

INVENTORY OPTIMIZATION OF USMC UNIFORMS THROUGH REVERSE LOGISTICS

By

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SECTION I

INTRODUCTION

Even though uniforms are expensive, they are a necessary cost because uniforms shape both the image and the mentality of Marines worldwide. As a result, the Marine Corps currently spends approximately \$45 million dollars annually issuing uniforms to enlisted Marines as they enter initial training. However, the current system employed by the United States Marine Corps (USMC) is inefficient and wasteful because it uses a common practice model to determine how many uniforms should be procured annually and has no model to reutilize discarded uniform material. This mindset is often referred to as purposeful obsolescence (Gregory, 1947), the discarding of material prematurely before it is truly no longer functional. If the Marine Corps had a system in place in which previously owned uniforms were repurposed or reused, the move could potentially save millions of dollars each year. Therefore, with this in mind, it is through cost savings and inventory optimization that this paper will demonstrate and propose ways by which the USMC could possibly save huge sums of money and reduce its annual uniform inventory simply by repurposing these returned uniforms.

Captain Nathan Loomis conducted similar research by examining the optimization of uniforms within the United States Marine Corps (USMC) and his research found that the USMC can save \$1.3 million annually (Loomis, 2015) just at Marine Corps Recruit Depot (MCRD) Parris Island alone. Even though his research was concerned with only the camouflage uniform and only at MCRD Parris Island, this researcher believes that his findings can also be applied to the entire Marine Corps. Currently, these returned uniforms are either sold as scrap to a local textile disposal agency, or they are incinerated per the Secretary of Defense's published guidance (Bell, 2008). To be fair, this waste is solely not just a USMC or Department of Defense (DoD) problem, but it is also a problem that the world is beginning to notice and attempting to rectify (Council for Textile Recycle, 1997). Studies show that prematurely discarded textiles account for 3.9 million tons of solid waste or 4% of the total landfills.

This researcher believes that the USMC can recycle and repurpose these reclaimed uniforms, some of which are prematurely discarded. To determine if the cost savings found at Parris Island and the proposed inventory optimization can benefit the entire Marine Corps, this paper will show that by consolidating resources from across the fleet, instead of just at Parris Island, that there can be substantial savings for the entire USMC. There has been very little research conducted within the military, academic, or corporate arenas to design and implement a reutilization system for clothing. The articles that do exist are mostly concerned with implementing sustainable textile design practices on a macro-level. These articles will be discussed in further detail in the Literary Review section of this research paper. These same articles do not go into details about how to implement such practices as

they can be very expensive to implement, especially if there is no infrastructure in place to support refurbishing products. One example cited research that proposed automating the return of second hand school uniforms by installing kiosks at various places within the school district (Boujarwah, 2009). Another article spoke about how the current cultural mindset of premature obsolescence originates with the fact that clothing is seen as disposable because it is so cheap to produce (Luz, 2007). A third article outlines that today's younger generation is more "eco-conscious" than previous generations, and thus, they are more willing to accept repurposed clothing, and in some cases, they actually prefer it (Palmer, 2005).

Statement of the Problem

Although the Army's Office of Business Transformation, the Navy's Office of Naval Research, and the Air Force's Office of Scientific Research have not conducted any formal research, there are numerous benefits to optimizing the USMC's uniform procurement and inventory levels. In addition to saving money and materials, recycling these uniforms will also give the USMC options for future designs of equipment that use the Marine Pattern (MARPAT) fabric. All of this can be done with a very minimal cost to the Marine Corps while at the same time giving substantial savings to the USMC's bottom line. The ultimate goal is to take these disposed uniforms and refurbish them to be re-issued to recruits at each of the three ELT commands. These three commands are located at MCRD Parris Island, MCRD San Diego, and Marine Corps Base (MCB) Quantico. The USMC needs to move to a more optimized inventory system of its uniforms simply because an electronic system would be more efficient, with both money and inventory. As a result, this study will focus on the refurbishing of these uniforms and propose ways to improve this process.

Purpose Statement

Currently the Marine Corps' system for the procurement of uniforms is simple, but inefficient. This paper will propose a system that will consolidate returned uniforms from the Personal Effects and Baggage Centers (PEBC) located at Camp Lejeune and Camp Pendleton, as well as those located at MCRD San Diego, MCRD Parris Island, and MCB Quantico. This paper will suggest that all collected uniforms be sent to Logistics Command (LOGCOM) in Albany, GA, and that from there, the uniforms can either be repurposed by using the existing reverse logistics system located at LOGCOM or be sent to Defense Logistics Agency (DLA) for disposal. The individuals at LOGCOM will then determine which items will be disposed. Uniforms that are repurposed and repaired will be reintroduced into the supply chain. Once reintroduced, the refurbished uniforms will be sent to each of the three ELT commands: MCRD San Diego, MCRD Parris Island, and MCB Quantico to be issued to new recruits (civilians entering initial enlisted training) and candidates (civilians entering initial officer training). Therefore, based upon the

researcher's previous knowledge and observations, the purpose of this study will be : 1) to identify the potential number of uniforms that are returned to the Marine Corps to be refurbished minus necessary costs to repair these uniforms; 2) to determine any process improvement that can be made to optimize the current inventory of USMC uniforms; and 3) to identify the differences between the current process and the proposed process to determine if it merits implementation.

Research Questions

1. How many uniforms are returned annually by Marines who are discharged and separated from the Marine Corps?
2. How many uniforms (in dollars) are returned annually that the Marine Corps can potentially repurpose?
3. What associated costs (if any) will be required to repair these uniforms to be re-issued?
4. How many uniforms are being disposed of as scrap textile each year?
5. Can the current process be improved to allow the reutilization of USMC uniforms?

Working Definitions

This section includes some necessary definitions of terms that are used throughout the paper. These definitions will aid the reader in better understanding this study and are as follows:

1. BCD – Bad Conduct Discharge. The Bad Conduct Discharge is given to enlisted military members by a court-martial due to punishment for bad conduct. A Bad Conduct discharge is often preceded by time in a military prison. Virtually all veterans' benefits are forfeited if the individual is discharged due to Bad Conduct. The civilian equivalent to this is usually a less serious felony (racketeering, fraud, etc.), depending on the crime committed.
2. Candidate – A civilian who wishes to become an officer within the Marine Corps. After passing an initial training called OCS (Officer Candidate School), the individual is eligible to receive a commission as a Second Lieutenant upon passing this school. There is no obligated time for an officer; once commissioned they may stay within the Marine Corps until they are separated. This ELT training for officers is conducted in Quantico, VA.
3. Condition Code – This is a code assigned by the local supply section or DLA that gives the general condition of the item being turned in for disposition, usually disposal. The codes are outlined by DLA and range from Condition Code A (Serviceable without Issue) to H (Unserviceable, Scrap). Below are the different condition codes that DLA authorizes for the classification of material:
 - Condition Code A - Serviceable-Issuable without Qualification and refers to new, used, repaired, or reconditioned material which is serviceable and issuable to all

customers without limitation or restrictions. It Includes material with more than 6 months shelf life remaining.

- Condition Code B - Serviceable-Issuable with Qualification New and refers to used, repaired, or reconditioned material which is serviceable and issuable for its intended purpose but which is restricted from issue to specific units, activities, or geographical areas by reason of its limited usefulness or short service life expectancy. It includes material with 3 through 6 months shelf life.
 - Condition Code C - Serviceable-Priority Issue Items which are serviceable and issuable to selected customers, but which must be issued before Condition A and B material to avoid loss as a usable asset. It includes material with less than 3 months shelf life remaining.
 - Condition Code D - Serviceable-Test/Modification Serviceable material which requires test, alteration, modification, conversion, or disassembly. This does not include items which must be inspected or tested immediately prior to issue.
 - Condition Code E - Unserviceable-Limited Restoration Material which involves only limited expense or effort to restore to serviceable condition and which is accomplished in the storage activity where the stock is located.
 - Condition Code F - Unserviceable-Reparable Economically reparable material which requires repair, overhaul, or reconditioning. Includes reparable items which are radioactivity contaminated.
 - Condition Code G - Unserviceable-Incomplete Material requiring additional parts or components to complete the end item prior to issue.
 - Condition Code H - Unserviceable-Condemed Material which has been determined to be unserviceable and does not meet repair criteria. It includes condemned items which are radioactivity contaminated, Type I shelf life material that has passed the expiration date, and Type II shelf life material that has passed the expiration date and cannot be extended.
4. DD – Dishonorable Discharge. If the military considers a service-member's actions to be reprehensible, the general court-martial can determine if a dishonorable discharge is in order. Murder and sexual assault are examples of situations which would result in a dishonorable discharge. If someone is dishonorably discharged from the military, that person is not allowed to own firearms according to US federal law. Military members who receive a Dishonorable Discharge forfeit all military and veterans' benefits and may have a difficult time finding work in the civilian sector. The civilian equivalent to this would be someone being charged with a serious felony (murder, rape, etc.).
5. DD-1348 – Defense Document 1348. This is an official form that officially transfers custody of any material within the Marine Corps. It is usually prepared electronically and then signed by

the party transferring it away, and the party receiving the item. The civilian equivalent is similar to having a package delivered, and then delivery confirmation is required.

6. DD-1149 – Defense Document 1149. This is an official form that officially ships material within a container and is the civilian equivalent of a shipping manifest. The document specifies from where the material is coming and to where it is transiting. The form itemizes the quantity and serial numbers (if applicable) of the items being shipped. This document can work in place of a DD-1348 if the two parties are geographically separated.
7. DLA – Defense Logistics Agency. It is the agency through which the entire DoD (Department of Defense) centralizes its logistics operations. This agency does not receive any subsidies from the DoD, and its offices are displaced across the entire globe in order to ensure that procured equipment is delivered to each of the four military branches. DLA is responsible for the procurement of all uniforms issued to recruits and candidates. DLA also delivers these uniforms to each of the ELT Commands to be issued to recruits or candidates. An important detail to also know is that uniform clothing through DLA is VMI (Vendor Managed Inventory). Therefore DLA owns the uniforms until they are issued to a recruit and/or candidate. Once the transfer has happened, the uniform then becomes the property of the USMC.
8. DMO – Distribution Management Office. This agency is responsible for the shipping of all military material throughout the world. It is a subsidiary of Transportation Command within the Department of Defense. The agency ships material from one military location to another military location. It is the military equivalent of the United States Postal Service (USPS).
9. DoD – Department of Defense. This Federal Agency controls all military operations throughout the world. The four military branches make up the bulk of the DoD; members of the military are a part of this agency.
10. ELS – Entry Level Separation. - If an individual leaves the military before completing at least 180 days of service, the individual receives an entry level separation status. This type of military discharge can happen for a variety of reasons (medical, administrative, etc.) and is neither good nor bad, though in many cases, service of less than 180 may prevent some people from being classified as a veteran for state and federal military benefits.
11. ELT Command – Entry Level Training Command. This is a common name given when collectively speaking about each of the three places where all Marines are trained, both officer and enlisted. These bases are MCRD Parris Island, MCRD San Diego, and MCB Quantico.
12. GCSS-MC – Ground Combat Support System Marine Corps. This is a system that the Marine Corps uses to procure, account, and maintain all assets within the entire Marine Corps. It is the Marine Corps ERP (Enterprise Resource Processing) system.
13. GMD – General with Misconduct Discharge. If a service member's performance is satisfactory, but the individual failed to meet all expectations of conduct for military members, the discharge is considered a general discharge. To receive a general discharge from the military there has to be some form of non-judicial punishment to correct unacceptable military behavior. A general

military discharge is a form of administrative discharge. The civilian equivalent to this is an infraction or less serious misdemeanor (typically from receiving multiple non-judicial punishments).

14. HQMC – Headquarters Marine Corps. This is the central agency that controls the Marine Corps and is overseen by the Commandant of the Marine Corps. All authority is approved or delegated by HQMC.
15. LOGCOM – Logistics Command. It is the USMC agency that centrally controls, repairs, and redistributes all material throughout the Marine Corps. If an item sustains considerable damage, then it will be sent to LOGCOM to be repaired or cannibalized to repair other items. This agency will play a key role in the proposed solution as LOGCOM already has the infrastructure necessary to repair and redistribute material throughout the Marine Corps. By using LOGCOM's expertise and knowledge, the Marine Corps can optimize its uniform inventory levels substantially.
16. MARPAT – Marine Pattern. This is an official, proprietary design used by the Marine Corps for its camouflage uniforms. The pattern is unique and displays a checkered pattern throughout the entirety of the uniform that aides in camouflage.
17. MCB – Marine Corps Base. This acronym typically precedes the official name for each physical base within the Marine Corps. Candidates are trained at MCB Quantico for Officer Candidate School (OCS). Each MCB has a Military Clothing agency by which all uniforms are procured or issued to Marines.
18. MCCS – Marine Corps Community Services. It is an agency similar to DLA, but it resides within the USMC. It receives no compensation or subsidies from the DoD or USMC; yet it operates as a service agency for each of the Marine Corps bases throughout the world. Depending on the base, each MCCS location, or "Exchange" as it is commonly called, will offer various MWR (Marine Wellness Recreation) services. Such services include outdoor rental equipment, auto repair shops, boat docks, gasoline, department stores, and many other services. The agency fills a gap within the USMC by offering services that allow Marines and their dependents to stay healthy and active for a very minimal price.
19. MCO – Marine Corps Order. This is an official order that typically details procedures for various aspects of the Marine Corps to include pay, administrative processes, training, etc. The orders are typically signed by the highest ranking member of the Marine Corps, the Commandant. These orders are longstanding and last until they are either replaced or cancelled by another MCO. They are based on the UCMJ (Uniform Code of Military Justice) and cannot violate the UCMJ. The order is equivalent to the US Title Code which is based on the US Constitution.
20. MCRD – Marine Corps Recruit Depot. The USMC has two of these locations. The first is in Parris Island, SC, and the second is San Diego, CA. These two bases process every recruit who wishes to become a Marine. All enlisted Marines begin their years of obligated service at one of these two locations.

