TOPIC: Literature Search: Transportation Workforce Recruitment and Retention Strategies
June 21, 2017

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Needs Statement: https://mndot-irrb.ideascale.com/a/idea-v2/539920

The transportation industry is facing a severe and growing workforce shortage. Not enough new workers are entering the field, and retaining current workers is often challenging. It can be difficult for local agencies to find the staff needed to deliver projects. The problem extends to consultants and the private sector. Research is needed to understand the causes of the shortage. The problem is especially acute for technical workers, including engineers, engineering techs, surveyors, and surveying techs.

Possible causes include: fewer people interested in the field; higher demand; retiring baby boomers/generational differences; competition due to the economic expansion; increasing education requirements; too few educational institutions offering appropriate degrees; uncompetitive salaries, perception of being a government worker, certification requirements, student debt.

Once there is an understanding of the causes, strategies are needed to address them. This project would create a report containing: 1) an analysis of the causes of the workforce shortage in the transportation industry, 2) recruitment and retention strategies to address these causes, including on-the-job training strategies.

Resources searched: TRID/RiP, ASCE, Library Catalog, Web

Most Relevant Results:

Entry-Level Transportation Construction Workforce Shortages
http://www.fdot.gov/research/Completed_Proj/Summary_CN/FDOT_BDF05_rpt.pdf
http://www.fdot.gov/research/Completed_Proj/Summary_CN/FDOT_BDF05.pdf

This study investigates the factors which have the greatest impact on job choice decisions of youth entering the workforce, with the goal of informing marketing and recruitment efforts of transportation construction within the state. To examine this issue, we used a combination of multiple methods, including literature review and analysis, baseline assessment, best practices analysis, and a survey of potential candidates. We found that the job choices of young people are most affected by the following factors: Type of Work and Work Setting, Flexibility/Autonomy, Financial Compensation/Benefits, Perceptions of the Recruitment Process, Advancement Potential, Level of Fit/Similarity, Interest in Additional Training/Education, and Contextual Influences.

To successfully recruit entry-level workers, transportation construction firms must address challenges not faced by other construction firms, including a generally negative public image and a perceived lack of “transportability” of job skills. Furthermore, the industry has difficulty recruiting individuals from two demographic groups: youth and non-traditional labor pools (e.g., women), primarily because of a lack of awareness of job opportunities in the industry and a poor industry image.
We recommend three broad strategies for addressing Marketing and Recruitment challenges and offer 42 ideas on how to implement them. Additionally, to fully address the workforce shortage, transportation construction companies must become more effective at managing their organizations. We offer 13 ideas for how companies can improve their organizational management.

We recommend three broad strategies for addressing the marketing and recruitment challenges:

- Improve Branding
- Develop a Recruiting Toolkit
- Improve outreach

**FHWA WORKFORCE DEVELOPMENT WEBSITE ADDRESSES CRITICAL NEED FOR MORE TRANSPORTATION PROFESSIONALS. SITE FEATURES INNOVATIVE RECRUITMENT/RETENTION PRACTICES, LINKS TO OUTREACH PROGRAMS, RESEARCH**

[https://trid.trb.org/view/625839](https://trid.trb.org/view/625839)

**URBAN TRANSPORTATION MONITOR, V. 16, NO. 16 (SEPT. 6, 2002), P. 6.**

**Filling The Pipeline**

[https://www.fhwa.dot.gov/publications/publicroads/02nov/02.cfm](https://www.fhwa.dot.gov/publications/publicroads/02nov/02.cfm)

Public Roads, **Issue No:** Vol. 66 No. 3, **Date:** November/December 2002

A group of 75 transportation leaders met in May 2002 at a National Workforce Summit to consider how the transportation community can address the increasingly complex workforce issue. Summit participants included representatives from more than 40 Federal and State transportation agencies, academic institutions, industry, labor unions, professional associations, and consulting firms.

The summit's participants agreed that the transportation profession must overcome two obstacles: (1) potential employees do not perceive transportation as an attractive, rewarding career option; and (2) transportation offers inadequate opportunities for career development, which makes it difficult to retain qualified employees at all levels.

