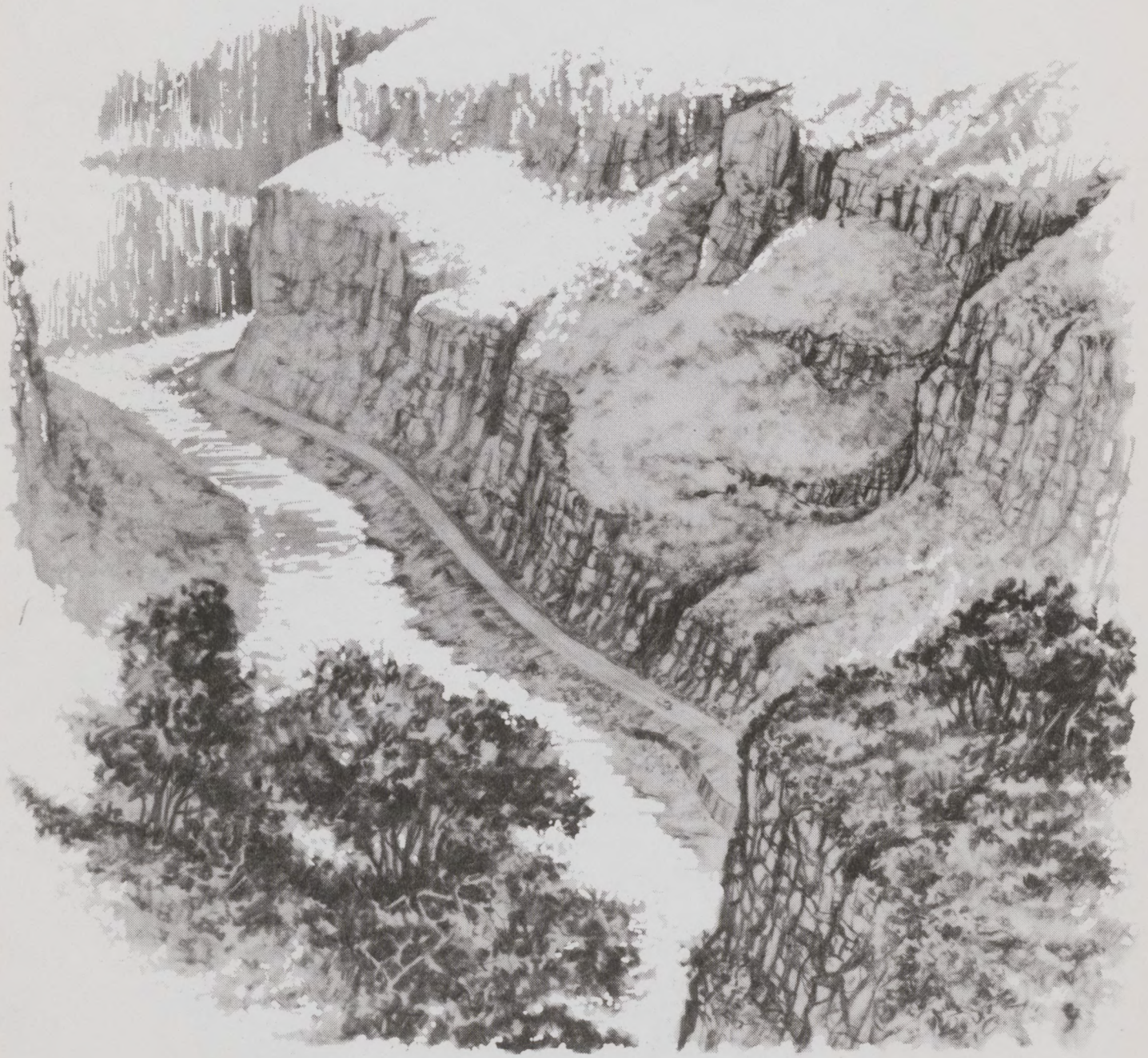
• ANNUAL • REPORT •

1983 Colorado State Department of Highways 1984



A Message from the Executive Director

Fiscal 1983 and Fiscal 1984 were years of major decisions, both on the federal and state level, to do something about our deteriorating highway system.

The United States Congress for the first time committed itself to a multi-year highway program and provided major funding increases for the completion and repair of the Interstate highway system as well as for bridge rehabilitation.

Here in Colorado, the federal commitment was matched by a motor fuel tax increase to provide additional state revenue to match the higher federal funding levels. Heartened by this action and by additional funding for C-470, the Highway Commission committed to fully match available federal funds to accelerate completion of C-470, to replace the Colfax Viaduct, and to start three important new capacity improvement projects--widening Parker Road in the Denver area, starting the first usable segment of the Colorado Springs Bypass, and constructing the LaPorte Bypass, the first leg of the Fort Collins Expressway.

In sum, the past two years gave us the opportunity to address major needs in our highway system. We are pleased to report on our progress in solving these as well as other challenges facing the Department of Highways.

Joseph Dolan

Contents

Major Events

Legislation and highway-related studies, as well as major construction projects, all contribute to the safety and comfort of Colorado's highway users. This section of the report highlights major activities of those areas.

54TH Colorado General Assembly

Surface Transportation Assistance Act of 1982 (STAA)

In December 1982, Congress passed the Surface Transportation Assistance Act which went into effect January 6, 1983. The Act increased the federal gas tax by 5¢ per gallon. The STAA is primarily oriented toward speeding up funding, especially for repairs of highways and bridges, and the completion and rehabilitation of the Interstate system.

Motor Fuel Tax and Fee Increase

The Colorado General Assembly adopted legislation effective July 1, 1983, that imposed a 3¢ increase on each gallon of gasoline and a 4¢ increase on each gallon of diesel fuel sold. Money generated by this new tax was primarily used for the matching funds needed to receive Colorado's portion of revenue provided by the 1982 STAA.

The following year, the General Assembly increased the fees for drivers' licenses, copies of motor vehicle-related records, and restoration of drivers' licenses in order to make these programs self-supporting and increase available funding for roads.

Four-Wheel Drive Vehicles

This legislation allows four-wheel drive vehicles with adequate tires (minimum tread depth of 1/8 inch and all four wheels engaged) to travel without chains when the chain law is in effect.

Creation of a Department of Public Safety

The Colorado General Assembly created a new Department of Public Safety effective July 1, 1984, to include the State Patrol, Colorado Law Enforcement Training Academy, Colorado Bureau of Investigation, Division of Criminal Justice, Division of Disaster Emergency Services, and a Division of Fire Safety.

Child Restraint Systems

In 1983, a law was passed mandating that children under four years of age and under 40 pounds be secured in a child restraint system when traveling in an automobile driven by a resident of Colorado. The law was amended in 1984 to exempt children who are being transported in a motor vehicle in which all seating positions are occupied or in a medical emergency.

Drunk Driving

This law permits law enforcement officers to revoke, on the spot, the licenses of drivers who refuse to take a chemical test for alcohol concentration or who register a blood alcohol level of .15 percent or higher. A seven-day permit is issued at the time a driver's license is revoked. During those seven days the driver must request a hearing with the Department of Revenue if he wishes to appeal the revocation. If convicted, revocation of the driver's license is for a period of one year and no probationary license may be issued. The new law includes stiffer penalties for a person found driving under the influence of alcohol or other drugs.

Prohibiting Opaque, Non-Transparent, or Mirrored Windows on Motor Vehicles

The law prohibits the use of opaque, non-transparent, or mirrored applications to the windshield or front side windows of motor vehicles if the operator of a vehicle cannot be easily identified from the outside. The law also prohibits the use of mirrored or metallic windows on any window of a motor vehicle, but allows such windows if they meet federal standards and came as original equipment on a motor vehicle.

Highway Bonding

In 1984, the General Assembly considered legislation to allow the Highway Commission to issue bonds for the repair and construction of highways. Existing law had not been changed in over 20 years and many provisions were outdated. After considerable discussion, the Legislature adopted a bill to allow the Commission to issue bonds for toll roads. Although use of such a law is hindered by the federal government's restrictions on toll roads, the bill represents a continuing attempt in Colorado to develop alternative financing methods for its highways and bridges.

Construction on I-70 at Glenwood Canyon

In 1983, the Highway Commission allotted $27 million to begin work on a scenic four-lane section of I-70 through Glenwood Canyon. The 12.5-mile segment through the canyon is one of two unfinished links of I-70 in Colorado, as it stretches across Colorado from the Kansas to Utah borders.

The project requires moving U.S. 6 slightly to the north to construct two eastbound lanes which will connect both ends to I-70. Traffic in both directions will then be diverted to the newly constructed lanes while the two westbound lanes are built at an upper level, chiseled out of the canyon wall. A bike lane will parallel the highway.

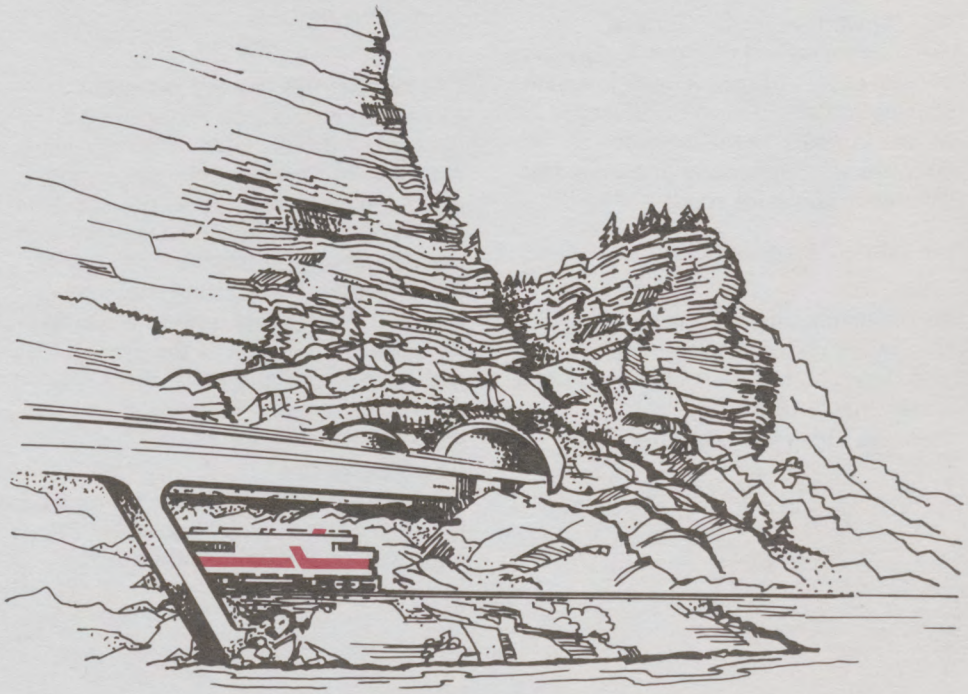
Preservation of the canyon's beauty is a serious element in the design and construction of the $320 million project. Construction, expected to be complete sometime in 1993, is within the U.S. 6 corridor, constructed in 1938.

