GAO

United States
General Accounting Office
Washington, D.C. 20548

General Government Division

B-249779

April 14, 1993

The Honorable Daniel S. Goldin
Administrator, National Aeronautics
    and Space Administration

Dear Mr. Goldin:

Total Quality Management (TQM) is a management approach that
strives to achieve continuous improvement of quality through
organizationwide efforts based on facts and data. TQM also
focuses business processes on meeting the needs of customers,
both internal and external. Although TQM traditionally has
been associated with private sector organizations and their
efforts to remain competitive and profitable, in recent years
federal organizations have been attempting to implement TQM to
cope with budget restrictions and better serve the public.

We recently surveyed federal installations to determine the
extent of their use of TQM and learned that 68 percent of the
installations surveyed were implementing TQM.[1] An
installation, as defined by the Office of Personnel
Management, is a unit with a specifically designated head who
is not subject to on-site supervision by a higher level
installation head and who has been delegated some degree of
authority in the performance of personnel management
functions. Our survey covered over 2,800 installations, such
as Internal Revenue Service Centers, Social Security offices,
military depots, and NASA centers. Eight installations of the
National Aeronautics and Space Administration (NASA) were
included in this survey, and the purpose of this
correspondence is to provide you a brief summary of the
results as they apply to NASA as well as to compare NASA
results with the results of all surveyed federal
installations. We believe this information--particularly data
on barriers to TQM--can be useful in your planning and as a
baseline for judging future efforts.

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[1]Quality Management: Survey of Federal Organizations
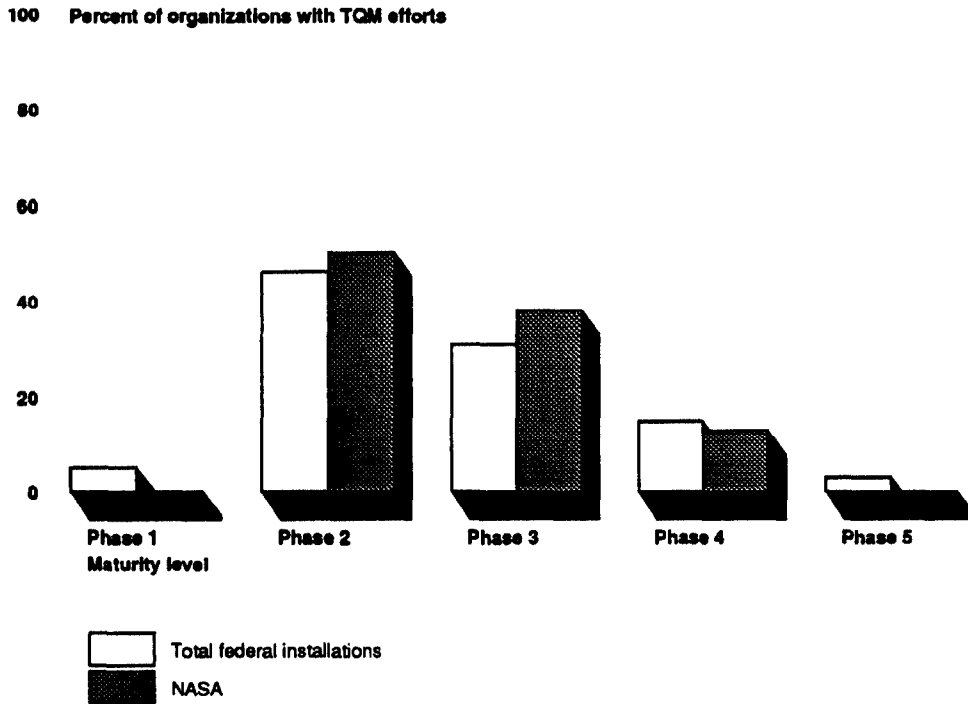(GAO/GGD-93-9BR, Oct. 1, 1992).

GAO/GGD-93-28R, TQM Implementation at NASA

STATUS OF TQM

TQM is being implemented at all eight of the NASA installations responding to our survey. These eight installations reported that they employed a total of about 20,000 personnel. The level of TQM activity at NASA is considerably above the 68 percent rate reported in our overall survey of federal installations' TQM efforts.

To obtain a picture of the status of federal TQM efforts, we asked installations to report their efforts in terms of a five-phase maturity scale. Maturity definitions ranged from Phase 1, preliminary TQM efforts, to Phase 5, institutionalized efforts that are achieving significant benefits (see enc. I for definitions). As figure 1 shows, no NASA installations reported being in either Phase 1 or Phase 5. The maturity levels of NASA installations appear to reflect that six of the eight installations report they have been implementing TQM for 3 or less years; on average Phase 5 installations across all federal respondents have been implementing TQM for about 5 years.

