



# COLORADO TRANSPORTATION SYSTEM PERFORMANCE REPORT



**SAFETY**  
**SYSTEM QUALITY**  
**MOBILITY**  
**PROGRAM DELIVERY**

Annual Report  
**2006**





# 2006 Annual Report

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## MISSION

The mission of the Colorado Department of Transportation is to provide the best multimodal transportation system for Colorado that most effectively moves people, goods and information.

## VISION

To enhance the quality of life and the environment of the citizens of Colorado by creating an integrated transportation system that focuses on moving people and goods by offering convenient linkages among modal choices.

## VALUES

CDOT values people, respect, integrity, customer service and excellence.

**Russell George**  
Colorado Department of Transportation  
Executive Director

**Jennifer Finch**  
Division of Transportation Development  
Division Director

## EXECUTIVE SUMMARY

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The purpose of the 2006 Annual Transportation System Performance Report is to provide information on the Colorado Department of Transportation's (CDOT) performance and progress toward meeting the transportation system performance goals and objectives of the state Transportation Commission.

CDOT continues to encounter challenges as it strives to meet the state's increasing need for services while also providing a safe and well maintained transportation system. These challenges are compounded by Colorado's recent economic situation that has resulted in fewer revenues available to the Department to provide these services and preserve the infrastructure. As the information in this report will substantiate, many of the goals of the Department are currently being met, although current revenue forecasts when combined with increased demand and significant cost increases, indicate that in the near future performance of the state highway system will experience significant deterioration.

Vitally important to CDOT is the continued input from our customers and the desire and commitment to meet their needs. Customer service measures are also highlighted in this report, and are obtained from the Statewide Customer Survey. The survey is administered every three years and asks Colorado residents' their opinions about the services provided by the Department and other transportation-related issues in Colorado. The data collected from the survey also helps the Transportation Commission and Department determine the priorities and learn more about travel behavior and characteristics of the state's citizens. The 2006 survey marks the fourth time the survey has been conducted.

In 2006, transportation issues dropped to fifth as the most important problem facing the state of Colorado following "education", "the economy", "taxes/government spending" and "growth/urban sprawl" respectively. When asked specifically about transportation issues, traffic congestion (27%) was cited as the biggest concern, followed by public transportation (20%), and road maintenance/repair (12%)., although it is important to note that transportation priorities vary by

### CDOT PERFORMANCE MANAGEMENT STRUCTURE

The Colorado Department of Transportation (CDOT) is committed to delivering services, programs and projects effectively while continuing to improve our efficiency and accountability. To help the Department maintain its focus on the service and quality of products we provide to the traveling public, Investment Level goals, objectives and measures have been developed. By aligning allocation of resources and work activities to support these goals and objectives, all CDOT Divisions and Regions play a role in achieving our mission: "To provide the best multi-modal transportation system for Colorado that most effectively moves people, goods and information." The department reports data and reviews progress on these performance measures to the Transportation Commission as part of its long range planning, programming and budget development process as well as reporting to the Colorado Legislature as part of its annual budget request.

geographic region, with congestion being of greatest concern along the Front Range and rapidly developing areas of the state, and system quality being of prime importance in some of the more rural parts of the state.

CDOT's Annual Transportation System Performance is summarized below by the four investment categories — System Quality, Mobility, Safety, and Program Delivery. In an effort to avoid duplication, "Strategic Projects", (identified as a fifth category in previous reports) has been integrated into the remaining four categories since they affect the performance of those investment categories. In addition, the Transportation Commission has approved some revisions to investment goals, objectives and measures that will be reflected in the 2007 Annual Report.



The Transportation Commission has put a high priority on maintaining existing infrastructure the last several years. Despite this emphasis,

future infrastructure condition indications are alarming, based on projected funding, increased costs, increases in population, and the age of the system. Some notable performance trends include:

- For the third consecutive year, the Department’s Statewide goal of 60% good/fair pavement condition was met. However, to maintain this level of service, funding for resurfacing and reconstruction will need to increase from the current \$151 million/year to \$300 million/year for the next fifteen years
- The On-System bridge good or fair condition based on percent of total bridge deck area has declined (96.80% good or fair in FY 2005 to 94.81% good or fair in FY 2006). The major portion of the decline is due to the condition of the I-70 Viaduct east of I-25 changing from fair to a poor condition. To maintain current condition levels, funding will need to increase to \$143 million per year. To eliminate the backlog of poor bridges in the next twenty years, funding will need to increase to \$187 million dollars per year for the next twenty years. Current funding is \$27 million per year for the bridge program. Funding from other capital construction sources are also used to replace bridges (e.g. bridges were replaced on the TREX project).
- Six out of the nine Maintenance Program Areas (MPA) met or exceeded their 2006 target, including Roadway Surface, Roadside Facilities, Structures, Snow and Ice, Planning and Scheduling and Roadside Appearance, while the other three MPAs, Traffic Services, Equipment, Buildings and Grounds, and Tunnels, did not meet the targeted performance rating.



Despite population growth in already congested areas and along the fringe of the Front Range as well as the significant growth along the

I70 corridor and other areas on the West Slope, traffic congestion has decreased over the past three years. This decrease has been primarily due to a combination of moderated growth in travel and expansion of some key

corridors along the Front Range. Mobility encompasses investments made improve accessibility of the transportation system, transportation options, connectivity, travel time variability and overall infrastructure management. The effort to illustrate statewide congestion relief performance, which is a component of mobility, led to the decision to measure congestion by the growth in vehicle miles traveled (VMT) and volume to capacity (V/C) ratio as well as the recent addition of average daily delay in congested corridors.

Notable 2006 mobility performance trends include:

- Vehicle miles of travel have increased from 27.4 to 28.5 billion from 2005 to 2006.
- Vehicle miles of travel in congested conditions and congested lanes miles of state highway have decreased slightly over the past three years.
- According to the 2006 Customer Survey, as a statewide average, traffic congestion was reported as the biggest transportation related problem in Colorado.



Providing a safe and secure transportation system to the traveling public is of prime importance to CDOT. As such,

CDOT implements numerous programs to improve the safety of its transportation system. Notable performance trends include:

- 2004 statewide crash rate declined to 293.6 from 299.3 in 2003
- 2004 statewide injury rate declined to 70.1 from 73.9 in 2003
- 2004 statewide fatal crash rate of 1.15 fatalities per 100 million VMT remains 0.31 below the national average of 1.46 fatalities per 100 million VMT
- Despite continued driver behavior education and awareness programs, statewide alcohol-related fatal crash rate increased from 37.3% in 2004 to 38.1% in 2005 however, seat belt usage did increase slightly from 79.2% in 2004 to 80.3% in 2005.



The Strategic Projects Investment Category was established to accelerate the funding and development of high priority

transportation projects throughout Colorado. Twenty-eight specific projects were selected for this program based on their statewide importance, overall visibility, cost and return on investment of the project in addressing on-going needs of safety, mobility, and reconstruction.

Due to the decline in Colorado's economy and available transportation revenues, progress made towards completing the twenty eight high priority projects has slowed. Seventeen of the original 28 projects have been completed, with eleven projects remaining to be completed as funding becomes available. Current estimates of revenue, debt service, and project costs indicate that these 28 projects will be completed in approximately 17 years.

Since all strategic projects impact system performance in the areas of safety, system quality, or mobility, in the future Strategic Projects are being incorporated as a key program area within each individual investment category and will cease to be an independent investment category, though progress on their completion will continue to be monitored and reported.



The Program Delivery Investment Category consists of activities that support the delivery of CDOT's programs and projects. Program

Delivery goals and objectives focus on program support functions such as engineering and construction supervision as well as other support functions such as policy analysis, public information, accounting and human resources. Notable performance trends include:

- CDOT's employee turnover rate increased to 12.7% from an FY 2005 level of 9.9%
- In FY2006, 24.78% of projects' ad-dates were met prior to or on the scheduled ad-date. This is an on-time ad-date performance decrease of 46% from FY2005 to FY2006. However, projects delivered within 30 days and within 60 days of scheduled ad dates increased to 44.25% and 53.10% respectively. Projects delivered beyond the 60-day scheduled ad-date timeline decreased from 27.1% to 10.6% in 2006.

## INTRODUCTION

The Colorado Department of Transportation (CDOT) is responsible for construction, maintenance and operations, and planning efforts that reach across many modes of transportation. This annual Transportation System Performance Report presents measures that CDOT is using to evaluate the condition of the transportation system, delivery of our transportation services, programs and projects and to assess progress made towards our Department's mission and vision with a focus on the state highway system.

### CDOT's Investment Strategy Framework

The Transportation Commission developed the Investment Strategy Framework to provide a better opportunity to use resources more effectively and efficiently. There are several key components of the framework that enable the alignment of CDOT's work activities to its organizational priorities as established by the Transportation Commission. The goal is, in effect, to align the "top" with the "bottom" and the "bottom" with the "top."

The purpose of the framework is to assist CDOT in establishing priorities, assure that these priorities are being implemented, resulting in better service for the traveling public and improved accountability to the general public. A strategic framework (i.e., strategic plan) must be flexible and practical and yet serve as a guide to implementing programs, evaluating how these programs are doing, and making adjustments when necessary. As such there is a review of goals, objectives and system performance as part of the long range planning process and the annual budget process.

A key to successful strategic planning is having performance measures that give accurate and timely information. The ultimate aim of implementing a measurement system is to improve the organizational performance of CDOT resulting in an improvement in system performance. CDOT intends to use performance measures to continually evaluate progress towards accomplishing its goals and objectives, by determining where improvements can be made in its process, and readjusting work activities accordingly.

The Commission has identified the following four major business functions, called investment categories:

- ✿ **Safety** – Services, programs and projects that reduce fatalities, injuries and property damage for all users and providers of the system.
- ✿ **System Quality** – Activities, programs and projects that maintain the physical (integrity/condition) function and aesthetics of the existing transportation infrastructure.
- ✿ **Mobility** – Programs, services and projects that enhance the movement of people, goods and information.
- ✿ **Program Delivery** – Functions that enable the successful delivery of CDOT's programs, projects and services.

Originally a fifth investment category was defined as Strategic Projects. Since all strategic projects impact system performance in the areas of safety, system quality, or mobility, Strategic Projects is now being identified as a key program area that spans all investment categories.

Each investment category has specific performance objectives and associated measures that provide the foundation for discussion on how to best invest available funds. Performance measures provide tools to relate the expenditures and work results to the policies, priorities, and goals of the Department as determined by the Transportation Commission. Performance measures are utilized on an annual basis as well as on a long range plan basis to relate expenditures and work results to the desired performance objectives (i.e., the desired end-result) for the State Highway system.

As part of the statewide transportation planning process the Transportation Commission sets long range policy direction, and allocates resources by program area to one of four Investment Categories: Safety, System Quality, Mobility and Program Delivery, as well as to the Strategic Projects Program.

In support of these Investment Categories, the CDOT Executive Management Team identified four Core Service business processes:

- **Snow and Ice Management** – All services and maintenance activities to keep the road open for the winter season including post-event operations and the reopening of closed roads.
- **Project Delivery** – All activities for the delivery of a transportation project from planning to construction management.
- **System Operations** – All traveler information and traffic-related activities including tunnel operations and emergency/incident.
- **Roadside Management** – All roadside (from curb-line [roadway edge] to edge of ROW) including rest areas and other off-road facilities.
- **Roadway Management** – All physical elements of roadway, tunnel, and bridge maintenance activities from roadway edge to roadway edge.

An Action Plan has been developed for each of the Core Services. The Action Plans identify strategies (i.e., what activities are needed to achieve the goals and objectives) and measures to assist CDOT regions, divisions and offices to align their activities to support CDOT's goals established by the Transportation Commission. The investment objectives are influenced by the allocation (appropriation) of funding by program and investment category. The Action Plan teams will have an ongoing role in monitoring progress toward achieving these goals and objectives.

The next step has been to develop Work Program Plans (WPPs) which implement the Action Plans. These are organization-specific tasks that are identified to align day-to-day work to CDOT's priorities in order to accomplish CDOT's goals and objectives.

## **Roles/Responsibilities**

### **The Transportation Commission:**

- Approves the vision statement, mission statement, and investment category goals and objectives, policies and priorities.
- Approves the Statewide Transportation Plan. (A 20 year+ long range plan)
- Approves the State Transportation Improvement Program. (A 6 year capital investment program)

- Approves the annual budget.

### **The CDOT Executive Management Team:**

- Identifies Core Services that define CDOT critical business processes.
- Approves the Action Plans that identify strategies and performance measures that support accomplishment of identified investment goals and objectives.

**Action Plan Teams** (consisting of a team of relevant CDOT staff)

- Prepare, for EMT approval, Action Plans that identify strategies and performance measures to support the accomplishment of the goals and objectives.

**Discussion:** Some of the management systems that provide data have gone through modifications and refinements adding to the need for prudence in data comparisons and analyses. The relationship between investment and outcome is less direct in some programs than in others. For example there is a relatively strong relationship between pavement investment and the Remaining Service Life [RSL] performance, while the relationship between safety behavioral investments related to seatbelt usage performance is less strong.

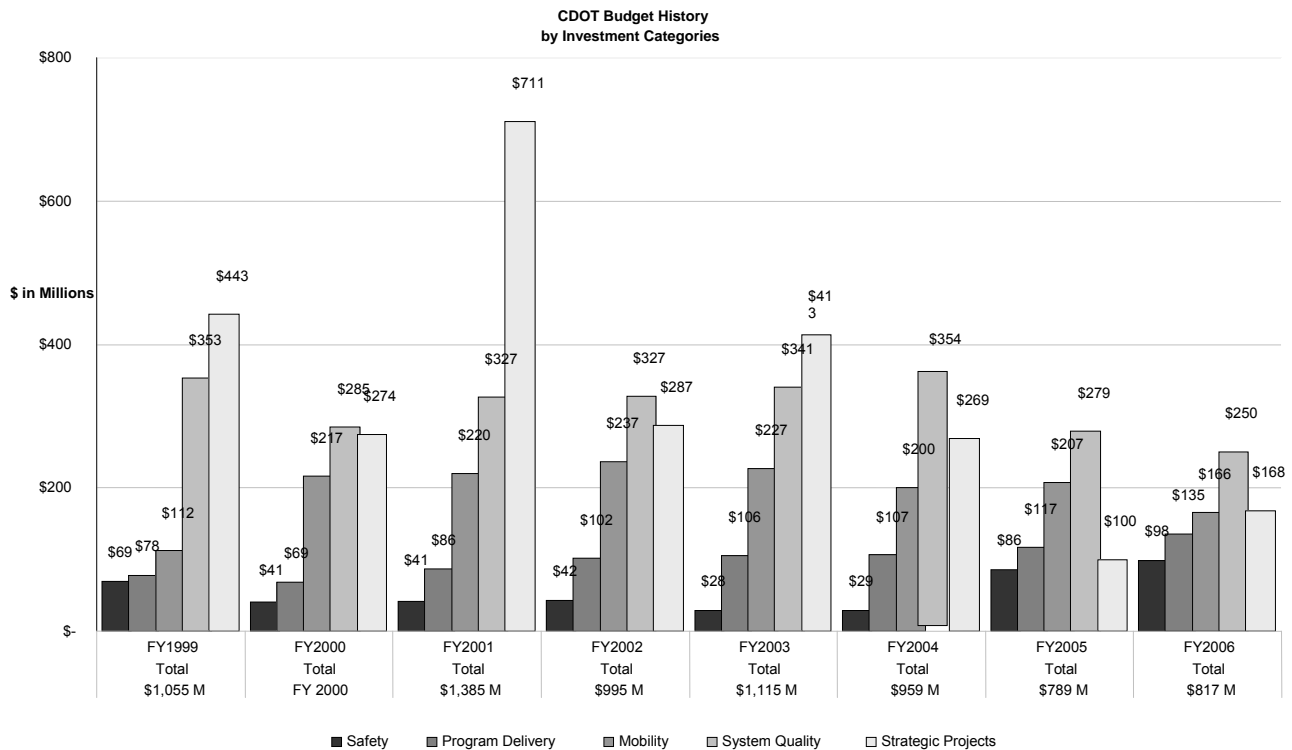
Analyzing the numerous performance indicators each fiscal year can give an indication of the state of the system and the change from year to year. However, care must be taken not to conclude that there was more or less of an emphasis or result in any of the investment categories based only on one or two performance indicators. In order to get a complete picture of results associated with specific investments in the transportation system, a full analysis must be completed on the total budget dollars available, current expenditures, the need in each category, previous years' expenditures, customer expectations, other outside factors and current performance indicators.



## Investments in the Transportation System

The graph below depicts CDOT's Investment Category budgets by year. Historically, CDOT utilized a resource allocation system linked to the five Investment Categories, allocated according to priorities established by the Transportation Commission as well as constraints associated with less discretionary sources of funds, primarily from the federal government.

In 2006, the Strategic Projects Investment Category will be integrated into the remaining four Investment Categories, since these projects affect performance in those investment categories.



The **Safety** and **System Quality** changes in funding for FY 2005 and FY 2006 are primarily due to a re-categorization of funding with the maintenance program's traffic services, which was shifted from the System Quality Investment Category to the Safety Investment Category.

The **Mobility** investment decreased from \$211 million in FY 2005 to \$166 million in FY 2006. The 21% change in funding is primarily due to the increased emphasis by the Transportation Commission on system quality.

**Strategic Projects** investment category funding sources include Transportation Revenue Anticipation Notes

(TRANS), S.B. 97-001 funds and federal funds. TRANS is a financing mechanism that allows the Department to issue bonds to accelerate projects today and use future federal and state revenues to pay back bondholders over time. S.B. 97-001 is a measure adopted by the legislature in 1997 that transfers 10% of the sales and use tax on automobiles and automobile related parts to CDOT for the construction of a specific list of high priority projects. The \$200 million decline in the Strategic Projects Investment Category from FY 2002 to FY 2003 was due to the loss of S.B. 97-001 funds. The FY 2006 funding includes the annual debt service of \$168M.

In FY 2006, **Program Delivery** funds increase to \$135 million from \$117 million allocated in FY2005. It is important to note that a portion of Program Delivery is actually the Transportation Commission Contingency Reserve Fund used for unforeseen purposes that arise during the fiscal year. In the event there are few emergencies, the fund is available for funding projects. This increase was largely due to an increase in the contingency fund as directed by the Transportation Commission from 1-2% to the current 5%.

