

European Practices in Transportation Workforce Development



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EUROPEAN PRACTICES IN TRANSPORTATION WORKFORCE DEVELOPMENT

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FHWA INTERNATIONAL TECHNOLOGY EXCHANGE PROGRAMS

The Federal Highway Administration's (FHWA) international programs focus on meeting the growing demands of its partners at the Federal, State, and local levels for access to information on state-of-the-art technology and the best practices used worldwide. While FHWA is considered a world leader in highway transportation, the domestic highway community is interested in the advanced technologies being developed by other countries, as well as innovative organizational and financing techniques used by FHWA's international counterparts.

The International Technology Scanning Program accesses and evaluates foreign technologies and innovations that could significantly benefit U.S. highway transportation systems. Access to foreign innovations is strengthened by U.S. participation in the technical committees of international highway organizations and through bilateral technical exchange agreements with selected nations. The program is undertaken cooperatively with the American Association of State Highway and Transportation Officials and its Select Committee on International Activities, and the Transportation Research Board's National Cooperative Highway Research Program (Panel 20-36), the private sector and academia.

FHWA and its partners jointly determine priority topic areas. Teams of specialists in the specific areas of expertise being investigated are formed and sent to countries where significant advances and innovations have been made in technology, management practices, organizational structure, program delivery, and financing. Teams usually include Federal and State highway officials, private sector and industry association representatives, and members of the academic community.

FHWA has organized more than 50 of these reviews and disseminated results nationwide. Topics have included pavements, bridge construction and maintenance, contracting, intermodal transport, organizational management, winter road maintenance, safety, intelligent transportation systems, planning, and policy. Findings are recommended for follow-up with further research and pilot or demonstration projects to verify adaptability to the United States. Information about the scan findings and results of pilot programs are then disseminated nationally to State and local highway transportation officials and the private sector for implementation.

This program has resulted in significant improvements and savings in road program technologies and practices throughout the United States, particularly in the areas of structures, pavements, safety, and winter road maintenance. Joint research and technology-sharing projects have also been launched with international counterparts, further conserving resources and advancing the state of the art.

For a complete list of International Technology Scanning topics, and to order free copies of the reports, please see pages iii-iv.

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Acquiring Highway Transportation Information from Abroad – Handbook
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International Guide to Highway Transportation Information
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EXECUTIVE SUMMARY

INTRODUCTION

Transportation agencies in the United States grapple with how to hire and retain sufficient numbers of technical and administrative workers, as well as how to train and retrain those workers to ensure they will be able to meet changing needs. These agencies realize that their workers – the organizations' human capital – are their most valuable investment, and they want to preserve and grow that investment.

The unemployment rate in the United States at the time of the scanning study was 3.9 percent, the lowest in 30 years. Coupled with the strong economy was a steadily growing demand for engineers and technicians, particularly in electronics and high-technology fields. Many transportation agencies expanded their staffs and expertise in the 1950s and 1960s, when the Interstate Highway System was designed and built. Today, many of those staffers are retiring, leaving a void that must be filled.

As transportation agencies in the United States shift from a new construction mode of operation to one of system preservation, much of the planning, design, and construction work is being outsourced, reducing the hands-on opportunities attractive to engineers and technicians. In addition, to many of today's younger engineers and technicians, civil engineering projects do not have the same allure as high-tech projects. That, coupled with the higher salaries typically offered by private firms, means transportation agencies are having increasing difficulty filling jobs and retaining staff. As a result, many jobs at transportation agencies go unfilled, forcing agencies to contract for more services. In some cases, the services are provided by former transportation agency staff members now employed by the contractor.

The number of engineering students in the United States has not kept pace with the growing demand. Although there has been a slight upswing in the number of U.S. undergraduate engineering students, most of the increase is in computer engineering. And the number of science and engineering graduate students in the United States has fallen for the fifth consecutive year.

The career goals of today's younger workers are also a factor. Most Generation X'ers expect to move routinely from one employer to another as a means of taking on new challenges and responsibilities. Although they are eager to assume responsibility, they stand fast against allowing their work life to intrude on their personal life, and they expect a more flexible workplace (for example, in terms of hours and culture). As a result, transportation agencies must adapt to the shifting work culture.

The needs of transportation agencies are also changing. In the past, most agencies relied primarily on a cadre of highly trained civil engineers. Today, however, the civil engineering staff must be augmented by workers skilled in computer engineering, high-tech electronics, regional planning, environmental protection, federal regulations, accounting, management, communications, public outreach, marketing, and other areas.

The challenges facing a transportation agency are broader than ever. Meeting those challenges requires a competent, skilled, and experienced workforce that can create and sustain a knowledge base.

The Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO), acting through the National Cooperative Highway Research Program, sponsored a scanning tour to give State and Federal transportation agency representatives a firsthand look at how several European countries deal with

these issues. The scan was conducted March 24 through April 7, 2001, in Sweden, Germany, France, and England.

Joseph S. Toole, director of FHWA's Office of Professional Development, and Pete K. Rahn, secretary of transportation for the New Mexico State Highway and Transportation Department, led the scanning team. Other team members included Randy Bergquist, program director for learning and development for the U.S. Department of Transportation; Ronald W. Carmichael, division engineer for FHWA's Western Federal Lands Highway Division; David S. Ferguson, personnel resources management officer for the Florida Department of Transportation; Gary Gilmore, administrator of the Montana Department of Transportation's Engineering and Highways Division; Gene C. Griffin, director of the Upper Great Plains Transportation Institute; Kathryn Harrington-Hughes, director of operations for the Eno Transportation Foundation; and Jerry A. Hawkins, director of FHWA's Office of Human Resources.

In each country, team members met with human resource managers, training directors, and other transportation agency staff involved in workforce development.

FINDINGS AND RECOMMENDATIONS

The United States is not alone in facing issues dealing with workforce recruitment, retention, and training. The four countries visited face similar challenges, and they have implemented a variety of techniques and practices to overcome those challenges. Although there is no one overarching solution that can be gleaned from the experiences in Sweden, Germany, England, and France, team members have proposed a number of actions, based on what they learned in those countries, that merit the U.S. transportation industry's consideration. Those actions are summarized in four categories below. The findings and recommendations are those of the scanning team and not FHWA.

Career Awareness

- Develop industry-wide commitment and funding for programs to spark and sustain kindergarten-through-12th-grade students' interest in transportation careers.
- Develop a comprehensive, coordinated program to introduce high school and middle school teachers to transportation careers and issues.
- Continuously market the transportation industry's heroes and their success stories to young people.
- Identify core job characteristics entry-level workers seek in a job, and encourage employers in the transportation field to provide those characteristics.

Workforce Development

- Define critical leadership roles in the face of a changing transportation industry.
- Develop industry-wide mechanisms for developing these leadership competencies.
- Prepare employees to better understand how delivery of government services is changing.

- Craft new relationships, institutions, and funding sources to develop and ensure industry-wide practical competencies and skills in transportation workers and technicians.

Program Effectiveness

- Find a means of engaging the entire transportation industry in the workforce development process.
- Develop a self-sustaining model for collecting and disseminating best practices in the industry.
- Strive to integrate workforce development and retention into the key business processes of an organization.
- Establish a common framework for delivering and measuring all types of learning.

Recruitment

- Broaden and formalize relationships with high schools, vocational schools, and community colleges, which are key sources of transportation workers.
- Create a means for attracting more students to civil engineering and overcoming financial roadblocks to a civil engineering education.

IMPLEMENTATION ACTIVITIES

An implementation team has been formed to identify how the action items the team identified might be evaluated or implemented in the United States. The implementation team consists of Joseph Tole, Randy Bergquist, and David Ferguson.

The information uncovered during the scanning study has served as the basis for several implementation activities:

- A CD with background information on U.S. transportation workforce issues was produced before the scan and distributed to host agencies. After the scan, 150 copies of the CD were sent to U.S. transportation organizations with an invitation to become involved in a national effort on workforce development.
- Presentations summarizing the scanning study findings were made at meetings of several transportation organizations, including AASHTO and FHWA.
- A series of articles on the outcome of the scanning study, targeted at *Public Roads* magazine and other publications serving the transportation industry, are in the works.
- A national workforce development summit sponsored by the U.S. Department of Transportation was conducted in May 2002. Top leaders from transportation organizations and industry spent two days focusing on this issue and developing a concerted program for improving the attractiveness of careers in transportation.

CHAPTER ONE

INTRODUCTION

Transportation organizations throughout the United States grapple with how to hire and retain sufficient numbers of technical and administrative workers, as well as how to train and retrain those workers to ensure they will be able to meet changing needs. These organizations realize that their workers – the organizations' human capital – are their most valuable investment, and they want to protect and nurture that investment.

In fall 2000, when this scanning study was being planned, the unemployment rate in the United States stood at 3.9 percent – the lowest it had been in 30 years. At the same time, transportation agencies and organizations were losing record numbers of staff to retirement, watching as many of their most experienced and knowledgeable staff members – those hired in the 1950s and '60s during the heyday of Interstate Highway System design and construction – walked out the door and began collecting their pensions. Filling the void they left behind was difficult. Engineers and technicians were in short supply, largely because of the seemingly incessant demand for workers in the electronics, high-technology and Internet fields. Salaries and perks offered in those technology fields made it difficult for transportation agencies to compete.

Even though unemployment rates have increased recently in the United States, resulting in a slightly greater availability of workers, many of these challenges persist in the transportation community. In the past decade or so, many public agencies have been forced to downsize even as their budgets have increased. Among State departments of transportation, for example, full-time employment has dropped 5.3 percent while budgets have increased 56 percent. Much of the planning, design, and construction work is now handed out to private contractors. But many of those same contractors face similar problems in hiring and retaining skilled workers. In addition, many younger engineers and technicians are drawn to more alluring high-tech projects, which can make civil engineering projects seem less desirable in comparison. The result of all this: transportation organizations are having increasing difficulty filling jobs and retaining staff.