Figure 1: Status of TQM

100 Percent of organizations with TQM efforts

80

60

40

20

0

| Phase 1 | Phase 2 | Phase 3 | Phase 4 | Phase 5 |

Maturity level

☐ Total federal installations

■ NASA

In our survey of federal installations, we asked respondents about the extent of their involvement in 43 activities commonly undertaken by organizations involved in TQM. Such activities include providing training in TQM tools for employees, establishing quality councils or steering groups, and establishing problem-solving teams. Installations reported that their involvement in these activities increased as maturity increased. In other words, installations identifying themselves as more mature in TQM also more frequently said they were doing the 43 activities commonly associated with TQM.

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We examined the activities reported by NASA installations, but because of the limited number of NASA installations, could not meaningfully compare the level of activities with reported maturity levels. We did note that all eight NASA installations reported establishing problem solving teams, and seven out of eight reported establishing quality councils or other TQM steering groups. Teams and quality councils are structural elements of TQM that most respondents to the federal survey reported establishing early in their efforts.

BENEFITS OF TQM

We considered benefits in two ways: (1) effect on external customers as reflected by overall organizational performance and (2) effect on internal customers as reflected by internal operating conditions. We asked respondents to assess TQM's effect on organizational performance in terms of productivity, reductions in costs, quality of products and services, overall service to customers, customer satisfaction, and timeliness. To depict the overall impact, we developed an index that is the average of responses to our questions on the degree of impact. Figure 2 compares NASA and total federal responses and shows that of the seven NASA installations that responded to this question six reported positive benefits, none saw negatives to TQM, and one felt it was too soon to judge benefits in three out of six performance dimensions. These results are more positive than the overall survey results, however, the limited number of NASA installations makes comparisons difficult.
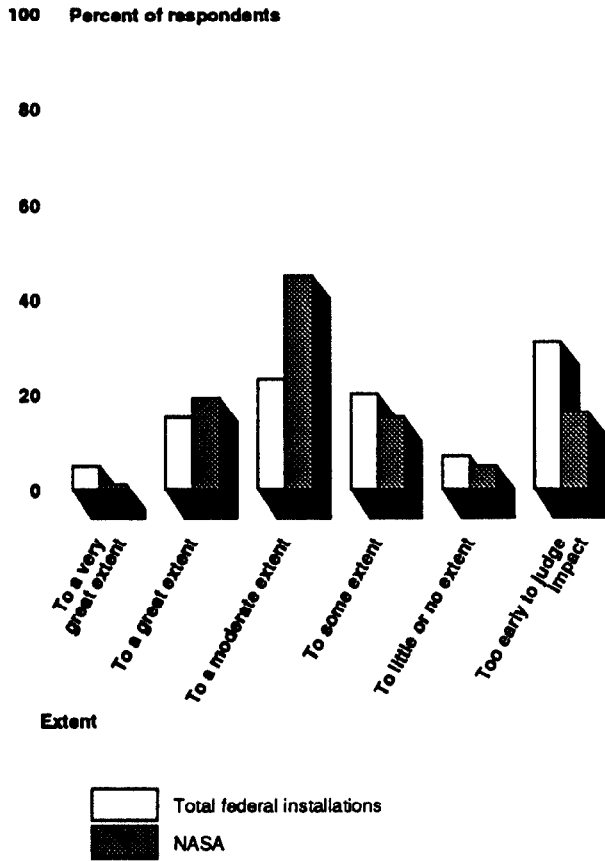
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Figure 2:   Impact of TQM on Performance

100 Percent of respondents - composite analysis

Impact

☐ Total federal installations
▨ NASA
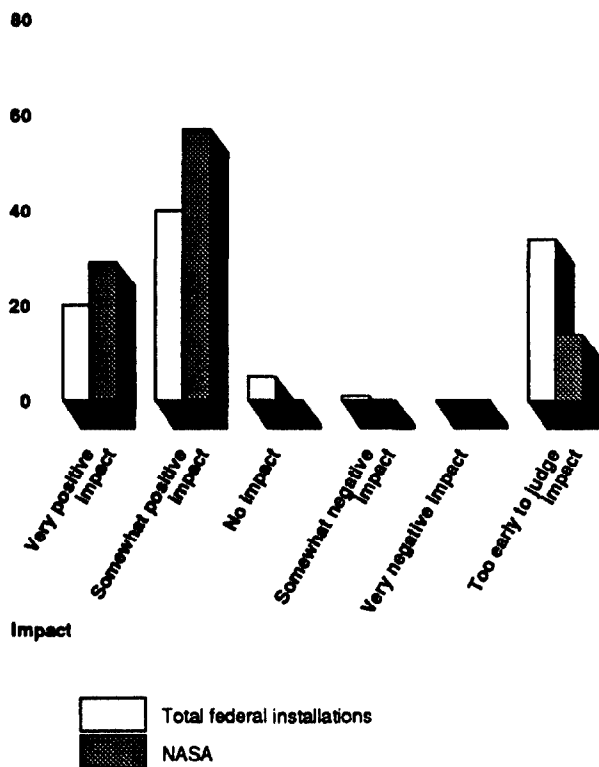
For internal operating conditions, we asked the installations to identify the impact of TQM on each of 13 internal operating conditions, such as communications and labor-management relations.   To illustrate the benefits, we developed an index in the same manner as for the organizational performance indicators. Figure 3 compares the NASA and total federal responses and once again shows that NASA installations generally reported greater overall benefits than the total of all surveyed federal installations, however, the limited number of NASA installations makes comparison difficult.