21. Military Clothing – This is an agency within each MCB that centrally controls all uniforms for the base. The agency is responsible for procuring and issuing all uniforms. Sometimes it is controlled by Marines (typically within the US), and in other cases, it is controlled by MCCA (typically overseas).
22. MIR – Manpower Information Request. This is an official request to MMSB for data pertaining to any Marine who has been separated from the Marine Corps. Data is typically provided in excel format.
23. MMSB – Marine Manpower Separations Branch. This is a sub-section of HQMC that specializes in tracking and processing all Marines who are separated from the Marine Corps.
24. MWR – Marine Welfare and Recreation. It is a subsidiary of MCCA and provides services for military members and their families such as outdoor equipment rental, gymnasium, and recreational sports.
25. NSN – National Stock Number. This is a 13-digit unique number assigned to every piece of equipment that can be procured within the DoD. The numbers are managed by DLA. The civilian equivalent to a NSN is a SKU.
26. OCS – Officer Candidate School. This is the officer version of boot camp. It takes place at MCB Quantico and lasts approximately 6 to 10 weeks, depending on the commissioning program. Candidates are issued two pairs of woodland (green) MARPAT, two pairs of desert (beige) MARPAT uniforms, and two pairs of boots.
27. OIC – Officer in Charge. Commanders are in charge of individual units such as Companies, Battalions, Regiments, or Divisions. An OIC is in charge of sections that are underneath a Commander. Commanders are the equivalent of a Vice President within a civilian firm. An OIC is the equivalent of a manager within a typical firm.
28. OTH – Other Than Honorable Discharge. The most severe type of military administrative discharge is the Other Than Honorable Conditions. Some examples of actions that could lead to an Other Than Honorable Discharge include security violations, use of violence, conviction by a civilian court with a sentence including prison time, or being found guilty of adultery in a divorce hearing (This list is not a definitive list; these are only examples). In most cases, veterans who receive an Other Than Honorable Discharge cannot re-enlist in the Armed Forces or reserves, except under very rare circumstances. Veteran's benefits are not usually available to those discharged through this type of discharge. The civilian equivalent to this is usually a serious misdemeanor (assault, DUI, etc.).
29. PEB – Pre-Expend Bin. This is a physical bin that contains material that is expendable but necessary for repairing equipment. These bins are tracked electronically within GCSS-MC and can have reorder points set up within them.
30. PEBC – Personal Effects and Baggage Center. There are two of these located within the Marine Corps, MCB Lejeune and MCB Pendleton. These two agencies collect all government property and in some cases personal effects of Marines who are discharged for various levels of

misconduct. These agencies receive all uniforms for Marines who are discharged with a characterization of Bad Conduct Discharge (BCD), Dishonorable Discharge (DD), Other than Honorable Discharge (OTH), and General with Misconduct Discharge (GMD). The PEBC then disposes of these uniforms depending on the condition code assigned to the disposed uniform item.

31. Quarter Sales - It is a department within MCCC that sells Condition Code A and B items that have been obtained from Marines who have been separated. These items are sold at about 25% of the regular DLA retail price. Quarter Sales receives these items free of charge from the local Military Clothing Section for that base.
32. RCO – Regional Contracting Office. This agency is responsible for ensuring all purchases over \$3000 are in accordance with DoD guidelines. Any purchase costing more than \$3000 must be competitively bid upon by external, non-government firms. This office ensures that those bids are legal and carried out in a professional competitive manner. Specifically at MCRD Parris Island and MCRD San Diego, the RCO oversees the uniform alteration contract at these bases.
33. Recruit – A civilian who wishes to become an enlisted Marine within the Marine Corps. After signing an initial contract, the recruit typically has 4 years of obligated service to the Marine Corps. This obligated time begins when the recruit enters Boot Camp at either of the two MCRD's.
34. SME – Subject Matter Expert. This is an expert within their respective field and typically an individual who has spent multiple years within their specific billet.
35. SOP – Standard Operating Procedure. While a MCO is signed by the Commandant, a SOP is typically signed by an Officer in Charge (OIC). The SOP details processes for a local agency. A SOP can easily be altered depending on the needs of the unit, but it cannot contradict any orders above them, including MCO's.
36. USMC – United States Marine Corps. The USMC is the preeminent fighting force within the Department of Defense for foreign conflicts. The Marine Corps specializes in amphibious operations worldwide. It is also the smallest branch of the DoD.
37. VMI – Vendor Managed Inventory. VMI is a Supply Chain concept where the manufacturer or supplier controls all inventory until it is ordered by the customer. VMI is typically centrally managed. It is also how DLA manages its inventory for all material for each of the four military branches.

Assumptions

Due to the lack of data regarding uniforms disposed as textile scrap and that the current process is decentralized with varying interpretations of uniform conditions, one can assume that the proposed process resulting from this research paper will have immediate effects and improvements over the

current system. One of these improvements will be the ability of the USMC to gather accurate data about every facet of the disposal of uniforms. This proposed process will allow these disposed uniforms to be more accurately tracked; and thereby provide a better representation of the number of uniforms being disposed. The assumptions of this study are as follows:

- 1) Repurposing uniforms is beneficial to the USMC's bottom line.
- 2) Repurposing uniforms will enable the USMC to order less new uniforms each year.
- 3) Implementing this proposed change will be of minimal cost to the Marine Corps.

Limitations

While MCCS tracks its annual sales of items within Quarter Sales, the same cannot be said for items disposed as textile scrap. MCCS Sales Data electronically tracks the number of items that are Condition Code A and Condition Code B because these items are serviceable without issue and thus require very little work in order for them to be resold. However, the items disposed as textile scrap are only tracked by total weight, a very inaccurate way to determine the number of uniforms that have been disposed. In fact, after speaking with individuals who work at the PEBC's and MCRD's, the researcher discovered that the uniform items are only tracked through a hard copy DD-1348 form (transfer of custody receipt form) rather than by an electronic system. Thus the data to determine the number of uniforms disposed as scrap is a very incomplete picture due to the lack of digital records.

SECTION II

LITERATURE REVIEW

This section will examine any literature that currently exists in relation to the topic discussed throughout this paper, that is, the repurposing of disposed uniforms by repairing and reissuing the uniforms back into the USMC inventory system. The topics will be organized thematically into two groups. First there will be a review of all current and previous military literature that outlines the disposal of uniforms and their findings. In addition, the second topic will focus on any academic research related to the topic of recycling clothing.

Military Literature

Each year the Marine Corps spends over \$45 million dollars in uniforms. The USMC then issues these uniforms to recruits and candidates upon entering their initial training into the Marine Corps. The number of uniform items that are issued is outlined in MCO 10120.28F (USA, 2005). This MCO states the exact amount of uniforms that are assigned to each individual. The total cost of uniforms that can be reclaimed are approximately \$1,512.27 for men and approximately \$1,469.48 for women. The cost of these uniforms is substantial, but it is necessary for both the image and mentality of being a Marine. These clothing items provide uniformity while at the same time give the Marine Corps a unique image that differentiates the USMC from the other branches within the DoD.

However, not every individual to whom these uniforms have been issued is allowed to keep them. Since the Marine Corps pays for these uniforms and then issues them, free-of-charge, to the recruit or candidate, the recruits or candidates must then return them if they do not pass the initial training or fulfill their obligated service. This usually happens in one of two instances. The first instance is when a recruit or candidate is processed for Entry Level Separation (ELS) (USA, 2014). In this instance, before leaving the MCRD or MCB, the individual must return all uniform items to Military Clothing. Once the items are returned to Military Clothing, those items are either reissued to another recruit (if Condition Code A or Condition Code B) or the items are disposed as scrap (Condition Code C to Condition Code H) through DLA. Additionally, if a Marine completes ELT, but is later discharged under a characterization of GMD, OTH, BCD, or DD then that Marine is required to return those uniforms. Instead of returning the uniforms to the MCRD, the Marine has to have the uniform items inventoried by the local Battalion Supply section. The logic is such that since these uniforms were issued to the Marine, at the government's expense, then the uniforms should be returned to the government to be reused if possible.

While there has been no formal research conducted on the topic by the Army, Navy, or Air force, other individuals have conducted research on the savings that can be achieved through the regular reuse of issued clothing. One policy change came in October of 2008 when the Under Secretary of the Department of Defense (DoD) mandated that all branches of the military seek ways to repurpose and to reutilize clothing in an effort to improve the previously cavalier policy of carelessly disposing of combat uniforms (Bell, 2008). This mandate resulted in the Marine Corps changing its policy in MCO (Marine Corps Order) 4050.38D to include provisions and provide clearer instructions concerning the repurposing of uniforms. The changed policy states that these uniforms are to be recovered and sent to the nearest PEBC to be potentially reissued or disposed. Additionally, MCO P10120.28G was also modified to give specific guidance on these reclaimed uniforms and the acceptable conditions under which these uniforms can be reissued.

One of the few formal research papers within formal research that exists was completed by Captain Loomis of the USMC (Loomis, 2014). In his research, he gives the most detail showing that while disposal policies exist; they are routinely followed in accordance with a local Standard Operating Procedure (SOP) rather than any centralized standard as outlined by LOGCOM. His research proposes that MCRD Parris Island seek ways to fall in line with the guidance outlined by the Under Secretary of Defense and to repurpose uniforms from recruits separated for ELS; thereby saving approximately \$1 million dollars annually just at MCRD Parris Island. This view is worthy of consideration and needs to be further tested and applied to the entire Marine Corps by making it a formalized, official process in order to save the entire Marine Corps millions of dollars annually.

Academic Literature

While the military has not conducted much formal research concerning the repurposing of uniforms, the academic realm has conducted a fair amount of research on the recycling of clothing. Though much of this research is about using second-hand clothing to make new apparel or accessories, some of the research papers are insightful and perhaps could be useful if the conclusions were applied to the Marine Corps' current procedures.

Repurposing is important because it allows an agency, in this case the USMC, to be more efficient with its inventory and its capital. This area within the USMC can (Domina & Koch, 1998), "provide a largely untapped resource with great reusing and recycling potential." These textiles can be reused in multiple ways. If the uniform is still within its original packaging (Condition Code A) then it can very easily and cheaply be reissued to another individual. If the item has been removed from the packaging and used, but is still in relatively good condition (Condition Code B or Condition Code C), then an alteration specialist can be used to modify these textiles at the garment level. Additionally, Condition Code D to Condition Code H can be cannibalized to repair Condition Code B and Condition Code C items. If Condition Code D to Condition Code H items is simply scrap, then the Marine Corps can receive

additional money from scrap textile specialists to incinerate the remaining uniforms to ensure that the fabric is not sold to foreign nations or enemies.

Other research has shown the benefits of making fabrics sustainable by having the intent to reuse clothing in order to make other items after the normal shelf life of the original item. One such research paper did substantial research into the reusing of women's clothing to make personal handbags (Lapolla, 2015). While the USMC will not authorize handbags to be made out of uniform material, the USMC can save money in other areas where the newly made equipment uses a fabric similar to the camouflage MARPAT uniform. One such area is in what is commonly called "782 gear." This is normal equipment issued upon check-in by the Battalion Supply Section to a Marine. This equipment remains with the Marine as long as they are with the Battalion, and they then use the equipment regularly for training and physical fitness. If the Marine Corps can give this scrap material to the manufacturer of 782 gear items, then that manufacturer can further reduce the cost of manufacturing those items, and at the same time, this will reduce the cost of the USMC to procure that manufactured equipment. Previous research has shown that this reclaimed material can be a substantial and cheap source of raw material (Young, 2004).