During the summit's breakout sessions, participants focused on three critical components of the issue: developing the workforce pipeline, improving training and professional development, and institutionalizing workforce development.

The meeting concluded with all present transportation leaders signing "**A Partnership for Educating, Training, and Developing the Nation's Transportation Workforce.**"

**National Transportation Workforce Summit**


April 24-26, 2012 in Washington, DC.

[http://www.wistrans.org/cfire/2012/05/cutc-workforce/](http://www.wistrans.org/cfire/2012/05/cutc-workforce/)

The Summit aimed to foster a national dialogue about the development of the transportation workforce of the future in the United States. This national dialogue helps promote greater visibility of transportation careers. It also addresses key workforce challenges for recruiting and retaining qualified personnel, meeting current and future workforce shortages, defining competencies for a high-performing workforce of the future, and for identifying and closing gaps in workforce training and education.

**AGC Workforce Advocacy**


AGC Message:
• Reform and Reinvigorate the Perkins Act. The Perkins Career and Technical Education Program is a $1.1 billion federal program that funds secondary and postsecondary career and technical education (CTE). Perkins was first authorized by Congress in 1984, was last reauthorized in 2006, and is currently overdue for reauthorization, as the last authorization period ended in 2013. Perkins is the only funding mechanism available for CTE programs, making its reauthorization critical for funding training programs for future construction workers. In addition to reauthorizing the program, Congress should include these structural changes:
  ◦ Align CTE programs to the needs of the regional, state, and local labor market;
  ◦ Support effective and meaningful collaboration between secondary and postsecondary institutions and employers;
  ◦ Increase student participation in experiential learning opportunities such as: industry internships, apprenticeships and mentorships; and,
  ◦ Promote the use of industry-recognized credentials.

• Encourage Private Funding for Craft Training Programs. The federal courts have long recognized an exception to the federal antitrust laws for craft training programs that are the product of collective bargaining. However, open-shop contractors are not afforded the same opportunity to pool resources for training purposes. Congress should amend antitrust laws so that all firms have an opportunity to establish region-wide training programs.

• Make Veteran Training and Hiring More Accessible. Veterans are not able to take full advantage of construction training programs. Congress should enact measures to allow veterans participating in pre-apprenticeship training programs to receive the same amount of educational assistance as non-veterans. In addition, the Work Opportunity Tax Credit (which provides a tax credit for hiring veterans and other targeted groups) should be extended.

• Encourage Partnerships Between Registered Apprenticeship Programs and Community Colleges. Programs that offer associate degrees to apprentices who successfully complete their training allow students to graduate debt free while learning valuable skills. Congress should encourage further collaboration between community colleges and registered apprenticeship programs, through grants and programs that have agreements with registered apprenticeship programs and proven records of success. Congress should also encourage community colleges to dedicate staff to serve as liaisons for the registered apprenticeship community.

• Expand Federal Apprenticeship Resources and Collect More Comprehensive Data on All Apprenticeship Programs. The limited federal funding for federal training programs could be better targeted with proper data on program performance. The Office of Apprenticeship should also conduct annual reviews of registered apprenticeship programs.

Preparing the Next Generation of Skilled Construction Workers: A Workforce Development Plan for the 21st Century
AGC outlined measures officials should adopt to expand secondary-school career and technical education and post-secondary training opportunities to attract more people to construction jobs.

Two-Thirds of Contractors Have a Hard Time Finding Qualified Craft Workers to Hire Amid Growing Construction Demand, National Survey Finds

2016 Workforce Survey Results, Minnesota Results
https://www.agc.org/sites/default/files/Files/Communications/2016_Workforce_Survey_Minnesota.pdf
How the Industry Can Recruit and Train the Next Generation of Construction Workers

Identifying and Addressing Workforce Challenges in America’s Transportation Industry

This report presents the findings from an information gathering process that involved a variety of transportation industry stakeholders reflecting on workforce issues and catalogs their proposed solutions. The report outlines the process where ETA, the transportation industry business community, education, and government representatives formed partnerships and developed model solutions to address key workforce challenges.