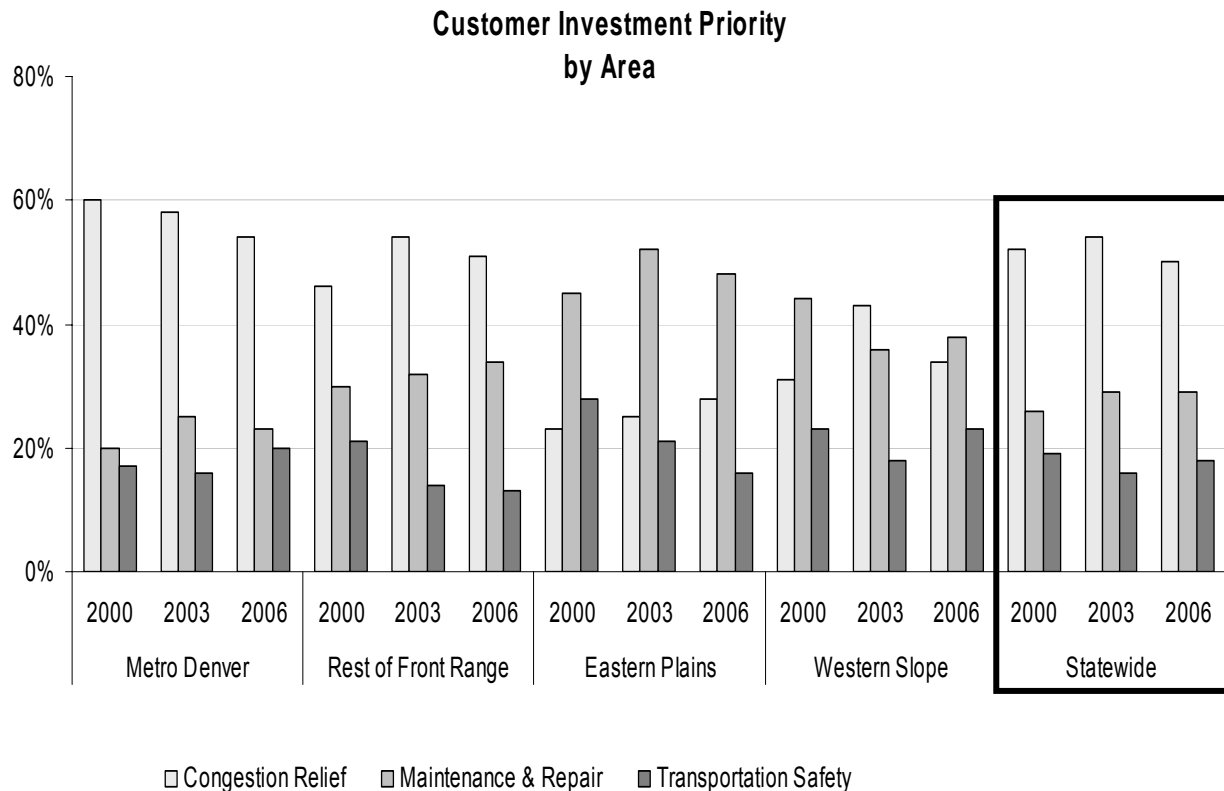
**Customer Perception**

Vitally important to CDOT is the continued input from our customers and the desire and commitment to meet their expectations. One instrument to obtain input is the Statewide Customer Survey. The first survey was

conducted in 1994 with a follow-up survey in 2000, 2003 and 2006.

This information is collected statewide and in four different geographical areas (Metropolitan Denver, Rest of Front Range, Eastern Plains, and Western Slope) as it was in the 1994, 2000 and 2003 surveys.

In addition to geographical areas, the 2003 and 2006 customer survey data are also provided by the six Engineering Regions and fifteen Transportation Planning Regions (TPR). The survey data is also a valuable tool for utilization in the statewide planning process. The Department’s objective is to conduct a statewide survey on a recurring basis to obtain valuable customer perception data to supplement other data and to guide transportation investments.



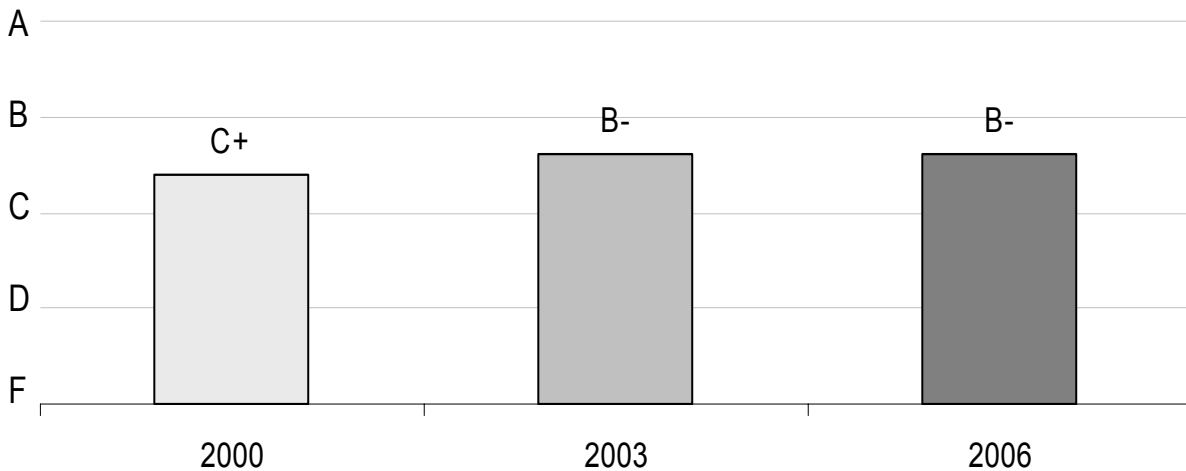
In the 2000 survey, the respondents ranked transportation as the second most important problem facing Colorado with growth/sprawl being number one on their list. Noteworthy is that transportation dropped to a tie along with growth/sprawl for fourth in the 2003 survey and dropped again to fifth in the 2006 survey following “education”, “the economy”, “taxes/government spending” and “growth/urban sprawl” respectively.

The previous two customer surveys typify the priority investment areas preferred by the general public. The statewide public’s preference in investment continues to be congestion relief (Mobility). However, priorities do

differ by geographic region. Safety, in the minds of the transportation user, has been ranked as the lowest priority in the 2000, 2003 and 2006 surveys.

Also quantified in the 2006 Statewide Survey is the customer perception of CDOT’s performance. The results from the 2006 Statewide Customer Survey rated “congestion”, “maintenance and repair of the transportation system”, and “transportation safety” respectively, as high priorities. CDOT’s overall performance was graded at “B minus”, the same grade as in the 2003 survey and an increase from “C plus” in the 2000 survey.

**Statewide Average Rating of CDOT Services**





Motor vehicle crashes are among the leading causes of injury death and hospitalization in Colorado. Each year more than 700 Coloradans are killed and nearly 4,400 are hospitalized for injuries sustained in a motor vehicle crash.<sup>1</sup>

A variety of projects and programs within the Department are directly involved in working to improve the safety of the transportation system. The Safety Investment Category is funded in two key program areas, *Roadway Safety Characteristics* which is measured by total crash rate, injury rate and fatality rate; and *Driving Behaviors* which is measured by alcohol related fatality rate and seatbelt usage.

Much of the success of these program areas is due to the passage of traffic safety legislation, such as the .08 BAC (Blood Alcohol Content) legislation and Open Container law passed in 2004 and 2005; continued success of grass roots organizations such as Mothers Against Drunk Driving; public education programs that raise the awareness of the public to the risks of driving and responsibilities as drivers; and federal highway safety programs that address driver behavior, roadway environments and vehicle standards.

The most serious highway safety problems in Colorado continue to be impaired driving, lack of occupant protection devices (i.e., seat belts and car seats) being used, younger drivers and aggressive driving.<sup>2</sup> Although monitoring total crashes helps to determine the magnitude of problems in the safety category, differentiating between types of crashes, those that are roadway characteristics versus driver behavioral (alcohol-related fatal and seat belt usage) can help determine the specific problem area. The monitoring and investments in these programs are aimed at decreasing the number of these types of crashes with the ultimate

<sup>1</sup> Injury in Colorado, Colorado Department of Public Health and Environment, August 2005.

<sup>2</sup> Colorado Integrated Safety Plan 2006-2008

## Performance Measures by Investment Category

goal to save lives, prevent injuries and minimize the associated economic and social impacts.

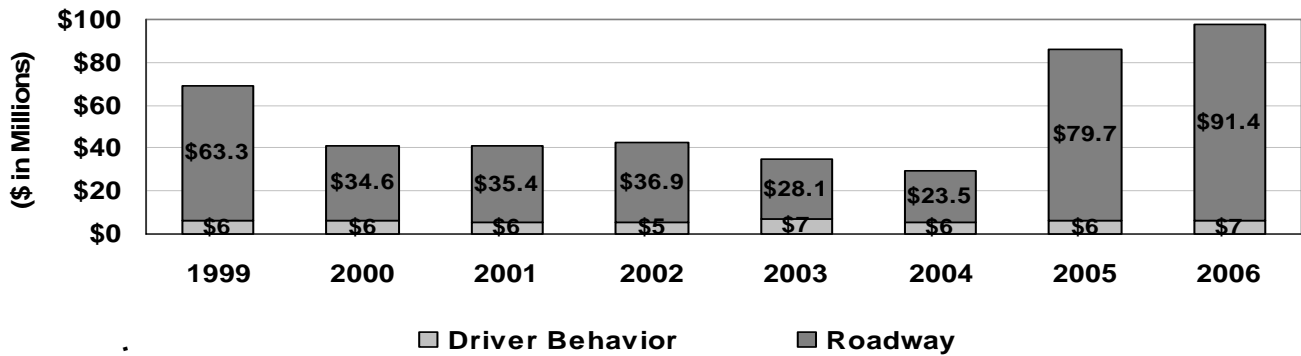
CDOT budgeted nearly \$98 million to safety related programs and projects in FY2006, much of which was distributed statewide through grants. The significant increase in funding for safety in 2005 and 2006 resulted from a shift of roadway striping funds from the System Quality to the Safety investment category.

### Costs of Motor Vehicle Injuries

The calculable costs of motor-vehicle crashes are wage and productivity losses, medical expenses, administrative expenses, motor vehicle damage, and employers' uninsured costs totaled over \$1 billion in 2005. The costs of all these items for each death (not each fatal crash), injury (not each injury crash), and property damage crash were:

<b>Average Economic Cost per Death, Injury, or Crash, 2005</b>	
Death	\$1,150,000
Nonfatal Disabling Injury	\$52,900
Property Damage Crash (including nondisabling injuries)	\$7,500

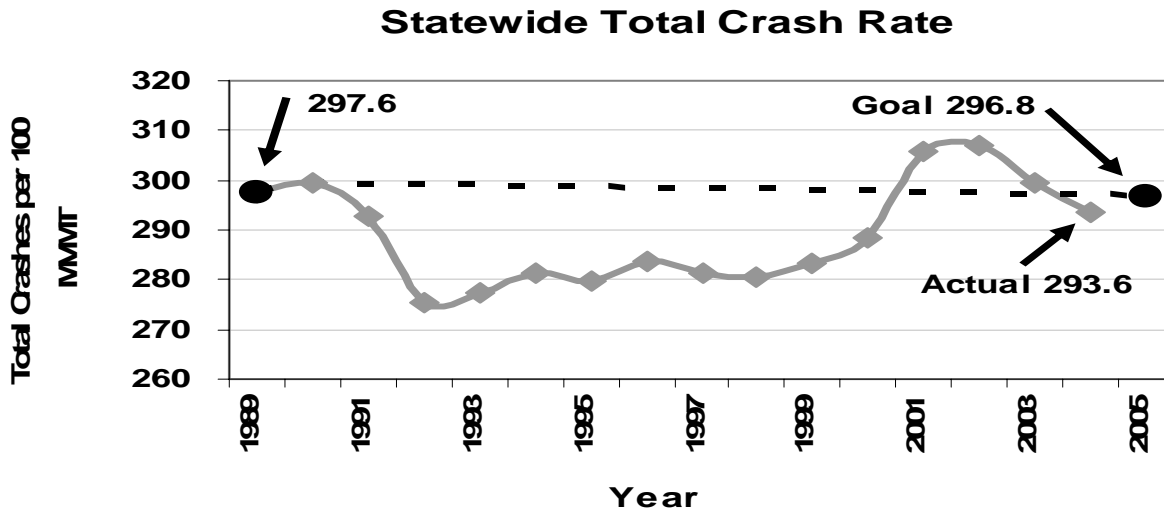
### Safety Investments by Program



The trend during the past three years shows a decrease in the **total crash rate**. In FY 2004, the crash rate was 293.6 per million vehicle miles traveled (MVMT). However, the total crash rate is forecasted to increase to

307.5 crashes by 2008 and to 311.8 by 2010, which is substantially higher than the Department's 2008 goal of 202.0 and 2010 goal of 289.7 due to anticipated increase in vehicle miles of travel.

**Statewide Total Crash Rate**  
Crashes per 100 million vehicle miles traveled (MVMT)



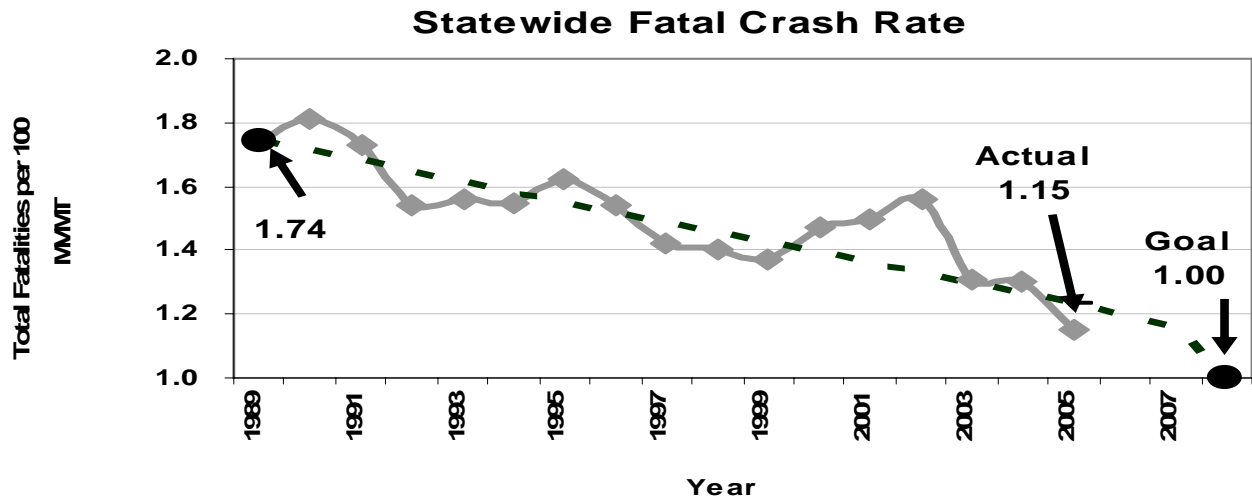
Motor vehicle crash **fatalities** account for approximately twenty-six percent of all injury death in Colorado. An average of 716 Coloradans die each year in motor vehicle crashes.<sup>3</sup> The fatality rate has been varying from year to year with an overall downward trend with the goal to reduce the statewide fatal crash rate to 1.00 by 2008. Similar to the crash rate, the fatality rate started to

climb in 2000, but made a major reversal in 2003 and continues to decrease to 1.15 in 2005. The FY 2006 fatal crash rate is an all time low and below the national average of 1.46.<sup>4</sup> This measure indicates the success of CDOT's safety programs and projects in reducing fatalities as well as improved safety features in vehicles.

<sup>3</sup> Injury in Colorado, Colorado Department of Public Health and Environment, August 2005.

<sup>4</sup> Traffic Safety Facts, NHTSA's National Center for Statistics and Analysis, 2004

**Statewide Fatal Crash Rate**  
Fatalities per 100 million vehicle miles traveled (MVMT)



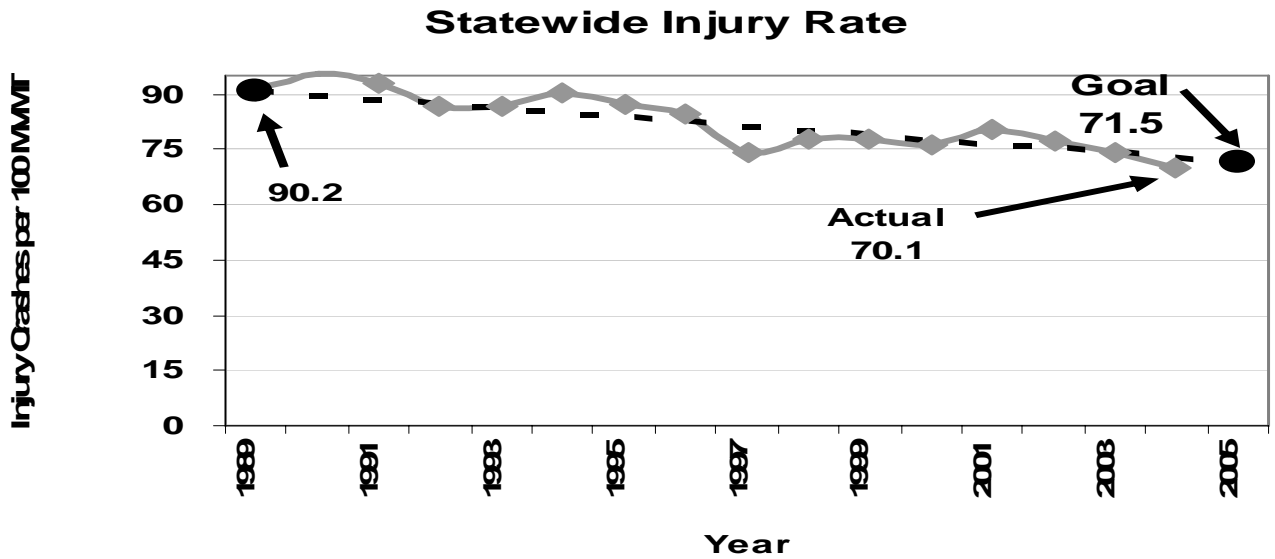
Motor vehicle crashes are the second leading cause of **injury** hospitalizations in Colorado, with the highest rate being among young adults ages 15-24.<sup>5</sup> The 2004 statewide injury crash rate of 70.1 has improved since the 1981 high of 126.2 per 100 MVMT and is well below the national average of 100 per 100 MVMT. Nevertheless, the rate had increased to slightly over 80 in 2001 from a low of 74.1 in 1997 before heading in a downward trend to an all time low in 2004.