Glenwood Canyon Pilot Tunnel

In order to maintain the visual character and recreational potential of the Shoshone Dam/Hanging Lake area, as well as removing much of the visual and noise impacts of the highway, design called for two vehicular tunnels, a plan which will also aid in returning the canyon to a more natural state.

Work on the Glenwood Canyon pilot bore tunnel includes diverting a live stream around the work site and cutting two test bores through the rock.

Geologic and geotechnical information gained during this project will be used in designing the vehicular tunnels.



I-25 Corridor Study-South

Concern about the impact of increased development in the area between Denver and Colorado Springs - an area served mostly by I-25, rural highways, and unpaved roads - led the State Highway Department, local government officials, and private sector developers to conduct the **I-25 Corridor Study.**

The purpose of the study was to examine the area and its future transportation needs as a whole rather than in reference to a single development at a time. The study objectives were as follows:

- To examine the cumulative effect of development on the corridor's highway system.
- To develop a short-range (1982-1990) and long-range (1990-2000) highway system plan.
- To identify other transportation modes and their influence on the highway system.
- To develop a cost allocation plan to support needed highway improvements.
- To provide a product that can be monitored, updated,or extended.
- To present results in a comprehensive and clear manner.

The I-25 Corridor Study was funded jointly with local and federal funds. A 21-member task force representing the Colorado Department of Highways, local governments, regional planning agencies, bus service providers, railroads, and private sector developers was appointed to manage the study. Led by CDOH, the I-25 Corridor Study provides the first comprehensive look at the corridor as an entity with special regard to the future of the area. The study provides a planned program of capacity improvements which will allow for development of the highway system to keep pace with growth.

Replacement of Denver's Colfax Avenue Viaduct

Replacement of the 66-year-old Colfax Avenue Viaduct, rated as one of the most dangerous bridges in the country, began with the removal of the old structure in June 1983. The 1.1-mile project, which included both design and construction of a detour project and the viaduct replacement, had an estimated cost of $30 million compared to the original viaduct, built in 1917, which totaled $787,000. The new structure contains the longest prestressed girders ever placed in Colorado: 150.5 feet in length and weighing 127,000 pounds each. The viaduct opened August 7, 1984, 100 days ahead of schedule.

Demolition of Old Colfax Avenue Viaduct

New Colfax Avenue Viaduct

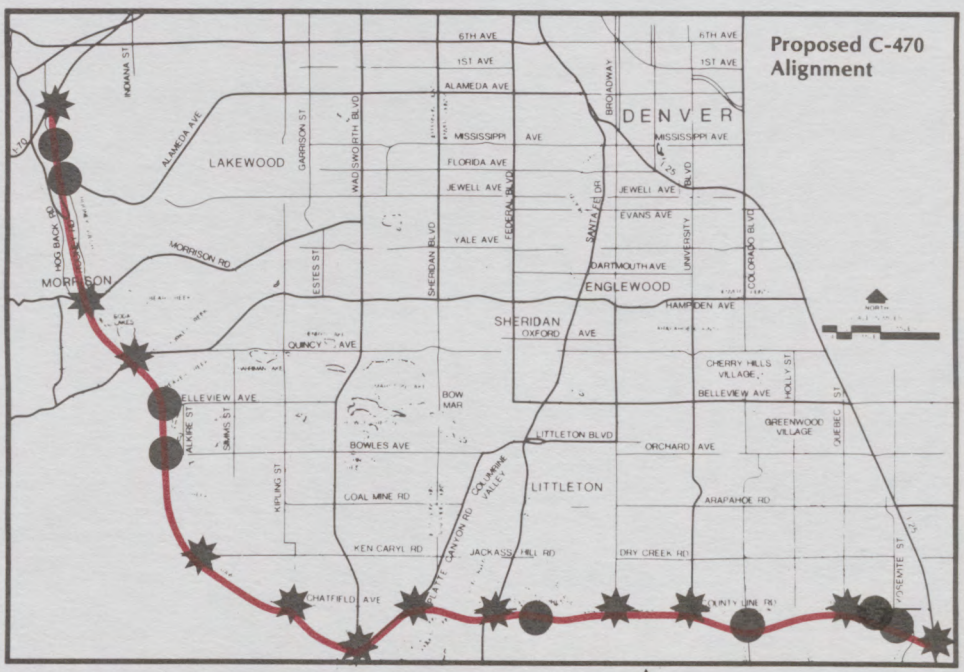
Truck Issues

Several changes affecting the trucking industry took place during the past two years. A **Longer Vehicle Combination Study** was conducted and later led to passage of legislation permitting longer vehicle combinations on designated sections of Colorado's Interstate system. Two other significant pieces of trucking legislation adopted by the 1983 General Assembly included a bill solidifying the Department's rule-making authority to issue overweight and oversize permits and increasing the fees for these permits, and a bill increasing the fine for loads in excess of 4,250 pounds above the legal limit. Legislation was also passed to bring Colorado into conformance with the overall truck dimensions as outlined in the 1982 federal Surface Transportation Assistance Act. During the 1984 session of the General Assembly, legislation changed the maximum length of a single unit vehicle, bringing Colorado into conformance with neighboring states, and allowed higher vehicles on specific highways designated by the Department.

In the effort to protect our highways from the effect of overweight vehicles, the Department conducted the National Workshop on Weigh-In-Motion (WIM). The workshop reviewed the current state of the art, as well as future possibilities, for the use of WIM in weight monitoring and enforcement.

Progress on the Construction of C-470

As long ago as 1958, a need for a southwest route around the metropolitan Denver area was expressed. Groundbreaking for this $219 million project took place in 1982. Additional federal funds for Interstate transfer projects became available in 1983, thus helping to increase activity and progress on C-470.



The Building of a Unique Highway System

The mountainous terrain of Colorado has made the construction and maintenance of its roads unique. The present 9,210 miles of our state highway system evolved from narrow dirt roads built by stage lines, mining companies, and private individuals in the mid 1800s. The following chronology and photographs of highway events show the dramatic growth of this system.

History of Road Development in Colorado

1859-1876 Many roads were built before Colorado gained statehood. Stage lines and mining companies were largely responsible for this growth, as were private individuals investing in toll roads.

1909 The first State Highway Commission was created in legislation passed by the General Assembly. Three members were appointed to the commission, taking their posts on January 1, 1910.

1915 Better roads were bringing more tourists to the state. The **Kansas City Post** referred to Colorado as the "Playground of America." The road from Denver to Colorado Springs averaged 253 cars per day, with 85 of these vehicles coming from other states.

1916 The passage of the Federal Road Act provided federal matching funds for state highway projects.

1917 The State Legislature passed the Highway Act reorganizing the Highway Commission into the State Highway Department and creating the State Highway Fund to distribute state and federal funds.

1918 The first concrete pavement was laid in the state. The roadway extended from Denver to Littleton.

1922 The U.S. Bureau of Public Roads approved Colorado's first federally aided road system which covered 3,332 miles.

1927 The highest auto road in the world was completed to the summit of Mt. Evans.

1932 The depression was felt by the Highway Department when federal-aid allocations under the Highway Acts of 1916 and 1921 ceased. Later, in 1936, several important projects were built with Public Works Administration assistance.

1940 Construction of the original highway was completed on Vail Pass.

Commissioners Borzago and McKay with the owner -editor of the ***Gilpin County Observer****, W.J. Stull (background) at Cold Springs, Gilpin County, Colorado June 2, 1918.*

1944 The Federal Highway Act of 1944 authorized the Interstate highway system including I-25 from Raton, New Mexico, to Cheyenne, Wyoming; I-80S (now I-76) from Denver to Julesburg; and I-70 from Denver to the Kansas line.

1948 Work began on Denver's Valley Highway (I-25).

1958 Denver's Valley Highway was opened.

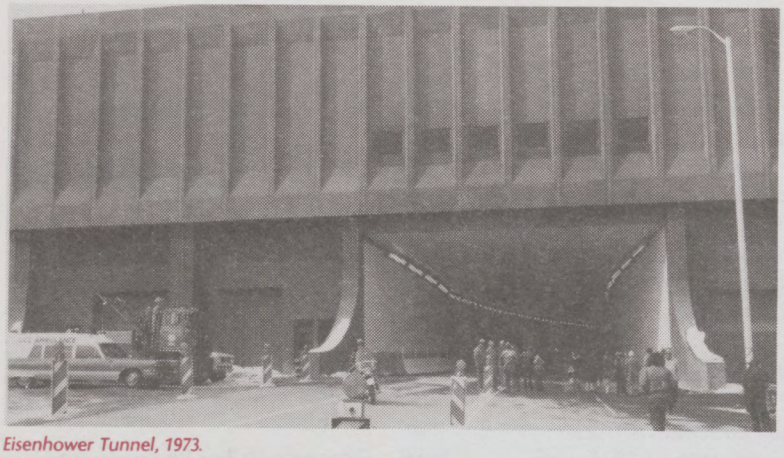
1964 The 1960s brought the expansion of the Valley Highway and I-70. I-70 east of the Valley Highway was opened to traffic in 1964.

1973 The westbound bore of I-70's Eisenhower Memorial Tunnel was dedicated by Governor John Love.

1979 Governor Richard D. Lamm dedicated the eastbound (Edwin C. Johnson) bore of the Eisenhower Memorial Tunnel.

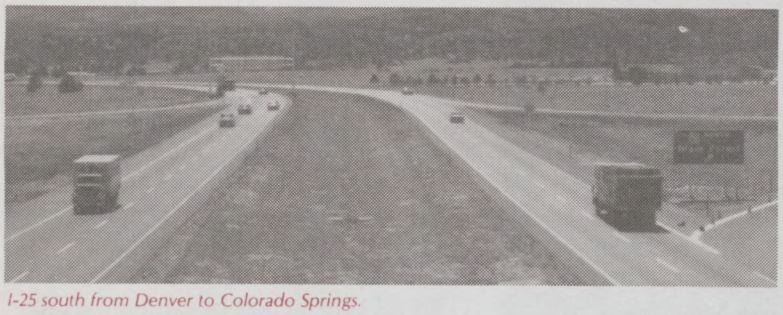
1984 After the demolition project in 1983, Denver's reconstructed Colfax Avenue Viaduct was opened to traffic. The 1.1 mile project was accomplished in just 395 days, 100 days ahead of schedule.