There are no signs that the supply shortfall will ease anytime soon. The number of engineering students in the United States has not kept pace with the growing demand. Although there has been a slight upswing in the number of U.S. undergraduate engineering students, most of that increase is in the computer engineering field. The number of science and engineering graduate students in the United States has fallen for the fifth consecutive year. In short, the proverbial pie is getting smaller and U.S. industries are fighting each other for a bigger piece of the pie.

The career goals of today's younger workers are also a factor: Generation X'ers – people born between 1961 and 1981 – fully expect to move from one employer to another as a means of taking on new challenges and responsibilities. Although Generation X'ers are eager to assume responsibility, they expect a more flexible workplace than that of their parents in terms of hours and culture, and they stand fast against allowing their work life to intrude on their personal life. Transportation agencies will have to find ways to accommodate these needs if they want to succeed in attracting these workers.

The needs of transportation agencies are also changing. In the past, most agencies were staffed primarily by highly trained civil engineers. Today, however, the staff must include workers proficient in computer engineering, high-tech electronics, regional planning, environmental protection, Federal regulations, accounting, management, communications, public outreach, marketing, and other skills.

The challenges facing transportation organizations are broader than ever. Meeting those challenges requires a competent, skilled, and experienced workforce that can create and sustain a diverse and dynamic knowledge base.

These challenges are not limited to the United States. The Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO), acting through the National Cooperative Highway Research Program, sponsored a scanning study to give State and Federal transportation agency representatives a firsthand look at how several European countries deal with these issues. The scan was conducted March 24 to April 7, 2001, in Sweden, Germany, France, and England.

Joseph S. Toole, director of FHWA's Office of Professional Development, and Pete K. Rahn, secretary of transportation for the New Mexico State Highway and Transportation Department, led the scanning team. Other team members included Randy Bergquist, program director for learning and development for the U.S. Department of Transportation; Ronald W. Carmichael, division engineer for FHWA's Western Federal Lands Highway Division; David S. Ferguson, personnel resources management officer for the Florida Department of Transportation; Gary Gilmore, administrator of the Montana Department of Transportation's Engineering and Highways Division; Gene C. Griffin, director of the Upper Great Plains Transportation Institute; Jerry A. Hawkins, director of FHWA's Office of Human Resources; and Kathryn Harrington-Hughes, director of operations for the Eno Transportation Foundation, who served as report facilitator. The scan coordinator was Jake Almborg of American Trade Initiatives, Inc.

The team had three key objectives:

- Identify innovative workforce development practices in Europe.
- Bring that information back to the United States and disseminate the findings throughout the transportation industry.
- Share the U.S. experience in workforce development with other countries.

Before heading to Europe, the team developed a list of amplifying questions, which was sent to their hosts to help them focus their presentations. The questions centered on five general themes:

- How do you determine your workforce needs?
- How do you find and hire the right people?
- How do you keep the right people?
- How do you hone their skills to match changing needs?
- How do you motivate your employees?

Early in the planning process, Marie Dominique Gorrigan of American Trade Initiatives conducted an office-based study to gather background information to help determine which organizations and institutions active in education, training, and professional development the scanning team should visit. As a result of the desk scan, meetings were scheduled with public- and private-sector transportation organizations actively engaged in education, training, and professional development in Sweden, Germany, France, and England.

In each country, team members met with human resource managers, training directors, and other transportation agency staff involved in workforce development. What follows in this report is a summary of what they heard during an intense two weeks of meetings, presentations, and discussions.

CHAPTER TWO

WORKFORCE POLICIES AND PRACTICES

SWEDEN

Swedish National Road Administration

Sweden, with a population of 8.2 million, has 400,000 kilometers of roads. The Swedish National Road Administration (SNRA) – a unit of the Ministry of Industry, Employment, and Communications – is responsible for the entire road transport system. It also is responsible for developing and implementing road transport regulations and maintaining the 100,000 kilometers of state roads, which carry about 80 percent of the traffic.

SNRA has a staff of 6,500, down from a high of 9,000 a decade ago. Sixty percent of its workforce is expected to retire in the next 10 years. Its human resources department and line managers thus focus a great deal of effort on making the most of their existing workforce, as well as on finding the right workers when filling job vacancies.

“We must hire people who can take on a lot of responsibility and can work well with other people,” said Lena Rosen, director of the 220-employee human resources department. “The key is to hire the right person, so we spend a lot of time picking the right person.” Rosen considers attitude as important as skills. “The interviews and references play a big role in the determination,” she said. “Testing plays a very small role.”

SNRA has a close working relationship with industry. SNRA sees itself as having the responsibility for ensuring an adequate supply of qualified people for transportation jobs both at the agency and private companies, as SNRA believes that expertise in both the public and the private sectors is necessary for quality roadways. The SNRA staff concerns itself with ensuring that the needed expertise is available either in-house or from a private-sector company. The agency’s development program consists of four key components:

- Trainee program (primarily for civil engineers recruited from universities)
- Career choice seminar
- New managers development program
- Experienced managers program

A fifth component – for specialists – is under development.

The career choice seminar has been found to be an effective means of retaining promising young employees. The five-day seminar, aimed at developing leadership skills in young employees, is offered to a hand-picked group of employees who have worked at SNRA for five or six years and have shown great potential. During the seminar they work intensely with an instructor to develop individual six-month plans customized to match their interests with their potential. About 350 people have participated in the seminars.

SNRA also has developed a knowledge management strategy for the road transport sector, which it summarizes as “using new and existing knowledge to ensure that the goals in

national transport policy are attained in the best possible way.” The strategy is built on the following four concepts:¹

- The road transport sector offers attractive and stimulating tasks, which attract creative, capable, and competent individuals.
- New knowledge is used to develop various products and programs, and the ensuing results are put into common use.
- Those involved in operations, as well as in research, development, and education, are well acquainted with and make use of existing knowledge.
- The educational programs offered are founded on research and development results and correspond to current needs as established through a constructive and continuous dialogue between educational bodies and the different players in the sector

The public-sector SNRA has been quite innovative in applying private-sector practices. For example, it has created cost centers to improve efficiency and to better meet customer needs. Two-thirds of the SNRA staff work in one of four cost centers: training and development, ferry operations, construction and maintenance, and consulting services. Each cost center, with the exception of construction and maintenance, is charged with breaking even while operating in full competition with the market. The SNRA’s regional offices are the cost centers’ customers, but they are by no means captive customers. They can choose to buy services from the SNRA centers or from any private supplier. One key advantage of the cost centers, according to SNRA staff, is that they “set the benchmark for the industry on price, by ensuring that one large private company does not corner the market in a particular area of the country.” The cost centers, with the exception of the construction and maintenance center, are not subsidized by the state, so their revenue must cover expenses.

The Road Sector Training and Development Center (Vägsektorns Utbildnings Centrum, or VUC) was established to provide training in core competency areas (professional skills) and community responsibility. According to Ann-Therese Albertsson, head of VUC, the center’s main task is “to plan and conduct courses that ensure the development of skills and expertise to be used in current operations, as well as in the strategic development of the road transport network.” SNRA gave VUC the equivalent of US\$142,000 (SKr1.5 million) in start-up funds in 1997. Since then, it has operated with no subsidy, and with the expectation that it will earn at least 15 percent each year. If the center makes a larger “profit,” it either transfers the money into the next year’s



Figure 1 Ann-Therese Albertsson, head of SNRA’s Road Sector Training and Development Center, describes the center’s operations and funding mechanism to the team members.

¹ “Knowledge Management Strategy for the Road Transport Sector,” by Hans Ingvarsson, head of the R&D Division of SNRA, Dec. 19, 2000

budget (using it, for example, to develop a new course), or returns the money to its customers (who could, in essence, be considered shareholders).

Each year, more than 4,000 employees of SNRA and other companies participate in about 300 different VUC courses held at various sites across the country. Course fees and the sale of course materials provide the bulk of its income, about 70 percent of which comes from course fees collected from SNRA.

VUC's strength lies in its access to expertise available at the SNRA, according to Albertsson. On-staff experts often are hired to conduct VUC courses, and VUC reimburses the employee's department for time spent preparing and teaching the course. The requirement that VUC be self-sustaining does, however, present one problem, said Albertsson: "We sometimes can't afford to develop needed courses, because there is just not enough of a market for those courses. The income won't cover the development costs."

SNRA's motto is to "hire for competence and train for skills." Competence includes professional ability, values, and social skills. Managers, who are responsible for each staff member's competencies, develop a performance plan for each staff member. This performance plan is based on the team's plan, which is based on the department's plan, which is in turn based on the agency's strategic plan. Managers create a map for each new employee, clearly indicating which skills should be mastered if he or she wants to help the agency meet its future needs and achieve its goals. The employee thus knows what to focus on and is responsible for charting his or her own career development.

Once workers enter their first management jobs, they become involved in the new managers development program. The program helps new managers develop their management skills and realize the important role that they play in the agency's success and in their employees' success. The one-year program for experienced managers, modeled on a program developed by General Electric, is targeted at middle management people with ambition, as well as potential, for higher-level leadership positions. It provides those managers with an opportunity to reflect on and develop further their own strategic and personal management skills.

In the past, SNRA strongly encouraged managers, who typically were men, who wanted to move up the career ladder to accept assignments in SNRA's regional offices. But today there are as many women as men in the workforce, and in many cases a job transfer affects two workers – the SNRA worker and his or her spouse. SNRA staffmembers say many workers refuse to uproot their families and move without some guarantee that their family income will not suffer, so they sometimes work behind the scenes through an informal network of human resource personnel to find a job for the spouse.

