

# Innovative Improvement Driven Foundation for Denver's Transit Expansion Program

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## INTRODUCTION

The Denver Regional Transportation District (RTD) has embraced managerial performance excellence as the path to delivering the highest quality transit program with diminishing resources and increasing demands. RTD implemented innovative quality management principles on its successful T-REX project, completed in 2006, and continues to apply them today.

Most organizations want to successfully deliver new products and services to the marketplace quickly, at the lowest cost, and the highest quality. Transit agencies across the country are challenged to develop new transit capacity with fewer resources and seek solutions to their budget pressures, while still providing critical transportation service to connect people to jobs and support economic vitality. The RTD is engaged in FasTracks, a multi-billion dollar transit expansion program to build new rail and bus rapid transit in the Denver region of Colorado.

The RTD recognizes the challenge in delivering a successful transit program while maintaining service levels, balancing shrinking budgets, and managing strict timelines with less staff. In 2005 RTD implemented a systematic requirements-based quality oversight program as a basis to help FasTracks align resources and improve communication, productivity, and effectiveness to ultimately achieve its strategic goals established in the FasTracks Plan. The result was the RTD being awarded the Rocky Mountain Performance Excellence Timberline Performance Award in 2012 and is currently pursuing the Peak Performance Award, the highest state level performance excellence award. Improving the delivery of projects has translated into RTD being able to do more with less.

## FASTRACKS TRANSIT PROGRAM

Initiated after a successful public vote and in response to increasing road and highway congestion, the Regional Transportation District (RTD) FasTracks Program is a multi-billion dollar transit expansion plan to build 122 miles of new commuter rail and light rail transit lines, and 18 miles of bus rapid transit in the Denver region of Colorado. The FasTracks program consists of six new rapid transit corridors and three existing corridor extensions (see Figure 1 below): Central Corridor Extension, East Corridor, Gold Line, I-225 Corridor, North Metro Corridor, Northwest Rail Corridor, Southeast Corridor Extension, Southwest Rail Corridor Extension, US 36 BRT Corridor, West Corridor, and Denver Union Station.

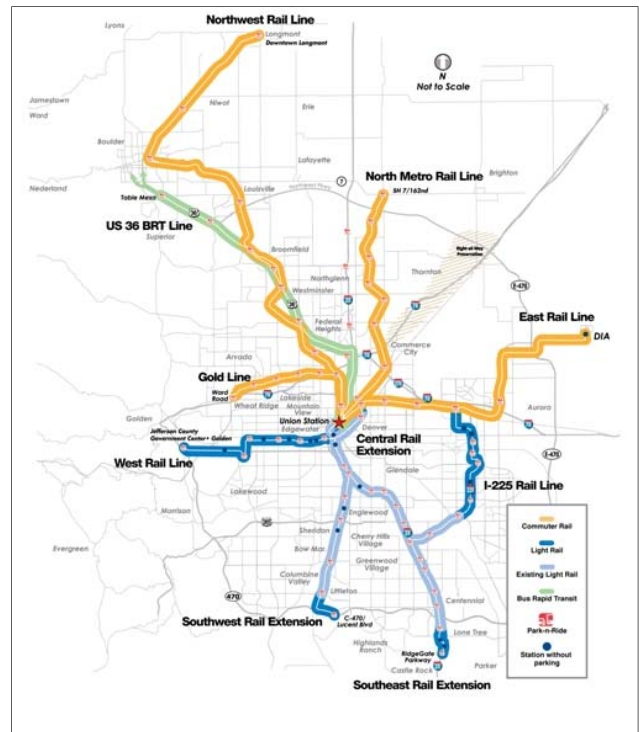


Figure 1: FasTracks Plan

The FasTracks Plan was adopted by the RTD Board in April 2004, and approved by the voters in November 2004. The RTD Board adopted three core goals for the FasTracks Plan:

1. Establish a proactive plan that balances transit needs with future regional growth
2. Increase transit mode share during peak travel times
3. Provide improved transportation choices and options to the citizens of the [Regional Transportation] District

The bulk of the design and construction work for FasTracks is being delivered by consultants and contractors using multiple delivery methods: Design-Bid-Build, Design-Build, Construction Management at Risk, and Design-Build-Operate-Maintain (DBOM), and a Public-Private Partnership.