Other research conducted by Luz et al (2007) may provide insight into why the Marine Corps currently views clothing as expendable rather than salvageable. This paper states that due to the ability to make clothing so cheaply, many people view clothing as expendable or perishable to a certain degree (Luz, 2007). His findings agree with research conducted by Jegethesan et al, who states that today's generation of people are much more open to repurposed clothing than previous generations and that they actually prefer refurbished (Jegethesan, 2012) clothing because it makes them feel like they are being more responsible and helping the world in a very "eco-friendly" way. Another suggestion, based on research that the Marine Corps could additionally utilize, was published by Russell et al (Russell, 2010). Russell found that the reuse of clothing can be a substantial cost saver because most corporate clothing is frequently discarded before the performance of the garment has deteriorated to a point of unserviceability. Some researchers have also developed a chemical process by which garments can be revitalized in order to extend the lifetime of the fabric beyond its original use; a process that could potentially be used by the Marine Corps.

In conclusion, substantial research has been done academically in the civilian world. Most efforts seek to repurpose second-hand clothing to be used as accessories, such as handbags. However, as previously stated one can see that very little research has been done that directly involves the military and repurposing of uniforms. Thus, this paper maintains that a process improvement would be beneficial to the Marine Corp because it would make the Marine Corps more efficient. This topic of reusing used material is a topic that could warrant more research. This process improvement, as seen through the above research, both military and academic, is a necessity for the modern world.

SECTION III

METHODOLOGY

Research Design

As previously stated, the purpose of this study is: 1) to identify the potential number of uniforms that are returned to the Marine Corps to be refurbished minus necessary costs to repair these uniforms; 2) to determine any process improvement that can be made to optimize the current inventory of USMC uniforms; and 3) to identify the differences between the current process and the proposed process to determine if it merits implementation.

In order to obtain the above information, data was collected from multiple avenues in order to determine if the researcher's proposed method is viable. Through a series of information requests, phone calls, and emails, Store Managers and Officers in Charge were contacted in order to obtain both their opinion and any data that their office had collected concerning USMC uniforms. After this data was collected, a combination of both quantitative and qualitative methods was used during the data analysis phase of this study. Microsoft Excel was used to measure and accurately calculate totals during the data analysis phase.

It should be noted that this research paper focused on the number of uniforms, rather than the size of the uniforms. This was done on purpose, and the reasons are twofold. The first, and lesser reason, is that due to the large quantities of uniforms that are ordered annually and then subsequently issued each year to approximately 30,000 recruits and candidates, the probability of all of these uniforms being issued is exceptionally high. The second, and more important reason, is that this research paper is primarily concerned with efficiency. Repurposing uniforms means greater efficiencies are gained from the resources used. In other words, the only way to gain these efficiencies is to reutilize any uniform clothing that is given back because the intent is to repurpose it elsewhere. For these two reasons, size was not considered because it is irrelevant when considering the large number of uniforms that are procured and issued each year by the Marine Corps.

Population and Sample

The target population of this study was typically those individuals who oversee the day-to-day operations of their functional area. These people included: warehouse managers of each MCCA Warehouse Operations, the OIC (Officer in Charge) at each PEBC, the OIC of each Military Clothing section, the Contracting Officer responsible for each Uniform Alteration Contract, and finally SME (Subject Matter Experts) at LOGCOM and DLA. Due to geographical limitations, many of these

conversations happened over the phone or through email. Preliminary analysis from their conversations demonstrated that most who work for the Marine Corps were receptive to the idea of uniform inventory optimization. These same individuals stated that they would like to receive a copy of this research when it is fully completed. This same preliminary analysis also substantiates the fact that the disposal of uniforms as scrap material is largely an untracked system.

Data Collection

Data was collected from multiple sources over a 3-month period. The majority of the data collected is quantitative in nature. The primary format for this quantitative data is in Microsoft Excel. Copies of this data can be found in the appendix section of this paper. This quantitative data can be divided into two primary sections, uniforms that are reclaimed internally by the USMC and the uniforms given to external agencies outside of the USMC, such as Quarter Sales or DLA.

Data gathered concerning the total reclaimed uniforms came from four individuals. The first was a Manpower Information Request (MIR) sent to HQMC (Headquarters Marine Corps) concerning the total number of Marines that are discharged each year under a BCD, DD, OTH, or GMD discharge. These categories are further divided by gender, male and female. A MIR was sent to HQMC on September 15, 2015, requesting the number total for each of the above categories, and the data was received approximately 30 days later with the information that was requested. It included the totals for Fiscal Year (FY) 2011 to Fiscal Year 2015 broken down by fiscal year, then gender, and finally by type of discharge. In addition to the MIR, the OIC for Military Clothing at MCRD Parris Island was also contacted through email. He was asked to provide the total cost of all uniforms issued to a recruit prior to entering training. He provided a response on August 21, 2015, that gave the total cost of all uniforms issued to a single recruit. His data stated the cost of each item and the quantity of each item that a recruit receives. Furthermore, emails were sent to the Contracting Officer at each of the two Regional Contracting Offices in MCRD Parris Island and MCRD San Diego concerning the contract that was awarded for uniform alterations on their respective base. They were able to provide a copy of the contract, the total awarded amount, and the period of performance (i.e. duration) for each respective contract.

Data gathered concerning the second area, total uniforms given to agencies external to the USMC, was gathered from seven individuals from across the various agencies listed previously. At MCRD Parris Island, MCRD San Diego, MCB Camp Pendleton, MCB Camp Lejeune, and MCB Quantico each warehouse manager for MCCA was asked for their total annual sales data from their Quarter Sales department. MCB Quantico and MCB Lejeune had sales data from FY11 to FY15. MCRD Parris Island only had sales data FY13 to present. MCRD San Diego only had sales data for FY15. MCB Camp Pendleton did not have any sales data because they do not operate a Quarter Sales section. Additionally each OIC for the PEBC's at MCB Lejeune and MCB Pendleton as well as the OIC's of the Military Clothing section for MCRD Parris Island, MCRD San Diego, and MCB Quantico were emailed and asked to provide the total

number of uniforms that they disposed as textile scrap. PEBC Lejeune was able to provide a weight total but not quantity total. PEBC Pendleton was unable to provide any data. Military Clothing at San Diego and MCB Quantico were only able to provide data for FY15. MCRD Parris Island was not able to provide any data.

In addition to quantitative questions, qualitative questions were also asked to the managers, OIC's, and SME's at each of the various organizations that were questioned. These questions focused on determining the current process for uniform disposal and if there was anything unique about their local SOP (Standard Operating Procedure). Phone calls were the primary method of determining this information. These questions were asked to the manager at each MCCS Quarter Sales department at MCRD Parris Island, MCRD San Diego, MCB Quantico, MCB Camp Lejeune, and MCB Camp Pendleton. These questions were also asked to each OIC at PEBC Camp Lejeune, PEBC Camp Pendleton, MCRD Parris Island Military Clothing, MCRD San Diego Military Clothing, and MCB Quantico Military Clothing. There were two sets of questions asked. One group of questions was asked to the SME's at LOGCOM and DLA as these agencies are primarily involved in the procurement of uniforms. The second group of questions was asked to the PEBC's, Military Clothing, and MCCS as these agencies are primarily involved in the receipt, issue, and disposal of uniforms.

The first questionnaire consisted of eight questions that were verbally asked over a phone to representatives at LOGCOM and DLA. All inquiries were open-ended as the question's purpose was to simply gain a better understanding of the process. Research has shown that opened-ended questions are better for this type of research when the researcher has a limited knowledge and the responses are expected to be detailed (Warde, 1990). These open-ended questions were designed for the researcher to gain a better understanding of the supply chain at the enterprise-level within the DoD and USMC. These queries were helpful in obtaining a greater understanding about the uniform procurement process and were formulated based on the researcher's eight years of experience within the Marine Corps Supply and Procurement field. These questions were chosen so that they would provide the information necessary for formulating answers to the primary purpose of this study: 1) to identify the potential number of uniforms that are returned to the Marine Corps to be refurbished minus necessary costs to repair these uniforms; 2) to determine any process improvement that can be made to optimize the current inventory of USMC uniforms; and 3) to identify the differences between the current process and the proposed process to determine if it merits implementation.

Figure 1: Questionnaire for LOGCOM and DLA Representatives

1) How does your agency procure USMC uniforms?
2) Would your agency consider accepting returned uniforms?
3) Does your agency have the space to host alteration specialists?
4) Did your agency have alteration specialists at any time?

5) What is the current process for your agency to procure uniforms?
6) How does your agency manage uniform inventory levels?
7) Does your agency seek ways to reutilize uniforms from the services?
8) Do you feel that that USMC could better manage its uniforms inventory?

The second questionnaire consisted of seven questions asked verbally over a phone. As in the previous questionnaire, all questions were open-ended in order for the researcher to gain a better understanding of the process. These questions were asked to each OIC at PEBC Lejeune, PEBC Pendleton, MCRD Parris Island Military Clothing, MCRD San Diego Military Clothing, and MCB Quantico Military Clothing.

Figure 2: Questionnaire for PEBC's, MCCA, and MCB Military Clothing

1) How does your agency issue uniforms to recruits/candidates?
2) Does your agency have alteration specialists to tailor uniforms?
3) How many uniforms, approximately, do they tailor within a year?
4) How does your agency receive returned uniforms?
5) How does your agency decide which uniforms are sent to Quarter Sales or Scrap Textile?
6) Does your agency track this information (quarter sales and scrap data) digitally?
7) How far back does your agency track this data?

Data Analysis

Quantitative data was the primary data analyzed after all data had been gathered. This data was then compared to answers given by the SME's, OIC's, and Managers. The quantitative data can be found in the appendix section of this research paper.

The quantitative data which consisted of the total discharge numbers, total number of uniforms issued to a recruit or candidate, and the cost to alter uniforms was combined into a single Microsoft Excel document. This allowed the researcher to use simple excel calculations to determine the total number of uniforms, irrespective of size as noted earlier, that are expected to be returned each year, and then multiply that number by the cost to alter all uniforms issued to a recruit or candidate. This data is further refined by fiscal year and then by gender within each fiscal year. A sum total was then calculated for each fiscal year to determine the potential maximum number of uniforms that could be returned each fiscal year. Further calculations were made based on the cost of the uniform alteration

contracts at both MCRD Parris Island and MCRD San Diego. This started with the total dollar amount awarded for the contract divided by the period of performance (i.e. duration of contract). Then this number was divided by the annual expected throughput (i.e. number of Marines) specified within the contract to determine an “altered uniform cost per Marine.” This number was then multiplied by the number of discharges within each FY to determine a “cost to repurpose” dollar amount. This number was finally subtracted from the number of uniforms returned to display a net savings on the repurposing of uniforms.

In summary, the purpose of this study is: 1) to identify the potential number of uniforms that are returned to the Marine Corps to be refurbished minus necessary costs to repair these uniforms; 2) determine any process improvement that can be made to optimize the current inventory of USMC uniforms; and 3) identify the differences between the current process and the proposed process to determine if it merits implementation. In order to achieve the stated goals and objectives of this paper, data was collected over a period of time and primarily through email and phone conversation. It was also important to know whether the researcher’s proposed process could drastically improve the current system or have no impact at all. The conclusion is that the repurposing of USMC uniforms definitely would help optimize uniform inventory levels and at the same time save the USMC money on its annual uniform budget in future fiscal years.

SECTION IV

RESULTS

The results of the study are divided into two main sections, quantitative and qualitative data. The quantitative data itself can be separated into three subsections. The first quantitative section will present data about reclaimed uniforms collected from each PEBC and MCRD. The second section will provide quantitative data concerning each MCRD's uniform alteration costs. The third section will present quantitative data on the current uniforms disposed. The final section, which is qualitative, will provide data on the current process of uniform reclamation and disposal within the USMC and is based on the open-ended questionnaire given to each respondent.

Characteristics of the Survey

The total number of respondents to all questions asked was fourteen respondents. These questionnaires were given to them over the phone. Their contact information was obtained by means of an internet search for the agency, and then, once the call was made, the researcher was transferred to the appropriate manager or OIC for the respective agency. All individuals provided feedback, and most were able to provide quantitative and qualitative data, resulting in a 100% response rate. No demographic data was taken of the individuals because it was not necessary and had no relevance to the research.

Quantitative Data

In order to obtain information concerning the first statement of purpose, that of identifying the potential number of uniforms that are returned to the Marine Corps to be refurbished minus necessary costs to repair these uniforms, the individuals who were contacted were able to provide the necessary quantitative data. By recording this data in Microsoft Excel, the researcher was able to use this information to determine the potential savings.

Quantitative Data for Repurposed Uniforms

A spreadsheet was provided by the OIC of Military Clothing at MCRD Parris Island. This spreadsheet goes into detail and documents the quantity and cost of each uniform issued to a recruit. This data is further divided by gender since male uniforms are different from a female uniform. The data provided from this spreadsheet shows that a male recruit will be issued \$2,005.34 of uniform items upon entering recruit training. If the male Marine is separated, then of these items, only \$1,521.27 is required to be returned, no matter the condition of the material. If any of the \$484 dollar difference is still within its original packing, then it must be returned as well. For females the numbers are very

similar. Females are issued \$1,937.74 of uniforms upon entering recruit training. If the female Marine is separated, then of these total issued items only \$1,469.48 is required to be returned, no matter the condition. Also, like the male Marines, if any of the \$469 difference is still in its original packaging, then it must be returned as well.