Identifying Transportation Industry Workforce Challenges:

Challenge #1: Image, Outreach, and Recruitment
• Demand for workers is increasing in select sectors including rail, transit, and trucking.
• Negative perceptions of wages and advancement opportunities lend a negative image of the industry.
• Educators and guidance counselors lack of awareness of career opportunities in the industry.
• Recruiting youth and from non-traditional labor pools is particularly challenging.

Challenge #2: Retention and Advancement
• Retention of entry-level workers is a challenge in several sectors.
• Entry-level employees often lack the skills needed to advance.
• It can be difficult to recruit talented managers.

Challenge #3: Training: Entry-Level Workers
• Some entry-level workers lack soft skills and/or other occupational skills (e.g., safety skills, using new technology).
• In some sectors, national certifications could be beneficial, as well as standard training models.
• Barriers to training include the cost (e.g., the cost of equipment) and location of training.

Challenge #4: Training: Incumbent Workers
• Some incumbent workers could benefit from training in technology, management, and other skills.
• A key barrier to training incumbent workers is time spent in training, away from the job.

Identifying Transportation Industry Workforce Solutions:

Over 50 transportation industry stakeholders proposed some 146 solutions and developed 48 solutions matrices during the Transportation Industry Workforce Solutions Forum.

Workforce Management: A Practical Toolkit for Transportation Agencies.
TR News. 2012/1. (278) pp 28-31 (Photos.)
An NCHRP project has identified workforce challenges critical to transportation agencies and has packaged a set of resources into a toolkit on workforce management. The structured, searchable, web-based repository can help agencies find information for diagnosing and addressing workforce issues,
including recruitment, retention, succession planning, and training, with links to best practices, policies, procedures, data sets, and other tools.

**Innovation in Government: Workforce Practices.**

A review of the literature on innovation within government provides detailed case studies on innovative practices adopted by transportation agencies across the U.S. These case studies focus on operational innovations adopted by transportation agencies, particularly innovative workforce practices, rather than policy innovations applicable to the broader transportation industry. After reviewing two anecdotal examples of innovations to expand and maintain transportation infrastructure, the discussion shifts to five different case studies on innovative transportation workforce practices. These innovative practices target the following workforce challenges which state departments of transportation (DOTs) are currently confronting: recruitment; retention; staff development; organizational change; and succession planning. The case studies provide specific examples of how innovation occurs in state DOTs.

Substantial workforce challenges emerging within state DOTs include: increased retirement eligibility within their workforces; loss of talent to the private sector; and the need for acquiring new skill sets necessary for meeting new technological demands.

A survey conducted by Universum USA and published in Business Week (Gerdes, 2008) suggests that low pay and a rigid set of hiring rules place the transportation industry on the lagging end of fields sought after by younger workers.

**Recruiting, Retaining, and Promoting for Construction Careers at Transportation Agencies.**
[http://rip.trb.org/view/1467192](http://rip.trb.org/view/1467192)

Construction is a labor intensive industry, meaning that employees are the most valuable resource to construction firms and organizations. Yet, challenges exist in today’s workforce in terms of recruiting and retaining quality employees as well as attracting individuals from minority and underrepresented groups. Currently, the aging workforce of the United States along with the acknowledgment that newer generations of potential transportation workers have many different ideals, beliefs, and expectations than previous generations, reveals that recruitment and retention issues should be a primary concern for public transportation organizations such as state departments of transportation (DOTs). Gone are the days that individuals are hired by one firm and that person works their entire career at that firm.

Smart, ambitious, and highly motivated employees are difficult to find and even more difficult to keep, especially when considering individuals for technician positions such as DOT engineers, engineering technicians, maintenance personnel, and information technology professionals. These difficulties are not just a construction industry problem, but a more widespread issue for industries that require career technical education fields. Qualified personnel has to be compensated well and require work that develops their skills and matches their personal interests. Since engineering and technical employees require challenging and rewarding work, strategic hiring and retention plans must be employed to successfully recruit and retain each of these types of workers. Therefore, to manage the dynamics of meeting today and tomorrow’s construction and maintenance demands with an ever shrinking and changing workforce, state DOTs need robust workforce management strategies and guidance that can effectively attract, train, and retain engineers, technicians, and workers needed to construct and maintain the U.S. highway infrastructure well into the 21st century. The strategies developed can then be used by state DOTs to gain and sustain valuable human resources from current as well as future generations of workers, including minority and underrepresented individuals within transportation agency careers.

