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Problem: After four years and \$1.8B the Sergeant York program was cancelled after failing to meet its requirements.

Solution: The Army’s Forward Area Defense (FAAD) concept emerged as a replacement. Four elements comprised the FAAD systems that then formed a combined arms team. The AVENGER, was a line-of-sight rear system that rapidly locks on and fires a STINGER missile at enemy targets. The Army program office embraced Total Quality Management (TQM) focusing on:

- Satisfying user requirements,
- Sustaining a quality product, and
- Ensuring continuous product improvement.

The result was a program that went from go-ahead decision to actual fielding in 3-years!

Title: Using **Total Quality Management** to Improve **Quality**, Cost and Productivity.

Value Statement: TQM has been successfully employed by a large number of American companies as a strategic vehicle for recapturing marketplace lost to the Japanese. TQM has been and continues to be employed (under different names) by many DoD organizations and DoD suppliers to improve the quality and reduce the cost on weapon system programs. A word of caution, approximately 50% of TQM projects fail because of the lack of management commitment and follow-thru.

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Background: Not long after World War II ended, General MacArthur invited Dr. W. Edward Deming and several hundred other scientists and advisors to Japan to help rebuild the country. One of the attendees at a Deming lecture on statistical quality techniques was a Japanese professor that had taught many of Japan’s leading CEOs. He convinced the CEOs that if they adopted Dr. Deming’s techniques, they could turn Japan’s economy around in just 5-years. And as many of us know, in the 60’s the Americans lost the consumer electronics market, the steel market and much of the automotive market to the Japanese. This caused the CEOs of many American firms (Ford, IBM, Xerox, etc.) to adopt Dr. Deming’s principles of TQM and helped them to regain some of their lost market share.

The term Total Quality Control came from Armand Feigenbaum, Director of

Manufacturing and Quality Control of General Electric from 1958 – 68 in a book he authored in 1951.

Discussion: TQM is a management approach to providing highly competitive quality products and services as defined by the customer by engaging the entire organization in the use of quality statistical tools. TQM is a systematic, integrated, and organizational way of managing daily operations focused on continuous improvement in product and processes.

Several quality guru's have helped to develop what we consider TQM:

- Dr. Deming developed a set of 14 management principles and identified 7 deadly diseases for guiding management action. Deming's points focused on the need to drive out fear in an organization and not relying on inspection to ensure quality. These points include:
 - 1."Create constancy of purpose to improve product and service (quality).
 - 2."Adopt the new philosophy by management learning the responsibilities and taking leadership for change."
 - 3."Cease dependence on mass inspection by building quality into the product."
 - 4."End the practice of awarding business on price (move towards a single supplier for any one item)."
 - 5."Improve constantly and forever your systems and processes."
 - 6."Institute training on the job (job related training)".
 - 7."Institute leadership".
 - 8."Drive out fear".
 - 9."Break down barriers between departments".
 - 10."Eliminate slogans and exhortations."
 - 11."Eliminate quotas or work standards and management by objectives."
 - 12."Remove barriers that rob people of pride of workmanship".
 - 13."Institute a vigorous education and self-improvement program".
 - 14."Put everyone in the organization to work accomplishing the quality transformation".

- Dr. Joseph Juran developed and espoused a 15 point program that focused on a spiral of continuous improvement. He is also established the Juran Quality Trilogy that first focused on Quality Planning, then Quality Control, and finally Quality Improvement.
- Philip Crosby was probably quality's best spokesperson and popularized many of the ideas of the gurus and coined such phrases as "Quality is free," "Cost of Quality," and "Zero-Defects."
- Kaoru Ishikawa, was a student of both Deming and Juran and developed many of the tools used today to include Quality Circles, the Cause-and-Effect Diagram and the Seven Tools of QC.

TQM Process One of the better TQM Process Models is Crosby's 14-Points:

- Steps:**
1. Establish strong management commitment.
 2. Form quality improvement teams with representatives from all departments.
 3. Identify problems and opportunities for improvement.
 4. Evaluate the Cost of Quality.
 5. Raise the awareness of quality by all employees.
 6. Take action to correct problems.
 7. Establish an Ad Hoc Committee for the Zero Defects Program.
 8. Train all supervisors to carry out their part of the quality improvement program.
 9. Hold a Zero Defects Day to establish a new attitude.
 10. Encourage everyone to set improvement goals.
 11. Encourage employees to communicate to management the obstacles to improvement.
 12. Establish an awards program to recognize those who meet their goals or perform in an outstanding manner.
 13. Establish a senior level Quality Council to focus management attention.
 14. Do it all over again!

Results: None available.

Benefits: The application of TQM a weapon system program in production can result in significant reductions in cost and cycle times, and major improvements in quality, responsiveness and performance.

Application to other programs:



This practice is applicable on any program in which a new high-technology product is being designed, developed, produced and/or maintained.

Key words: Quality Management, Total Quality Management, Total Quality Control, TQM, Deming, Juran, Crosby, Ishikawa

(keywords are used to support improved search capabilities in the information repository):

Additional http://acc.dau.mil/simplify/ev_en.php click on the Production, Quality and

Resources: Manufacturing Special Interest Area for additional information
<http://quality.org/TQM-MSI/TQM-glossary.html> Glossary of TQM terms
<http://www.mazur.net/tqm/tqmterms.htm> TQM Dictionary
<http://home.att.net/~iso9k1/tqm/tqm.html> TQM Tutorial
<http://www.staff.brad.ac.uk/ckarazai/QualityAssuranceManagement/Gurus.pdf>
Briefing on the Quality Gurus

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