 25 – March 1, 2003, Portland Oregon.

61 Ibid.

62 FAR Part 1.102-4(e), http://www.arnet.gov/far/loadmainre.html

2. Inherently Governmental Functions

The British experience with PFI's started mainly with "non-military support and management[63]", but over time it has transitioned to more direct combat support functions, bringing contractors closer to the battle lines. The same has been true for DOD, as it also has sought to outsource functions that were once considered exclusively within the military domain. This has been a move somewhat away from FAR 7.503, which states that "The purpose of this subpart is to prescribe policies and procedures to ensure that inherently governmental functions are not performed by contractors."

The resulting shift in interpretations of what is inherently governmental means that the regulations have fallen behind current practice. To prevent potential conflict with regulations, the FAR/DFAR should re-evaluate what it describes as inherently governmental functions.

[63] Krahmann E., "Controlling Private Military Companies: The United Kingdom and Germany," pp. 8, Harvard University, paper presented at the International Studies Association Annual Convention, February 25 – March 1, 2003, Portland Oregon.

III. USMC ENGINEER REQUIREMENTS AND CURRENT STRUCTURE

A. INTRODUCTION

In this chapter, the intent is to define exactly what the USMC requirements for engineering equipment are and what the benefits and costs are associated with maintaining the current structure. Understanding the requirements will allow us to better determine if it is feasible to support the requirements through a PFI. The UK MOD stated they avoided quantitative requirements to address their requirements in a PFI in favor of capability based requirements[64]. It is the intent of this thesis to address USMC requirements more through capabilities needed than through numbers of various equipment types. A previous Naval Post Graduate School (NPS) thesis, An Analysis of USMC Heavy Construction Equipment (HCE) Requirements, concluded that the USMC has too much equipment and doesn't do a good enough job maintaining what it currently has in its inventory.

B. CURRENT STRUCTURE

1. Background on the USMC

The National Security Act of 1947 amended in 1952 gives the USMC its current mission and its structure. It states that USMC is "trained, organized, and equipped for offensive amphibious employment."[65] The act established the three active USMC divisions and one reserve division.

2. Organization of the USMC

a. Marine Expeditionary Force

The three active and one reserve Marine Divisions are centered on the four Marine Expeditionary Units. Each MEF has three main components: a Marine Division, A Marine Air Wing, and a Force Service Support Group. The MEF's are geographically

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[64] Colby, I. RE: PRIVATE FINANCE INITIATIVE INFORMATION REQUEST. Available E-mail from EVPWFM@dpa.mod.uk. 18 September 2003.

[65] Marine Battle Skills Training Handbook; MCWP 0-1.1, "United States Marine Corps Organization," http://www.tecom.usmc.mil/csw/deskguide/Desktop%20Guide%20-%20United%20States%20Marine%20Corps%20Organization.htm. November 2003.

dispersed (Table 1) and capable of independent operations within their AOR is support of Commanders-In-Chief (CINC's).

MEF	HEADQUARTERED
I MEF	CAMP PENDLETON, CA
II MEF	CAMP LEJEUNE, NC
III MEF	OKINAWA, JAPAN
IV MEF	NEW ORLEANS, LA

Table 1. Location of Marine Expeditionary Forces (MEF's)

b. Marine Air Ground Task Force (MAGTF)

The USMC is structured to fight or operate as a combined arms team called a MAGTF, composed of four elements (see Figure 1). The MAGTF is task-organized according to the needs of a particular mission and is under the command of one commander to ensure unity of effort. This task organization, depending on the mission can cause large fluctuations of requirements for different categories of equipment and supply and the nature of them might change over time. A military operation can quickly turn into a humanitarian assistance operation. Any potential PFI would need to incorporate, and be able to support such drastic and quick change. A MAGTF can range in size from a few hundred Marines to tens of thousands. For Operation Desert Storm in 1991, the USMC MAGTF was composed on two entire MEF's.

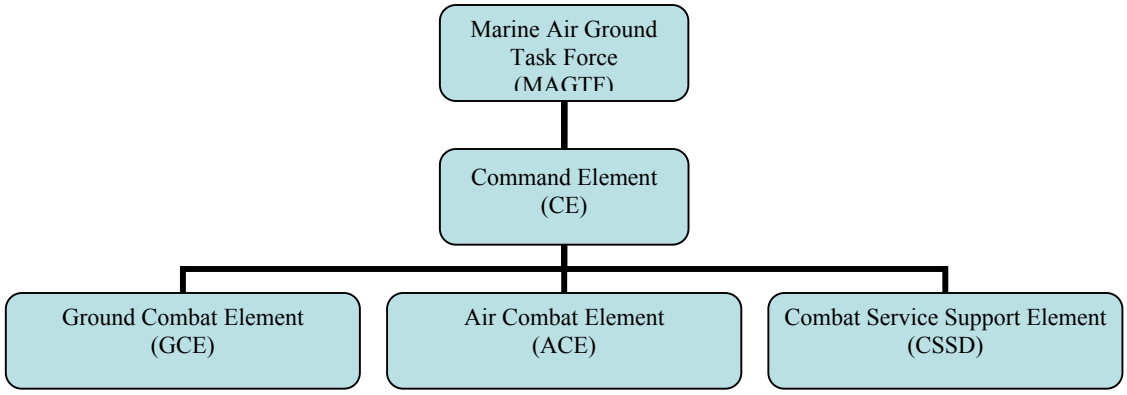

Figure 1. Marine Air Ground Task Force

c. Force Service Support Group

The USMC Combat Service Support (CSS) is primarily organized around the Force Service Support Group (FSSG) and Marine Wing Support Group (MWSG), designed to provide CSS for Marine Aircraft Wing's. While all units have organic CSS capabilities, the bulk of the CSS is provided by either the FSSG or MWSG. They can cover the full range of CSS services: supply, maintenance, general engineering, transportation, health services, and services[66]. Each of these functions is normally assigned to a battalion within the FSSG or MWSG.

d. Engineer Support Battalion

Within the FSSG, the Engineer Support Battalion (ESB) is responsible for providing the depth of the engineering capability for the entire MAGTF above the organic capabilities of individual units. It holds the bulk of the general engineering assets for the USMC and it can be task organized to support varying missions. All of the engineer equipment in the ESB is commercially available equipment. ESB's doctrinal mission is:

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66 UNITED STATES MARINE CORPS, Logistics Operations School, Marine Corps Service Support Schools, "Introduction to Logistics and Combat Service Support (CSS)," http://www.lejeune.usmc.mil/mccsss/los/Lessons/LEC/C104.pdf. November 2003.

to provide combat engineering and limited engineering, bulk liquid, and utility support for the MAGTF[67]

Figure 2 shows the organization of the ESB.

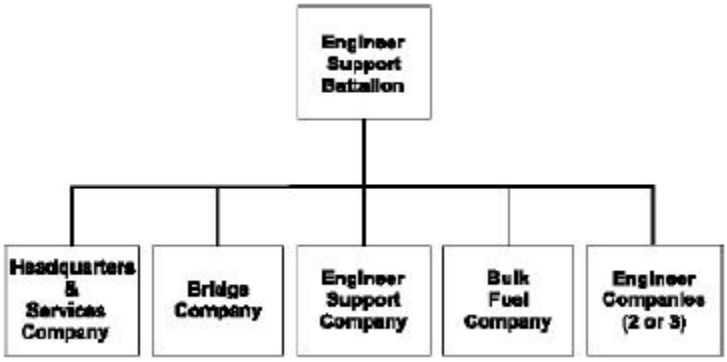

Figure 2. Organization of the Engineer Support Battalion.[68]

e. Marine Wing Support Squadron

Within the Marine Aircraft Wing, the Marine Wing Support Squadron (MWSS) "provides the full range of aviation ground support (AGS) capabilities.[69]" These functions are designed to support the unique requirements for airfield operations for "both expeditionary and fixed-based locations.[70]" Each MWSG usually supports four squadrons, "two for fixed-wing aircraft, and two for rotary-wing aircraft"[71]. All of the engineer equipment in the MWSG is commercially available equipment. Figure 3 shows the organization for the MWSG.

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67 United States Marine Corps, *Marine Corps War Publication 3-17: Engineer Operations*, pp.1-9, 14 February 2000.

68 Ibid.

69 Ibid, pp.1-6.

70 Ibid.

71 Ibid, pp.1-7.

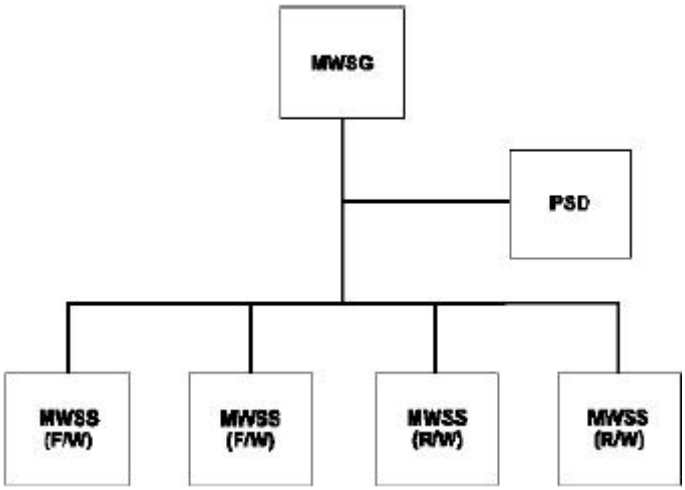

Figure 3. Organization of the MWSG[72].

f. Combat Engineer Battalion

Within the Marine Division, the Combat Engineer Battalion provides the combat engineer functions. The bulk of the equipment within the CEB is not commercial in nature, but rather specifically designed to perform combat engineer functions. The combat engineer equipment is based on commercial equipment, making its maintenance similar to that in the commercial market place. Its mission "is to enhance the mobility, counter-mobility, and survivability of the Marine Division through combat and limited general engineering support.[73]"

Figure 4, shows the organization of the ESB. Each Combat Engineer Company normally supports a Regiment within the Marine Division.

