Montana
Department of Transportation

Engineer Rotation Program

A 12-month training program with full salary and benefits

PROGRAM GOALS:

- Understand MDT policies
- Become familiar with MDT field district and Helena office work units
- Experience a broad base of hands-on experience
- Receive assignments that are meaningful to achieving your career goals
- Develop professional contacts that will help in your job performance
- Result in increased job performance standards that benefit MDT and you!

Opportunity

Make the most of your engineering skills with a career at MDT:

- Your work will benefit Montana's citizens and visitors alike.
- You will be involved in challenging assignments with an award-winning transportation agency.

Recent graduates often start their careers by entering the Engineering Division's Rotational Orientation Program.

You'll be introduced to the division's diverse engineering functions and receive hands-on experience in the wide variety of engineering work with our highway and bridge improvement program.

When you complete the program, you'll have a permanent position in one of the numerous work units.

First year assignments include:

- Road design
- Bridge design
- Hydraulics design
- Materials and geotechnical
- Environmental unit
- Project management
- Right-of-Way design
- Safety management
- Traffic engineering
- Photogrammetry and survey
- Transportation planning
- Maintenance
- Contract administration
- Field assignments in road and bridge construction

Engineers advance by meeting the requirements of the engineering advancement policy. These requirements include passing the FE exam, performing higher-level assignments and acquiring related experience.

We value your engineering skills and would like to talk to you more about a career with the department. For further information contact:

Patricia Davis, Personnel Specialist
Human Resources Division
Montana Dept. of Transportation
2701 Prospect Avenue
PO Box 201001
Helena MT 59620-1001
(406) 444-6042
(406) 444-7696 for hearing impaired

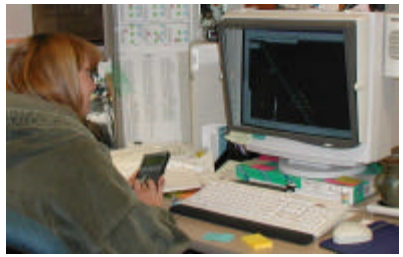
CHALLENGING JOBS!

It's not all playing in dirt – pick the area that suits you…

Construction and maintenance of Montana's highways requires …

addressing environmental issues before the project begins and throughout construction,

testing highway construction materials and establishing standards,



designing the roadway, bridges and appurtenances using state of the art computer programs and equipment!

Constructing the roadway –

building bridges,

building retaining walls, and

managing projects and overseeing construction

You can be part of the MDT team!

TEAM MDT

serving you with pride

Making it happen –
one road at a time!

Interstate 15 Interchange in Helena

Montana Department of Transportation
2701 Prospect Avenue
PO Box 201001
Helena MT 59620-1001
www.mdt.state.mt.us

Helena Headquarters

The Montana Department of Transportation attempts to provide reasonable accommodations for any known disability that may interfere with a person from participating in any service, program or activity of the Department. Alternative, accessible formats of this document will be provided upon request. For further information, call Organizational Development at (406)444-6054. For the hearing impaired, the TDD number at MDT is (406)444-7696. We're on the web at www.mdt.state.us.

Montana Department of Transportation

October 4, 1999

ENGINEER ROTATION PROGRAM

The goals of the rotation program are:

- To provide an understanding of MDT's policies.
- To provide hands on experience.
- To provide assignments that are meaningful to the employee.
- To develop an understanding of each unit, section, bureau, and district to which the employee is assigned.
- To develop a familiarity with personnel in each unit, section, bureau and district to which the employee is assigned.
- To improve job performance, which benefits both the employer and the employee.

Purpose:

The purpose of the Department's Engineer Rotation Program is to supplement the engineer's college training or previous experience with a broad background in the functional areas of highway engineering. It involves 12 months of intensive orientation and emphasizes "hands-on" performance in the major offices and program areas relative to the engineering and construction aspects of Montana's highway infrastructure.

Engineers generally enter the program through recruitment at their college. The procedure is to submit a State application for employment to the Human Resources Division in Helena. A current in-house employee may be accepted into the program by application to the Human Resources Division.

Engineers who enter the Rotation Program are encouraged to take full advantage of the learning opportunities. Upon completion they will return to their permanent assignment. All employees are encouraged to take advantage of classes offered by the Department and to apply for advancement when vacancies occur throughout their career.

