



The Crisis in Transportation Workforce Development



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The Norman Y. Mineta International Institute for Surface Transportation Policy Studies (MTI) was established by Congress as part of the Intermodal Surface Transportation Efficiency Act of 1991. Reauthorized in 1998, MTI was selected by the U.S. Department of Transportation through a competitive process in 2002 as a national “Center of Excellence.” The Institute is funded by Congress through the United States Department of Transportation’s Research and Innovative Technology Administration, the California Legislature through the Department of Transportation (Caltrans), and by private grants and donations.

The Institute receives oversight from an internationally respected Board of Trustees whose members represent all major surface transportation modes. MTI’s focus on policy and management resulted from a Board assessment of the industry’s unmet needs and led directly to the choice of the San José State University College of Business as the Institute’s home. The Board provides policy direction, assists with needs assessment, and connects the Institute and its programs with the international transportation community.

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THE CRISIS IN TRANSPORTATION WORKFORCE DEVELOPMENT

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FOREWORD

Transportation is facing a major workforce crisis. With a large number of current employees who are eligible or who will soon be eligible to retire, transportation institutions across the United States face a major shortage of workers and talent.

This symposium, *The Crisis in Transportation Workforce Development*, was convened to address this growing concern, to offer possible solutions, and to act as a call to action.


Numerous transportation industry policy makers, researchers, and innovators were invited to participate in the open forum, and to share their research and experience regarding workforce development, recruitment, and retention.

Participants in various discussions were:

- Asha Weinstein Agrawal, MTI Research Associate, Assistant Professor, Urban and Regional Planning, San José State University
- John Collura, Professor of Civil and Environmental Engineering and Director of the UMass Transportation Center
- Rod Diridon, Executive Director, Mineta Transportation Institute
- Ronald E. Hynes, Deputy Associate Administrator for Research, Demonstration and Innovation, Federal Transit Administration, U.S. Department of Transportation
- Diana Long, Workforce Development Coordinator for the Nick J. Rahall II Appalachian Transportation Institute
- William W. Millar, President of the American Public Transit Association, MTI Trustee
- The Honorable Norman Y. Mineta, former Secretary of Transportation, Hill & Knowlton Vice Chairman
- Janet P. Oakley, Director of Policy and Government Relations for the American Association of State Highway and Transportation Officials
- Stephanie Pinson, President/CEO of Gilbert Tweed Associates, Inc. and APTA Executive Board and Human Resources Committee Member, MTI Trustee
- Senator Robert H. Plymale, Director of the Nick J. Rahall II Appalachian Transportation Institute
- U.S. Congressional Representative Nick Rahall, D-WV, Committee on Natural Resources Chairman and Committee on Transportation and Infrastructure Vice Chairman
- Michael S. Townes, President/CEO of Hampton Roads Transit and APTA First-Vice Chair, MTI Trustee
- David L. Turney, Chairman/President/CEO of DRI, MTI Board of Trustees Chair

For transportation and transit agencies and institutes across the United States to continue to produce the best and brightest, we must seek innovative solutions to recruitment and

retention of new employees. We must get people excited and interested in a career in transportation.



Rod Diridon, Executive Director
Mineta Transportation Institute

EXECUTIVE SUMMARY

This document, *The Crisis in Transportation Workforce Development*, is the summary of a symposium held on October 6, 2007. The symposium was sponsored by the Mineta Transportation Institute and the Rahall Transportation Institute, and co-sponsored by the American Association of Railroads, the American Association of State Highway Transportation Officials, the American Public Transportation Association (APTA), the Federal Railroad Administration (FRA), the Federal Transit Administration (FTA), and the National Railroad Passenger Corporation. For this symposium, numerous transportation policy makers, transit executives, and human relations professionals charged with recruiting staff were invited to participate in an open forum.

Topics of discussion included the imminent retirement of the baby boomer generation, the migration of core worker skills, and techniques for successful recruitment and retention of employees in transportation. With the baby boomer generation retiring and a large chunk of the transportation workforce eligible to retire soon after, transportation is entering a workforce crisis. In order to solve this problem, innovative recruitment techniques such as targeting grade school and college students, and retention programs including improved internal training and education need to be implemented. Transportation must work to recruit and retain the best and brightest.

Highlights of the symposium included presentations and panel discussions by:

- William Millar defining the challenges facing the transportation industry, and opening the door for possible solutions;
- Michael Townes discussing options that the Hampton Roads Transit has considered concerning recruitment and retention;
- Ron Hynes discussing workforce problems such as the impact of an aging workforce and the emergence of technology in the transit workplace;
- Dr. Diana Long speaking about the workforce study that she participated in for the West Virginia Department of Transportation which surveyed current workers on their perceptions of retirement, benefits, salary, retention, and reasons for staying or leaving;
- Janet Oakley talking about what the state Departments of Transportation are doing in reaction to the changing demographics of the modern transportation workforce;
- Stephanie Pinson discussing the implications of the workforce crisis in transportation on recruitment and retention for Gilbert Tweed, a private recruitment firm;
- Dr. Asha Agrawal speaking on her study of engineering majors in graduate school, examining why students do or do not select transportation as their emphasis; and how through exposure more engineering students could be attracted;
- A discussion with panelists Dr. John Collura, Stephanie Pinson, Janet Oakley, and Ron Hynes responding to Dr. Agrawal's study;

- Senator Robert Plymale discussing the implications of a changing workforce and how a lack of flexibility will lead to a serious crisis for government transportation institutes;
- Former U.S. Secretary of Transportation Norman Mineta speaking on how the workforce dilemma needs to be attacked at the local level through restructuring;
- Congressman Nick Rahall talking about the importance of transit to America, and explaining the social and human implications of continued mismanagement of the workforce; and
- A question and answer session where the panelists and speakers respond to audience questions on recruitment, retention, training, and other workforce-related inquiries.

INTRODUCTION

ROD DIRIDON

This program is co-presented by the Mineta Transportation Institute, which has conducted several of these programs with the APTA over the years, and the Rahall Transportation Institute, about which Bob Plymale will comment more on when he is speaking.

The purpose of this presentation is to present a provocative subject to you. All of the individuals who will be speaking have their resumes presented in some detail in the agenda packet, so they're not going to be introduced except by title [see Appendix A].

Now let me introduce the individual who will be presiding today, a very special person for the Mineta Transportation Institute, and the first of the resumes in the packet, David Turney. David is the Chairman, President, and CEO of DRI as well as a Board of Trustees' Chairperson at the Mineta Transportation Institute, and a past chair of the business members' board for the American Public Transit Association.



Figure 1 Mineta Transportation Institute Executive Director Rod Diridon, Sr.

DAVID TURNEY

The art of presiding is very simple: Stand up, shut up, and sit down. So, with that, I'm going to be brief because I know all of you are not here to listen to me talk.

Since its inception under its founder Norman Mineta, the Mineta Transportation Institute has been focused on the crisis of workforce development in transportation—this is an area of vital concern to our private-sector and public-sector workforce development. Under the able leadership of Rod Diridon, they've been at the forefront of this problem for a long time. We've

got a great group of panelists here today who will be addressing you on this subject, and I think you'll find their comments to be very interesting and challenging.

With that said, I'd like to ask Bill Millar to come forward.



Figure 2 David Turney, Chairman, President and CEO of DRI and MTI Board of Trustees Chair

BILL MILLAR

Good morning, all. I, too, want to welcome all of you on behalf of the Mineta Transportation Institute. I'm the First Vice-Chair, and unless there's a coup, I guess I will become the Chair soon. I'm honored to be here, and especially honored to be in the presence of the namesake of the Mineta Transportation Institute, Norm Mineta. In addition, I'm not sure if Chairman Rahall has arrived yet, but certainly, to be associated with anything that he is involved with is good, and I'm very pleased that we will be working so closely with the Rahall Institute. Finally, I want to thank Bob Plymale for agreeing to this partnership.

The topic of this particular seminar is something that has been near and dear to my heart. One of my great mentors, a guy named Jim Maloney, said to me when I entered this industry, "It's all about people." And I was young and even more foolish than I am today, and I protested, and I said, "Jim, it's not all about people—there are these buses, there are these rail cars"—and in those days, these new-fangled computers were coming in the business and I said, "It's all about those things." Jim said, "It's not. It's all about the people." And he was right, of course, and that's what I've learned. Yeah, we have fun gadgets we play with in this industry, but they don't mean anything. It is simply all about the people.



Figure 3 William W. Millar, President of the American Public Transit Association (APTA) and MTI Trustee

Now, APTA has been involved in workforce-development activities for quite a long time. The nature of our business is people-intensive, with over 360,000 direct employees, and many other tens of thousands of employees and workers who benefit from our business. In addition, the nature of our industry, like that of many other people-intensive industries, is getting more and more complex. This means we need to focus even more on the people side of our business. About seven years ago, the APTA executive committee came to the conclusion that it needed to form a task force for workforce-development initiatives. It was co-chaired by Stephanie Pinson, Bev Scott, who is the incoming First Vice-Chair of APTA, and a transit board member, Sandra Foster. The task force for workforce-development initiatives was staffed by Pam Boswell and others from APTA, and its purpose was to assess the workforce needs in the public-transportation industry and to develop recommendations to meet those needs. The findings of that task force were in a report entitled *Workforce Development: Public Transportation's Blueprint for the 21st Century*, and the key findings were as follows:

- It was recognized that there were fundamental changes under way in our industry, and that if we were going to be able to deal with those changes, we had to work systematically in the way we approach the business;
- The report documented a number of very innovative things that were being done in the industry by individual transit systems to deal with their workforce-development issues;
- The report documented examples of progress, and it showed that even in the public sector, where sometimes it is said “you just can’t do anything!”, progress could be made. In fact, many communities and many public systems were doing very innovative things, and the report laid out several models of the best practices that could be used by others in the industry; and

- Finally, the report documented a current consensus on several points: our industry's ever-changing demographics, the institutional barriers that tend to make us a little bit slow in the uptake, as well as the need for improved hiring practices, developing succession planning, and improved labor-management collaborations and partnerships.

Based on this report, APTA set a rather modest goal, in the Swiftian tradition of word: “How do we make the public-transportation industry the employer of choice for Americans?”

Well, since that report was published almost seven years ago now, many, many things have happened in our industry, and many things have been undertaken by APTA. APTA now offers a broad range of workforce development, organizational development, and human-resource-related sessions at our major and technical conferences.

We promote research on the issue of workforce development, using our cooperative-research transit program with the Transportation Research Board. We have also partnered very closely with the Amalgamated Transit Union, as well as other unions that represent transit employees.

I saw Brian Turner here, who represents one of the great successes that the APTA program has developed—the Community Transportation Center and the Career Leadership Partnership program.

We have moved into developing standards in the bus, rail, and facilities-management area. These standards were introduced to our industry to help express what are we trying to develop people to do. For example, we worked with ASE (Automotive Service Excellence) to bring their standardization program into the bus-maintenance industry.

We have created several different kinds of professional development programs. One of the flagships is Leadership APTA, which now has graduated nearly 200 persons, and is cooperating with the Eno Foundation in the development of a center for Transit Leadership and the delivery of annual high-quality development training.

We've developed and facilitated distance learning, in which the Mineta Transportation Institute has been a leader; we've developed webinars and e-learning resources and the APTA has now even created an online introductory training course concerning track circuit and signal maintenance for our rail industry; and we've worked with the National Transit Institute and others to identify, develop and implement a variety of training courses.

So we certainly are doing many things, but with such a large workforce, with so many different organizations in our market space, much more needs to be done. Our plan is to continue to cooperate with as many other organizations as possible. I have already mentioned a few. Let me go through the list quickly, so you can get a sense. There is the Amalgamated Transit Union, the Transport Workers Union, the Conference of Minority Transportation Officials, the Council of University Transportation Centers, the Mineta Institute, the National Transit Institute, the Transportation Research Board, the U.S. Department of Labor, and several branches of the U.S. Department of Transportation including the Federal Transit Administration, the Federal Highway Administration, and the Federal Railroad

Administration, also the Research and Innovative Technologies Administration, and many other parts of the DOT, and other organizations such as the Women's Transportation Seminar.

I think the solution is going to take all of us working from a lot of different perspectives in order to meet the challenges we have, and certainly those of us at the APTA look forward to continuing to work on this subject.

DAVID TURNEY

Michael Townes is a Vice Chair of APTA and an incoming Chair as well as President and CEO of Hampton Roads Transit, which is on the cutting edge in dealing with the public sector's problems and difficulties in workforce development.

MICHAEL TOWNES

It's an honor to be here with this distinguished panel and to be here with Secretary Mineta. As a member of the MTI Board of Trustees, and former Chair, I'm pleased to see the Institute continue its efforts to bring together the transportation community, to share research findings, and the insights of leading transportation experts. Under the energetic leadership of Rod Diridon, this Institute has a solid record in dealing with critical industry issues through national forums such as today's examination of workforce-development challenges in the transportation industry, including public transportation.

Previous national summits sponsored by MTI have focused on rail security and financing transportation in the future. The demographic, sociological, cultural, and technological challenges in both the industry and the national workforce will also have a critical impact on the transit industry's employment environment. As a long-time member of this industry, and a general manager of a public operating agency, I understand the challenges of delivering services, and the impact of issues related to recruitment and retention of employees. APTA's workforce-development initiative established a framework for addressing these issues on a long-term basis. As a result, there continues to be a sharing of innovative practices for addressing workforce issues in both the public and private sectors of our industry.

At Hampton Roads Transit a few years ago, we had to respond to the challenges in maintaining a quality workforce, especially in difficult to recruit and retain positions. We realized that in order to achieve a positive return on our recruitment efforts, more attention had to be paid to employee retention. From an agency perspective, we began to view human resources as a critical, strategic business function rather than as an administrative necessity. And I'm happy to say we have had great success in attracting, recruiting, and retaining employees at all levels of our agency— management, operations, maintenance, etc. We have systems in place to assess our workforce and continually monitor our workforce's needs. The increase in popularity of public-transportation services brings about increased attention to the quality and the quantity of workers providing services. And looking toward the future, we

have a tremendous opportunity at HRT to build upon our efforts—to create a workforce with excellent performance and high potential. I think that all agencies have that opportunity.

As you may know, the HRT is the project sponsor for Norfolk, Virginia's future light rail transit system. This is a \$232 million project that involves construction of 11 stations with three park-and-ride locations, which will provide major access throughout our region. It will be a starter line for expanding transit services in what is a major metropolitan area. I'm proud to note that we are in the final design phase, and last week, signed our full-funding grant agreement with the Federal Transit Administration. This project will not only change the transit landscape in our region but will provide significant workforce development opportunities for workers who will ultimately build, operate, and maintain the light rail system.

We all need to address the workforce challenges now and into the future. I look forward to the information exchange on best practices and developing a plan to continue working together to improve workforce development. Best wishes for a productive day, and thank you for the opportunity to speak.

ROD DIRIDON

I should stress that MTI did our first study on the crisis in transportation workforce development in 1994, which was published in 1995, and it indicated the potential of a serious workforce crisis as the baby boomers began to age out of their positions as productive employees in our profession. That's occurring now, and it isn't going to phase in gradually—it's going to hit us very quickly, all at once, and you'll hear this from our expert panel. The ages of those baby boomers are almost all the same, within a few years of each other. As they age out, we're going to see a crisis in the mid- and upper-management levels and among the top technicians in our industry that's going to be quite serious. Now we've known about it for awhile and we've been talking about it for awhile. It's past time to have some solutions, solutions which this panel is here to share with you. We have the best in the nation here talking to you.

We have John Collura, who will be your moderator for the next panel. John is also a top expert in this subject, and he has been involved in both the engineering community and academic community for many years.

We have Senator Plymale, who you will meet at the luncheon break, who is also an expert in transportation, workforce development. Having chaired the Congress of State Legislators Education Committee, he understands the crisis in finding skilled people to fill positions in both the technical and management areas in the near-term future in transportation, in government, and in the private sector.

Those are just a few of the people that are going to be presenting to you today. They know the problem and they know some of the solutions. They are here to communicate their solutions through this forum and our web pages to the general transportation community.

I'll now introduce Dr. John Collura. John is a professor of civil and environmental engineering and Director of the University of Massachusetts Transportation Center, and he also chairs the National Council of University Transportation Centers Workforce Development Task Force.