A MIR was sent to MMSB (Marine Manpower Separations Branch). This specific section within the Marine Corps tracks all separations data throughout the USMC as it is relevant to both pay entitlements and recruiting. This data provided the total number of separations from FY11 to FY15; these numbers were then further broken down by gender, both male and female. The results of the MIR data can be seen in Figure 3 below:

Figure 3: USMC Discharge Data FY11 to FY15

FY	SEP_DOC_DESC	TOTAL	MALES	FEMALES
2011	BAD CONDUCT DISCHARGE	52	48	4
2011	DISHONORABLE DISCHARGE	8	8	-
2011	ENTRY LEVEL AND UNCHARACTERIZED	2,106	1,754	352
2011	GENERAL DISCHARGE	1,025	942	83
2011	OTH - OTHER THAN HONORABLE CONDITIONS	2,873	2,768	105
2012	BAD CONDUCT DISCHARGE	56	55	1
2012	DISHONORABLE DISCHARGE	19	19	-
2012	ENTRY LEVEL AND UNCHARACTERIZED	1,695	1,406	289
2012	GENERAL DISCHARGE	1,079	989	90
2012	OTH - OTHER THAN HONORABLE CONDITIONS	2,610	2,500	110
2013	BAD CONDUCT DISCHARGE	34	34	-
2013	DISHONORABLE DISCHARGE	14	14	-
2013	ENTRY LEVEL AND UNCHARACTERIZED	1,954	1,573	381
2013	GENERAL DISCHARGE	1,166	1,054	112
2013	OTH - OTHER THAN HONORABLE CONDITIONS	2,234	2,146	88
2014	BAD CONDUCT DISCHARGE	22	22	-
2014	DISHONORABLE DISCHARGE	22	21	1
2014	ENTRY LEVEL AND UNCHARACTERIZED	1,932	1,513	419
2014	GENERAL DISCHARGE	1,169	1,065	104
2014	OTH - OTHER THAN HONORABLE CONDITIONS	1,783	1,696	87
2015	BAD CONDUCT DISCHARGE	9	9	-
2015	DISHONORABLE DISCHARGE	30	30	-
2015	ENTRY LEVEL AND UNCHARACTERIZED	1,620	1,259	361
2015	GENERAL DISCHARGE	1,287	1,162	125
2015	OTH - OTHER THAN HONORABLE CONDITIONS	1,564	1,499	65

This separations data was then multiplied by the previously provided uniform cost data. This then allowed the researcher to determine the total value of uniforms that are returned each fiscal year to the Marine Corps, either to the nearest PEBC or MCRD. The results from this formula can be seen below:

Figure 4: Number of USMC Discharges FY11-FY15

Fiscal Year	Total Discharges	Total Dollar Amount
FY11	6064	\$9,196,807.52
FY12	5459	\$8,279,235.83
FY13	5402	\$8,187,810.55
FY14	4928	\$7,465,174.87
FY15	4510	\$6,832,391.41

Quantitative Data for Uniform Alterations

To further answer the first research objective of identifying the potential number of uniforms that are returned to the Marine Corps to be refurbished minus necessary costs to repair these uniforms, a thorough analysis of potential costs to repair uniforms had to be determined. Once again, the individuals who had been contacted were able to provide the necessary quantitative data in Microsoft Excel. This allowed the researcher to use this data to determine potential costs for doing alterations or repairs.

The researcher contacted the RCO at MCRD Parris Island, specifically the Contracting Officer responsible for the Uniform Alteration contract. He provided the total awarded amount plus the period of performance for the alteration contract. The total awarded amount was \$8,840,602 to be performed over 54 months. This brings the contract cost per year to \$1,964,578. Additionally, the OIC at Military Clothing at Parris Island stated that the typical throughput for Parris Island each year is approximately 18,000 recruits. Taking the cost per year and dividing it by the annual throughput, an “Alterations cost per Marine” is developed. This equates to \$109.14 per Marine to have all of the returned uniforms altered. It should also be noted that in this contract that MCRD Parris Island provides the facilities and utilities for the alteration specialists while the contractor is responsible for providing the labor, equipment, and working material.

The researcher also contacted the RCO at MCRD San Diego, specifically the Contracting Officer responsible for the Uniform Alteration contract. He also provided the total awarded amount plus the period of performance for the alteration contract. The total awarded amount was approximately \$6,000,000 to be performed over 42 months. This brings the contract cost per year to \$1,714,285. Additionally, the OIC at Military Clothing at San Diego stated that the typical throughput each year is

approximately 16,000 individuals. Taking the cost per year and dividing it by the annual throughput, an “Alteration cost per Marine” is developed. This equates to \$107.14 per Marine to have all of their uniforms altered. It should also be noted that in this contract that MCRD San Diego provides only the working material for the alteration specialists. The contractor is responsible for providing the facilities, utilities, labor, and equipment.

Quantitative Data for Disposed Uniforms

In order to completely answer objective one of the research proposal, that is to identify the potential number of uniforms that are returned to the Marine Corps to be refurbished minus necessary costs to repair these uniforms, a thorough analysis of the number of uniforms disposed as scrap textile must also be determined. This data was divided into two sections; first the Quarter Sales data and second the Textile Scrap data. All MCCA store managers and PEBC OIC's were more than willing to assist in compiling and retrieving this data. However, it quickly became apparent that their data was primarily only within FY15. Previous Fiscal Years were mostly incomplete from both MCCA and each of the two PEBC's.

Data for Quarter Sales was the most easily acquired and can be seen numerically in the appendix section of this paper. This sales data was tracked by every Quarter Sales section, but most of the data was not tracked prior to FY15. MCB Quantico has sales data from FY11 to FY15 while MCRD Parris Island had sales data from FY13 to FY15. All other agencies did not track this data. MCB Quantico has steady sales number between \$29,468.79 in FY11 to a huge spike in sales in FY15 of \$55,383.63. MCB Lejeune's data has shown a steady decline in Quarter Sales uniforms since FY11 in which they sold \$197,168.80. Most recently they recorded \$102,175.00 in items sold through Quarter Sales. MCRD Parris Island since tracking the data in FY13 has year-over-year increases of approximately \$12,000 each year. FY11 recorded \$74,540 in sales and FY15 recorded \$101,490 in sales. MCRD San Diego has the largest Quarter Sales numbers by far since MCRD San Diego began tracking Quarter Sales in FY14. They recorded \$436,000 in sales in FY14 and \$534,975 in sales in FY15.

Textile Scrap data was the most difficult to acquire. This is largely due to these numbers being tracked by weight rather than by individual item. Also items are tracked only by a hard copy DD-1348 form, rather than electronically. However with these limitations, MCRD San Diego, MCB Pendleton, and MCB Quantico were able to provide relatively accurate data on the number of items that are disposed as Textile Scrap. Again, it should be noted that this data is likely to be inaccurate due to the items not being tracked electronically or by quantity. These numbers are simply an approximation based on the weight and are only from FY15. MCRD San Diego disposed of \$2,964,603 dollars of uniform items; MCB Quantico disposed of \$111,047.23 in uniforms; and MCB Pendleton disposed of \$1,365,313.96 in uniforms.

Qualitative Data on Current Uniform Disposal Process

In an effort to answer the second posed research objective, that is, to determine if any process improvement can be made to optimize the current inventory of USMC uniforms, the individuals who were questioned provided their responses in regards to the current process by which USMC uniforms are disposed. In order to understand if the process can be improved, each individual outlined his specific agency's role and the general process by which uniforms are reclaimed.

The representative from DLA provided the most detail concerning the complete picture of the uniform procurement process. In his responses he stated that when the USMC wishes to procure a new uniform item, DLA has that branch initiate the gathering of sales data on this new item for 18-24 months. During this time the military branch will collect the data that DLA needs in order to source the material for that military branch. Thus, this military branch will begin collecting two years of order history data from at least three vendors that can source the item. It will also include the average monthly order rate and the projected safety stock level (usually 10%) for the new uniform item. Once this data is collected over an 18-24 months, it will become an officially sourced item through DLA and be supported as such. Once it becomes an official item, it can be ordered through the USMC ERP system, GCSS-MC (Ground Combat Supply System – Marine Corps). The DLA representative further stated in his response that DLA is open to a more efficient inventory system, but since the uniform items are VMI, then it must be a "USMC led initiative, not DLA".

The OIC of Military Clothing at Parris Island and the OIC at San Diego also provided responses. Both individuals outlined a very similar process about the manner in which military uniforms are handled. Once a uniform item is issued to a recruit, it is immediately ordered through DLA. Once that item reaches a safety stock level, which varies depending on the uniform item, it is re-ordered through DLA to replenish that stock. These uniform items are issued to recruits utilizing a "bubble scan sheet", similar to those seen on multiple choice exams. First, the recruit takes the sheet and then selects the size needed for each uniform item. The items are then removed from the shelf by the recruit and placed in a duffle bag. If a recruit is separated while at ELT, then the recruit must return all items to Military Clothing. Then Marines at Military Clothing will sort through the returned items and re-issue them to another recruit, if possible. The items that cannot be re-issued are sent to either Quarter Sales or DLA Disposition Services as textile scrap.

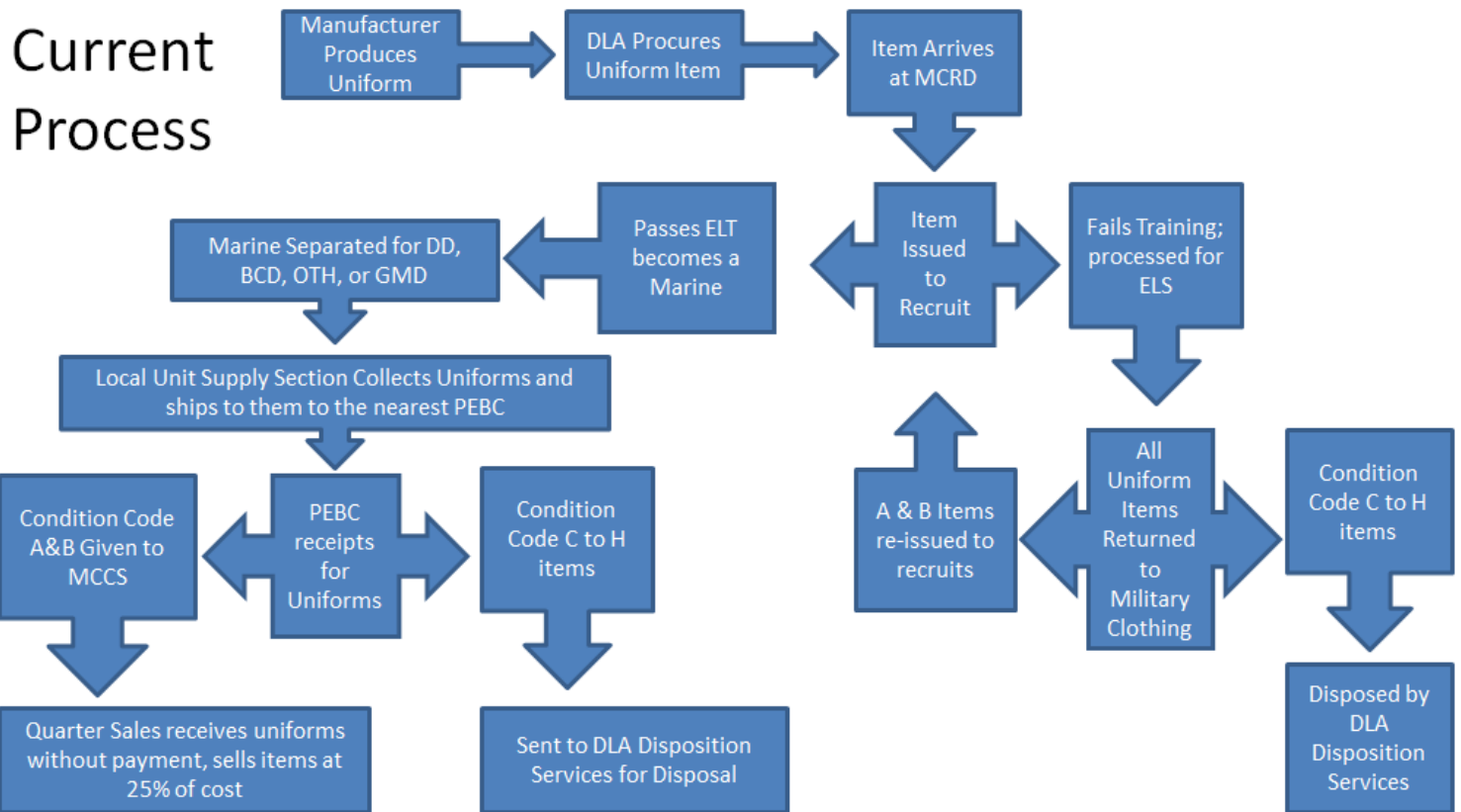
The OIC at each PEBC in MCB Lejeune and the OIC at MCB Pendleton both had similar responses in how they handle uniform items from Marines who are separated after completing ELT training. The PEBC Marines receive these returned uniform items and then sort them by serviceability. Serviceable items are then given to MCCS Quarter Sales for re-sale. The two PEBC's differ in this regard. MCB

Pendleton gives all serviceable items not to their Quarter Sales, but instead to MCRD San Diego. MCB Lejeune, however, only gives MCCA Quarter Sales certain items not based upon serviceability but rather upon preference, even if the item is brand new. Many of these undesirable uniforms combined with the unserviceable uniform items are then given to their bases' DLA Disposition Services for disposal as textile scrap.