Construction is progressing successfully for RTD's FasTracks Project with the West Corridor opening to the public in April 2013. Construction of the Denver Union Station is also advancing. The Eagle project is under construction and is being delivered under a Public-Private

Partnership called Denver Transit Partners. It is responsible for construction of the rail line to the Denver International Airport from downtown Denver, and the Gold Line which will be a light rail transit line west of downtown Denver. Denver Transit Partners are also going to construct a portion of the Northwest Rail Corridor that is shared with the Gold Line, and a commuter rail maintenance facility. Construction is also progressing for the US 36 project which is a Colorado Department of Transportation (CDOT) led project that will bring 18 miles of Bus Rapid Transit (BRT) service between Downtown Denver and Boulder along U.S. 36. The I-225 Rail Line is also currently under construction which will connect the existing Nine Mile Station on the Southeast Light Rail Line with the upcoming Peoria/Smith Station on the East Rail Line and will include eight stations. The North Metro Rail, Southeast and Southwest extensions are currently in the design phase.

## **FRAMEWORK FOR PERFORMANCE EXCELLENCE**

In the 1980s, it was recognized that the United States was losing its economic competitiveness and hegemony to other countries, especially Japan, due to these countries seemingly producing better quality products and services than the US. In response, a national dialog was started with a renewed focus and emphasis on quality management aimed at strengthening the competitiveness of the US. The goal was to improve organizational

performance practices, capabilities, and results. The Malcolm Baldrige National Quality Improvement Act of 1987 established The Baldrige National Quality Program, which was named for Malcolm Baldrige, who served as United States Secretary of Commerce during the Reagan administration. In 2010, the program's name was changed to the Baldrige Performance Excellence Program to reflect evolution in the field of quality from a focus on product, service, and customer quality to a broader, strategic focus on overall organizational quality - called performance excellence.

The Baldrige Criteria for Performance Excellence [1] provides a comprehensive framework for organizations that want to become high-performing. It is a framework that organizations can use to plan, implement, and improve their management systems. The Baldrige Criteria is a set of questions about critical aspects of management and performance of an organization such as strategic planning, leadership, customer and market focus, human resources, measurement, analysis, knowledge management, and demonstrating results. It embodies modern, validated best practices for management that have evolved over a period of time based on a holistic, systems theory for management and taking into account new perspectives and research about what it means to be a high performing organization.

Similar performance excellence enhancing and recognition programs have been developed since the institution of the Baldrige Performance Excellence criteria. In RTD's home state of Colorado, the Rocky Mountain Performance Excellence (RMPEX) (formally Colorado Performance Excellence) was established as a non-profit organization to help organizations improve performance and achieve results. "It is one of over 30 state programs that exist throughout the U.S. RMPEX is the resource that guarantees tailored, low-cost, actionable, objective feedback and consultation to organizations throughout the Rocky Mountain Region. RMPEX serves its customers and the community through its core competencies of training and education, assessment and feedback, recognition and awards, and facilitation of networking and the sharing of best practices." [2]

RMPEX is structured as a tiered offering of assessments designed to facilitate the performance excellence journey for applicants regardless of their maturity. All four tiers use the Baldrige framework and provide a written feedback report highlighting key themes, strengths, and opportunities for improvement. Organizations that want to use the Baldrige Criteria to help them improve their business performance typically begin the process by applying at the High Plains level, which requires the organization to write an organizational

profile describing their business and assessing themselves against a subset of the criteria. The second level is the Foothills level which requires the organization to describe their approach to their management systems and processes. The Timberline level is the second highest level with the Peak level being the most comprehensive including all the Baldrige Criteria. Some Peak Level organizations seek the Malcolm Baldrige National Quality Award which is the highest level of national recognition for performance excellence that a US organization can receive.

In October of 2012, a team of RMPEX examiners visited the FasTracks main office and many project offices to talk to FasTracks team members, examine records and documents, and observe activities. The purpose of the visit was to confirm and clarify statements made in the Timberline application associated with how the FasTracks organization has addressed the Baldrige Criteria for categories 1 thru 6. As a result, RTD was recognized at the Timberline award level in 2012 and is currently pursuing the Peak award. Feedback received

The Baldrige Criteria is a set of questions about seven critical categories of managing and performing as an organization:

1. Leadership
2. Strategic Planning
3. Customer focus
4. Measurement, analysis, and knowledge management
5. Workforce focus
6. Results

from the RMPEX examination team in 2012 is being incorporated into current practices. For example, feedback received from the examination team regarding lessons learned where the team did not have a formal method to institutionalize a specific lesson into current practices. As a result, the team decided to include a step in the lessons learned process whereby the method of incorporating the lessons would have to be described, the status of its implementation in the Lessons Learned database, and it would be verified as being implemented thru the auditing process. This feedback has resulting in strengthening the value of the Lessons Learned process to the FasTracks program.