DR. JOHN COLLURA

It's great to be back in North Carolina. I was fortunate to be a student at North Carolina State some years ago, at which time, I was the lucky recipient of an UMPTA (Urban Mass Transportation Act) fellowship, and I still remind Chuck Morrison that there was some hesitation to award me an UMPTA fellowship because I was a civil engineering student. They thought I would just use that fellowship, and two years later end up teaching highway geometric design, and the transit community wouldn't benefit from it. But the fact of the matter is that over the last 30 years I've had to the opportunity to work in academia, to teach, among other courses, public transportation. So if it hadn't been for Chuck Morrison and other UMPTA/FTA foresight, I might not have had the opportunity to pursue a career in transportation with an emphasis in public transit.

It's both a pleasure and a privilege to have this opportunity to moderate this session today, to acknowledge all the important issues in the field of transportation: safety mobility, sustainability, climate change, global warming, etc. And one of those very important cross-cutting issues is to make sure that we have the labor force to address the problems that I have just described. There's nothing more important to us than making sure that those in the profession of transportation learn what they need to know so that they can address problems effectively.



Figure 4 Dr. John Collura, Professor of Civil and Environmental Engineering and Director of the UMass Transportation Center

I think the Rahall and the Mineta Transportation Institutes have done a great job pulling together a distinguished group of panelists today, representing both the public sector and the private sector. We're going to hear about what's going on at DOT in Washington, and how they're trying to deal with the workforce development. We're also going to get a more national perspective from AASHTO, and then we'll get viewpoints from the academic circle. Both the Rahall and Mineta Transportation Institutes have really struck a balance in trying to pull together a group which can give us the varied perspectives that are expressed on workforce development.

We have five panel members who are going to speak for 15 to 20 minutes each, which will leave us about 20 minutes for a dialogue among the panel members; there will probably be some questions that will surface from each of their presentations, and it would be good to have some interaction among the panel members.

Let me introduce our first speaker, Ron Hynes. Ron serves as the Deputy Associate Administrator for Research, Demonstration, and Innovation for the FTA. Ron is going to provide a perspective from Washington, from the DOT, and provide us with some of the challenges and issues they're facing in the area of workforce development, and how they plan to recruit and retain their employees.

RON HYNES: THE CRISIS IN TRANSIT WORKFORCE DEVELOPMENT

Thank you very much. It's great to be here today, and Rod, thanks for inviting me. I like transportation. I'm a transportation guy, I like the people who work in transportation, and I enjoy talking to everybody who has an interest in transportation. To me, it's what I've been doing most of my life, so I'm glad to be here.



Figure 5 Ron Hynes, Deputy Associate Administrator for Research, Demonstration and Innovation, Federal Transit Administration, U.S. Department of Transportation

Workforce development is a great subject because we have to think about how we're going to replace all the people that are our good friends and colleagues—people we've worked with who are retiring soon, and how we're going to fill the void and attract new blood to our industry. The challenges have never been so great. We have funding issues, technology issues and capacity issues. And these issues are coming at a time when people are leaving, at a time when there's very low unemployment, and there is a great demand for people with high-tech proficiency.

When we talk about a company, a lot of times their motto or their slogan might be that their source of success is their people, or that their greatest asset is their people. I think that's true; if you don't have good people, you don't have a good organization. Right now we're finding that we have waves of people, like the baby boomers, that are going to retire, and competition for new people moving in. Those things are combining right now to challenge the assets and the

possible success for our organizations. So I'll talk a little bit about what the DOT and the FTA are doing, and how we hope to recruit and retain the best and brightest.

We all know about the baby boomers, starting to turn 62 in 2008. That is just next year. We've been talking about the boomers for a long time, but it's finally here.

There are 300 million people in the U.S. population, and baby boomers constitute between 76 and 77 million. Over 36 million Americans are age 65 or older today, and by 2030, this number will double, and one in five Americans will be 65 or older. More than one in five Americans over 65 do not drive, and this makes more of a demand for transit, for FTA to deliver transit services. Transportation systems across the country are at or near capacity. We have major transit systems that have been built close to 100 years ago, and now they're coming up for major renewal and construction efforts, and while we've already added trains and made improvements such as control systems, they're still nearing capacity. Our highway system is nearing capacity in some areas. Our rail systems are nearing capacity. Delays at airports are commonplace.

This aging-workforce issue is not just a problem for transit, but transit agencies employ over 350,000 people, so there's a lot of people going to be retiring, and a lot of new people that have to be hired and trained. Transit agencies need to be considering their aging issues, retirements, need for accommodations, where to hire people with disabilities that have problems getting around the office.

There is also a need for technical capacity and proficiency in all of our employees in all facets of transit. We're building high-tech things into our services, into our vehicles, and into our operating systems.

People that are on the Board now grew up in this, and it took place informally, they have the knowledge to find out who's who in the organization. They've come up through the ranks, and they know people, who to ask, and how to get things done. They have knowledge of the industry and the operating environment because they've been there for years, and they know how to get things done. They come in and out of transit, in and out of the agencies, and they know the outside partners. They know who they used to work with. They know how to work with governments—county government, city governments, and the federal government. They know the regulatory requirements, not just in the funding side but also the safety-oversight side.

Transit technology is growing, our systems are sophisticated and getting more so. We're trying to get more and more high-tech because it saves cost, it increases safety, and it gives better service for the transit user. We have more sophisticated vehicles—rail is even looking at systems now that will be fully automated.

Bus lines—we're having BRT systems that can actually dock themselves. The driver will let go and the system will actually bring itself in to park at a certain location so wheelchairs can roll off and on with precision docking, just like a rail system.

Ferries—we're putting wi-fi on ferries, so you can use your laptop in the automobile while you wait to board the ferry. You get on, open up your laptop, and it's still on, and you continue working all the way until you get off the ferry. So across the different modes of transit, we're increasing technology.

We're working on more sophisticated intermodal considerations, where your train meets your bus in an intermodal facility. We're building more park-and-ride stations, facilitating stricter corridor management with ITS, and the list goes on. These projects all involve specialists from different kinds of fields in transit.

We also have many initiatives to relieve congestion and many of these involve multi-modal considerations. For instance, we now have technology that will tell us if a park-and-ride is full or if there are spaces available. We have technology which tells us where to position equipment to direct flow as congestion changes during the day. We have more sophisticated security management, including new character-recognition and intelligent-vision systems.

All these new technologies create a number of workforce-related questions: Where do we find people to staff this? How do we get these people interested in all these new and different transit systems? How do you convince them that transit is a high-tech field they should go into?



Figure 6 The panel listens during Ron Hynes' presentation

This combines with the question of who's going to retire when. Retirement decisions are voluntary. People decide when they're going to retire; sometimes it depends on the economy—in a good economy maybe they can cash out on their house, and move away, to a less expensive area of the country. Or maybe it's a bad economy, and their children need help, so they decide to stay working longer, or they want their children to go for an advanced degree, and they need to continue working.

In addition, people are living longer. Why retire if you're going to live to be 100? Why not work until you're 80? Hopefully people feel engaged by their work. They have good feedback, and they want to participate a little longer.

Retirement policy is changing too. There are some ideas afoot in the government where you retire and then come back part-time to lend your expertise. As retirement policy changes in the government and private sector, it may influence when people retire, or if they retire for good. A lot of times when people retire, they remain on as consultants.

The transit workforce is also affected by things outside the transit system itself, such as employment. When employment goes up, transit demand goes up. When fuel prices go up there's a greater demand for transit. Congestion initiatives, such as limiting access to city centers or congestion-related pricing, may increase the need for transit.

This is what the FTA is doing. In the fiscal year '06, approximately 18 percent of FTA's workforce was eligible to retire. Not everyone went, but they can retire if they want to. An additional four percent become eligible in '07. To provide an example—in our research office we have 41 slots, 41 full-time positions. Thirty-nine are filled, and 15 of these will be able to retire in the next four years, nearly one third of our office and soon more. We have several employees in our research office that trace their way back to UMPFA, and that's foundation knowledge that's kind of hard to replace.

We have a person on our staff who was a designer for the WMATA building, for the DC metro system, and who worked for the construction company as they built it, and then came to FTA a couple years later. So we have a lot of foundation knowledge that we certainly don't take for granted, and we certainly will miss when they retire. And this is across FTA. Just from '05 to '07, we can see the difference with people retiring—senior people who have been in transit for a long time, who have worked their way up through the ranks to become supervisors, managers, or executives.

So what are we going to do about it? We're developing strategies to resolve workforce gaps. We're realigning our organization, trying to make it more efficient. Instead of having a weekly report, we may switch to a bi-weekly report, to free people up to do more constructive, or more imaginative work, instead of just generating reports. We're also trying to improve our workers' skills—we're always sending people to training. We invest heavily in training so that current employees can fulfill management roles more quickly and effectively than they would have otherwise. We always take advantage of the federal government's excellent programs for developing leaders.

We have coaching programs, training programs, and mentorship programs, and we mentor people throughout the ranks at different levels through Presidential Management Fellowships (PMF) and Career Resident Programs. We have, in my office alone, three PMFs, one in each of our technical areas, that we've recruited in the last two years. One we just hired in the last two months, and these people are stars, and we can really look forward to them developing into leaders in the future.

We support student internship programs, we reach out to colleges and high schools, we recruit people in their junior year in high school so maybe they come back their senior year and when they go to college, if they go to a local college, maybe they'll find out that transit is an exciting place to work. If we can get just a fraction of these interns interested in transit, and the research we're doing or transit in the other areas—for example in environmental planning—that could spark interest. Then we can recruit a new employee who already has transit workplace experience, a person that started in our research office.

At the FTA we have increased our employee professional-development opportunities and job detail, so when we have a new PMF or other new hire, initially it sets us back productivity-wise, but we know, for long-term growth, it will pay off in the long run. Recently, we had some of our new hires go down to a regional office to find out more about how a regional office works and they brought that experience back with them, and it will help them make better use of their skills in the future.

Of course, we do a lot of work to recruit the best because it's very important to recruit and retain the best people. But with the need for an increase in entry-level hiring we also need to start to look at our current skill mix. For example, in my office we have a lot of engineers, and that's fine, but we need more people with project management skills. And as we go through the FTA, we need more project managers than pure scientific engineers. So while there should always be an emphasis on core competencies, we also need to look at specific skills.

One thing we've done to recruit the best is we have a tuition payback plan. If we have a possible new hire who is fresh from college with a lot of student loans to pay back, we can pay back some or all of those loans. If they agree to be here for a number of years, maybe a period of three years, we'll pay back so much a year, or so much every six months. Also, we market, we go out to job fairs, we reach out to under-represented groups, we reach out to people who maybe haven't thought about transit as a career.

Other things we have done to cultivate the best possible workforce—the FTA sponsors the Community Transportation Development Center (CTDC), and our training and career ladder programs work closely with CTDC. The CTDC is quite accomplished, and lately it has had success in certifying rail mechanics. The CTDC also does a lot of technology training. They work closely with blue-collar workers and labor, training them to use new vehicles, computer-controlled apparatus, and other technology. The FTA is also reaching out to the Conference of Minority Transportation Officials (COMTO); we give presentations, we invite people to visit, and we take part in the selection for transit internships. We partner with a variety of University Transportation Centers (UTCs), supporting young researchers in university programs.

We partner a UTC with a transit agency that's local, so we have a graduate or undergraduate student that does work with the local transit agency. The transit agency can become kind of a laboratory for the UTC where people can go out and experience the transit workplace and field. Many students don't have any idea what a career in transit is really about, so if we can

get students involved in the day-to-day operations or a segment of the transit industry, that can spark some interest.

Finally, we are here at the FTA work with the National Transportation Institute (NTI) to gain institutional knowledge. We watch what's going on with NTI because we have a lot of key people there who are eligible to retire, and we want to retain their knowledge, and we try to find courses for NTI that value FTA and aid workforce development.

We also work with the Transportation Safety Institute (TSI) for safety and security training. We sponsor the TCRP program, which provides us with studies and reports on transportation.

That concludes my presentation for this morning. I am delighted to be here, thank you very much.

DR. JOHN COLLURA

Our next speaker is Dr. Diana Long. Dr. Long serves as the Director of the Workforce Development Group at the Rahall Transportation Institute. She is going to provide us with a perspective on the challenges and issues surrounding workforce development, based on some work she's done in West Virginia and the surrounding area.

DR. DIANA LONG: JUMP, PUSH, PULL, CATCH AND GROW—HECTIC TIMES IN WV

Good morning. I gave my presentation the title, “Jump, Push, Pull, Catch, and Grow,” based on some of the verbs that came out of a workforce study we did for the West Virginia Department of Transportation, dealing with who retires, who’s going, who’s staying, and how to find new people, and I thought that these words all fit together.

I’m going to give a brief introduction to that workforce study, then I’m going to take the recommendations that were created in light of the results of this study and show how they can be applied to all of transit. Workforce is an issue in this country, and the more technical a skill becomes (as is occurring in transit), the more labor-intensive the skill becomes, and the harder it is to find the correct workers. So hopefully you’ll get something that you can take home to use or some points to talk about and discuss.

The Nick Rahall Appalachian Transportation Institute is located in West Virginia, in Huntington, on the Marshall University Campus. We are one of ten national university centers, and our theme is “Transportation and economic development in mountain regions.”

My job title of Workforce Director is a kind of vague term. We have a lot of engineers on our staff, but I’m not an engineer. I always say I’m the right brain of the organization. So I spend a lot of my time telling the engineers how things feel, and a lot of times, although they don’t quite get my sense of humor.

In the workforce study we did a review of the literature about retirement and retention. To do so, we then developed a Web-enabled survey and the workers log on at their district’s office, and we had great success with that survey.

We did interviews, which was one of my favorite parts of the study. We interviewed personnel at about 18 other states’ DOT offices, learning some of their best practices. Many of those practices led to some of the recommendations I’m going to make today. We also we did a database analysis of the demographics of the West Virginia Department of Transportation. You can look at the full study yourself, at your own leisure.

The purpose of the study was to find out exactly where the Department of Transportation is in terms of retirement, service, and education levels. We asked: “Who’s going to retire? Who’s going to stay? How are we going to find the new workers?”

This slide is probably like the one that every other speaker has—it’s a snapshot of the findings from West Virginia. Right now, we have a little over 5,000 workers, and basically, in the next five years, about 43 percent of them are going to be eligible to retire. We took the figures out seven years, and we ended up with about 70 percent of current employees who would be eligible to retire. We even found one worker who’s 90 years old although we figured he’s

probably not going to be retiring any time soon. He's probably like *Weekend at Bernie's*, just propped up in some DOT truck out by the highway someplace, just sitting there.

We went through 54 peer-reviewed articles, which is detailed in the study. And we used those to develop the survey questions that we put out on the worker survey. We had a 55 percent response on our Web-enabled survey, and I don't know how many of you actually deal with surveys and rates of return, but 55 percent is pretty phenomenal for any type of survey, so we were really thrilled with those results.

<i>WVDOT Demographics</i>	
Total number in workforce	5,149
Average age	48.66
Average years of service	14.20
Retirement eligible 2007	1,390; 27%
Retirement eligible 07-11	2,200; 43%
Rule of 80 eligible	471
Workers under age 45	1,753
Response to survey	2,839; 55%

Figure 7 West Virginia DOT Demographics

As we gathered results our question became “If we've got 45 to 50 percent of the people who can retire, and are eligible to retire, are they going to?” Just because you're eligible doesn't mean you're going to go. From our survey, we found that there are three main factors that lead to retirement: there are those who are pushed, those who are pulled, and those who jump at the chance to retire.

Those people who are pushed are those who don't want to retire but are forced out. Those who are pulled are those who have found something more lucrative or attractive. And those who jump are those who are counting down to retirement.

People who are pushed out are usually those people with poor health or those who know that their skills are obsolete, and that they had better go while they still have benefits before their employment is terminated.

When it comes to people who are pulled, the literature shows that married men, especially married men with a retired spouse, are pulled toward retirement. They feel that they really need to go out and do something with their significant other.

Those who jump tend to be those who are unhappy at work, people who can see that their pensions are starting to decline. Those people may have done some side work, have additional assets or another source of income. Widowed men and women, and divorced and/or single men and women are also more likely to jump.

This all leads us to who's likely to stay. You talk about all the history that's walking out the doors and with all these people who are ready to go; but how can we keep some of them?

One major factor which allows you to retain employees is giving them the opportunity for some flexibility in their work. The hours don't necessarily bother them, but it's the work that they're doing. They want work that they like to do, work that makes them happy and gives them a sense of purpose. Employees want to do project work with creativity and innovation, and to pass on the report writing, the documentation, the record keeping to someone else.

We found there are also people who are more likely to stay. Men who use work as their social network, people in lower pay grades with less access to a car and house, those who can't afford to go, and those with dual-income families usually stay longer because they have more debt, more responsibility, and they may have college-age children. Women with a retired spouse are also more likely to stay at work, probably because they are not going home with him sitting there doing nothing.