[72] United States Marine Corps, *Marine Corps War Publication 3-17: Engineer Operations*, pp.1-6, 14 February 2000.

[73] Ibid.

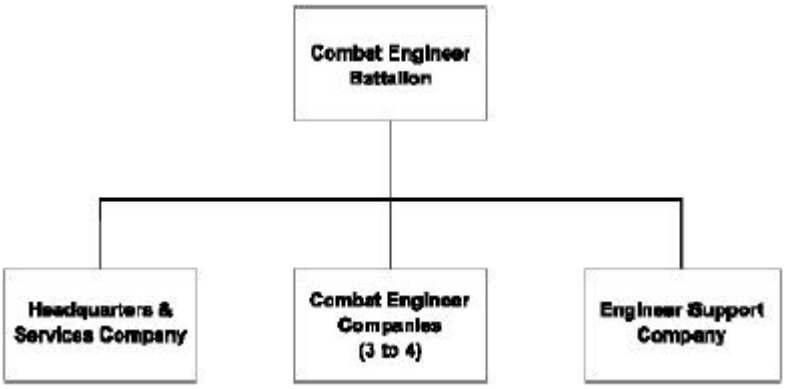

Figure 4. Organization of the Engineer Support Battalion (ESB)[74]

3. Support Structure

There is a large support infrastructure associated with the Engineer Equipment in the USMC. There are bases where the equipment is kept and maintained; Military Occupational Specialty (MOS) schools that train the equipment operators and mechanics; and a large logistics and supply system that supports the entire establishment.

The entire base infrastructure is expensive to maintain and it involves some duplication of capabilities to support the geographically dispersed units. This duplication requires the investment of additional manpower that is drained from the operating forces.

The school infrastructure also draws manpower from the operating forces to train the next generation of mechanics and operators. The training is comparable to that in the private sector. The school structure is maintained year round and runs 30 courses a year to meet requirements to reflect the rate at which new Marines graduate from basic training[75].

4. Manpower

There are currently some 8000 Marines[76] involved in the engineer community divided into some 14 primary MOS's (**Appendix E**) that support the table of organization (T/O) personnel requirements for all Engineer billets in the USMC. Of these, there is

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[74] United States Marine Corps, *Marine Corps War Publication 3-17: Engineer Operations*, pp.1-9, 14 February 2000. MCWP 1-4.

[75] Combat Engineer instruction Company, FY-2004 Schedule Classes, http://www.lejeune.usmc.mil/mces/CEIC/BCE_04.htm. November December 2003.

[76] United States Marine Corps Manpower and Reserve Affairs, "MOS 13XX from Aug 03 FYDP".

approximately a sixty six percent turnover of personnel every four years[77]. This turnover makes it hard to keep institutional knowledge and core competencies. For all MOS's, it takes from 6 to 9 months to get a basically trained Marine and up to an additional 2 years to make the Marine truly proficient in their MOS. Part of the reason for this has to do with the broad types of equipment that military personnel must master. This can leave as little as one years worth of time of a truly efficient operator or mechanic available to the USMC.

5. The Equipment

The USMC has invested over one billion dollars[78] in its engineer equipment. **Appendix D** lists all of the Engineer equipment broken down by Table of Authorized Material (TAM) number in the USMC inventory. The basis for keeping this equipment is the Table of Equipment (T/E), which states how much equipment the USMC, should maintain to meet all of its contingency requirements. Engineer Equipment is classified as B (Bravo) TAM. The existing T/E dates back to the 1970's, and the current fleet reflects those requirements[79]. The USMC T/E has not been updated, despite USMC personnel strength has being reduced since the end of the cold war.

This disconnect has led to equipment being purchased that was really not needed. In addition, on a day-to-day basis, the USMC only uses approximately fifteen to twenty percent of its engineer assets to meet its operational requirements. This leads to underutilization of the fleet, most of which sits idle on various lots around the bases. In contrast, utilization in the private sector hovers well above eighty percent[80] of on-hand equipment.

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[77] United States Marine Corps, "JOINT STATEMENT OF LIEUTENANT GENERAL CAROL A. MUTTER UNITED STATES MARINE CORPS DEPUTY CHIEF OF STAFF FOR MANPOWER AND RESERVE AFFAIRS AND MAJOR GENERAL JACK W. KLIMP COMMANDING GENERAL, MARINE CORPS RECRUITING COMMAND BEFORE THE HOUSE NATIONAL SECURITY COMMITTEE SUBCOMMITTEE ON MILITARY PERSONNEL ON 12 MARCH 1998 ON RECRUITING AND RETENTION." http://armedservices.house.gov/testimony/105thcongress/3-12-98mutter-klimp.htm. November 2003.

[78] Marine Corps System Command, *Private Finance initiative – Private Opportunity Public Benefit*, Slide 11, 14 March 2003.

[79] Telephone conversation between Mike Farley, GTES, MarCorSysCom and the author, 5 November 2003.

[80] Interview with James R. McCormack, Manager United Rentals, Seaside, California., and the author, 17 October 2003.

Only twice in the last twenty years has the USMC used the bulk of its engineer equipment, and that occurred with Operation Desert Storm, 1991 and operation Iraqi Freedom in 2003. This comparison is not entirely fair because the military's objective is different than that of the private sector. But it does serve to demonstrate that for its normal peacetime environment, the USMC has too much equipment. If the war time surge needs could be met through outsourcing, then there is high probably a cost savings could be achieved.

C. MAINTENANCE PROCESS

1. Introduction

The USMC maintenance of equipment is divided into five echelons of maintenance, first through fifth. These are further divided into three main levels, organic, intermediate, and depot level maintenance (Table 2). Although the levels of maintenance and responsibility for them are defined according to the breakdown in Table 2, there is some overlapping authorized, which varies depending on the type of equipment and occasionally on the mission and available resources.

Echelons of Maintenance	
Organic	1st & 2nd EOM
Intermediate	3rd & 4th EOM
Depot	5th EOM

Table 2. Echelons of Maintenance (EOM)

2. Organic Maintenance

Normally, the organic levels of maintenance are the responsibility of the using unit. This is tasked to the equipment operators and the using unit mechanics. The skill set required to conduct the lowest level of maintenance are quickly developed by military personnel. One of the main tasks for organic maintenance is to conduct proper Preventive Maintenance (PM) on the equipment to keep the equipment in operational order. The USMC defines organic maintenance as:

> Maintenance performed by the trained operator, maintainer/technician, or crew on the unit's assigned equipment. Generally consists of limited action by crew or operator to include cleaning, inspecting, preserving, lubricating, adjusting, and testing as well as replacing parts, minor assemblies, and sub-assemblies as unit mission dictates and as defined by operator, maintainer/technician or crew MOS (Individual Training Standards) ITS.[81]

The Marine Corps does a good job at training both its equipment operators and mechanics to conduct organic maintenance. For one, the skills are not that difficult to learn and they are practiced with regular routine at all units that own the equipment.

3. Intermediate Maintenance

Intermediate maintenance is tasked to specialized maintenance companies, in the case of engineer equipment, to Engineer Maintenance Company within the FSSG. Any truck related intermediate maintenance of engineer equipment is tasked to Motor Transport Maintenance Company within the FSSG. Intermediate level maintenance is defined as:

> Those maintenance actions performed by specifically trained personnel normally in support of using organizations. This level of maintenance assures a comprehensive [bumper to bumper] repair of components and/or end items usually consisting of calibration, repair or replacement of damaged or unserviceable parts, components, or assemblies. Intermediate maintenance serves to support lower levels of maintenance by providing technical assistance and performing maintenance beyond the supported unit's capability[82].

Maintenance at this level is normally performed at an intermediate level maintenance activity, EMC or MTM for engineer equipment. These facilities are fixed in a garrison environment and deploy in full (or in part) to support operations. Despite their ability to deploy, they are not easily relocated and have a heavy logistics footprint. Equipment must be evacuated back to this facility to get repaired, which can put a burden on forward units.

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[81] United States Marine Corps, Installation and Logistics Department, Logistics Enterprise Integration Center http://www.hqmc.usmc.mil/LPI.NSF. November 2003.

[82] ROM WIPT Session V Information, "Proposed Levels of Maintenance Definitions." http://www.hqmc.usmc.mil/LPI.NSF. November 2003.

To help minimize this problem, intermediate maintenance companies that deploy use contact maintenance teams to conduct intermediate maintenance repairs on site in the field. Contact maintenance teams are a mechanic shop on wheels, usually a High Mobility Multipurpose Wheeled Vehicle (HMMWV). However, contact maintenance teams are limited in both number and in the type of repairs that they can conduct, which vary by equipment type. This is a sharp contrast to similar mobile repairs units in the private sector that can carry enough equipment to perform all levels of intermediate maintenance on equipment. For example, Caterpillar Corporation claims that its mobile maintenance repair vehicles are capable of all intermediate maintenance on their equipment[83].

