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Value Recovery from the Reverse Logistics Pipeline

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Summary

Value recovery in the form of the return and repair of reparable spare parts involves large amounts of time as well as inventory investment for the Army. This research defines metrics to evaluate the retrograde processes and establishes a baseline of performance based on fiscal year 2000.[1] In that year, approximately 603,000 individual unserviceable Class IX items[2] valued at almost $2 billion were handled Army-wide by organizations below depot repair activities. Almost half of those items were repaired and returned to serviceable stocks; many were relatively inexpensive items. A significant dollar value also left Army inventories in the form of disposals or condemnations,[3] although the bulk of the items were individually of low value.

Reparables are important because they are intended to be their own source of future serviceables. By definition, a "reparable" is an item that can be reconditioned or economically repaired for reuse when it becomes unserviceable.[4] As part of a Level of Repair Analysis, the Army decides which parts should be repaired so that they can be used again, i.e., which parts are to be reparables rather than consumables that are automatically disposed of upon failure. Reparables are typically more expensive investment items that should be expeditiously moved to repair points for repair/refurbishment/remanufacture to return them to serviceable stocks so as to minimize the amount of inventory investment.

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[1] Although the data are nearly three years old, no concerted attention has been directed at systemwide process improvements in the return and repair of reparables as a source of supply. The transition to Single Stock Fund (SSF) has shifted organizational boundaries, but the issues and magnitudes of the metrics are relatively unchanged today. Thus the recommendations remain current. See page 14 (footnote 6) and page 50 (footnote 17) for additional information and references to SSF changes.

[2] In the Department of Defense, there are 10 categories or classes into which supplies are grouped to facilitate supply management and planning. Class IX is defined as repair parts and components for equipment maintenance.

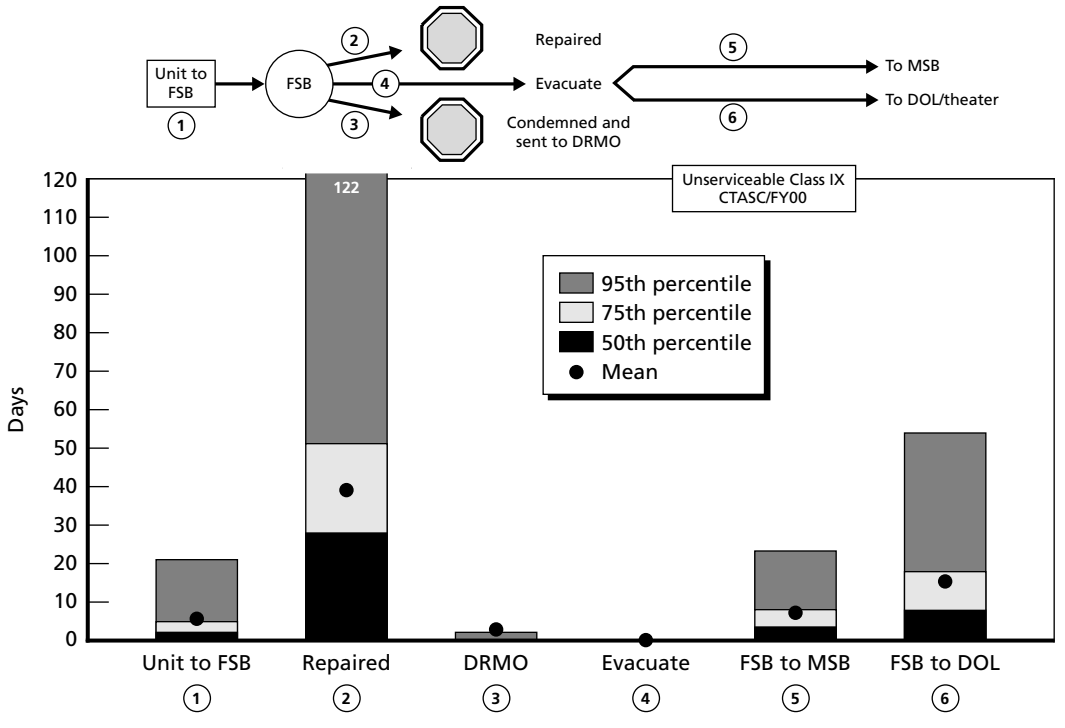
[3] Items that are removed from inventory are usually sent to the local Defense Reutilization and Marketing Office (DRMO), which has the responsibility for disposing of such items.

[4] Similarly, a "recoverable" item is one that normally is not consumed in use and is subject to return for repair or disposal.