According to forecasts, CDOT is well on our way to reaching our 2010 goal of reducing injury crashes to 65.3 and data suggest that highway improvement

projects combined with safety programs directly affects both crashes that result in fatalities and injuries. However, safety performance measure data is the perfect example of “no performance measure stands alone” rule when using data to support decisions. The recent rise in statewide alcohol-related fatal crash rate implies that the infrastructure investments alone are not sufficient to have an impact on safety and other statewide safety rates must be assessed along with the alcohol-related fatal rate prior to making decisions on investments in the Safety Investment Category.

<sup>5</sup> Injury in Colorado, Colorado Department of Public Health and Environment, August 2005.

**Statewide Injury Rate**  
 Injury crashes per 100 million vehicle miles traveled  
 (MVMT)



The percent of **alcohol-related fatal** crashes declined significantly from 1989 to 2005. In 1989, alcohol was involved in forty percent of the fatal crashes in Colorado. By 2005, the percent of alcohol-related fatal crashes dropped to 38.1%, which remains below the national average of 39%. Factors attributing to alcohol-

related fatal crashes include driver demographics, degree of urbanization and type of vehicle. In addition to the passage of the .08 BAC law, statewide programs targeting these specific factors is expected to have further impact on alcohol-related fatal crashes.

**Statewide Alcohol-Related Fatal Crashes as a Percentage of all Fatal Crashes**  
 Fatalities per 100 million vehicle miles traveled (MVMT)

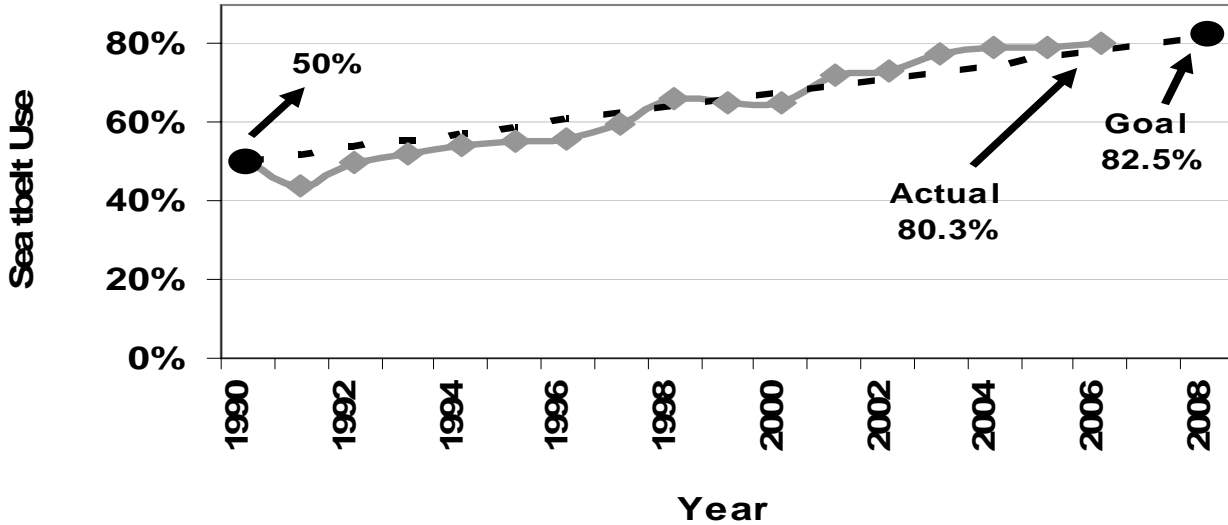


## Statewide Seat Belt Usage

Seat belts are the most effective means of reducing fatalities and serious injuries. In 2004, it is estimated that safety belts saved 15,434 lives nation-wide and billions of dollars in medical care, lost productivity, and other injury-related costs.<sup>6</sup> CDOT funds education and enforcement activities that aim to increase safety belt

usage, as a result, seat belt usage in Colorado has increased substantially from 50% in 1990 to 80.3% in 2006. The 2008 and 2010 goal of 82.5% and 85% is slightly higher than what is expected if past trends continue. Current efforts should be continued or enhanced in order to achieve this goal.

### Statewide Seat belt Usage



<sup>6</sup> Traffic Safety Facts, NHTSA's National Center for Statistics and Analysis, 2004



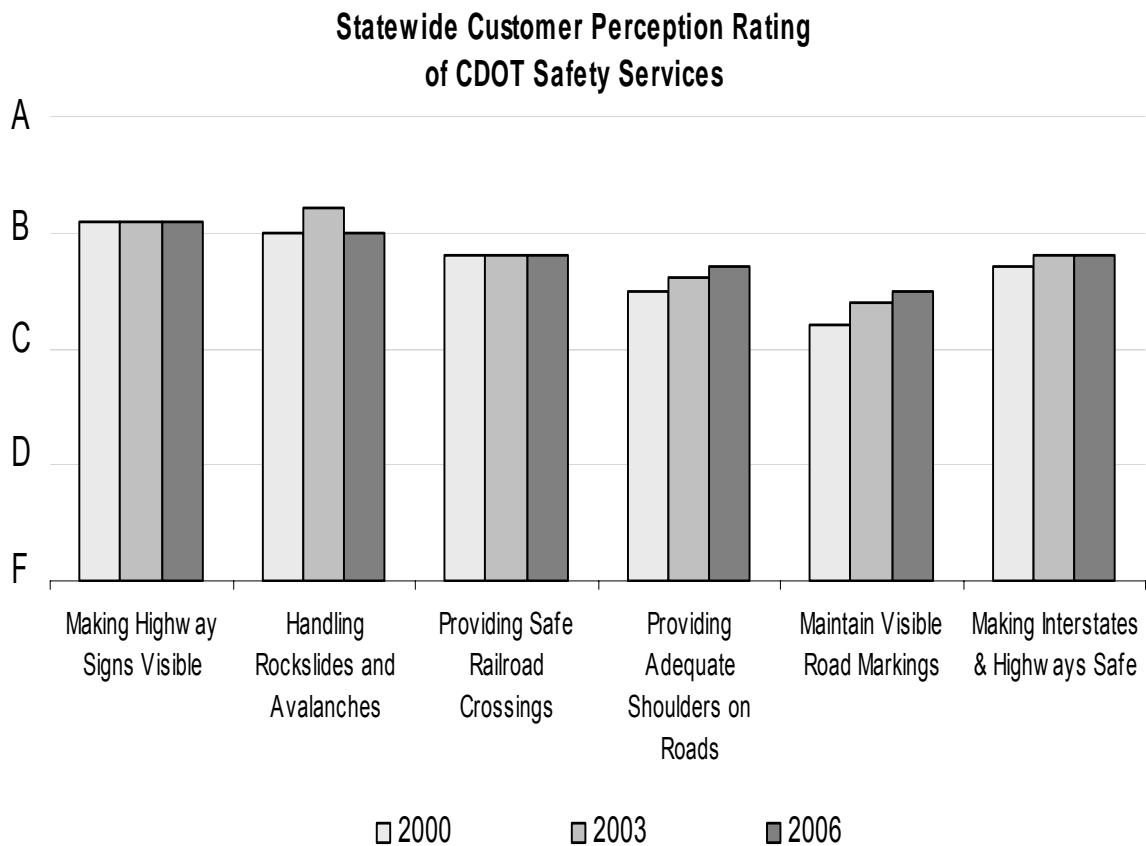
### Customer Perception of Safety

Customers rated making highways and interstates safe a grade of B minus. Customer perception has remained the same in 2003 and 2006, but has risen slightly from previous years' surveys.

The purpose of this performance measure is to gauge overall customer perception on the safety of the state highway system. This measure will help CDOT determine if the safety improvement projects are perceived as having a positive impact on its customers.

Gauging customer perception is one of the techniques used to validate investment decisions.

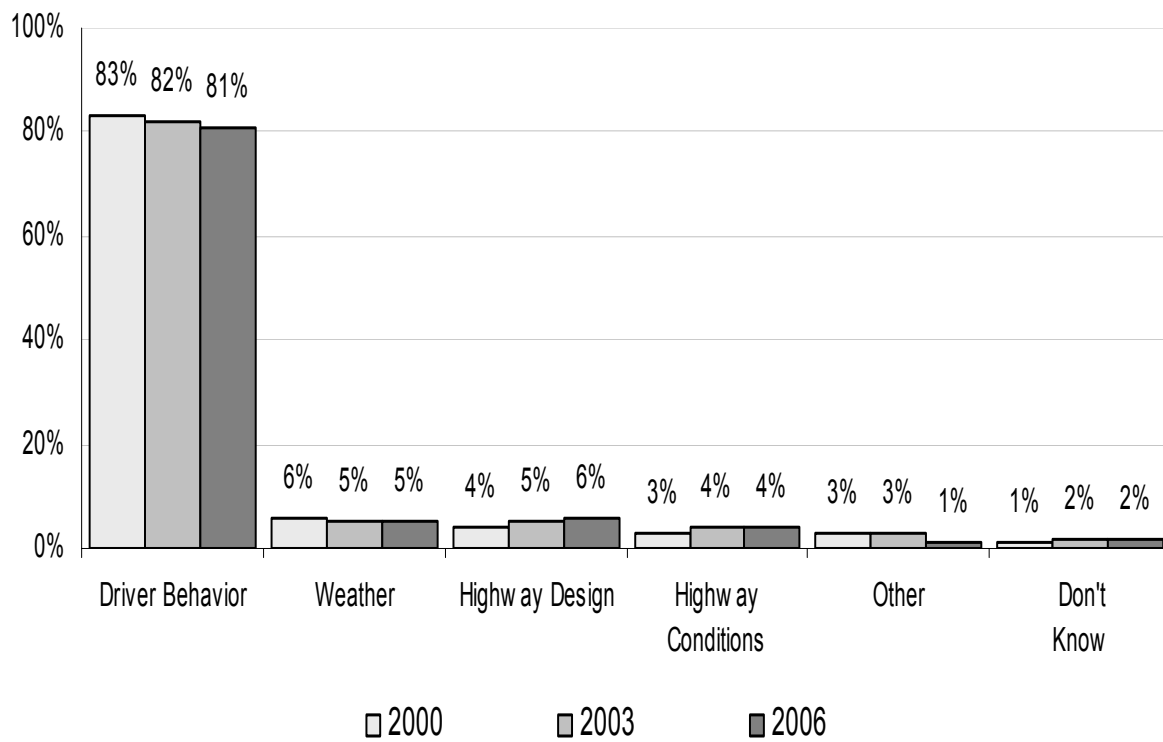
There are no specific safety areas that demonstrated a customer perception grade below C. Comparing 2006 to 2003 survey results, most ratings were very close. The biggest drop in satisfaction was from a 3.2 rating to a 3.0 rating for handling avalanches and rockslides, but it should be noted that this survey came soon after a rockslide closed a state highway and Interstate.



Respondents were asked what they perceived to be the most common cause of traffic crashes in Colorado. The vast majority of respondents (81%) cited “driver

behavior” as the most common cause of traffic accidents. The data are virtually unchanged from the 2000 and 2003 surveys.

### Statewide Customer Perception of Crash Causes

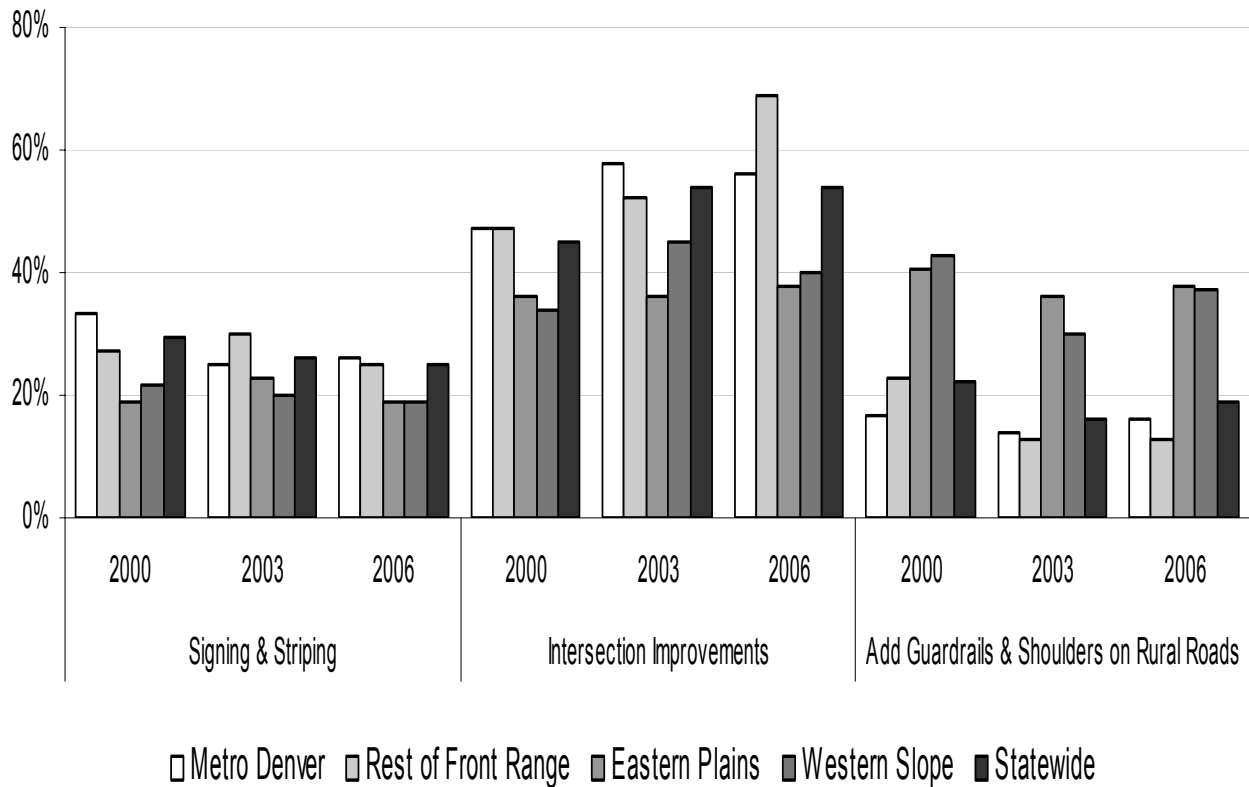


Survey respondents were then asked to prioritize various methods of improving traffic safety. About three in five respondents thought a higher priority should be given to improving the safety of roadways as opposed to conducting public safety campaigns.

The preferred safety investment solution was roadway improvements. For all areas of the state, intersection safety improvements were the highest priority.

However, for the other safety improvement options there were significant differences by area. The Western Slope and Eastern Plains respondents indicated “adding guardrails and shoulders on rural roads” as their second highest priority, followed by signing and striping as the third priority. In the more urbanized areas of Metro Denver and the rest of the Front Range, the second and third priorities were reversed.

**Roadway Safety Improvement Preference  
by Area**





## ***Performance Measures by Investment Category***

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**GOAL:**  
> Preserve the transportation system  
> Keep transportation system available and safe for travel

This investment category includes activities that maintain the physical function and aesthetics of the existing transportation infrastructure. Transportation investments in System Quality can impact the performance and customer

perception of other investment categories such as safety and mobility. Investment decisions in this category impact the surface quality and remaining service life of roadways and structures

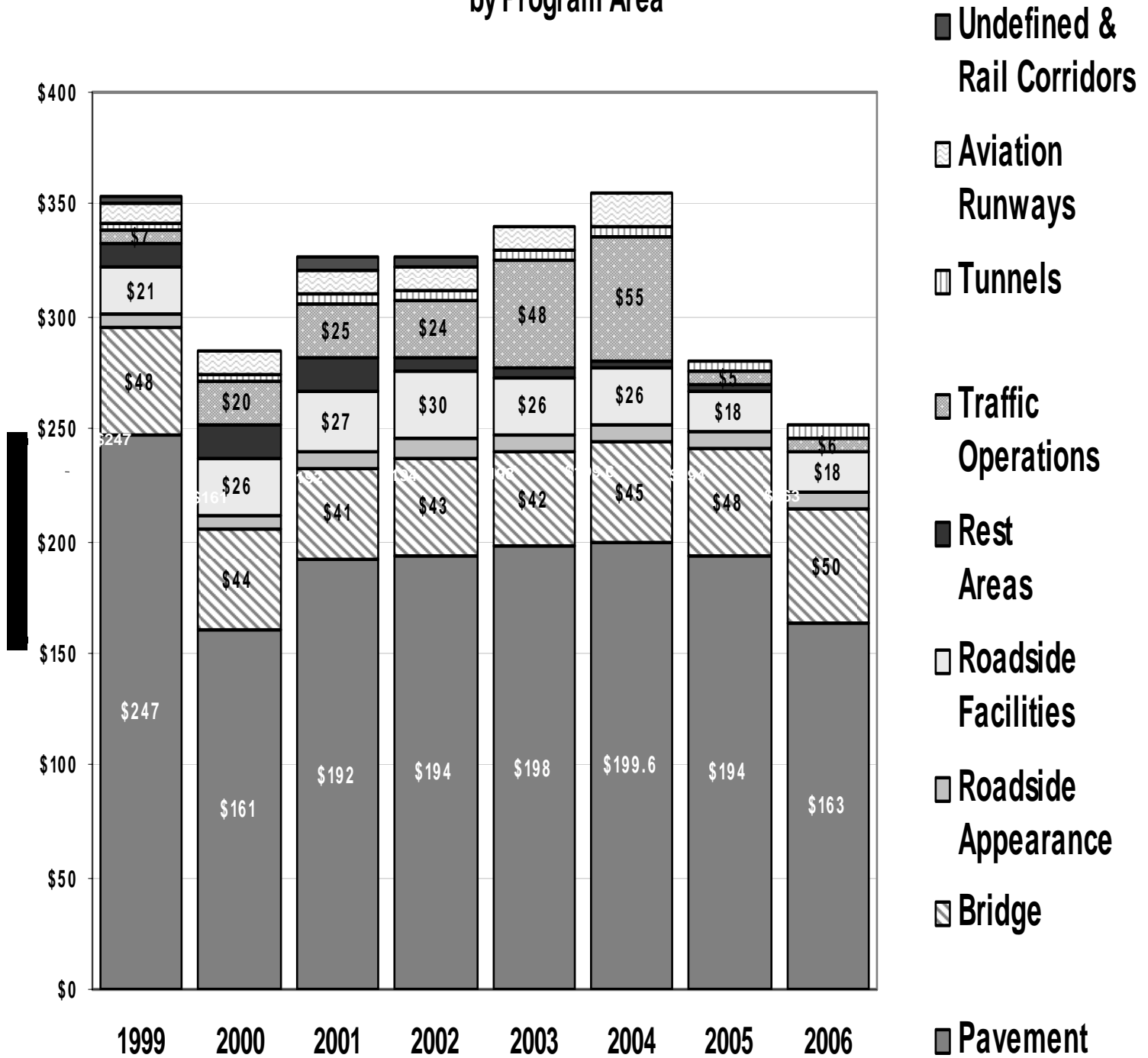
The Transportation Commission has put a very high priority on this investment category since it is critical to maintain the integrity of the existing infrastructure.