4. Depot Level Maintenance

Depot level maintenance is tasked to the USMC Logistics bases in Albany, GA or Barstow, CA. Depot level maintenance is defined as:

> Maintenance performed on material requiring major overhaul or complete rebuild of parts, subassemblies, assemblies or end items, including the manufacture of parts, modifications, testing and reclamation as required. Depot maintenance serves to support lower levels of maintenance by providing technical assistance and performing maintenance beyond their responsibility.[84]

Depot level maintenance is the most complicated of all maintenance tasks. The level of proficiency required for the mechanics at this level takes many years to develop. For this reason, most of the depot level maintenance has been turned over to civilian government employees that work at either of the two main logistics bases. In addition, the need to have to send secondary repairable components back to these bases, has forced the USMC to keep a large back-up inventory of the items throughout the world. The dollar value of the inventory is estimated to exceed six hundred million dollars[85].

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[83] Interview with James R. McCormack, Manager United Rentals, Seaside, California., and the author, 17 October 2003.

[84] ROM WIPT Session V Information, "Proposed Levels of Maintenance Definitions." http://www.hqmc.usmc.mil/LPI.NSF. November 2003.

[85] USMC Installation and Logistics Division, *Logistics Enterprise Integration Brief*, Slide 68. 9 January 2003.

D. LIFE CYCLE MANAGEMENT

The USMC has not had a program to analyze or manage the life cycle costs of the equipment it purchases. It buys new engineer equipment to meet the planned allowance. As the equipment is disposed of through the Defense Reutilization Marketing Office (DRMO), it buys replacement equipment piecemeal. The process for disposing of equipment is not very structured and it relies heavily on the opinion of the requesting command. This demonstrates that the current USMC life cycle management is not effectively managing government assets.

In 1997, Secretary of Defense William S. Cohen announced "that reducing total ownership costs for our defense systems not only made good sense but was the only way that the Department of Defense (DOD) would be able to afford to sustain and modernize its weapon systems in the near future.[86]"

As a result of this guidance, the USMC as well as the other services began looking for ways to obtain accurate Life Cycle Cost (LCC). What the USMC is doing will be discussed in the section of emerging concepts. LCC analysis is composed of two main parts, the acquisition cost plus the operation and maintenance costs (O&M). While the USMC can identify the amount of money spent on acquiring new equipment, obtaining an accurate forecast of future O&M costs has been difficult if not impossible. While the USMC does have a system designed to do that, the Marine Corps Integrated Maintenance Management System – Automated Information System (MIMMS-AIS), the system has not worked. The system doesn't capture costs such as "pre-expended bin items, non-system national stock numbers (NSN), and open/credit card purchases".[87] Also there is generally poor record keeping and inaccurate data entry at the unit level. Likewise, there is no system to centrally track condition and use of the equipment. Analyzing LCC for individual equipment types is difficult if not impossible. Inability to analyze LCC is a problem not only for the USMC, but also for the entire DOD.

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[86] LtCol Mathews, Randy A., "A Secretary of Defense imperative." http://www.almc.army.mil/alog/issues/JanFeb99/MS368.htm. November 2003.

[87] Blaxton, A.C., Fay, M.J., Hansen, C.M., Zuchristian, C.M., *An Analysis of USMC Heavy Construction Equipment (HCE) Requirements*. MBA Professional Report, Naval Post Graduate School, Monterey, California, June 2003.

Marine LCC management stands in sharp contrast to that in the private sector. Two firms contacted during this study, Caterpillar and United Rentals claimed to be able to track not only exact LCC but also the condition and usage of all of their equipment. This ability is central to their competitive advantage in the market place. Failure to do so would put a company at a serious disadvantage in relation to their competition.

E. MISSIONS/CAPABILITIES

1. Introduction

The USMC engineer equipment fleet provides broad engineer support to the entire Fleet Marine Force (FMF). How can this support be defined? As noted this analysis follows a capability based assessment rather than a quantitative analysis. Although exact numbers of equipment types in the fleet and their location are known, it has been demonstrated that they are not tied to current requirements. In addition, the quantity and disposition of equipment is more an estimate of requirements, as they can change drastically with mission type. What is known is that the USMC under uses its engineer equipment in comparison to the private sector, an average of 200 hours per year versus 2000 hours per year. It was also demonstrated in Operation Desert Storm and Operation Iraqi Freedom, that the USMC requires a large amount of engineer equipment in a major war scenario.

Faced with these two contrasts, this thesis will address USMC engineer requirements in terms of capabilities instead of numbers of equipment type. The following sections address capabilities the USMC needs from its engineer equipment fleet. The USMC defines engineering capabilities in four broad categories. There are "mobility, counter-mobility, survivability and general engineering support[88]". The first three capabilities have a more direct combat support role, whereas the last one covers a broad range of engineering tasks. Throughout the different types of capabilities, there is a duplication of functions. The primary source document is USMC War Publication 3-17, Engineer Operations.[89]

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[88] Installation and Logistics Department: Engineer Advocacy Center (EAC), "Engineer Advocacy Center Charter." http://www.hqmc.usmc.mil/LPEWeb.nsf. November, 2003.

[89] United States Marine Corps, *Marine Corps War Publication 3-17: Engineer Operations*, 14 February 2000. MCWP 1-4.

2. Mobility

Mobility is the capability of the MAGTF to "move in time and space while retaining their ability[90]" to complete their mission. There are five mobility functions that the MAGTF expects from engineers: countermine, counter obstacles (breaching), gap-crossing, combat roads and repair, and forward aviation combat engineering (FACE).

3. Counter-Mobility

As its name implies, counter-mobility is defined as the "physical shaping of the battle space to alter the scheme of maneuver of the enemy[91]". The intent is to restrict the enemy's operations to allow the MAGTF the "opportunity to exploit enemy vulnerabilities or react to enemy actions.[92]"

4. Survivability

Survivability "includes all aspects of protecting personnel, weapons, and supplies". [93] It is primarily associated with the constructing field fortifications to protect personnel and equipment from enemy weapons fire.

5. General Engineering Support

General engineering refers to those activities that contribute "to force sustainment by enhancing the environment to improve operational tempo in the[94]" AOR. Like the previous engineering capabilities, they are a force multiplier that enhances the MAGTF's combat power. There are eight broad classes of general engineer support. These are: construction, airfield support, bridging support, follow-on breaching and/or area clearance, electrical support, bulk liquid support, explosive ordnance disposal, and port operations. This section will briefly discuss these classes of engineering support.

a. Construction Types

There are two classifications of construction types: vertical and horizontal. Vertical construction refers to "the improvement or construction facilities for use by the MAGTF.[95]" The types of vertical construction are:

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[90] Ibid, pp. 4-8.

[91] Ibid, pp. 4-11.

[92] Ibid, pp. 4-11.

[93] United States Marine Corps, *Marine Corps War Publication 3-17: Engineer Operations*, pp.4-11, 14 February 2000. MCWP 1-4.MCWP 3-17.

[94] Ibid, pp. 5-1.

[95] Ibid.

- Wood and masonry
- Existing facilities rehabilitation
- Structural Reinforcement

Horizontal constructions are those "required to shape the terrain to meet the operational requirements of the MAGTF.[96]" The types of vertical construction include:

- Main Supply Route (MSR) construction and/or maintenance
- Expeditionary Airfield
- Site preparation for bed down facilities
- Ordnance storage facilities

b. Airfield Support

Airfield support capabilities are those required to ensure the fullest operation of the airfield to allow the ACE to bring maximum assets to help the MAGTF effort. It can mean the construction of a new airfield, expansion or rehabilitation of current airfield, or rapid runway repair to bring an airfield back into operation following an enemy attack. The ACE is a major component of the MAGTF and it is the engineer's job to ensure that airfields are as capable as possible of sustaining air operations.

c. Bridging Support

Bridging support helps the MAGTF maintain its momentum by overcoming gaps (rivers and/or natural or man made ditches). Depending on the size of the gap, it can require as little as one bridge laying equipment vehicle to a full battalion effort or greater. Quick gap crossings are critical to avoid unnecessary concentration of forces.

d. Follow-on Breaching and/or Area Clearance

The breaching capabilities under the general engineering support operations are designed to augment those done by the assault echelons under the mobility capability. Those are done by the assault unit to get through an enemy obstacle. The follow-on support in trace is generally much larger than the assault unit and the initial breach might not be large enough to allow for adequate flow of equipment and supplies. It is in this instance, when follow-on breaching and/or area clearance comes into effect.

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[96] Ibid.

e. Electrical Support

Warfare is destructive in nature and normally results in the destruction of at least part of the local infrastructure. As the MAGTF advances towards its objective it can find that there are limited or no readily available power supplies. It is in these situations that mobile electric power (MEP) is essential to provide the MAGTF with its own power needs.

f. Bulk Liquid Support

The modern MAGTF is heavily dependent on the supply of water and especially fuel to sustain its operations. Lack of fuel can adversely impact both the rate of the advance and the air operations of the ACE. It is the responsibility of the ESB to transfer and store Class III (bulk liquids) for the MAGTF.

g. Explosive Ordnance Disposal (EOD)

The modern battlefield is filled with ordnance of varying types, both friendly and foreign. EOD assets support the clearing and defusing of ordnance to ensure the safety of an area of operations.

h. Port Operations

The USMC is an amphibious force, designed to come ashore through a hostile beach. While the USMC has not attempted a full scale amphibious operation since the Korean War, it has initiated most of its operations since then from ships. Engineers can play a critical role in the initial offloading of equipment and supplies by creating or improving a port facility.