Defining and Measuring the Reverse Logistics Process

Using fiscal year 2000 (FY00) as a baseline, we define the processes of recovering value from an unserviceable Class IX reparable—from turn-in by a soldier until it is repaired, condemned and disposed of, or evacuated to a higher echelon of repair. From the process definitions, metrics are calculated at three levels of activity: (a) forward support battalion (FSB), (b) main support battalion (MSB) and aviation support battalion (ASB), and (c) Director of Logistics (DOL) and theater-level repair activities. As an example, Figure S.1 depicts segment metrics for overall Army performance at the FSB level. Segment 1 (circled numbers on the figure depict segments) starts when an unserviceable item has been removed and replaced by a serviceable one and is then turned in by a mechanic to the supply system, starting the retrograde process. Once entered into the supply system, the unserviceable item then moves through a series of actions until it reaches final disposition: repair in the field, disposal, or unserviceable stock awaiting induction into a national source of repair. Depicted for each segment are the median, 75th percentile, 95th percentile, and

Figure S.1
FSB Processing of Unserviceable Retrograde



mean process times. In the top portion of the figure, the generalized process segments are shown and numbered to correspond to the metrics in the lower portion of the figure.

As the metrics in this report reflect, there are opportunities for improvement, as the total process times are long. In FY00, repair time for items that were repaired below depot level and returned to serviceable stocks averaged over 33 days. Items that were condemned and disposed of averaged 28 days to process, and items that were sent to depot level for repair averaged over 82 days to be moved to repair locations.

To help understand where improvements are possible, the metrics are portrayed at the three different organizational levels: FSB, MSB/ASB, and DOL/theater. For example, Figure S.1 shows Army-wide times for FSB-level processes. Then we examine performance in each of the process segments (e.g., turn-in process, repair process, various transit segments, etc.) for individual Army major commands (MACOMs) in Europe, Korea, the Pacific region, and the continental United States (CONUS).

Improving the Reverse Logistics Process

Some initial improvement ideas are also presented; these resulted from many observations made during process walks. With respect to the Army transformation and future operations, the quick and timely repair of unserviceable Class IX components may be critical to maintaining acceptable readiness levels as constrained by inventory investments. The focus and emphasis need to be on successful and timely value recovery—not just moving or piling up broken parts.

Improving the reverse pipeline involves an understanding of what constitutes "improvement." The term "velocity management" has been used to focus primarily on reducing the order fulfillment time and variability when a customer orders a needed part; faster and/or more consistent deliveries are almost always going to be better. In reverse logistics, velocity is still relevant, but "faster" might not be the guiding principle. Thus, for reference, we define improving the flow in the reverse logistics pipeline to mean *timely movement to minimize the amount of inventory investment.* In other words, the objective is to make the most cost-effective use of existing inventories.

Timely return of unserviceable carcasses to a point of repair has important readiness and cost implications:

- **Improved readiness.** Reverse logistics within the Army and the Department of Defense (DoD) has a direct impact on equipment readiness as well as on inventory investment.

The "transformed" Army will have a significantly smaller logistics footprint—especially when deployed. The evacuation of unserviceable reparables to a repair point will be important to expeditiously return key repair parts to serviceable condition in order to make them available to deployed soldiers.

- **More responsive sustainment.** With timely movement and collection of unserviceable parts at centralized repair points, there is less chance of interrupting repair flow because of a shortage of carcasses, i.e., unserviceable items that can be repaired.

  A primary measure of supply chain effectiveness in DoD and in the Army is customer wait time (CWT), or how long the soldier customer has to wait until a needed part is delivered. The CWT metric links directly to how well the reverse logistics processes function—longer CWT can result in reduced readiness as well as higher supply and maintenance costs. Reverse logistics process performance, as it affects replenishment wait time (RWT), also drives inventory investment.
- **Less inventory investment.** If the "return to serviceable" time is shortened, more turnover of reparable assets is realized, and fewer are needed.
- **Better visibility and less overall clutter** within the system can result if unserviceables are moved expeditiously and consolidated at known locations. Item Managers (IM) can manage their reparable inventories with more precision and be more responsive to unexpected demands. This could be especially important for legacy and Army-unique systems for which there is no longer any manufacturing or commercial support; components and piece parts often have to be salvaged from unserviceable stocks with unknown or inconsistent washout rates.
- **Savings in transportation costs** are possible if forward and reverse pipelines can be integrated and synchronized from a system perspective versus treating individual items independently.
- **Financial incentives** such as credit policies, transportation fee structures, surcharges, etc. must necessarily align with and support decisions to improve the flow of unserviceable reparables to an endpoint.

Conclusion

Responsive repair capability plus timely and deliberate throughput are the keys to improved retrograde flows within the reverse logistics process. A broad range of activities needs to be examined, understood, and improved—beginning with timely turn-ins of unserviceable Class IX reparables, to redistribution of serviceable retrograde, to physical movement of retrograde, to in-transit visibility, and ultimately including the places of value recovery—repair shops and depots.

The Army should seek to integrate systems between levels—between forward and reverse processes and between organizations. Ultimately the focus needs to be on the soldier with equipment that needs to be supported—reverse logistics may be what he/she depends on for valuable and scarce replacement parts to support a fast-moving operation.