1984 Construction began on a scenic 12.5-mile section of I-70 through Glenwood Canyon.

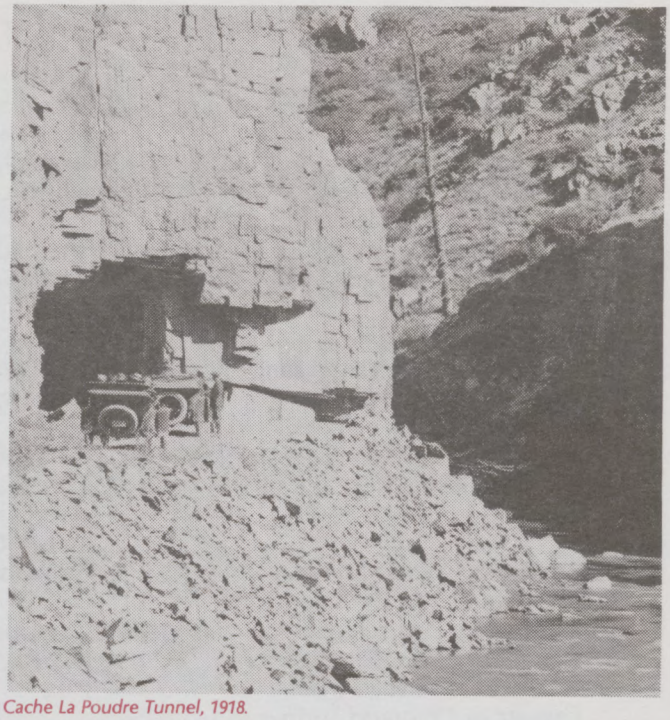


Eisenhower Tunnel, 1973.

Road through Haskell's Place, Colorado, 1888.



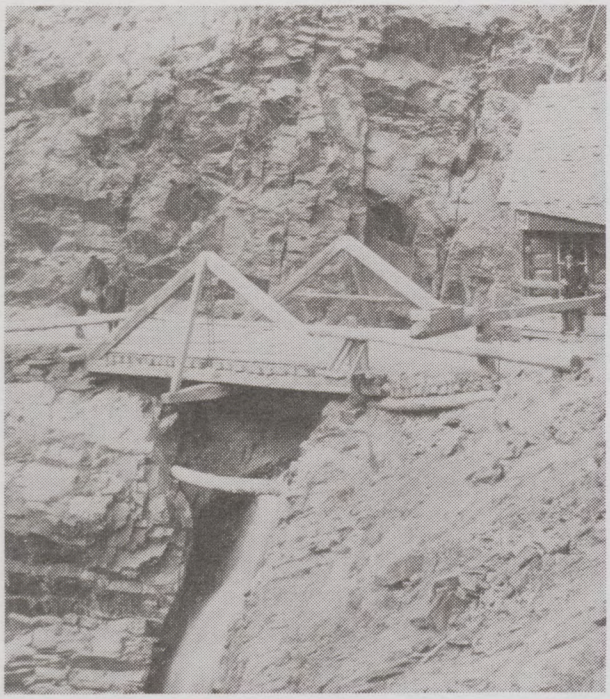
I-25 south from Denver to Colorado Springs.



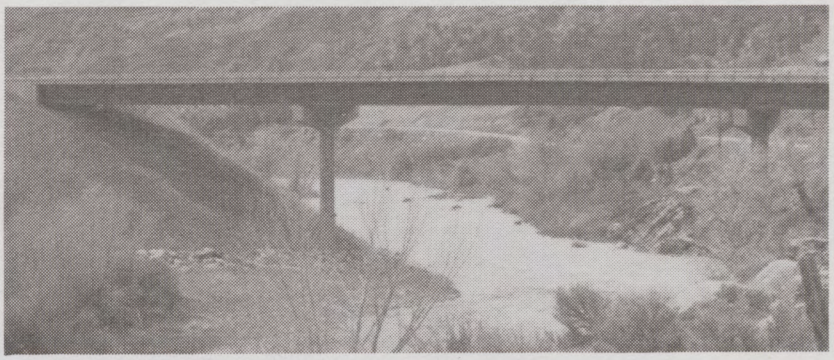
Cache La Poudre Tunnel, 1918.

Roadway from Denver to Colorado Springs, 1918.

I-25 through Denver, Colorado, 1984.



Bear Creek Falls Toll Bridge.



Bridge over Animas River.

State Patrol's 1984 Mustang.

Vintage 1935 Colorado Courtesy Patrol Vehicle.

One of Colorado's early toll roads.

Denver-Boulder Turnpike toll gate, 1957.

Department Organization

The Colorado Department of Highways began with three commissioners and a stenographer, secretary, and engineer. Today it has a work force of more than 2,900, comprised of Highways, Administration, Transportation Planning, Management and Budget, Highway Safety, Information Systems, and Audit. The Colorado State Patrol, following action by the 1983 Legislature, was removed from the Department of Highways effective July 1, 1984, and placed under a newly created Department of Public Safety.

About the Commission

Colorado's 9,210-mile state highway system is managed by the State Department of Highways under the guidance of the Colorado Highway Commission. The Commission is composed of nine citizens appointed by the Governor and approved by the State Senate to serve four-year terms.

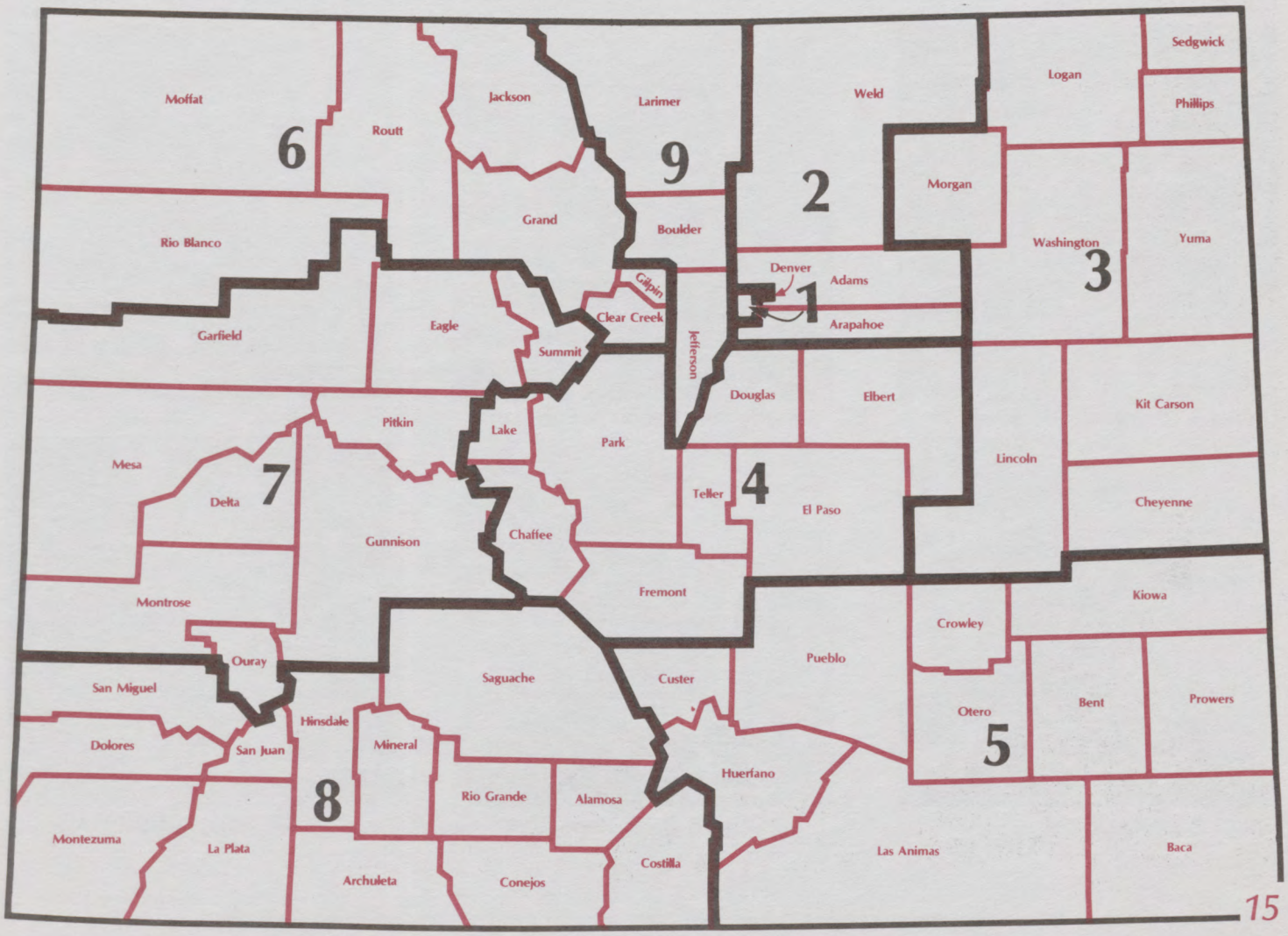
Prior to 1983, eight of the commissioners were from specific districts, one was appointed at-large. Pursuant to a legislative change, in March 1983 all nine members represent a geographic area of Colorado.

Duties of the Commission

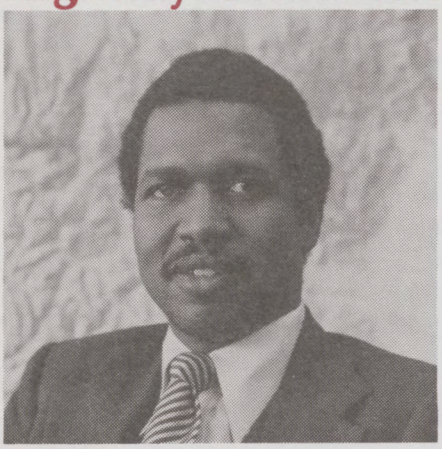
Under the state law, the powers and duties of the Highway Commission include the following:

- Formulating general policy with respect to the management, construction, and maintenance of public highways in the state.
- Advising and making recommendations to the Governor and the General Assembly relative to highway policy.
- Promulgating and adopting all state highway budgets and programs, including construction priorities and the approval of extensions or abandonments of the state highway system.

Commission Districts



Highway Commissioners



District 1, King H. Harris

District 2, Grant Wilkins

District 3, Charles L. Hanavan, Jr.