F. NAVAL CONSTRUCTION FORCE

The Naval Construction Force (NCF) or the "Seabees" is the engineering unit within the Navy. They have considerable more depth and capabilities than the USMC ESB. NCF units provide general engineering support to the MAGTF and are under its operational control. The NCF "reinforces and augments the MAGTF's limited engineering capability" and they are part of the planning for any major operation. We mention them because the NCF is integral to the USMC engineering capabilities. Any change in USMC engineer community practices must take account of NCF roles and capabilities.

G. EMERGING CONCEPTS

1. Joint Vision 2010 & 2020

Joint Vision 2010 & 2020 has forced the services to start working closer together. The objective is to transform the military towards to the future war fighting force to achieve the goal of ensuring that the U.S. military can maintain full spectrum dominance on the battlefield. Full-spectrum dominance is achieved through four capabilities: "dominant maneuver, precision engagement, focused logistics and full-dimensional protection.[97]" In the realm of focused logistics, it has stated that the goal is to better support the war fighter through an integrated system. This system will "provide a more seamless connection to the commercial sector to take advantage of applicable advanced business practices and commercial economies."[98]

Focused logistics in Joint Vision 2010 & 2020 encourages the Services to improve the manner in which logistics supports the war fighter in part by looking at new ways of doing and providing logistics. This is a path that all of the services have started over the last couple of years.

2. USMC Strategy 21

The USMC has laid out its strategy to achieve the objectives of Joint Vision 2010 & 2020 through USMC Strategy 21. As part of this strategy, the USMC has set a course to change the way in which it fights. This new strategy is called Operational Maneuver from the Sea (OMFTS), which we will discuss in more detail in the next section. In the area of focused logistics, Strategy 21 encourages "enhanced experimentation to include ways to accomplish acquisition, logistics, and support tasks through technological innovations, outsourcing, and other techniques.[99]"

To this end, the USMC has implemented a number of logistics initiatives to improve logistics processes through the use of "prime vendor, partnership with industry,

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[97] Joint Chief's of Staff, *Joint Vision 2020*, pp. 2, US Government Printing Office, Washington DC., June 2000.

[98] Joint Chief's of Staff, *Joint Vision 2020*, pp. 31, US Government Printing Office, Washington DC., June 2000.

[99] United States Marine Corps, *USMC Strategy 21,* pp.8, Department of the Navy Headquarters United States Marine Corps Washington, D.C., 2003.

and contractor logistics support.[100]" In addition, the USMC is continuing to push the envelope on looking at sourcing services that were once considered core competencies.

3. Operational Maneuver from the Sea

Operational Maneuver from the Sea (OMFTS) is a strategy that will allow the USMC to assault its objectives as the name implies from the sea, without the need to establish an operating base ashore. Its aim is to use the vastness of the sea as a staging area from which an assault can be launched on the enemy's center of gravity or exploit enemy vulnerabilities.

a. Ship to Shore

OMFTS requires the ability to quickly deploy from ship to shore to put overwhelming force on a target before the enemy has a chance to organize effective resistance. This will require equipment that the USMC is developing to include the Advanced Amphibious Assault Vehicle (AAAV), MV-22, Joint Strike Fighter, and the next generation Landing Helicopter Assault (LHA) ship, the Landing Helicopter Experimental (LHX). This operational structure will require that the engineering community develop ways adapt to a fast pace environment.

b. Reduced Logistics Footprint

Because OMFTS will require sea basing to conduct operations, it will require a substantially reduced logistics footprint, which is a change from the traditional USMC iron mountain mentality that requires enough supplies to cover all eventualities. To achieve a reduced logistics footprint, the USMC is attempting to create a more responsive supply and maintenance system that will allow for the storing of just the right amount of equipment to meet operational needs. The keys to this initiative will be to[101]:

- Modernize Logistics Information Systems
- Improve Equipment Readiness
- Improve Logistics Response Time
- Reshape Intermediate Level Inventory

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[100] MajGen Higginbotham, G.B., "USMC Logistics Transformation," brief presented to the National Defense Industrial Association, 27 April 1999.

[101] MajGen Higginbotham, G.B., "USMC Logistics Transformation," brief presented to the National Defense Industrial Association, 27 April 1999.

4. Adopting Best Business Practices

In the drive to transform the military, it has become obvious that in many regards, the military is well behind the private sector in terms of efficiencies. While the commercial sector has been forced to find the most effective means to conduct business, the military did not pick up on this until budgets became tight in the early 1990's. The USMC has pushed hard to achieve efficiencies in all areas and has active programs under way to incorporate best business practices into its own processes. Among the initiative the USMC is trying to implement are:

- Partnership with academic institutions
- Internships in Private industry
- Partnering with Private industry
- Outsourcing

5. Five to Three EOM

One initiative that is currently underway is the transformation of the EOM from five levels to three. The new proposal is to create three levels: organizational, intermediate, and depot level (see figure 5).

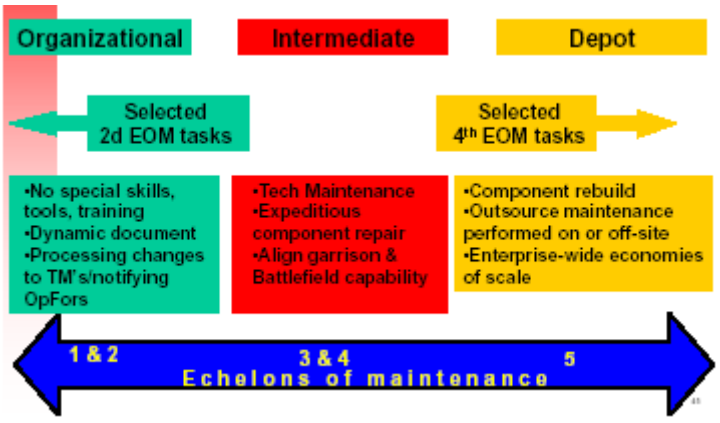

Figure 5. Proposed Levels of Maintenance[102]

6. Marine Corps Logistics Command (MARCORLOGCOM)

We mentioned in a previous section that the USMC has not had a Life Cycle Cost management program and that it has historically been unable to capture the associated

[102] USMC Logistics Enterprise Integration. Shaping Logistics to Support the 21st Century Warfighting.

costs. Recently, the USMC integrated USMC Material Command (MCMC) and USMC Logistics Bases (MCLB) into a new command, USMC Logistics Command (MARCORLOGCOM). Its mission is to provide

> worldwide, integrated logistics/supply chain and distribution management; depot level maintenance management; and strategic pre-positioning capability in support of the operating forces and other supported units to maximize their readiness and sustainability and to support enterprise and program level Total Life Cycle Management.[103]

This new Command will finally attempt to address the LCC of equipment in the inventory, which should lead to better decision making process about investment in the equipment fleets of both the future and the present.

H. CONCLUSION

In this chapter, we have outlined the current: structure of the engineer community, maintenance process, life cycle management, capability requirements, and emerging concepts that affect the community. The intent has been to analyze the engineer community to see how it currently operates, what it does well, where there are deficiencies, and where it is going. Having a though rough understanding of these concepts is critical if we are to try to define the requirements for an outsourcing option that will still meet all of the requirements of the USMC.

[103] Global Security, "Logistics Command Officially Established," http://www.globalsecurity.org/military/library/news/2003/06/mil-030626-usmc03.htm. November 2003.

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IV. USMC REQUIREMENTS FOR A PFI

A. INTRODUCTION

The intent of this chapter is to outline how a PFI could work and the requirements that the USMC would need to include in a proposed PFI. While not an all inclusive list, the intent of this approach (creating such an outline and a list of requirement) is to provide a rough planning document that can be initially used by an IPT. This chapter will first outline the assumptions that the proposed PFI is based on in order to put it in context. Next, it will outline the requirements that the USMC needs to consider in such a PFI.

As was covered in Chapter III, USMC requirements can be defined in terms of quantity of equipment, capabilities (packages of different equipment types), and training requirements. How can USMC engineer equipment (commercial and military unique) requirements be defined? One answer is by equipment type based on the current needs and T/E tables. Does this solve the problem of getting what is need where we need it? The equipment is spread out over the globe to meet USMC operational and contingency needs. This includes USMC war reserve material. The result is that there is too much equipment on hand to meet many contingency requirements, and the current problem of not being able to manage it effectively.

The same approach applied to a PFI, would likely force the contractor to have too much equipment in standby mode, increasing cost to the government. Because the private sector already has equipment throughout the world, it is best to define USMC needs in terms of capabilities to assemble within predetermined time periods. The private sector would then agree to meet the capability need; however, this would also be a quantitative need that must be addressed through a matrix. A sample decision matrix will be included in a later section.

It is important to keep in mind that USMC engineer equipment needs account for a very small percentage of the private sector availability. With this in mind, it would be conceivable to have the private sector meet USMC needs across the spectrum of capabilities. It could be deemed a "fact" that there exists enough capability to meet all of

our equipment requirements. An option of how to meet USMC engineer equipment requirements would be to use the UK MOD engineer PFI equipment requirement proposal (**Appendix F**) that defines requirements in terms of capabilities and time tables.