The literature also shows that if you want people to stay, you should look at initiating some senior-friendly policies, such as easy access. With everybody waiting on their hip replacement when the elevator goes out, those seniors can't climb up the steps, so offices on the first floor might be a good idea. Get new computers with bigger screens and get or improve anything that recognizes that your employees aren't as young as they used to be. If you help your older employees work, and they are happier, they'll stay.

We have talked about what they call the "third age." If you look at the life expectancy of people now, retiring at 60 isn't an option any more. To think that we are going to live for 30 more years and that we are going to have to have this organization support us in retirement for those 30 years, that's neither realistic nor reflective of the lifestyle that we have today.

Finally, people want growth—even older people want challenges—and they want meaningful work. Don't give me something that goes in a data dump somewhere that nobody looks at, or nobody cares about. We all want to do things that mean something.

Of course the most obvious thing to do if you want to retain and recruit the best employees is better pay, benefits, and job security. People want decent pay, they want benefits, and they want job security.

Of course you can't keep everyone indefinitely, even those who aren't pushed, pulled, or jumping toward retirement—you always need to think about recruitment. When you look at

people going to work for government agencies, especially those with high-level skills, there are always private contractors who are able to pay them a whole lot more than the government. However, we have found that a lot of professionals coming out of college will still consider working for the government, that the salaries don't prohibit them from applying or considering those applications but that it does contribute to them not accepting a government job. So from a recruiting standpoint, we need to emphasize those benefits that go beyond salary. You can overcome the salary differentials with some other types of incentives. One of the best recruitment strategies people have had so far is the retirement of student debt.

We have more and more individuals going to college now than we ever have, and we have a lot of those students graduating with debt. This means the government is in a position where it could offer to pay back a student's college loans, and that's a tremendous incentive to get people to come to work for you.



Figure 8 Dr. Diana Long, Workforce Development Coordinator for the Nick J. Rahall II Appalachian Transportation Institute

It has been shown that there is a relationship between the experience and knowledge gained from my major as a college student and what I choose as my future employment. For example, if I go all the way through college in a teacher education program and the first time I enter the classroom is on my first day as a teacher, it becomes very likely that I could wash out. Maybe I can't stand kids. So the more activities and relationships that you can get involved in, with any of the training providers or education providers, to build a relationship between a student's major, and a job in transit, the higher a level of interest, the lower the chance of washout. It creates a "go where I know" mentality.

People go where they know. I like to use the example of my son, Nathan. Nathan went to a WVU-Georgetown basketball game in the ninth grade with his buddy John and John's sister, and afterwards they got to go to a fraternity party. When it came time to go pick a college, he didn't even want to look. He said, "I think I'll just go to WVU since I already know

everybody up there.” Here is my son making these decisions based on something he did in the ninth grade, but that’s what he knew in his little mind, and he ended up going to WVU.

Prospective employees need exposure. If you ask someone to list 50 different occupations in a five-minute time period, he or she can’t do it. They can only list doctors, lawyers, the things that are in their immediate world. So for them to say they are going to grow up to work in transit isn’t likely because they don’t know what that means. People go with what they know. The literature shows that there are vast untapped markets of potential employees—people in the military, females, recent college graduates—and we need to learn how to tap these.

Going back to the DOT findings, we found that those workers who were eligible to retire now but choose not to tend to be pretty happy. They want to work, they love to negotiate their job duties and their finances are also important, so they’re staying put. In West Virginia where we’ve had times where all of a sudden employee benefit plans were maybe going to be threatened, that’s when you would hear retirement-eligible employees say, “Okay. Once this happens, buddy, I’m out of here!” And there’s a certain psychological edge to that freedom of knowing if one day I wake up and if I don’t want to go to work, I just won’t go.

The problem lies in those folks who are eligible to retire in the next five years. They’re unsure and they’re dissatisfied, but they’re staying put for right now, at least until they retire. We have what’s called a “rule of 80,” their age less their service, and they can retire and still have their health insurance paid for about 10 years, based on the cause of their retirement. So if you look at employees who are 55 years old, and who can go to work for a private contractor, or even start their own business, they can have some basic insurance paid for. That creates a huge population of workers who are ready to walk out the door at any minute.

In our research we tried to look at the education levels of employees at the DOT, but we found that the database isn’t current. So it was really hard to analyze what the structure and expertise of the workforce really was. One thing we did find is that there was a conflict between attitudes and actions as far as education and training. They all listed that career development and educational opportunities as a crucial issue in their staying in transit. But then when we looked at how many classes or development courses they’d taken in the last three years, it tended to be zero. So they say it’s important but haven’t really taken advantage of any of the education. What we’re finding now is that certifications are much more important than an actual degree, especially with new and emerging occupations. You don’t have traditional training programs for some of these things, especially new programs such as GIS or personnel. Typically, these positions could be filled by an engineer, but with the current structure of training, we have secretaries training for these positions. So it is no longer necessarily that the position or the degree that you have dictates what career path you’re on, or what career development you need.

There are also “mission-critical” or new and emerging occupations, which are the ones that everybody is paying attention to. We are all trying to decide who is going to be needed in the next 10 years and not just back-filling those who decide to retire.

Recruitment and retention isn't just an issue of capturing or attracting fish out of the pond because there are just no fish out there. We're basing an economy on trying to fill jobs and recruit people when the people themselves aren't there. It used to be if you had a physical job you didn't have to think, but that's changing. There are now physical jobs which require a technology-based education, and this creates a perfect storm for employment.

At the West Virginia Department of Transportation, 34 percent of those people 45 years of age or younger are looking for other positions, and when we looked at those occupations that the state had defined as mission-critical, it was even higher. The highly skilled were more likely to be looking. So it's one thing to lose a worker with a skill that's really easy to replace, but when you start getting some of those very specialized skill workers jumping ship the crisis becomes even greater.

So here are some recommendations: some of them are mine, some were some from the literature. They don't necessarily reflect all the positions of the Rahall Transportation Institute, but, if you're going to turn things around, we've got to do something different.

If you don't address salaries and benefits, you aren't going to get anybody. Appalachia Power right now has pet insurance if you're a deck hand. If you don't get your salaries and benefits up there, it's going to constantly be an issue for recruitment and retention.

Nobody's doing succession planning—everybody's talking about doing succession planning, but it's just, "Gee. How many people are retiring this week? Next year?" The real questions are: Which skills are obsolete? Which skills are up and coming? How are we going to rearrange transit with fewer people, fewer skilled workers? How are we going to integrate the technology that we need so that we can be more productive? And it's not necessarily just by getting more people in transit but through the implementation of technology that makes the systems work better.

We need to consider restructuring tuition reimbursement. How many of you offer tuition reimbursement programs for your folks? Well, what I found is, usually there's a little stipulation there that says it has to be related to your job. Using West Virginia Department of Transportation for the example, if you're a secretary you can take all the secretarial courses you want to, but you can't take an engineering course. We don't pay for that because that doesn't have anything to do with your job. Now isn't that kind of stupid? If you need engineers, why not target people who are right there with you and pay their way to go to be an engineer no matter what their current job is? Target those occupations that you need, and invest and support those, not just with people who are already in them. Try to look at the skill of the worker and not the skill of the job. A lot of people are in jobs that do not reflect what kind of skill levels they have or could have. We tend to think, because it's a lower-level skill job, that that person must have some lower-level skill abilities, but that's not necessarily true.

I think dual tracks for promotion are also very important, especially in government hierarchy. We have this system where you have to be promoted to make more money, especially in some of the technical skill areas. You'll take a really good diesel mechanic and promote him to

supervisor, and what's happened is you have lost a really good diesel mechanic and gotten a lousy supervisor. So make it easy for people to become experts and grow in their own fields, and pay them accordingly.

We need to offer student loan payoffs and recruit students. If you ask people what engineers do, nobody knows. And I have no idea what engineers really do except the ones I work with now. Engineers and some of those technical fields need to be heavily recruited and emphasized by transit. So... they go where they know, so that they can understand, "This might be something I like to do."

Also, how many of you work with your local WIA (Workforce Investments Acts) board? It used to be the JTTA. They have tons of money and they waste lots of what they have. Workforce Investment Acts are government money for training and development, which is locally decided upon, and a lot of it gets wasted. Agencies need to be very vocal and be very persistent if they want these funds. They need to say "These are the type of workers I need." We don't need any more nail salons, we need technician levels and we need short-term programs to give workers some high-level skills. It's very frustrating because the WIA board is very bureaucratic. But if you are vocal, persistent, and constantly trying to get some money earmarked for specific occupations that you have in your area, sometimes you can succeed.

We've talked a lot about the internships. You should offer internships, but not for students to just come in and make copies. If you're going to have an intern in there, you have to make sure they're exposed to all the neat, fun stuff. Really set up those programs, and have your best people in charge of them. Don't just have them work with the work-staff people—put them with your best people. They can learn a lot and get enthused and do a lot for your organization.

The last thing we asked people was "what do you want to do?" and "what skills do you have?" We don't pay a whole lot of attention to those innate abilities that people have, the things that are their passion, what comes easy to them. We'll ask students all the time, "What do you want to be?" and the answer will be, "I'm going to be a lawyer." "I'm going to be a dentist." Or maybe "I'm not going to take chemistry. I don't like science." A lot of the time they don't really look at what they want to do. You mustn't always look at the skill of the job but look at the skill of the workers, and starting to do some aptitude assessment is a good way to do that.

If you need to get in touch with me, my e-mail is longd@marshall.edu, the West Virginia study is at our web site: njrati.org. We also have a data document if you'd like to look at all the statistics. It's been a pleasure, and I hope you've enjoyed everything.

DR. JOHN COLLURA

Thank you, Diana. Our next speaker is Janet Oakley. She serves as the Director of Policy at the American Association of State Highway and Transportation Officials. Janet's going to give us

the perspective of the state departments of transportation and other AASHTO stakeholders on workforce development challenges.

JANET OAKLEY

Good morning. John Horsley, the executive director of AASHTO, has been involved over the years with the Mineta Transportation Institute, and would be here were it not for the fact that he is on his way to China for the ITS World Congress meeting.

Now you all look at me and say “What’s a person representing those highway guys doing here at a summit that’s associated with APTA?” And I would say the AASHTO of today is not the AASHTO of 15 years ago. Over the last eight years we have been putting a greater emphasis on transportation. We’ve been getting rid of those silos and looking at cross-cutting issues, with workforce being one of those issues that we have to address. Transportation is about dealing with congestion, not just when we’re building roads or building transit agencies but building systems. So there needs to be a commitment to all modes, and we appreciate the opportunity to engage in this dialogue with you today, and hope that it is the beginning of a conversation between AASHTO and APTA.

What I’d like to do today is represent the state DOT’s perspective, and the changing state of the DOT workforce—our changing environment, the changing workforce, and what these changes implicate for workforce management.



Figure 9 Janet P. Oakley, Director of Policy and Government Relations for the American Association of State Highway and Transportation Officials

About four years ago, when Brian Nichol was moving into the head of AASHTO and was still a commissioner at the Indiana DOT, in a speech to the board of directors, he talked about the “new normal.” DOTs have to operate in a climate of new normal, where the extraordinary

becomes the ordinary. Right now, you have to embrace change and embrace a concept of focusing on innovation so that innovation becomes the norm: taking the research that we normally would have put on the shelf, or put in our bookcases, and applying it. Brian came to this concept of new normal when he had to deal with the reconstruction of a major section of interstate in downtown Indianapolis. He said, “Okay, I’m going to bracket a period of time from the Indy 500 in May to the Brickyard 500 in September, and close that urban interstate segment during that period between those two major events, and I’m going to get the segment reconstructed in record time using the most innovative materials and construction techniques. We’ll get in, get out, and stay out of the business of reconstruction.” It was an incredible success. It was termed a “hyperfix,” and it’s about making the extraordinary ordinary. What this does is change the whole climate of what DOTs are about and the workforce that has to serve it.

So here are the drivers of change.

First, there is the changing mission of state DOTs. We are certainly moving away from our emphasis on heavy construction. Are we still building? Yes, but we are not building like we were during the period of the Interstate system. We are certainly still reconstructing, but we're moving more toward overall management, operation, and maintenance of the system. We're much more engaged today in inter-relationships with our communities, with local governments, and with MPOs. Right now state DOTs are going out and spending time with the business community, with chambers of commerce, with shippers, with the folks whose business it is to get products to market, get products from market to the public.

We’re also trying to do tasks with less money. We have less money overall, and what money we do have is getting sucked into mega-projects. When you throw in the inflation associated with construction materials, there’s been an incredible erosion of purchasing power with respect to our program. You have these mega-projects in the transit industry, and we certainly have them on the highway side, and this causes the mission to become more political today than it ever was before.

Clearly there are trends currently changing workforce demographics. I think the generational differences are important because in a workforce you can have four or five different generations working together. We just heard how at West Virginia DOT, there’s a gentleman who’s 90 years old. He’s certainly from the veterans’ generation, but we also have the baby boomers and the Gen-Xs and the Gen-Ys, and now the new millennial generation. So we’re dealing with a workforce that has all those generational groups working together, and there are tremendous differences across those generations.

Another issue of key importance is how you deal with workforce recruitment and retention. This includes how you deal with the whole concept of succession planning, and how you do strategic planning for workforce development.

Another factor in workforce development involves new business practices we engage in. Certainly change in international and national business practices are leading DOTs toward

change and causing change in their workforces. There is a new focus on quality, and on customers. In addition, outsourcing and off-shoring have implications for the make-up of your workforce.

National and state transportation policies drive workforce change. With fewer resources and more mega projects, we have the problem of a looming shortfall—for us \$4.3 billion in the highway trust fund. On the fiscal side, how we finance transportation is making a big difference in terms of the makeup of the transportation workforce. In relation to the growing emergence of public/private partnerships, I heard Tom Warne say, “Gee, if you look at it now, the engineers get kicked out of the room, and we bring in the attorneys and the financial officers, and they are the ones who are doing the deals, and the engineers are sort of brought in at the end.”

I just came back from AASHTO’s annual meeting in Milwaukee, and we had presenting to the board of directors a gentleman from a company called ProLogis. ProLogis is some sort of fancy commercial real estate development company that locates and invests in commercial real estate to serve transportation logistics, and that means that because in terms of overhead, the transportation component of overhead costs are so substantial that it creates an entire business niche. These companies are making investments in just locating commercial real estate for warehousing and other operations to support transportation logistics.

Finally, I just want to say that this whole issue of climate change is also going to be a big driver over the next decade, until we begin to make progress. Transportation is a major contributor to greenhouse gas emissions, and we will be called upon to make major contributions to solving that problem. That means, as we move forward, we're going to have to have people with skills in that area as well.

Let’s talk about workforce trends—agency downsizing and reorganization. We still need to grow our programs further; while our programs have doubled in the last 10 years, our workforce has still diminished. We are moving to a younger workforce and we’re moving to a younger set of leaders. So, we aren’t going to have the luxury of waiting 25 years for people to put in before they begin to move up through the ranks.

Another emerging influence in our workforce is the concept of paraprofessionals, and the role of certifications. We’re seeing much more of this; it’s kind of like the physician’s assistants, where you have non-engineers who are gaining technical skills and being brought into the engineering profession as paraprofessionals. I think that paraprofessionals add a valuable dimension and can be a source for filling the gap that we have.

This concludes my panoply of the workforce/management challenges and opportunities we currently face. I thought that Dr. Long’s data was tremendously important in helping us understand real strategic workforce planning; she went through recruitment, retiring, retention, and succession planning and she mentioned all of those pieces that relate to workforce management and talked about some of the challenges and opportunities.

When we look at our options in recruitment and retention, we can see what are our challenges and opportunities. Salary is important, but another factor can be seen when you look at the different generations in the workforce: for Generation Xers, the Ys, and the millennial generations, stability is a factor. We're finding later on in the retention phase that the younger kids coming in today are more mobile and are much less worried about stability. It's more about overall quality of life for them, it's a different culture.

In fact, I had a clash with one of my own colleagues when I was putting together this presentation. One of the younger staff members who runs our track program said he didn't want me to use the word "culture." He said, "Somehow that has a negative connotation because people don't think of the culture of the DOTs as something positive." And I said, "But our culture, it's about icons and creating an atmosphere of wanting to go into the DOTs; because of our culture people see the DOTs as a place where there is a test bed of innovation and excellence." We like to think that our state DOTs are creating a culture, and that they are presenting icons that provide a culture of excellence and that are creating a reputation that attracts people to them.