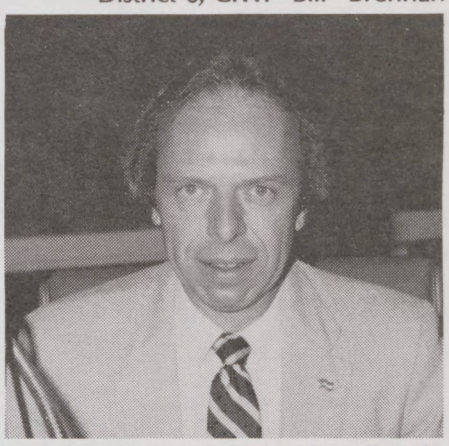
District 4, George G. Alderman

District 5, Joseph A. Fortino

District 6, C.W. "Bill" Brennan

District 7, James Golden

District 8, Bill E. Roundtree



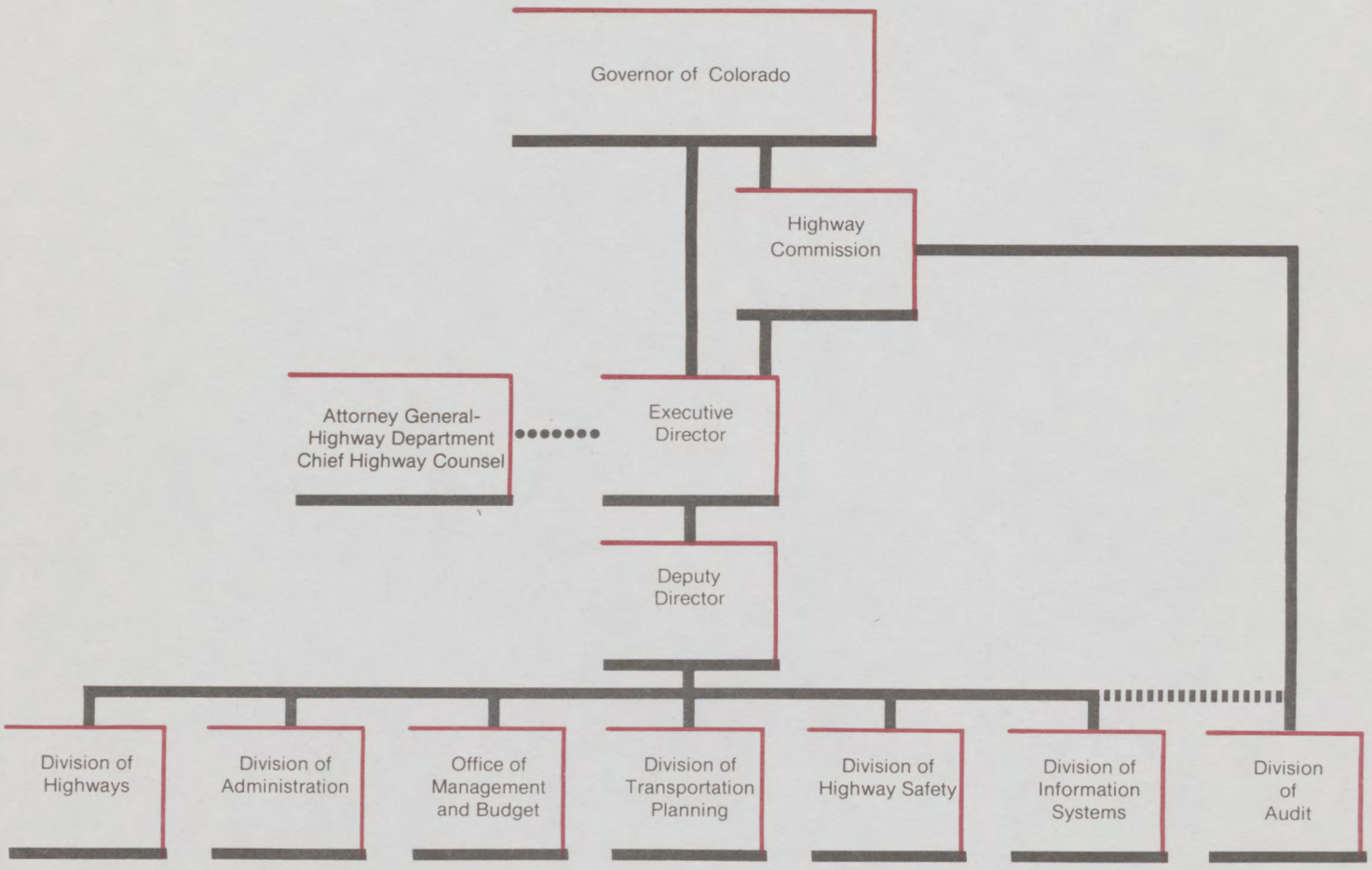
District 9, Richard J. Albrecht

Colorado Department of Highways Goals

It is the policy of the Colorado Department of Highways to direct its efforts toward the accomplishment of the following goals for the health, safety, and welfare of the people of Colorado:

- To improve the structural integrity of the transportation system.
- To improve the usefulness of the transportation system.
- To improve travel efficiency of the transportation system.
- To reduce transportation-related accidents.
- To improve the energy efficiency of the transportation system.
- To vigorously support compliance with the 55 MPH speed limit.
- To utilize the statewide transportation system as a positive influence toward achieving state and local priorities for economic development.
- To minimize the adverse social and environmental effects of transportation systems development.
- To increase the minority population's participation in the economic benefits of the transportation system through direct employment, contracting policies, and route decisions.
- To maximize the effectiveness of Department resources through increased Department efficiency, economy, and productivity.
- To provide assistance to public and private entities in transportation matters.

Organization of the Colorado Department of Highways



Direct lines of Authority & Responsibility

Advisory Relationship

Appointing Authority

As of July 1, 1984

District I

Phillip R. McOllough
18500 E. Colfax Ave.
Aurora, Colorado 80011
303-757-9371

District II

Frank L. Sollee
P.O. Box 536
905 Erie Ave.
Pueblo, Colorado 81002
303-544-6286

District III

Robert P. Moston
P.O. Box 2107
222 S. 6th St. #317
Grand Junction, Colorado 81502
303-248-7210

District IV

Albert Chotvacs
P.O. Box 850
1420 2nd St.
Greeley, Colorado 80632
303-353-1232

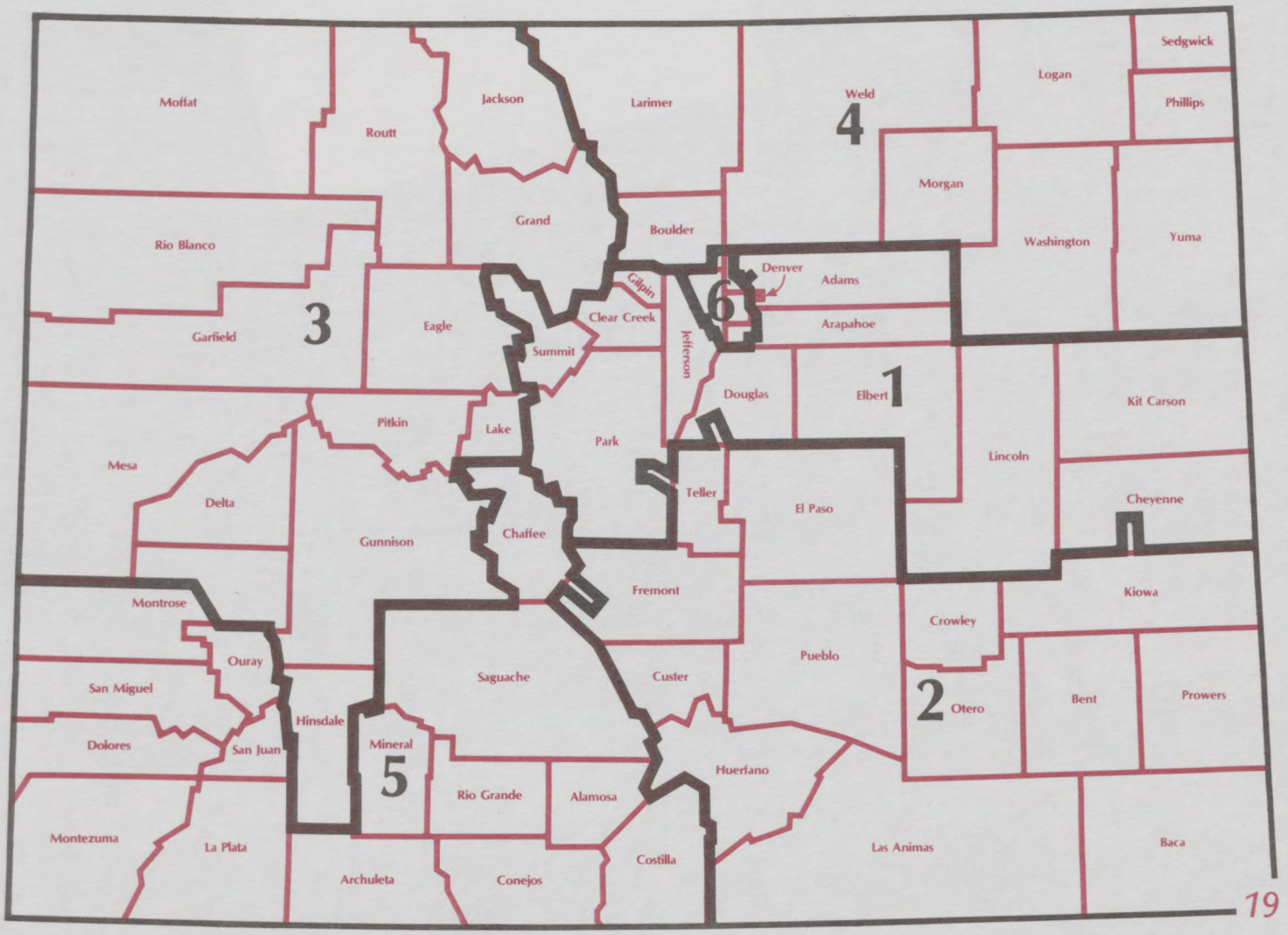
District V

Alfred A. Shablo
P.O. Box 2507
Highway Building
Durango, Colorado 81301
303-259-1241

District VI

Richard J. Brasher
2000 South Holly
Denver, Colorado 80222
303-757-9251

Engineering Districts



Program Highlights

The Department is justifiably proud of its numerous accomplishments during the past two years. Programs summarized in this section have been successful in serving the needs of the traveling public.

Highway Safety

As a coordinating agency for work in numerous fields of traffic safety, the Division of Highway Safety concentrated its efforts on alcohol safety, emergency medical service for traffic crash victims, traffic engineering studies, safety belt and child safety seat use promotional efforts, and speed compliance projects. Highlights of the past two years follow.

Traffic Fatalities

Fatal traffic accidents involving alcohol continue to decline in Colorado. During the first six months of 1984, there were 89 alcohol-related crashes, compared with an average of 140 during the first six months of the previous five years. The trend, however, began in 1983 when there were 118 alcohol-related crashes. The Division credits the drunk driving laws passed in 1982 and 1983 for the drop in fatalities.

Drunk Driving

During this period, the Colorado Legislature passed changes in the state's drunk driving laws which significantly increased penalties for Driving While Ability Impaired and for Driving Under the Influence. The new law introduced the element of public service work for drivers convicted. These changes became effective July 1, 1982.