To encourage students of all ages to consider SNRA an attractive employment option, the agency has developed a school program, which is supported by the head office, regional offices, and cost centers. Program staff members determine what types of activities are best suited for students of all ages (primary school through college) and create informational material for different target groups. "We are already doing many things directed at college and university students, but we realize now we have to start earlier" said Ingrid Jarefors of SNRA's human resources department.

A 120-page "Information Labor Market" report, which is targeted at 16-year-olds and distributed in the schools, includes a section on highway work. The cost of producing the report is shared

by the government and employment agencies. The “future train” exhibit, targeted at 9th-grade students, is circulated among primary schools. Guest speakers from transportation companies and organizations participate in the moving exhibit, describing their companies’ missions and discussing the types of jobs they offer. In some areas, SNRA provides support to vocational schools (as do private companies), assisting in the teaching of construction trades. Graduates of vocational schools typically encounter no problems finding a job. Private-sector companies often team up with SNRA in career-guidance programs aimed at high school and primary school students.

Swedish National Road Consulting (SweRoad), another SNRA cost center, is an attractive option for many younger Swedes interested in studying, traveling, and working in other countries. SweRoad provides a range of services to clients outside Sweden, so it is a means of attracting and retaining younger SNRA workers. “The best people want to go work for SweRoad, but they come back to us with better skills,” said Karl Sicking, head of the construction and maintenance center. SweRoad can also borrow SNRA staff for short periods, allowing them to gain valuable experience working on projects in other countries.

The SNRA construction and maintenance cost center will need about 1,000 new workers in the next 10 years, and large construction firms face the same challenge, according to Jarefors. This has led private companies to team with SNRA on projects aimed at attracting primary and high school students to careers in construction.

In exit interviews conducted at SNRA, employees cited the following factors as most important to job satisfaction:

- To organize (control) their own work (this was reportedly the most important factor)
- To be part of a process leading to a better world
- To do something important
- To earn a good salary
- To work with a good team
- To have fun
- To control their working conditions
- To earn vacation
- To have educational opportunities

SNRA has had a difficult time filling its management jobs, which employees often perceive as being too stressful. To counter that impression, the agency empowers its employees by giving them more responsibility and by flattening the organizational structure. The resultant new employee policy has four key points:

- An employee should be mature and responsible and should understand and support the agency’s mission. This fits with the agency’s flat organization, in which employees are in 25- or 30-member departments with only two organizational levels and employees are accorded a high level of responsibility.

- Managers should act more like coaches, helping their employees achieve superior performance.
- The work environment should make employees feel free to speak up on issues.
- The work environment should be more of a partnership, in which managers and employees, rather than trade unions, cooperate.

Strong personnel laws and regulations protect workers in Sweden, and most workers belong to a union. SNRA salaries are negotiated on a case-by-case basis. The manager determines what he or she wants to pay an employee, and then negotiates with the union to reach a salary agreeable to both. Compared with the United States, the range between the highway agency's highest- and lowest-paid workers is much smaller. Most SNRA non-management-level jobs pay wages comparable to those offered in the private sector. But managers in the private sector often earn more than those working for SNRA. The higher wages draw many of SNRA's younger managers to the private sector, but SNRA expects many of them to return eventually, lured back by the better working environment, retirement plan, and benefits.

To accommodate employees' personal needs, SNRA sometimes provides them with computers for their homes. By allowing, for example, parents of young children to use computers to work at home for several hours each day (usually after school is out in the afternoon), the agency is able to compete on quality-of-life issues.

NCC International

NCC International is a private-sector construction and property development company in the Nordic and Baltic regions. It has 26,000 employees, and it bills itself as a "young, exciting company in which the focus is on innovation, participation, and the expertise of each employee." NCC salaries are about the same as at SNRA, but NCC promises potential employees that they will "have more fun in the private sector – you will actually build something," said NCC President Per Nielsen. NCC places a great deal of emphasis on recruiting and retaining workers.

"We need to start attracting students to the construction industry in grammar school," said Nielsen. "Students are starting to drift away from construction and civil engineering. They're moving toward information technology and biotech careers." NCC teams with trade organizations in activities aimed at attracting high school students to careers in the construction industry. NCC also actively promotes careers at NCC to university students.

In an average year, the company's staff turnover is one to two percent. But in some years, economic conditions have forced the company to dramatically cut employees (at one point, reducing its workforce by 30 percent), usually using a "last hired, first fired" scheme. The average NCC employee is 45.4 years old, and the retirement age is 60.

The company sends Christmas cards and uses other means to let former employees know that the door is always open, should they want to return to the company "after having gained experience elsewhere."

Every technical person who joins NCC goes through a two-year training program during which he or she typically rotates through three work units and takes several courses germane to the job level. A development meeting is held each year to give the employee and supervisor an opportunity to jointly design a training plan for the employee and to evaluate the performance of both the employee and the manager. The training plan is filed in the employee's personnel file, and the human resources department then arranges for the employee to attend courses that fit his educational and training needs. NCC budgets five training days a year for each white-collar employee and 1.5 days for blue-collar workers.

Pay is based on three components: base salary for the job, individual performance (evaluated annually), and the performance of the work unit.

GERMANY

State and Federal Highway Agencies

Germany has three categories of public-sector employees: workers, who are responsible, for example, for road maintenance; civil service employees, who are employees or contractors; and civil servants, who, after completing a probationary period and receiving special training, are a protected class of workers who hardly can be fired. Civil servants are held in high esteem in Germany, and civil service jobs are coveted. The top-level government positions – those with “supreme power” and charged with carrying out federal law – can be filled only by civil servants. Civil servants, for example, must conduct public hearings.



Figure 2 Hans Mundry of the Ministry of Transport, Building, and Housing discusses the necessary characteristics of technical professionals in the public-service sector in Germany.

Individuals interested in civil service jobs must first be accepted into a two-year preparatory course, during which time they will be employed in a state administrative office and paid subsistence wages. Only two to three percent of university graduates participate in this rigorous training program. At the end of the two-year program, the individual must pass an examination before becoming eligible to serve as a civil servant at the federal, state, or local level.

The goal of the road transport sector is to have a highly qualified workforce, said Hans Mundry of the Ministry of Transport, Building, and Housing, and this goal has been achieved. Technical professionals in the public-service sector must have three attributes, according to Mundry: they must be “able and knowledgeable, they must have courage, and they must have spirit, to allow for rationalization and compromise.”

High school graduates who want to become civil engineers have two options for post-secondary education. They can attend the four-year polytechnic university (Fachhochschule),

which provides a 14-month program of training in planning, construction, maintenance, and administration; or they can attend the five-year technical university. Most choose the more practical Fachhochschule, where they learn “how to do the job.” Those who opt for the more research-oriented technical university are taught how to be problem solvers and effective managers. Since 1995, however, the number of people studying at both schools has dropped, because the jobs for which the schools prepare students are not considered as interesting as those in information technology.

A growing concern among civil service agencies and private-sector companies in Germany is the length of time it takes for a university student to finish school. Thirteen years of schooling normally is followed by five or six years at a university, and then the graduate must perform one year of military or other service. This means that young people are typically 26 years old – with no practical experience – before they are eligible to start the two-year preparatory program for civil service jobs. They are 28 years old before they are ready to start their careers. “This is a growing concern for us,” said Jürgen Sparmann, president of the Hessian State Road Directorate (Hessisches Landesamt, or HSVV). “We would like to shorten the time period, but we’re also facing the fact that as technology increases, it requires more education.”

The recent financial situation in Germany has resulted in a significant decrease in tax revenue. As a result, there is less money for transportation. This has caused the department to make plans for cutting the workforce by at least 400 people over the next four years and is prompting the German states (Länder) to “abolish our old household-oriented budget system,” said Horst Hanke, a director at HSVV and formerly in charge of its human resources department.

The department is developing cost-management systems, which should be in place by 2008. Under the new systems, the transport department will offer politicians a product, such as a new road, at a certain price, and then must deliver that product at the agreed-on price. By being forced to focus on the bottom line, the transport department will by necessity find the most economical means of project delivery – determining, for example, whether to do the work itself or outsource it. This is in marked contrast to the traditional way of selecting and building transport projects in Germany, where transport staff typically are expected to “do a good job in a reasonable amount of time,” with little regard for cost. It will require a new type of manager, according to Hanke. “Today, we know if a job is done well, but we have no idea of the true project cost, including staff cost,” he said. “In the future, we will set a budget for a job, and we will then have to stay within that budget. We will need to train people in this new way of thinking.”

Hanke said it no longer will be enough to be a good engineer on HSVV’s staff. “Our workers will also have to have social competence and soft skills,” he said. The agency’s training programs have been revised to emphasize these new skills.

A qualifications profile is developed for each employee, showing the employee’s competencies compared to those required for each job level. These profiles are added to each employee’s personnel files, and they prove helpful when the agency seeks to fill a staff position.

Efforts also are made to integrate an employee's performance and development. A mandatory one-hour meeting between the team leader and each team member is conducted each year, during which time they discuss performance, pay, future goals, and training. This is a confidential, undocumented meeting, and both parties are encouraged to be open and truthful.

Transport department salaries are set in accordance with the German BAT, which is the federal pay scale for public service jobs. Salaries are categorized into the three levels of employment: workers, civil service employees, and civil servants. Civil servants are judged on their performance and competencies. "We would like to switch to a system that evaluates them as we evaluate them internally, with profiles," said Spamann. "That will provide clarity and transparency, but it will take years to change."

The federal transport department frequently hires from among the state transport ranks. Department officials explain that this hiring practice not only ensures that they get talented, experienced people, but also helps to build better lines of communication and cooperation between the state and federal agencies and to "overcome any animosity" between state and federal workers.

