DEPARTMENT OF DEFENSE
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OFFICE OF THE SECRETARY OF DEFENSE
Under Secretary of Defense (Acquisition)

CHANGE NO. 1
DoD 4245..7-M
February 13, 1989

TRANSITION FROM DEVELOPMENT
TO PRODUCTION

The following page changes to DoD 4245 .7-M, "Transition from Development to Product ion," September 1985, are authorized:

PAGE CHANGES

Remove: Pages v&vi and 1-7 through 1-10
Insert: Attached replacement pages and new pages 1-11 through 1-18

Changes appear on pages v and 1-7 through 1-9 and are indicated by marginal asterisks.

EFFECTIVE DATE

The above changes are effective immediately.

JAMES L. ELMER
Director
Correspondence and Directives

Attachments: 14 pages

WHEN PRESCRIBED ACTION HAS BEEN TAKEN, THIS TRANSMITTAL SHOULD BE FILED WITH THE BASIC DOCUMENT

THE UNDER SECRETARY OF DEFENSE

WASHINGTON, DC 20301

ACQUISITION

12 JAN 1989

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARY OF DEFENSE (POLICY)
DIRECTOR , DEFENSE RESEARCH AND ENGINEERING
ASSISTANT SECRETARIES OF DEFENSE
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GENERAL COUNSEL
INSPECTOR GENERAL
DIRECTOR , OPERATIONAL TEST AND EVALUATION_
ASSISTANTS TO THE SECRETARY OF DEFENSE
DIRECTORS OF THE DEFENSE AGENCIES

SUBJECT: Total Quality Management (TQM) in Acquisition and the Transition from Development to Production

TQM is our way-of-life approach to conducting the defense acquisition process. In keeping with this philosophy, I have authorized publication of the attached urgent change to DoD 4245.7-M, "Transition From Development to Product ion." The purpose of this change is to guide both the military and the private sectors of the defense community in the adoption and use of TQM principles.

The "transition" or "templates" manual covers the entire acquisition process and is already a TQM document in concept. Certain of the TQM provisions have been reemphasized and aggregated into a new "TQM" template that also identifies new and proven TQM techniques that have come to prominence. The TQM template shall be used in conjunction with the original manual, September 1985, pending the availability of a more comprehensive revision in 12 to 18 months.

TQM is applicable to all DoD activities whether concerned with acquisition or not. All DoD personnel are involved. I enjoin us all to examine our functions and the roles we play. Quality must be uppermost in every process. The execution of each of our jobs must add value to the products we make and the operations and services we per form.

Attachment

TRANSITION FROM DEVELOPMENT TO Production

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APPENDIX

A. Acronyms A-1

Throughout this document there are timelines for many template activities that begin and/or end between two major milestones. In such cases, the timeline is depicted for simplicity purposes as beginning and/or ending in the middle of the program phase. It is left to the users of this document to determine how *early or* how late *in the phase* the template activity begins or ends; and such a determination will be influenced by the types of program, the acquisition plan, and the best judgment of experienced Government and industry personnel.

The subsequent pages of this document contain all the templates generated by the DSB task force to reduce risk inherent in the design, test, and production processes. Additional templates have been generated as a result of a DoD and industry wide review. Since some risk is associated with funding, facilities, management issues, and the transition plan for design, test, and production, the entire network of templates is arranged in a sequence considered logical from a typical program manager's viewpoint. Funding is presented prominently because it influences every other template in the transition document. The total network of critical path templates is shown in figure 1-2.

TEMPLATE APPLICABILITY IS CORRELATED WITH ACQUISITION PHASES AND MILESTONES

In figure 1-3, the time phasing associated with development of each of the templates is identified as the program progresses through the material acquisition cycle. Program risk is introduced when a particular template activity is started after or continued beyond the timeline. For those less familiar with the DSARC process and its typical relationship with program phasing, the conceptual phase begins after the justification for major system new start (JMSNS) is approved. Between Milestones I and II, the demonstration/validation phase occurs and Milestone II is the beginning of FSD. The production phase begins at Milestone IIIA (tooling, long lead time, and pilot production) notwithstanding the production preparations that must begin early in the FSD phase, and Milestone IIIB generally signifies the beginning of rate production.

NEW DoD MANAGEMENT INITIATIVE TAKES PRECEDENCE

Change 1 to this Manual is a new template added to Chapter 1 to incorporate Total Quality Management (TQM). In the event of conflict with other templates, the TQM template takes precedence.