B. ASSUMPTIONS

1. Restructure USMC CSS for Engineer Equipment

In Chapter III, the current structure of the USMC Engineer Community is outlined. In Chapter I, it was stated that one of the reasons for seeking the outsourcing of capabilities is to allow the military to concentrate on those tasks that it does well and needs to keep in house and to allow contractors to do the rest. This is also one of the main justifications for adopting a PFI solution. The analysis indicates a PFI type alternative can be effective for the USMC Engineer needs. However, the current EOM CSS needs to be restructured to allow for the USMC to concentrate on its core tasks while outsourcing (through the PFI) the rest.

For the purposes of this analysis, it is proposed that a restructured EOM CSS operate as follows. That the Marine Corps concentrate on those EOM tasks that can be accomplished by equipment operators and maintenance contact teams, preferably one's with enhanced capabilities. This would allow the Marine Corps to concentrate on providing those EOM tasks that can be accomplished in a field environment. For those tasks that cannot be accomplished in a field environment, it is proposed that they be outsourced to the private sector through a PFI.

In effect, this would leave two EOM vice the current five or the proposed three. One would be the responsibility of the USMC and the other would be the responsibility of the private sector. Where in the EOM spectrum would the line of responsibility be drawn? This line would vary by equipment type and capability of the maintenance contact teams, yet in all probability it would be somewhere between the current 3rd and 4th EOM. For the purposed of this thesis, this range will be referred to as Field Capable Maintenance (FCM). Those tasks that do not fall within the FCM range will be referred to as Non-Field Capable Maintenance (NFCM).

This division of tasks would allow the USMC to maintain and concentrate on critical core competencies (FCM) that it needs military personnel to accomplish on the

battlefield. This thesis assumes that there is no inherent need for the government to accomplish higher echelons of maintenance. The bulk of USMC Engineer equipment is commercially available and serviceable around the world.

The reasoning for proposing such a restructuring is based on three presumptions. First, the USMC is fairly good at training equipment operators and mechanics to conduct FCM. The skills required to conduct these levels of maintenance can be easily achieved through MOS School and OJT at units. Furthermore, these skills are more easily acquired in a relatively short period of time, and they provide units with corporate knowledge that can be maintained despite high personnel turnover.

On the other hand, the skills required to conduct NFCM are not easily learned. Due to their complexity, it requires training for prolonged periods to master. This is not beyond the capability of military personnel, but it is not practical due to frequent rotations. In the private sector, mechanics that perform this type of maintenance routinely do so for their entire career. In fact, the USMC currently uses civilian contractors or government personnel to conduct the bulk of fourth through fifth EOM, which represent the range covered by NFCM.

The second presumption is that relying on operators and enhanced maintenance contact teams both in garrison and in an operational environment would allow the USMC to "train as we fight." This would eliminate problems associated with transitioning from peace to war and vice versa. In a combat or operational environment, USMC CSS in the field is conducted primarily through maintenance contact teams.

A recent after action report from Iraq[104] recommended that the USMC logistics community operate in peacetime as it does in wartime. It noted that there was difficulty transitioning from its garrison environment during the recent conflict in Iraq. This would entail transforming both EMC and MTM into maintenance contact team companies that would dispatch maintenance contact teams to conduct on site repairs. Because maintenance contact teams would be military, this would avoid the problem of contractors on the battlefield. However, maintenance contact teams are currently not structured to conduct the full range of FCM. Among other things, the USMC would need

[104] Regimental Combat Team Five, "Operation Iraqi Freedom Logistics After Action Report," pp.6.

vehicles that carry more capabilities than the current HMMWV based maintenance contact teams.

Recommendation: USMC study how to increase capabilities of maintenance contact teams to support FCM.

The third presumption is that any required maintenance that falls in the category of NFCM requires equipment that is not readily available in a field environment, even to an enhance maintenance contact team; rather it requires a fixed facility. A fixed facility is usually established in rear areas, well away from a combat zone if not outside the theater of operations. This facility is not easily moved; equipment requiring this level of maintenance is usually evacuated with wreckers. Because the NFCM EOM facility would always be established in a rear area, it makes sense to have civilian contractors conduct these repairs. As mentioned under reason number one, civilian personnel are more efficient at conducting NFCM than military personnel.

2. How would the PFI work?

The specific details or requirements of how the proposed PFI would work are presented in section C of this chapter. The basic proposal for this PFI would be for a consortium of companies to provide (lease or rent) the USMC Equipment needs throughout the world either by making the equipment available in CONUS (leaving transportation to the USMC) or by delivering it to a destination OCONUS (normally a POD or APOD). The consortium would also be responsible for conducting all NFCM as well as any overflow FCM.

For normal peacetime conditions, the USMC would lease or rent the amount of equipment plus the maintenance support that it needs to meet its day-to-day operational requirements. For times of war, the consortium would guarantee the availability of equipment, within various timeframes (Table 3) to meet wartime requirements. This proposition does imply a degree of risk for the USMC. What if the equipment is not locally available? Through a PFI structure, the risk is transferred to the contractor who would bear the responsibility of sourcing the equipment. Accepting this degree of risk does imply a shift from the iron mountain mentally addressed in Chapter III.

Unit	Equipment Available	Maintenance Facility Available
MEU/MEB/MWSG	72 hours	96 Hours
FSSG/ACE/DIV	2 Weeks	2 Weeks
MEF	One month	One Month

Table 3. Sample Equipment and Maintenance Facility Availability Timeframe

In addition, the consortium would agree to establish a maintenance facility in the nearest POD or APOD to support operations. As part of the PFI, the USMC would be responsible for FCM while the consortium would be required to support NFCM and overflow FCM. Support available from the consortium would have to be large enough to support the entire USMC requirement. The consortium would also ensure that spare parts support would be available throughout the world either through its own distributors or through the military supply system.

3. Interest from Industry

An assumption made in this thesis is that there is interest in the private sector for such a PFI type arrangement. A number of private sector companies were contacted to determine their level of interest to meet the USMC Engineer equipment requirements through some sort of PPP. It was learned that there is a great deal of interest from the private sector in doing some sort of PPP for this type of equipment although they all requested additional details and assumptions that this study was not prepared to give.

Ninety eight percent[105] of private sector engineer equipment is the same as that used by the military, the main difference being the chemical agent-resistant coating (CARC) paint. Also engineer equipment is available throughout the world. The Armed Forces have on many occasions rented engineer equipment in support of military exercises and operations. Many engineer equipment makers are already structured to support their equipment on a global basis. Further, a PPP would provide a source of revenue for spare capacity. Finally, the wartime needs for the USMC would represent less than one percent of the commercially available equipment. USMC wartime needs

[105] Marine Corps System Command, *Private Finance initiative – Private Opportunity Public Benefit*, Slide 11, 14 March 2003.

would be a minimal drain on the commercial sector, meaning that they could easily meet any Marine Corps requirement.

C. REQUIREMENTS TO INCLUDE IN A PFI

This following section addresses the particular requirements that would need to be addressed in a PFI arrangement to support USMC Engineer requirements. While this list is not all-inclusive, it does represent a good starting point for planning purposes. For each item, this thesis addresses the particular requirements the USMC will need, which although not all inclusive either, are also a good starting point. The reference for these requirements is the UK MOD requirements lists[106] for their PFI arrangement for Engineer Equipment. The requirements addressed in the following section are more qualitative than quantitative.

D. PROPOSED PFI REQUIREMENTS

1. General Requirements

a. Capabilities

Capabilities address two concerns. One is the variety of missions that the Marine Corps would have to accomplish with the use of engineer equipment. The other is the amount of equipment needed to accomplish the missions. The different capabilities required by the USMC were address in Chapter III and they are translated into the equipment types outlined in Appendix B. The amount of equipment can be structured around being able to support varying size units like a MEU, MEB, or MEF, within prescribed time limits in different geographical areas.

b. Equipment Performance

Performance requirements address the issues of equipment reliability and overall fleet readiness. The performance required from each individual type of equipment was addressed in Chapter III. The other is the level of equipment readiness of all required equipment to support the operating forces.

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[106] Colby, I. RE: PRIVATE FINANCE INITIATIVE INFORMATION REQUEST (Schedule of Authority Requirements). Available E-mail from EVPWFM@dpa.mod.uk. 10 September 2003.

For individual equipment types, the USMC should adopt commercial standards because they would meet all USMC need, and would require no modifications to the equipment. A previous NPS thesis recommended the adoption of commercial standards because they result in higher productivity[107].

For overall equipment readiness, the USMC needs to determine an achievable level that balances costs vs. readiness. The higher the required readiness of the equipment, the greater the cost will be. Current USMC standards require an overall readiness of no less than 85% readiness for all equipment types.

c. Equipment Replacement

There are three conditions under which the USMC would need to have equipment replaced:

- Obsolescence (end of useful life)
- Destroyed
- Broken beyond the level of maintenance available in the field environment.

Both cost and time to replace are important factors to consider. The time frame would be very short in a wartime or operational scenario and lengthier during normal garrison activities. Above all else, the contractor must be capable of short notice replacement during periods of conflict. An additional point that must be considered is where the contractor would be required to deliver the equipment to (the nearest POD or APOD) and who would be responsible for transportation.

d. Handover of Equipment

The USMC has spent over one billion dollars on the current fleet of equipment (outlined in Appendix B). This substantial investment occurred over the course of two decades. If the equipment is turned over to a contractor, a fair valuation must be made, based on the current condition of the fleet. This valuation could be achieved either through a random sample survey or through a complete inventory. A contractor would more than likely want to do a complete survey. Regardless of the method chosen, the government must be careful to ensure a fair evaluation so as not to appear to be giving away tax payer resources.