Germany has a dual education system, in which students are placed in academic or vocational education tracks. As in Sweden, a university education is free to students who pass the entrance exam. Students in the vocational track graduate at 16, and at that point they enter a three-year apprenticeship program. Apprenticeship programs typically have three components:

- A school-based program
- Hands-on experience at a project site
- Educational and training programs provided by trade associations

Once apprentices pass a final exam, they join the workforce.

Hans Grimmig GmbH

The owners of Hans Grimmig GmbH, a small, family-run construction company in Germany, say the country's low unemployment rate is an impediment to recruiting engineers. To attract and retain good people, the company fosters a family-like atmosphere and strives to show that management personally cares for each employee. It also provides company cars and a profit-sharing plan. "Our main goal is to instill staff with the notion that they don't 'go to work,' but rather go 'to their company,'" said Dieter Grimmig. "We want them to spend the company's money as if it were their own."

Company managers also complained about the country's lengthy educational system. The company recruits from both the Fachhochschule and the technical university, but tends to hire more from the technical university. Newly hired civil engineers go through a three- to six-month probationary period, which gives the company time to see if they have the appropriate drive, commitment, and ability to work well under pressure. Those who stay become involved, committed employees, said Grimmig.

The company says it is important to hire even when the company does not have job openings. "There are not enough good people to go around," said Grimmig. "If we find good people, we hire them, even if we don't have a job opening. We tell our employees that we want to be the best company – and that requires top personnel and equipment."

A trade association of construction companies runs a training center offering a series of 42-week apprenticeships in construction trades and directs a program aimed at encouraging young people to choose careers in the construction industry. Since 1998, a new vocational academy has offered a three-year engineering studies program. This program, which consists of a mix of practical experience and academic study, has proven popular with young workers and employers.

FRANCE

Not only is France facing increasing numbers of retirements, but recent legislation also cut the standard workweek from 39 to 35 hours. This forces agencies to become more productive – to, as one person put it, "recruit more brains than workers."

There are about 100,000 civil service positions in France, where civil servants are known as "agents" and top-level civil servants are referred to as "engineers." The term "engineer" has a much broader meaning than in the United States, and it is reserved for managers and leaders who have graduated from a select group of universities.

Competition for civil service jobs is keen. All civil service positions are filled through a competitive process. Candidates must pass a written test and then undergo an oral examination to determine if they are suited for a particular job. This process, intended to prevent nepotism and cronyism, does not always result in the best person being hired for a job, according to several highway managers in France. Training is thus seen as an important counterbalance to the recruitment process.

The Ministry of Equipment takes training seriously and maintains its own training network, including schools and universities, training centers, and intradepartmental training programs. A database called Omesper is used to keep track of each employee's competencies, such as degree, training completed, and positions held. According to Pascal Martin-Gousset of the Ministry of Equipment, the agency's training programs have allowed many of its staff to become accomplished managers, but sometimes at the expense of their technical expertise. He stressed that the ministry needs people with a combination of management skills and technical expertise.

Formal Schooling

After two years in preparatory classes at a university, students can compete for a position in one of the ministry's prestigious schools. Those selected are paid civil service wages while they study. The problem, according to the ministry, is keeping graduates on the ministry's payroll, as private industry goes after these qualified, well-trained young people aggressively. Starting salaries are comparable for public- and private-sector jobs, but the public sector is said to offer young technical specialists more responsibility early in their

careers. About a third of new graduates leave government service to accept positions in the private sector. Their new employers must then reimburse the government for the cost of their education. Most of those who leave the civil service remain in the private sector, as wage increases usually are greater than in the public sector.

A strong tie exists between the government and universities in France. The ministries are, in fact, direct sponsors of some of the nation's most prestigious colleges. Most notable of these is the National School of Bridges and Roads (L'Ecole Nationale des Ponts et Chaussées, or ENPC), founded in 1747. It accepts, through a very competitive process, only the best and brightest students. Its faculty members not only teach, but also conduct research for the Ministry of Equipment and private companies, allowing them to bring a real-world perspective to the classroom. About half of the school's students come from the Ministry of Equipment.

The National School for Equipment Technicians (L'Ecole Nationale des Techniciens, or ENTE), created in 1972, offers courses in basic science, work organization, and human behavior. It is designed to train technicians to work in all departments of the Ministry of Equipment. Its students, selected through a competitive process, come from the ranks of the ministry, as well as from other agencies and the public. Some students have never worked before, while others are in entry-level ministry positions. Those who are admitted but who do not work for the ministry are made civil service interns, who are then paid by the ministry and guaranteed a job once they finish the program. The training takes place over a one- to two-year period, depending on a student's credentials and background.

The National School of Public Works (L'Ecole Nationale des Travaux Publics de L'Etat, or ENTPE) offers a three-year graduate program for managers and engineers. Created in 1954, 80 percent of its students are Ministry of Equipment employees. Training fields include transportation and traffic studies (a growing program), water management, urban planning and management, and social sciences and personnel management. It also offers an international department, which hosts students from other countries and sends French students abroad for training.

Continuing Education Programs

A subsidiary of the National School of Bridges and Roads – the Ponts Formation – offers continuing education programs for engineers with technical and scientific expertise and a good knowledge of management and economics. The school is self-supporting and strives to achieve a two percent profit each year. Students pay their own tuition. Each year 200 short (one-to-four-day) training courses and 30 longer sessions (ranging from two to four weeks and geared for foreigners) are conducted. Key topics include transport and the economy, procurement, project management, and environmental impact assessment. The requirement that the school be self-supporting, however, sometimes keeps it from developing and offering a course that is needed but would attract only a small number of students.

Because technicians are likely to change jobs several times during their careers, they are trained in more general skills first. “The students are eager to learn cold, hard facts, and they find it somewhat destabilizing to be taught these softer skills at first,” said Bernard Gambini, director of the Ponts Formation. “But those skills are just as important to their future careers and success.”

Ten intergovernmental centers for vocational training (CIFPs) provide continuing education programs for central administration employees, including the Ministry of Equipment.

The CIFP for Paris has four main missions:

- Recruit workers through competitions.
- Provide training programs.
- Provide management consulting services to the departments in the region.
- Develop and manage training in the region.

Training accounts for 80 percent of the activities of the CIFP for Paris, which has a budget of FRF13 million (US\$1.7 million) and a staff of 30.

ENGLAND

Highways Agency

The focus of the Highways Agency – an executive agency of the Department of the Environment, Transport, and the Regions – has shifted dramatically in response to a government-issued 10-year transport policy. “The government has given the Highways Agency a new role so that it can play a central role in developing better services to road users and non-users alike, improving safety, tackling noise, and protecting the environment,” said Highways Agency Chief Executive Lawrie Haynes. “From now on, it will become a network operator by more actively managing roads and ensuring motorways and trunk roads work more closely with other transport systems.”²

That 10-year policy has spawned three Highways Agency plans:

- Business plan, an annual document that lists the agency’s goals for the year to meet the 10-year transport plan’s goals, as well as outlines programs and budgets for the next two years.
- Corporate plan, which sets out how the agency will need to change over a three-to-five-year period to meet those goals. The agency is striving to modernize, allowing it to provide better, more customer-focused, and cost-effective services.
- Management plan, an internal document that attempts to link the high-level objectives in the business plan to individual staff plans (i.e., personal and staff growth).

One of the agency’s eight key objectives is to “be a good employer managing the business efficiently and effectively, seeking continuous improvement.” In the past, the agency’s mission centered on excellence in engineering and technologies. Now, the emphasis is on excellence in people – and that has made finding and retaining good employees a high-priority task.

To encourage employees to strive for personal and career success, every permanent staff member is given a “Planning for Success” folder. The folder includes the following:

² *An Introduction to the Highways Agency*. April 20, 1999. (Booklet.)

- **“Core Competence Framework.”** This booklet presents the core competencies set by the agency and explains how they are used in the agency. Core competencies are defined as the skills and behaviors individuals must possess to be effective in their work at the agency. The booklet identifies those competencies common to all jobs in the agency, grouped into three performance headings: developing and maintaining relationships, achieving results and outcomes, and being personally effective. The booklet is intended to be used in conjunction with an individual’s Performance and Development Plan.”
- **“Notes for Guidance for Completion of Performance and Development Plans.”** This booklet explains the purpose of performance management and provides information and instructions for completing an individual “Performance and Development Plan.”
- **“Performance and Development Plan.”** This eight-page form, issued annually to employees since 1996, includes information on the job’s objectives, the competencies appropriate to the job, an assessment of development and training activities necessary for improving job performance, results of a formal mid-year review, the supervisor’s assessment of the jobholder’s performance and capability for promotion, and comments from the jobholder. “The performance and development plans provide clearer job expectations, setting out what is expected in terms of output (objectives) and behavior (competence),” said Nigel Gray, head of the Pay and Appraisal Team at the Highways Agency.
 
- **“Voluntary Self-Assessment Form.”** This form is intended to help the jobholder structure his or her thoughts when developing a career plan or completing a Performance and Development Plan. The employee and manager agree to key objectives that set forth what is expected in terms of output, behavior, and competencies, particularly in dealing with customers. Promotions are based on how well the employee stacks up against the Core Competence Framework, not just what he or she has accomplished in the past.

Figure 3 Each staff member of the Highways Agency is given a “Planning for Success” folder, which includes advice and strategies for charting a successful career in the agency.

A new, simple, eight-band pay structure covers all agency staff. A staff member’s progression through the appropriate pay band is linked to his or her performance. The pay band is determined by the “weight” or quality of the job held.

Agency staff members have made a deliberate shift to an increased use of the word “services,” as in “providing good services” to customers both inside and outside the agency. They have identified new skill areas needed on their staff, including transport planning, customer care, communication, procurement and negotiating, contract management,

business management, and strategic planning. “The agency is moving toward hiring more people with a broad range of skills, rather than specialists that then need to be trained in the soft skills,” said Highways Agency engineer Dave Clark. The main role of engineers is shifting to that of contract managers. This is a change that is not always well received by many of the agency’s staff engineers, who prefer to work at the project site rather than deal with paperwork in the office.