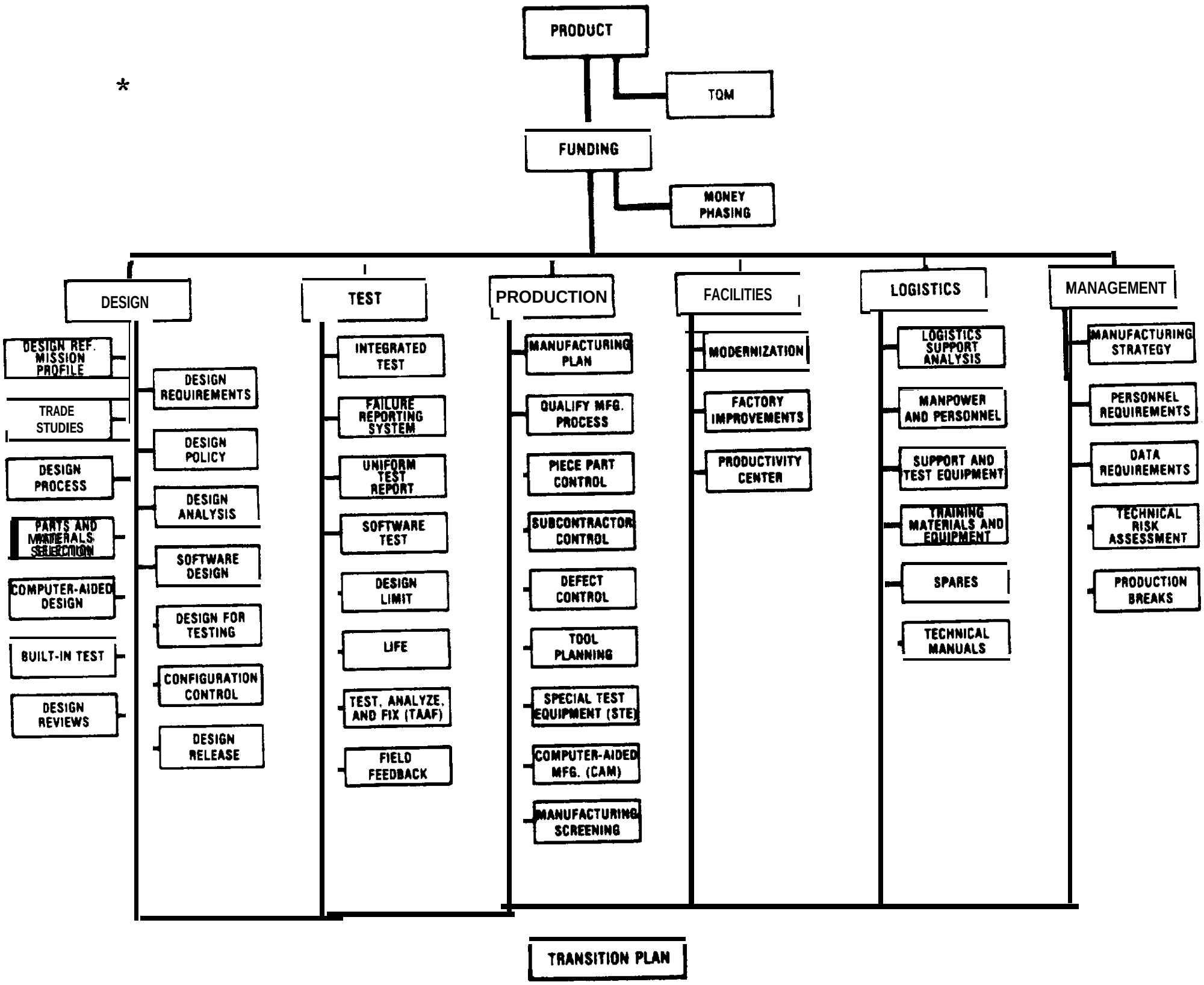

Figure 1-2. Critical Path Templates

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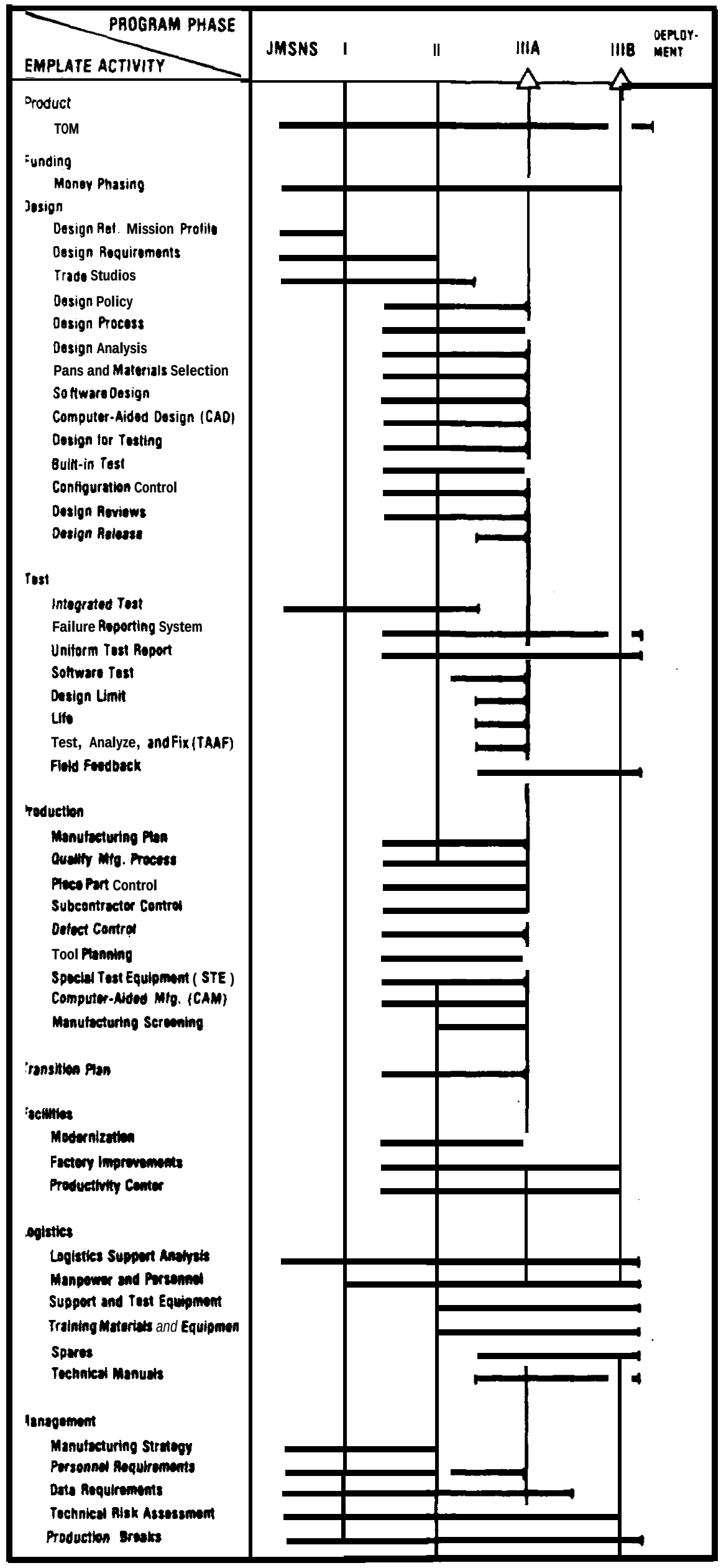

PROGRAM RISK IS **INTRODUCED** WNEN A PARTICULAR