## THE PURSUIT OF THE IMPROVEMENT DRIVEN TRANSIT AGENCY

RTD's systematic improvement efforts began in 2001 with the highly successful \$1.67 billion T-REX design-build project, a joint CDOT and RTD project. T-REX was completed in 2006 and included improvements along 17

miles of I-25 highway and the addition of 19 miles of new light rail transit spanning three counties and five municipalities in the area of south Denver metro. The project was the first major design-build project for both RTD and CDOT and they needed an unobtrusive way to oversee the project.

The T-REX team, with assistance from Delcan, developed and implemented an Audit Program. The Audit Program was developed based on auditing and quality management principles. The program is a unique oversight methodology in that it is focused on the contract requirements and its overall aim is to provide credible feedback primarily to the contractor, but also to other project participants as well. This enables improvements in project implementation, enhancing management outcomes. For its results the T-REX organization was awarded the RMPEX award for managerial excellence, at the Timberline level, in 2004.

In 2005, the RTD adopted a similar oversight strategy, again assisted by its consultant Delcan Corporation, for the FasTracks program and established a Quality Policy which became the guiding principles for Public Responsibility and Citizenship, Building Quality In, Measurement by Fact, RTD FasTracks Continuous Improvement, and added later in 2010, Teamwork. The Quality Policy was signed by the head of the Planning and Development Department responsible for FasTracks. The guiding principles outlined in RTD's Quality Policy provided direction to the FasTracks team to develop, implement and improve the Quality Management

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Oversight (QMO) program. This was followed by the development of the QMO program objectives, manual and procedures, and the development and tailoring of the custom software to support the efficient implementation of the QMO program. QMO is discussed in more detail in the next section.

RTD's Quality Policy was aimed at ensuring a systematic and consistent approach to overseeing all of the work comprising FasTracks to efficiently and effectively leverage the RTD's limited resources. Traditionally owners of new transit projects undergoing design and construction, staff their organization, often supplemented by consultants, to perform design reviews and inspections of construction. The Owner's team may also self perform many of the management activities themselves. However, for FasTracks to take this approach, it would require a very large staff due to the

sheer volume of work with multiple corridors being designed and constructed concurrently.

**RTD FASTRACKS QUALITY MANAGEMENT OVERSIGHT PROGRAM**

An important aspect of the Quality Policy was the direction that all consultants and contractors are responsible for developing written management plans to show how they were going to manage the work for all areas they are responsible for managing, including systems safety, environmental, worker safety, design and construction management, public information, and other management areas. Hence it was made clear in all design and construction contracts that their organization was solely responsible for managing their work, and demonstrating through the provision of records, that they were fulfilling their contractual requirements.

The QMO program is based on the International Standard ISO 9001:2008 Quality Management Systems Requirements and covers the planning, design, construction, and integration testing phases for all the projects comprising FasTracks. It is organized into four stages, planning, implementing, measuring, and improving, and their respective process areas are depicted in Figure 2. The QMO program approach is to perform oversight activities that focus attention on the management activities of contractors performing the work and evaluating and communicating overall project performance on a regular basis to provide feedback to project participants.

The QMO program is the foundation for performance excellence based on quality management principles that helps RTD to aim at high levels of managerial performance.

**BUILDING MANAGEMENT ASSETS AND LEAVING A LEGACY FOR RTD**

RTD FasTracks management system is evolving in that it is continuously improved during each project execution and each subsequent project. This results in cycles of improvement. A project specific implementation of the project management processes, including the QMO program allows RTD to store its knowledge. Every time RTD performs a project, it continuously improves its capability to manage projects.

The majority of knowledge is embodied in the individuals that form the FasTracks organization, their skills, talents, and experience. The field of Knowledge Management is a growing field of research and practice dealing with how organizational knowledge is created, shared, used, and made available to the organization as a whole for useful purposes. According to Gupta and

Sushil, “knowledge management efforts typically focus on organizational objectives such as improved performance, competitive advantage, innovation, the sharing of lessons learned, integration and continuous improvement of the organization.” [3] The framework that RTD is using has a value that is often overlooked in organizations, that is the value of good management practices.