The Area Manager at DLA Disposition Services on MCB Pendleton, MCB Lejeune, MCB Quantico, MCRD San Diego, and MCRD Parris Island in their responses reinforced the above comments made by the OIC of Military Clothing at each respective base. If DLA receives the items as scrap textile, the uniforms are incinerated as prescribed by a DoD Order implemented by the Under Secretary of Defense in 2008 (Bell, 2008).

Each Store Manager for the MCCA Exchange at MCB Pendleton, MCB Lejeune, MCRD Parris Island, MCRD San Diego, and MCB Quantico provided responses to the questionnaire that was listed earlier. Each manager stated that they track all Quarter Sales data. All of them also stated that Quarter Sales does not pay the Marine Corps for these uniforms, yet Quarter Sales receives these uniforms on a periodic basis from the bases' local Military Clothing office. One interesting note was from the responses at the Exchange in MCB Pendleton and MCB Lejeune. Both of these stores stated that they regularly receive donated uniforms from active duty Marines. They also sort through these uniforms and sell them alongside their other Quarter Sales items. MCB Pendleton was the only respondent who stated they do not operate a Quarter Sales, and instead give all items that would be sold to MCRD San Diego to be re-issued to recruits.

Figure 5: Flowchart of the Current General Process used by the USMC based on Results



This chart illustrates the detailed results found from analyzing the data collected from multiple agencies throughout the Marine Corps. Quantitative analysis was used to analyze and determine the total number of uniforms that are reclaimed by the Marine Corps each year. Secondly each MCRD provided quantitative data concerning the cost of altering uniforms at each base. Additionally, quantitative data was also collected to determine how many uniforms are being disposed as textile scrap. Finally, qualitative data was collected and descriptively analyzed to better understand the current process and where possible improvements can be made to the existing system. In the next section, discussion of these results will be detailed alongside an explanation of the results, with suggestions for improvement.

SECTION V

DISCUSSION

As stated previously, this portion of the research paper will focus on and then draw conclusions based upon the data that was gathered. Included will be a discussion about changes that the Marine Corps should consider as a result of the data. This discussion will not only incorporate all of the quantitative data that was gathered, such as the repurposing of uniforms, alteration contracts, and the disposed uniforms, but also, the qualitative data concerning the current disposal process.

Quantitative Data

The previously identified quantitative data shown for the repurposing of uniforms substantiates that as recently as FY15 a total of 4,510 Marines were discharged for reasons that were other than Honorable. This demonstrates that as many as \$6,832,391.41 in uniforms were returned to the Marine Corps through the PEBC's or MCRD's. Previous Fiscal Year's data further supports this theory. In FY14 around 4,928 Marines were separated for conditions other than Honorable. This led to approximately \$7,465,174.87 in uniforms being returned to the Marine Corps, either through the PEBCs and MCRDs. Similar data can be seen for FY11, FY12, & FY13.

Quantitative Data for Repurposed Uniforms

If this trend were to continue, then the projected total of discharges that are not Honorable (i.e. DD, BCD, OTH, GMD, and ELS) would be approximately 4,100 Marines during FY16 or about \$6,000,000 of uniforms. However, during these previous five fiscal years, the Marine Corps was transitioning from a fighting force of 202,000 Marines in January 2012 to a fighting force of about 186,000 Marines (Wetzel, 2012) by January 2016. During this time, it is expected that the discharge numbers would be higher when the fighting force was 11% larger. Since the size of the USMC fighting force has stabilized, it can be expected that in FY16, the Marine Corps will have approximately the same number of discharges as in FY15, 4,500. This data suggests that the Marine Corps will again receive approximately \$6,800,000 worth of uniforms from these Marines as they are discharged from the Marine Corps. The same data also indicates that the Marine Corps receives a substantial amount of uniforms that can be repurposed and reissued to recruits and candidates at ELT commands. Therefore, the Marine Corps needs to consider the proposed process of repurposing these uniforms.

Quantitative Data for Uniform Alterations

Next, the cost to repair these uniforms must be considered. The preceding data results stated that there is a distinct difference between the two MCRD's on how they approach the alteration of

uniforms at their respective ELT commands. According to the surveys, which will be discussed further in the Qualitative Data section, this primarily has to do with the available space at each MCRD. MCRD Parris Island has more land mass than MCRD San Diego and more buildings. Therefore, it is easier for MCRD Parris Island to provide this capability to their alteration specialists. However, it is interesting to note that even though MCRD Parris Island provides the facilities and utilities for their alteration specialists, the contract to alter their uniforms is slightly more than it is at MCRD San Diego. It is beyond the scope of this paper to ascertain why this is the case, but sufficed to say, it is an interesting point that the Marine Corps must consider. The researcher believes that if the Marine Corps decides to repurpose its uniforms then it should consider a model similar to what is found in MCRD San Diego. This model utilized by MCRD San Diego requires the alteration specialist to conduct all work off base because MCRD San Diego does not have the facilities to do the work on-base. MCB Albany, where LOGCOM is located, has the same constraints as MCRD San Diego, a lack of facilities. This lack of facility space, combined with the fact that the MCRD San Diego contract is more cost effective, makes it easier for the Marine Corps to implement.

Quantitative Data for Disposed Uniforms

Next, were the quantitative results from the uniforms given to MCCS Quarter Sales or disposed as textile scrap. These results were the most surprising to the researcher, particularly the results from Quarter Sales. This will be discussed in two separate parts, Quarter Sales and Textile Scrap.

Concerning the results from Quarter Sales, this data gives a true representation of the amount of uniforms that the USMC can save with little effort. While this data is largely incomplete due to the data not being tracked reliably, it does indicate that the Marine Corps can save a large sum of money at an absolute minimum. The only Quarter Sales section that could reliably provide data from FY11 through FY15 was MCB Quantico, the smallest issuer of clothing. Every other agency could only reliably show data from FY14 or FY15, thus making it difficult to draw a conclusion based on previous history. However, all sections provided data from FY15. From this data, it suggests that at a minimum the USMC could have saved \$1,128,297.18 from uniform items that were Condition Code A or B; uniforms that are immediately serviceable upon return. It should also be noted that this dollar amount would not require an alteration specialists to repurpose these uniforms.

Concerning the results from the Textile Scrap, as noted in the Qualitative section, these uniform items are largely disposed through DLA Disposition Services. These uniforms disposed as textile scrap are not tracked very accurately by the USMC. The only current requirement is to track these items via a hardcopy DD-1348 (custody of change of receipt). As such, these documents are not tracked by their quantities in any digital form where the data can be compiled and researched easily. It should be noted that this data is tracked solely by total weight. This lack of accurate, complete data is evident as there is no data beyond FY15 in this category from any MCB or MCRD. The tracking of this material should be

considered in the future in order to implement a method that would more accurately follow this data electronically so that research can be further conducted on how many uniforms are disposed by quantity rather than by weight.

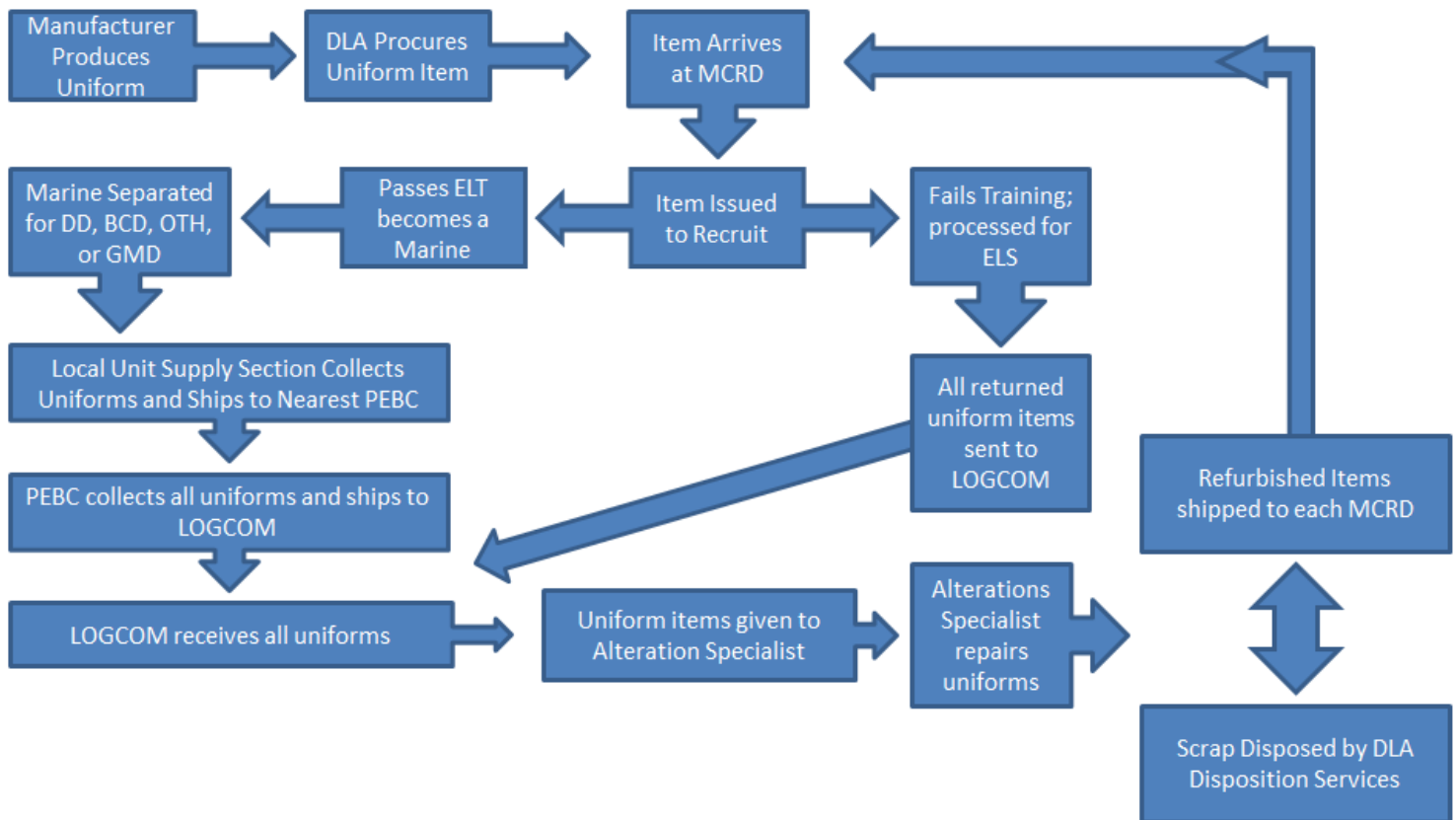
Qualitative Data for Uniform Disposal

The final section, qualitative data for the disposal of uniforms, provided the researcher with the most insight into whether or not the process could be improved. The open-ended questions asked in the survey allowed the researcher to better understand the entire DoD Supply Chain. Their answers provided insight into possible ways of inventory optimization. Prior to this research paper, the researcher had little knowledge or experience in this area of the Marine Corps. Based on the previously stated results, it can be seen that substantial process improvement can be made within the uniform disposal system, simply by tracking each uniform item electronically rather than by weight. This would also allow further research to be conducted about which uniforms meet their service life sooner than others. This knowledge could in turn lead to a better designed uniform in the future or at least one that is more durable; thereby providing a uniform with a longer lifespan.

There were three notable contributions from the open-ended questionnaire. The first was from the DLA representative located at LOGCOM. In his statement, he noted that since the inventory is VMI, DLA is open to the USMC becoming more efficient with its uniforms as it would require them to keep less on their shelves and a lower safety stock, thus optimizing their inventory. The second was a response that was given by both the PEBC OIC at MCB Lejeune and the OIC of Military Clothing at Parris Island. Both of these individuals noted that there were a substantial amount of uniforms returned that could have been re-issued to recruits. The final noteworthy response came from the OIC of Military Clothing at Parris Island. He stated that the uniforms disposed as textile scrap from Parris Island were not being incinerated. This claim is supported by the research that Captain Loomis conducted on his initial study of USMC uniforms in August 2015 that these uniforms are indeed not incinerated but are sold by the pound to a local company called Carolina Textile. This company then repurposes these uniforms and sells them as apparel in stores and even to other nations around the world as secondary clothing. MCRD Parris Island is the only USMC base that conducts this practice.