Another important change in the drunk driving law was the creation of the Law Enforcement Assistance Fund (LEAF). This fund was generated by a $50 fee assessed each driver convicted of an alcohol-related traffic charge -- either DWAI or DUI. In addition, a separate $10 fee was assessed against the guilty driver. This fee went directly to the county in which the conviction took place. For the first time, Colorado cities and counties began receiving help for drunk driving enforcement on a regular and largely predictable basis.

Of the total LEAF amounts collected, the Division of Highway Safety administers 80 percent and the Alcohol and Drug Abuse Division of the Department of Health administers the remaining 20 percent. Highway Safety LEAF proceeds go to cities and counties to assist with law enforcement activity, while Alcohol and Drug Abuse Division proceeds go toward statewide alcohol abuse education and prevention efforts.

The Division of Highway Safety made its first LEAF awards on July 1, 1983, to 11 locations in an amount totaling $295,000. Additional awards in 1984 brought the total to $1,136,200.

Drunk driving arrests in Colorado reached nearly 38,000 in 1983. Translated into a rate based either on arrests per 10,000 licensed drivers or per uniformed officer, Colorado's drunk driving arrest rate stood among the top half-dozen states in the country.

The Division of Highway Safety continued an aggressive program to train all traffic law enforcement officers in effective arrest techniques and to train prosecutors and judges who deal with drunk driving cases.

A contract with the Colorado District Attorneys Council was initiated to improve the tracking system for drunk driving cases. The new system included installation of computers in the offices of each of the state's district attorneys. It was designed to provide more complete information about how effectively drunk driving cases were moving through the prosecution process.

Child Safety Seats

Working with numerous service organizations ranging from extension homemakers groups to hospitals and other health care providers, the Division of Highway Safety helped establish over 100 programs throughout the state to encourage voluntary use of safety seats for children riding in cars. The programs featured safety seats available for loan to parents of newborns.

Hazardous Materials Training

The Division of Highway Safety administers a training school for persons responsible for containing and controlling spills of hazardous material while in transport. This program, called the Colorado Training Institute, was the first and only such school conducted by a public agency in the nation when it was established several years ago. During 1983, 866 students were trained to handle hazardous materials spills safely. Another 617 students attended during the first six months of 1984.

Traffic Engineering Studies

A comprehensive study of hazardous locations on both state highways and city streets was launched by the Division's traffic engineering branch. Training programs for local traffic engineers in many cities and counties were also initiated.

Colorado State Patrol

In order to maintain a more secure environment for the motoring public, the Colorado State Patrol set the following goals:

- Reduce accidents
- Improve traffic flow
- Increase public security
- Increase productivity within the organization
- Improve Affirmative Action hiring
- Reduce roadway deterioration

To accomplish these goals, the six district commanders, using the Management Information System (MIS), targeted problem areas and then concentrated patrolling efforts in these areas.

Operations

Reducing alcohol-related accidents is a prime concern of the Patrol. Team operations were used in the areas where these accidents were prevalent. The REDDI Program (Report Every Drunk Driver Immediately) has made the public more aware of the drunk driver problem, and has been successful in obtaining their support and participation for this effort.

The Patrol's Auto Theft Unit, working in conjunction with field troopers, recovered 854 vehicles and made 269 arrests. The dollar value of the recovered stolen property is in excess of $3,800,000. Again, security at the Colorado State Fair was provided by the Patrol, utilizing troopers from around the state.

Information Systems

The MIS is the primary tool used to increase efficiency and productivity. Through monthly reconciliation with the Department of Highways' Financial Management System (FMS), the Patrol is better able to monitor expenditures. The MIS also monitors maintenance records on all vehicles.

Equal Employment

Equal employment opportunity is a continuing concern. Special recruiting materials and efforts are used to encourage potential employees in protected classes.

Truck Inspection

Many troopers have been certified as C.V.S.A. (Colorado Vehicle Safety Alliance) Inspectors, increasing the Patrol Truck Inspection Program throughout the state. This certification helped the troopers to become more familiar with the trucking industry. The Patrol continues to work with other agencies, such as the Department of Revenue's Ports of Entry Division, in regulating truck traffic.

Management by Objectives (MBO)

Operating and planning programs within the Colorado Department of Highways are directed toward the accomplishment of specific objectives, developed through the Department's management by objectives philosophy and system. This system requires the adoption of a mission statement and supporting goals by the Highway Commission as the initiating action. Subsequently, the operating and staff divisions determine and commit to appropriate specific objectives. This annually recurring process has helped the Highway Department stretch the transportation tax dollar as far as possible.

Minority Business Enterprise

The Colorado Department of Highways is currently involved in the largest Minority Business Enterprise (MBE) program in the Department's history. During FY 1982-83, $14 million was awarded to MBEs and WBEs (Womens Business Enterprise) for prime contracts, subcontracts, and construction materials. In FY 1983-84, the Department increased its MBE/WBE contract awards by $4.1 million, bringing the total contracts awarded to $18.1 million, which also included professional consultant services.

The Surface Transportation Assistance Act of 1982 requires that not less than ten percent of all federal-aid highway dollars be awarded to DBE (Disadvantaged Business Enterprise) firms. In FY 1982-83, the Department awarded 11.4 percent of its total construction contracts to DBE firms. In FY 1983-84, the Department had 13.4 percent DBE participation in federal-aid contracts.

Rail Program

The Colorado Department of Highways has been involved in rail planning since 1976, analyzing issues relating to Colorado's rail transportation network. The Annual State Rail Plan, produced by the Rail Unit of the Division of Transportation Planning, provides an overview of these issues and presents a statistical and graphic summary of rail freight activities.

The Department also administers a Federal Railroad Administration program which provides funding for track rehabilitation and rail facilities construction projects. More than $1.2 million has been invested in improving Colorado's rail network since 1980 through this program.

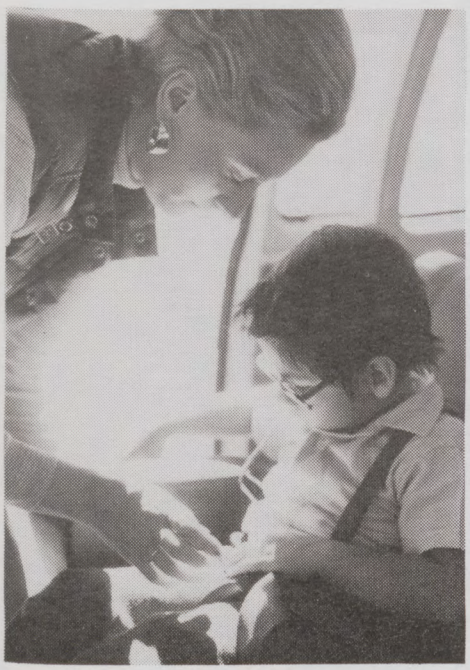
Transit Program

The Transit Unit of the Department's Division of Transportation Planning administers three Urban Mass Transportation Administration (UMTA) grant programs which include the following:

- Technical studies
- Capital equipment purchases
- Capital purchases and administration and operations assistance

The recipients of federal UMTA funds are small rural transit agencies and private nonprofit transportation agencies who serve the elderly and handicapped.

During FY 1982-83, 800,761 passenger trips in buses and vans were recorded under the UMTA program, originating from 55 sites throughout the state. During FY 1983-84 the number of trips through this program increased to 1,100,522.



Bicycling

The Department has for several years promoted bicycle transportation by encouraging the construction of safe bicycle facilities and offering technical assistance to local governments and bicycle organizations.

More and more Coloradoans are recognizing that bicycling can be an energy-efficient, pollution-free, fun mode of transportation. The Department has been instrumental in the construction of many miles of bikeways in the state. As funds are available, Colorado will continue to address this transportation need.

Information Systems

Information Systems was given divisional status in May 1984, bringing together engineering computing, interactive graphics, administrative data processing, and office automation activities. Their charge is to modernize and provide new tools to raise the productivity of Department personnel through long-range information system planning.

The completion of the new computer graphics system allows for computerized drafting activities and mapping. The six computer stations, active with two shifts each day, have increased the productivity of the draftsperson from 4:1 to 10:1, depending on the nature of the work. This will also provide the Department with the capability to accept digital map information from the Federal Highway Administration, United States Geological Survey, counties, and cities.

Along with the 42 microcomputers in use throughout the Department, many new large-scale computer programs are being installed, including a central data base for all information concerning any section of the public road system, and a system to schedule all preconstruction engineering activities carried out by the Department. This will provide in-depth planning, scheduling, and the proper use of resources. Another system provides a management tool to coordinate, evaluate, and account for the use of all highway equipment throughout the state.

Transportation Planning

Resource Allocation and Project Prioritization

During the summer of 1982, the Department initiated the Resource Allocation and Project Prioritization program (RAPP). The purpose of the program is to recommend an allocation plan by work group, project type, and engineering district to meet the objectives and priorities of the Department. In January 1983, the resource allocation phase was utilized in the distribution of Interstate 4R and secondary funds. The project prioritization phase of the program, which involves the specific ranking of eligible sections within a project type, was developed in 1984 and will be implemented in the upcoming year.

Pavement Management System

Another element initiated during 1982 within the programming process, involved the development of a Pavement Management System (PMS). The Pavement Management System is a method to identify an optimal strategy for routine maintenance, minor surface treatment, and resurfacing. This system will be utilized in future years to optimize the allocation of funds for roadway surface treatment. In FY 1983-84, the network level of the system was designed and implemented. The final step in the programming process is the Five-Year Highway Program of Projects, which annually outlines the proposed projects to be undertaken in the next five years. The RAPP and PMS programs will provide input to the five-year program in future years.

Traffic Data Collection

An area of emphasis in FY 1983-84 was the development and initial implementation of a traffic data collection plan which will eliminate duplication of effort in collecting traffic information as well as provide more timely and accurate traffic information. This plan includes the acquisition of new traffic counting equipment and a new, more effective approach for collection of traffic information.

Colorado Road Information System

During FY 1983-84, the Division staff designed and began implementation of an integrated roadway information management system, the Colorado Road Information System (CORIS). This system will generate reports and give staff easy access to information translating into a significant savings in cost and staff time. Mileage records, pavement conditions, and traffic data were placed in the system.

Computer Graphics System

Another area of significant progress was mapping. With the Department's acquisition of a computer graphics system in 1983, staff began the process of digitizing maps into a computerized format, allowing easy retrieval and efficient, low cost production of the many maps necessary for the Department and, in the future, for other state and local government agencies.

Research and Development Activities

During the past two years, an average of 70 projects were conducted by the Research Branch of CDOH. Many of these projects dealt with geological or structural design and construction technology on I-70, in both Glenwood Canyon and the northwest area of Denver. As technology improves in the properties and use of asphalt cements, these new concepts have been incorporated into asphalt pavements. This includes recycling pavements, identifying chemical properties of asphalt cements, and the use of additives to improve the strength of asphalt pavements. Within the past two years, concrete pavement research has accelerated, especially in reconstruction, overlays, and the investigation of cement/aggregate chemical reaction that has been deteriorating concrete pavements in the western part of the country. Additional research topics include safety and maintenance, economics, and environment.