I just want to say that this idea of training technicians to be paraprofessionals is a new and emerging area. I worked with Tom Warne on a project looking at what we called "in-service training needs," which is training to give and nurture our workforce's versatile professional, career, and skill development. One of the things we found while we were directing this training is that there is a migration of needed skills from complementary to core. A lot of skills that we used to say were complementary skills are now turning into core skills.

Things are also changing in project management: there is more outsourcing, and the employees of the DOT are in constant need of more project-management skills. We need employees with skills in financing, public relations, and public speaking. These are the kinds of skills that are now the core skills that the leaders at the state DOTs, and the CEOs, are saying are mission-critical.

Another factor driving change is the modernizing of training-delivery approaches. Going back to the Milwaukee meeting, I was listening to Rhonda Faight, who is the CEO and secretary of the New Mexico DOT, and heads up our standing committee on quality. She was talking about the reports they were producing, and she said, "Oh, by the way, not only is it available on the Web, but we can put it on mp3 for you to upload to your iPod." iPods, that is the next frontier in how we can deliver training.

Our current workforce needs strong leadership development; succession planning is not just about the leaders, succession management is critical to the entire workforce structure. You heard a lot of people talk about succession planning today, but people aren't really doing it. We aren't investing the time and resources in the strategic-workforce planning that's needed, particularly with the high frequency of retirements for experienced leaders. It's not just the leaders who are important but we need to view their retention as critical to our success.

Another factor I want to discuss is the transfer of institutional knowledge, which is an important consideration when dealing with high levels of retirement. There are just some leaders with knowledge that we cannot replace. We have Jack Basso, who came from the U.S. DOT where he was the assistant secretary for policy and budget. Jack Basso is probably the only person on our staff who really knows how the federal highway program works and how it is financed. I don't know how his institutional knowledge can be captured and transferred although I do know that his son is now working at the U.S. DOT, and we're just hoping that it's something that's genetic.

What is AASHTO doing for workforce development? First, I will say that AASHTO's strategic plan was completed two years ago, with their strategic plan for 2000 to 2010. AASHTO's CEOs had four goals, and one of their goals was to assist the state DOTs with leadership and performance. In looking at their objectives, they said there was a critical need to develop tools to assist states in core competencies, downsizing, outsourcing, workforce recruitment, retention, and succession planning, and in-service training. If you would look up at the top of the screen you will see the four goals and objectives, which all fit on one page.

In addition, there are a number of different things that are going on, and I'm going to talk about our track program and mention what NCHRP studies are uncovering.

In some way, shape, or form, in every management forum, regardless of the subject, issues related to workforce gaps and the need for training and recruitment are raised. Pete Rahn, who's the director at the Missouri DOT and who was installed as the president of AASHTO just last week, has an interest in the U.S. DOT's Transportation Curriculum Coordinating Council, which deals with training for the construction industry. AASHTO's track program deals with transportation and civil engineering. It sends engineers into middle and high schools to expose them to engineering and transportation-related professions. It also introduces planning, drafting, computer systems, environmental engineering, and structural engineering. In addition, there are eight learning modules that are included: bridge design, city planning, design and construction, environmental engineering, highway safety, magnetic levitation, motion, and traffic technology. They have curriculum packages that teachers can use and they sponsor competitions. The kids form teams, they build projects, and we bring these students into our annual meetings where they compete amongst themselves and against AASHTO's chief engineers in design competitions, in concepts as varied as building bridges to figuring out how to fix potholes. They are exposed to engineers, and we've found that to be a valuable way to establish and nurture a pipeline between the transit community and very young students.

Our "Tools to Aid State DOTs in Responding to Workforce Challenges" is a new report that is due out very soon. It has some very specific tools to aid state DOTs and is very applicable to the transit sector.

With the new workforce we need to look at the generational differences. You have to look at the new millennial generation and look at the expanding nature of social networks and horizontal communication tools.

Tom Warne, a former director of the Utah DOT, has been engaged with us in looking at workforce issues. He would say, “When we change the way we look at things, the things we look at change.” That applies to our workforce and how we manage and strategically plan for the workforce of tomorrow.

DR. JOHN COLLURA

Thank you, Janet. Our next speaker is Stephanie Pinson. Stephanie serves as the President and CEO of Gilbert Tweed Associates. She has been very active with the APTA and has served as an MTI trustee. Stephanie is going to provide us with a perspective on workforce issues from her varied experiences in private industry as well as in public transportation.

STEPHANIE PINSON

As you know, what we do in this industry, and in other industries, is to recruit senior talent for our clients, and those clients are both public agencies like yours and private corporations who supply goods and services.

I thought I'd tell you a little bit about Gilbert Tweed. We are what is known as a retained executive search firm. Gilbert Tweed was founded by two women in 1972, Lynn Gilbert and Janet Tweed, so there is no Gil Tweed. We get letters to him at least once a week, but he doesn't exist. Janet is still with us. Myself, Janet, and a third partner now make up the leadership and management of the firm. We are a fully-integrated firm, we have all genders and ethnicities.

When I was asked to talk on this topic, I realized that I was going to have all my thunder stolen by other speakers who had also been surveying, and so I thought what I would do is base my remarks on what we are seeing as the practical realities of what others have talked about. The things that they've discussed are coming home to my desk and to my practice, and I want us to start doing something real about it. We really are in a crisis. People have said to us, "This isn't a crisis, and we shouldn't be getting everybody upset about it." But, ladies and gentlemen, this is a crisis—the pig has come through the pipe, and it's gotten to where we are.

So I took a look at trends that we at Gilbert Tweed are experiencing. Of our search practice, approximately 40 percent of what we do is financial services related, and about 30 percent is transit: for transportation, government services, and infrastructure of a variety of types; and finally, ten percent, and this is growing, is for construction and general contracting.

Right now, we're seeing a coming together of financial and infrastructure related skills; we have innovative new financing that's starting to occur in the transit and construction industry, and we are being asked by our financial services clients to help them find financial advisors with an understanding of construction, transit, and/or infrastructure projects.

Gilbert Tweed's level of search tends to be for CEOs and the immediate staff area, and we do a lot of senior project management work, and engineering management at senior levels. So we're working at the crux of the problem right now. Frequently our searches are to replace a retiring person who's had his or her job for a relatively long time. We are going from the client to other sources to recruit new talent, and we are finding that we are not recruiting young, hotshot managers because there are very few young, hotshot managers out there in the industries we're talking about. So our sources tend to be the market, which is to say people doing a job which is already in the market. Thus, our network in the APTA and COMTO and AASHTO and WTS are all important elements for us.



Figure 10 Stephanie Pinson, President and CEO of Gilbert Tweed Associates, Inc., APTA Executive Board and Human Resources Committee Member, and MTI Board of Trustees Member

The luckiest thing that ever happened to me was the day that Bev Scott said to me, and it was just 20 years ago—“Stephanie, go join APTA.” And I very intelligently asked, “What’s APTA?” Well, now I know what the APTA is, and I know how important it is, and I know that I am not seeing any young, up-and-coming practitioners at APTA meetings. So one of the things I think we need to do is encourage our general managers to bring those people to the meetings. Once you’re up at senior staff, it’s important that you be here and network, but the kids have to be coming too or we lose them.

I do some advertising, although that is really more to get word out that you have searches that need to be filled, but that does not usually produce the best candidates because the best candidates are already working. What it does do is help to give me an expanded database of where I might find people who could be interested in a particular position, and that’s very important.

Another source for recruitment is the general industry, and one of the things I think we all need to do is put our heads together and ask ourselves, “What else is like us? Where else will we find a candidate that could work in a given position?” We have to stop saying, “Twenty years of experience,” or “Ten years of experience” or “Two years of experience” or “Must come from a transit agency.” Because the minute we do that, we shut down our world again, we increase our insularity. So I’m encouraging, I’m begging you, to help me and people like me find appropriate sources to help us get through this workforce crisis.

I took a look at our practice over the past three years and found some trends. First, the number of searches we have made has increased dramatically in my practice area. That’s good news and I love that. But, what this demonstrates is that many of our clients, especially the

public-sector clients, are finding that they cannot successfully unilaterally recruit talent at the levels we're talking about, and so we're helping them.

The other thing we're finding is that the workforce has shrunk significantly, creating a relative scarcity and hence, the length of time to fill our searches. Our claim to fame has always been that we were able to say, "If you give us a transit or a transportation search, the chances are very good that we will fill that search within two months." Now I have to say, "We will try to fill that search in two months." But I know, and I make sure that the client knows, that it could take much longer depending on the position and depending on the condition of the market in that particular area. Our searches are lengthening, and the problem with searches that lengthen has to do with the opportunity cost. It reflects instability inside the organization, and it raises the expense of developing candidates for a client, who may have to see more than one candidate to fill any given search. And while we're working very closely with our clients to plan searches so that we can make it a much tighter process than it used to be, we're also doing some innovative financing on our own.

Over the past three years, the cost of a new hire has increased, as it takes more to entice someone to leave where he or she is presently. It takes more to entice that individual to leave, and more means more opportunities, more money, better benefits, and a greater sense of stability, although now stability means the stability to get things done, not the stability to retire in place. Very few people today are thinking about a lifetime job. Most people are thinking about a career, and how their current job fits into their career.

I find that I do a fair amount of career counseling for a variety of people, but I can never ascertain what a person's next job ought to be. When I ask "What do you want to do?" it is remarkable how often people don't know have an answer. They haven't focused on their core competencies; they have simply run their job the way they needed to run their job. I think part of what needs to happen is that you need to work with employees when they're in your employ, before you lose them, to help them shape what they want to do. That's one way to work on retention, and I don't see it happening very often. Some companies and some agencies are doing that, and when it does happen it's a great tool for employee retention.

One of the things we've seen in the market is that plain salaries and benefits packages have increased in frequency. That's creating another kind of dislocation. Our positions, especially the top positions, are all in the public eye, as all of you living in the fish bowl know very well. Now some transit CEOs are at and above the \$300,000 salary level, and when you say that in the *New York Times* or in the *Atlanta Journal* or in the *Washington Post*, people go nuts. However, the fact is that our CEOs are running major facilities, with huge assets under their control, and if they were in the private sector they'd be earning seven-figure salaries. So we have to help the public and to help our boards, which are under pressure to understand that the market is very scarce. The eligible people are few and far between. We're hiring major talents to help them get through the changes that are coming in our industry, not desk fillers. We need to help people understand how to tell that story, and it's actually pretty exciting if we can learn to work with it.

The public sector is increasingly losing top talent to the private sector, and it's only partly about compensation. It would be a mistake to think that our people, or any transportation professionals, just jump for dollars. They also go for interest and opportunity. Still, people don't take pay cuts very happily. I've been often been told, "Well, this person works in New York City, and we're inviting him or her to work in Charlotte, the cost of living is much lower, so we don't need to offer them much more." Well, if they don't offer much more in terms of salary or benefits the person who is looking at the job says, "Yes, but first of all, I'm making now what you want to offer me there, and I won't go for a lateral because when I do that I will have compressed my own salary." Moving for them is not a smart economic decision. It would be difficult to get somebody to do that, except for a person who is in the third age—the wonderful third age who has maybe 20 years more to work if they stay well. That person says, "Let me think about this. I'm already supported. My pension is set. I'm supported as to medical benefits. There are a lot of things I can do to help alleviate the condition of taking a financial lateral." They don't go for cuts in pay either, but they may take a lateral if you can show them that the benefits of going to work there make it worthwhile to take that position.

I had someone in my office the other day who is 62 and has just taken retirement from a major transit authority. We have a position that blessedly is not going to require relocation, so that's a real bonus. And the position looks really interesting to this person. He does not need health benefits because he's set for life, but he would like there to be some kind of premium on taking the position, and it's a big job, so he's saying, "They don't have to give me benefits. How can I do a package?" In the public sector, we rarely talk about "packages." In the private sector, we always talk about package. In the public sector, we have to help ourselves by learning how to talk about packages. CEOs in our industry are talking about packages. And what do packages include—or what should they include? Base salary of course, maybe the cost of living, benefits, or maybe some kind of annuity package that juices up the benefits or a living allowance if you've had someone move from a lower-cost to a higher-cost area. So you really have to start thinking creatively about how to attract employees.

I'm going to race through some more problems that I'm facing. You've heard about structural issues, and I would have told you about the aging of the workforce and the lack of succession planning, but you all have done it much better than I could, with more numbers and depth. I'll just say we have to stop saying that we're going to do all these things that we're not doing, like succession planning. Every once in a while, somebody like Mike Townes has a really good retention program, but mostly we're letting people come and go, and we can't afford to do that. We need help with that, and we need help with educating our workforce, and we need help with making us a sexy outfit.

When Bev, Brian Turner, M.P. Carter, and I all started working on workforce development many years ago, we said we wanted to be able to make this the industry of choice. We wanted to be able to hire the best and the brightest, and we wanted to know that when we were

finished with workforce development, we would have built perpetuity into our industry. But today we have barely scratched the surface.

Things have changed, and we have a climate crisis, the workforce is in crisis. But I want to go back for a minute to 1958. In 1958, we had a crisis, and the crisis was very similar: the crisis was concerning the lack of engineering talent. Bless the Russians, they had put up Sputnik, and the United States government had said, "Oh, my goodness! We need engineers." And suddenly, the money flowed into engineering, research, and development. And the industry became sexy. All engineering positions became sexy, and engineers became vital talent.

So now I am asking you, we have an opportunity to leverage ourselves by declaring a crisis and by helping the FTA and the others to understand that there's a way to help.

It begins with government funds that can be matched by private funds, that can be matched by our funds, to create a training and development program that can leverage us to help the climate and the workforce crisis. I would be more than happy to work with anybody who will help us market and develop that, and we've got a great opportunity now with the visioning program going on.

DR. JOHN COLLURA

Thank you, Stephanie. Our fifth panel member is Dr. Asha Weinstein Agrawal. Dr. Agrawal is an Assistant Professor, serves as the Acting Chair at the Department of Urban and Regional Planning at San José State University, and is a Mineta Transportation Institute fellow. Today Dr. Agrawal is going to draw from some studies she's done, examining why college students choose the transportation profession.

DR. ASHA WEINSTEIN AGRAWAL: TO BE A TRANSPORTATION ENGINEER OR NOT? A SURVEY OF CIVIL ENGINEERING MAJORS

I am quite excited to have an opportunity to share with you some research that I have been working on to try to address one small piece of the big question we're all here trying to understand. I have titled today's presentation, "To Be a Transportation Engineer or Not: A Survey of Civil Engineering Majors." First, what I want to do today is talk to you briefly about the background of the larger study that this survey is part of. Next, I will explain to you what this study of transportation engineering majors and civil engineering majors was about, then I plan to address the key findings that come out of our research. Finally, I will discuss what we can all do as transportation professionals to try to entice more students into a career in the transportation field.

I'll give you all some background on the study. The larger study is called "Paving the Way," and the problem we set out to solve through the survey is "how do we prepare an ample pool of educated and qualified transportation engineers and transportation planners to start taking over the jobs that are going to be opening up?" The approach we took was to identify actions that can be taken while students are in university programs studying civil engineering or planning; we hypothesized that a lot of students were going into those master's and bachelor's programs without yet having chosen a specialization. We wanted to discover what we can do to get people, once they're at the university, excited about studying transportation. This project was funded by the Mineta Transportation Institute, and I'd like to acknowledge my co-researcher on this project, Dr. Jennifer Dill, from Portland State University.

Now let me tell you a little bit more about the survey. We used a variety of techniques to try and understand the problem and to develop a useful survey. We reviewed the curriculum of about a hundred civil engineering bachelor's programs to see whether those students were taking transportation classes, what transportation classes were required, and when they were taking those classes.

We also interviewed faculty in civil engineering programs to try and get their impressions of why and how students make a choice about which field within civil engineering they choose to specialize in. We also did some focus groups within undergraduate and graduate civil engineering programs at Berkeley and Portland State University. We used all of that information to develop an online survey, which took students about 15 to 20 minutes to complete.

It was a diverse and exhaustive survey, so we were able to cover a lot of topics. One was asking students, "How did you choose your specialization? And where did you get the information or inspiration that led you to make that choice?"

We also had done a fair amount of review of career development literature, and we used that to develop a variety of questions, including “What is important to you in your career? Is it salary? Prestige? Is it working with people? Or do you prefer working with data and analysis? What are your larger objectives? Do you want a career where you work to improve the quality of the natural environment or the quality of life in cities and towns? What are you looking to achieve?”

We then asked all the civil engineers what their impressions were of the transportation specialization in particular. We then ended our survey with some of the usual socio-demographic questions and a few questions about the programs where the students were studying.

We were delighted to receive responses from over 1,800 students from 56 different universities, which gave us a huge pool of data to work with. Overall, our 1,800 students represent about four percent nationally of all the students studying civil engineering in a bachelor’s program. We think that we have a fairly good representative sample there. Now let me turn to what I think are the most interesting and relevant findings of this survey.