With continuing increases in material costs, aging infrastructure and fiscal constraints, it is imperative to maintain the quality of the existing transportation infrastructure since it is almost always less expensive than reconstruction roads and structures that comes from lack of ongoing maintenance..

System Quality investment Program Areas are: Pavement, Bridge (both on and off system), Roadside Facilities, Traffic Operations, Rest Areas, Roadside Appearance and Other Modes.

Based on the fiscal year 2006 Budget, CDOT allocated approximately \$250 million, which is 30.6% of the total budget, to System Quality programs, services and projects.

## System Quality Investments by Program Area



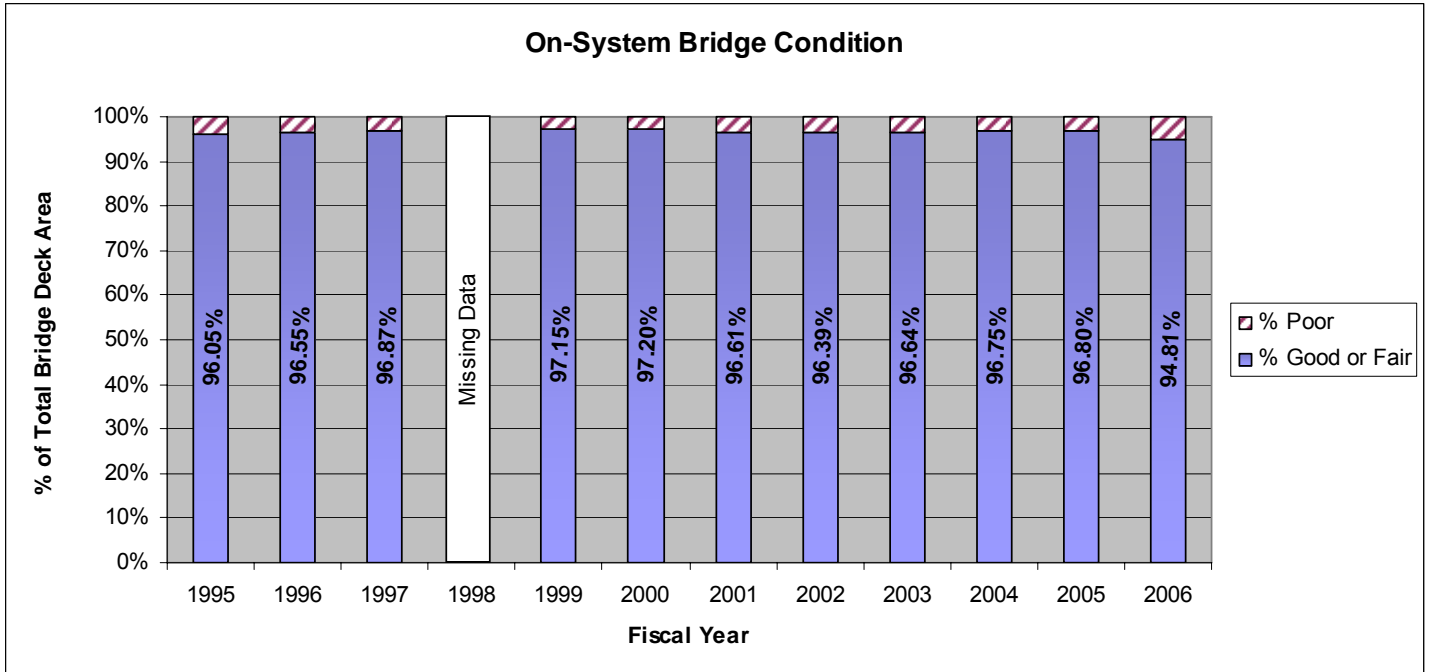
**Expenditures by Fiscal Year**  
(\$ amounts in graph above are shown below)

<b>In millions of dollars</b>	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006
Undefined & Rail Corridors	\$2.2	\$0.9	\$5.26	\$5	\$0	\$0	\$0	\$0
Aviation Runways	\$9.5	\$10.3	\$10.6	\$10.6	\$11.2	\$14.7	\$0	\$0
Tunnels	\$2.4	\$2.7	\$4.8	\$5.0	\$4.8	\$5.1	\$4.7	\$6.3
Traffic Operations	\$7	\$20	\$25	\$24	\$48	\$55	\$5	\$5
Rest Areas	\$10.4	\$14.7	\$14.1	\$7.0	\$3.82	\$2.8	\$3.7	\$0.0
Roadside Facilities	\$21	\$26	\$27	\$30	\$26	\$26	\$18	\$18
Roadside Appearance	\$5.2	\$5.6	\$7.0	\$8.2	\$7.0	\$7.0	\$7.4	\$8.5
Bridge	\$48	\$44	\$41	\$43	\$42	\$45	\$48	\$50
Pavement	\$247	\$161	\$192	\$194	\$198	\$200	\$194	\$163

**Bridge Sufficiency**

The on-system bridge conditions chart is based on the total deck area of bridges on the state highway system. In 2006 the good or fair rated bridges decreased slightly from the 2005 condition. The major portion of this decline is due to the condition of the I-70 Viaduct east of I-25 changing from a fair to a poor condition. The proposed objective for the bridge program is to eliminate the bridges in poor condition. Bridges in good condition adequately meet all safety and geometry standards and

typically do not require significant maintenance. Bridges in fair condition require preventative maintenance and either are near exceeding safety and geometry standards or require rehabilitation. Bridges in poor condition do not meet all safety and geometry standards and require reactive maintenance to ensure their safe service. For the purpose of determining bridge funding needs it is assumed that bridges in poor condition have exceeded their economically viable service life and require replacement.



The current replacement cost for the backlog of poor on-system bridges is estimated at \$877 million dollars. Critical among these structures is the I70 viaduct through Denver, which must be replaced at a cost estimated in excess of \$500 million. This presents an enormous challenge for CDOT because of Colorado's tight fiscal situation.

The On-System Bridge Replacement Needs graph shows the estimated bridge condition needs over the next twenty-five year period based on alternative funding levels per year. A projected funding of \$191 million dollars per year for twenty years would eliminate the backlog of bridges in poor condition and thereafter funding of \$144 million per year would be needed maintain the bridges at 100% good or fair condition.<sup>7</sup>

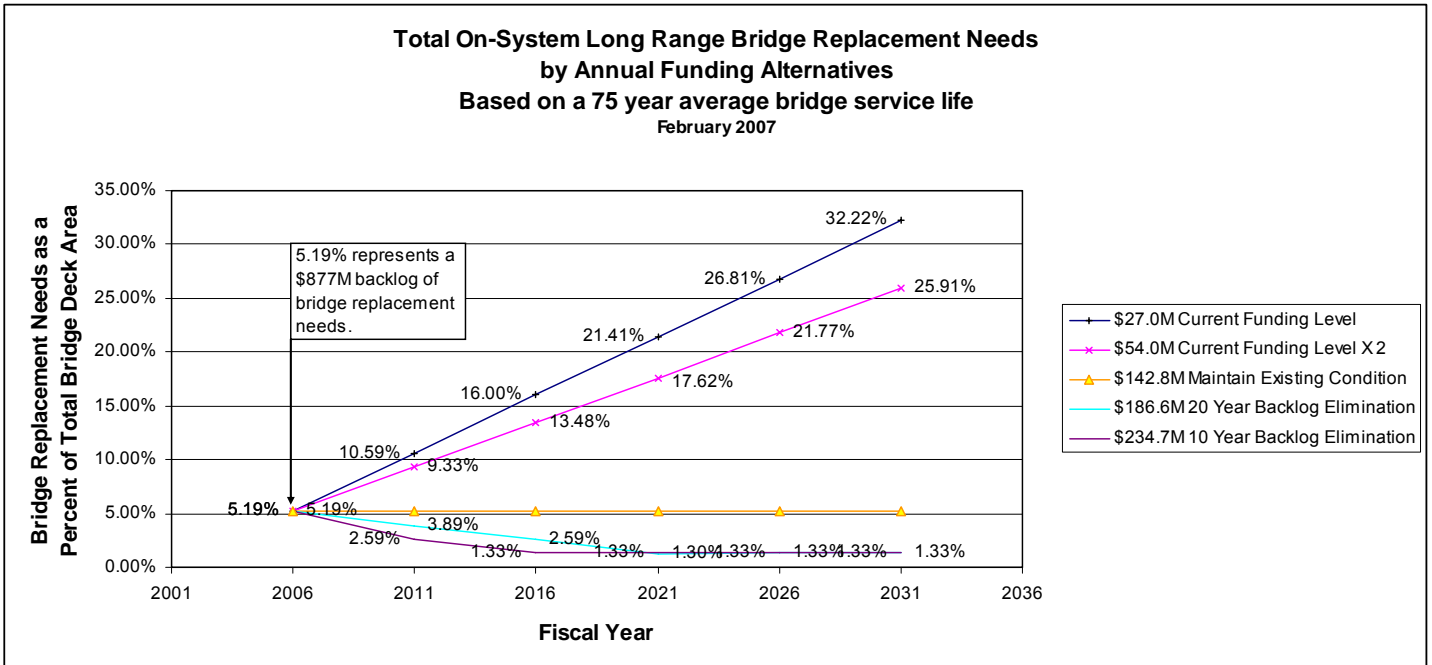
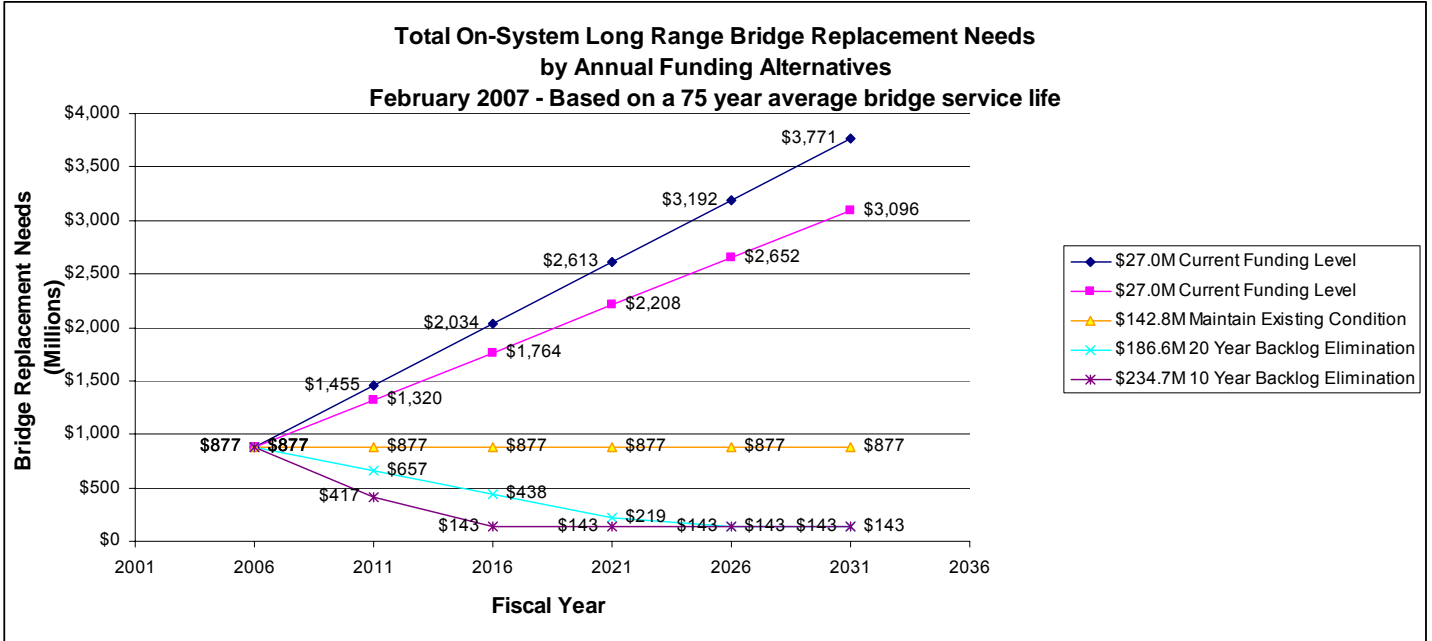
A higher level of initial funding would eliminate the backlog of current bridge needs more quickly. Present investments of \$27 million dollars in bridge replacement investment falls far short of the projected needs.

The graph below illustrates the implications of deferring maintenance of bridges. If only the \$27 million/year in bridge program funds are used to replace bridge structures, approximately \$3.878 billion in funds will be required in the year 2031. However if that \$27 million/year is doubled to \$54 million/year, the amount needed in 2031 will fall to \$3.203 billion.

Approximately \$235 million/year will be required through the year 2016 to address the backlog in bridge needs within 10 years and then \$147 million/year will be necessary to keep bridges at a good condition.

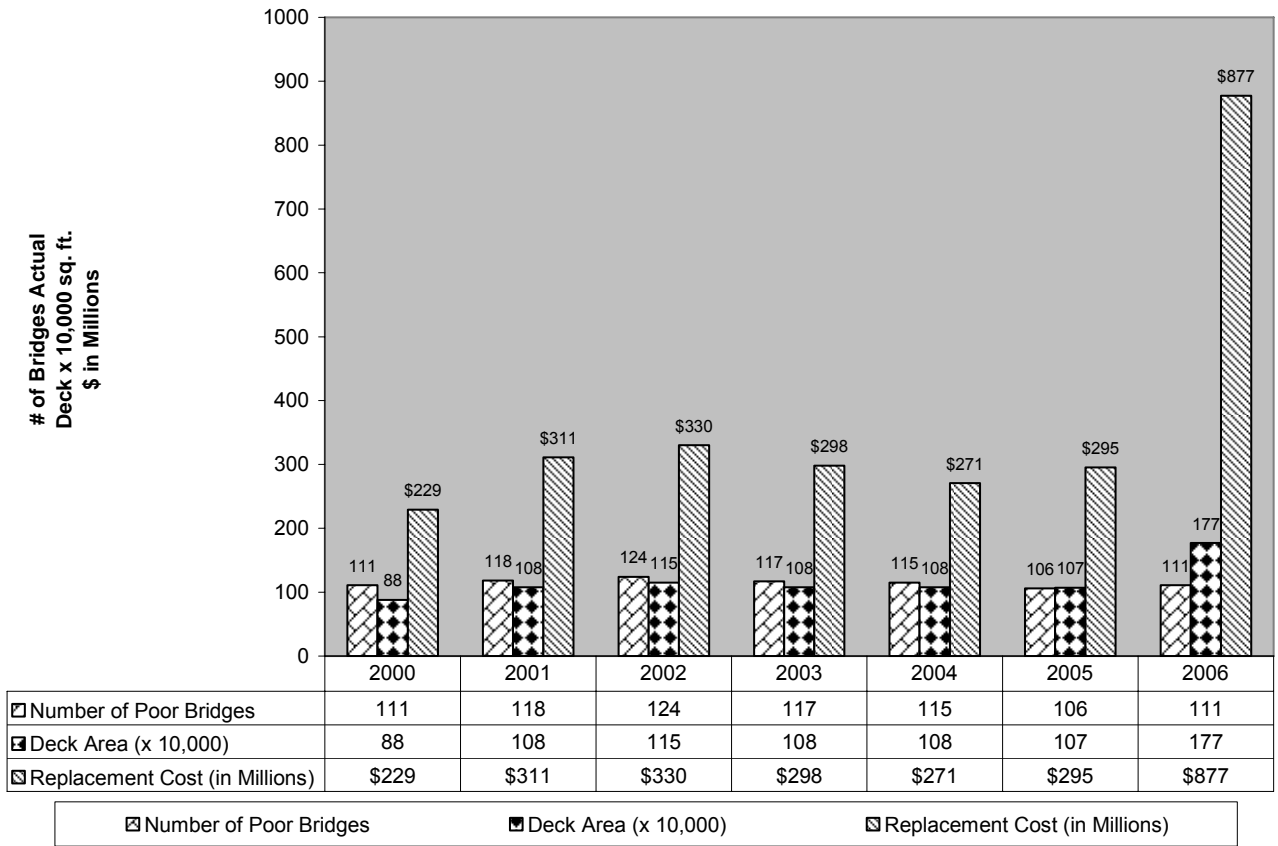
<sup>7</sup> Assumptions:

1. Bridge life expectancy of 75 years
2. \$877M backlog of poor bridges requiring replacement
3. \$314 per square foot total project replacement cost
4. Number of bridges remains constant
5. Calculations in 2006 dollars not indexed for inflation in cost or budget increases.





## CDOT Bridges in Poor Category



(The above chart includes the 46th Avenue Viaduct/I-70 Viaduct. The replacement cost of the viaduct exceeds the \$314 / SF used for average bridge replacement cost. The \$500M replacement cost for this structure used is from the I-70 East EIS.)

### Pavement Condition

Colorado state highways' and Interstates' pavement condition rating trends are reflected in the four following graphs. The Pavement Management System forecasts the Remaining Service Life (RSL) of the highway pavement. RSL is the estimated number of years before total reconstruction of the roadway is necessary. In 2006, 19% of CDOT's roadway system have a remaining service life equal to zero, meaning they require reconstruction.