TEMPLATE ACTIVITY IS **STARTED LATE** OR CONTINUES **BEYONDTHE** TIMELINE

Figure 1-3. Template Timelines

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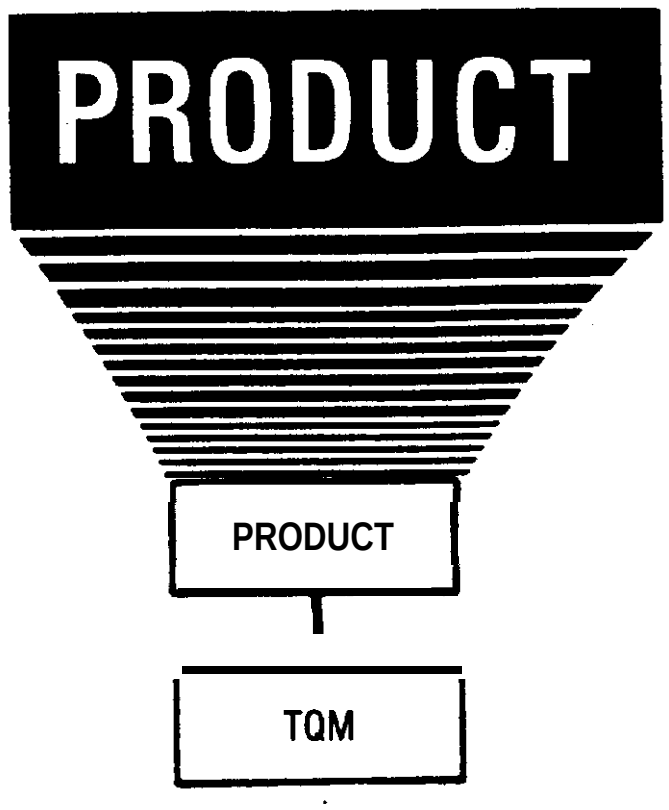
PRODUCT
PRODUCT
TQM