While precise definitions vary among practitioners, “transportation system management and operations” (TSM&O, or simply TSMO) comprises generally a collection of technologies, services, and operating strategies aimed at delivering reliable, safe, and efficient transportation and timely information to travelers and shippers to enable them to make informed decisions to minimize their unexpected delay and improve the safety of their travel. As an area of professional practice, TSMO is a multifaceted approach to maintaining and improving the capacity, security, safety, and reliability of our multimodal transportation system. TSMO practice has increased in scope and prominence as practitioners have developed and adapted increasingly sophisticated ways of applying electronics, communication, information management, and data analytics technologies to enhance the capabilities and performance of our transportation infrastructure. State departments of transportation (DOTs) and other agencies responsible for that infrastructure face growing needs for a fully competent workforce to provide TSMO technical and managerial expertise as staff members and consultants. Recruiting and developing such expertise is complicated by generational shifts within the larger professional and technical workforce and the rapid pace of technological innovation as well as by the particular challenges government agencies face in a competitive labor market.

The National Operations Center of Excellence (NOCoE) was organized as a partnership of the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), and the Intelligent Transportation Society of America (ITSA), with support from the Federal Highway Administration (FHWA). The partnership works to provide resources and services to support the TSMO professional community.

In June of 2016, NOCoE hosted a 2-day summit on TSMO workforce development, bringing together a diverse group of practitioners, agency managers, human resource (HR) specialists, professional education and training specialists, and professional service providers. The summit’s goal was to identify viable actions to encourage and influence development of resources to support rapid evolution of the TSMO workforce.

Assessing, Building, and Retaining Workforce Capacity in the Aviation Industry.

Workforce development in the aviation industry has historically been limited in scope. The industry lacks focus on strategic long-term workforce planning and workforce development needs. In Airport Cooperative Research Program (ACRP) Synthesis 18, "Aviation Workforce Development Practices" airport operators and stakeholders noted that the entry-level workforce is typically hired with little aviation-specific education or experience. This study also found that coordinated workforce planning and development efforts that integrate best practices in recruitment, retention, on-the-job training, and succession planning rarely exist at airports. Whether the result of funding constraints, risk management efforts, retirement of seasoned industry talent, new technologies, or variability in airport types; the absence of strategic planning for attracting, educating, and developing the future airport workforce leaves the aviation industry in a precarious position. Thus, the industry needs to take action to prepare for the challenges of dramatic workforce changes, growing demand for services, rapid technological development, and ballooning costs across the industry. The objective of this research is to identify and begin an evaluation of current and future airport workforce capacity issues; evaluate existing education, training, and other workforce development resources; and outline effective strategies to meet future workforce capacity requirements.

STEM Teacher Professional Development - Transportation Series/Student Outreach and Education - Companion Proposals.

The nation is battling a critical global competitiveness void due to the substantial lack of students pursuing Science Technology Engineering and Mathematics (STEM)-related degrees. Additionally, few high school students are being prepared to enter the workforce and effectively contribute to the economy in STEM-related career fields. Addressing critical transportation workforce shortages and corresponding recruitment and
retention issues requires exposing and educating students to industry opportunities as early as possible. Teachers are instrumental in creating an educational environment for exposing students to transportation and STEM-related academic and career treks. Equipping K-12 educators through transportation-focused professional development programs is the first step in building a critical pipeline for augmenting the future transportation workforce. This project will focus on the development of continuing education workshops that will present educators with current and emerging transportation infrastructure issues. Topics include highway design, transportation systems, traffic safety, construction materials, climate event impact and the future of surface transportation. Texas Tech researchers from the Edward E. Whitacre Jr. College of Engineering, and a Texas certified teacher will serve as workshop instructors. The project effort will also focus on equipping educators with classroom implementation materials to inform and inspire students about STEM careers in the transportation industry. Development of grade-appropriate teaching modules and projects will be developed for classroom use, such as academically rigorous senior year Capstone research projects. Simple concepts that students learn in high school level physics, math and chemistry classes (e.g. frictional resistance, corrosion) will be used to construct project-based lessons (PBL) and activities that expose students to real-life scenarios. In addition, methodologies for integrating hands-on projects into lessons and developing rubrics to assess student learning and progress will be provided. Content will be developed by faculty and content master teachers and will cover state academic standards, Texas Essential Knowledge and Skills, 21st Century Skills, and College and Career Readiness skills. Lastly, the effort will yield student recruitment and outreach for 6th - 12th grade students enrolled in classes taught by teachers who participate in the Transportation Series workshops. The goals include sparking student interest, providing faculty-to-student discussion sessions, and solidifying student plans for college and career aspirations in the transportation industry.