The graphs illustrate a substantial change in pavement condition between years 1997 and 1998, due to the different methodology to measure pavement condition at the juncture of these years. Instead of a ride-ability index pavement condition rating based on elements of

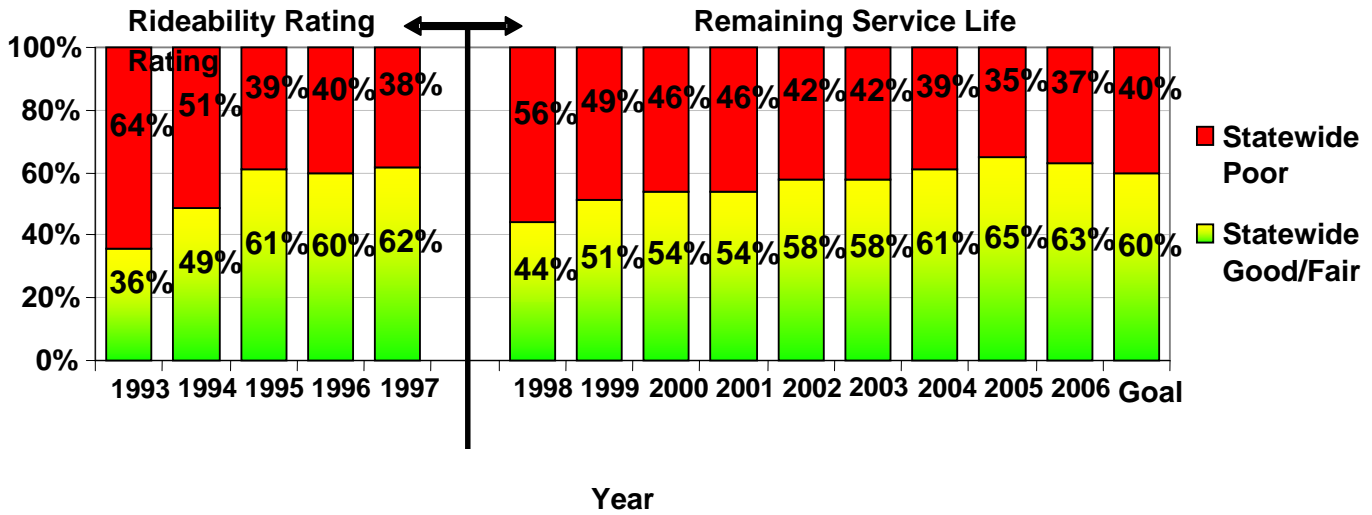
surface smoothness and aesthetics used in 1997 and prior years, the pavement condition is rated for the length of remaining service life condition from 1998 and thereafter. Thus the data for 1997 and prior years are not comparable to 1998 and subsequent years. This change of evaluation redistributes the investment away from the obvious visible needs of the surface and more towards sustaining and maintaining the remaining value of the roadway.

The pavement condition objective is to attain a 60 percent good/fair remaining service life on highways statewide overall. This objective is further separated into three classifications: interstates, NHS (National Highway System non-interstate), and other state

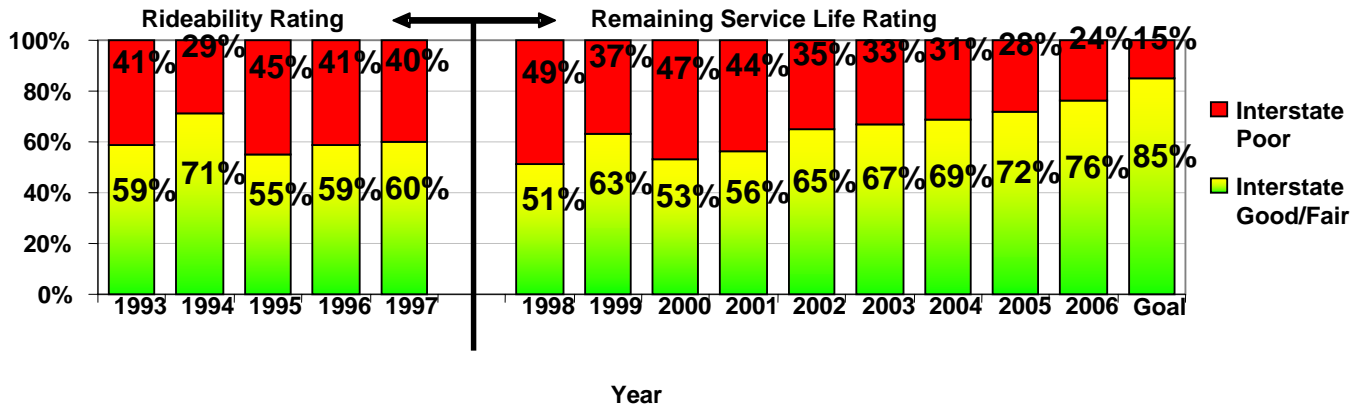
highways. The goals for these are 85 percent on interstate highways (976 centerline miles), 70 percent on

NHS highways (2395 centerline miles), and 55 percent on all other state highways (5669 centerline miles).

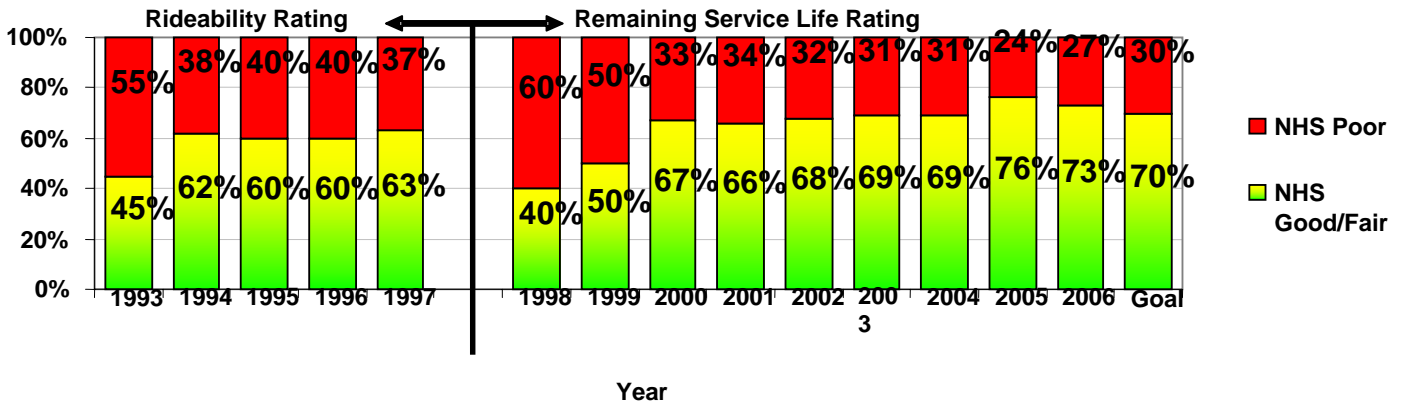
### Pavement Condition Statewide



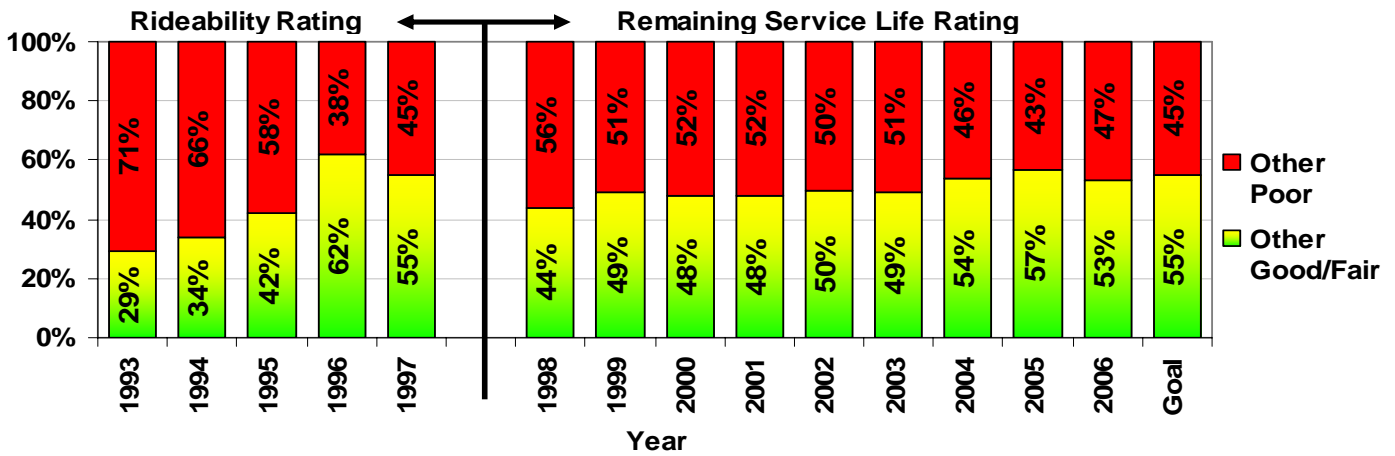
### Pavement Condition Interstate



### Pavement Condition NHS



### Pavement Condition Other Highways

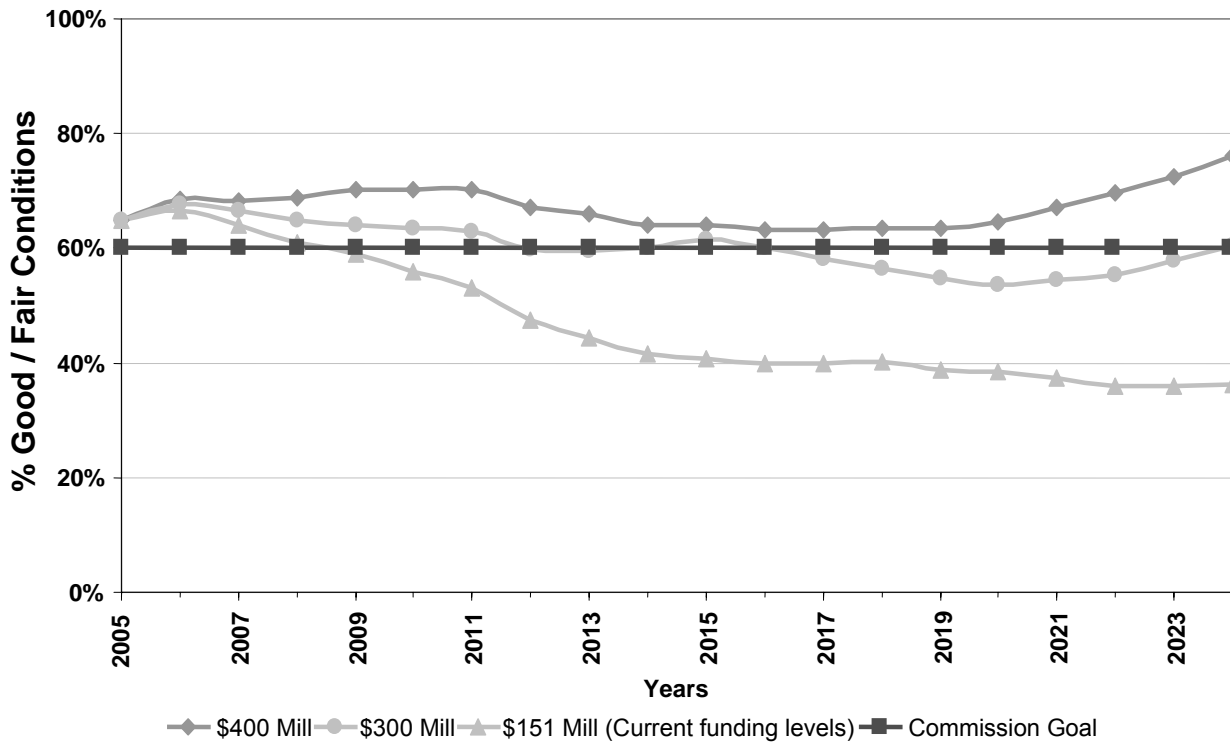


## Long Range Projections

Monitoring the pavement condition during the next several years will be critical as conditions will decline at current funding levels. The projected pavement

condition graph indicates that a substantial increase in annual funding will be necessary to meet the Transportation Commission performance goal.

**Pavement Management Program - 2005 Long Range Condition Projections by Funding Allocation**



## Maintenance Levels of Service (MLOS)

Maintenance Levels of Service (MLOS) activities are tracked and rolled up to the Maintenance Program Areas (MPAs) and then again to the statewide average. The delivery of maintenance services encompasses about 70 individual activities organized within nine MPAs. They are Planning & Training; Roadway Surfacing; Roadside Facilities; Roadside Appearance; Traffic Services; Structures; Snow & Ice Control; Equipment, Buildings, & Grounds; and Tunnels. Each of the nine program areas is assessed for the service level achieved against their expenditures. Each assessment is then converted into a grading scale of A through F.

& Grounds; and Tunnels. Each of the nine program areas is assessed for the service level achieved against their expenditures. Each assessment is then converted into a grading scale of A through F.

### Maintenance Level of Service Investments



Expenditures by Fiscal Year (Missing amounts in graph above are shown below)

In millions of dollars	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006
Planning & Scheduling	\$6.17	\$7.36	\$7.49	\$6.89	\$7.78	\$7.36	\$7.82	\$7.85
Roadside Appearance	\$6.18	\$7.65	\$6.47	\$7.08	\$6.50	\$7.77	\$6.51	\$7.83
Structures	\$1.77	\$3.95	\$4.70	\$6.33	\$7.13	\$6.37	\$9.86	\$8.64
Tunnels	\$4.04	\$4.83	\$4.42	\$5.08	\$4.86	\$5.15	\$4.72	\$6.32

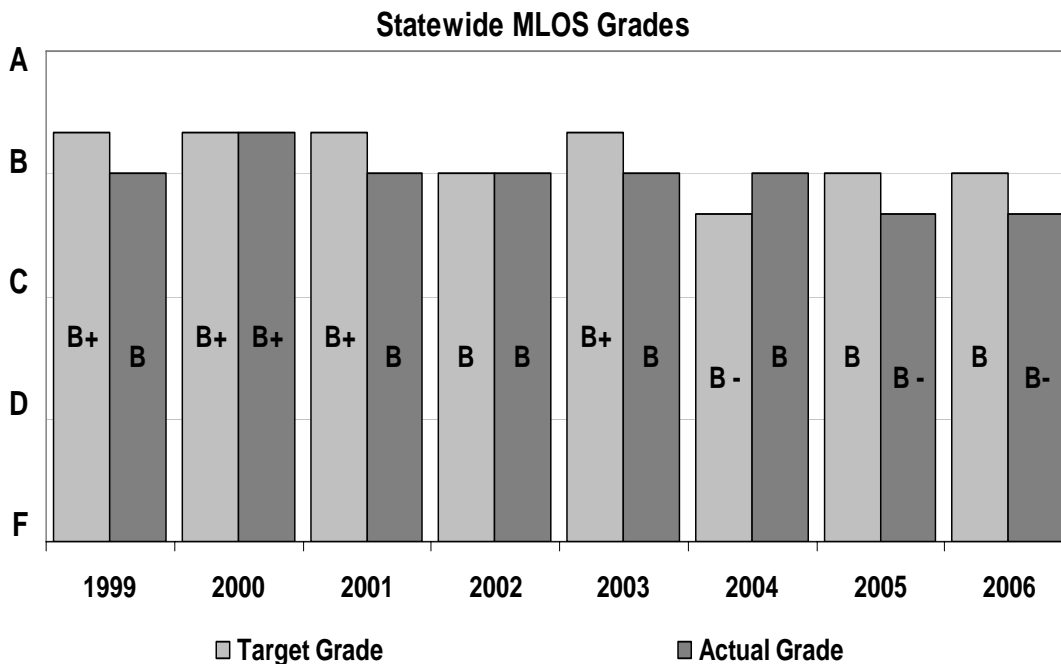
## MLOS Grade

The statewide MLOS grades in the table below demonstrate the optimization of the maintenance budget

and the service results achieved in each of the Maintenance Program areas.