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CHAPTER 1

INTRODUCTION FOR TQM CRITICAL PATH TEMPLATE

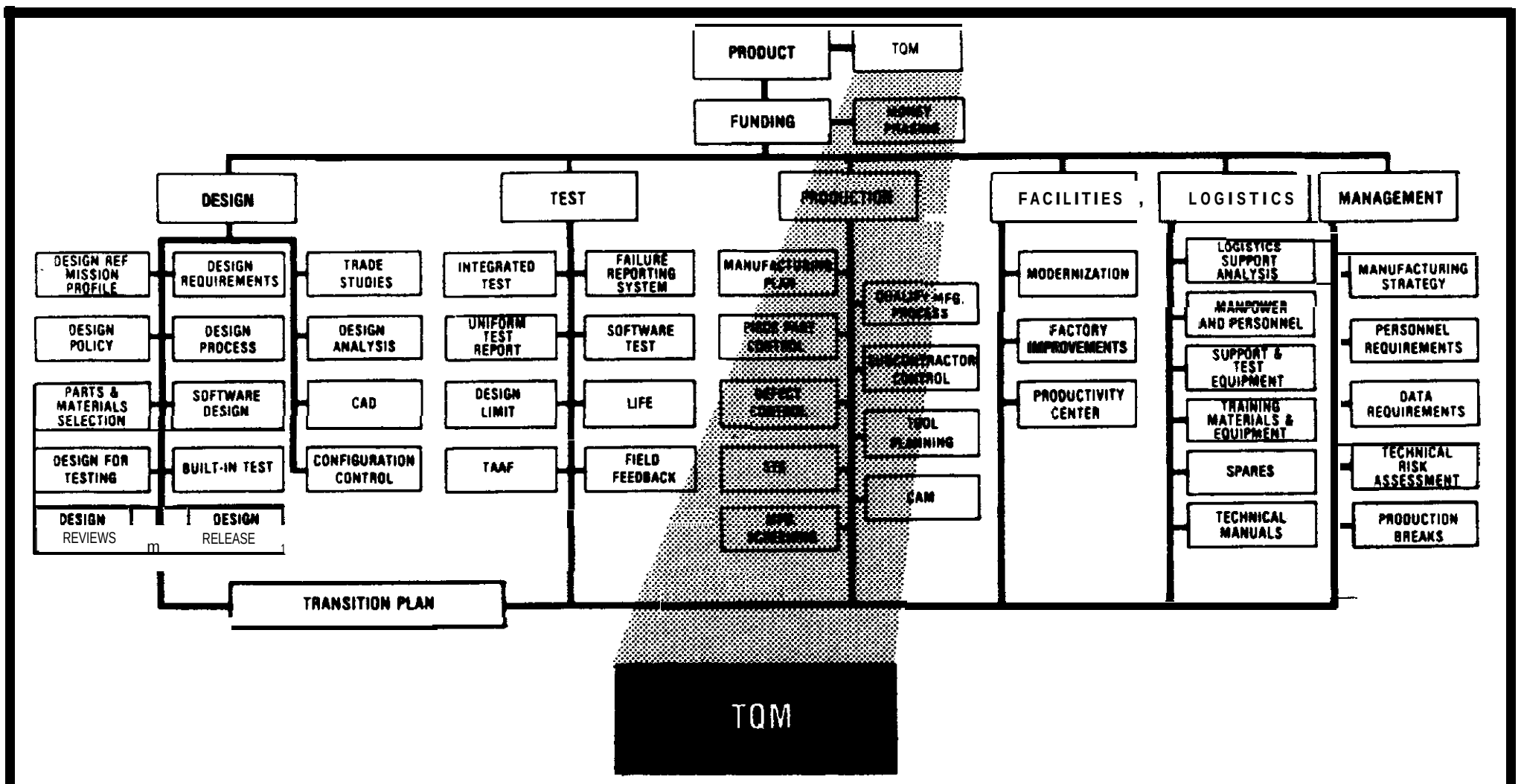
. . Since publication of this Manual in September 1985, a major New DoD initiative has been instituted called TQM. Change 1 to this Manual provides additional guidance to implement the philosophy and managerial approach involved with TQM and consists of a new template inserted in chapter 1. The new template aggregates TQM provisions now contained in the Manual by highlighting key DESIGN, TEST, and PRODUCTION template activity and identifying certain advances in **TQM** methods and techniques that have come to prominence. Pending a more extensive revision to this Manual, guidance in the TQM template shall take precedence in the event of conflict with other templates.