While in the Engineer Rotation Program, the employee is responsible for submitting weekly reports on activities and a report from each of their supervisors upon completion of an assignment.

An employee enters the program as a Civil Engineer Specialist, grade 12. After one year of successful participation and passing the Fundamentals of Engineering exam, they are eligible for advancement to Civil Engineer, grade 13.

Areas included in the rotation are:

Bridge Design …….. 5 weeks *
Construction – Helena …… 2 weeks
District Construction ……22 weeks
Environmental …….. 2 weeks
Hydraulics …… 5 weeks
Road Design …… 2 weeks
Materials …… 3 weeks
Project Management ……4 hours
Right-of-way ……2 weeks
Information Services (computers) ……2 hours
Traffic Design ……..2 weeks
Photogrammetry & Survey ……5 weeks
Transportation Planning …… 1 week
Safety ……4 hours
Orientation ……4 hours

* Short orientation assignment to Bridge for those preparing for a career in construction engineering.

All areas in the rotation program except for the District Construction assignments are usually located in Helena. District Construction assignments may be any place in the state and may change within a given District during the assignment. They may be in remote locations and in rural settings. Brief descriptions of the MDT work units and the learning experiences provided by the rotation program are listed below.

Bridge Design – The Bridge Bureau designs all major bridges for highways controlled by the department, and approves bridge design performed by consultants. The rotational engineer will spend five weeks in the Bureau and during that time will:

- focus on general layout design,
- receive an overview of the background information necessary to determine structural type, and
- become familiar with the design process of footings, piers, columns and beams.

Construction – Helena - The Construction Bureau coordinates all activities connected with highway construction. This includes bid preparation and letting,

developing policies and specifications, resolving construction problems, and approving payments for construction work. The rotational engineer will receive an introduction to the following:

- the essentials of specification writing,
- the major elements of contract administration, and enforcement,
- project inspection,
- an introduction to the Disadvantaged Business Enterprises (DBE) program, and
- the preparation and processing of contractor's progress and final estimates.

District construction - The Department's five District Offices (Missoula, Butte, Gt. Falls, Glendive and Billings) provide the field services needed within each geographic area. During highway construction projects, district personnel work closely with the contractor, conducting construction surveys, inspecting the work and monitoring traffic control. Construction and maintenance are the main responsibilities of the districts, but these functions are supported by other services - Right-of-Way, Engineering Services, Centralized Services, and Maintenance. During the twenty-two week rotation in the District, the engineer will:

- learn highway terminology,
- gain experience in project orientation, surveying, inspection orientation, layout (slope, culvert & grade staking), construction grading, aggregate base and sub-base, asphalt paving, inspection, concrete testing and inspection, and project documentation,
- use manuals and specifications in conjunction with inspection assignments,
- manage contracts, enforce specifications and manage utility agreements, and
- become familiar with the management of the District office (District engineering, construction, maintenance, public relations, and traffic units) and its overall function within the Department's organization.

Environmental - Environmental Services is composed of three sections, the Environmental Engineering Section, the Resources and Planning Section and the Hazardous Waste Section. Professional staff includes engineers, biologists, hazardous waste specialists, a historian, an archeologist, and an agronomist. The rotational segment will provide:

- a basic understanding of the National and Montana Environmental Policy Acts (NEPA and MEPA) in regards to highway and related construction,
- an understanding of the impacts of highway work on society and the natural environment,
- an understanding of how to avoid or mitigate potential impacts,
- an introduction to interagency, public and private entity cooperation, and
- an understanding of the agreements, environmental studies and permits necessary for highway construction to proceed

Hydraulics - The Hydraulics Section performs the hydrologic and hydraulic design for proposed highway projects in the preconstruction phase of the highway program. The rotational engineer will be exposed to and gain familiarity with the following aspects of hydraulic design during his rotation:

- review of procedure and administrative memoranda and hydraulic detailed drawings,
- hydrologic analysis,
- hydraulic design of structures such as culverts and bridges,
- culvert service life analysis,
- introduction to and discussion of bridge scour evaluation,
- introduction to and discussion of urban storm drain design elements including survey, utilities, design criteria, and a field review of urban related projects,
- discussion of floodplain management rules and regulations, and
- other topics as time and workload allows.