[107] Blaxton, A.C., Fay, M.J., Hansen, C.M., Zuchristian, C.M., *An Analysis of USMC Heavy Construction Equipment (HCE) Requirements*. MBA Professional Report, Naval Post Graduate School, Monterey, California, June 2003.

How would turning over the equipment happen? Because of the size of the engineer equipment fleet, a quick turnover would probably be impractical. A gradual turnover would be more appropriate and provide hedges to deal with issues that would undoubtedly arise.

e. Compliance with US Legislation

The FAR and the DFAR do not specifically address PFI's or PPP's. While acquisition reform has opened the way for such outsourcing, there is no clear guidance. The recent Air Force tanker deal received heavy scrutiny from Congress in part because it went beyond current regulations in the FAR and DFAR. The lesson is that the USMC must line up political support before undertaking such a large project.

f. Compliance with Legislation Outside US

While agreements with other countries allow the United States to bring in its equipment into their borders to support operations, it must also include arrangements for our contractors, as they will probably have to establish or upgrade infrastructure to support operations. While this might seem trivial, because of our reliance on contractors in a PFI arrangement, it cannot be taken for granted.

2. PART II: Service Support Requirements

a. Service Support

We have proposed that the USMC rely on the contractor for all NFCM. What needs to be addressed in this section is the turnaround rate that the contractor should meet. Would there be a guaranteed turn around time of so many days or hours for different types of contingencies? How much time must be given to the contractor to set up a suitable facility in a given environment with X capabilities? Determining these requirements involves a complicated analysis, but it is critical to maximize operational supportability. We propose that the USMC use the matrix used by the UK MOD (Appendix F) for planning purposes. While their requirements are no doubt different than those of the USMC, there are many similarities.

b. Integrated Logistic Support Plan

Because the bulk of the USMC engineer equipment is commercially available and supportable throughout the world, this study proposes that logistics support be outsourced to the contractor. There are questions that would need to be addressed.

Would the contractors be forced to use their own support infrastructure or would they have access to DOD systems? Can the USMC use MIMMS or other systems? The commercial sector already has integrated logistics support plans for their operations throughout the world. Does the USMC want to rely on the contractors system or on its own? Does the USMC want visibility into the contractors system?

c. Maintenance and Repair

One of the assertions in this thesis is that the USMC should concentrate its maintenance efforts on FCM and leave NFCM to the contractor to be performed at a rear area facility. This will allow the USMC logistics community to concentrate on its core engineer competencies (outlined in Chapter III). Upgrading capabilities of existing maintenance contact teams can allow them to easily perform FCM. Private sector maintenance contact teams already have this capability.

d. Materiel Flow Management

The flow of assets and equipment into an operational area can be both costly and limiting, depending on infrastructure and availability of lift. It must be determined whether a contractor will use their own transportation assets or if they will have access or need for government assets such as Airlift Mobility Command (AMC) or Traffic Management Office (TMO). Will the contractor be responsible for delivery to the POD or APOD or just the POE or APOE? If they use government assets, will they pay government rates or equivalent commercial rates? In addition, depending on the urgency of the support required, will the government need to be prepared to pay a premium in wartime or contingency operations, and if so at what rate?

e. Spares

If the USMC sources out its engineer requirements through a PFI it would also have to decide whether it wants to outsource spare part support as well. Currently, it uses the established supply system where it obtains Class IX repair parts through DLA or GSA. One of the primary reasons for commercial support for the USMC engineer requirements is that cost savings can be achieved through the use of commercial sources. Likewise, it is possible to obtain cost savings by using commercial spare part support rather than maintaining a large government infrastructure to do the same. Commercial companies can already support spare parts requirements for their equipment throughout

the world. It would seem appropriate then to use existing commercial supply sources to meet USMC spare parts requirements because additional cost savings can be achieved.

f. Technical/Proprietary Documents

The length of PFI contracts signed by the UK MOD has run upwards of 30 years[108] depending on the capital investment undertaken by the private sector. Even with reevaluations every couple of years, PFI's can commits both the government and the contractor to a long-term commitment that is not easily modified or terminated. Any actions undertaken by either party can have an impact on the other. For this reason, it is important that the government both know and understand any company actions in terms of new developments or changes in business plans. The government must also ensure that the information is protected from disclosure.

g. Training: General

As part of the PFI solution proposed, the government can also turn over responsibility of training military engineer equipment operators and mechanics to a private contractor. The contractor would have responsibility for training operators on all equipment types to a given standard of proficiency, and be responsible for training operators and mechanics to perform their respective FCM. The contractor would have to run a number of courses annually depending on needs for both mechanics and operators, as determined by USMC Manpower branch. The contractor can also be responsible for conducting refresher training to ensure that proficiency levels are maintained.

To be a viable part of this PFI, the contractor would be required to demonstrate that it could perform these functions cheaper than the current in house option. This can save the USMC both costs and billets that it can then dedicate to the operating forces.

h. Training & Equipment Records

In a PFI arrangement, the contractor would be required to maintain all records for equipment maintenance and for personnel training. All of this data must be available to the USMC so that it can independently track the state of readiness of the equipment and the skill level of its personnel.

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[108] United Kingdom Ministry of Defense, "PFI Guidelines: Procurement Issues Contractual." http://www.mod.uk/business/ppp/guidelines/contractual.htm, November 2003

i. Safety

Material Handling Equipment (MHE) and engineer equipment operation are a leading cause of accidents that result in serious injury or death within the United States USMC[109]. To respond to this increasing trend the USMC has implemented a stringent safety program. As part of the PFI, the USMC would have to require that a contractor maintain a similar safety program.

3. Management Information System (MIS)

Information management is a key to the success of a complicated PFI such as this. Proper information management will allow for real time access to information that can be used to solve issues before they become a problem. Real time access can facilitate effective planning of engineer support to the MAGTF. The following topics are issues that must be addressed as an integral part of the proposed PFI.

a. MIS Structure and Design

It is well known the USMC has a hard time tracking the current engineer equipment fleet in terms of its current condition, hours of use, or wear and tear on individual equipment. In fact, the USMC has no visibility on the particulars about any piece of equipment. The current maintenance management system, MIMMS, is not up to the task, nor are other systems such as ATLASS. A firm requirement for this PFI would be for the contractor to propose an MIS that could do all of the above. This could be an existing commercial system to reduce costs. Companies like Caterpillar already do this for all of their equipment throughout the world.

b. Transition and End-State Phases

Because of the size of the USMC engineer equipment fleet it would probably be impractical to make a quick transition to a new system. It would be part of the PFI requirements to have a potential contractor develop a proposed implementation plan to transfer the USMC to their MIS. The contractors must have maximum flexibility to design such a system. A system demonstration would also be required to ensure that there are no flaws in the system or process.

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[109] NavalMessage 181310Z Jan 96,"Safety During Forklift Operations", http://www.hqmc.usmc.mil/safety.nsf/0/bd69ec731b7e900a85256acb00559725/$FILE/Forklift.doc. November 2003.

c. Information Access

It is important for the government to have access to any MIS that supports the PFI. Access will not only allow the government to ensure that their interests are being served, but also assist in the operational planning effort.

d. Data Entry/Interfaces

What ever MIS is implemented government personnel must be allowed to enter data and process it to support requisitions and decision making. To this end, the entry of data must be available to contact teams operating in the field.

e. Data Ownership

If the contractor owns the data, does the military have the right to oversee it and use it for its own purposes? The government should have such a right, as it is a way to measure effectiveness and asset costs.

f. Software Support

Potential contractors must also present a plan addressing the supportability of the MIS. Will this be the contractor's responsibility or will the task be subcontracted out? Will the system be upgradeable?

4. Change/Contract Management

As already mentioned, a PFI can be a very long commitment for both the private sector and the government. All requirements, obligations, or potential eventualities that can occur during the life of the contract can be written into the final negotiated agreement. The UK experience with PFI's shows the need to make adjustment in the future and that the success of these adjustments depends on the flexibility of the process. This concept is not unknown to the DOD, who has experience the effects of changing requirements on most of its major programs. For this reason, the USMC needs two things in relation to the management aspects of a PFI.

First, the PFI needs to be flexible enough to allow both parties to make changes with reasonable effort. It is impractical to expect that all potential requirements during the life of a PFI can be addressed in a contract. The PFI must have a built in mechanism that allows for relatively rapid changes especially with provisions for changes during time of war.

Second, the USMC must create a management team that can be dedicated to the PFI management over the life of the contract. This will preserve continuity and corporate knowledge, which are critical to the success of the effort. The UK MOD has made this a requirement for their PFI's.

E. CONCLUSION

This chapter has outlined how a proposed PFI could be structure to support USMC engineer equipment needs and how the Marine Corps should restructure is CSS and logistics functions to concentrate on its core competencies. In addition, a series of factors have been presented that would need to be addressed individually in a PFI.

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V. FINDINGS, RECOMMENDATIONS AND CONCLUSION

A. INTRODUCTION

The intent of this thesis was to determine if the UK MOD PFI for their Category C vehicles is a feasible alternative for the USMC to meet its engineer requirements. If so, then also outline the requirements and considerations that need to be considered for implementation. An analysis was conducted of what a PFI is, how it is structured and how it operates, plus the lessons learned that UK MOD has had with them over the last decade. This included an analysis of contacts and trends within the private sector. Then, an analysis of the USMC current engineer equipment structure, organization, processes, and requirements was conducted to determine what would need to be addressed in a PFI type arrangement. Finally, based on the analysis in Chapters II and III, a PFI was drafted that would meet all USMC engineer equipment requirements. How this proposed PFI would work was explained. In addition all of the particular requirements that the Marine Corps would need to address as well as an implementation plan were identified. This chapter states the findings, recommendations, and conclusions to MARCORSYSCOM.