Building and Retaining Workforce Capacity for the Railroad Industry.
http://rip.trb.org/view/1332027

The American railroad industry continues to change dramatically. Freight railroads have merged and consolidated, rationalizing their assets and workforce. Further, both the freight and passenger railroad labor pools have aged and have decreased in size with the retirement of their members. It is widely perceived that, in the face of expanding demand and potential growth, the railroad industry will be unable to attract and maintain a sufficient number of new, qualified employees at all levels. Without major changes in programs to maintain and enhance workforce capacity, trends suggest that the future will continue to present significant challenges for both freight and passenger rail services. An educated and effectively trained workforce is necessary to respond to increased demand for rail service, to implement new developments in technology and logistics, and to offset a continued loss of institutional knowledge as a result of retirements. A lack of concerted attention to address this problem will make it difficult to maintain and build sufficient workforce capacity with the required skills, and the inability to meet workforce needs may ultimately constrain future industry growth. While this growth is generally considered in the context of intercity freight and passenger systems, there is also recognition that states and other public and private agencies developing new passenger and commuter rail services will need to draw from a pool of well-trained workers. In addition, it will be necessary to continue to develop strategic and business planning skills. By accurately forecasting ridership and service levels, institutions at all levels can identify market demand and select optimal routes to ensure the success of transportation services offered. To accomplish this goal, it is essential that the workforce have the expertise necessary to plan, design, construct, operate, and maintain quality freight and passenger rail systems. A limited number of universities and community colleges in the United States provide railroad engineering and operations curricula. These institutions have relied on grants and other forms of support from the railroads and the public sector to produce graduates who are employable by the industry, as well as research results of interest to the industry. In addition, railroads have existing programs to train employees for field maintenance, construction trades, and operations. Many of these programs are associated with community colleges. Without continuing, expanding, and supplementing these programs, it is not clear that the potential supply of a qualified workforce will be sufficient to meet future demands of the railroad industry. The objective of this research is to identify and evaluate current and future workforce capacity issues and to develop effective strategies for meeting future workforce capacity requirements. The research should: (1) Characterize the current and
anticipated U.S. railroad industry workforce in terms of numbers, demographics, and skills at all levels across the industry based on a targeted review of existing literature, other available information, as well as original research. (2) Evaluate sufficiency and effectiveness of current education, training, and recruitment programs as the means of attracting new employees into the industry and retaining existing employees. (3) Recommend practical strategies for recruiting, retaining, and developing a qualified professional and technical workforce for the rail industry at all levels, and metrics for evaluating effectiveness of these strategies.

**WVDOT Workforce Study 2013.**
[http://rip.trb.org/view/1300152](http://rip.trb.org/view/1300152)
The objective of the study was to collect and analyze data concerning the current and projected demographics of the workforce and to recommend strategies which could address any critical shortages of workers, reduce turnover, attract the skilled personnel needed by the department and to develop a cooperative infrastructure of the education and training providers.