The Highways Agency’s workforce is aging. Most of its 1,700 employees joined the staff in the 1960s through 1980s, when it was conducting a huge construction program. Most of those people will begin retiring in the next five years or so. The agency is not yet experiencing major recruitment or retention problems, but that is expected to change around 2010 as the number of retirees grows. Until about four years ago, Highways Agency staff was made up predominantly of engineers and technicians. Now, however, most of the engineering and construction work is being done by private-sector companies, and the number of Highways Agency staff skilled in human resources, accounting, and procurement is increasing. Today, 67 percent of agency staff are administrators, 28 percent are engineering specialists, and five percent are environmentalists. “We’ve had a lot of change in the past 10 years, and the amount of change is now accelerating. We need to equip people in the necessary skills,” said Mel Nash, Highways Agency division head. “But we must do this while still delivering on the business side. The ministry is increasingly interested in how we deliver, not just what we deliver”

The agency’s traditional skills – including engineering, project management, technical expertise, civil service values, and “delivering the business” – are no longer enough. Now, they must be augmented with expertise and skills in the following areas:

- Transportation planning
- Customer care
- Communication
- Information services and technology
- Procurement and negotiating
- Contract management
- Business management
- Strategic planning

“We tended before to operate in silos,” said Nash. “Now, we’re beginning to break those barriers down, to encourage people to work in other departments, and to think outside their silo.”

The Highways Agency is committed to the professional development of its staff, as evidenced by its GBP1.8 million training budget (US \$2.6 million, or an average of \$1,500 per employee), dedicated training staff, cadre of outside consultants, and network of learning resource centers.

Nash cited leadership skills as a key issue for the organization. “Developing leadership skills has not been a priority for the organization,” he said. “Instead, technical skills have been seen as the way to the top of the organization – and if you happened, by chance, to have leadership skills, that was a bonus.”

The agency has taken several steps to help the staff develop its leadership and management skills, including providing the following:

- “The Good Manager Guide,” an easy-to-follow chart that spells out the characteristics and behaviors that make a good manager
- Competence frameworks, which define the desired skills and behaviors for all agency employees.
- The Leadership Development Scheme, which was established in response to the realization that “the Highways Agency needs inspiration, imagination, and innovation. It needs leaders.”³ This two-year program was designed to provide opportunities for talented agency staff members with potential and ambition to reach a senior level within a set timeframe. Those selected are sent to a development center, where their strengths and areas for improvement are assessed. An individually structured program is then developed, which enables each participant to follow a career path that suits him or her and meets the needs of the agency.
- Learning Resource Centers, which provide an open learning environment in which individuals or teams choose what, where, and how to learn. Resources at the centers, located in most Highways Agency offices, include audiotapes, computer-based training, videotapes, and CD-ROMs. Students can use these resources in the centers, their offices, or their homes.
- Management training in business processes and activities.
- Mentoring programs, which ensure that expertise is transferred within the organization. A one- or two-day training session weeds out those who do not have the right qualifications for serving as a mentor
- A coaching program for senior executives, in which outside consultants are brought in to serve as coaches. The program is integrated with the new 360-degree evaluation programs for all senior and middle managers.
- Career development advice, to help staff members plot their career paths. “We’re trying to get people to realize that career development is their responsibility,” said Nash. “But the human resources department can help them decide which areas need development.”
- Interchange and temporary assignments, which allow people to cross train and gain valuable experience.

The role of the human resources planning team is to contribute to the agency objective of “having the right people, at the right place, at the right time.” The department strives to be proactive, rather than reactive, according to Gary Freer, team leader of human resource planning. The department uses a spreadsheet system to estimate future needs based on

³ *Leadership Development Scheme. Career...* Highways Agency brochure. Undated.

past trends, staffing, and other information. This system, said Feer, is helpful, but its basis in a steady-state scenario limits its utility. A software tool is in the works that will allow the department to forecast what its workforce needs would be were it to take on a particular project or program.

The Highways Agency is accredited by “Investors in People,” a government-sponsored program aimed at encouraging employers to develop the skills of their staff and thereby improve business and economic performance. The program, which has been implemented throughout the United Kingdom in organizations ranging from hotels to manufacturers, sets a level of good practice for improving an organization’s performance through its people.

Accreditation recognizes that the organization:

- Is committed to developing and training its employees.
- Regularly reviews the development and training needs of its employees.
- Takes action to develop and train its staff members.
- Evaluates its investments in training and development to measure success and promote improvement.

To build interest in transportation careers among younger students, the Highways Agency sponsors a “take your sons and daughters to work day,” and it staffs a stand at employment fairs. The Institution of Civil Engineers serves as a recruitment tool for the profession, regularly sending its regional training officers to visit college students.

Construction Industry Training Board

The Construction Industry Training Board (CITB) was established by statute and is funded by a levy on the construction industry. It provides training in the construction trades for young adults (i.e., those just entering the workforce) and adults. The CITB’s objective is to “promote and facilitate the training of sufficient people in the skills needed for a world-class construction industry.” The levy (0.25 percent of wages paid by the larger employers in the construction industry) is supplanted by income from training activities and government agencies. The levy is well accepted by the industry and, according to CITB, “is the fairest way of gathering funds from individual employers in order to share the cost of training in a mobile industry. This maintains a solid skills base and ultimately benefits all employers in the long term.”

CITB offers apprenticeships, career advice to young students, curriculum materials for vocational training, and a nationwide network of more than 120 Curriculum Centers, which support primary and secondary school learning through the medium of construction. The largest portion of the CITB budget, however, goes to grants given to employers who train their own employees. The grants do not cover the total training cost, but they award companies that provide training for their workers. About 15,000 employers received grants in 2000. Even small companies exempt from the levy benefit from grants, sometimes earning substantial amounts because they run large apprenticeship and training programs. According to CITB, the construction industry needs to recruit 64,000 people each year

merely to maintain its workforce of laborers, crafts people, construction managers, and professionals. When one allows for growth, the number jumps to 74,000. The industry faces a huge task: recruiting and training some 370,000 new people over the next five years, while providing training and other resources to improve the skills of the existing workforce.

CITB Chief Executive Peter Lobban commented that a focus group found interest in information technology careers waning among young people. "They see it as a sweatshop industry that doesn't do anything, so interest in construction is growing," he said. "We heard, 'we want to see your heroes,' so we created a series of recruiting posters that feature young heroes in the construction field." CITB also trains and sponsors these people, so that they can go into schools and talk to students about career opportunities in construction.

Construction Industry Research and Information Association

The Construction Industry Research and Information Association (CIRIA) is a member based independent research association founded in 1960. Its agenda and activities are driven by practitioners in industry and government, and today those activities predominantly center around collaborative research leading to publications and workshops on best practices. CIRIA's role, according to Peter Bransby, director general of the association, is to "improve the performance of all those concerned with construction and the environment." In 2000, the association had 48 employees and 623 subscribing organizations, and it conducted 47 research projects and produced 53 publications.

Ideas for CIRIA projects come from a variety of people and organizations. A committee reviews proposals to determine if there is a real need among practitioners for such a project. If the decision is yes, the committee develops a scope of work and seeks funding from industry and the government. A typical project resulting in a report would cost CIRIA the equivalent about US\$140,000 and take 18 months to complete.

Calls for tenders, which are advertised on the Web, elicit intense competition. CIRIA members are accorded a slight advantage in the selection process. Even though most contractors fully expect to lose money on these projects, they seek them because of the prestige and because the projects "pay them to learn." For example, one contractor was paid the equivalent of US\$56,000, but spent the equivalent of US\$282,000 assembling a top-notch team to conduct the work. Nonetheless, the contractor said it was "the best investment he ever made."

Despite access to state-of-the-art computers, electronics, and software, practitioners still prefer that CIRIA reports be furnished in printed form rather than electronic form. "They



Figure 4 Team members spent an afternoon touring the Construction Industry Training Board's campus several hours outside of London, which offers apprenticeships and hands-on training in the construction trades.

want to be able to flip through the reports, and to keep them in the maintenance shop or truck if necessary,” said Bransby.

CIRIA encourages and sustains practitioner networks as mechanisms for sharing knowledge. For example, the Construction Productivity Network was established to allow practitioners to learn from one another and to improve productivity in the industry by sharing expertise and knowledge. CIRIA has found small workshops (no more than 20 people) to be popular and effective. The three- to four-hour workshops typically begin with a session on the latest developments in a particular area, such as performance measurements, followed by open debate and discussion. “Key to their success is the fact that no names are recorded in the workshop notes, so people feel free to say anything, without fear of being embarrassed,” said Bransby. “They enjoy talking frankly with other professionals grappling with the same issues and problems.” Workshop notes are distributed to participants and made available to others. As popular as the workshops are, most participants are not willing to pay much for them, so CIRIA subsidizes them substantially.

CHAPTER THREE

RECOMMENDATIONS

Based on what scanning team members learned in Europe, the team proposes a number of actions that should be further evaluated for possible application in the United States. These actions are grouped into four categories: career awareness, workforce development, program effectiveness, and recruitment. The findings and recommendations are those of the scanning team and not FHWA.

CAREER AWARENESS

Develop a funding source and industry-wide commitment to reach into kindergarten through 12th grade to encourage transportation careers.

To ensure that the transportation field attracts the talented people needed to meet future workforce demands, the industry needs a coordinated strategy or a well-defined national initiative to stir the imaginations and interests of young people and encourage them to seek careers in transportation. We need to make students of all ages aware of the jobs and opportunities available in the transportation field, and we should encourage students to start early to gain the knowledge and skills to pursue such careers.