Road Design – During a road design project, the Road Design Section must coordinate with many units internal and external to the Section. The two week rotational segment will provide the engineer with the following:

- familiarization with design procedures and standards,
- an overview of the interaction of roadway design with other sections, bureaus, districts of the Division,
- a general overview of the Area Engineer responsibilities including route selections and study; study of alternate locations, land use, and public and private access requirements; and environmental assessments,
- could include such activities as: computation of quantities and cost estimates; establishment of grades and horizontal alignment; preparation of typical sections; writing of specifications; completing plan-in-hand reviews; and preparing correspondence and reports, and
- generally provides familiarization with CADD software.

Materials - The Materials Bureau is comprised of three Sections – the Testing Section, the Geotechnical Section and the Pavement Analysis and Research Section. The Materials Bureau tests all materials used in the construction of highways to make sure they meet contract specifications. A wide range of tests are performed on aggregates, concrete, asphalt, fabrics, soils, paints, water, fertilizer, oil, wood, metal and other products. The rotational engineer will learn how the Materials Bureau work is coordinated with the planning, construction and repair of highways and become familiar with:

- the testing and analysis of soils, aggregates, asphalt, cement, concrete and other materials with emphasis on why testing is performed, what happens to the test results and who uses the data,

- the identification of soil types requiring pipe coating, surfacing design methods, selection of typical sections, and application of specifications,
- the purpose and use of soil surveys, and
- geotechnical investigations and designs. The rotational engineer may have the opportunity to go on a field study.

Project management - The Engineering Management Unit monitors and updates the Preconstruction Management System that is used to schedule projects and develop preconstruction manpower needs. The rotational engineer will be provided an overview of the Engineering Management Unit that will include:

- the purpose and operation of MDT project management system, and
- how the MDT monitors the completion of preconstruction project activities.

Right-of-Way -The Right-of-Way Bureau acquires land for highways. It also provides assistance and payments to individuals and businesses, designs the right-of-way, and arranges for relocating utilities that conflict with highway construction. The rotational engineer will:

- learn how to prepare right-of-way plans and deeds,
- learn about public utility involvement in MDT projects, and
- accompany Right of Way agent on field negotiations.

Information services (computers) - A brief orientation will be provided to the rotational engineers and the engineer will have the opportunity to:
- learn options on VMS menu,
- become familiar with production engineering application systems,
- learn the routines of engineering application systems in development, and
- receive an introduction on how engineering application is set up, updated and maintained.

Traffic Design - The Traffic Engineering Section is responsible for the selection, design and placement of all permanent traffic control devices within the project limits. The Section performs highway capacity determinations, geometric design of major intersections, interchange types and configurations, and the selection and design of medians.

- The major rotation assignment is geometric design with an orientation on signing studies, design and plans, and includes the design of traffic signals and street illumination, traffic operation studies, and traffic analysis.

Photogrammetry & Survey - The Photogrammetry and Survey Section is responsible for conducting aerial and field surveys, in coordination with the District Office, for all Department projects.

- The five week rotation in this section will provide an overview of MDT survey policies, procedures, equipment and interactions with other bureaus and sections.
- The practical application of the above will include review and reduction of control, cadastral, and topographic surveys as well as participation in field surveys as allowed by the schedule.

Transportation Planning - The Transportation Planning Division provides a broad range of planning functions. These activities help officials select projects and provide information for short and long-range construction and grants programs. The division is comprised of the Multimodal Planning Bureau, the Data Collection and Statistics Bureau, the Multimodal Programming Bureau and the Traffic Safety Bureau.

- This rotation segment provides the engineer with an overview of the Transportation Planning Division and offers participation in the process whenever possible.

Safety Management - The Safety Management Section is responsible for reviewing the accident history on projects and make recommendations for safety enhancements based on the accident analysis. The Section also reviews preliminary plans and provides input on features that would improve the project from a safety perspective. The rotational engineer will receive an overview of this Section.

Orientation An orientation is included which provides an introduction to the Department and the Engineering Rotation Program. This overview of the Montana Department of Transportation and Engineer Rotation Program is intended for the general orientation of new employees to the program and does not represent Department policy. For detailed information, the employee should consult the appropriate policy information.