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Figure 3: Extent of Positive Impact on Internal Operating Conditions

100 Percent of respondents

80

60

40

20

0

Extent: To a very great extent, To a great extent, To a moderate extent, To some extent, To little or no extent, Too early to judge impact

Extent

☐ Total federal installations
■ NASA

BARRIERS TO TQM

We asked all the federal installations we sent our recent survey to about the significance of 21 potential barriers to implementing TQM that had been identified through our research. Nine barriers were said to be moderate to very major problems by 39 percent or more of the total federal respondents. NASA respondents were not generally consistent with the category of

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barriers identified by the total federal survey and the limited number of NASA installations made comparison difficult. Table 1 lists the major barriers reported by NASA respondents.

Table 1: Major Barriers Reported by NASA Respondents as Moderate to Very Major Problems

Barriers to implementing TQM	Percent
1. Employees do not believe they are empowered to make changes.	88
2. Resistance to measuring processes.	88
3. Insufficient support for TQM among installation managers.	88
4. Measures of satisfaction from external customers difficult or impossible to get.	75
5. Employees' resistance to changing roles or changing organizational structures.	75
6. Management unfamiliar or uncomfortable with statistics and measurement techniques.	63
7. Funding/budgeting constraints.	63
8. Employees have insufficient information on how to implement TQM and use TQM tools.	63
9. Problems due to federal personnel regulations.	63

Five of the top barriers identified by the total federal respondents were also among the top nine barriers identified by the NASA respondents. The four top NASA barriers not included among the overall top barriers were: (1) resistance to measuring processes, (2) insufficient support for TQM among installation managers, (3) measures of satisfaction from external customers difficult or impossible to get, and (4) management unfamiliar or uncomfortable with statistics and measurement techniques.
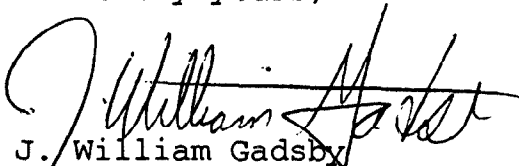
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SUMMARY

NASA respondents reported more positive impacts on performance
than the total federal respondents and differences in the
categories of major barriers to TQM implementation. Our survey
of federal TQM efforts indicated that as installations invested
more time and effort in TQM activities, they matured in the
implementation of TQM, found that the barriers became less
difficult, and reaped greater benefits. In that regard, NASA
respondents' message was similar; as NASA installations matured
barriers became less difficult and they reaped greater benefits.

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We have enclosed a copy of our report Quality Management: Survey
of Federal Organizations (GAO/GGD-93-9BR, Oct. 1, 1992) to
provide information on the background; results; and objective,
scope, and methodology of the total survey.

We hope you will find this information useful in guiding your
quality management initiatives and in improving service to your
customers under today's budget constraints. We will make copies
of this correspondence available to others upon request.

The major contributors to this correspondence are listed in
enclosure II. If you have any questions, please call me on (202)
512-8387.

Sincerely yours,

J. William Gadsby
Director, Government Business
  Operations Issues

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PHASES OF TQM IMPLEMENTATION

PHASE 1 - DECIDING WHETHER TO IMPLEMENT TQM

Management is researching or deciding whether to implement TQM, but no formal decisions or activities have been initiated by top management. A few employees may have attended quality conferences or network meetings, but the installation as a whole has yet to be informed or involved in a TQM project.

PHASE 2 - JUST GETTING STARTED

TQM efforts are in the early planning and implementation phase. Management has made a formal decision to start TQM and has communicated this to the organization. The organization's mission and vision have been articulated. A few quality structures, such as quality councils, steering committees, or teams, have been established, and some awareness training has been given. Preliminary quality planning has been done. Pilot programs or newly initiated installationwide efforts to improve quality are included in this phase.

PHASE 3 - IMPLEMENTATION

Specific TQM processes designed to improve quality are in place. TQM training for management and employees is beyond the orientation/awareness stage and focuses on TQM tools and techniques and team-related activities. Measures of quality and productivity have been identified and specific goals have been set.

PHASE 4 - ACHIEVING RESULTS

The installation has a sustained TQM effort and has begun to achieve and document significant results. Systemic, cross-functional, and/or organizational achievements from the TQM effort have been realized.

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PHASE 5 - LONG-TERM INSTITUTIONALIZATION

The installation has incorporated all of the principles and operating practices of TQM throughout much of the organization. The installation has documented substantial improvements in quality and customer satisfaction resulting from these efforts and is making consistent and continuous improvement throughout. An installation in this phase may have been recognized as a Quality Improvement Prototype Award winner or may be a recipient of the President's Award for Quality.

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