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United States Government Accountability Office  
Washington, DC 20548

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May 29, 2009

Congressional Committees

*Subject: Defense Management: Observations on DOD's Analysis of Options for Improving Corrosion Prevention and Control through Earlier Planning in the Requirements and Acquisition Processes*

This report formally transmits the attached briefing in response to section 1041 of the Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 (see enclosure D). The act requires the Comptroller General to review the Department of Defense's report on options for improving corrosion prevention and control, including the methodology used to assess the potential options, and provide the results to the House and Senate Armed Services Committees within 60 days after submission of the Department of Defense report. On April 29, 2009, we provided the briefing to staff of your committees to satisfy the mandate and 60-day reporting requirement.

We are sending copies of this report to the appropriate congressional committees. We are also sending copies to the Secretary of Defense; the Deputy Secretary of Defense; the Under Secretary of Defense (Acquisition, Technology, and Logistics); the Secretaries of the Army, Navy, and Air Force; and the Commandant of the Marine Corps. This report will also be available at no charge on our Web site at <http://www.gao.gov>. Should you or your staffs have any questions concerning this report, please contact me at (202) 512-8365 or [solisw@gao.gov](mailto:solisw@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report were Tom Gosling, Assistant Director; Janine Prybyla; Matt Spiers; and Allen Westheimer.

William M. Solis  
Director, Defense Capabilities and Management

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United States Senate

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**Observations on DOD's Analysis of Options  
for Improving Corrosion Prevention and  
Control through Earlier Planning in the  
Requirements and Acquisition Processes**

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**Briefing for Congressional Committees  
April 29, 2009**

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## Background

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- The Department of Defense (DOD), through its costs of corrosion studies, has identified nearly \$12 billion in annual corrosion costs (not including Air Force aircraft and missiles). Corrosion also affects equipment readiness and safety.
  - For many years, DOD has recognized that earlier planning could lead to corrosion prevention and control benefits. For example,
    - In 2003, the Under Secretary of Defense for Acquisition, Technology, and Logistics issued a policy memorandum stating that corrosion prevention should be specifically addressed at the earliest phases of the acquisition process.
    - DOD's 2003 Directive 5000.01 on the defense acquisition process states that program managers shall consider corrosion prevention and mitigation when making trade-off decisions that involve cost, useful service, and effectiveness.
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## Background (cont.)

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- However, in 2007 we reported that most of the major acquisition programs we reviewed had not incorporated key elements of corrosion prevention planning.
  - Section 1041 of the Duncan Hunter National Defense Authorization Act (NDAA) for Fiscal Year 2009 requires the Secretary of Defense, acting through the Director of Corrosion Policy and Oversight, to submit a report on corrosion prevention and control (CPC). Specifically, the report should include:
    - comments and recommendations regarding potential improvements in CPC through earlier planning;
    - an evaluation and business case analysis of options for improving CPC in DOD's requirements and acquisition processes, including the impact of such potential improvements on system acquisition costs and life cycle sustainment; and
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## Background (cont.)

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- o an analysis of the following four options for including corrosion control and prevention:
    - as a key performance parameter (KPP) for assessing the selection of materials and processes,
    - as part of an existing KPP for sustainment,
    - as part of the capability development document in the joint capabilities integration and development system, and
    - as a requirement for weapon system managers to assess their CPC requirements over the system's life cycle and include the results in their acquisition strategy prior to contract solicitation.
  - The NDAA also requires GAO to review DOD's report, including the methodology used to analyze the four options.
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## Engagement Objectives

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1. Identify the methodology and criteria DOD used to assess the four options for improving CPC in the requirements and acquisition processes,
2. Assess the extent to which DOD analyzed the impact of the options on system acquisition costs and life cycle sustainment, and
3. Determine whether service and Joint Staff officials agree with DOD's assessment and if they have identified other potential options for improving CPC in DOD's requirements and acquisition processes.