FasTracks is certainly going to leave tangible assets - the transit infrastructure that will benefit the region, a legacy for future generations. Just as important, it is leaving a strong set of management best practices, an intangible asset for RTD that will be beneficial after FasTracks is complete. Many of the practices can be applied to other parts of the RTD organization, including rail and bus operations. The practices should be used for future capital programs, enhancements and upgrades to existing infrastructure.

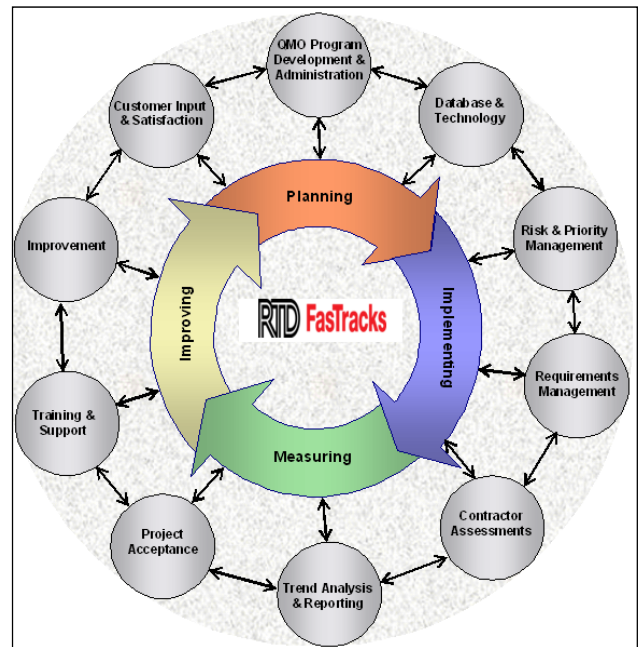


Figure 2: FasTracks QMO Process Areas

**LINKING STRATEGY TO IMPLEMENTATION**

The RTD Board’s vision for FasTracks was captured in the FasTracks Plan, approved by the RTD Board of Directors and General Manager on April 22, 2004. This Plan was born out of a regional effort to meet the growing transportation needs within the Denver metropolitan area. The FasTracks Plan includes three core goals described in the FasTracks Transit Program section above which provided for a foundation to deliver the FasTracks program. RTD has refined and updated its strategy during

the course of the planning, design and construction of FasTracks since 2005 primary to accommodate budget challenges.

By using the Baldrige Criteria as a framework for management, RTD is identifying and strengthening linkages affecting the strategic and other supporting goals. The FasTracks Plan describes the transit infrastructure promised to be delivered to the Legislature, the Governor, elected officials and the general public. Using the Baldrige Criteria RTD continuously assesses itself in areas such as strategy, defining its strategic planning process; identifying strategic objectives; and describing how its strategy is manifested in action plans. For leadership, RTD described how its senior leaders guide, sustain, and govern FasTracks; how legal and ethical behavior is promoted; and how RTD fulfills its societal responsibilities. The criteria encourages RTD to analyze and examine all the areas which are generally recognized as good management practices and to manage to achieve the organization's overall strategic goals. An important aspect of the criteria is for the RTD to be able to implement its strategy and know its status throughout FasTracks implementation.

The Baldrige Criteria for Results, found in category 7, requires that an organization summarize its performance and improvement results in all key areas. For this category, the RTD recorded its business results for areas such as what customers' think about the RTD's products and services, overall financial and market performance, leadership system and social responsibility, and results of all key processes and process improvement activities. This exercise provides a dashboard of information about how well the RTD is meeting the needs of its customers and its progress toward its overall strategy. This is the final category required to move from the RMPEX Timberline level award to the Peak award level. Peter Drucker, a famous American management theorist once said, "What gets measured, gets managed." [4] This Results category supports the notion that in order to improve and get closer to the RTD's goals, it must collect meaningful performance data, analyze the data, and take action to align its operations with strategy - a management function.