First, we were interested in what people are specializing in. Here on this slide is our pool, which has everyone from freshmen to seniors. Thirty-eight percent of the students were undecided and had not yet chosen a specialization. Of the students who had chosen a specialization, structural engineering was by far the most popular, and 23 percent of our sample of students said that’s what they were specializing in.

Transportation came in next, but it was only about half as many students, at about 12 percent. Third was environmental engineering and construction management, which each had eight or nine percent. Then we had people with other specializations, as well as those who were declared generalists or who did not want to narrow themselves down.

We were also interested in the “when” in the program. At what point in their four years or so in school are students choosing a specialization? We found that before entering the university, only 15 percent of students knew what they wanted to specialize in, which is good news because it suggests that there is a huge opportunity to influence people while they are in university programs. We also found that by the end of the sophomore year, 53 percent of students, about half, had decided what they wanted to specialize in, suggesting that those first two years are particularly important and where we should be focusing our efforts to better educate and recruit students to transportation. Finally by the end of the senior year, a majority—84 percent—of students had chosen a specialization.

Combining the last two slides I’ve shown you, we looked at when students develop an interest in the different specializations. On this slide you can see what people at the end of their freshman year said about their chosen specialization compared to people [at] the end of their senior year. Then that last column of this table shows the change over that time period. So, not surprisingly in the category “undecided,” there was a drop: 57 percent of people at the end of

their freshmen year still weren't sure what they wanted to specialize in, and only 17 percent said the same thing by the time they were at the end of their senior year.

Interestingly, in construction management, there was really no change in interest from freshman to senior. Nine percent of freshmen said they wanted to be construction management specialists, and nine percent of seniors said the same thing, so not much change happened to the overall percent in that specialization from beginning to end.

Structural engineering saw pretty healthy growth, with 16 percent of freshmen to 29 percent of seniors saying that was their chosen specialization, a growth of 80 percent.

Environmental engineering saw slightly-higher growth numbers with six percent of freshman year respondents saying that they wanted to be environmental engineers, which nearly doubled to 11 percent choosing it their senior year.



Figure 11 Dr. Asha Weinstein Agrawal, Assistant Professor of Urban and Regional Planning at San José State University, MTI Research Associate

And of course, what did we learn about transportation? Well, we found that few students at the end of their freshman year were planning to specialize in transportation, a measly seven percent, but by the end of the senior year that had grown to 18 percent, a greater than 200 percent increase. Looking collectively at all these numbers, what this tells me is that transportation, more than any other specialization, is one where students are learning about while they're undergraduates. Thus, there is an opportunity to encourage people and excite them about the field of transportation, and more room to grow.

Now I want to talk about a few of the key things we learned about how civil engineering students perceive transportation. One of the striking things we found was that 80 percent of entering civil engineering majors said they did not know what a transportation engineer does. So clearly there are a great number of educational opportunities.

The second thing we found is that a lot of engineering majors had basic misperceptions or a limited view of the transportation engineering profession. We had an open-ended question in the survey, which asked people to write down up to three things that they think

transportation engineers work on professionally. By and large, respondents wrote things like counting cars and traffic data analysis or they mentioned building bridges and designing interchanges. While these are very important things that transportation engineers do, they hardly encompass everything that transportation professionals engage in.

People weren't writing things like working in the transit industry, and almost nobody mentioned anything about transit system design or operations. We also had very few students linking transportation engineering to solving environmental issues. So we hypothesized that students don't have a handle on how diverse the field is, and how there may be a niche that could fit their personal interests in engineering.

We asked 20 general questions about the transportation engineering profession, and when we compared the answers of the people who said, "I'm interested in transportation," with everyone else (the non-transportation respondents in our group), we did not find that the non-transportation people had negative views of the field. We didn't have a lot of structural engineering majors saying, "Oh, transportation engineering: the classes are more boring," or "It's not prestigious." What we did see was a big difference between what people did and didn't know. When we asked the non-transportation majors a question like, "What do you do as a transportation engineer?" they tended to answer, "I don't know," much more often than telling us they had a negative view of the field.

These points all add up to an environment where people just don't know, even after they've been in a civil engineering program, what transportation engineering is about. Hopefully, I can end by inspiring you to think about a few things that we can do to fill that education gap, to inform people about transportation engineering and make them feel excited about it as a career.

I think there are two goals that we should focus on: one is to introduce students to what transportation is about. We need to show that there's a lot more to it than just designing bridges and intersections or counting cars and analyzing traffic flow data. We need to show the link to transit careers and we need to talk about the link between the transportation-engineering profession and the environment. Three-quarters of the students in our survey who had not yet decided on a specialization said it was important to them to have a career where they worked to improve or safeguard the natural environment. Well, transportation engineering is full of opportunities to do that. Whether it's running a transit system, designing safe bicycle facilities, or designing new vehicle technologies, the transportation engineering profession can be key to the reduction of the impact transportation has on the natural environment.

The second of our two goals is that we should be focusing our efforts on those first- and second-year students who haven't yet decided what specialization they might be interested in. Here are some specific things we can all do as professionals to try to introduce first- and second-year engineering students to transportation. One thing we can do is to offer internship opportunities. It's important that students do something interesting. Yes, you can have them

make your photocopies, but you've also got to take them to interesting conferences, or give them some analysis problems, or whatever is likely to be a more exciting side of the job you're introducing to them. I would remind everybody that an internship does not only affect one student. If you're the Wisconsin Department of Transportation and you give a freshman engineer a great summer internship experience, that person is going to go talk to all of his or her friends and could get those people interested in an internship in transportation.

Second, guest speakers at universities are useful, and I would encourage you to send your more dynamic speakers, the people who are working on cutting-edge projects and are good at conveying the enthusiasm they feel for the field. Those can be guest speakers in classes or special speaker events organized by an ITE student chapter or some group like that.

A lot of classes have projects where the students spend a semester with the instructor and some sort of an outside client solving a real-world problem, and a lot of instructors use the projects that are near and dear to them, where they already have contacts. However, instructors are often looking for new projects, and so if you approach university faculty, and say, "Hey, I've got a great transit operations problem that your systems analysis class might be able to work on," then that class may take a transportation project instead of a structural engineering project or whatever project the faculty member might otherwise have chosen to use. I think this is also an area that can have an impact beyond the students in that particular class because then they talk to their friends.

Another possibility which hasn't been explored much is to fund a transportation-professional-in-residence at a university. A lot of universities like to have somebody who's not an academic come for a semester or a year to spend his or her time in the university teaching a course, organizing professional development opportunities, providing mentoring, and introducing students to his or her profession. There's usually not enough money at many universities to do this, but if there were some outside funding to help, organizations or companies with some money that they could spend on a project like this, it might be possible to get a transportation professional in a position like that.

Lastly I'll just mention from our analysis of the curriculum, most students are not taking a transportation class in their first or second year, and those are the two critical years. This is something academics can be involved in and also organizations like ITE, APTA, or AASHTO. They need to try to develop small course modules that show exciting transportation engineering topics that instructors could drop into a class on statistics for civil engineers, or systems analysis for civil engineers, or any of the other basic courses that freshmen and sophomores take. Generally in these base-level classes, unless the instructor happens to be a transportation expert, transportation may not come up, or it may not come up in its most dynamic form. But, as an instructor, I know if people can hand me course material that is interesting and well-developed I'm often happy to use it, or at least adapt it. This is one way we can try and start slipping transportation into the general courses students take earlier in their careers, and there's a place for interested professional organizations to help develop that material.

So I will end here, but I would love to hear from any of you who have other ideas about how the professional community can interact successfully with academics and transportation-engineering or -planning students. Thank you very much for your attention.

QUESTIONS AND ANSWERS: A.M. SESSION

JOHN COLLURA

Thank you, Asha. We have a few minutes and, as I indicated when we got started, we're going to allow the panelists to talk and offer thoughts. I'd like to give any one of the five panelists a chance to add to or elaborate on what Asha has just presented. What are some of the actions that could respond to the challenges and issues that we've heard discussed in the last couple of hours? Go ahead, Stephanie.

STEPHANIE PINSON

I have had some experience with the visiting person on campus giving courses. It's a wonderful opportunity for a corporation. So, for the corporate people in the room today and for anybody you know who is eligible for this: go talk to them about it. It's an extraordinary opportunity in two ways—for the students, it tells them what we're about, and for the person who's working there, it is a guaranteed recruitment method.

So if you're looking to bring young people in, either as interns or as entry-level workers, go to the universities and work with them, for a year if possible, but a semester works too.

JANET OAKLEY

I have a suggestion. For years, the university transportation centers have worked with APTA, AASHTO, the DOTs, and the American Association of Road and Transportation Builders, under a strategic alliance to look at a number of cross-cutting issues. I would suggest that under this alliance, we ought to figure out a way to pull together human-resource professionals and experts among those different groups, to share information. AASHTO has a standing committee on finance and administration, and a vibrant human-resources group of people led by Nancy Richardson, the Director of Transportation at the Iowa Department of Transportation. From the academic side, research sharing could be improved, and I suggest that we ought to find a strategic alliance to seek a way to pull together the professionals and representatives from those different sectors. The synergy of that would be tremendous. I was impressed by the amount of practical results-oriented research that's being done, and I just don't know whether we're really getting enough out of that-enough sharing and networking across different sectors of the profession.

DR. JOHN COLLURA

Thank you, Janet. Any other thoughts? Go ahead, Ron.

RON HYNES

One thing I think that might also work is to involve your workforce in the recruitment and retention process. One thing we do in our office is we let people sit in on employee-selection panels that normally aren't in the loop. We also transfer some of the responsibilities downward to new hires, with the idea that they have a fresh look at the organization; for instance, we have someone who's involved in our standards program at a very low level in the organization, he has been there for about a year, yet he partnered to lead one of our teams in China for the International Standards Organization. So you can get responsibilities down to a lower level and allow the perks and the benefits that come with those responsibilities to follow. These people talk to friends, their partners, other presidential fellow managers and whatever circles they're in, and they're always talking about the best place to work, and we like to be on that list when those topics come up.

DR. JOHN COLLURA

I have one comment, which may elicit a few other comments from the panel members. One of the concepts that I was introduced to, working with workforce-development experts, is the whole metaphor of the workforce pipeline as defined by some as "cradle to grave." I like to think of it as cradle to retirement/golf community, but one slice through the pipeline has to do with K through 12, and it was touched on this morning. The question I would post, and this is something that many of us in academia wrestle with, when you go to junior high schools are you promoting an interest in math, science, reading, writing? Or are you promoting the engineering profession?

And I guess the same line of questioning holds true for going to high schools: are the high school students at a point where you can talk to them about transportation engineering, or even civil engineering? Or is it again something where we really need to focus on fundamentals like math, science, reading, writing, and other more general liberal-arts aspects of a K through 12 curriculum?

JANET OAKLEY

Yes, I mentioned the AASHTO track program in transportation and civil engineering. It is there mostly to expose children at an early age to civil engineering in the broadest of terms, in a practical sense, not from the math side. It is about civil engineering from the practical side of building bridges or designing urban communities. It's done throughout the United States and now in Canada also, but it's not just the curriculum. It's also about bringing in engineers as volunteers to participate in the classrooms, to assist the teams, to engage in the community with the students. I think all of that is critical because it's learning not necessarily the science for the sake of the science, which has value, but it's also introducing what these people do. I think the other aspect of bringing students to our conferences and exposing them to

transportation when they're presenting their engineering projects, where they're working with these chief engineers, is also very valuable.

In relation to when Jennifer was asking, "How can you make this profession sexy?" as I was driving to the airport to fly to Charlotte, I was listening to NPR, and there was a discussion about the hit "Numb3rs" crime show and how "Numb3rs" has made the mathematics profession sexy. Mathematicians have gone from being geeks to being cool guys. Maybe you guys who are more creative than I am can think of screenplays for a serial involving cool engineers who solve problems. I think that if you're looking at that pipeline, "from cradle to grave," you have to look at what turns people on, and certainly with these young kids, things like this make a difference. Schools have seen a tremendous upsurge in students going into mathematics, getting degrees, and it's attributed in part to the success of this particular TV show.

DR. DIANA LONG

I think that the national associations can play an important role here. I had a stint as a school administrator, and we implemented the track program at one time, but what's happened since the last school-to-work initiative died is that the No Child Left Behind Act is dominating the schools. This means increased graduation requirements, so there is no more room for anything else, no matter how much we need it or say it's valuable. So the best thing that a program like track can do is go through each state's required individual learning outcomes. So when we have a curriculum that is already done, we can say "Here are your learning standards and here's what standards this track program meets." That national credential brings a lot of credibility, so a local transit authority might make one teacher excited, but it's not going to go anywhere. Unfortunately, it's just this whole school-to-work thing; kids have to decide where they want to go by the ninth grade because they can't take four years of math unless they do. So it's just a real dilemma, and schools are getting further and further away from making that tie.

DR. ASHA AGRAWAL

My father is a mathematician, so I tend to think math is great in and of itself, but my experience is that you don't excite people in the skill. You excite them in the job—with what they can do and how we can make the world a better place. That's why most planning students say they want to go into planning, and I think we have to sneak in the physics and the math.

DR. JOHN COLLURA

Thank you. I hope that everybody has enjoyed this as much as I did. This is a subject that is near and dear to my heart. If you would like to continue to participate in a dialogue, let me remind you all that the Council on University Transportation Centers, better known as the CUTC, a task force on the workforce-development issue, plans to have several regional

summits, the first of which will be up in New England next spring. I'm sure many of you will be hearing about it, and so let me give you a personal invitation to join us so that you can continue to be informed about the challenges and the issues that we're all facing in the transportation profession on workforce development.

Before closing, let me again thank our panelists, and let me also acknowledge the fine work that the Rahall and Mineta Transportation Institutes did in selecting our panelists. Special thanks to Rod Diridon, Bob Plymale, and Leslee Hamilton for all of their hard work.

KEYNOTE INTRODUCTION BY SENATOR ROBERT PLYMALE

As the director of the Rahall Transportation Institute, it is certainly a pleasure to co-sponsor this event.

We feel like we are one of the few, or at least one of the few, new transportation centers. We were actually started in 1998, thanks to Congressman Rahall's work and ability, and his focus on transportation. It all started out as the Appalachian Transportation Institute, and we are the only institute that's ever been on the "West Wing." Not long ago, Congressmen were laughing about whether we need \$12 million dollars for an Appalachian Transportation Institute. It was a joke to them, but it was no joke to us. We have received a great deal of accolades in a couple of different realms, but one that I think is a testament to the people that work at RTI—not to the director but the people who work at RTI—is an unsolicited recipient of the UTC Center of Excellence by our granting agency that Rod and I both adhere to in what was called RSPA, the research and special programs administration now RITA is the acronym for that.

So, how do you address workforce development in its entirety? From a state perspective, and being in the state senate for 15 years, I have found that the state reacts in two ways. We react either through leadership or through crisis, and 90 percent of the time, we react to crisis. To be honest with you, transportation is already in a crisis situation as it relates to workforce, and as transportation professionals we're faced with many complex workforce-related issues. Being the Education Chair in the Senate, I have listened to educators talk about their needs for workforce, and then listened to transportation professionals discuss the same issues; both of the problems are very similar. They need to be more pertinent, more flexible in higher education, able to adjust. If you want to watch what I think's the slowest moving object, it's the curriculum committee in higher education. They move at a glacial pace. We need to melt them and make them more reactive; we need to do the same thing in transportation.

There are challenges for which each of us have a distinct input from our areas of expertise. In Congress, under the leadership of then-Congressman Mineta and Congressman Rahall, you had ISTEA (Intermodal Surface Transportation Efficiency Act) and SAFETEA-LU (Safe Accountable, Flexible, Efficient Transportation Act: A Legacy for Users), a framework for where we should go. Now, there are targets addressing safety, equity, innovative, finance, and congestion relief. At RTI, as one of the ten national centers, it is our responsibility to start looking at these things closely. As a state affiliate, I don't think that a transportation center, particularly since we're the main one in West Virginia, has addressed any of those issues satisfactorily. So we have started a dialogue to start addressing what we haven't done that before.

In all the geographic regions, as you look at the metropolitan areas, and as you look at West Virginia, we do the poor-man's ITS. We have to be more innovative, to come up with newer, more permanent solutions. Now let me give you some facts about why these specific challenges are unique, and how from a rural perspective, from West Virginia. Forty percent of residents in rural areas have no access to public transit. In 40 non-urbanized counties—now remember, we only have 55 counties in West Virginia—only 12.9 percent of the total demand for transit was met in fiscal year 2005. This means that you have people who have problems with access to healthcare and/or workplace. If you're only meeting 12.9 percent of their needs, then you have a serious problem, and nearly half of all rural West Virginia residents have no access to public transit.