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## Scope and Methodology

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- We reviewed DOD's March 6, 2009, report on CPC improvement options, obtained supporting documentation, and interviewed Corrosion Policy and Oversight officials at the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics:
    - to identify the criteria and methodology used, including the input received from the acquisition and logistics communities, to assess the options,
    - to assess the analysis of the impact of corrosion improvement options on system acquisition costs and life cycle sustainment, and
    - to determine the current availability of corrosion cost data, and ongoing and planned efforts to obtain additional data.
  - We also interviewed corrosion, logistics, and acquisition officials from the military services and the Joint Staff:
    - to obtain their views regarding the four options, and
    - to determine if other options have been identified or if other efforts are ongoing to improve CPC.
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## Scope and Methodology (cont.)

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- We conducted this performance audit from February 2009 through April 2009 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Summary

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- DOD's methodology for assessing the four options used several qualitative criteria and informal input from corrosion, acquisition, and logistics subject matter experts.
  - DOD's report did not quantitatively analyze the impact of the options on system acquisition costs and life cycle sustainment. According to officials, the data is not yet available to do so, but efforts are ongoing or planned that are expected to provide additional information for a quantitative business case analysis.
  - Military service and Joint Staff officials generally agreed with DOD's assessment of the four options, and identified two other options for improving CPC that were not included in DOD's report. The recently designated military department corrosion executives plan to assess whether implementation guidance is needed for a new CPC planning requirement that was recently incorporated in the acquisition process.
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## Objective 1: Methodology and Criteria Used to Assess Options

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- DOD's methodology for assessing the four options used several qualitative criteria to evaluate the likelihood that each option will successfully improve lifecycle CPC actions and result in an effective program.
  - Based on our review of DOD's report, we identified the following qualitative criteria DOD used to assess the options:
    - o direct relationship to CPC,
    - o probability of influencing CPC, and
    - o ability to be stated in operational terms and linked to a capability requirement (such as personnel and system performance).
  - According to officials, these criteria were used to evaluate the overall ability of each option to influence early CPC and maintain CPC as a priority throughout the development and fielding of a system.
  - DOD's assessment did not address the feasibility of implementing each option or the steps that would be necessary for implementation.
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## Objective 1: Methodology and Criteria Used to Assess Options (cont.)

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- Informal input was sought from corrosion, logistics, and acquisition subject matter experts across the department from July through October 2008 through a briefing at a DOD Corrosion Forum, several meetings, and circulation of report drafts.
  - Informal input was obtained from officials from the following:
    - July 2008 Corrosion Forum (84 attendees)
    - Corrosion Working Integrated Product Teams
    - Deputy Under Secretary of Defense (Logistics and Materiel Readiness)
    - Assistant Deputy Under Secretary of Defense (Maintenance Policy and Programs)
    - Joint Staff – Logistics
    - Joint Staff – Requirements
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## Objective 1: Methodology and Criteria Used to Assess Options (cont.)

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- On the basis of this approach, DOD concluded that including CPC in the sustainment KPP (materiel availability metric) was the option with the highest likelihood of successfully improving CPC because this KPP:
    - Has already been implemented and is acceptable to the operational community—in 2007, the Joint Staff established the sustainment KPP as a mandatory KPP for all major defense acquisition programs, and
    - Has a strong likelihood of influencing CPC throughout the system life cycle if the effects of corrosion on materiel availability can be characterized. According to officials, however, predicting, measuring, and assessing the relationship between corrosion and the sustainment KPP is challenging.
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## Objective 1: Methodology and Criteria Used to Assess Options (cont.)

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- DOD rated the remaining three options as having a low to moderate likelihood of successfully improving CPC on their own because they are difficult to express in operational terms and link to a capability requirement.
- However, DOD recognized these options had higher potential if implemented with one or more of the other options. For example,
  - Including CPC as part of the capability development document could be very effective if implemented with the sustainment KPP.
  - Including CPC as part of the acquisition strategy, if tied to a capability requirement, should ensure the appropriate program structure is in place to implement improved CPC.