Figure 6: Flowchart of the Proposed Process for Repurposing Uniforms based on Results

Proposed Process



In summary, the research found that there is good cause to repurpose returned uniforms from discharged Marines. Additionally, it should also be noted that both Store Managers from MCB Pendleton and MCB Lejeune stated that in addition to the uniforms they receive from discharged Marines, they have also had many retiring Marines donate their uniforms. The cost to repurpose these uniforms regardless of how they are obtained would be minimal as an alteration specialist could repurpose these uniforms for a relatively low cost. A few surprising results came from the amount of uniforms sold at Quarter Sales and the lack of electronic, reliable data from those uniforms disposed as textile scrap. Finally, the qualitative analysis provided the most insight into the current system process and a few differences between each of the MCB's and MCRD's practices in terms of disposal of uniforms and desire for a more optimized system. The results definitely suggest that the current process can be improved upon, a process that would thereby save the USMC substantial money, while also optimizing their current inventory needs.

SECTION VI

CONCLUSIONS

This study has analyzed the amount of uniforms that are returned to the USMC each fiscal year, the cost of alteration specialists to fix these uniforms, the amount of uniforms that are sold at Quarter Sales or disposed as Textile Scrap, and finally the Marine Corps' current process of disposing reclaimed uniforms. It was concluded through the analyzed data that the USMC can save substantial money while also optimizing its current uniform inventory if it seeks methods to make the process more efficient. This section will summarize the study and provide recommendations for future research.

Summary of Conclusions

In summary, the research has substantiated that the Marine Corp can reutilize its abundance of uniforms that are returned each fiscal year. Instead of these uniforms being disposed as textile scrap, they can instead be repurposed and reissued to recruits or candidates at ELT commands. This will reduce the number of uniforms that the Marine Corps has to purchase each year, thereby spending less, and at the same time optimizing its uniform inventory.

While academia has conducted substantial research in this area, the research was primarily directed at reusing these clothing items as accessories. Unfortunately, the military has conducted very little research in this area even though repurposed uniform items have the potential to provide a huge cost savings for not only the USMC, but the DoD as a whole. As stated, the USMC has developed a process to repurpose some of these items by giving them to Quarter Sales or by having the MCRD reissue them to recruits, but this system is largely inefficient because it is decentralized and has no definitive quality control. As an example of this waste and inefficiency, the PEBC in MCB Lejeune will dispose of Condition Code A items as textile scrap simply because Quarter Sales does not want the item, not because the uniforms are unusable. By making changes to and by correcting these inefficiencies, the USMC's bottom line would improve as it would reduce the annual volume of newly bought uniforms.

As mentioned previously, the purpose of this study is: 1) to identify the potential number of uniforms that are returned to the Marine Corps to be refurbished minus necessary costs to repair these uniforms; 2) to determine any process improvement that can be made to optimize the current inventory of USMC uniforms; and 3) to identify the differences between the current process and the proposed process to determine if it merits implementation. All objectives were accomplished because store managers at each Quarter Sales and OIC at each MCB or MCRD were verbally given a questionnaire that provided substantial knowledge on the current process being conducted by the USMC concerning uniform disposal.

Implications

It was suggested by the DLA representative at LOGCOM that there are ways that the uniform system could be improved with the USMC. He further stated that if the USMC sought to optimize its uniform inventory levels that the USMC could save about \$45 million dollars on its annual budget. According to the research seen in this paper, the researcher believes that this statement is true.

The process can be vastly improved by tweaking the current procedure slightly. A MARADMIN (Marine Administrative Order) could be published that would direct the following adjustments to the current process.

- 1) LOGCOM establishes an alteration contract at MCB Albany that already has the alteration specialists store in order to repurpose the clothing off-site.
- 2) All personnel (Active, Active Reserve, and Reserve) Marines, Recruits, or Candidates that are separated from the Marine Corps under the characterization of BCD, DD, OTH, or GMD will be required to return their issued uniforms per MCO P10120.28G. This includes those who were given special uniform allowances for Special Duty Assignments. If a Marine wishes to dispose or donate his uniforms, he can give the uniforms to his local Battalion Supply Section who in turn will send the items to the nearest PEBC. Each box or crate will have an inventory list detailing the quantities inside.
- 3) Each PEBC or Military Clothing will not dispose of any uniforms, regardless of Condition, but will instead send them via DMO (Distribution Management Office) to LOGCOM at MCB Albany who will then give them to the contracted alteration specialist.
- 4) The alteration specialist will then sort through the clothing and will attempt to repurpose as many uniforms as possible. The alteration specialist will be allowed to wash, clean, and "cannibalize" uniforms in order to repair other uniforms for repurposing. Once a uniform item is repaired it will be placed into one of two containers where an inventory of what is in each container will be kept. One container will go to MCRD Parris Island and the other to MCRD San Diego.
- 5) These repaired uniform items will be loaded into GCSS-MC and transferred to each respective MCRD within GCSS-MC. Once the container is full it will be shipped to each respective location with the appropriate DD-1348's inside to be signed by a representative at each MCRD.
- 6) Each MCRD will sign the DD-1149 (shipping receipt form) for the container and load it into their Perpetual Inventory within GCSS-MC and treat the uniform items as a PEB (Pre-Expended Bin). When the items are issued to a recruit, they will be removed from the PEB in accordance with MCO 4400.150.
- 7) The alteration specialist will identify at the end of each fiscal quarter, the quantity of uniforms that will be disposed as textile scrap. They will report the exact number of

individual uniform items to DLA Disposition services via a DD-1348 and ETIDS document for tracking purposes and maintain this record for 5 years.

- 8) DLA Disposition services will then incinerate these items identified as textile scrap in accordance with DoD directive from 2008 (Bell, 2008).

This proposed process change could benefit the Marine Corps greatly in three distinct areas. First, the newly implemented process would have saved the Marine Corps approximately \$6,832,391 if all uniforms from FY15 had been repurposed. Additionally, even if only 50% of the uniforms from FY15 had been repurposed, \$3,170,077 per year could still have been saved; a substantial dollar savings in either case. It should be noted that these dollar amounts, based upon FY15 data, account for the potential cost of \$246,117 for an alteration specialist to repurpose the returned uniforms. Figure 11 in the appendix graphically depicts this data. Second, this proposed process also increases quality control fivefold because it centralizes all inventories in one location. It also implements one standard, based upon the expert opinion of an alteration specialist, to determine the uniform's potential serviceability after refurbishment instead of the five different standards based on local SOP. Finally, it optimizes the USMC's current uniform needs from DLA. It does this by potentially reducing the number of procured uniforms, which according to the research results can range, from 7 to 15% annually. Thus, by inputting uniform items into GCSS-MC, this process will allow the uniform items to be tracked individually and disposed properly with the correct NSN (National Stock Number), a current problem with the documents currently being submitted to DLA Disposition Services.

This study has focused solely on the repurposing of all current Marine Corps uniforms. The research and results provided herein apply and can be found through each respective agency identified within this paper. The results may be applicable to the other branches of the military as well since their processes are similar to the USMC's, but that data and research is beyond the scope of this research paper. Future research could include each individual branch's uniform disposal process. Additional future research could be conducted by the USMC to identify if these reclaimed uniforms that would be disposed as textile scrap could be repurposed for inclusion in the manufacturing of "782 equipment" that has the MARPAT pattern.

Recommendations for Future Research

Future research should be considered on whether these reclaimed uniforms that would ordinarily be disposed as textile scrap could instead be used by manufacturers to produce equipment such as backpacks, assault packs, Kevlar covers, or poncho liners. Academia researched this area at length in many research papers (Irick, 2013). The USMC could give this reclaimed material to these manufacturers for inclusion in the production of similar products and further help the USMC save money each fiscal year.

In conclusion, the single goal of this study was to understand and research potential savings for the USMC by refurbishing the uniforms that are returned each fiscal year. This repurposing could be a potential solution to reduce the Marine Corps' annual uniform procurement requirements. This could in turn save the Marine Corps substantial amounts of money each fiscal year. In the current environment of federal budget cuts to the military and a necessity to "do more with less", the repurposing of these uniforms is but the first step to a more efficient Marine Corps and should be seriously considered as a viable option.

Section VII

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APPENDICES

Individuals Who Received Questionnaire

DLA Disposition Services Camp Pendleton	Mr. Brian Meadows
DLA Liaison for LOGCOM	Mr. Rickey Green
LOGCOM – Logistics Service Management Center	Mr. Joseph Wingard
MCB Quantico – OCS Supply	LCpl Laura Bukowski
MCCS Quarter Sales Camp Lejeune	Mr. Allen Carter
MCCS Quarter Sales Parris Island	Ms. Kimberly Corbin
MCCS Quarter Sales Camp Pendleton	Ms. Jacelyn Smith
MCCS Quarter Sales Quantico	Mr. Shawn Dixon
Military Clothing Parris Island	Capt. Frank Patterson
Military Clothing San Diego	Mr. Brett Gunther
MMSB HQ Marine Corps	Mr. Timothy Johnson
PEBC Camp Lejeune	Mr. Ralph Pratt
PEBC Camp Pendleton	GySgt Benjamin Johnson
RCO Parris Island	Mr. Chad Dando
RCO San Diego	Ms. Rebecca Longo

Excel Data

Figure 7: Quarter Sales and DLA Disposition Services Totals

		Quarter Sales	Textile Scrap Given
FY11	MCRD PI	No Data	No Data
	MCRD San Diego	No Data	No Data
	MCB Quantico	\$ 29,468.79	No Data
	PEBC Lejeune	\$ 197,168.00	No Data
	PEBC Pendleton	N/A*	No Data
FY12	MCRD PI	No Data	No Data
	MCRD San Diego	No Data	No Data
	MCB Quantico	\$ 25,634.20	No Data
	PEBC Lejeune	\$ 160,605.00	No Data
	PEBC Pendleton	N/A*	No Data
FY13	MCRD PI	\$ 74,540.64	
	MCRD San Diego	No Data	No Data
	MCB Quantico	\$ 31,573.77	No Data
	PEBC Lejeune	\$ 146,476.00	No Data
	PEBC Pendleton	N/A*	No Data
FY14	MCRD PI	\$ 88,481.08	
	MCRD San Diego	\$ 436,447.62	No Data
	MCB Quantico	\$ -	No Data
	PEBC Lejeune	\$ 97,229.00	No Data
	PEBC Pendleton	N/A*	No Data
FY15	MCRD PI	\$ 101,490.13	No Data
	MCRD San Diego	\$ 534,975.80	\$ 2,964,603.00
	MCB Quantico	\$ 55,383.63	\$ 111,047.23
	PEBC Lejeune	\$ 102,175.00	No Data
	PEBC Pendleton	N/A*	\$ 1,365,313.96
*All Condition Code A & B items go to MCRD San Diego			