Figure 12 Senator Robert H. Plymale, Director of the Nick J. Rahall II Appalachian Transportation Institute

Every mode and segment of transportation has a common need in the 21st century—we have to have skilled workers, and we have a workforce-development problem.

Well, today, we are very pleased to have a couple people coming to speak on this subject. I will tell you that I've had the privilege of meeting this person on a number of different occasions, he is former Congressman and Secretary of Transportation Norm Mineta. I think that when you look at what he's done and the way these things have been done, you wonder why California would ever vote for term limits. He served as a city councilman, a mayor, a congressman, and as Secretary of Commerce and Transportation. His accomplishments are numerous, and I could go on and on, but one accomplishment that I would like to highlight is ISTEA. If you look at something that's changed in a way that is similar to how the Eisenhower defense and interstate system changed our country, ISTEA changed the way we look at transportation. With that, it is my privilege to introduce former Congressman, former councilman, mayor, and former Secretary, Norm Mineta.

KEYNOTE SPEAKER SECRETARY NORMAN Y. MINETA

A transportation policy summit is not exactly the way most people would probably want to spend a typical Saturday, and yet we know from the discussion of the panel this morning, as well as what Senator Plymale said, that these are not typical times. And, as we've been hearing today, a rank-and-file crisis is brewing, and it's going to take the collective will of everyone to figure out a solution. In spite of this, I know that we can and will succeed.



Figure 13 The Honorable Norman Y. Mineta, Former Secretary of Commerce and Secretary of Transportation, Hill & Knowlton Vice Chairman

Recently, I read an interesting piece in the *Washington Post* about how federal agencies had paid out more than \$100 million dollars in bonuses last year in order to recruit and retain employees in hard-to-fill jobs. That's nearly twice as much as what was spent in 2005. Considering that nearly 60 percent of the federal government's 1.8 million civil service employees will be eligible to retire over the next nine years, and experts predict that at least 40 percent will retire, you see that there is a workforce dilemma.

When I was the Secretary of Transportation, one of the major issues I had to face was the dwindling pool of talent. We needed civil engineers, air traffic controllers, truck drivers, pilots; you name it and there was a vacancy for it. I felt back then the way many of you and you folks who are in HR feel today. One of the things that we did to correct our dilemma was to focus on young people. I can't tell you how many high schools I visited or the number of speeches I gave. I constantly reminded the young people that Henry Ford was just 16 years old when he became an apprentice in a machinist's shop, and all of us know what Orville and Wilbur did because they had been fascinated by flight at an early age when their father gave them a flying toy made of cork and bamboo. One of the messages that really sticks with kids is the whole issue of independence. They heard me talk about the freedom that transportation offers us today, especially the freedom that comes from public transportation. Independence is a big part of the reason why Americans took billions of trips on public transit in 2006 and why transit ridership has grown dramatically in the last 10 years.

In Milwaukee, ridership in 2005 hit its highest point in a decade. The Dallas Area Rapid Transit reported a 10.5 percent increase in bus and rail ridership from October 2005 to August 2006. For many Americans, public transit now means that they have access to a wide range of community-based services that offers them the freedom and mobility that they might not have had in the past. All of this freedom is threatened if we don't invest in the future of America's workforce, and I use the word "invest" literally because during my tenure at the Department of Transportation, we provided almost \$140 million to support university transportation centers. This is where the next generation of workers is being molded at this very moment. By fiscal year 2009, we're going to have 60 It's around the country, and that's up from 33 back in 2001. As all of you are so well aware, these centers are making a difference by attracting bright young men and women into hard-to-fill careers.

Recently, a survey of the Council of University Transportation Centers found that more than 1,000 graduate and undergraduate students in IT's are currently pursuing civil engineering degrees. Just think about that: more than a thousand; and while that's a good start, it's not good enough. We've got to have more, and we've got to start laying that groundwork today, and that's what this summit is all about. The fact is, developing a transportation workforce for the 21st century has to be a priority, but the solutions cannot be expected to come from Washington, DC. They do have to come from you.

I know from my own experience that the best solutions to local problems come from the local level. That was the thrust of what I was trying to do in ISTEA. I'll give you an example: in the State of California, the local community gets a part of the state gasoline tax, and we had public hearings in the City of San José on where that money should go. We had a list of seven projects that the city council came up with. Then we sat down with Calutrons and they said, "Hey, what about project XYZ?" And I said, "Well, that's number 11." And they responded "Well, can you fund that under your seven?" "No, the priority was these seven, and that was number 11, so we're not going to fund it." So then Calutrons said, "Okay, well, if that's the case, we're not going to fund this project with state money in your area." And we had no way to push back on it. That's why, in ISTEA, I set up NHS and STP so that we would be able to have, at the local level, more clout working with the state in terms of what happens to the money. So we were able to shift that decision making to localities and councils. We gave responsibility to the MPOs that we had in existence, and we used the Metropolitan Planning Commission in the San Francisco Bay Area, which Rod Diridon chaired at one point, as the model of what MPOs should look like across the country.

Now the other part of it I'd like to mention is something that I think was brought up by Janet, and that was this whole issue of "silos." One of the things I had to fight at the Department of Transportation was the silos—FAA, Federal Highway, Federal Transit, Maritime, etc. And I kept saying every week to our senior managers, "One DOT." The whole thing with RITA came about because one time there was a big study about concrete for highways. Then the FAA was doing a big study on concrete for airports. And I said to them, "What's the difference in the concrete that's on a highway versus what's on a runway, except

that one is this thick, maybe, and the other may be this thick?” And when I started to look at this whole thing, there were a lot of research projects among the modes that were really climbing all over each other, and the RSPA had an operating agency involved in it all. And I said, “Why do we have an operating agency in a research and special programs administration?” So we pulled all of the operating agencies like pipeline safety and hazardous materials out of RSPA and made research and intelligent transportation or administration a mode of its own in order to bring more focus to R&D and to the UTC areas. I think that we have to fight these silos.

The other thing I'd like to see happen, and I'm not sure how best to deal with this, but I know when I was at Berkeley-and I've got to admit, I started out at Berkeley as an aeronautical engineering major until I took calculus, and, at that point, I decided for the safety of the country and my own future, I better find something else to do. But being in the ROTC, and having a minor in transportation, one of the things I really enjoyed at that point was being a member of the student chapter of the National Defense Transportation Association. I don't know how many student chapters there are of APTA or AASHTO, whatever organizations that might be of a national scope, but it seems to me that may be one area in order to try to guide and to encourage young people to look at transportation. Rod Diridon, through the Mineta Transportation Institute, has nationwide competitions on transportation projects and while these are just junior high school students who are doing these things, it does encourage them and spark their interest in transportation.

And the other thing I think we have to do is to be able to show students what the career paths are for transportation. We need to be able to show them how they could become the general manager of a transit district, that you're not going to be just stuck with being a CFO, that you encourage people to come in, and encourage them in terms of a career path so they know that they can advance themselves.

No one appreciates all of this more than our next speaker, Congressman Rahall. Nick Joe and I have been great friends from the time we first met when he came to Congress in 1976. By then I was an old-time member with one term over Nick Joe. But when he first came to Congress, there was no question that he was well-suited for the job. He delved into the committee activities early on; but more importantly, my wife, Deni, and I, count Nick Joe as one of our closest friends.

We have worked closely together on the House Committee on Public Works and Transportation, and Nick Joe has always been a strong voice in Congress, not only for his congressional district, but for West Virginia and for the whole Appalachian region. Before I make way for him, just let me say thanks to all of you for this opportunity to share a few thoughts this afternoon. Travel safely and may God bless each and every one of you, and may God continue to bless the United States. Now, ladies and gentlemen, it gives me great pleasure to turn things over to my very good friend, Congressman Nick Joe Rahall.

KEYNOTE SPEAKER CONGRESSMAN NICK RAHALL

Thank you very much, Secretary Mineta.

I want to join in congratulating all of you who have put this conference together. Certainly, the Norman Y. Mineta National Policy Summit is hitting the nail on the head by facing the crisis we have today in workforce development. From the Mineta Transportation Institute, to APTA, to the Rahall Transportation Institute, to AASHTO—I salute you for taking the time to bring together this most important discussion.

Norm Mineta and I go back over 30 years. I came to the Congress in 1976. I had worked on the staff of Senator Byrd before being elected, and so I was in a position to get my first and second choices for committee assignments when I first came to Congress, and my first choice was what was then called the Public Works and Transportation Committee. My second choice was what was then called the Interior and Insular Affairs Committee. Today, the first is called the Transportation and Infrastructure Committee, where Chairman Jim Oberstar has just recently appointed me as his Vice Chairman, and the second is now called the Natural Resources Committee—I chaired that committee this year. Both committees have been very crucial to southern West Virginia. I chose them because of their jurisdiction and that they are so relevant to the issues and concerns of all of our people in West Virginia.

When I got involved in transportation during my first year in the Congress, I found it my most exciting committee. It was a committee where you could work across party aisles, across philosophical aisles, a place where you could get something done. Norm Mineta was my mentor and associate on that committee. Watching Norm, I saw how you get things done in the Congress. I learned from Norm how to reach across party aisles, and across philosophical differences. I must admit that then I didn't even know what "intermodal" even was. I thought it was part of somebody's body, or our body, or something, until I went to the many meetings that Norm Mineta would call for the development of ISTEA, and to see his explanation of the minute details. He worked on the drawing board, using the charts to show what he meant by "intermodalism," demonstrating his vision for transportation policy into the future of this country. From Norm's ideas, I finally began to realize that it's not just about roadways, and it's not just the concrete that you lay or trying to get from point A to point B. It's so much more, I learned what intermodalism is, and how it guides us all in moving our goods and our people around this country in an efficient manner.

On a daily basis, we hear about public transportation, but mostly we hear about its failures, especially in our nation's capital. We hear about train derailments, overcrowded buses, ferry delays, etc. These events make the news and they draw the public's attention, but they are not proof of the system's failures. They are actually proof of the system's successes.



Figure 14 Congressman Nick Rahall

Transit services are woven so tightly into our nation that they are a part of our history and they are part of our culture. Think about the “Wheels on the Bus” song, probably one of the first songs that any kid in America learns today and one that can drive a parent to the brink of insanity. Trains have long represented possibility and adventure: the “Orange Blossom Special,” the “Wabash Cannonball,” “Let the Train Whistle Blow,” “Night Train,” “Last Train to Clarksville,” and, yes, “I’ve Been Working on the Railroad”—all these songs bring up the view of transportation and moving around our country.

We take our transportation system for granted, as an ever-running cog in our complicated society, because it is so successful in keeping our economic engines purring. However, sometimes I think that we forget that public transportation is one of the greatest public services that any government can provide. It ensures that a nurse gets to the hospital for his or her shift. It enables the working parent access to a daycare center, and it delivers the student to class on time. Public transportation is the great equalizer, allowing even those of modest means to get an education, to get a job, to build successful careers, and to earn decent wages.

On a micro level, public transportation is a vehicle for achieving the American dream, and everyone who makes those trains run on time, everyone who drives to work, or who pilots the ferry is helping to make a difference in the lives of others. I think the highest calling is to work in public service. For example, you can see it when you think about the role of Amtrak during the Katrina disaster, when the Amtrak conductor was able to bring people out of that disaster and deliver into the area much-needed medical supplies, critical food and water resources. You can see it in New York City, on that tragic day of September 11, about the role of the subway conductor who independently chose to halt the train and not continue on to the World Trade Center stop on that morning.

This conference is about that calling, about all these noble activities of the American citizens involved in transportation. At this point, you've all heard the statistics: Norm mentioned them to you and Bob mentioned them to you. You've heard them on this morning's panel regarding the percentage of the federal workforce that will retire in the coming years. The baby boom is quickly turning into a bust for the transportation workforce.

Our last transportation authorization bill, SAFETEA-LU, included several training and educational programs that my colleagues in the Congress felt were important to put in place over the next five years to help stem the tide of workforce shortages that we are now facing. We continued the flexibility that began with Norm Mineta. We authorized them to spend program funds on educational opportunities spanning all grade levels and target career transportation workers. SAFETEA-LU also authorized a host of other transportation workforce programs aimed at encouraging our best and brightest to seek graduate degrees as well as establishing a campaign in our elementary and secondary schools promoting awareness of transportation centers. We need students building these transportation models, as I've seen them do at RTI and in the classroom. We need them to go out and put them into practical use on the ground in real time.

The Rahall Transportation Institute, I'm proud to say, was awarded its first patent this year in light-emitting ceramic-device technology, an achievement that "illuminates" the exciting career opportunities for someone with an advanced degree in the transportation field.

SAFETEA-LU also authorizes scholarship and mentoring programs through non-governmental organizations and the operating administrations within the U.S. DOT. It allows states to use money for workforce development and training. These core state program funds will teach workers, promote transportation-career activities, student internships, and support our universities. Possibly the best workforce-development tool that SAFETEA-LU authorized was the university transportation centers (UTCs). SAFETEA-LU expanded the UTC program to 60 universities, and more than doubled the funding for these centers of excellence.

In Huntington, West Virginia, the home of RTI, it's not easy to move mountains-just ask our coal industry. But under the guidance of Senator Plymale, RTI is working hard to do just that. It has already contributed to inventories, capacity, and sustainability assessments of several public-transit assets. Their planning and technology developments have the potential to improve security of public transit and solidify their role in responding to and recovering from natural disasters across our country. While the challenges of solving our problems in transportation workforce development are great, they are not insurmountable.

As I conclude, let me thank you for a conference of this nature. You have brought the important stakeholders: those who figure out the solutions, go back, and implement them. I also want to thank my good friend, Norm Mineta, who's been in West Virginia and has been on every mode of transportation we have. He has been at our airport, bringing grants to help improve our response to disasters. He has been on a coal truck down the Tolsia segment of the

King Coal Highway. I'd also like to thank Bob Plymale again for all he does directing the Rahall Transportation Institute, and to each of you. Thank you for what you do. Keep up the great work and God bless you.

QUESTIONS AND ANSWERS: ALL SPEAKERS

SENATOR ROBERT PLYMALE

Let me talk a little about the this symposium. This is the first in a series of workforce summits that the UTCs like the Mineta Transportation Institute and the Rahall Transportation Institute are doing. There will be one in the spring in the Boston or Amherst area. I know that we at RTI will be helping to support it. Workforce development is a key issue, and we certainly need to look at these regional meetings to try to get an understanding of what's happening nationally. With that, are there any questions?

KAREN RAE (NYS DOT)

If you could, please talk about attention between the work environment and college and school recruitment, especially looking at working conditions. Are there any thoughts or ideas of how those of us in public service can act to augment our ability to hire and attract? How might we be doing different things?

DR. DIANA LONG

I don't have an answer for you, but one of the questions we asked in all of the 16 states that we interviewed the DOT personnel in the Southeastern Association was "If you could do anything that you wanted to do, that's possible today to do, what would it be?" Every single one of them just about said eliminate the civil service system. It's killing them. So misery loves company.

AIDA DOUGLAS

I'm with Capital Metro in Austin, Texas, and I actually flew in so I could hear all of you today. I'm in the Leadership APTA class of 2007, and our group focused on leadership, the next generation, and a lot of what I heard today, we discovered through the research that we conducted this year. But one thing that I wanted to share with you, as a member of Generation X and the others coming behind me, one of the things that I didn't hear today is the fact that we're over-concentrating recruitment and retention in the transportation engineering type of fields. Our industry is made up of many different fields, and I have a business background with a master's in public administration. I think we need to reach out to all the other fields out there. Through the research that we conducted, we found that about 53 percent of those surveyed never even thought of transportation as a field they would go into. In addition, I also have a question for Mr. Hynes.

You mentioned about the Presidential Management Fellow, and I wanted to ask you how that is something that others can pursue, not necessarily in the FTA area, but is it something that can be applied to by anyone else?

RON HYNES

The answer to the first part of the question is that transportation does offer all those things. We work with UTCs, and when they say, “We don’t do much transit work because we do electrical engineering work,” just say, “There are all kinds of applications for any discipline in transit systems and transportation,” especially when we get into aviation and those other fields.

As for the PMF, it’s a program of Presidential Management Fellows. It’s kind of a competitive thing to get listed as a PMF, and they have job fairs just for the PMFs. Once in the program, they are allowed details when they transfer to different parts of the government, not just in transportation, but other parts of government, and they have opportunities for continuing education, and there’s a planned advancement. I can tell you more about it or who to contact for more information, but it’s a government-wide PMF program.