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## Objective 2: Impact of Options on Acquisition and Sustainment Costs

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- DOD's report did not quantitatively analyze the impact of the options on system acquisition costs and life cycle sustainment.
  - Although two graphs in the report display quantitative relationships between corrosion spending and readiness, Corrosion Policy and Oversight officials based these graphs on assumptions regarding potential impacts, not actual studies or results.
  - Officials explained that they were unable to assess the costs and benefits of earlier CPC planning due to a lack of the following validated data:
    - o Effects of corrosion on system availability, and
    - o Associated reduction in life cycle costs resulting from improvements.
  - In addition, while DOD's cost of corrosion studies have highlighted general areas where corrosion costs are occurring, officials said data regarding the factors driving corrosion costs are also lacking.
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## Objective 2: Impact of Options on Acquisition and Sustainment Costs (cont.)

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- Efforts are ongoing or planned that are expected to provide some of the necessary data for a quantitative business case analysis.
  - For example, the Corrosion Policy and Oversight office has sponsored a study to assess the impact of corrosion on materiel availability (sustainment KPP).
    - The current focus is to determine the best methodology for the study.
    - A report was initially due in June 2009, but this date could slip due to data issues.
  - In addition, service return on investment status reports for fiscal year 2005 CPC projects are due to the Corrosion Policy and Oversight office in September 2009.
  - To varying degrees, the services are using DOD cost of corrosion studies to investigate the factors driving corrosion costs.



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## Objective 3: Perspectives of Service and Joint Staff Officials on CPC Options

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- Service and Joint Staff officials we spoke with generally agreed with DOD's assessment of the four options. Some officials suggested other ways for improving CPC during the acquisition process, including:
  - A corrosion-specific sub-metric to support the sustainment KPP: The Army is currently studying the usefulness of various metrics with regard to measuring the impact of corrosion, as the materiel availability metric is influenced by many factors in addition to corrosion.
  - A corrosion engineer: Air Force officials suggested that corrosion planning could be improved if a full-time, government corrosion engineer was required in each System Program Office whose sole responsibility is to plan, implement, and monitor CPC activities. However, the potential costs and benefits of this option have not been studied or evaluated by the Air Force.

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## Objective 3: Perspectives of Service and Joint Staff Officials on CPC Options (cont.)

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- In December 2008, DOD issued DOD Instruction (DODI) 5000.02 and required that a CPC plan be part of the acquisition strategy for major defense acquisition programs.
  - The corrosion executives are currently assessing the needs of their respective military departments, including the need for implementation guidance related to the new corrosion requirement in DODI 5000.02.
  - The Army, Navy, and Air Force designated corrosion executives in January 2009, as required by Section 903 of the fiscal year 2009 NDAA.
    - Army – Deputy Assistant Secretary of the Army for Acquisition Policy and Logistics
    - Navy – Division Director, Ship Structures and Materials, Naval Sea Systems Command
    - Air Force – Associate Director, Logistics, Office of the Deputy Chief of Staff for Logistics, Installations and Mission Support
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## Concluding Observations

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- While DOD's methodology was based on a qualitative analysis, with limited supporting data, DOD's report recognizes that CPC considerations are rightly placed at the earliest stages of the requirements and acquisition processes.
  - DOD and the services have taken actions to improve early CPC planning by:
    - Including corrosion prevention and control planning as a mandatory element in the acquisition plans for major acquisition programs,
    - Designating corrosion executives to coordinate department-level corrosion control and prevention program activities (including budget programming), and
    - Initiating a study of the impact of corrosion on material availability to more directly link the sustainment KPP to corrosion in the future.
  - However, these actions have all been recently undertaken and it is too early to determine the effects of these changes.
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## Views of Agency Officials

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To obtain agency views, we discussed a draft of this briefing with officials from the Corrosion Policy and Oversight Office.

They concurred with the facts presented.

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