Figure 8: FY15 USMC Uniform Allowances - Male

Revision #1 to Bag List at Standard Selling Price Fiscal Year 2016 Marine Corps - Men					
Lead NSN	PGC	Bag Item	FY 15 Qty.	FY 15 Price	Monetary Allowance
8465-01-117-8639	17632	Bag, Duffel, Nylon, OG	2	\$ 23.43	\$ 46.86
8440-00-261-4966	00100	Belt, Coat, Man's Cotton (White)	1	\$ 5.99	\$ 5.99
8465-01-225-4661	34333	Belt, Reflective, Safety	1	\$ 2.97	\$ 2.97
8440-00-577-4177	00152	Belt, Trousers (men's cotton webbing khaki)	2	\$ 2.93	\$ 5.86
8415-01-527-1494	03093	Blouse, Desert, MCCUU w/Permethrin	3	\$ 38.86	\$ 116.58
8415-01-527-1430	03092	Blouse, Woodland, MCCUU w/Permethrin	2	\$ 38.90	\$ 77.80
8430-01-591-1103	04094	Boot, Rugged All Terrain (RAT), Hot Weather	1	\$ 141.70	\$ 141.70
8430-01-563-6897	03544	Boot, Rugged All Terrain (RAT), Temperate Weather	1	\$ 152.70	\$ 152.70
8315-01-503-2455	10053	Buckle, Belt, Gold Plated, Coat	1	\$ 1.55	\$ 1.55
8315-01-503-9483	17528	Buckle, Web Belt, Gold Plated	2	\$ 2.94	\$ 5.88
8415-01-485-8163	02900	Cap, Combat Utility, Field Boonie w/EGA, Desert, MARP	1	\$ 12.15	\$ 12.15
8415-01-485-6751	02899	Cap, Combat Utility, Field Boonie w/EGA, Woodland, MAI	1	\$ 12.15	\$ 12.15
8405-01-485-4313	02896	Cap, Combat Utility, Garrison w/EGA, Desert, MARPAT	1	\$ 8.96	\$ 8.96
8405-01-485-4299	02895	Cap, Combat Utility, Garrison w/EGA, Woodland, MARPAT	1	\$ 8.81	\$ 8.81
8405-01-279-7652	02042	Cap, Garrison, Poly/Wool Gabardine, Green	1	\$ 11.66	\$ 11.66
8455-01-503-1103	10054	Clasp, Necktie, Gold Plated	1	\$ 1.46	\$ 1.46
8405-01-279-5579	02049	Coat, Man's Poly/Wool Gabardine, Green, w / Belt	1	\$ 164.89	\$ 164.89
8405-01-504-8638	02850	Coat, Man's, All Weather, Poly/Ctn, MC Shade 2246	1	\$ 98.48	\$ 98.48
8405-01-512-3040	02916	Coat, Men's, Dress Blue	1	\$ 181.86	\$ 181.86
8405-01-268-3698	02021	Crown, Dress Cap, White	1	\$ 6.34	\$ 6.34
8405-01-304-6455	02095	Crown, Service Cap, PWG, Green	1	\$ 9.61	\$ 9.61
8420-00-009-2347	00293	Drawers, Cotton, Briefs, White	6	\$ 1.88	\$ 11.28
8405-01-530-8034	03147	Frame, Service Cap	1	\$ 16.57	\$ 16.57
8415-01-538-4821	03250	Gloves, Dress, Black	1	\$ 18.82	\$ 18.82
8440-00-160-0770	00171	Gloves, Men's, White	1	\$ 15.50	\$ 15.50
8455-00-286-0307	11061	Insignia, Blk, Metal	2	\$ 0.64	\$ 1.28
8455-00-985-7414	33552	Insignia, BOS Collar, Blk, Pair	1	\$ 2.02	\$ 2.02
8455-01-502-8701	28256	Insignia, BOS, Cap	1	\$ 2.05	\$ 2.05
8455-00-965-1664	33551	Insignia, BOS, Cap, Blk	1	\$ 1.45	\$ 1.45
8455-01-502-9317	28258	Insignia, BOS, Collar, Gold, Pair	1	\$ 2.02	\$ 2.02
8455-00-965-1556	33550	Insignia, Garrison Cap	1	\$ 0.64	\$ 0.64
8415-01-550-1251	03410	Jacket, Athletic	1	\$ 63.43	\$ 63.43
8455-01-475-5316	27385	Name and Service Tape, Embroidery, Khaki	3	\$ 5.11	\$ 15.33
8455-01-475-5330	27384	Name and Service Tape, Embroidery, Olive	2	\$ 5.11	\$ 10.22
8440-01-519-7026	28768	Necktie, Men's	2	\$ 6.16	\$ 12.32
8415-01-550-1677	03411	Pants, Athletic	1	\$ 30.78	\$ 30.78
8405-01-515-8984	02923	Shirt, Man's, Long-Sleeve, Khaki Shade M-1	2	\$ 36.04	\$ 72.08
8405-01-515-8968	02922	Shirt, Man's, Short-Sleeve, Khaki	3	\$ 30.16	\$ 90.48
8430-01-434-3748	02303	Shoes, Men's Dress Black	1	\$ 44.95	\$ 44.95
8440-01-508-4956	02885	Sock, Boot, Coyote Brown	6	\$ 2.03	\$ 12.18
8440-01-415-0051	02275	Socks, Dress	3	\$ 1.12	\$ 3.36
8440-01-508-5580	02884	Socks, PT, Quarter Length (3 pair Package)	1	\$ 2.01	\$ 2.01
8405-01-496-8808	02765	Sweater, Pull-Over Olive Green, w/ Epaulettes	1	\$ 38.77	\$ 38.77
8415-01-443-7722	02359	Sweatpants, Marine Corps, Green	1	\$ 7.76	\$ 7.76
8415-01-443-9870	02360	Sweatshirt, Marine Corps, Green	1	\$ 8.31	\$ 8.31
8415-01-527-1970	03095	Trousers, Desert, MCCUU w/Permethrin	3	\$ 42.21	\$ 126.63
8405-01-279-7671	02043	Trousers, Man's Poly/Wool Gabardine, Green	2	\$ 49.56	\$ 99.12
8405-01-280-0106	02044	Trousers, Men's, Blue	1	\$ 46.31	\$ 46.31
8415-01-527-1838	03094	Trousers, Woodland, MCCUU w/Permethrin	2	\$ 42.18	\$ 84.36
8415-01-530-6873	03148	Trunks, General Purpose	3	\$ 11.14	\$ 33.42
8415-01-533-8807	03164	Undershirt, Man's Synthetic Olive Drab	3	\$ 9.84	\$ 29.52
8420-00-450-0048	02424	Undershirt, Man's, Olive Green	3	\$ 3.38	\$ 10.14
8420-00-543-6644	00312	Undershirt, White Cotton	3	\$ 2.83	\$ 8.49
8315-01-503-2104	11143	Waistplate, Plain	1	\$ 9.48	\$ 9.48
All Issued Items - Total					\$ 2,005.34
All Returnable Items - Total					\$ 1,521.27
Items that CAN NOT be returned per MCO 10120.38G					

Figure 9: FY15 USMC Uniform Allowances - Female

Revision #1 to Bag List at Standard Selling Price						
Fiscal Year 2015						
Marine Corps - Women						
Lead NSN	PGC	Bag Item	FY 15 Qty.	FY 15 Price	Monetary Allowance	
8465-01-117-8699	17632	Bag, Duffel, Nylon, OG	2	\$ 23.43	\$	46.86
8465-01-225-4661	34333	Belt, Reflective, Safety	1	\$ 2.97	\$	2.97
8440-00-577-4177	00152	Belt, Trousers (men's cotton webbing khaki)	1	\$ 2.93	\$	2.93
8415-01-527-1494	03093	Blouse, Desert, MCCUU w/Permethrin	3	\$ 38.86	\$	116.58
8415-01-527-1430	03092	Blouse, Woodland, MCCUU w/Permethrin	2	\$ 38.90	\$	77.80
8430-01-591-1103	04094	Boot, Rugged All Terrain (RAT), Hot Weather	1	\$ 141.70	\$	141.70
8430-01-563-6897	03544	Boot, Rugged All Terrain (RAT), Temperate Weather	1	\$ 152.70	\$	152.70
8315-01-503-9483	17528	Buckle, Web Belt, Gold Plated	1	\$ 2.94	\$	2.94
8415-01-485-8163	02900	Cap, Combat Utility, Field Boonie w/EGA, Desert, MARP,	1	\$ 12.15	\$	12.15
8415-01-485-6751	02899	Cap, Combat Utility, Field Boonie w/EGA, Woodland, MAI	1	\$ 12.15	\$	12.15
8405-01-485-4313	02896	Cap, Combat Utility, Garrison w/EGA, Desert, MARPAT	1	\$ 8.96	\$	8.96
8405-01-485-4299	02895	Cap, Combat Utility, Garrison w/EGA, Woodland, MARPA	1	\$ 8.81	\$	8.81
8410-01-542-3737	03343	Cap, Garrison, Women's	1	\$ 11.21	\$	11.21
8410-01-413-2165	02271	Coat, Wms Poly/Wool Gabardine, Green	1	\$ 128.05	\$	128.05
8410-01-504-8598	02851	Coat, Woman's, All Weather, Poly/Ctn, MC Shade 2246	1	\$ 101.58	\$	101.58
8410-01-512-4664	02917	Coat, Woman's, Blue	1	\$ 131.89	\$	131.89
8405-01-268-3698	02021	Crown, Dress Cap, White	1	\$ 6.34	\$	6.34
8405-01-304-6455	02095	Crown, Service Cap, PwG, Green	1	\$ 9.61	\$	9.61
8415-01-538-4821	03250	Gloves, Dress, Black	1	\$ 18.82	\$	18.82
8445-00-310-1151	01377	Gloves, Women's Nylon/Knitted White	1	\$ 15.59	\$	15.59
8405-01-530-8034	03147	Frame, Service Cap	1	\$ 16.57	\$	16.57
8455-00-985-7414	33552	Insignia, BOS Collar, Blk, Pair	1	\$ 2.02	\$	2.02
8455-01-502-8701	28256	Insignia, BOS, Cap	1	\$ 2.05	\$	2.05
8455-00-965-1664	33551	Insignia, BOS, Cap, Blk	1	\$ 1.45	\$	1.45
8455-01-502-9317	28258	Insignia, BOS, Collar, Gold, Pair	1	\$ 2.02	\$	2.02
8455-00-965-1556	33550	Insignia, Garrison Cap	1	\$ 0.64	\$	0.64
8415-01-550-1251	03410	Jacket, Athletic	1	\$ 63.43	\$	63.43
8455-01-475-5316	27385	Name and Service Tape, Embroidery, Khaki	3	\$ 5.11	\$	15.33
8455-01-475-5330	27384	Name and Service Tape, Embroidery, Olive	2	\$ 5.11	\$	10.22
8445-01-280-2215	38827	Necktab, Woman's SH	1	\$ 8.02	\$	8.02
8445-01-101-1649	91155	Necktab, Wms Black	1	\$ 8.16	\$	8.16
8415-01-550-1677	03411	Pants, Athletic	1	\$ 30.78	\$	30.78
8410-01-610-1216	03904	Shirt, Woman's, Quarter-Length Sleeve, White	1	\$ 18.06	\$	18.06
8410-01-514-8661	02921	Shirt, Woman's, L/S, MC Khaki	2	\$ 27.66	\$	55.32
8410-01-514-8515	02920	Shirt, Woman's, S/S, MC Khaki	3	\$ 24.41	\$	73.23
8435-01-435-8394	02307	Shoes, Women's, Oxford, Black	1	\$ 40.15	\$	40.15
8410-01-413-2737	02292	Skirt, Women's Poly/Wool Gabardine, Blue	1	\$ 37.38	\$	37.38
8410-01-413-3894	02291	Skirt, Women's Poly/Wool Gabardine, Green	1	\$ 37.97	\$	37.97
8410-01-525-1042	03003	Slacks, Woman's, Blue 2319	1	\$ 42.33	\$	42.33
8410-01-525-0190	03004	Slacks, Women's, Poly/Wool Gabardine, Green	2	\$ 48.92	\$	97.84
8440-01-508-4956	02885	Sock, Boot, Coyote Brown	6	\$ 2.03	\$	12.18
8440-01-415-0061	02275	Socks, Dress	3	\$ 1.12	\$	3.36
8440-01-508-5580	02884	Socks, PT, Quarter Length (3 pair Package)	1	\$ 2.01	\$	2.01
8405-01-496-9808	02765	Sweater, Pull-Over Olive Green, w/ Epaulettes	1	\$ 38.77	\$	38.77
8415-01-443-7722	02359	Sweatpants, Marine Corps, Green	1	\$ 7.76	\$	7.76
8415-01-443-9870	02360	Sweatshirt, Marine Corps, Green	1	\$ 8.31	\$	8.31
8415-01-527-1970	03095	Trousers, Desert, MCCUU w/Permethrin	3	\$ 42.21	\$	126.63
8415-01-527-1838	03094	Trousers, Woodland, MCCUU w/Permethrin	2	\$ 42.18	\$	84.36
8415-01-530-6879	03148	Trunks, General Purpose	3	\$ 11.14	\$	33.42
8415-01-533-9807	03164	Undershirt, Man's Synthetic Olive Drab	3	\$ 9.84	\$	29.52
8420-01-450-0048	02424	Undershirt, Man's, Olive Green	3	\$ 3.38	\$	10.14
8420-01-194-0914	01892	Undershirt, Man's, White, V-Neck	3	\$ 2.89	\$	8.67
All Issued Items - Total					\$ 1,937.74	
All Returnable Items - Total					\$ 1,469.48	
Items that CAN NOT be returned per MCO 10120.38G						

Figure 10: Total Uniforms Returned Minus Cost to Repurpose with Net Savings

Fiscal Year	Male Discharges	Male Dollars	Female Discharges	Female Dollars	Total Discharges	Total Dollar Amount
FY11	5,520	\$ 8,397,410.40	544	\$ 799,397.12	6064	\$ 9,196,807.52
FY12	4,969	\$ 7,559,190.63	490	\$ 720,045.20	5459	\$ 8,279,235.83
FY13	4,821	\$ 7,334,042.67	581	\$ 853,767.88	5402	\$ 8,187,810.55
FY14	4,317	\$ 6,567,322.59	611	\$ 897,852.28	4928	\$ 7,465,174.87
FY15	3,959	\$ 6,022,707.93	551	\$ 809,683.48	4510	\$ 6,832,391.41
		USMC Provides (MCRD PI):	USMC Provides (MCRD SD):			
		Facilities, Utilities	Material			
		Vendor Provides:	Vendor Provides:			
		Labor, Equipment, Material	Facilities, Utilities, Labor, Equipment			
Alteration Contract Amount		\$ 8,840,602.00	\$ 6,000,000.00			
Period of Performance (months)		54	42			
Alteration Contract Annually		\$ 1,964,578.22	\$ 1,714,285.71			
Projected Marines Annually		18,000	16,000			
Alteration Cost Per Marine		\$ 109.14	\$ 107.14			
Altered Uniforms per Marine		9	9			
Cost Per Uniform		\$ 12.13	\$ 11.90			
Discharges	FY15	4,510				
% Recoverable	50%	2,255				
Cost to Repurpose		\$ 246,117.99	\$ 241,607.14			
Total Savings Annually		\$ 3,170,077.71	\$ 3,174,588.56			
Returnable Uniform Items Total Cost - Men		\$ 1,521.27				
Returnable Uniform Items Total Cost - Women		\$ 1,469.48				

General Military Terms

BCD – Bad Conduct Discharge. The Bad Conduct Discharge is given to enlisted military members by a court-martial due to punishment for bad conduct. A Bad Conduct discharge is often preceded by time in a military prison. Virtually all veterans' benefits are forfeited if the individual is discharged due to Bad Conduct. The civilian equivalent to this is usually a less serious felony (racketeering, fraud, etc.), depending on the crime committed.