SECRETARY NORM MINETA

Aida, could you sort of describe that picture you drew for me of a bridge and all the supports to the bridge? I think that’s really a great illustration of what ought to be done.

AIDA DOUGLAS

Actually, when Janet was speaking, she made a reference to the fact that you have to have public relations skills as we communicate our mission to everyone else, and it made me think of a bridge—transportation being a bridge with all the different pillars. Now with the ideas of making sure that all of our bridges in the nation are up to par, it made me think of the different pillars that our industry has to have. You have to have the technical in the middle, and have your management. You have to have your PR and all the other fields that go along with that, so I think that’s what makes the bridge steady.

SECRETARY NORM MINETA

Maybe what you’re saying is our workforce-development program is structurally deficient.

MINNIE FELS JOHNSON

I’m the national Chair of Project for Public Spaces, but I’m also a former general manager for some 15 years in the Dayton region. While we suffer this tremendous gap in finding the

proper workforce that our industry needs, who is working on retention of the baby boomers? Or are they just being put out to pasture and let go? There is a vast amount of knowledge that's out there, and people who still have some 30 years left in life and who don't want to just play golf all the time. Where do they go when they can retire or need to leave their jobs? There is this tremendous amount of knowledge that is there that is untapped, and I'm wondering who focuses in on that kind of resource while we also build the base and solve some of these functional/structural issues?

DR. DIANA LONG

In the study we did in West Virginia, in reviewing all those other states, some of the best practices, I believe in Missouri, they've implemented some step-down programs where someone who is eligible to retire declares how long they still want to work, and they negotiate a salary package with a different benefit package.

There's another example of where they transfer the work over to one of their contracting engineering firms, and that person then became under the private salary but assigned to state department project work, so they kept that history and that talent within them because the person was still going to work anyway, so they established some of those partnerships with their major contractors, and actually, as part of the bid processes, you can agree to do this.

MINNIE FELLS JOHNSON

But you see my point: somebody may live in Dayton, Ohio, for example, and would be willing to move to Missouri at this point in their life if there is a great opportunity. But because they have this vast amount of knowledge, losing them is a serious blow for the institute they work for. There is this narrow focus on "from cradle to grave," but there is no real strategy; part of it may have to do with America and how we view the aging population as throwaways. There is no real strategy to plug holes and there is no real national bank of people to put their names on lists to provide their technical expertise. We should be able to deploy them to certain places for two or three years. We are so used to working in the format that you describe if you live in a particular state where they have these specific programs, but we need a national strategy to deal with this.

DR. JOHN COLLURA

I'd like to add to the thought regarding how to take advantage of having experienced personnel leave before they retire, and how you lose their experiences, their insights, and so on.

In Massachusetts, like so many other states, there is a local technical assistance program known as LTAP. It's funded by the Federal Highway Administration and is geared toward training local public works officials, highway superintendents, etc. It has been such a successful

program that the Massachusetts State DOT established a state-level technical assistance program for training state transportation officials. What both the LTAP and the state technical assistance program have been doing over the last four or five years is hiring retired officials to serve as instructors in courses for individuals who are still working in the state and local transportation agencies. That's been one way to take advantage of those who have experience and have a lot of knowledge that some of the younger new recruits don't have. It could be something that many other states consider doing because they have the Federal Highway Administration's LTAP resource.

MINNIE FELLS JOHNSON

I just simply offer this as a national strategy that's something that we can focus on, and I can speak from a personal standpoint. I'm retired and I've held a cabinet post, I've been a general manager, I've run practically every kind of system there is, and I have a Ph.D. I'm over-qualified and I found my way into this new strategy that I'm working on, but not a single call ever came. Now I know how to pick up the phone and call. I thought about what other people do when they retire, and how they are just left to die.

SECRETARY NORM MINETA

From a federal perspective I think that's something that would have to be handled by the Office of Personnel Management, OPM. There are problems that have to be overcome, but the issue comes down to seniority, and what kind of bumping rights there might be if you bid as a DOT employee for a Department of Energy opportunity that you might see, and whether or not a DOE employee would have first preference over a non-DOE job. So I think the only way to handle it at the federal level would not be at the federal departmental agencies but at OPM. It would be OPM's job to chart out all of the alternatives, and then you'd have to satisfy SEIU, ASPI, NTEU, all of the federal unions in terms of making sure that there aren't any people who fall between the cracks.

MINNIE FELLS JOHNSON

What if the job is not a union job, and somebody just put their name on a list, in a national place, on some Web, or somebody who controls that, and different properties can go and find this chief engineer that they're looking for. There is no place to go for that, and so there are certain areas that you can get out of the logjam, and I am not aware that there is any kind of system to deal with this issue.

FORREST WILLIAMS

I'm a member of the Santa Clara County VTA board and a San José Councilmember, but I'm also a retired engineer. I have a doctorate degree in electrical engineering. I worked at IBM for 35 years, Boeing for six years, and General Electric for six years. I was in the wave of this Sputnik era, when we said we were going to put a man on the moon, I started out as an electrical engineer, and evolved, due to the changes in technology, to computer science. Engineering is just a discipline: it teaches you how to approach a problem and it teaches you the fundamentals. So, in life, your career will change, but the skills are still there, depending on what it is you want to do. I'm excited now because we have a challenge like Sputnik—we have global climate changes that are impacting us. I think, in the transportation industry, we've got to package it, and bring that enthusiasm with us.

When I talk to individuals about transportation as a career, the first thing they think about is railroad tracks and trains. But we are so far advanced with the technologies that we have today, for example, where is the train? When will it get to point A and point B? Will it be on time? Will it be late? All of those technologies are there. So we can sell the future with enthusiasm, and talk to people about what it is, and I think that's one thing that we need to do.

One thing that I hear us talk about is engineering versus paraprofessionals or technicians. The question I've got is what program do we have for the junior college levels like for a journeyman type of job? A plumber, electrical, transportation technician—those are the types of things where we can get people who could move forward and increase their education as they earn.

SECRETARY NORM MINETA

As I understand it, one of the things that the high school graduate of today can expect in their lifetime of employment is going to go through six career changes, not six job changes, but six career changes, and I think you hit the nail on the head when you said community colleges will probably have to provide that kind of continuing education for our workforce. But the other part that really disturbed me this morning was, because our population growth is 1.2 percent, that's essentially a no-growth policy. So we really have a shrinking work force out there. So it's not just transportation, it's health. It's all sectors of our economy trying to get seven gallons out of a five-gallon tank, and so I think that may be part of the reason for six career changes because people find that opportunities in one area are not developing, so they figure, "Well, I might as well try somewhere else." And so, to me, I think that community college resource is probably going to have to be expanded in the future. I think you'll also see companies like Strayer and Phoenix and others who are private universities trying to fill those gaps as well, because the community colleges and public universities haven't been able to fill that gap. But I don't know who can always afford the \$30,000–\$40,000, whatever it is that a Phoenix or Strayer or other schools might cost in terms of getting that continuing education

for them to transition from one career to another. But, again, it is a vital component of what we have to face.

FORREST WILLIAMS

The reason I was thinking of the junior college level is that with the product cycles of things today, it's quick—there is a rapid cycle for development into the marketplace, and then we all move on to something else, and if the economy turns slightly, there is a need for skill redevelopment. And many times, to get the quick turnaround, two years of junior college is much quicker than say, taking electrical engineering. So you can hone those skills and make those adjustments at the junior college level quickly, so as you look at the return of the economy when it turns around, now you have a skill level for what the future may be.

SECRETARY MINETA

Forrest, you were there in the nuclear energy division of General Electric in San José when it had a workforce of 10,000 or 13,000. That workforce is now 800 people, and all they're doing is training how to operate nuclear power plants safely. And we have no nuclear power plants envisioned for construction, and yet there seems to be more public acceptance of maybe the possibility of nuclear coming back. But Westinghouse is gone. GE is gone. Are we going to put our energy for the future in nuclear, in Toshiba, or Hitachi, or somebody else?

DR. JOHN COLLURA

I'd also add that in Massachusetts, we have used the local technical assistance program to address some of the so-called paraprofessional needs—training staff at the local level traffic signal technicians, highway maintenance crews on patching potholes, and subject matters that typically aren't within the curricula at a university but can be placed fairly easily into a local technical assistance program. I know that there are some states that have looked at the possibility of integrating that into community college programs, but institutionally, it's a little bit more challenging. And it's just a matter of the state DOT working with the LTAP to figure out what basic needs are unmet, and what they have to do to meet them.

BARRY BARKER

I'm with TARK in Louisville, Kentucky. I want to talk for a minute about entry-level jobs—the bus operators, the vehicle operators. What's happening is that a lot of transit authorities came into being in the late 1970s, and we're hitting that 30-year mark where folks can typically retire, irrespective of age. We've got 50 of our bus operators—50 out of 450—who could walk in tomorrow and say, "We're out of here." We are trying to figure out how to respond to that.

The other piece is that many of us fought hard to get part-timers, and what that has evolved into—folks come in initially as a part-time bus operator, and then work their way to full-time, and I'm not sure we're attracting the best people with that. It is saving through operating costs in the short-term that I don't know helps us in the long-term.

And then the extent to which we still have this ethic about promoting from within, and giving bus drivers and entry-level mechanics a way to move up in the operation. How do we support that? The question was asked about tuition-reimbursement programs, and many of us stuck our hands up, but this might be a much more robust approach to being able to do that, particularly in a time of tight funding.

SECRETARY MINETA

Are there any joint programs with unions, with the Teamsters, or somebody to do apprenticeship training? We know the electrical union does that. The plumbers do that. Anything with the mechanics or bus drivers?

BARRY BARKER

We're developing some of those programs in conjunction with the unions. For example, one of the things that we've worked out with our union is for each ASCE certification that a mechanic gets and retains is worth a nickel an hour, and there's up to eight of those. Not massive amounts of money, but it's an attraction of another forty cents an hour that they can work their way into.

RON HYNES

The FTA has a program with the CTDC, Community Transportation Development Corporation, to train bus mechanics and some light rail mechanics. It has to do with standardization of tests for certification and skills, and the idea is, as Barry says, that they reap a reward from getting more skills, and they also would reap some satisfaction from gaining more skills.

One thing we're looking at is if we introduce a hybrid bus that costs maybe \$350,000, what is the skill set to maintain that bus? There are more critical parts that can break, and we don't want to fix it through trial and error. These things are very expensive, so we want to get it back in service. So how do we train a new workforce that's engaged, interested in their job, and finds it rewarding beyond the union contract. How do they find the job rewarding so they want to go into it, want to stay in it, and accelerate their gaining skills in that area?

BARRY BARKER

It was 20 or 25 years ago when I first started interacting with mechanics. I heard a lot of them say, “Look, I’m a mechanic. I’m not an electrician.” But today, you have to have electronic skills to even get anywhere near any of these buses to diagnose what’s wrong with them.

DR. DIANA LONG

I’d like to add that I think part of the solution is a call to action on the education and training providers. When you have education services that can provide lifelong learning requirements for a bus driver or a mechanic hired 20 years ago, then they can be trained as an ASE-certified diesel mechanic today, or for the new hybrid buses, at your local community colleges and technical schools. I think we need to call on the education providers to serve industries that are in constant need of training for their employees. Be persistent, and keep calling for these types of things.

GEORGE KARBOWSKI

I’m the Director of Operations and Maintenance with Foothill Transit in West Covina, California. I’ve been in this business about 30 years, and the way I got started was quite by accident. I was really kind of disgruntled with my current employment, and I opened the newspaper, and there was a full-page ad—the SCRTD in Los Angeles at the time was hiring mechanics. Even though I was a mechanic, I never considered the transit industry. We’re all about people, and the face and the heart and soul of every transit company in this country is the operator and the mechanic. That’s who we really are. Most people don’t have any idea who the engineers and executives are, but they know that operator who picks them up every morning. If you look at the ability and the skills required of our operators and mechanics today, they’re on par with what fighter pilots and engineers needed in the 1940s and ‘50s, and they’re operating and maintaining vehicles and systems that are exponentially more expensive and more complicated. Right now, the big buzz term is global warming, and the impact that emissions have on our serious climate problems. When we think about alternate fuels, we say “What a great thing!” But, in reality, the biggest impact on emissions from automotive and heavy-duty vehicles, and particularly transit buses, has been the development of onboard microcomputers to control the engine, and it has gone way above and past electricity. It’s into electronics, and it’s into IT. Our operators and mechanics really need to know that they’re part of this effort to maintain these vehicles, and we have to start looking at the high schools. Sure, we’re looking at engineers in the colleges and the junior colleges, and we have to look at the high schools. Let’s face it. There are a lot of people out there who may go to a trade school but are not going to go to college. Generally we say if you can’t get a job, be a bus operator, or be a mechanic. Well, that’s not the case any more. So I urge you to make sure we don’t overlook the heart and soul of our transportation organizations.

OLIVER DAVIS

I'm the Chair of the Board of South Bend Public Transportation, and I would like to ask Janet Oakley about whether moving less-experienced workers into leadership is a strategy and what are some of the ways that you've seen people be able to do that without hurting the agency? If you move less-experienced people into the leadership, and replace people who have had the 20 or 30 years of experience, what are some things that you have seen people do to protect the agency? In addition, when you move people into leadership positions so as to have younger leaders, what are some things that are being done to help to motivate and aide these young leaders in their new positions?

JANET OAKLEY

What a number of the states have indicated among their strategies are rotating assignments, challenging assignments, not being wedded to sort of moving people directly up through the ranks. You see now people being plucked, but people being plucked after programs of mentoring and partnering, challenging assignments, rotating assignments, and the ability to not be strictly wedded to that seniority. The ability to move people, to give them formal training as well as the mentoring and the partnering is key, the is the flexibility to be able to creatively reach vertically and horizontally, to pull out the leaders and groom the leaders.

Particularly with the younger generation, offering an improved quality of life is of great importance. We talked this morning about working with your icons, having and giving opportunities, challenging assignments, and the opportunity to work with, alongside those icons. Aida talked about her project—that's a leadership grooming program, and APTA also has a leadership program. That's part of what national associations can do, but there is also a lot of hands-on within each organization that you need to do, to have the flexibility to move personnel within your organization to find and groom the leaders for tomorrow.

SENATOR ROBERT PLYMALE

Ron, how do you identify leaders in trying to groom your new management? Do you have any specific ways?

RON HYNES

Much like any organization, you see spots where people can advance, and you try to give them the freedom to advance. Our program has grown so much in the last five years, and the number of full-time employees that we're allowed to have has actually declined in the last five years by a handful. For instance, we have a brand-new program under SAFETEA-LU for hydrogen fuel cell development—\$49 million over the life of SAFETEA-LU—and not one new person to help us do that. Right now, we have about 200 active research projects, so it's

kind of almost like battlefield promotion, where a new hire may step into some things and kind of get pushed into doing more than they would have 10 years ago. When you are selective when you hire, and hire the very best, the people who really care about what they're doing, and who really like their job, they can be given some freedom and some autonomy, and they dig into it. When I go home at night, I have to get some people out of the office. I kind of call over the cubicles, "Let's go," because I don't want my employees to burn out. But I'm really encouraged by how hard our people work, and how much they really get into what they're doing.

With the last Presidential Management Fellow we hired, I had our office director go to the job fair and take one of the people who run our UTC program with them because they'd be working with these people. I wanted everyone, from the ground up, to be involved in the selection process. My quote to them on the way out the door was, "I don't care if they have a degree in home economics. I want a passion for transit," because it's really what they care about doing, and we can always just teach them the skills and what they need to know, but you can't teach passion for their job.

JANET OAKLEY

I don't want to date myself, but I am actually a product of Senator Dole. When Senator Dole was secretary, Dole had a transportation management initiative for women. I'm a product of that. I was able to blaze a little bit of trail, and went to the Transportation Appropriations Committee on the House side with Tom Kingfield and Greg Dahlberg. Now it's routine to send people, but in the spirit of one DOT, that was a tremendous opportunity because people did have assignments all over the department and were able to go from highways to maritime. There were tremendous opportunities there to give people the exposure and mentoring, so it provided an opportunity for the employee and provided an opportunity to really work on those silos by giving people exposure across modes.

SECRETARY NORM MINETA

It also has its downside because we had two interns with Senator Kit Bond, and they'd been there about two years, and I said I needed them because this was when we were trying to bring closure to SAFETEA-LU, but Kit Bond just beat me over the head about it. "No, I don't want this person to go back to DOT at this point." So we kept them there for another year.