**Building a Sustainable Workforce in the Public Transportation Industry--A Systems Approach.**
[http://rip.trb.org/view/1335323](http://rip.trb.org/view/1335323)
This final report provides the background information and methodology employed to complete Transit Cooperative Research Program (TCRP) Project F-16a, Building a Sustainable Workforce in Public Transportation - A Systems Approach. The Guidebook provides practical recommendations to public transportation stakeholders that are geared to help transit organizations build a more sustainable workforce and better orient themselves as an “employer of choice” among the current labor market and non-traditional candidates. These recommendations are presented across a series of four modules which may be used independently by transit leaders or combined to form the fully integrated Guidebook. The modules address the following four areas: strategies for recruitment, retention, training and development, and professional capacity building (Module 1); metrics to evaluate the effectiveness of human resource practices adopted or contemplated (Module 2); reflections and strategies that pertain to image management (Module 3); and a framework for an ongoing benchmarking process (Module 4). Information across the modules is in the form of example successful programs, state-of-the-art initiatives, industry effective practices, and directions to implement and measure those practices. The Guidebook intends to serve all facets of the public transportation industry including large, medium, and small; urban and rural; rail and bus; public, private-for-profit, and private-nonprofit systems and vendors.

[http://rip.trb.org/view/1230579](http://rip.trb.org/view/1230579)
Aviation industry leaders, including the Federal Aviation Administration, other federal and state government, airports, consultants, operators, tenants and aviation interest groups, are constantly seeking intelligent, trainable, and enthusiastic professionals to meet airport technical, operating and managerial demands. Airport operators are interested in supporting on-airport businesses in their quest to maintain an adequate workforce through recruitment and retention. Airports are also looking to provide job opportunities in their communities, in part, as a method of increasing support for the airport itself. As many of the industry's senior experts and key officials are retiring or leaving the industry, aviation professionals are competing to mentor, groom and hire the same few experienced aviation enthusiasts. Many aviation companies and schools have training and internship programs. Many programs partner schools, businesses and airports. This synthesis of practice will collect and report on existing, common and successful methods and resources currently available to develop and train personnel for aviation and airport professions. The synthesis also will report on additional research needed to increase the number of experienced job seekers in the aviation industry and provide the entire industry a continuous resource of interns available to mentor and aid in meeting growing workload demands.

**Transportation Education Development Pilot Program - Part 1.**
[http://rip.trb.org/view/1359722](http://rip.trb.org/view/1359722)
The grant awarded to the Transportation Research Center (TRC) will fund four new programs to help transportation leaders attract and maintain workers in this challenging environment. Transportation Systems Institute--is focused on maintaining or recruiting new talent to the DOT workforce in Vermont, New Hampshire, and Maine. Second Careers in Transportation Program--is focused on attracting retirees from other industries to bring their skills to bear on the 21st century challenges in transportation. Transportation Systems Academy--provides hands-on training for transportation industry jobs to students in the Community High School of Vermont Northern State Correctional Center campus and will provide this training at technical high schools. Community Colleges--Working with the American Association of Community Colleges (AACC) the project is collecting information about what community colleges are doing now and could do in preparing the next generation of transportation workers. The project will present the results of this effort at the 2010 AACC Workforce Development Institute (WDI).

Transportation Education Development Pilot Program - Part 2.
[Link to the grant summary](http://rip.trb.org/view/1359744)

The grant awarded to the Transportation Research Center (TRC) will fund four new programs to help transportation leaders attract and maintain workers in this challenging environment. Transportation Systems Institute--is focused on maintaining or recruiting new talent to the DOT workforce in Vermont, New Hampshire, and Maine. Second Careers in Transportation Program--is focused on attracting retirees from other industries to bring their skills to bear on the 21st century challenges in transportation. Transportation Systems Academy--provides hands-on training for transportation industry jobs to students in the Community High School of Vermont Northern State Correctional Center campus and will provide this training at technical high schools. Community Colleges--Working with the American Association of Community Colleges (AACC) the project is collecting information about what community colleges are doing now and could do in preparing the next generation of transportation workers. The project will present the results of this effort at the 2010 AACC Workforce Development Institute (WDI).

