

TASK FOUR: THE ROLE OF MATERIALS IN DEFENSE

A. TERMS OF REFERENCE

How can the Department of Defense better address its materials aspects and problems? Are DOD's (and NATO's) scientific, technological, and industrial bases adequate to support their missions?

Rationale

The primary role of the Department of Defense is to provide maximum security to the United States and the Atlantic Alliance. To achieve this goal, new military systems and weapons must be developed or improved constantly. Advanced materials and technology must be available to permit the development of these new concepts and systems which generally are stymied by materials limitations. The narrowing lead of the United States and NATO in science and technology apparently is affecting their development of advanced materials and the accompanying technology,

Questions

1. How can materials research and development be made more productive in a world of declining real dollar funding?
2. Can implementing the design team approach (designer, materials engineer, nondestructive evaluation, process planning and manufacturing, and maintenance and repair) from the time of the conceptual stage provide a significant increase in cost effectiveness?
3. What is the best way to expedite the development of materials and technologies that limit the development of new systems and weapons?
4. Would permitting the allocation of DOD funds to basic science not directly tied to specific missions be more effective in furthering the long-range, materials-associated needs of DOD than continuing the present restriction largely to National Science Foundation funding?
5. Can centers of excellence for areas, such as casting and welding, that would involve individuals from industry, academia, and Government and multidisciplines be effective in advancing and disseminating technology? How should it be structured—Government owned? Consortium of interested parties? Permanent or rotating personnel?

6. Is the trend toward reduction in DOD's manpower and resources in its materials and structures divisions severely reducing its effectiveness? Concomitantly, do reductions of staff and effort in other agencies such as the Bureau of Mines contribute measurably to the decline of materials development and technology? How can policy level officials be made more aware of the importance of materials to defense?
7. How could the research and development programs of Defense Services be coordinated better to more effectively develop new materials and technology? How could Government-civilian agencies interact in such a system? What international measures concerning materials would be most effective in promoting and strengthening the NATO alliance?

B. SUMMARY OF TASK FORCE REPORTS

Task Four

Group A

Group B

Points of Agreement

DOD should adopt the design team approach. Matters such as acquisition cost, life cycle cost, methods of nondestructive evaluation, and general materials evaluation must be considered as early as possible in the design program

A materials properties data bank should be established between Government and Industry to aid in the development of materials and processes specifications and standards and the accomplishment of engineering design

DOD must have a strong role in choosing its basic research and relating it to its missions because it can best judge its overall needs

The design team approach should be followed with emphasis on recognition of an adherence to common standards and specifications

DOD should use contract provisions to require that data (such as mechanical and physical properties of materials and structures, including processing where applicable) developed under Government contract be submitted in an orderly fashion to designated Government Information systems for storage and retrieval.

NSF-funded basic research is not providing enough new materials ideas to adequately support future DOD hardware requirements. DOD should expend its dialogue with NSF with the objective of correcting this deficiency

Points of Disagreement

Except in unusual instances, acknowledged, rather than Government-created "centers of excellence" are more likely to be effective and competent, and to have long-term viability and real acceptance

The Government should fund on a continuing basis "centers of excellence" on Government owned property to develop the expertise and manpower as needed for emerging DOD goals

Comments

For years, Congress and DOD officials have not appreciated the importance of and limitations of materials. Increased effort should be devoted to bring to the attention of all executives in Government and business the critical dimensions of materials problems and appropriate actions

Mandatory reviews should be made of all service needs to identify common materials problems and make the findings public as far as possible

DOD should improve its technology transfer and information exchange mechanisms