Project participants want to know the status of the work throughout project implementation. Certainly information about costs, schedule performance, and improvement of costs and schedule are very important and are readily available. RTD continuously measures, monitors, and updates its cost and schedule performance for FasTracks projects. Obtaining measures and depicting trends in some of the other areas of performance are more challenging. For areas associated with trends in quality

management, performance of contractors, and measures of internal process improvement, the team is able to measure and show how well the QMO program is achieving its objectives and providing value to FasTracks. Thus, the results from the QMO program show trends in performance associated with a main function of the FasTracks team, which is, effectively overseeing the work and making sure work is performed in accordance with the requirements of respective contracts.

As an example of how the QMO is used to help measure the performance of the contractor is called Priority Planning which is a process that prioritizes oversight efforts based on risk and past performance to establish the scope of oversight activities to be performed by the RTD FasTracks team and to provide adequate confidence that constructed facilities meet RTD's requirements prior to contractual acceptance. Priority Planning assists in allocating design and construction review resources to areas of highest risk. These areas include portions of the design and construction that are more likely to be in non-conformance with the requirements based on previous experience, and areas where any non-conformance is likely to result in a greater consequence to schedule, cost, safety, security and/or quality. The plan is updated on a regular basis if changes in risk have been identified. The process allows the focusing of future oversight efforts on areas needing improvement. Implementing of Priority Planning results in a reduction in the amount of staff that would otherwise be needed using a traditional approach to oversight.

Another example of measurement of quality is the initiation of the Quality of Life study in 2005. Stakeholders (particularly the Legislature and the Governor) and the general public want to know if a large transit program is accomplishing or has accomplished its macro objectives which are increasingly being associated with quality of life measures. According to the American Public Transportation Association, "Public transportation in the United States is a crucial part of the solution to the nation's economic, energy, and environmental challenges - helping to bring a better quality of life. In increasing numbers, people are using public transportation and local communities are expanding public transit services. Every segment of American society - individuals, families, communities, and businesses - benefits from public transportation". (APTA Website) The Quality of Life study (QoL) identifies, tracks and measures how the FasTracks Plan is achieving its goals. More broadly, the study is identifying and quantifying FasTracks' effects on the region. These QoL measures environmental, socio-economic, land development and usage, and ridership patterns. These measures demonstrate how the region is changing as the transit corridors are planned, designed,

constructed and opened for service. The QoL also collects “before and after” measurements required by the Federal Transit Administration (FTA) for those rapid transit corridors receiving federal New Starts funds. The QoL provides information to the customers of FasTracks, the general public, and also allows for research to be performed by determining the value that transit systems provide to local and regional communities.

## **CONCLUSIONS AND FUTURE OPPORTUNITIES**

All enterprises want to improve their ability to deliver results, whether it is a sports team, non-profit engaged in humanitarian missions, or a transit agency that has mission to develop and operate a transit system for the use by the general public. Striving for performance excellence in a systematic way can reap many benefits. RTD’s employs QMO as its implementation of the Quality Management Performance Measurement System. RTD has applied the Baldrige Criteria successfully in that has progressed through levels of performance excellence as measured by RMPEX Timberline Level award.

In the case of RTD, the people living in the district pay local taxes to fund RTD’s operations and federal and state taxes are used to fund grants to build new transit facilities. Each of these stakeholders expects their money to be used wisely and effectively. Clearly then, the ultimate beneficiaries of RTD’s success are the general public, the ultimate end-users of the transit system. By RTD focusing its efforts on trying to do the best job possible by employing the Baldrige Criteria the travelling public will benefit from the transit system for many years to come. RTD is developing custom software tools to enable good management processes, asking for feedback from its peers, using innovative procurement methods, and many other activities to better manage the FasTracks program, Based on the positive results achieved by RTD the constituents will recognize not only the value of their investments, but also RTD’s trustworthy stewardship of the projects, making it that much likely that RTD can continue to deliver value well into the future.

RTD has the opportunity to apply its quality-based management program to establish an asset management framework for all phases of an asset, including operations and maintenance, thus realizing the promise of asset management by adding value, decreasing overall costs well into the future. Many of the tools and techniques RTD uses in the QMO can be easily adopted to support condition assessments, inventory management, performance analysis and modeling.

In conclusion, many organizations are trying to find ways to increase their ability to be successful in an

environment of shrinking budgets, growing demands for transparency and accountability, in an increasingly difficult regulatory environment. By adopting a QMO program, a transit agency can develop a management framework to link actions to strategy which will enable it to realize its strategic objectives and create value for its customers, stakeholders and the traveling public. Other agencies can benefit from RTD’s experience for their performance excellence journey.

## **REFERENCES**

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