Research Brief

RAND PROJECT AIR FORCE

A New Tool Forecasts Programmed Depot Maintenance Workloads for Aging Aircraft

RAND RESEARCH AREAS
THE ARTS
CHILD POLICY
CIVIL JUSTICE
EDUCATION
ENERGY AND ENVIRONMENT
HEALTH AND HEALTH CARE
INTERNATIONAL AFFAIRS
NATIONAL SECURITY
POPULATION AND AGING
PUBLIC SAFETY
SCIENCE AND TECHNOLOGY
SUBSTANCE ABUSE
TERRORISM AND HOMELAND SECURITY
TRANSPORTATION AND INFRASTRUCTURE
WORKFORCE AND WORKPLACE

Aging Air Force fleets have accrued material deterioration problems that have increased maintenance workloads and, in turn, reduced fleet availability for operations and training. Nowhere has this problem been more apparent and severe than during the periodic inspection and repair of aircraft structural elements known as programmed depot maintenance (PDM). PDM is conducted in large Air Force or contractor facilities where aircraft can be partially disassembled, inspected, and repaired.

The total labor required to complete PDM is expected to increase as fleets age, but analysts disagree about the extent. Among other reasons, the uncertainty is due to the difficulty in obtaining the actual labor hours applied during PDM. This has led to the use of other sources of information, such as engineering judgments or statistically based cost and workload trends, to predict future conditions. In the case of the KC-135 aerial refueling tanker, for example, different approaches have led to a wide range of forecasts, from stabilization in the near term (as suggested by the engineering approach) to continued growth (as suggested by the statistical approach).

RAND Project AIR FORCE (PAF) has developed a new method—the PDM Capacity Assessment Tool (PDMCAT)—that estimates future PDM workloads using only minimal information from inside a facility. The tool relies on easily observable features, such as the number of docks for performing maintenance and recent measures of actual performance. It forecasts the average number of aircraft that will be in PDM status each year over several decades, based on

- the initial number of aircraft in PDM status
- the physical capacity of the facility or facilities
- the PDM induction policy (the period allowed between the completion of one PDM and the start of the next)
- the minimum hands-on flow time (the minimum time it would take a facility to complete a PDM if only one aircraft were in PDM status).

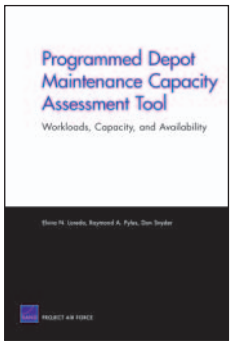
To illustrate the model's capabilities, PAF used it to evaluate the U.S. Air Force's capacity for supporting PDM on the KC-135.[1] The research team discovered that, while future annual fleet costs increase and aircraft availability decreases with age and workload, they do so less rapidly than expected because the aircraft induction rates decrease as the PDM flow time increases. This result leads to less-drastic cost and availability forecasts.

PDMCAT can be used to support fleet PDM planning, programming, and budgeting and facility and process improvements. However, PDMCAT is a macro forecasting tool; as with all forecasting tools, its accuracy will depend on how well the underlying factors (e.g., forecasts of future workloads, labor-application rate, depot capacity) have been measured. ■

This product is part of the RAND Corporation research brief series. RAND research briefs present policy-oriented summaries of published, peer-reviewed documents.

Corporate Headquarters
1776 Main Street
P.O. Box 2138
Santa Monica, California
90407-2138
TEL 310.393.0411
FAX 310.393.4818

[1] For a complete analysis of the KC-135 fleet, see Michael Kennedy et al., *Analysis of Alternatives (AoA) for KC-135 Recapitalization: Executive Summary* (Santa Monica, Calif.: RAND Corporation, MG-495-AF, 2006).



This research brief describes work done for RAND Project AIR FORCE and documented in *Programmed Depot Maintenance Capacity Assessment Tool: Workloads, Capacity, and Availability*, by Elvira N. Loredo, Raymond A. Pyles, and Don Snyder, MG-519-AF (available at http://www.rand.org/pubs/monographs/MG519/), 2007, 118 pp., ISBN: 978-0-8330-4015-2.

RAND Offices
Santa Monica, CA • Washington, DC • Pittsburgh, PA • Jackson, MS • Cambridge, UK • Doha, QA

RB-219-AF (2007)