B. FINDINGS

1. There is interest in the commercial sector to meet government engineer equipment requirements through such arrangements as leasing, renting, or PPP.
2. Companies in the private sector can meet engineer equipment needs throughout the world. Complimenting private sector capabilities with DOD logistics support can enhance world wide supportability.
3. The UK MOD has is currently considering a PFI arrangement that meets its requirements. Its needs in terms of capabilities and equipment requirements are very similar to those of the USMC. Also, the UK MOD engineer equipment fleet is about the same size as those of the USMC.
4. UK Government has experienced positive results overall with the PFI type arrangements that they have set up over the past fifteen years. PFI's have been used

to meet a variety of public sector requirements. In addition, they have extensive knowledge on the implementation process for PFI arrangements.

5. PFI contractual arrangements are highly flexible and can be adjusted to meet a variety of requirements.
6. PFI's are long-term arrangements and there must be a means to make adjustments once it is implemented because it is impossible to make provisions for all potential occurrences.
7. Renting engineer equipment has become the primary method for large organizations in the private sector to meet their engineer equipment requirements. The largest customers for engineer equipment manufacturers are rental companies.
8. The entire DOD logistics process involves a multitude of stakeholders, all of whom can have a significant effect on any proposed change to the process. The UK MOD found that dealing with the plurality of stakeholders within its own system was a major reason of why it took four year to reach the current decision point.
9. Current USMC requirements documents for engineer equipment date back to the 1970's and don't properly address current requirements.
10. USMC MIS doesn't allow for proper tracking of individual engineer equipment usage, operations and maintenance costs, nor life cycle management. It is therefore difficult to obtain accurate cost data to support an outsourcing study.
11. The USMC uses only a small percentage of its engineer equipment on a day to day basis while the rest of the equipment sits mostly idle resulting in considerable underutilization compared to commercial sector usage rates.

C. RECOMMENDATIONS

1. Assemble an IPT to conduct a business case analysis of using a PFI arrangement to meet USMC engineer equipment needs. The business case would need to include a cost benefit analysis that could determine if this option is advantageous.
2. Send a team to the UK MOD & C Category IPT to evaluate their process of dealing with the engineer PFI over the last four years. The process that the UK MOD has

followed has been lengthy and required many adjustments to bring it to the point of making a decision. A great deal can be learned from their experience. There is excellent potential to learn valuable lessons that can save a great deal of time and effort. This action would require a government-to-government request.

3. Request that the Caterpillar Corporation Government Liaison Office debrief their experience with the UK MOD PFI. There is considerable knowledge from an industry perspective that can be learned from such an exchange. A PFI is a long-term contract that must work for both the government and the contractor. It is important to obtain private industry perspective.

4. Conduct an industry day in which the private sector would be invited to present their ideas and concepts for meeting engineer equipment requirements. It is important to provide the private sector maximum flexibility in how to meet our requirements. This would allow for the greatest amount of innovation.

5. Start a PFI arrangement on a small scale and build up from there. Choose perhaps just one type of equipment such as a D7 Dozer and just a CONUS test bed. A limited test can make it easier to analyze the effectiveness of a PFI solution as well as provide a learning opportunity that will allow the process or requirements to be adjusted more easily. In addition, a limited test would be easier to implement, as it would affect less stakeholders.

6. Address PPP in the FAR/DFAR. The FAR/DFAR currently doesn't specifically address issues involving PPP's, and it puts limits on leasing when it comes to government contracting. Recent government regulations have opened the door to additional outsourcing options to include a shifting view of what are inherently governmental functions. It is time for the FAR and DFAR to provide guidance on PPP possibilities in a manner that encourages the services to find innovative solutions.

7. Manage PFI/PPP at the DOD level[110]. There is no doubt that all of the services have engineer equipment to support their day to day operations and contingency

[110] United Kingdom Ministry of Defense, "PFI Guidelines: Procurement Issues General." www.mod.uk/business/ppp/guidelines/general, November 2003

requirement. There is also considerable redundancy in the equipment, where it is stored, support infrastructure, amount maintained for war reserve and contingency purposes. The UK MOD found it beneficial to seek to outsource engineer equipment requirements for all of the services in one package. From a DOD perspective there could be considerable cost savings achieved by coordinating the different engineer equipment requirement across the services. While this study did not look at this possibility, it is an area where further analysis can be useful. This idea can be applied to more than just engineer equipment.

D. CONCLUSION

This research has demonstrated that the USMC is not efficiently managing nor operating its engineer equipment. At the same time, it has been demonstrated that a PFI is a viable alternative, as a PPP arrangement to meet USMC engineer equipment needs. The research has explained how a PFI can work to meet USMC engineer equipment requirements as well as address all of the relevant requirements for successfully implementing it. It is recommended that the USMC establish an IPT to determine if this or another outsourcing method would better meet USMC engineer equipment needs.

APPENDIX A: SOURCES FOR IMPROVED VALUE FOR MONEY[111]

- Ensure that assets are fully fit for purpose but no more, that is removing any tendency to over-design or gold-plate and removing the cost pressure from post contract design changes.
- Closely integrating design with operational needs so that the assets can be operated and maintained with maximum efficiency.
- Increasing the efficiency of both construction and operation by applying existing expertise.
- Making use of new technology and/or new, more effective business processes.
- Achieving economies of scale by enlarging the asset and sharing its use between the public sector and other customers (or between two or more public sector customers).
- Designing the asset to provide scope for other services to be sold to third party users.
- Designing the asset to improve its resale value or its capacity to be transferred to new users after the end of the contract.
- Making easier the introduction of user charges where appropriate as a means of improving the match between supply and demand.

111 Chancellor of the Exchequer, *Private Opportunity, Public Benefit: Progressing the Private Finance Initiative*, pp. 17, Her Majesty's Treasury, November 1995.

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APPENDIX B: HER MAJESTY'S TREASURY (HMT) PAYMASTER RECOMMENDATIONS[112]

1. PFI deals already signed, or accepted as operationally and financially viable, will proceed without delay.

2. Every potential partnership project will be subject to a more rigorous appraisal early in its life, so contractors, funders and operators do not squander time and resources on projects which are unlikely to work and the public sector avoids wish list' schemes.

3. We will draw up guidance on tendering for partnership projects, in consultation with the National Audit Office, the Audit Commission and the Accounts Commission for Scotland.

4. Where possible, we will set a timetable for each project's tendering process to give potential private partners an indication of when a decision can be expected on a project.

5. We will urgently review the existing legislative framework, issue guidance and, where appropriate, enact new legislation to ensure that public bodies have the necessary legal power to enter into contracts.

6. We will ensure that the guidance on risk transfer and value for money, including templates, is kept up to date, in consultation with public and private sector interests.

7. In particular, we will seek to develop a clear and consistent policy on generic risks - for example, the approach to changes in Government health and safety policy or the treatment of contaminated land.

8. We will encourage a wide range of partnership deals, including public/private joint ventures, such as Manchester's Metrolink tram system, and non-profit trusts, such as those providing old people's homes formerly run by local authorities.

9. The Private Finance Panel will be strengthened and given a specific remit to streamline procedures, develop standard forms of contract and cut red tape.

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[112] Her Majesty's Treasury, "PAYMASTER GENERAL ANNOUNCES KICK-START TO PFI (PUBLIC/PRIVATE PARTNERSHIPS) Review of Private Finance Machinery End of Universal Testing."