Transportation Education Development Pilot Program - Part 3.
[Link to the grant summary](http://rip.trb.org/view/1357381)

The grant awarded to the Transportation Research Center (TRC) will fund four new programs to help transportation leaders attract and maintain workers in this challenging environment. Transportation Systems Institute--is focused on maintaining or recruiting new talent to the DOT workforce in Vermont, New Hampshire, and Maine. Second Careers in Transportation Program--is focused on attracting retirees from other industries to bring their skills to bear on the 21st century challenges in transportation. Transportation Systems Academy--provides hands-on training for transportation industry jobs to students in the Community High School of Vermont Northern State Correctional Center campus and will provide this training at technical high schools. Community Colleges--Working with the American Association of Community Colleges (AACC) the project is collecting information about what community colleges are doing now and could do in preparing the next generation of transportation workers. The project will present the results of this effort at the 2010 AACC Workforce Development Institute (WDI).

[Link to the report](http://rip.trb.org/view/1232903)

The synthesis examines practices and innovative approaches that address the development of transportation leadership in today’s work environment. The report covers demographics, recruitment and retention, leadership training, and succession management.

[Link to the report](http://rip.trb.org/view/1227710)
This study will assess the likely human resource needs of surface transportation public agencies over the next two decades and will make recommendations for recruiting, training, and retaining needed personnel. The study will address both professional and nonprofessional staffing needs for state and local highway and transit agencies and for the private sector organizations that provide contracted services to these agencies. The study will focus on strategies that agencies can use to ensure that they stay abreast of their changing needs and on approaches that universities and training organizations can take to address agency staffing needs.

http://rip.trb.org/view/1228853  
Many state departments of transportation (DOTs) and other transportation agencies face recurring pressures to reduce staff, curtail recruitment, trim administrative costs, and outsource activities. At the same time, these agencies work to maintain high standards of service to transportation-system users, taxpayers, and their other stakeholders. The tensions created by these opposing forces have given rise to both managerial innovation and to needs for management tools that can help senior agency officials to determine when the agency's essential human resource (HR) capabilities are at risk. The innovative strategies and tools agencies have devised to can be useful to other agencies facing similar pressures. Nor is the situation unique to DOTs; experience gained in the private sector and elsewhere in the public sector may be useful to transportation agency management. Yet there currently is no mechanism for sharing and comparison of HR best practice benchmarks for DOTs seeking to define the HR resources that are essential to the agency's core competence and to maintain that core competence when downsizing and outsourcing decisions must be made. A summary review of experience and best practices would be of great value to senior agency managers. Such work as TRB Special Report 275, The Workforce Challenge: Recruiting, Training, and Retaining Qualified Workers for Transportation and Transit Agencies and NCHRP Synthesis 323, Recruiting and Retaining Individuals in State Transportation Agencies could provide a useful starting point for the review. The review would likely describe how agencies have determined what are the essential core competencies they must maintain to fulfill their missions, how agencies have used recruitment, hiring, training, and other HR actions to assure they have the HR capability to maintain these core competencies, and how agencies have responded to external pressures for agency downsizing and service outsourcing. The objective of this project is to analyze and benchmark HR best practices for determining what are the essential core competencies an agency must maintain to fulfill its mission, how agencies have used HR actions to assure they have the capability to maintain these mission core competencies, and how agencies have responded to external pressures agency downsizing and service outsourcing within this context of maintaining core competencies.

Managing Employee Life Cycles to Improve Labor Retention  
http://ascelibrary.org/doi/10.1061/%28ASCE%290742-6748%282003%293%3A1%2819%29#sthash.CzKTzfFP.dpuf  
Since much has been written about how to hire and recruit good people, the focus of this article is on how to retain employees. After briefly examining the cost of employee turnover, the author provides a management framework that can help improve employee retention and increase profitability. It is stressed that employees at every phase of the life cycle need to believe that the work they do is important and meaningful. The author concludes that if people see that their employers care about them and their careers, they will deliver better results and will be more committed to their careers with the company.