REACH; (Research Activities on Colorado Highways) continues to be very popular and successful, providing the latest state-of-the-art, research conclusions, and recommendations to a wide audience of federal, state, and local agencies.

Interstate Highway Projects

Colorado's 914 miles of Interstate highway represent ten percent of the total state highway network. The Interstate routes contribute to the growth of the state, carrying 37 percent of the vehicle miles traveled (VMT) and providing primary routes for the transportation of goods.

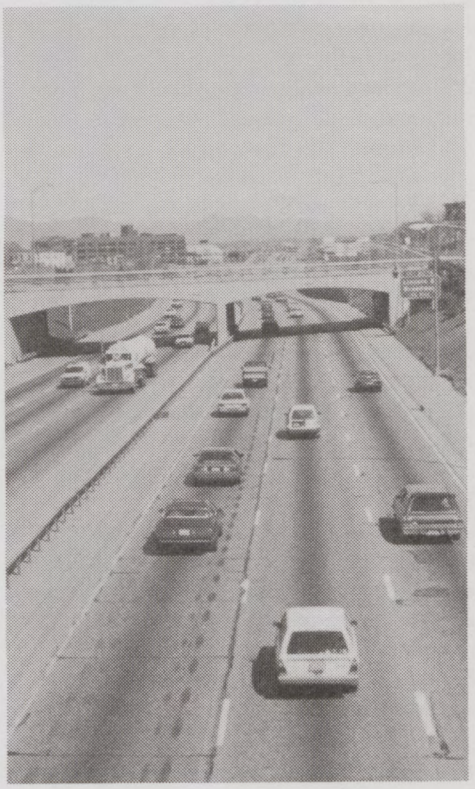
The Interstate highway 4R program authorizes funds for the resurfacing, restoration, rehabilitation, and reconstruction on our Interstate highways.

During the federal fiscal year ending September 30, 1983, $37,683,770 was obligated by the Department under the 4R program, including engineering and construction costs. Funds obligated under the 4R program in federal FY 1983-84 totaled $44,965,204. These amounts reflect the impact of the 1982 Surface Transportation Assistance Act.

Eight 4R projects were completed during the state fiscal year ending June 30, 1983, with a total contract value of $3,062,469. Active and not completed during the fiscal year were 14 projects totaling $15,668,389. Twenty-one projects were completed in FY 1983-84, totaling $14,665,000.

Type of Project	Number of Projects	
	FY 1982-83	FY 1983-84
Overlay	7	8
Grading, Stabilization and Paving	3	1
Grading, Structures and Paving	3	4
Guardrail	1	1
Bridge Deck	2	1
Lighting	2	2
Park and Ride	3	1
Sound Barrier	1	0
Striping	0	3
Total Projects	**22**	**21**

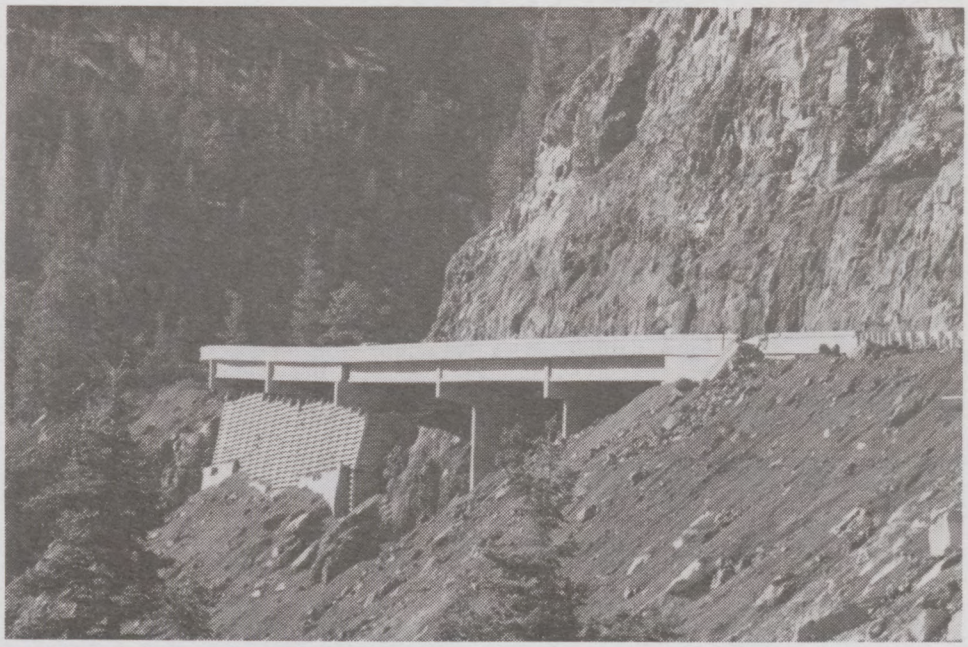
A total of $8,905,365 was paid to contractors for 4R work performed during FY 1982-83. This small amount, relative to the total funds obligated, reflects the large carry-over into FY 1983-84 of construction work not completed.



Bridge Progress

One of the most important and costly investments on any given section of highway is the bridge. The Department maintains a bridge design and inspection staff that strives to improve and protect this investment. To achieve this, 50 designs were completed during FY 1982-83 and 171 designs were completed in FY 1983-84. These designs included new bridges, bridge widenings, and major structure rehabilitations. The major increase in bridge design and construction is due to increased federal funds made available for bridge replacement and rehabilitation. This includes Interstate, as well as other federal-aid programs. During this same period of time, over $56 million in bridge construction was started, with most of that now complete. Bridge construction included the replacement of 38 structurally deficient bridges using funds from the Federal Bridge Replacement and Rehabilitation Program.

An inspection program is conducted to inventory and continually appraise the condition of these structures. Currently, there are 3,531 bridges on the state highway system. A complete file on the condition of each bridge is maintained by the Department and is the basis for repair and replacement priorities. Bridges not classified as deficient are inspected biennially by district inspectors. Deficient bridges are examined annually by Staff Bridge inspectors and on a more frequent basis by district inspectors, depending on traffic volume and the condition of the deficient bridge.



Side bridge on S.H. 160, Wolf Creek Pass.

Maintenance Program

Protecting Colorado's investment in its highway and bridge system has for years been a top priority of the Department. Daily maintenance involves approximately 80 different activities such as pothole prevention maintenance, which includes surface treatment, joint crack sealing, patching, pipe replacement, and shoulder cutting. The eight maintenance sections have increased activity in all of these areas. With the assistance of the Maintenance Management System (MMS), the Department is better able to monitor activities and crew production, as well as provide monthly maintenance reports.

In FY 1982-83, $95.5 million was budgeted for maintenance projects. The FY 1983-84 maintenance budget was increased to $98.8 million. These figures do not include major resurfacing projects which are included in the construction budget.

Heavy winter snowfall, resulting in spring floods and mud slides, plagued the state during the past two years, taxing the Department's snow maintenance crews and equipment. The spring runoff on the western slope caused $4.3 million of damage, due primarily to flooding and mud slides during the two-year period.

The Department is proud not only of the excellent work produced by the maintenance crews, but of the many humanitarian acts these men and women performed, assisting the traveling public during adverse conditions.

Result of mudslide on S.H. 139, Douglas Pass

Performance Indicators

Our highway needs and the Department's accomplishments in meeting those needs are demonstrated in this section of the report.

The dramatic increase in population, especially along the Front Range, and the increasing amount of vehicle miles traveled plus an abnormal amount of snowfall have increased the need for highway maintenance. Despite these obstacles, the Colorado Department of Highways has met the needs of the traveling public.

Employee Statistics

Department of Highways

	1980-81	1981-82	1982-83	1983-84
Number of employees	3044	2886	2888	2907
Number of protected-class employees (minorities and women)	578	555	581	629
Number of minority employees	303	297	325	361
Percentage of protected-class employees	19.0%	19.2%	20.1%	21.6%
Percentage of minority employees	10.0%	10.3%	11.3%	12.4%

Division of State Patrol

	1980-81	1981-82	1982-83	1983-84
Authorized number of employees[1]	783.5	720	725.5	719
Percentage of protected-class employees	31.7%	30.7%	26.3%	30.2%
Percentage of minority employees	10.8%	11.3%	10.5%	12.1%

Highway and Bridge Program Statistics

	1980-81	1981-82	1982-83	1983-84
Prime contract awards *number of projects*	196	181	197	213
Prime contract awards *in dollars*	$108,341,240	$96,820,292	$123,187,852	$181,068,827
Minority business enterprise prime contracts *number of projects*	20	14	30	36
Minority business enterprise prime contracts *in dollars*	$8,318,037	$5,671,653	$10,523,460	$13,083,000
Average number of bids received for each project	6	6	5	5

Truck Weight and Safety[2]

	1980-81	1981-82	1982-83	1983-84
Trucks cleared	3,653,859	2,517,210	2,577,746	3,563,910
Trucks weighed	2,009,246	1,639,057	1,824,112	2,329,701
Overweight violations[3]	20,125	16,861	15,637	24,858
Percentage of weight violations	1.002	1.029	.857	1.07