Steps to consider include the following:

- Initiate a national campaign to bring the public's attention to the importance of the transportation industry and its value as a major component in America's economic future.
- Establish a national commission to determine the investment in awareness and educational outreach in the transportation sectors. Have the commission seek legislative or national support for Federal funds to be assessed to fund national training and educational priorities.
- Seek to include a 21st century update of the National Highway Institute in the next transportation reauthorization legislative package, which would expand the institute's authority and extend its capabilities for reaching the next generation of transportation workers. Such changes would enhance the provision of technical training to include national leadership for professional and worker training industry-wide, with national funding authority included.
- Become a resource for teachers, who are always looking for outside sources for lectures, presentations, and field trips. A field trip to a construction site for a group of 5th graders, for example, would be an eye-opening experience and a great introduction to the transportation industry for both the teacher and the students.
- Create a nationwide program to weave engineering concepts into the kindergarten-through-12th-grade curriculum. This would be an effective way of encouraging transportation careers from the earliest ages.
- Establish a national funding source for a national engineering and construction institute, similar to the models used in France and the United Kingdom for

professional and technical training. One of the missions of such an institute would be to attract people to, and train them for the transportation field.

- Form public-private partnerships that could provide model curricula at the kindergarten-through-12th-grade and university levels.

Identify the core characteristics entry-level people seek in a job in the transportation field.

Management often does not understand what people most value in a job. Employees usually say meaningful work, training and educational opportunities, and challenging assignments are the chief reasons they stay with a company. Employers, on the other hand, usually point to compensation as being most important to employees.

The U.S. Department of Transportation, State departments of transportation, AASHTO, and universities studying this issue should team together to better understand what young people look for in a job. Anecdotal evidence buttressed by research is needed to determine what college students seek in a job. Those characteristics should then be compared with the culture of State transportation agencies. An organization's culture can be its biggest barrier to successful recruiting.

An exploratory committee of stakeholders should be formed to evaluate this premise and to recommend a course of action. Stakeholders would include the U.S. Department of Transportation, State departments of transportation, AASHTO, universities, and other organizations with an interest in this issue.

Develop a program to introduce high school and middle school teachers to transportation careers and issues.

Students develop career interests as they progress through middle school and high school. By the time they graduate, many already have a perception of their future career – or, at least an idea of what they do not want to pursue. Much of the basis for those perceptions comes from their teachers and mentors.

A program to make teachers more aware of transportation careers and issues should consider the following:

- Create programs that would provide training and exposure to teachers in the field of transportation. Such a program should provide teachers with teaching aids, exercises, curricula, and other materials that would serve as a base for an engaging program.
- Encourage businesses and local chapters of transportation organizations to volunteer to help teachers create and present programs describing the important role of the transportation system and the people who develop and maintain it.
- Encourage industry to employ teachers during the summer months to help make them more aware of the opportunities in and challenges of the transportation profession. Many middle school and high school teachers seek temporary

employment during the summer, and those same months are the peak period for the construction industry.

- Ask teachers to encourage students' parents to involve their children in "take your son/daughter to work" days, particularly those in the transportation industry.

Find ways to attract more young people to careers in transportation.

Transportation employment covers a vast range of opportunities and careers, but it must compete against many other challenging careers. One organization or company alone cannot tackle the task of attracting new employees to the field, but it is possible to make progress if the various partners in the transportation industry work together and leverage their resources.

Options include the following:

- Work with the transportation industry (as is done in Germany and England) to develop a reliable funding mechanism that could support these types of programs. For example, consider imposing a percentage takedown from the annual apportionments of Federal-aid highway funds (similar to what is done with State planning and research funds) targeted specifically for funding a program to publicize careers in the growing, dynamic field of transportation.
- Identify transportation industry heroes and publicize them to young people, as England has done so successfully. These young workers could serve as spokespersons for the industry.
- Develop a nationwide system for identifying minimum core skills and competencies for critical transportation construction trades.
- Develop a national construction skills curriculum that would lead to a national certification program for selected trades.
- Create a series of training institutions that provide a nationwide curriculum of training in construction skills and trades.
- Develop an industry-wide campaign aimed at middle school and high school students to trumpet the real-world experiences of actual transportation workers.
- Feature former students in publicity campaigns.

WORKFORCE DEVELOPMENT

Define critical leadership roles in the face of a changing transportation industry.

The transportation industry is changing, and that requires its leaders to have a new set of knowledge and skills. The transportation industry should define a set of core characteristics and skills (competencies) that leaders need and then strive to provide a means for honing those skills and characteristics in its promising leaders of tomorrow.

Develop industry-wide mechanisms for developing leadership competencies.

A common thread throughout the scanning team's discussions with European experts was the influence of leadership on the workforce development process. In all cases, the European entities, both public and private, made conscientious investments in training and development at all levels of their workforce. The Europeans have discovered, as has the U.S. highway industry, that future leaders must be versed in business acumen. That involves the ability to acquire and administer human, financial, material, and information resources that accomplish the organization's mission and to use new technology to enhance decision making.

Several possible steps for the U.S. transportation industry include the following:

- Convene a group of stakeholder executives to explore commonalities in approaches to leadership development, including representatives from the U.S. Department of Transportation, FHWA, AASHTO, university transportation centers, transportation associations, and the Eno Transportation Foundation.
- Establish a transportation leadership development council to advance the implementation of future leadership development activities. This council should include representatives from the U.S. Department of Transportation, FHWA, AASHTO, university transportation centers, and the Eno Transportation Foundation.
- Establish a world-class institute directed at serving the leadership development needs of the entire transportation enterprise. It may be appropriate at this point to establish a more stable funding source that ensures the continued growth and functionality of such an institute. Such a mechanism could be supported by legislation, partnering agreements, or other grants or endowments.

Prepare employees for their changing role in the delivery of government services and products.

More and more government services are being contracted out. Government employees are increasingly removed from customer services and products. Instead, their role is becoming one of contract management and oversight. This role, although important, is different from what most public-sector employees were trained for and are comfortable with. Government agencies should take steps to prepare them for this shift in responsibilities and to ensure that they have the necessary skills, knowledge, and tools.

Develop new relationships, institutions, and funding sources to develop and ensure industry-wide practical competencies in transportation workers and technicians.

The transportation industry must continually grapple with advances in technology and methodology and improvements in equipment. To meet the demands for well-qualified, competent staff, the industry must continually train and retrain existing staff, as well as people new to the industry. A recognized and respected institution or training center is essential to the continued growth and quality workmanship of the industry.

Steps toward achieving this goal include the following:

- Establish better working relationships with the university system to provide continuing education on an as-needed basis, in fields deemed appropriate by the industry.
- Explore the possibility of attaching a fee to all contracted construction work, which could be used to support technical training in the industry.
- Look at the potential of operating internal training on a pay-as-you-go basis.
- Work with vocational-technical centers to ensure they provide training that is meaningful to the transportation industry.
- Coordinate, through an information clearinghouse, existing technical and professional programs in each State.

PROGRAM EFFECTIVENESS

Engage the entire transportation industry in the workforce development process.

The Federal government, State transportation departments, education community, and private sector have a common interest in developing the human assets needed to design, deploy, operate, and maintain our national transportation systems. To ensure that the transportation field attracts the talented people needed to meet future workforce demands, the industry needs a coordinated strategy or a well-defined national initiative to stir the imaginations and interests of young people to seek careers in transportation. In addition, we need to provide today's employees with continual training and development programs to ensure that they have the skills needed to effectively accomplish the priority work of their organizations.

Organizational success depends on having the right employees with the right competencies in the right place at the right time. A national focus on workforce planning is one way to help ensure an adequate supply of individuals possessing the skills needed today. "A Staffing Plan Survey of State Transportation Agencies," conducted by the New Mexico State Highway and Transportation Department in September 1999, found that three of the top-five staffing and human resources priorities among State transportation agencies were employee recruitment, retention, and succession planning. Clearly a national dialogue and focus of resources on this overall set of issues would offer the best opportunity to develop national partnerships and approaches to address this on a comprehensive basis. The ideas, creative solutions, funding possibilities, strategic alignment of resources, and commitments

made in this context would help energize and engage the entire transportation community. All organizations with a transportation or educational mission should be considered potential partners in a national effort on workforce development. Some type of national coordinating group will be needed to collect and disseminate information and to leverage creative ideas and practices.

An ongoing domestic workforce development scan being conducted by American Trade Initiatives for the National Cooperative Highway Research Program provides an excellent opportunity to assess the current state of workforce planning and development in State departments of transportation. The scan's survey should be broadened to include other transportation partners outside the AASHTO community.

The National Workforce Summit sponsored by FHWA, AASHTO, and the Transportation Research Board in spring 2002 served as a state-of-the-nation dialogue on workforce planning and development. The participation of transportation's chief executives in this session provided a great foundation for future partnerships.

Develop a model for collecting and disseminating best practices.

U.S. highway agencies are accustomed to leveraging their resources by pooling funds for joint research projects (for example, through the National Cooperative Highway Research Program). A program on workforce development issues, modeled after England's Construction Industry Research and Information Association, would be a logical next step. Such a program should involve the highway industry as well as government agencies, as they all stand to gain from it.

As a first step, the National Cooperative Highway Research Program could develop a project to investigate the feasibility of such a program and to propose a plan for evaluating best practices, packaging those practices for a wide variety of organizations in the highway community, and disseminating that information broadly. The project should also recommend how the program could be self-sustaining.

Integrate workforce development and retention into the key business processes of the organization.

One common theme heard repeatedly during the four-country scanning study was that workforce planning and development must be an integral part of an organization's strategic and business planning processes. Workforce planning must be on par with budgeting, strategic planning, and operations. Investing in the human capital of an organization must be a bottom-line item for all organizations, just as important as product and service development and delivery.