Candidate – A civilian who wishes to become an officer within the Marine Corps. After passing an initial training called OCS (Officer Candidate School), the individual is eligible to receive a commission as a Second Lieutenant upon passing this school. There is no obligated time for an officer; once commissioned they may stay within the Marine Corps until they are separated. This ELT training for officers is conducted in Quantico, VA.

Condition Code – This is a code assigned by the local supply section or DLA that gives the general condition of the item being turned in for disposition, usually disposal. The codes are outlined by DLA and range from Condition Code A (Serviceable without Issue) to H (Unserviceable, Scrap). Below are the different condition codes that DLA authorizes for the classification of material:

- Condition Code A - Serviceable-Issuable without Qualification and refers to new, used, repaired, or reconditioned material which is serviceable and issuable to all customers without limitation or restrictions. It Includes material with more than 6 months shelf life remaining.
- Condition Code B - Serviceable-Issuable with Qualification New and refers to used, repaired, or reconditioned material which is serviceable and issuable for its intended purpose but which is restricted from issue to specific units, activities, or geographical areas by reason of its limited usefulness or short service life expectancy. It includes material with 3 through 6 months shelf life.
- Condition Code C - Serviceable-Priority Issue Items which are serviceable and issuable to selected customers, but which must be issued before Condition A and B material to avoid loss as a usable asset. It includes material with less than 3 months shelf life remaining.
- Condition Code D - Serviceable-Test/Modification Serviceable material which requires test, alteration, modification, conversion, or disassembly. This does not include items which must be inspected or tested immediately prior to issue.
- Condition Code E - Unserviceable-Limited Restoration Material which involves only limited expense or effort to restore to serviceable condition and which is accomplished in the storage activity where the stock is located.

- Condition Code F - Unserviceable-Reparable Economically reparable material which requires repair, overhaul, or reconditioning. Includes reparable items which are radioactivity contaminated.
- Condition Code G - Unserviceable-Incomplete Material requiring additional parts or components to complete the end item prior to issue.
- Condition Code H - Unserviceable-Condemed Material which has been determined to be unserviceable and does not meet repair criteria. It includes condemned items which are radioactivity contaminated, Type I shelf life material that has passed the expiration date, and Type II shelf life material that has passed the expiration date and cannot be extended.

DD – Dishonorable Discharge. If the military considers a service-member's actions to be reprehensible, the general court-martial can determine if a dishonorable discharge is in order. Murder and sexual assault are examples of situations which would result in a dishonorable discharge. If someone is dishonorably discharged from the military, that person is not allowed to own firearms according to US federal law. Military members who receive a Dishonorable Discharge forfeit all military and veterans' benefits and may have a difficult time finding work in the civilian sector. The civilian equivalent to this would be someone being charged with a serious felony (murder, rape, etc.).

DD-1348 – Defense Document 1348. This is an official form that officially transfers custody of any material within the Marine Corps. It is usually prepared electronically and then signed by the party transferring it away, and the party receiving the item. The civilian equivalent is similar to having a package delivered, and then delivery confirmation is required.

DD-1149 – Defense Document 1149. This is an official form that officially ships material within a container and is the civilian equivalent of a shipping manifest. The document specifies from where the material is coming and to where it is transiting. The form itemizes the quantity and serial numbers (if applicable) of the items being shipped. This document can work in place of a DD-1348 if the two parties are geographically separated.

DLA – Defense Logistics Agency. It is the agency through which the entire DoD (Department of Defense) centralizes its logistics operations. This agency does not receive any subsidies from the DoD, and its offices are displaced across the entire globe in order to ensure that procured equipment is delivered to each of the four military branches. DLA is responsible for the procurement of all uniforms issued to recruits and candidates. DLA also delivers these uniforms to each of the ELT Commands to be issued to recruits or candidates. An important detail to also know is that uniform clothing through DLA is VMI (Vendor Managed Inventory). Therefore DLA owns the uniforms until they are issued to a recruit and/or candidate. Once the transfer has happened, the uniform then becomes the property of the USMC.

DMO – Distribution Management Office. This agency is responsible for the shipping of all military material throughout the world. It is a subsidiary of Transportation Command within the Department of Defense. The agency ships material from one military location to another military location. It is the military equivalent of the United States Postal Service (USPS).

DoD – Department of Defense. This Federal Agency controls all military operations throughout the world. The four military branches make up the bulk of the DoD; members of the military are a part of this agency.

ELS – Entry Level Separation. - If an individual leaves the military before completing at least 180 days of service, the individual receives an entry level separation status. This type of military discharge can happen for a variety of reasons (medical, administrative, etc.) and is neither good nor bad, though in many cases, service of less than 180 may prevent some people from being classified as a veteran for state and federal military benefits.

ELT Command – Entry Level Training Command. This is a common name given when collectively speaking about each of the three places where all Marines are trained, both officer and enlisted. These bases are MCRD Parris Island, MCRD San Diego, and MCB Quantico.

GCSS-MC – Ground Combat Support System Marine Corps. This is a system that the Marine Corps uses to procure, account, and maintain all assets within the entire Marine Corps. It is the Marine Corps ERP (Enterprise Resource Processing) system.

GMD – General with Misconduct Discharge. If a service member's performance is satisfactory, but the individual failed to meet all expectations of conduct for military members, the discharge is considered a general discharge. To receive a general discharge from the military there has to be some form of non-judicial punishment to correct unacceptable military behavior. A general military discharge is a form of administrative discharge. The civilian equivalent to this is an infraction or less serious misdemeanor (typically from receiving multiple non-judicial punishments).

HQMC – Headquarters Marine Corps. This is the central agency that controls the Marine Corps and is overseen by the Commandant of the Marine Corps. All authority is approved or delegated by HQMC.

LOGCOM – Logistics Command. It is the USMC agency that centrally controls, repairs, and redistributes all material throughout the Marine Corps. If an item sustains considerable damage, then it will be sent to LOGCOM to be repaired or cannibalized to repair other items. This agency will play a key role in the proposed solution as LOGCOM already has the infrastructure necessary to repair and redistribute material throughout the Marine Corps. By using LOGCOM's expertise and knowledge, the Marine Corps can optimize its uniform inventory levels substantially.

MARPAT – Marine Pattern. This is an official, proprietary design used by the Marine Corps for its camouflage uniforms. The pattern is unique and displays a checkered pattern throughout the entirety of the uniform that aides in camouflage.

MCB – Marine Corps Base. This acronym typically precedes the official name for each physical base within the Marine Corps. Candidates are trained at MCB Quantico for Officer Candidate School (OCS). Each MCB has a Military Clothing agency by which all uniforms are procured or issued to Marines.

MCCS – Marine Corps Community Services. It is an agency similar to DLA, but it resides within the USMC. It receives no compensation or subsidies from the DoD or USMC; yet it operates as a service agency for each of the Marine Corps bases throughout the world. Depending on the base, each MCCS location, or “Exchange” as it is commonly called, will offer various MWR (Marine Wellness Recreation) services. Such services include outdoor rental equipment, auto repair shops, boat docks, gasoline, department stores, and many other services. The agency fills a gap within the USMC by offering services that allow Marines and their dependents to stay healthy and active for a very minimal price.

MCO – Marine Corps Order. This is an official order that typically details procedures for various aspects of the Marine Corps to include pay, administrative processes, training, etc. The orders are typically signed by the highest ranking member of the Marine Corps, the Commandant. These orders are longstanding and last until they are either replaced or cancelled by another MCO. They are based on the UCMJ (Uniform Code of Military Justice) and cannot violate the UCMJ. The order is equivalent to the US Title Code which is based on the US Constitution.

MCRD – Marine Corps Recruit Depot. The USMC has two of these locations. The first is in Parris Island, SC, and the second is San Diego, CA. These two bases process every recruit who wishes to become a Marine. All enlisted Marines begin their years of obligated service at one of these two locations.

Military Clothing – This is an agency within each MCB that centrally controls all uniforms for the base. The agency is responsible for procuring and issuing all uniforms. Sometimes it is controlled by Marines (typically within the US), and in other cases, it is controlled by MCCS (typically overseas).

MIR – Manpower Information Request. This is an official request to MMSB for data pertaining to any Marine who has been separated from the Marine Corps. Data is typically provided in excel format.

MMSB – Marine Manpower Separations Branch. This is a sub-section of HQMC that specializes in tracking and processing all Marines who are separated from the Marine Corps.

MWR – Marine Welfare and Recreation. It is a subsidiary of MCCS and provides services for military members and their families such as outdoor equipment rental, gymnasium, and recreational sports.

NSN – National Stock Number. This is a 13-digit unique number assigned to every piece of equipment that can be procured within the DoD. The numbers are managed by DLA. The civilian equivalent to a NSN is a SKU.

OCS – Officer Candidate School. This is the officer version of boot camp. It takes place at MCB Quantico and lasts approximately 6 to 10 weeks, depending on the commissioning program. Candidates are issued two pairs of woodland (green) MARPAT, two pairs of desert (beige) MARPAT uniforms, and two pairs of boots.

OIC – Officer in Charge. Commanders are in charge of individual units such as Companies, Battalions, Regiments, or Divisions. An OIC is in charge of sections that are underneath a Commander. Commanders are the equivalent of a Vice President within a civilian firm. An OIC is the equivalent of a manager within a typical firm.

OTH – Other Than Honorable Discharge. The most severe type of military administrative discharge is the Other Than Honorable Conditions. Some examples of actions that could lead to an Other Than Honorable Discharge include security violations, use of violence, conviction by a civilian court with a sentence including prison time, or being found guilty of adultery in a divorce hearing (This list is not a definitive list; these are only examples). In most cases, veterans who receive an Other Than Honorable Discharge cannot re-enlist in the Armed Forces or reserves, except under very rare circumstances. Veteran's benefits are not usually available to those discharged through this type of discharge. The civilian equivalent to this is usually a serious misdemeanor (assault, DUI, etc.).

PEB – Pre-Expend Bin. This is a physical bin that contains material that is expendable but necessary for repairing equipment. These bins are tracked electronically within GCSS-MC and can have reorder points set up within them.

PEBC – Personal Effects and Baggage Center. There are two of these located within the Marine Corps, MCB Lejeune and MCB Pendleton. These two agencies collect all government property and in some cases personal effects of Marines who are discharged for various levels of misconduct. These agencies receive all uniforms for Marines who are discharged with a characterization of Bad Conduct Discharge (BCD), Dishonorable Discharge (DD), Other than Honorable Discharge (OTH), and General with Misconduct Discharge (GMD). The PEBC then disposes of these uniforms depending on the condition code assigned to the disposed uniform item.

Quarter Sales - It is a department within MCCS that sells Condition Code A and B items that have been obtained from Marines who have been separated. These items are sold at about 25% of the regular DLA retail price. Quarter Sales receives these items free of charge from the local Military Clothing Section for that base.

RCO – Regional Contracting Office. This agency is responsible for ensuring all purchases over \$3000 are in accordance with DoD guidelines. Any purchase costing more than \$3000 must be competitively bid upon by external, non-government firms. This office ensures that those bids are legal and carried out in a professional competitive manner. Specifically at MCRD Parris Island and MCRD San Diego, the RCO oversees the uniform alteration contract at these bases.

Recruit – A civilian who wishes to become an enlisted Marine within the Marine Corps. After signing an initial contract, the recruit typically has 4 years of obligated service to the Marine Corps. This obligated time begins when the recruit enters Boot Camp at either of the two MCRD's.

SME – Subject Matter Expert. This is an expert within their respective field and typically an individual who has spent multiple years within their specific billet.

SOP – Standard Operating Procedure. While a MCO is signed by the Commandant, a SOP is typically signed by an Officer in Charge (OIC). The SOP details processes for a local agency. A SOP can easily be altered depending on the needs of the unit, but it cannot contradict any orders above them, including MCO's.

USMC – United States Marine Corps. The USMC is the preeminent fighting force within the Department of Defense for foreign conflicts. The Marine Corps specializes in amphibious operations worldwide. It is also the smallest branch of the DoD.

VMI – Vendor Managed Inventory. VMI is a Supply Chain concept where the manufacturer or supplier controls all inventory until it is ordered by the customer. VMI is typically centrally managed. It is also how DLA manages its inventory for all material for each of the four military branches.