Workforce Demographics among Project Engineering Professionals—Crisis Ahead?  
http://ascelibrary.org/doi/10.1061/%28ASCE%290742-597X%282003%2919%3A4%28173%29#sthash.Hjuqz0o0.dpuf  
The age and experience profile of project engineering professionals employed by both owners and contractors has recently become a concern due to downsizing, retirements, and lack of hiring during the 1990s. Data were gathered from U.S. Census panels and from 27 owner firms and 23 contractor firms within the Construction Industry Institute to investigate the extent of this issue. In particular, the study examined changes in industry staffing levels, projected industry staffing levels, the current age and experience profile of project engineering staffs, current and projected hiring practices, and retention levels. The results of the data analyses indicate that, while substantial downsizing occurred among project engineering professionals during the early 1990s, the era of downsizing appears to be at an end. However, the high proportion of engineering professionals nearing retirement suggests that the transfer of knowledge from more to less experienced employees is an area of critical importance for both owners and contractors. Data showing demographic breakdowns using these analyses will be given, conclusions drawn, and policy implications outlined.

Competitive Forces That Drive Civil Engineer Recruitment And Retention
http://ascelibrary.org/doi/10.1061/%28ASCE%291532-6748%282001%291%3A3%2817%29#sthash.o4de69qs.dpuf
Leadership and Management in Engineering, Vol. 1, Issue 3 (July 2001)
To assess the prospects for an adequate supply of civil engineers in the future, a model developed by Michael E. Porter to analyze the strength of competitive forces within an industry is applied. In accordance with this model, attention is given to rivalries, the threat of new entrants, the bargaining power of both buyers and suppliers, and the threat of substitute products or services. Recommendations are made for the benefit of firms concerned about staffing levels.

Recruitment And Retention Of Civil Engineers In Departments Of Transportation
http://ascelibrary.org/doi/10.1061/%28ASCE%291532-6748%282001%291%3A3%2830%29#sthash.UjsBUTdX.dpuf
Leadership and Management in Engineering, Vol. 1, Issue 1 (January 2001)

Innovations And Best Practices: Leadership Development And Retention
http://ascelibrary.org/doi/10.1061/%28ASCE%291532-6748%282001%291%3A1%2837%29#sthash.UTxnJlfz.dpuf
Leadership and Management in Engineering, Vol. 1, Issue 1 (January 2001)

One Company's Approach to the Recruitment And Retention Of Engineers
http://ascelibrary.org/doi/10.1061/%28ASCE%291532-6748%282001%291%3A1%2848%29#sthash.CFlLEASX.dpuf
Leadership and Management in Engineering, Vol. 1, Issue 1 (January 2001)

Building a sustainable workforce in the public transportation industry : a systems approach
http://www.trb.org/Publications/Blurbs/169592.aspx
TCRP 162
TRB’s Transit Cooperative Research Program (TCRP) Report 162: Building a Sustainable Workforce in the Public Transportation Industry—A Systems Approach provides a guidebook that addresses contemporary issues in workforce development, retention, and attraction, and public transportation image management.

The guidebook provides practical tools to transit agencies on a variety of workforce issues including workforce strategies that enhance organizational processes, performance metrics to evaluate the impact of workforce strategies, image management techniques that improve perceptions of the public transportation industry, and benchmarking processes that allow for continuous organizational improvement.

Tools to aid state DOTs in responding to workforce challenges
TRB’s National Cooperative Highway Research Program (NCHRP) Report 636: Tools to Aid State DOTs in Responding to Workforce Challenges examines tools that officials of state departments of transportation (DOTs) can use in recruitment, development, and retention of a productive and effective workforce.

Developing transportation agency leaders
http://www.trb.org/Publications/Blurbs/156267.aspx
TRB’s National Cooperative Highway Research Program (NCHRP) Synthesis 349: Developing Transportation Agency Leaders examines practices and innovative approaches that address the development of transportation leadership in today’s work environment. The report covers demographics, recruitment and retention, leadership training, and succession management.

Least Relevant results:

Choosing a Civil Engineering Career: Some Market Research Findings http://ascelibrary.org/doi/10.1061/%28ASCE%291052-3928%281995%29121%3A3%28170%29#sthash.X8yyBcXG.dpuf

The AASHTO guide to recruitment and retention of civil engineers.
TA157 .A43 1990

Transportation professionals: recruitment and retention: results from a survey of AASHTO member departments
HE355 .T72 1988