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What Should Be Stocked in War Reserve?

A New Method for Allocating Resources

When Army units deploy rapidly for a contingency operation, it creates challenges for the initial sustainment of deployed units. Units bring some supplies with them but generally only enough for a short period. Beyond that, supplies need to come from theater-level inventory or have to be airlifted in. Theater-level inventory typically is established and replenished by sealift. However, it is likely to take 45-plus days for the first supply ships to arrive from the United States. While airlift could be used during this period, it is a scarce resource also heavily valued for early deployments. Additionally, when a contingency occurs, the global demand on the supply chain rapidly increases. Inventories maintained to support home station training become insufficient to fill all demands. The Army increases procurements to increase inventories and satisfy the higher demands. But since many items have lengthy procurement lead times, the “peacetime” level of inventory will sometimes run out in the face of the higher demand before increased deliveries begin.

The Army’s war reserve secondary items (WRSI) within Army Prepositioned Stock (APS) address these risks. Stockpiles positioned overseas in strategic locations and aboard ships enable the rapid establishment of theater inventory. Additional inventory in the United States, not made available to support training, compensates until the industrial base can surge and provide a higher level of supplies. However, funding for WRSI stocks often falls short of the total requirement given the breadth of Army budget priorities, and the Army has lacked a formal method for prioritizing which WRSI items to buy for APS when funding is short.

The Army asked RAND Arroyo Center to develop techniques to prioritize the use of a \$467 million FY 2007 budget for WRSI materiel for a Northeast Asia contingency scenario. Arroyo

Key Points

- Empirical demand data can be used to forecast contingency demands.
- Forward positioning should focus on fast-moving items with relatively low cost-to-weight ratios.
- The airlift avoidance and readiness benefits of stocking different items can be traded off to reflect different priorities.

adapted actual demand data to derive forecasts of the potential contingency demands; determined which items should be forward positioned versus stored in the continental United States (CONUS) and delivered via airlift; and allocated the budgeted funding to maximize the WRSI inventory investment value with respect to readiness and minimizing the need for sustainment airlift early in a contingency.

Empirical Demand Data Were Used to Forecast Contingency Demands

To determine what to stock in war reserve, the Army needs a way to know which items likely to be demanded in a contingency will have large demand increases. It is important for these items to be in APS to bridge the gap until production can surge. The Army also needs to know which items would demand substantial early airlift if not stocked forward.

Arroyo analyzed pre-OIF and OIF demand data to identify items that were critical to operations and for which wartime demand increased substantially or stressed production capacity. This analysis identified about 18,000 candidate items for possible war reserve funding.

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Arroyo then used data from OIF in calendar years 2003 and 2006 to develop demand forecasts for a Northeast Asia scenario. The demand data were time-phased by deploying unit to account for the force buildup at the beginning of a contingency. Calendar year 2006 data were included to ensure that repair parts for newly fielded and upgraded systems would be considered and that phased items would not be stocked.

Focus Forward Positioning on Fast-Moving Items with Low Cost-to-Weight Ratios

Even if the supply system has sufficient inventory to handle increases in demand, decisions about which items should be forward positioned in APS outside CONUS are key to ensuring that strategic airlift is not overtaxed. A forward positioned item should have high and regular demand. In addition, the item should have a relatively low cost per pound. For example, batteries are heavy compared to their unit price. If they are needed in large numbers, it is much more cost-effective to buy more for inventory and forward position them than to use valuable airlift capacity to transport them from CONUS.

Relatively few WRSI items need to be forward positioned to significantly reduce the airlift burden. The 1,800 items identified as good candidates for forward positioning accounted for about 80 percent of the volume (cubic feet) and weight of demands (see the table). These items represent less than 10 percent of the forecasted total demand value, showing that relatively small investments in inventory can

produce substantial airlift avoidance. If forward positioned items are selected well, just one or two strategic lift aircraft per day will be required to meet contingency demands using stocks stored in the United States.

Resource Allocation Method Trades Off Time and Readiness Benefits

Arroyo also developed a method to determine the best set of items and inventory levels for a given funding level. This method takes into account how much each item, if included in war reserves, would contribute to warfighting capability (available or “ready” equipment) and would help avoid the use of strategic airlift. For this analysis, Arroyo also used the demand forecasts developed from the OIF demand data. However, the resource allocation method permits demand forecasts from any source to be used as an input. It also permits varying the weighting of the time periods and the weighting of airlift avoidance versus the readiness contribution. Arroyo varied the weighting factors to develop two potential allocation schemes for the Army. The Army used one of these, with updates for new items, as the basis for FY 2008 spending on WRSI materiel for a Northeast Asia scenario.¹

Moving forward, the Army should ensure that the process for identifying items for war reserve is flexible and agile so that it can be updated quickly as equipment and operational forecasts change. ■

¹ Due to changing priorities, the FY 2007 budget for WRSI materiel was shifted to other needs.

Forward Positioned Items as a Percentage of All Items with Demands

Contingency Demand Data	% of Items	% of Demands	% of Total Value of Demands	% of Total Volume of Demands	% of Total Weight of Demands
OIF, March to September 2003	2	16	9	70	80
OIF, January to June 2006 (time-phased)	2	13	10	80	82

This research brief describes work done by the RAND Arroyo Center and documented in *A Funding Allocation Methodology for War Reserve Secondary Items*, by Kenneth Girardini, Carol E. Fan, and Candice Miller, TR-793-A, 2010 (available at http://www.rand.org/pubs/technical_reports/TR793.html). This research brief was written by Kristin J. Leuschner. The RAND Corporation is a nonprofit institution that helps improve policy and decisionmaking through research and analysis. RAND’s publications do not necessarily reflect the opinions of its research clients and sponsors. RAND® is a registered trademark.

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