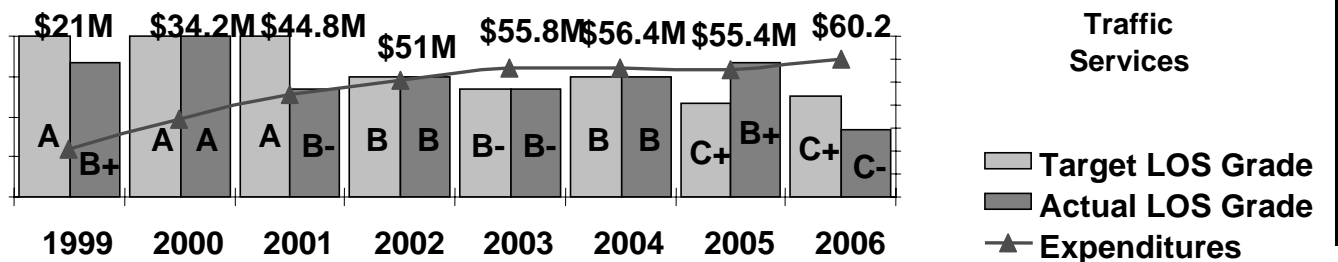
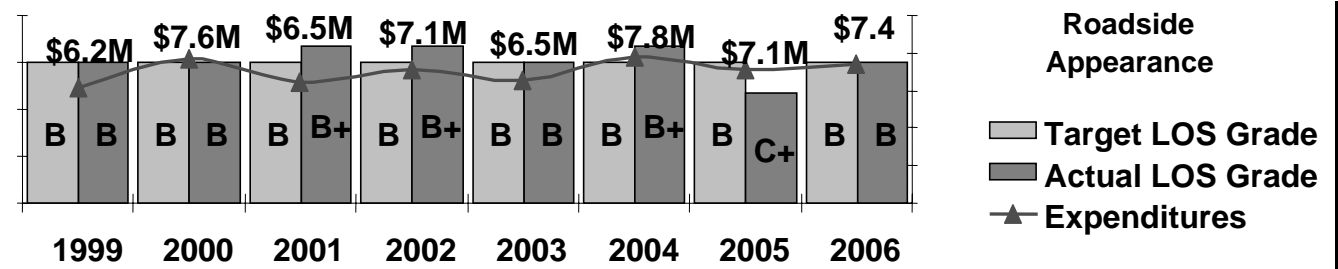
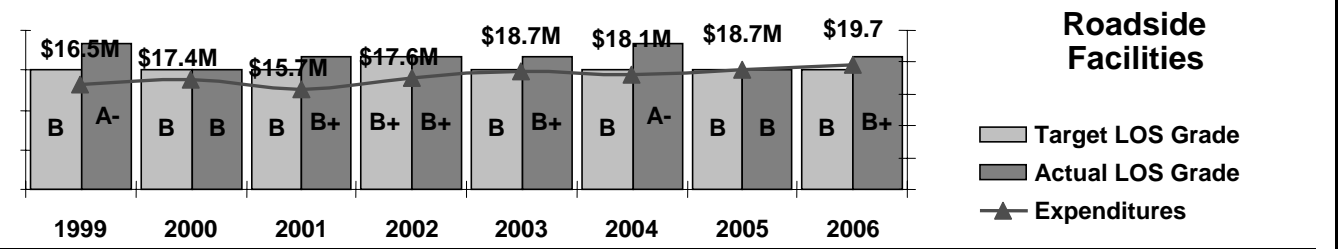
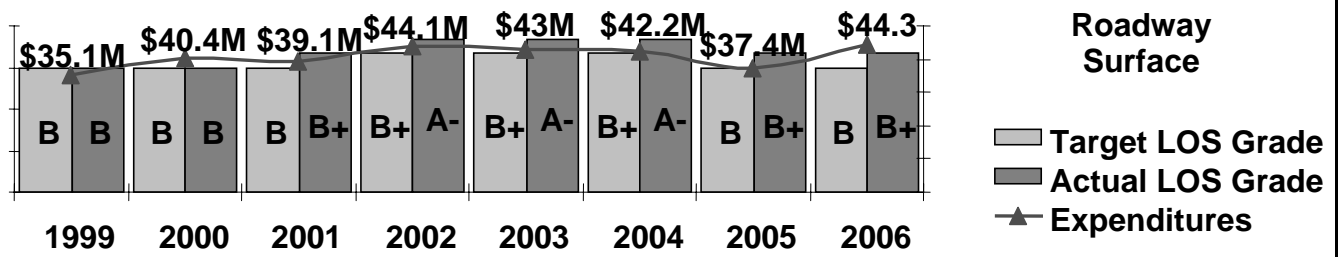
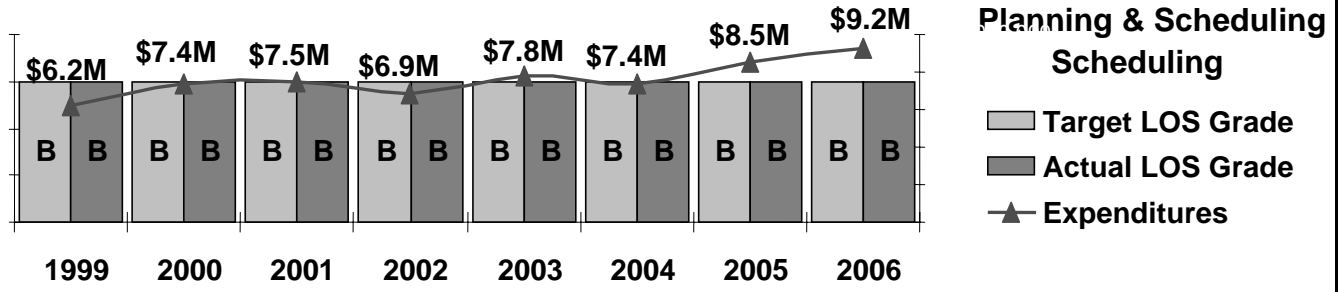
2006 Maintenance Condition Survey			
MPA	Target	Actual	Achievement
Planning & Scheduling	B	B	Target Met
Roadway Surface	B	B+	Target Exceeded
Roadside Facilities	B	B+	Target Exceeded
Roadside Appearance	B	B	Target Met
Traffic Services	C+	C-	Target Not Met
Structures	D+	C	Target Exceeded
Snow & Ice Control	B-	B+	Target Exceeded
Equip., Bldgs., & Grounds.	B-	C+	Target Not Met
Tunnels	B-	C-	Target Not Met
<b>Statewide Total</b>	<b>B</b>	<b>B-</b>	<b>Target Not Met</b>

The graph below illustrates the Department meeting or exceeding the Statewide Level of Service (LOS) overall targets in three of the past eight years of the program.

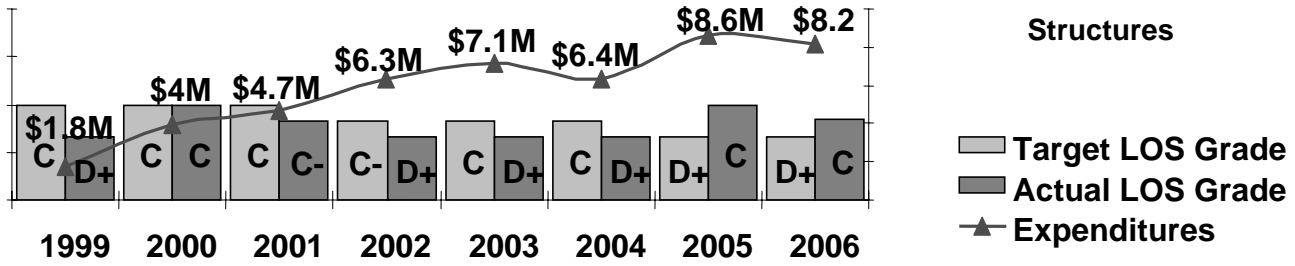


The following graphs illustrate eight years of investments (in millions of dollars), the levels of service targets, and the levels of service outcomes on an annual

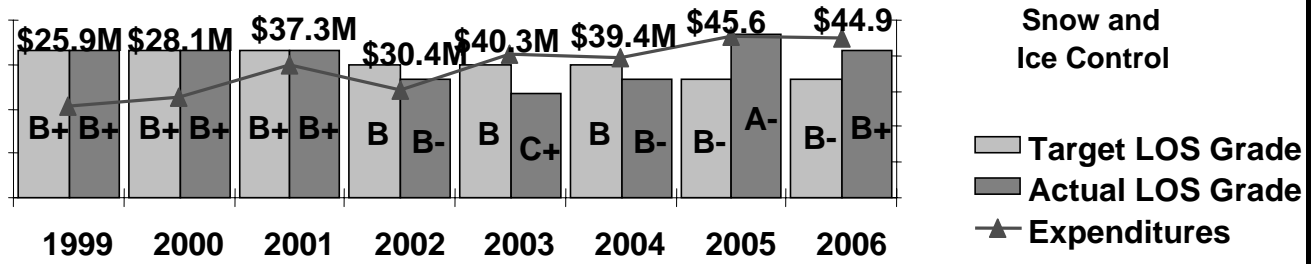
basis in the maintenance program areas. Generally, maintenance has provided expected results from resources invested.



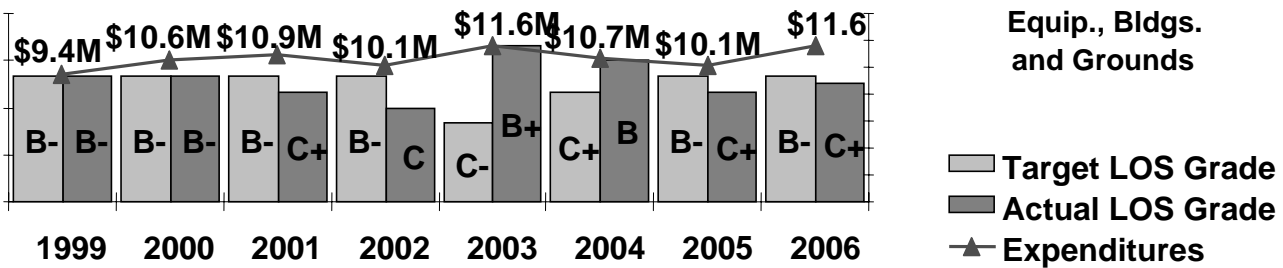
### Structures



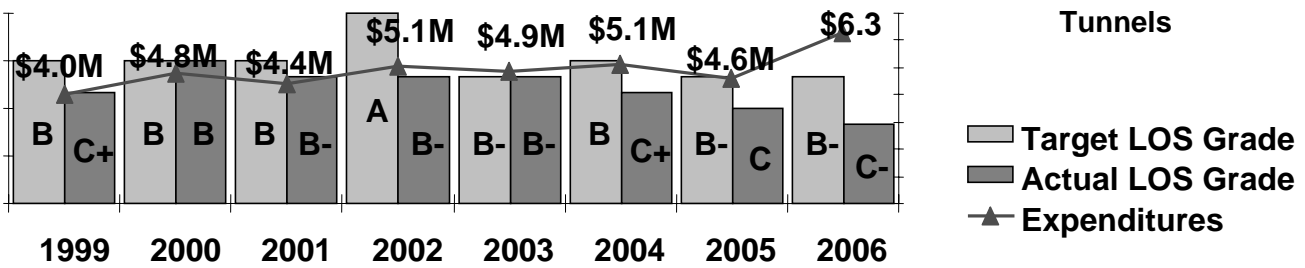
### Snow and Ice Control



### Equip., Bldgs. and Grounds



### Tunnels



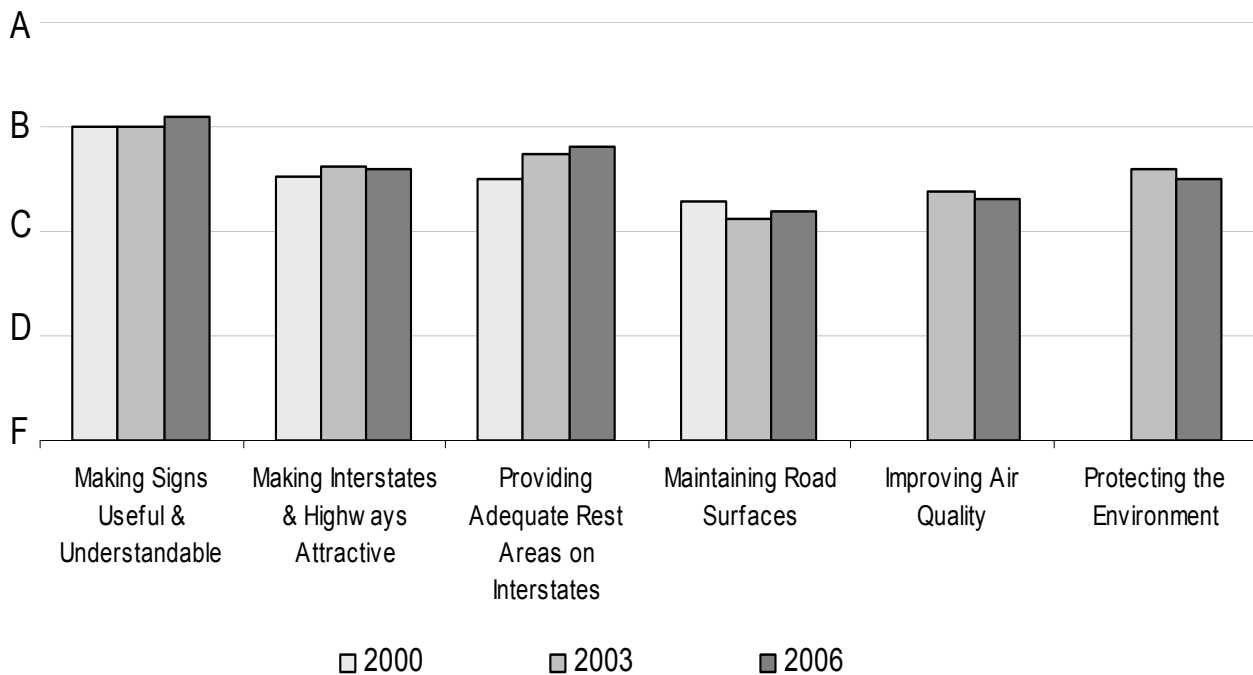


### Customer Perception of System Quality

Customer ratings related to specific aspects of services provided by CDOT included in the system quality category, ranged from the “B” level for ‘making highway signs useful and understandable’ down to the “C plus”

level for ‘maintaining road surfaces’. These measures over time will help CDOT understand if its investments are providing value and benefit in meeting the Department’s goals as well as meeting customer expectations.

**Statewide Customer Perception of CDOT System Quality Services**



# Mobility

**GOAL:**

- > Improve mobility
- > Increase travel reliability

Population growth in many areas of the state has and will continue to result in increased traffic congestion. Mobility encompasses investments made in accessibility of the transportation system, transportation options, connectivity, travel time variability and overall

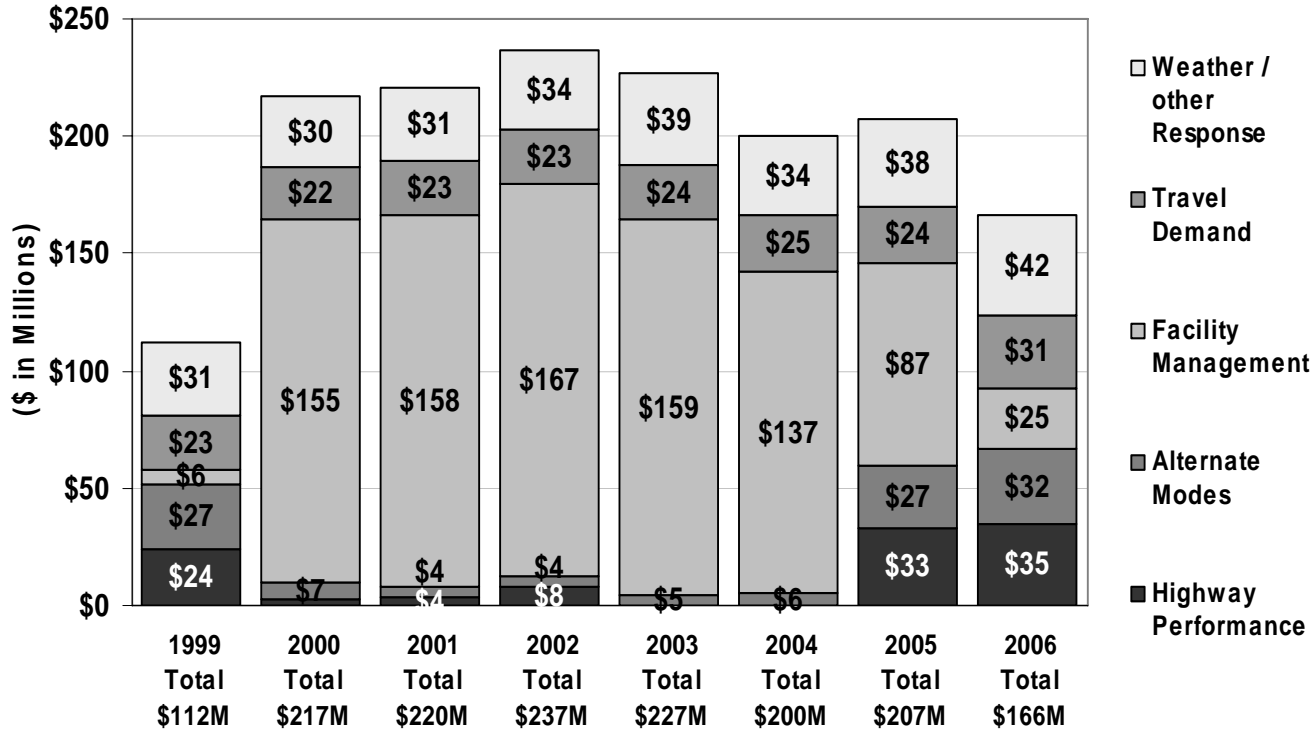
infrastructure management. The measure of “Mobility” performance is an area that has been evolving since the beginning of the investment strategies program. There are numerous suggested measures that have been proposed, not only in Colorado but also in many other States, to measure Mobility. Mobility means many different things to many different transportation users. The effort to illustrate statewide congestion relief

## Performance Measures by Investment Category

performance, which is a component of mobility, led to the decision to measure congestion by the growth in vehicle miles traveled (VMT) on congested highways with a volume to capacity (V/C) ratio greater than >85. In 2006, travel time delay on congested state highway corridors was proposed and accepted by the Commission as an additional measure of congestion. This measure is a better tool to use to identify congestion levels and is more easily understood by the general public. Customer perception of mobility is an important tool to balance the priorities of mobility reliability, accessibility, variability, availability, and connectivity.

In FY 2006, CDOT allocated approximately \$166 million, 20.3% of the total budget, to mobility related programs. These programs include: Highway Performance, Weather/Other Response, Travel Demand, Facility (System) Management and Alternate Modes.

**Mobility Investments by Program Area**

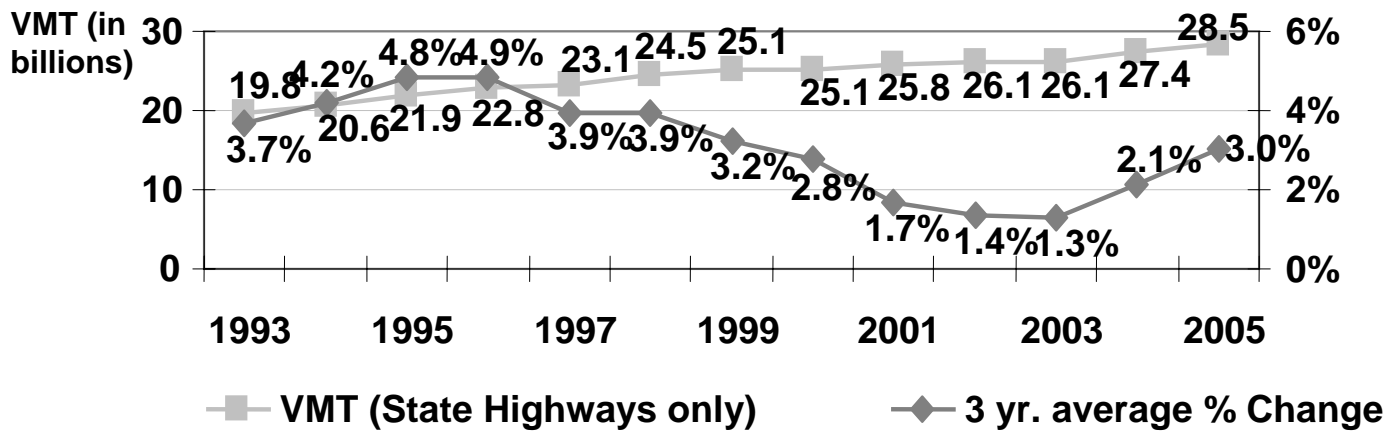


## Vehicle Miles Traveled

The number of vehicle miles traveled on state highways is continuing to increase. Vehicle Miles Traveled increased 3.97% from

27.4 billion in 2004 to 28.5 billion in 2005. The 3-year average growth rate also increased from 2.12% in 2004 to 3.04% in 2005

## Vehicle Miles Traveled and Average Growth Rate



## Measures of Congestion

The table below illustrates a number of measures of congestion for the calendar years 1997 through 2005. A congested roadway is defined as experiencing a volume to capacity ratio of  $\geq .85$ . The methodology and data availability used for calculating congestion changed in 2003 and 2005 due to a change in national methodologies, which restricts the ability to compare results between years.