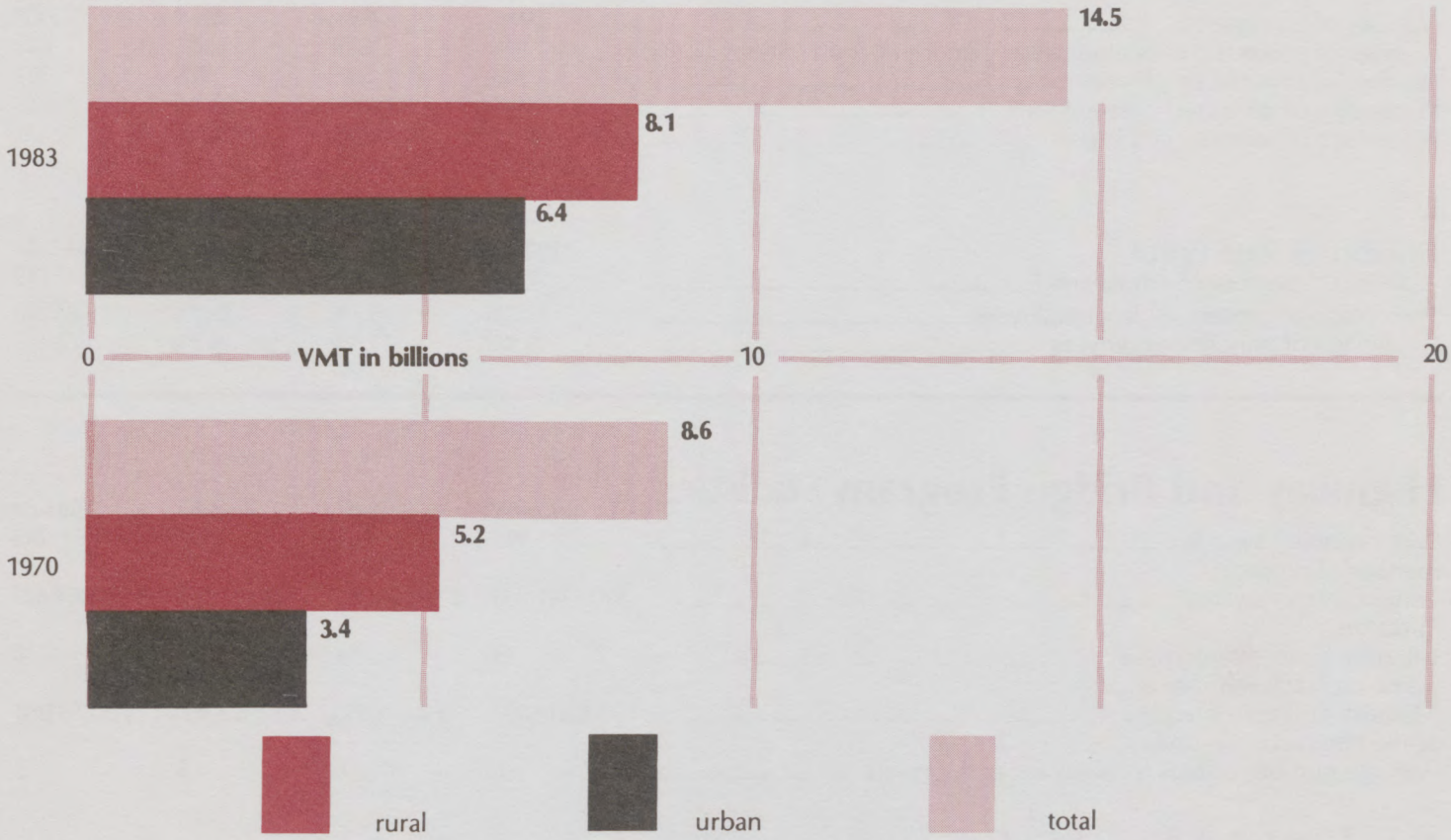
1 These figures represent authorized levels and do not necessarily reflect actual levels which may fluctuate during the year.

2 Total number of trucks cleared by the Port of Entry Division, Department of Revenue.

3 Overweight violations includes the total number of violations where enforcement was an oral warning, a written warning, or a citation.

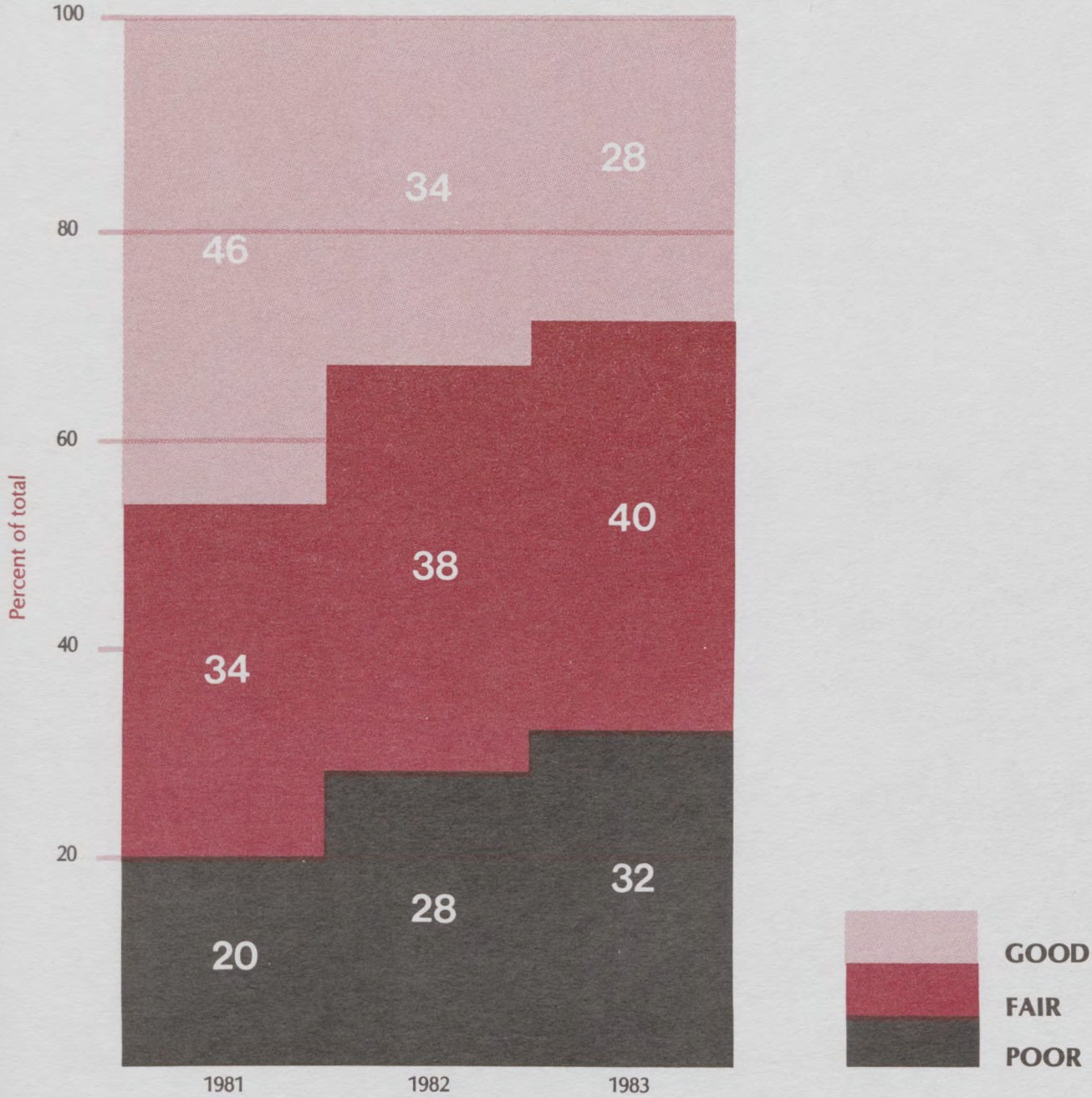
Annual Vehicle Miles of Travel (VMT)

state highway system only



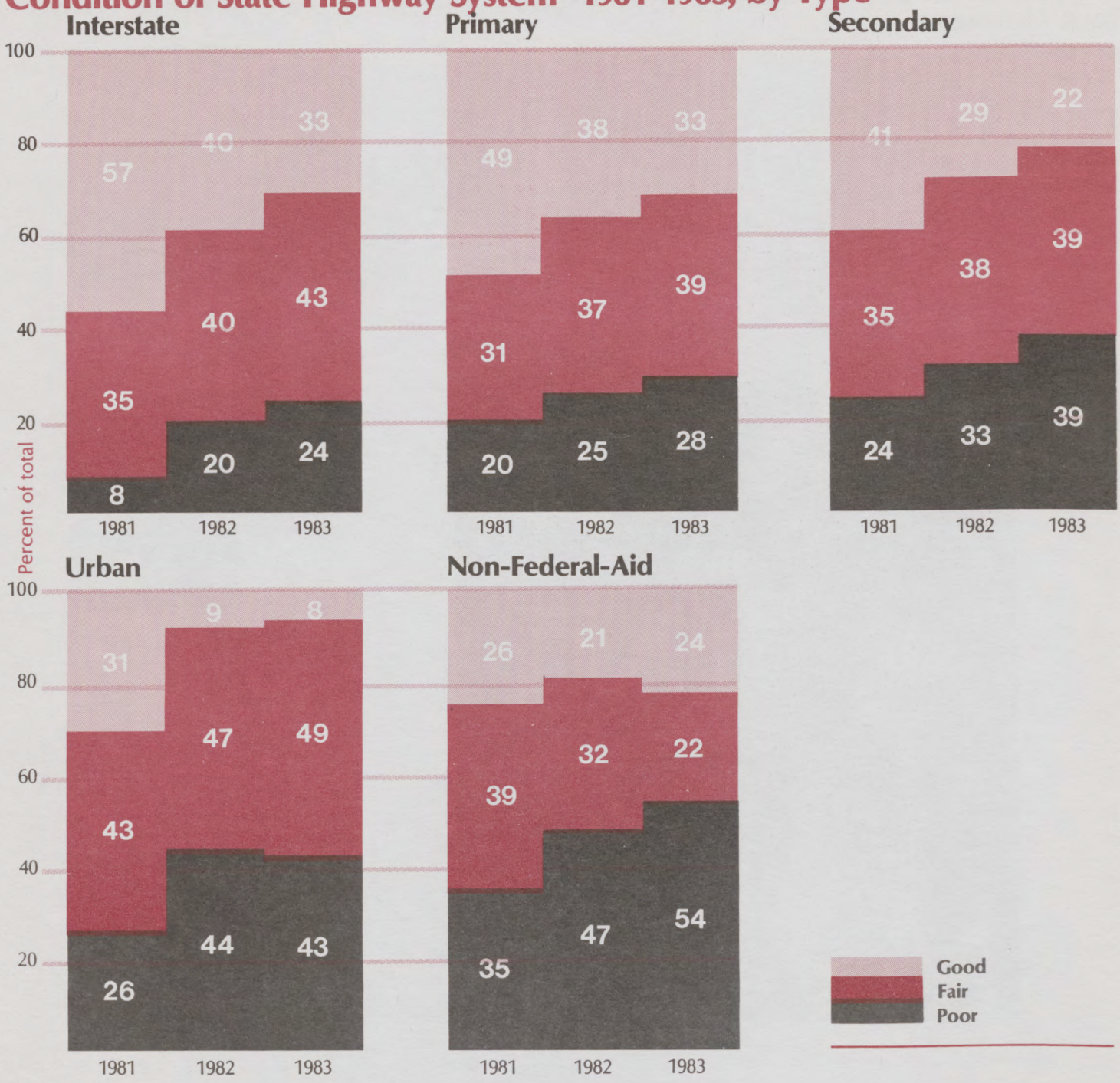
Condition of State Highway System [1] 1981-1983

Total All Systems



[1] Condition information based on roadway roughness and cracking as defined by the Colorado Pavement Management System.

Condition of State Highway System[1] 1981-1983, by Type



[1] Condition information based on roadway roughness and cracking as defined by the Colorado Pavement Management System.