TQM is the disciplined process of continuous improvement in performance at every level and in all areas of responsibility within the Department of Defense. Improved performance is directed toward goals assigned to cost, schedule, mission need, and operational suitability. Increasing "user" satisfaction is the paramount objective. Whereas this Manual concentrates on the industrial process concerned with the acquisition of materiel, TQM principles are applicable equally to supporting functions and military operations.

TQM was approved for application DoD-wide by the Secretary of Defense on March 30, 1988, assigning it "top priority." The DoD posture statement on quality is reproduced on page 1-17. On August 30, 1988, the Under Secretary of Defense for Acquisition issued direction to implement TQM in the acquisition process and called for a climate in both Government and industry that would foster TQM implementation.

The TQM template is portrayed at the top of the template network in figure 1-2, directly supporting the product. By "product" is meant systems, equipments, hardware, or software, and supporting services. TQM affects everything the Department of Defense produces, procures, or performs. It is appropriate to all templates and nonacquisition activities. TQM requires professional discipline and commitment from both the Department of Defense and industry.

TEMPLATE



AREA OF RISK

TQM is an organized process of continuous improvement by private defense sectors and **DoD** activities aimed at developing, producing, and deploying superior materiel. The primary threat to reaching and sustaining this superiority is failure to manage with a purpose of constantly increasing the intrinsic quality, economic value, and military worth of defense systems and equipments. The Armed Forces and defense industrial entities may not attain a lasting competitive military posture and long-term competitive business stature without a total commitment to quality beginning at the highest managerial levels. TQM is applicable to all functions concerned with acquisition of defense material, supplies, facilities, and services. Being satisfied with sub-optimum, short-term goals and objectives has adverse impacts on cost, schedule, and force effectiveness. A short-term approach also leads to deterioration in the efficacy of specific products, the firms that produce them, and the industrial base overall. Major risk also is entailed with the inability to grasp and respond to the overriding importance attached to quality by the “customer” or user activities.

OUTLINE FOR REDUCING RISK

- The organization has a “corporate level” policy statement attaching highest priority to the principles of TQM. This policy statement defines TQM in terms relevant to the individual enterprise or activity and its products or outputs.

“ The corporate policy statement is supported by a TQM implementation plan that sets enduring and long range objectives, lists

criteria for applying TQM to new and on-going programs, provides direction and guidance, and assigns responsibilities. Every employee at each level plays a functional role in implementing the plan.

- All personnel are given training in TQM principles, practices, tools, and techniques. Importance is placed on self-initiated TQM effort.

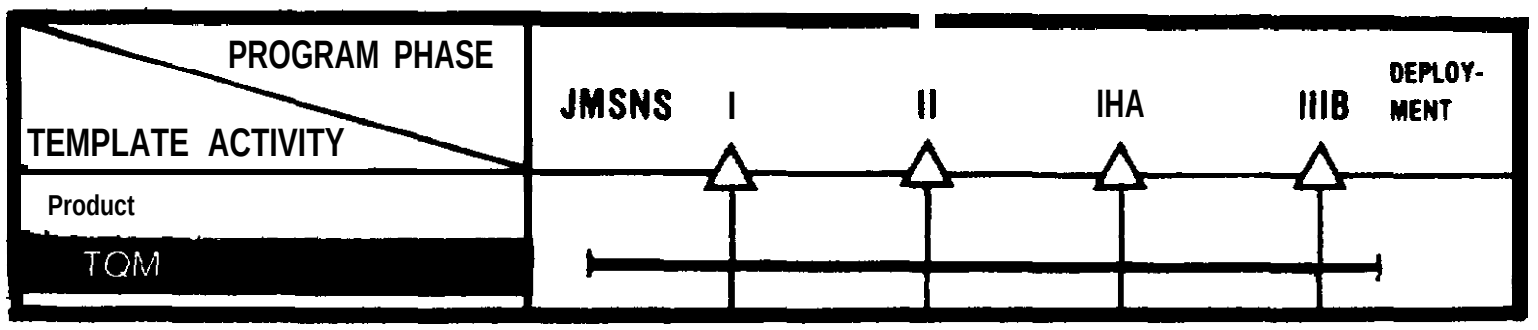
- TQM effort begun in the conceptual phase of the acquisition cycle is vitally concerned with establishing a rapport between the producer and the user or customer and a recognition of the latter's stated performance requirements, mission profiles, system characteristics, and environmental factors. Those statements are translated into-measurable design, manufacturing, and support parameters that are verified during demonstration and validation. Early TQM activity is outlined in the Design Reference Mission Profile template and Design Requirements template. The Trade Studies template is used to identify potential characteristics which would accelerate design maturity while making the design more compatible with and less sensitive to variations in manufacturing and operational conditions.