The data indicates that the congested miles of state highway, as well as the vehicle miles of travel on

congested roadways may have declined slightly despite increases in the total vehicle miles of travel. This decline in congestion is probably related to a number of factors, including the completion of additional lanes on I25 in Douglas, El Paso and Weld Counties, US285 and C470 in Jefferson County, US50 in Mesa and Delta Counties, expansion of light rail in the metro area, growth on the urban fringe and west slope where available highway capacity exists, increases in local roadway capacity, as well as reduced travel due to the significant increase in fuel costs during this time period.

### Measures of Congestion for the State Highway System

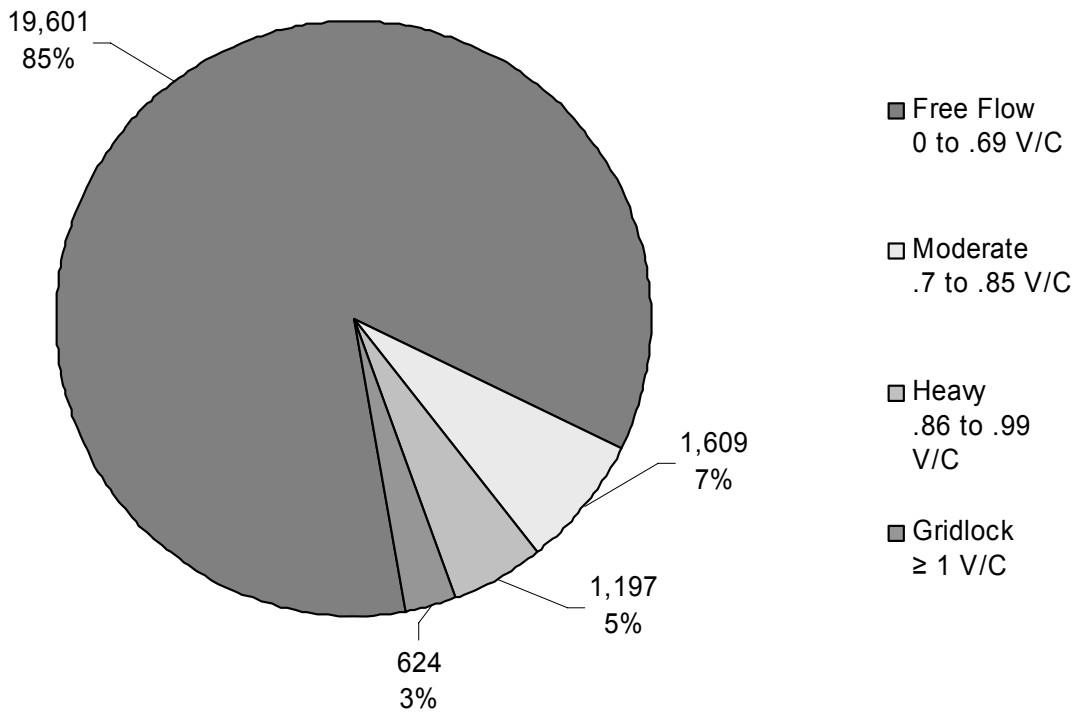
Year	Total Lane Miles	Congested Lane Miles	Percent of Congested Lane Miles	Total Daily VMT	% change in Daily VMT	Total Daily VMT on Congested Highways	Percent of Daily VMT on Congested Highways
1997	22,830	2,270	9.9%	65,118,800	3%	24,785,200	38.1%
1998	22,760	2,280	10.0%	67,217,700	3%	25,780,500	38.4%
1999	22,900	2,270	9.9%	68,659,600	2%	25,579,300	37.3%
2000	22,920	2,100	9.2%	68,866,300	0%	21,215,900	30.8%
2001	22,810	2,570	11.3%	70,620,600	3%	24,552,500	34.8%
2002	22,870	2,610	11.4%	71,510,000	1%	24,525,700	34.3%
<b>DO NOT COMPARE PRE-2002 AND 2003-4 MEASURES OF CONGESTION DUE TO CHANGE IN METHODOLOGY</b>							
2003	23,060	2,230	9.7%	71,604,200	0%	23,633,000	33.0%
2004	23,140	2,160	9.3%	75,161,900	5%	23,803,300	31.7%
<b>DO NOT COMPARE PRE-2005 AND 2005 MEASURES OF CONGESTION DUE TO CHANGE IN METHODOLOGY AND REFINEMENT IN DATABASES</b>							
2005	23,030	1,950	8.5%	78,142,300	4%	23,347,700	29.9%

### % of Lanes Miles Congested

CDOT conducts annual analysis of highways to determine congested segments based on volume-to-capacity (V/C) ratio and will continue to track these

changes over time. The congested lane miles of less than .7, from .7 to .85, .86 to .99, and over 1 volume to capacity ratios are identified in the chart below.

### Congested Lanes Miles 2005

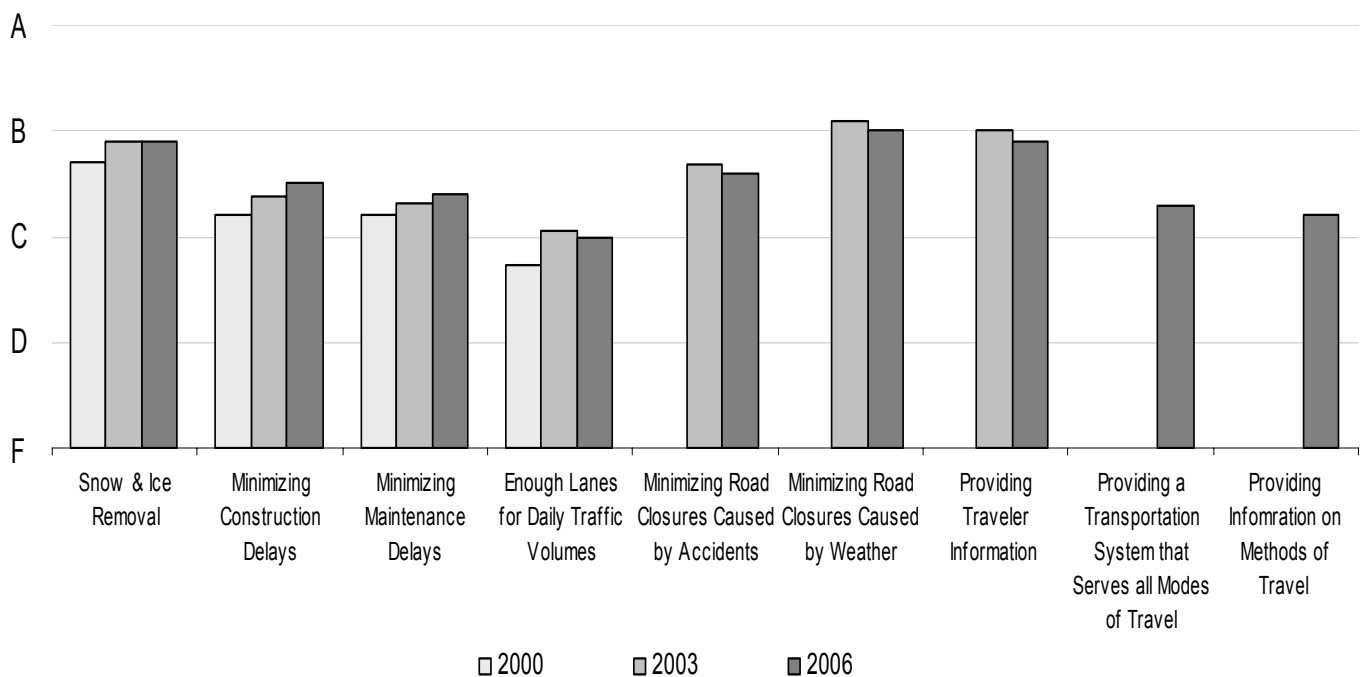


## Customer Perception of Mobility

According to the 2006 Statewide Customer Survey, congestion remains the highest transportation related priority issue in Metro Denver, Rest of the Front Range, and Western Slope, while it was the second frequently given response in the Eastern Plains. This high concern is also reflected in the mobility related areas, as shown in the graph at below, rated by the travelers in Colorado.

Ratings for “conductng road construction work in ways that keep traffic delays to a minimum” and “conducting road maintenance work in ways that keep traffic delays to a minimum” improved slightly from 2000 to 2006. This measure over time will help CDOT understand if their investments are providing value and benefit in meeting the Department’s Mobility goals as well as meeting customer expectations.

Statewide Customer Perception of Mobility

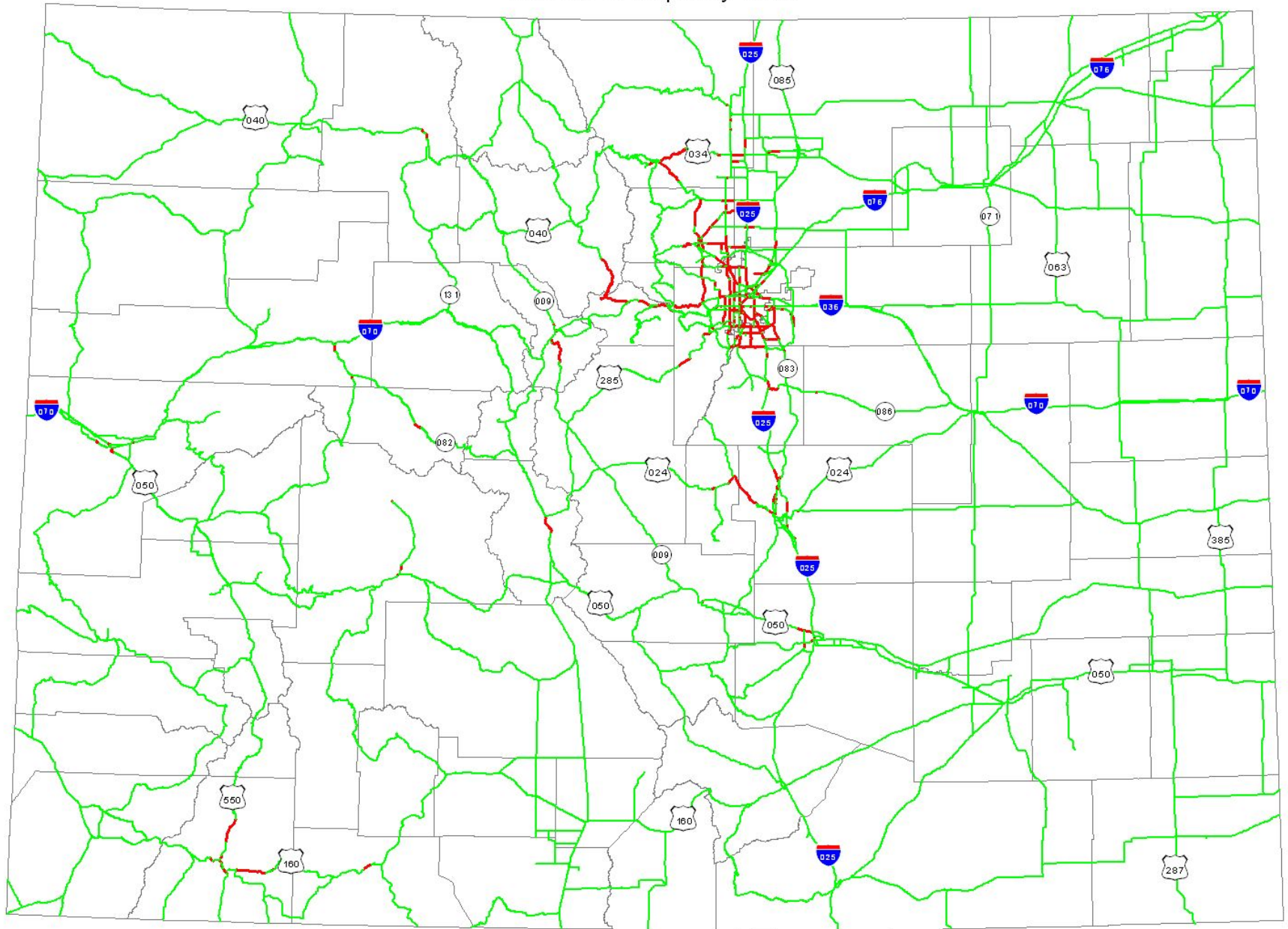


The “Colorado State Highways Volume-to-Capacity” map illustrates the highways with .85 and greater volume to capacity ratio and those highways that are less than .85 volume to capacity ratio. It should be no




surprise that the map reveals that the majority of the congestion resides along the Front Range where the majority of Colorado’s population resides.

# Colorado State Highways

## Volume-to-Capacity Ratio



### State Highways

-  V/C ratio less than 0.85
-  V/C ratio equal to or greater than 0.85
-  Counties

Produced: August 2006

# Strategic Projects

## Performance Measures by Investment Category

### GOAL:

- > Accelerate completion of projects
- > Increase investment in the program

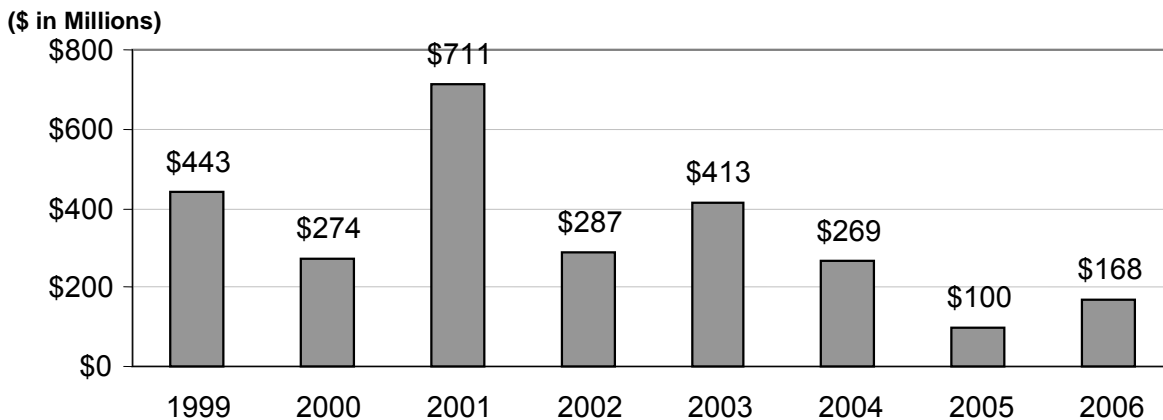
The Strategic Projects Investment Category was established to accelerate improvements to 28 high priority transportation projects statewide by providing a dedicated funding source. The elements that qualify a project for high priority status are based

on the project's regional or statewide significance, cost and return on investment of the project in addressing on-going needs of safety, system quality and mobility. These projects are large in scope and consist of multiple phases to complete.

The combined efforts of the Strategic Projects measures provide the fiscal accountability and quantifiable data to assist in determining project shortfalls or overages that impact project delivery timelines and project investments.

As approved by the Transportation Commission, the total 1999 projected un-inflated cost to build the 28 strategic projects was \$4.65 billion dollars. The 2005 cumulative programmed dollars are \$2.983 billion dollars. For fiscal year 2006, CDOT budgeted \$168 million dollars to the Strategic Projects.

### Strategic Project Investments





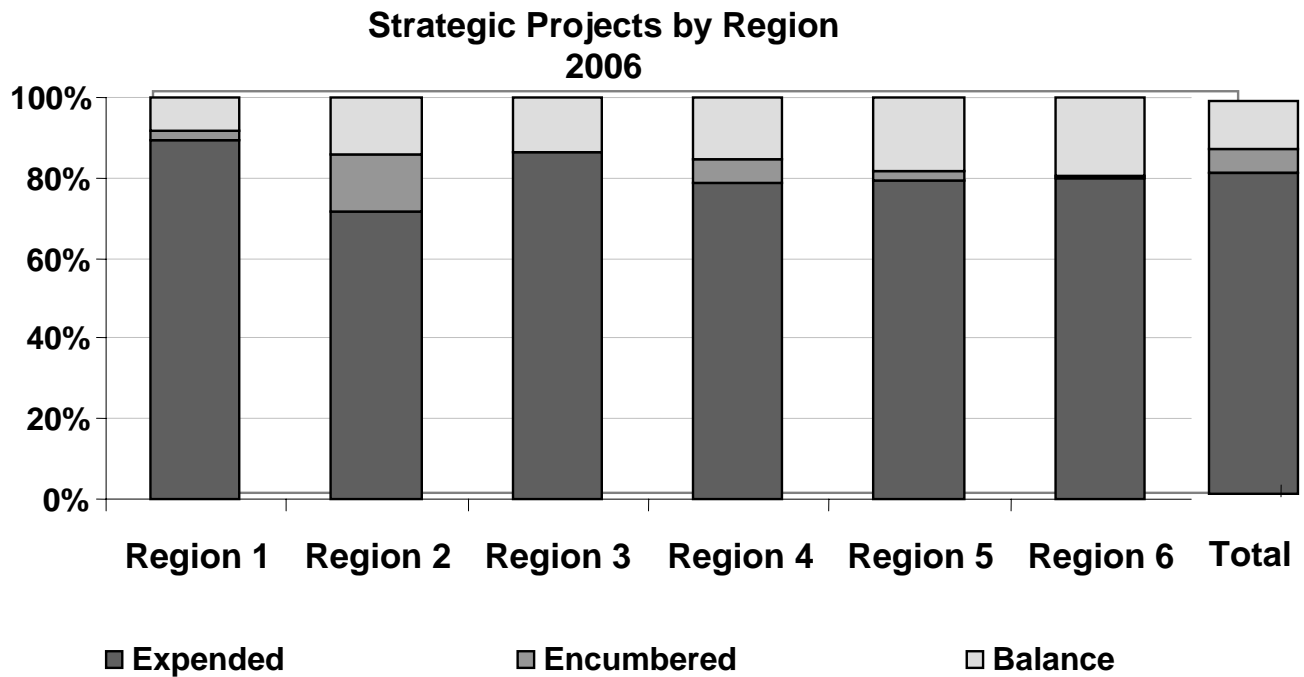
**Actual Funds Encumbered Versus Total Encumbrance Planned by Program**

Of the 28 Strategic Projects, the Regions have monitored the project dollar expenditures and encumbrances since the inception of the program to expedite the delivery of the projects. The continuing challenge is to encumber or expend 100% of funds within a specified timeframe on planned projects. The difficulty of this measure is the environment in which projects are managed. Project delays can and do occur outside of the direct control of CDOT project managers. Despite this somewhat difficult situation and challenge, the performance data should ultimately provide the necessary information to improve the encumbrance and expenditure of funds that will result in project completions.