The following strategies should be considered for adoption by individual transportation organizations:

- Consider workforce planning and development a bottom-line element critical to the success of transportation organizations, similar to product development and delivery.

- Assign units within an organization specific responsibility for focusing on workforce planning and development issues. Resources, including staff and budget, must be devoted specifically to accomplishing these responsibilities.
- Make delineation of roles and responsibilities and accountability for accomplishment of the various elements of workforce planning and development an inherent part of the organization's business plan.
- Develop and evaluate workforce planning and development performance measures along with other organizational performance measures.

Coalitions and partnerships at the local level (schools, universities, trade groups, and associations) and national level (Transportation Research Board, AASHTO, American Road and Transportation Builders Association, Associated General Contractors, U.S. Department of Transportation, FHWA, and others) should identify best practices and develop and provide tools for the systematic integration of workforce planning and development into the organization's business processes.

Establish a common framework for delivering and measuring all types of learning.

In the four countries visited on the scanning mission, it was evident that the government, either alone or in concert with private industry, was responsible for developing a framework for the delivery of training. Training centers were a key means of ensuring the workforce has the necessary knowledge, skills, abilities, and competencies. In many cases, those who have successfully completed a course and demonstrated they have acquired the necessary skills or abilities are provided with documentation of their accomplishment. This serves as a standard for the level and quality of training, which provides employers an across-the-board measure of ability.

To ensure a consistent level of training and a standardized measurement of such training, the U.S. transportation industry should take the following steps:

- Investigate the possibility of establishing transportation technical training institutes. For consistency of operation and level of training, these should be under the general governance of the U.S. Department of Transportation or FHWA. They should be governed by a board consisting of members of State agencies, Federal agencies, and private industry. Several institutes could be established, each serving an AASHTO region. The curriculum could be quite flexible to reflect actual needs in the industry. Enrollees would be trained for jobs in a particular trade or occupation. Funds for establishing such institutes could be sought from the Federal government, either as grants or specific allocations in the next surface transportation act. Enrollees would include employees of private contractors with their employer paying the cost of participation, employees of State departments of transportation, and workers or aspiring workers who apply directly and pay their own way. Certainly, many details would have to be worked out, but this could channel a flow of qualified technical personnel into the transportation field.
- Encourage transportation department staffs to volunteer to serve as course instructors. This volunteered time, although a cost to departments, may end up costing much less than is now spent on hiring, training, and qualifying workers.

RECRUITMENT

Extend and formalize relationships with high schools, vocational schools, and community colleges, which are key sources of transportation workers.

The transportation agencies (and governments in general) in all four countries take an active role in promoting and formalizing their relationships with educational institutions. Transportation agencies are strategically involved in promoting careers in transportation.

The U.S. transportation industry is already attempting a number of strategies to direct students into the transportation field. The primary means of doing so is the AASHTO Transportation and Civil Engineering Program (TRAC), with about 25 member States.

TRAC encourages careers in transportation at various levels, not just in engineering. TRAC's programs are made available to secondary schools (high schools and middle schools) through regional centers that involve State departments of transportation, other government organizations, universities, nonprofit organizations, and private industry. At its most basic level, TRAC is a program designed to integrate with science, math, and social studies curricula. Volunteers from the transportation profession visit secondary schools, where they engage students in solving real-world transportation problems. By providing a link between the classroom and society, TRAC fosters an appreciation for transportation careers and helps draw talented students of all backgrounds to the field of transportation.

The following items should be considered:

- Encourage State departments of transportation to join TRAC and work with the TRAC manager to enhance the program.
- Encourage State departments of transportation to develop an engineering internship program for high school students. AASHTO might be a likely means of coordinating such programs.
- Create an ongoing, adequately funded means to enable teachers and guidance counselors – people who greatly influence a student's career path – to learn firsthand about the challenging and rewarding opportunities available in the transportation industry. This would help them become champions for transportation careers.

Create a means for attracting more students to civil engineering and ensure that anyone who wants to be a civil engineer has access to the necessary educational programs.

Financial means should not be a barrier to a career in civil engineering. If a student is interested in and capable of a civil engineering education, tuition should not preclude him or her from pursuing such a degree. Scholarships and grants should be widely available for aspiring civil engineers who lack adequate financial resources.

CHAPTER FOUR CONCLUSION

The scanning team members found no “silver bullet” for addressing the gaps in workforce development in the U.S. transportation industry. They did, however, identify a number of innovative European practices that could benefit the U.S. transportation industry by encouraging young people to aspire to careers in transportation, helping transportation agencies find and hire people with the skills and knowledge they need, helping workers keep abreast of new technologies and ways of doing business, and keeping employees motivated through challenging work and a supportive environment.

An implementation team has been formed to identify how the action items the team identified might be evaluated or implemented in the United States. The implementation team consists of Joseph Toole, Randy Bergquist, and David Ferguson.

The information uncovered during this scanning study has already served as the basis for several implementation activities:

- A CD with background information on U.S. transportation workforce issues was produced before the scan and distributed to host agencies. After the scan, 150 copies of the CD were sent to U.S. transportation organizations, with an invitation to become involved in a national effort on workforce development.
- Presentations summarizing the scanning mission findings were made to the following groups or meetings:
 - AASHTO Human Resource Committee
 - 2001 International Symposium on Transportation Technology Transfer
 - National Cooperative Highway Research Program Project Panel 20-36
 - FHWA Annual Business Meeting
 - Transportation Research Board summer meeting
 - AASHTO regional meetings
- A series of articles on the outcome of the scanning study, targeted at *Public Roads* magazine and other publications serving the transportation industry, are in the works.
- A national workforce development summit sponsored by the U.S. Department of Transportation was conducted in May 2002. Top leaders from transportation organizations and industry spent two days focusing on this issue and developing a concerted program for improving the attractiveness of careers in transportation.

APPENDIX A

TEAM MEMBERS

BIOGRAPHIC SKETCHES

Pete K. Rahn, panel co-chairman, is the secretary of the New Mexico State Highway and Transportation Department in Santa Fe, New Mexico. Rahn leads a 2,700-employee organization responsible for all modes of transportation in New Mexico. His areas of emphasis include improving the organization's customer service, applying the Malcomb Baldrige quality principles, and developing a flexible and responsive workforce. Before joining the department, he was corporate vice president of Kysar Insurance in Farmington, New Mexico, and an elected county official. Rahn has a bachelor's degree in city and regional planning from New Mexico State University. He chairs the American Association of State Highway and Transportation Officials' Standing Committee on Quality and is a member of the Transportation Research Board Task Force on Accelerating Innovation in the Highway Industry. He is immediate past president of the Western Association of State Highway and Transportation Officials.

Joseph S. Toole, panel co-chairman, is director of professional development for the Federal Highway Administration (FHWA) in Washington, D.C. Toole administers a national program of training, education, and workforce development, which includes international outreach. This program encompasses technical and management training for Federal, State, and local agencies and other countries and awards educational grants for current and prospective transportation staff. He is co-chair of FHWA's Workforce Planning and Professional Development Task Force. Toole partners with State departments of transportation and transportation associations on studies to determine future workforce needs and to identify best practices in managing human resources. He has served FHWA in a variety of field and headquarters positions over the past 25 years, including serving as special assistant to the FHWA administrator and as director of FHWA's Office of Technology Applications. He has chaired or served on a number of agency task forces, including the FHWA 2000 Work Group, which established the agency's original strategic planning process. Toole graduated from California Polytechnic State University in San Luis Obispo with a degree in transportation engineering, and he has a master's of business administration in finance from George Washington University. He is a licensed professional engineer.

Randy Bergquist is program manager for learning and development for the U.S. Department of Transportation's Departmental Office of Human Resource Management in Washington, D.C. He is responsible for developing, recommending, and overseeing a variety of learning and development policies, programs, initiatives, and special high-level workforce planning projects. He has 21 years of Federal service, working for the U.S. Department of Commerce and the U.S. Department of Transportation in the areas of employee relations and employee development. Bergquist received a bachelor's degree in music education from Shenandoah College and Conservatory of Music and a master's degree in counseling from the University of Wisconsin. He is a member of the Human Resource Development Council Executive Committee, chairs its professionalism subcommittee, and serves on the policy and legislation subcommittee.

Ronald W. Carmichael is division engineer for the Federal Highway Administration's (FHWA) Western Federal Lands Highway Division in Vancouver, Washington. The division is one of three field offices responsible for the Federal Lands Highway Program and serves Alaska, Oregon, Washington, Idaho, Montana, and part of Wyoming. As division engineer, Carmichael is responsible for administering highway programs in cooperation with the Federal lands management agencies (Department of Defense, U.S. Forest Service, National Park Service, U.S. Fish and Wildlife Service, Bureau of Indian Affairs, Bureau of Land Management) and State and local transportation agencies. The Western Federal Lands Highway Division provides transportation engineering services for planning, design, construction, and rehabilitation of roadways and bridges on, or providing access to, federally owned lands. Carmichael joined FHWA in 1975. Previous assignments included positions in North Carolina, Maryland, Nebraska, Pennsylvania, and the headquarters office in Washington, D.C. Before joining FHWA, he worked for the U.S. Army Corps of Engineers. Carmichael has a bachelor's degree in civil engineering from North Carolina State University. He is a registered professional engineer.

David S. Ferguson has served as chief of personnel resources for the Florida Department of Transportation since January 1973. His responsibilities include compensation, classification, benefits, discipline, union contract negotiations, selection, training and development, and policy development. He is also responsible for developing and directing all personnel and training programs for about 10,000 employees statewide. In 1994, he developed and implemented a new personnel system for the department, which included a major consolidation of job classes; pay broadbanding; a knowledge, skills, and abilities selection system (eliminating minimum qualifications); a computerized system to rank employees for superior proficiency pay increases; and a bonus payment program. Before joining the department, he held several personnel positions in both the public and private sectors. He has served on numerous State committees covering compensation, productivity, benefits, career service reform, and training.