Deficient Bridges on the State System, by County (1983)

	total bridges by county	total bridges found structurally deficient	total bridges found functionally obsolete
Adams	192	7	0
Alamosa	4	0	0
Arapahoe	145	5	0
Archuleta	17	1	0
Baca	32	4	2
Bent	28	1	0
Boulder	91	4	3
Chaffee	34	4	1
Cheyenne	36	0	1
Clear Creek	67	4	0
Conejos	16	2	0
Costilla	5	0	1
Crowley	15	2	0
Custer	14	3	0
Delta	25	2	1
Denver	147	3	0
Dolores	10	0	0
Douglas	57	1	0
Eagle	96	3	1
Elbert	66	1	1
El Paso	228	7	4
Fremont	68	5	6
Garfield	92	4	1
Gilpin	7	1	0
Grand	35	8	3
Gunnison	28	4	1
Hinsdale	3	0	0
Huerfano	68	5	2
Jackson	10	1	0
Jefferson	168	6	2
Kiowa	17	5	0
Kit Carson	71	1	0
Lake	14	1	3
La Plata	24	0	0
Larimer	173	8	8
Las Animas	106	7	4
Lincoln	86	4	6
Logan	73	9	0
Mesa	148	3	2
Mineral	10	1	0
Moffat	31	3	0
Montezuma	19	0	0
Montrose	42	2	1
Morgan	75	7	0
Otero	85	6	2
Ouray	20	5	1
Park	37	3	5
Phillips	12	0	0
Pitkin	10	1	1
Prowers	47	6	1
Pueblo	170	6	2
Rio Blanco	29	1	1
Rio Grande	17	0	0
Routt	24	5	1
Saguache	25	1	0
San Juan	5	0	0
San Miguel	6	0	0
Sedgwick	32	1	0
Summit	30	0	0
Teller	12	2	0
Washington	32	2	2
Weld	228	13	0
Yuma	17	3	0

Total bridges	3,531
Total structurally deficient	194
Percent total structurally deficient	5.49%
Total functionally obsolete	70
Percent total functionally obsolete	1.98%

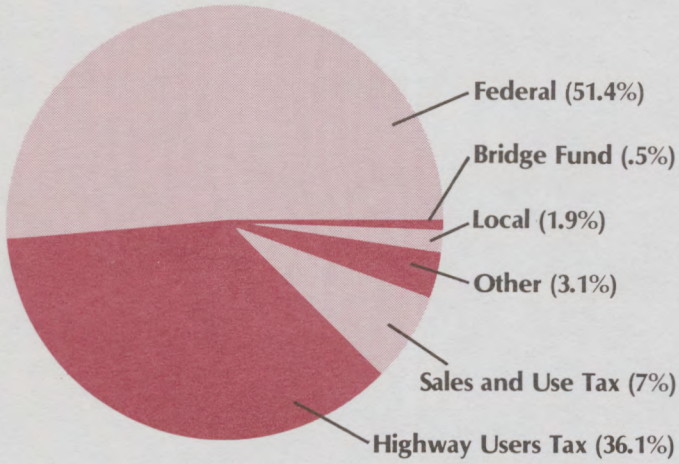
Financial Data

The federal government's Highway Trust Fund is the greatest single source of Colorado's highway revenue.

The increase in motor fuel efficiency and the continuing inflation of road repair and construction costs have seriously trimmed the generating power of the state's second largest source of highway revenue, the state Highway Users Tax Fund (HUTF). The base of this fund is the gas tax, gross ton-mile tax, and motor vehicle registration fee. In 1979, the General Assembly passed legislation, later known as the Noble Bill, creating additional highway revenue by dedicating a portion of the state's general sales tax attributed to auto-related products to the HUTF.

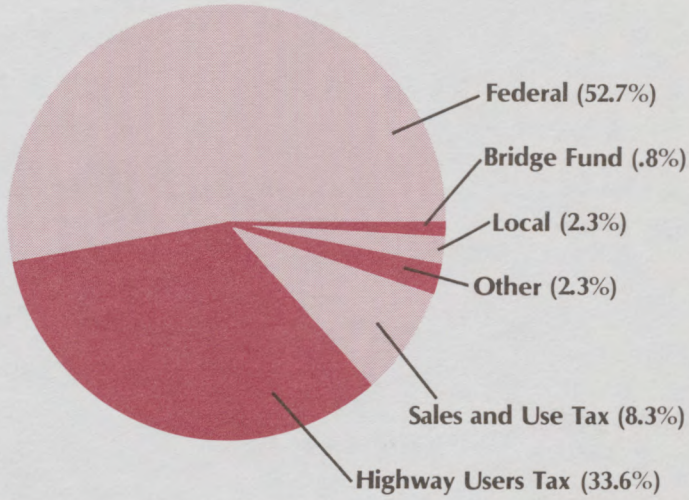
The remaining portion of highway revenue is received through several miscellaneous sources such as the driver's license fee, motor vehicle title fee, HUTF interest, and certain motor vehicle penalty assessments.

Revenues - FY 1982-83 - $278 Million



Does not include Colorado State Patrol
State share only of bridge fund
Local share of project costs

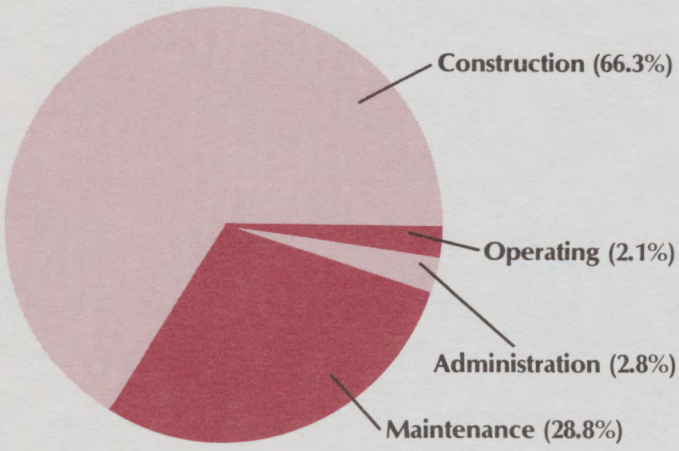
Revenues - FY 1983-84 - $385 Million



Does not include Colorado State Patrol
State share only of bridge fund
Local share of project costs

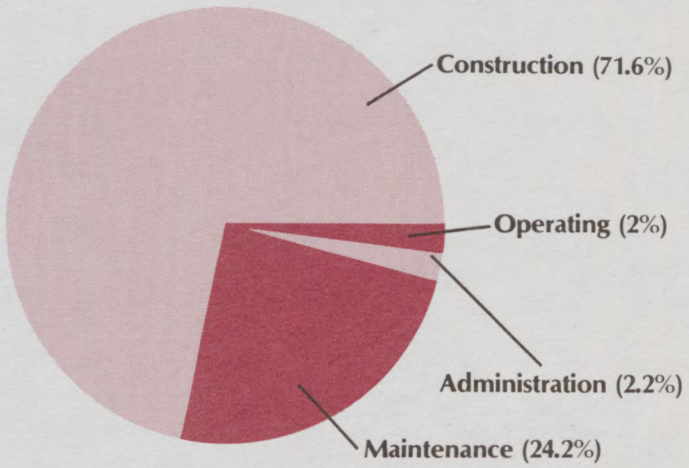
Expenditures - FY 1982-83 - $282 Million

Figure includes carry-over projects from FY 1981-82



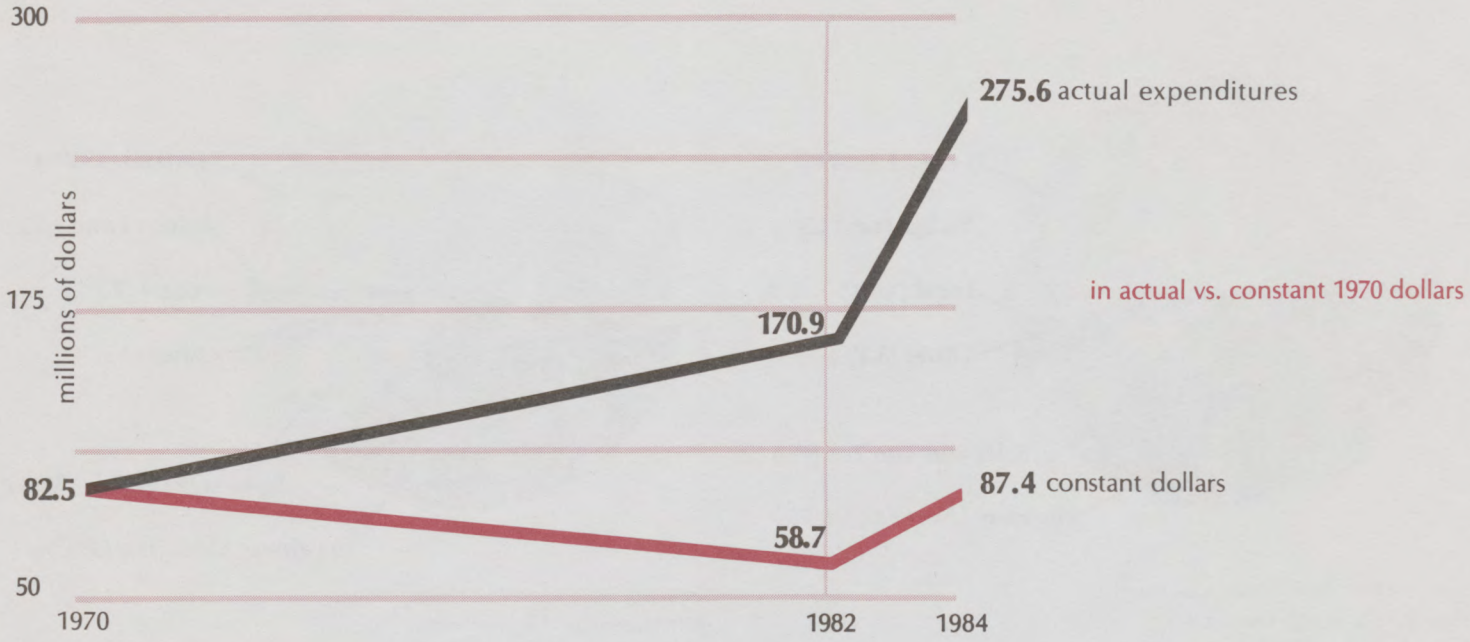
Does not include Colorado State Patrol
Construction includes new projects, resurfacing, and restoration of existing highways.

Expenditures - FY 1983-84 - $385 Million



Does not include Colorado State Patrol
Construction includes new projects, resurfacing, and restoration of existing highways. This figure also includes projects budgeted.

Colorado Department of Highways Construction Expenditures



Colorado Department of Highways Maintenance Expenditures