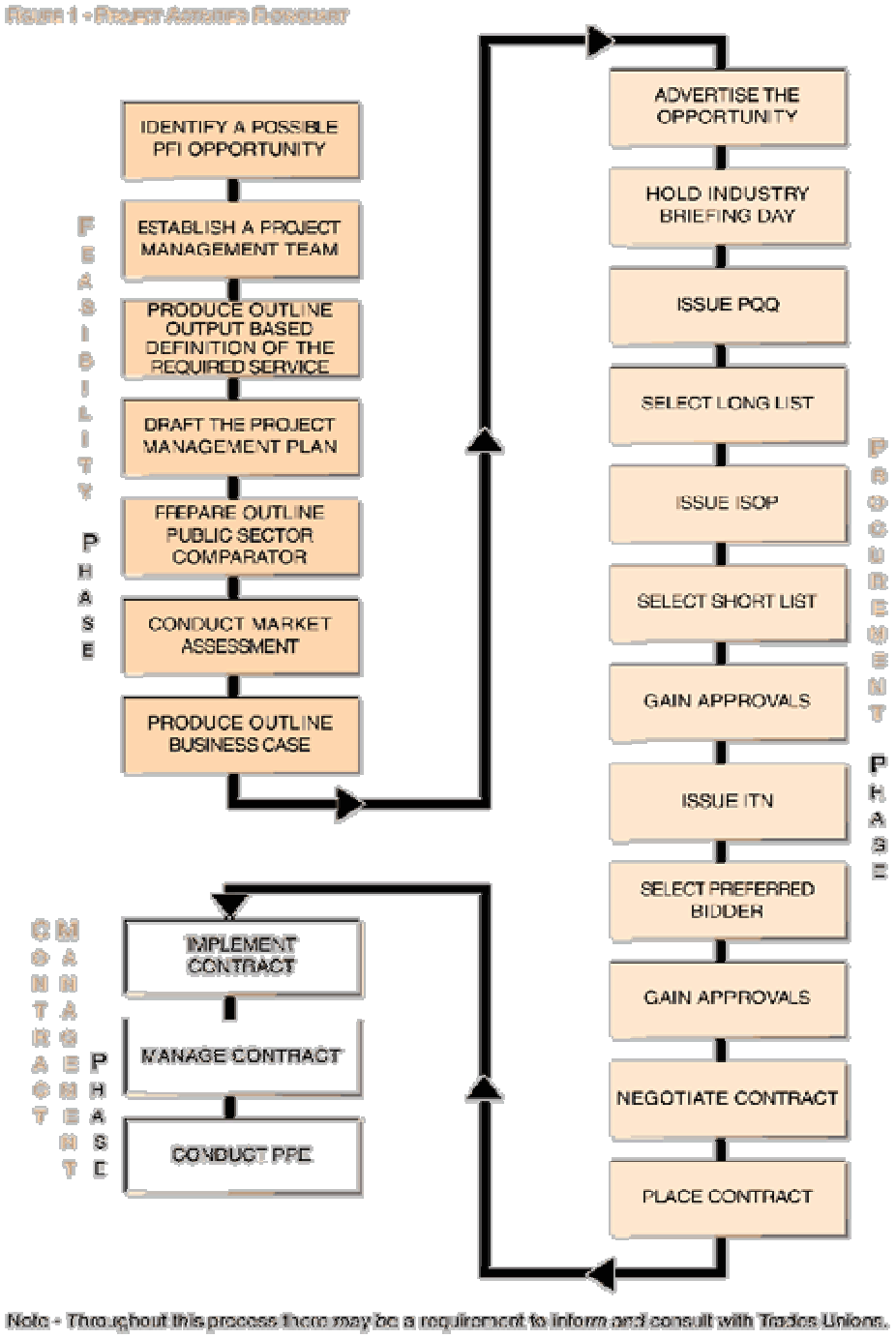
www.hm-treasury.gov.uk/newsroom_and_speeches/press/1997/press_41_97.cfm. November 2003.

10. With the assistance of the Private Finance Panel and 4Ps - the partnership company set up by the Local Authority Association with support from the Department of Environment - we will encourage the rapid dissemination of best practice throughout Whitehall and the regions.

11. We will require Government, especially at local level, to involve small business in partnership deals where possible.

12. We will maintain prudent control on public sector revenue commitments to partnership deals and public sector liabilities in joint ventures, following consultation with the relevant public bodies.

APPENDIX C: PHASES OF A PFI PROJECT[113]



113 UK MOD, "PFI Guidelines: The Phases of a PFI Project – Feasibility." http://www.mod.uk/business/ppp/guidelines/feasibility.htm. Novermber 2003.

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APPENDIX D: MARINE CORPS ENGINEER EQUIPMENT REQUIREMENTS[114]

TAMCN	FA CODE	WSC	Item	(Pacing) T/E No.	MEQPT ID No.
B0001	21	MU	Air-Conditioner 60Hz, 9,000 Btu		
B0002	21	JA	Air-Conditioner 60Hz, 18,000 Btu, F18H-38A		
B0007	21	JF	Air-Conditioner MCS Vertical 60K, Btu, FOOT-2HS		
B0011	21	JK	Air-Conditioner A/E 32C-39, 18K Btu		
B0012	21	2U	Air Conditioner, F18T-MPI, 60/400Hz, 18 Btu		
B0114	29	MK	Boat, Bridge Erection, USCSBMK2	N3250	USCSBMK2
B0120	29	JP	Bridge, Erection Set, (MGB)	N3250	MGB
B0152	29	JT	Bridge, Medium Girder (MGB), Dry Gap	N3250	MGB2
B0155	29	2K	Bridge, Floating Ribbon, 70-Ton		
B0391	26	JV	Container Handler, Rough Terrain, 50,000 lb, 988B	N3190/N3290 N3390	
B0443	26	Z3	Crane, High Speed, High Mobility, HSHMC		
B0446	26	26	Crane, Rough Terrain, Hydraulic, Light		
B0589	23	3Q	Excavator Combat, M9 ACE	N1310/N1320 N1230	M9 ACE
B0675	29	KF	Fuel Dispensing System, Tactical, Airfield, M1966	N8702/N8703	TAFDS
B0685	29	KG	Fuel System Amphibious Assault, M69HC	N3150/N3250	AAFS
B0730	20	KH	Generator Set, 3 kW, 60 Hz, Skid Mounted, MEP-061B		
B0891	20	KK	Generator Set, 10 kW, 60 Hz, Skid Mounted, MEP-003A/803A		
B0921	20	KL	Generator Set, Tact Quiet, 10 kW, 400 Hz, MEP-813A/805A		
B0953	20	7M	Generator Set, 30 kW, 60 Hz, Skid Mounted, MEP-005A/805A	N3150/N3250	
B0971	20	7N	Generator Set, 30 kW, 400 Hz, Skid Mounted, MEP-114A/815A		
B1016	20	KN	Generator Set, Tact Quiet, 60 kW, 400 Hz, MEP-115A/816A		
B1021	20	KP	Generator Set, 60 kW, 60 Hz, Skid Mounted, MEP-006A/806A		

[114] Marine Corps Bulletin 3000, 10 January 2003. www.logcom.usmc.mil/merit/MRIPT/6%20Promg%20MCBUL3000%20FY03.pdf

B1045	20	KM	Generator Set, 100 kW, 60 Hz, Skid Mounted, MEP-007A/007B		
B1046	20	3P	Generator Set, 100 kW, 60 Hz, Skid Mounted, MEP-007C		
B1082	23	FU	Grader, Road, Motorized, 130-G	N3150/N3250	
B1135	29	KQ	Helicopter Expedient, Refueling System (HERS)	N8702/N8703	
B1291	99	37	Light Weight Decontamination System, M1731	B1131/B1132 B1181/B2310 N1030/N1230 N2301/N2310 N1181	
B1298	29	J7	Line Charge Launch Kit, Trl Mtd, 01365	N1310/N1320 B1132/N1230	
B1315	29	J8	Mine Clearing Launcher, MK-154, MOD 0		MK-154
B1580	29	KU	Fuel Pump Module (SIXCON)		
B1780	46	4M	Riverine Assault Craft (RAC) System	N1020	
B1922	23	L5	Scraper-Tractor, Wheeled, 621B		
B2085	29	MT	Storage, Tank, Module, Fuel (SIXCON)		
B2127	29	SP	Sweeper, Runway, Vacuum, 600	N8702/N8703	
B2460	23	NW	Tractor, Full-Tracked, W/Angle Blade, T-5		
B2462	23	7E	Tractor, Medium, Full-Tracked D7G, Caterpillar	N1130/N1310 N1320/N3150 N3250/N3350 N1230	
B2482	23	ML	Tractor, All Wheel Drive w/Attachments FLU-419	N1320	
B2561	26	MC	Truck, Forklift, Extended Boom	N3390	
B2566	26	KV	Truck, Forklift, Rough Terrain, 4,000 lb		
B2567	23	Z2	Tractor, AT, Articulated Steering, 644E	N1310/N1320 N3190/N3150 N3210/N3290 N3250/N3390 N8702/N8703 B3310/B3311 N3350	
B2604	29	NB	Reverse Osmosis Water Purification Unit (ROWPU)	B3310 N1310/N1320 N3150 N3250/N3350	
B2685	29	KA	Welding Machine, ARC, Trl-Mtd DCC353P		

APPENDIX E: ENGINEER MOS BREAKDOWN[115]

MOS	DESCRIPTION
1301	Basic Engineer, Construction, and Equipment Officer I
1302	Engineer Officer I
1310	Engineer Equipment Officer II, III
1330	Facilities Management Officer
1390	Bulk Fuel Officer III
1300	Basic Engineer, Construction, and Equipment Marine
1316	Metal Worker
1341	Engineer Equipment Mechanic
1342	Small Craft Mechanic
1345	Engineer Equipment Operator
1349	Engineer Equipment Chief
1361	Engineer Assistant
1371	Combat Engineer
1391	Bulk Fuel Specialist

[115] MOS 13XX From August 2003 for FYDP, Manpower and Reserve Affairs, USMC.

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APPENDIX F: SAMPLE UK MOD ENGINEER PFI EQUIPMENT REQUIREMENT[116]

Priority	**Unassisted maintenance**		**Assisted and contractor maintenance**	
	Scheduled	*Unscheduled*	*Scheduled*	*Unscheduled*
Priority 1 Units	Provision of spares within **3 working days**	Provision of spares within **12 hrs**	Rectification. 48-hour response time with repair complete or machine replaced within **72 hours** of report	Rectification. 3-hour response time with repair complete or machine replaced within **12 hours** of report
Priority 2 Units	Provision of spares within **3 working days**	Provision of spares within **24 hrs**	Rectification. 48-hour response time with repair complete or machine replaced within **72 hours** of report	Rectification. 12-hour response time with repair complete or machine replaced within **24 hours** of report
Priority 3 Units	Provision of spares within **3 working days**	Provision of spares within **3 working days**	Rectification. 48-hour response time with repair complete or machine replaced within **72 hours** of report	Rectification. 48-hour response time with repair complete or machine replaced within **72 hours** of report

116 UK MOD, "C VEHICLE CAPABILITY," pp.3, v1.0 dated 15th September 2003

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