Gary Gilmore is chief engineer for the Montana Department of Transportation in Helena, Montana. As chief engineer, he is responsible for overseeing the department's \$300 million pre-construction and construction programs. Gilmore is respected across the State for his technical expertise, commonsense approach to issues, and experience. He is known as a "spark plug" for getting things done. He began working for the department as an engineer-in-training in 1971 and served as division traffic engineer and field project manager. He worked as the district construction engineer for eight years before being appointed operations engineer. He has been the department's chief engineer since 1996. Gilmore has a bachelor's degree in civil engineering from Montana State University and is a licensed professional engineer. He attended the Northwestern Traffic Institute and the Highway and Transportation Management Institute at the University of Mississippi.

Gene C. Griffin is director of the Upper Great Plains Transportation Institute at North Dakota State University. The institute is a freestanding department within the university and serves as the university's focal point for transportation research and education. Griffin has more than 26 years of experience as a transportation and logistics researcher and research administrator. He has conducted scholarly work in economics, management, business logistics, and public policy related to rail and motor transport, low-volume roads, economic development, and agricultural transportation. Griffin has served as director of the institute

since 1980, during which time its annual budget has increased from \$175,000 to more than \$3 million and its staff has grown from two to more than 20. He is responsible for the institute's five programs: 1) research and service program; 2) Mountain-Plains Consortium, a regional university transportation center; 3) TEL8, a regional telecommunications system dedicated to transportation training and education; 4) Advanced Traffic Analysis Center, a program for integrating ITS solutions for traffic management in second-tier cities; and 5) graduate and undergraduate programs. During his tenure as director, the institute has gained national stature in the area of rural and small urban transportation and logistics. Griffin has a bachelor's degree in mathematics and a master's degree in economics from North Dakota State University, maintains an active involvement in research, and has published numerous reports and journal articles.

Kathryn Harrington-Hughes, the panel's report writer, is director of operations for the Eno Transportation Foundation in Washington, D.C. Her responsibilities include planning and managing leadership development and training programs, including the American Association of State Highway and Transportation Officials' National Transportation Management Conference and the Transit Cooperative Research Program's International Transit Studies Program. Before joining the Eno staff, Harrington-Hughes was president and principal writer for Harrington-Hughes & Associates Inc. (now Woodward Communications Inc.), where she produced numerous publications aimed at improving the skills and knowledge of transportation engineers and managers; director of communications for the Strategic Highway Research Program; and director of communications and marketing for the Institute of Transportation Engineers. She holds a bachelor's degree in journalism from the University of Maryland and serves as the secretary of the Transportation Research Board's Committee on Technology Transfer (A5012).

Jerry A. Hawkins is director of human resources for the Federal Highway Administration (FHWA) in Washington, D.C. Hawkins directs a comprehensive personnel and training program for FHWA employees located in the Washington, D.C., headquarters, State divisions, and four technical resource centers. Before becoming human resources director, Hawkins served as chief of personnel policy staff; chief of the Training and Executive Development Division, where he directed the Highway Engineer Training Program; and chief of the Personnel Operations Division, with responsibility for compensation, recruitment, merit promotion, staffing, planning and analysis, employee benefits, and management of automated training and personnel systems. During his Federal career, Hawkins gained expertise working in human resource and training functions in four other Federal agencies. He has a bachelor's degree in history from Norfolk State University and a master's degree in administration from George Washington University. He serves as FHWA's representative on the American Association of State Highway and Transportation Officials' Administrative Subcommittee on Personnel and Human Resources. He is also a member of the International Personnel Management Association.

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APPENDIX B SCHEDULE

Saturday, March 24, 2001
Team meeting
Stockholm, Sweden

Monday, March 26-Tuesday, March 27
Swedish National Road Administration
Stockholm, Sweden

Wednesday, March 28
NCC International
Stockholm, Sweden

Thursday, March 29
Ministry of Transport, Building, and Housing
Hesse State Road Directorate
Wiesbaden, Germany

Friday, March 30
Hans Grimmig GmbH & CoKG
Heidelberg, Germany

Sunday, April 1
Team meeting
Paris, France

Monday, April 2
French Ministry of Transport, Public Works, and Housing
Regional Center for Professional Development
Paris, France

Tuesday, April 3
French Ministry of Transport, Public Works, and Housing
Paris, France

Wednesday, April 4
Construction Industry Research and Information Association
London, England

Thursday, April 5
Highways Agency
London, England

Friday, April 6
Construction Industry Training Board
Kings Lynn, Norfolk, England

Saturday, April 7
Team Meeting
London, England

APPENDIX C

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APPENDIX D

AMPLIFYING QUESTIONS

The following statement and questions were sent to the host agencies before the scanning mission to help them focus their presentations.

Transportation agencies in the United States grapple with how to hire and retain technical and administrative workers and how to train and retrain those workers to ensure they will be able to meet changing needs. These agencies realize that their workers – the organizations' human capital – are their most valuable investment, and they want to preserve and grow that investment.

The unemployment rate in the United States is at 3.9 percent—the lowest in 30 years. Coupled with the strong economy is a steadily growing demand for engineers and technicians, particularly in electronics and high-technology fields. Many transportation agencies expanded their staffs and expertise in the 1950s and 1960s, when the Interstate Highway System was being designed and built. Today, many of those staffers are retiring, leaving a void that must be filled.

As transportation agencies in the United States have shifted from a new construction mode of operation to one of system preservation, much of the planning, design, and construction work has been outsourced, thus reducing the hands-on opportunities engineers and technicians find attractive. In addition, to many of today's younger engineers and technicians, civil engineering projects do not have the same allure as high-tech projects. That, coupled with the higher salaries typically offered by private firms, means that transportation agencies are having increasing difficulty filling jobs and retaining staff. As a result, many jobs at transportation agencies go unfilled, forcing agencies to contract for more services. In some cases, services are provided by former transportation agency staff members now employed by the contractor.

The number of engineering students in the United States has not kept pace with the growing demand. Although there has been a slight upswing in the number of U.S. undergraduate engineering students, most of the increase is in computer engineering. And the number of science and engineering graduate students in the United States has fallen for the fifth consecutive year.

The career goals of today's younger workers also are a factor. Most Generation X'ers expect to move routinely from one employer to another to take on new challenges and responsibilities. Although they are eager to assume responsibility, they stand fast against allowing their work life to intrude on their personal life, and they expect a more flexible workplace (for example, in terms of hours and culture). As a result, transportation agencies must adapt to the shifting work culture.

The needs of transportation agencies are also changing. In the past, most agencies relied primarily on a cadre of highly trained civil engineers. Today, however, the civil engineering staff must be augmented by workers skilled in computer engineering, high-tech electronics, regional planning, environmental protection, federal regulations, accounting, management, communications, public outreach, marketing, and other areas.

The challenges facing a transportation agency are broader than ever. Meeting those challenges requires a competent, skilled, and experienced workforce that can create and sustain a knowledge base.

The members of the scanning team would like to learn how public and private highway agencies in Sweden, Germany, France, and the United Kingdom build and maintain a dedicated, trained workforce of technical and non-technical staff. They are eager to learn both what has worked and what has not worked.

In particular, they are looking for answers to the following questions:

1. How do you determine your workforce needs?
 - a. What types of people and skills do you need?
 - b. How often does your agency review and evaluate your people and skill needs?
 - c. How do you identify gaps in the labor pool?
 - d. What tools do you use to forecast attrition?
 - e. How do you link workforce needs with your strategic plan?
 - f. What is the right level of investment in training? For example, do you budget a certain amount of money for each employee?
 - g. Do you monitor and evaluate employee training to ensure it is meeting the needs of both the employee and the agency?
 - h. How is your training funded?
 - i. What type of formal system or process do you use to anticipate future agency needs or major changes in skill needs?

2. How do you find and hire the right people for the job?
 - a. How early in the educational process do you begin recruiting for the “right people?”
 - b. How do you compete in a tight labor market?
 - c. What core competencies are needed, and how are they determined?
 - d. How do you assess talents versus skills?
 - e. What types of outreach mechanisms work best?
 - f. Do you target mid-career hires?
 - g. How do you get students interested in a career in transportation?
 - h. How do you keep students interested in a transportation career until you’re ready to hire them?
 - i. Do you use incentives or bonuses to attract employees?
 - j. What arrangements do you have with educational institutions to prepare students for transportation jobs?
 - k. What alliances do you have with professional associations that link transportation and professional development?

3. How do you keep the right people?
 - a. How do you reward good performance?
 - b. How do you balance your employees' work and life issues?
 - c. How are jobs defined, and how do you encourage and allow your employees to grow in their jobs?
 - d. How do you plan for succession?
 - e. Do you cross train? If so, how?
 - f. How do you encourage skilled workers to stay in the transportation industry (whether at your agency or another)?
 - g. What are the costs (tangible and intangible) of losing and replacing a worker in your agency?
 - h. What are the costs versus benefits of "paying" to retain workers (i.e., matching competing salaries)?
 - i. What agency-funded scholarships or work-study programs are available?
 - j. What is the role of technician certification and professional licensing in workforce development?

4. How do you continually improve skills to match changing needs?
 - a. What is your process for assessing skills?
 - b. What tools do you use to improve skills? How do you use technology in training?
 - c. Is training done within your agency, or do you contract for training?
 - d. Please describe any process your agency has for continual employee development.

5. How do you motivate employees?
 - a. How do you gauge employee morale?
 - b. What tools do you use to develop and maintain good employee morale?
 - c. What employee performance assessment procedures have been most effective?
 - d. To what extent are salary increases tied to performance?