The Strategic Projects current status indicates that through 2006, 86% percent of the budgeted dollars have

been expended or encumbered since the adoption of the Strategic Projects program. To date, all of the TRANS bonds have been issued and programmed for projects.

Seventeen of the original 28 projects have been completed or fully funded. Though completion of the remaining projects identified in the Strategic Project program is dependent on the future of the Senate Bill 1 funds allocated by the legislature on an annual basis, current revenue forecasts indicate the remaining eleven projects should be completed by 2017.



# Program Delivery

## GOAL:

- > Deliver high quality products and services in a timely fashion
- > Attract and retain an effective and qualified workforce
- > Foster an environment that respects workforce diversity

The Program Delivery Investment Category consists of activities that support the delivery of CDOT's programs and projects. Program Delivery goals and objectives focus on support functions such engineering and construction supervision, as well as, support functions such as policy analysis, public

information, accounting and human resources.

These measures provide quantifiable data that help determine to what extent funding is spent and encumbered and the contribution of support services to the delivery of projects and programs within planned timeframes. These measures balance the need to fiscally manage the resources while ensuring high caliber product delivery and customer service.

The Program Delivery investments are disbursed in the following seven program areas: Operations,

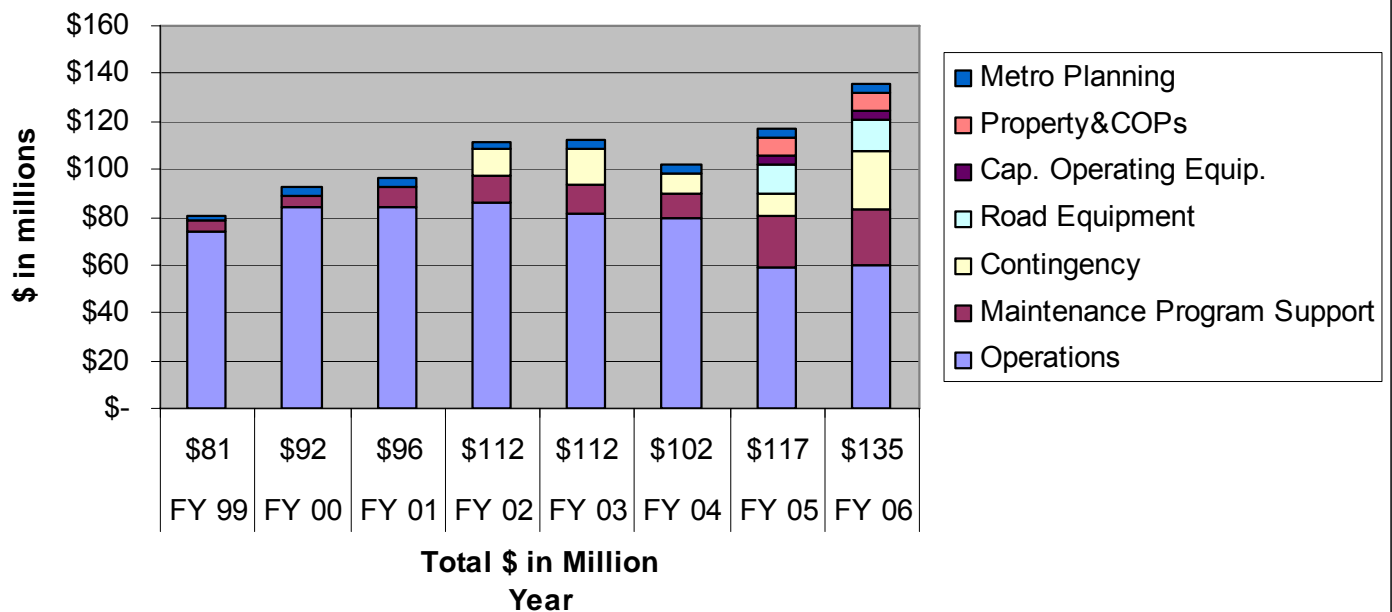
## Performance Measures by Investment Category

Maintenance Program Support, Transportation Commission Contingency, Road Equipment, Capital Operating Equipment, Property and associated Certificate of Participation costs, and federal Metro Planning funds which are passed through to the five metropolitan planning organizations.

This 2006 Annual Performance Reports uses different programs areas than previous reports to allow more accurate and consistent tracking of expenditures and trends.

For fiscal year 2006, CDOT allocated approximately \$135 million, an increase of 15% from the \$117 million allocated FY2005. The increase in funding from FY05 to FY06 is primarily due to the Transportation Commission establishing increasing the contingency reserve by \$15 million to \$25 million. The Transportation Commission Contingency Reserve Fund is distributed to the other Investment Categories for projects, maintenance or other unforeseen purposes that arise during the fiscal year.

### Program Delivery Investments by Program Area

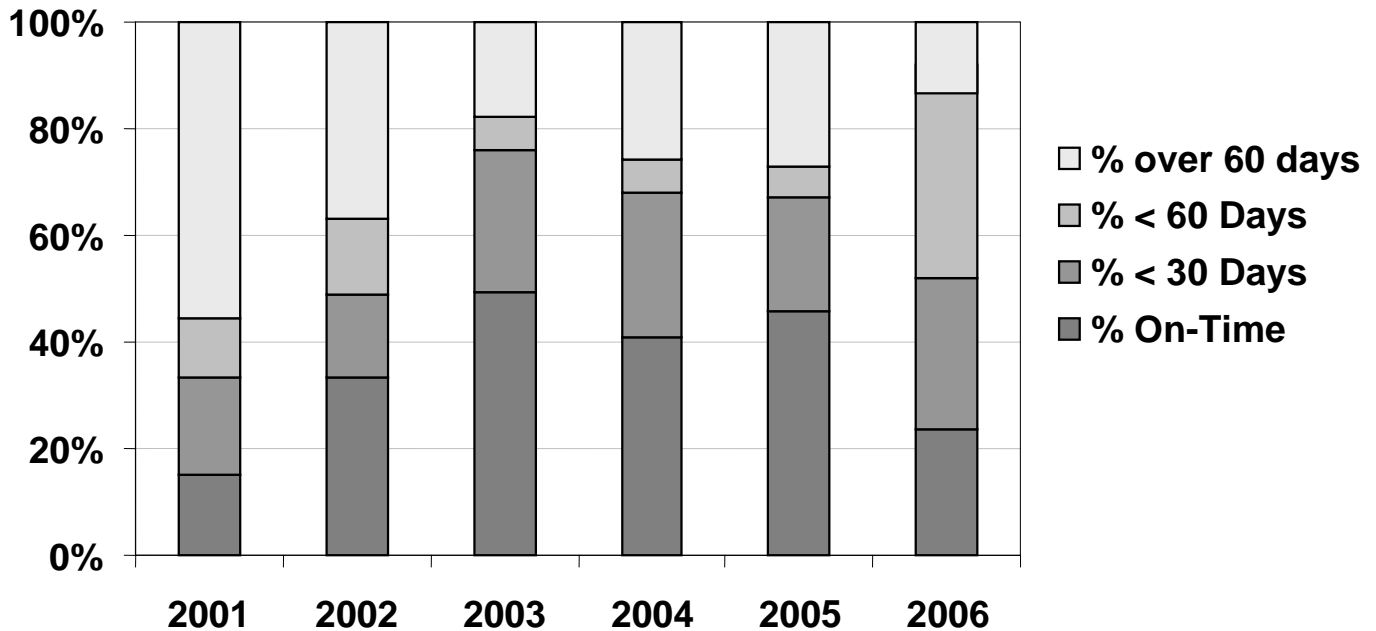


**Percent Ad Dates Met Prior, On-time, within 30 Days, within 60 Days, or Beyond 60 Days**

A key driver in meeting both the Strategic Projects and Program Delivery Investment Category goals is gauging how well project advertisement dates (ad-dates) are being met. In FY2006, 24.78% of projects' ad-dates were met prior to or on the scheduled ad-date. This is an on-time ad-date performance decrease of 46% from FY2005 to FY2006. However, projects delivered within 30 days and within 60 days increased to 44.25% and 53.10% respectively. Projects delivered beyond the 60-day scheduled ad-date timeline decreased from 27.1% in

2005 to 10.6% in 2006. For each delayed day, not only are the project timelines impacted, but also the ability to manage project resources effectively. More importantly, fiscal accountability becomes difficult to manage. The ability to begin projects on-time has a tremendous impact on the Department's credibility with customers and stakeholders, as well as bonding firms. The reality is that there will always be external barriers affecting this achievement. However, monitoring this performance will assist in understanding the magnitude of the problem, impacts and will help identify changes that may need to be made in order to improve performance .

**Statewide Project Ad-Dates Performance**



### CDOT Employee Turnover Rate

The increase in funding from FY05 to FY06 is primarily due to the Transportation Commission establishing a higher initial contingency reserve to be used in the event of an emergency. The Center for Human Resource Management (CHRM) has collected and analyzed CDOT's annual employee turnover rate for several years. Annual turnover rate contributes to the optimization of the Department's capability in retaining a qualified workforce.

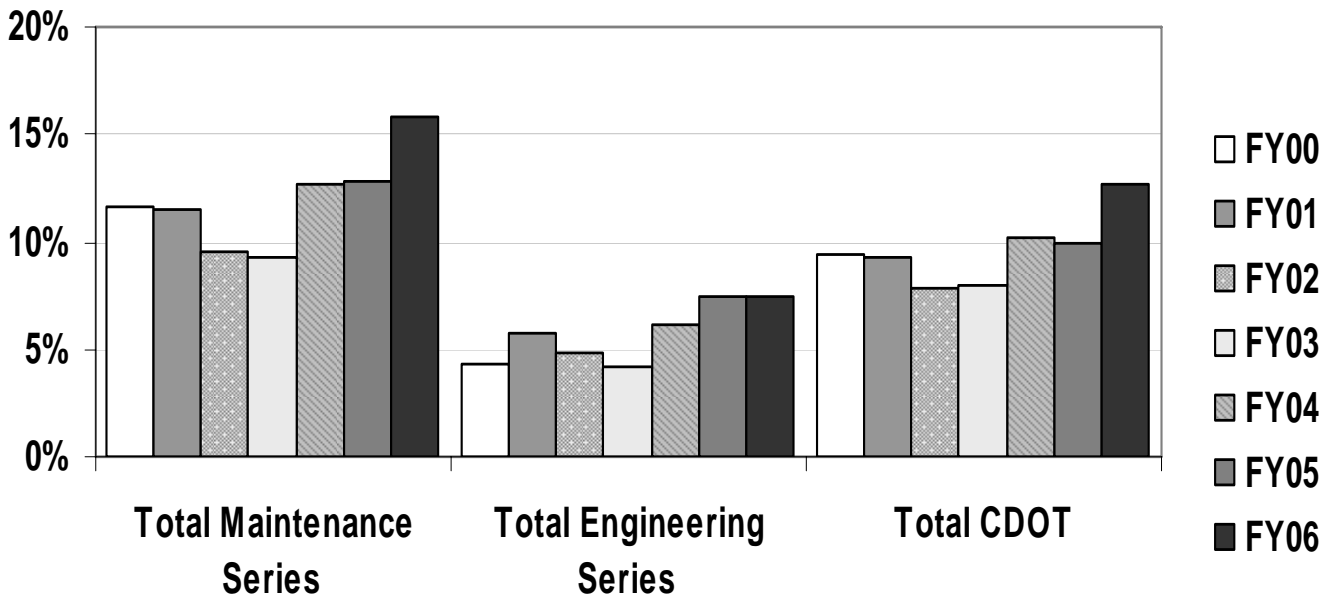
CDOT's annual turnover rate increased from 9.9% in 2005 to 12.7% in 2006. The percent indicates that approximately 13 out of every 100 CDOT employees terminate employment with CDOT on an annual basis. Employees generally terminate employment voluntarily through retirement or for job opportunities outside the

Department. Additionally, employees separate involuntarily through lay off or termination. The turnover rate for fiscal year 2006 has reached an all-time high.

### Maintenance Series Turnover

The rate of transportation maintenance turnover over the past ten years has been generally higher than the rate of engineering turnover. Maintenance turnover rate ranges from a low of 8.1% in 1996 to an all-time high in 2006 of 15.8%. Engineering turnover rate ranges from a low of 4.2% in 2003 to a high of 9.7% in 1999. The annual turnover rate of Maintenance Worker I employees has reached a new all-time high of 18.5%. Maintenance Worker II employee turnover also increased from 6.6% in 2005 to 11.2% in 2006, while Supervisor I decreased slightly from 10.3% in 2005 to 8.0% in 2006.

**Employee Turnover Rate**

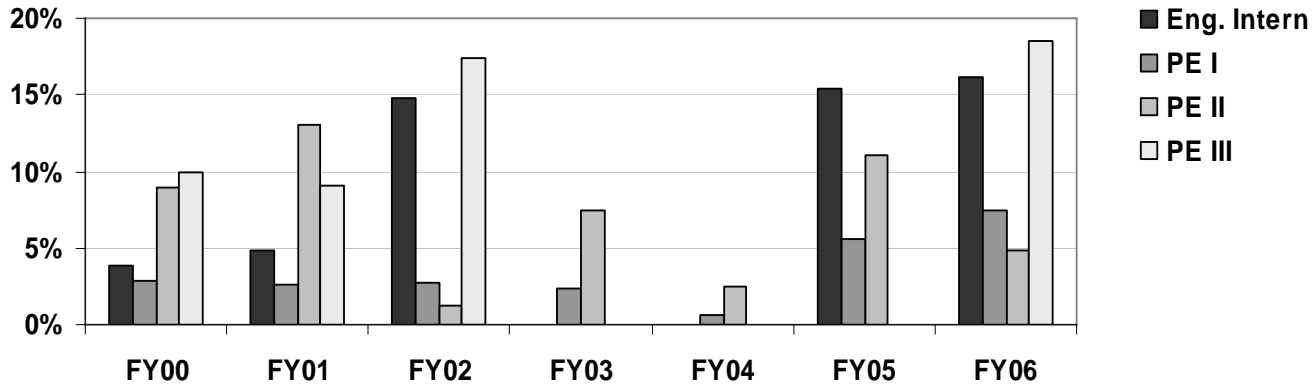


## Engineering Series Turnover

The Engineering series that had a low turnover rate for FY2003 and FY 2004 has increased slightly in FY2005 and FY2006. While the Professional Engineer II

classification decreased dramatically from 11.1% in 2005 to 4.9% in 2006, the Professional Engineer III classification increased from 0% 2005 to 18.5% in 2006.

**Engineering Series Employee Turnover**



Turnover can also be examined specifically for short-term employees. Probationary employees are those CDOT employees within their first year of state employment. The FY2006 turnover rate of 28.3% for probationary employees is at the highest point since 26.5% recorded in 2000. This is more than twice the turnover rate as a whole (12.7%). This suggests that improved efforts to select, orient and retain new employees may be a useful strategy. High turnover of new employees results in increased costs in the area of selection, new employee training and reduced productivity. However, because the probationary period is the final step of the selection process, it is anticipated that the turnover rate would be higher during this period of time.

While the loss of probationary employees occurs at a higher rate than with tenured employees, this loss may not have as much impact to the Department as the loss of

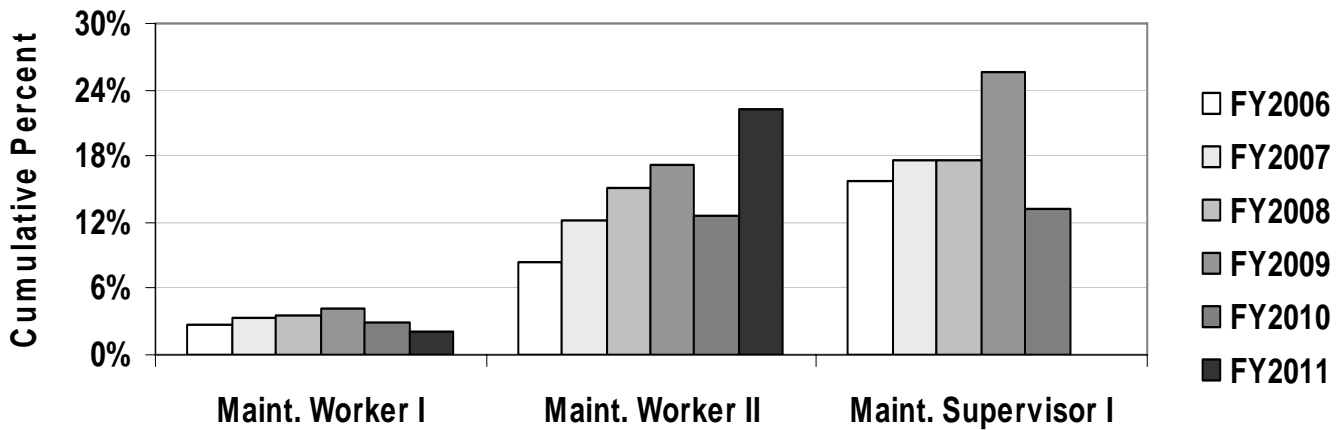
long-term employees. Long-term employee turnover can be of great costs to the Department, because it involves the loss of valuable organizational knowledge, training, skills, experiences, productivity, and cohesiveness among co-workers. Therefore, it is in CDOT's interest to minimize the rate of avoidable long-term employee turnover whenever possible. Data substantiating employees' reasons for separation from CDOT between 1999 and 2003 indicate that of the total number of separations from CDOT, approximately 48%, was attributed to voluntary resignation (e.g., accepted new job, personal reasons), and approximately 38% was attributed to retirement. Employee separation attributed to retirement will consistently contribute to annual employee turnover rates, and should therefore be monitored and managed for succession planning purposes.

## Retirement Projections

CDOT can expect to lose over 20% of its workforce over the next five years due to full retirement. This number does not include employees who may take early retirement with reduced benefits or those employees who have purchased retirement service credits. In

contrast to previous years' data, 2011 anticipated retirement projections are highest among the lower classes within the Maintenance series. This is alarming due to the fact that these lower classes serve as applicant pools to fill supervisory / management level positions as they become vacant.

### Maintenance Series Retirement Projections



Over the next five years, approximately 50% of both Professional Engineer I and Professional Engineer III employees are eligible for full retirement benefits.

### Engineer Series Retirement Projections