- Design phase TQM activity is described in the Design Process template. Key features enumerated include: design integration of life-cycle factors concerned with production, operation, and support; availability of needed manufacturing technology; proof of manufacture ng process; formation of design and design review teams with various functional area representation; and use of producibility engineering and planning to arrive at and transition a producible design to the shop floor without degradation in quality and performance. The Design Analysis template and Design Reviews template provide guidance in identifying and reducing the risk entailed in cent rolling critical design characteristics. Both hardware and software are emphasized (reference the Software Design template and Software Test template). A high quality design includes features to enhance conducting necessary test and inspection functions (reference the Design for Testing template).

- An integrated test plan of contractor development, qualification, and "production acceptance testing and a test and evaluation master plan (TEMP) covering Government-related testing are essential to TQM. The plans detail sufficient testing to prove conclusively the design, its operational suitability, and its potential for required growth and future utility. Test planning also makes efficient use of test articles, test facilities, and other resources. Failure reporting, field feedback, and problem disposition are vital mechanisms to obtaining a quality product.

- Manufacturing planning bears the same relationship to production success as test planning bears to a successful test program (reference the Manufacturing Plan template). The overall acquisition strategy includes a manufacturing strategy and a transition plan covering all production related activities. Equal care and emphasis is placed on proof of manufacture as on proving the design itself. The Qualify Manufacturing Process template highlights production planning, tooling, manufacturing methods, facilities, equipment, and personnel. Extreme importance is attached to subcontractor and vendor selection and qualification including flow down in the use of TQM principles (reference the Subcontractor Control template). Special test equipment, computer-aided manufacturing, and other advanced equipments and statistical based methods are used to qualify and control the manufacturing process.

TIMELINE



TQM oriented defense contractors and Government activities concentrate on designing and building quality into their products at the outset. Successful activities are not content with the status quo or an acceptable level of quality approach. Those activities respond to problems affecting product quality by changing the design and/or the process, not by increasing inspection levels. Reduction in variability of the detail design and the manufacturing process is a central concept of TQM and is beneficial to lower cost as well as higher quality. Defect prevention is viewed as key to defect control. Astute TQM activities are constantly on the alert to identify and exploit new and proven managerial, engineering, and manufacturing disciplines and associated techniques.

THE SECRETARY OF DEFENSE
WASHINGTON, THE DISTRICT OF COLUMBIA

DoD POSTURE ON QUALITY

- ***Quality is absolutely vital to our defense, and requires a commitment to continuous improvement by all DoD personnel.***

- ***A quality and productivity oriented Defense Industry with its underlying industrial base is the key to our ability to maintain a superior level of readiness.***

- ***Sustained DoD wide emphasis and concern with respect to high quality and productivity must bean integral part of our daily activities.***

- ***Quality improvement is a key to productivity improvement and must be pursued with the necessary resources to produce tangible benefits.***

- ***Technology, being one of our greatest assets, must be widely used to improve continuously the quality of Defense systems, equipments and services.***

- ***Emphasis must change from relying on inspection, to designing and building quality into the process and product.***

- ***Quality must be a key element of competition.***

- ***Acquisition strategies must include requirements for continuous improvement of quality and reduced ownership costs.***

- ***Managers and personnel at all levels must take responsibility for the quality of their efforts.***

- ***Competent, dedicated employees make the greatest contributions to quality and productivity. They must be recognized and rewarded accordingly.***

- ***Quality concepts must be ingrained throughout every organization with the proper training at each /eve/, starting with top management.***

- ***Principles of quality improvement must involve all personnel and products, including the generation of products in paper and data form.***

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