CHUCK HARVEY

I'm the Chief Operating Officer for the San Mateo County Bus System and the Caltrain Commuter Rail System in San Francisco. I'm a product of the community college system. I started out as a frustrated history teacher from San José State University, and then went back to school because there were no teaching jobs in California. I got a certificate in

electro-mechanical drafting and went to work for a vehicle manufacturer and then went over to the operating side, and then went back to night school. So I understand this need to retool our workforce, and I think we're missing a hook.

When John Sculley, who was the president of Pepsico at the time, was being recruited by Apple Computer to go to work in the computer industry, Steve Jobs asked him to come to work for Apple, and he was on the fence because he knew he was probably going to become chairman of Pepsico at some point in time. Steve Jobs said to him, "Would you like to sell sugar water for the rest of your life? Or do you want to have a chance to change the world?" And Sculley quit Pepsico and went to work for Apple, and, of course, there's another whole story behind that. The point is that we need a hook in transportation, a unified message, something that really grabs onto what's happening out there in the world of transportation today. We have tremendous problems in transportation, whether it be rail, freight, public, or air. To attract the best and the brightest in the country, we need a hook, something to get folks to want to come to work for us. It's impossible for us to find good, qualified, skilled workers in the San Francisco Bay Area with the cost of living being what it is, so I just think the industry needs to work hard on coming up with that big hook.

SENATOR ROBERT PLYMALE

In response, Congressman Rahall, I would like for you to highlight some of the things that are happening in terms of what you've seen in the transformation. We've had workforce issues which are very similar across the board, not just in transportation but in mining and things like that. You could talk about some of the innovative ways they're looking at public—private partnerships, and the way they've used workforce in that realm, as it relates to Southern West Virginia.

CONGRESSMAN NICK RAHALL

We have had quite a transformation in our workforce in West Virginia just in the time that I've been in office. For the last 30 years, we've seen our workforce dwindle throughout the coal fields because of mechanization and the technologies that have come online that have replaced man- and woman-power in our coal mines, which has in turn caused massive layoffs. We have the talented workforce in our state, and today we seek new ways of training and retraining and of putting them back to work. Our coal mines are hiring, probably more today than they have in recent years, but they're hiring a more specialized type of miner that makes good money, and they're not having any trouble finding people who want to work in the coal mines.

Where we also are being more innovative, in the public—private partnerships in the deep South, where our terrain is very difficult and it costs so much more to build a mile of highway versus a flat state, we've had to come up with more innovative ways to use scarce federal dollars. One of those ways has been through partnerships with coal companies and economic

development authorities in the southern counties, many of which use mapping plans and land use plans developed by you and RTI. We aid a mining company in the building of a roadbed to allow the coal company to go in and allow the coal company to mine the coal and get whatever it can out of a seam, and then they leave the road in condition for the Federal Department of Highways and/or state to come in and lay the road with fewer federal or state dollars involved in that process. And it puts people to work, and it gets the job done a lot quicker and, in some cases, can cut through some of the bureaucratic red tape that they would have to otherwise wait on from the federal government.

Now there are problems, of course, with Davis-Bacon, as we've seen in recent weeks, with the federal decision that companies have to pay prevailing wages to these workers, so we're going to have to see how that plays out in the months and years ahead, but they're being innovative, creative, and trying to get things done, not just sitting back and waiting for Washington to do it all.

AIDA DOUGLAS

Leslee has a copy of the presentation, so if anybody wants to get a copy of that I'll be happy to give you my business card. I think, trying to catch on the hook that somebody mentioned earlier, the slogan we came up with was, "Use your skills. Use your degree. Save the world. Careers in transit." And it ties to every one of the areas that transportation touches—from mechanics, operators, and to the administrators.

DR. ASHA WEINSTEIN AGRAWAL

I don't know if it's a question or a challenge to the room, but listening today, I think it's really interesting to think about how we've all talked about different aspects of workforce development, starting from retraining very senior people who may want to continue working but perhaps in a different capacity all the way down to recruiting junior high students. It seems like we have many organizations working on different pieces of this, committees interested in it, but it would be wonderful if somebody, some committee, some university transportation center, could take on the role of really trying to put together a leadership position, looking at all these different efforts, and provide a more centralized source of information for people to go to when they want to learn more, get more information, and get support on these issues.

The other thing I would just say, for those who have any political power in the world, the university centers really do a lot with very little money, and I actually think I am, in a way, a good example. I had no particular transportation background, although I had had a congestion pricing paper I did as a planning master student, and I thought that was kind of interesting. I went to Berkeley. I talked to the graduate advisor. I said I wanted to do a Ph.D. program at Berkeley in planning, and "oh, by the way, is there any funding? I'm kind of interested in

urban design and maybe transportation.” And the graduate advisor said, “Well, the only students that get any money are the transportation students. There is this university transportation center.” So I dutifully wrote my college application essay saying I longed to be a transportation professor some day, and I got in, and Berkeley offered me \$5,000. It was not very much money. It was basically tuition for one year, but that was enough. It got me in the door. It got me working in transportation. And so I would urge you all, to the extent you can, to really support these centers because they can have a very large impact with a relatively small amount of resources.

SENATOR ROBERT PLYMALE

John Collura and I co-chair the Workforce Development Committee for CUTC, and we’ve called it “STEPS”—seamless transportation educational portals. You have to have all these portals working together to be able to get the necessary workforce. We talk about the community technical college and junior colleges. They have to have something. That’s supposedly your quick fix when you’re talking about diesel mechanics or anything with hybrid, you’ve got to have all of those coming together, and then you build on those as certificates, as they get a two-year degree that works into a four-degree that may work into something else. I think that what I’ve seen in the last two years is the transportation community starting to come together to say “Hey, we are in this together, and if we’re going to have a workforce in the future, we’re going to have to come together.” It means universities working together and it means us working with two-year institutions. It’s going to require out-of-the-box thinking and it’s going to require doing things that we’ve never done before. We need to change to meet the changing workforce needs, and I think it’s evident in any state that you’re in that we need to start as soon as possible.

ABBREVIATIONS AND ACRONYMS

APTA	American Public Transportation Association
AASHTO	American Association of State Highway and Transportation Officials
Baby Boomer Generation	Generation which is reaching retirement age, born 1943–1960
BART	Bay Area Rapid Transit
CE	Civil Engineering
COMTO	Conference of Minority Transportation Officials
CTDC	Community Transportation Development Center
CUTC	Council of University Transportation Centers
FAA	Federal Transportation Administration
Generation X	Generation born from 1961–1982
Golden Age	Employees over age 60 who are eligible to retire but for a variety of reasons choose to continue working.
ISTEA	The Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
LTAP	Local Technical Assistance Program
Millennial Generation	Generation born from 1982–2002
MPO	Metropolitan Planning Organization
MTI	Mineta Transportation Institute
NHS	National Highway System
NTEU	National Treasury Employees Union
NYSDOT	New York State Department of Transportation
OPM	U.S. Office of Personnel Management
Paraprofessional	Individual trained through a certification program to do a particular job
PMF	Presidential Management Fellow
RTI	Rahall Transportation Institute
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SEIU	Service Employees International Union
TCRP	Transportation Cooperation Research Program
UTC	University Transportation Institute
UMPTA	Urban Mass Transportation Act
UMPTC	University of Massachusetts Transportation Center
WIA	Workforce Investment Acts

APPENDIX A CONTRIBUTORS

ASHA WEINSTEIN AGRAWAL, PH.D.

MTI Research Associate; San José State University, Assistant Professor, Urban and Regional Planning

Dr. Asha Weinstein Agrawal is the Acting Chair and an Assistant Professor in the Department of Urban and Regional Planning at San José State University.

Her research and teaching interests include transportation finance, transportation planning and policy issues related to pedestrian travel, and transportation history.

She is completing research on “Paving the Way,” a study involving surveys of university transportation programs and current students to determine practical short- and long-term strategies that state departments of transportation, universities, and others in the transportation field can use to attract a larger pool of students focusing on transportation during their academic careers.

In addition to the workforce development study for MTI, she has recently published a major report on transportation finance options for California. Dr. Weinstein Agrawal was a co-author on two major studies at the University of California, Berkeley, that investigated future transportation finance options for the State of California. She was also the principal investigator in a study of the equity of high-occupancy toll lanes conducted for the Santa Clara Valley Transportation Authority.

Dr. Weinstein Agrawal received her Ph.D. in urban planning from the University of California, at Berkeley, her master’s in urban planning from the London School of Economics, and a B.A. from Harvard.

DR. JOHN COLLURA

Professor of Civil and Environmental Engineering and Director of the UMass Transportation Center

Dr. John Collura is Professor of Civil Engineering at the University of Massachusetts, Amherst, and serves as the Director of the UMass Transportation Center. From 1998 to 2004, Dr. Collura was a Professor and Director of the Advanced Transportation Systems Infrastructure Programs at Virginia Polytechnic Institute. Dr. Collura has been teaching and conducting transportation research for more than 30 years and was the co-founder of the LTAP program at UMass back in the mid-1980s.

Dr. Collura's current research interests include the planning and deployment of ITS applications in the areas of electronic payment systems, transit signal priority and emergency preemption, and traveler information systems. He is a registered professional engineer (P.E.) and has been active with ITS America, ITE, and ASCE. Dr. Collura has taught courses in transportation engineering, transportation systems analysis, public transportation planning and operations, and intelligent transportation systems and has authored book chapters as well as more than 100 journal articles and technical reports.

Monographs and book chapters by Dr. Collura include *An Analysis of the Characteristics of Emergency Vehicle Operations*, *Transport Science and Technology*, "Information Technology Innovations in Public Transportation" (from *Transportation Engineer's Handbook*), and "Pavement Management Applications Using Geographic Information Systems" (from *NCHRP Synthesis of Highway Practice 335*).

ROD DIRIDON, SR.

MTI Executive Director, Council of University Transportation Centers (CUTC) Chair

Mr. Diridon is considered the father of modern transit in California's Silicon Valley. His political career began in 1972 on the Saratoga City Council. Because of term limits, he retired after five terms and six times as Chair of both the Santa Clara County Board of Supervisors and the Transit Board. He is the only person to chair the nine-county, 110-city, 27-transit district San Francisco Bay Area's three regional governments: Metropolitan Transportation Commission, Bay Area Air Quality Management District, and Association of Bay Area Governments.

Mr. Diridon has chaired over 100 national, state, and local transit programs. He is Chair Emeritus and the Governor's appointee to the California High Speed Rail Authority Board and Vice Chair of the national High Speed Ground Transportation Association. He chaired the American Public Transit Association and was Vice Chair for the Americas of the International Transit Association in Brussels and continues as a Director. He chaired the National Association of Counties' Transit Committee, advised the Federal Transit Administration, and chaired the National Research Council's Transportation Research Board's Transit Cooperative Research Program.

Mr. Diridon is the Executive Director of the Mineta Transportation Institute and chairs the Executive Committee of the national Council of University Transportation Centers. He also serves on the corporate Boards of Directors of the San José National Bank and the Empire Broadcasting Company. From 1969 to 1976 he founded and served as President of the Decision Research Institute, which developed a "shared survey" research procedure adopted by UNICEF. He frequently provides testimony to Congress and speaks throughout the world on sustainable transportation. Mr. Diridon earned both his B.S. and M.B.A. from San José State University, has been listed in *Who's Who in America* since 1974, and is cited by the

International Metro Magazine as one of the 50 who have influenced mass transit most in North America in the past century. The main train station was rededicated the “San José Diridon Station” upon his retirement in 1994 from elected office.

RONALD E. HYNES

Federal Transit Administration, Deputy Associate Administrator for Research, Demonstration and Innovation

Ron Hynes joined the FTA in June 2005 as Deputy Associate Administrator in the Office of Research, Demonstration and Innovation. The FTA’s research office has 41 employees who produce relevant research products that include such topics as fuel cells, international studies, and improved transit operations.

Mr. Hynes has nine years in government service; he came to FTA from the National Transportation Safety Board where he served as Associate Director of the Railroad Division in the Office of Railroad, Pipeline and Hazardous Materials Investigations.

Before joining the federal government, Mr. Hynes had 25 years of experience in the railroad industry, touching upon virtually every aspect of railroading. He served as a superintendent for a railroad and was responsible for safety, train dispatching, and employee development and training.

Mr. Hynes has a B.S. in Mechanical Engineering Technology from Youngstown State University in Youngstown, Ohio, and has done graduate work at Kent State University.

DR. DIANA LONG

Workforce Development Coordinator, Nick J. Rahall II Appalachian Transportation Institute

Dr. Long has been involved in the field of workforce development for over 30 years. Her expertise has been focused on the development and implementation of training programs to meet the needs of industry. She has been a strong advocate for treating education as an economic development issue, and firmly believes in the concept of developing the workforce to develop the economy of an area.

Dr. Long completed all of her education in West Virginia and pays alumni dues to several institutions. Her undergraduate degree was earned at Morris Harvey College, her M.S. in Technical and Adult Education was from Marshall University, and her Ed.D. from West Virginia University.

She is the only educator in the state to complete the requirements for a Certified Economic Developer from the International Economic Development Association.

She has worked for the Government Services division of RCA, Kanawha County Schools, Office of Technical and Adult Education, and a couple of divisions of Marshall University.

She is a board member of the National Academy Board for Manufacturing and Engineering, the Chemical Alliance Zone, and Godbey Works. She has limited consulting contracts with private industry for management training and the development of trainers from skilled employees.

At RTI, Dr. Long serves the role as the token right-brained person and spends her time working with the researchers and engineers in developing training programs and learning components for ongoing RTI projects.

WILLIAM W. MILLAR

American Public Transit Association (APTA) President and MTI Trustee

William W. Millar is President of APTA, North America's foremost organization dedicated to the advancement of public transit. As Chief Executive Officer of APTA since 1996, Mr. Millar is credited with re-energizing the organization. Membership is at an all-time high and attendance at APTA meetings is at record levels.

Prior to joining APTA, Mr. Millar was Executive Director of the Port Authority of Allegheny County in Pittsburgh for 13 years. As head of PAT, one of the Country's largest public transit providers, he directed a system that operates bus, light rail, exclusive busway, demand-response, and inclined plane transit service.

After completing his B.A. at Northwestern University and his M.A. at the University of Iowa, Mr. Millar began his career as the transportation planner for Lancaster County, PA. This was followed by his position at the Pennsylvania Department of Transportation to develop and manage Pennsylvania's Free Transit Program for Senior Citizens as well other transit aid programs.

Mr. Millar's philosophy has been to build partnerships by working together with organizations traditionally associated with transportation as well as those typically not connected with transit. Mr. Millar led the APTA organization in working with this broad coalition of interests to vigorously make the case for transit to Congress and the Administration.

Mr. Millar is a nationally recognized expert in public transit. He has traveled and spoken extensively throughout North America and internationally promoting public transit. He is the recipient of many awards and citations, including the prestigious Jesse L. Haugh award for Transit Manager of the Year.

Transportation research is of special interest to Mr. Millar. He is the founder of the Transit Cooperative Research Program and is active in the Intelligent Technology Society of America (ITS America), the Transportation Research Board and the Transportation Technology Center,

Inc. He has written numerous articles and serves on advisory boards of university transportation programs in various states including California, Colorado, New Jersey, North Carolina, and Pennsylvania.

SECRETARY NORMAN Y. MINETA

Hill & Knowlton Vice Chairman

Secretary Norman Y. Mineta is Vice Chairman of Hill & Knowlton, based in its Washington, DC office. Mineta provides counsel and strategic advice to Hill & Knowlton clients on a wide range of business and political issues.

Secretary Mineta is well-known for his work in the areas of transportation, including aviation, surface transportation, and infrastructure—and national security. He is recognized for his accomplishments in economic development, science and technology policy, foreign and domestic trade, budgetary issues, and civil rights.

For almost 30 years, Secretary Mineta represented San José or the South Bay area—first on San José’s city council then as mayor—and from 1975 to 1995 as a member of Congress. Throughout that time, Mineta was an advocate of the burgeoning technology industry. He worked to encourage new industries and spur job growth, and he supported the development of the infrastructure to accommodate the industry and its tremendous growth.

Secretary Mineta served as the Chairman of the House Transportation and Public Works Committee from 1992 to 1994, after having chaired the Subcommittee on Aviation and the Subcommittee on Surface Transportation. He was the primary author of the groundbreaking ISTEA legislation: the Intermodal Surface Transportation Efficiency Act of 1991. In 2000, Mineta was appointed by President Bill Clinton as the U.S. Secretary of Commerce. At the Department of Commerce, Mineta was known for his work on technology issues, for achieving international cooperation and intergovernmental coordination on complex fisheries issues, and streamlining the patent and trademark process.

Secretary Mineta was appointed Secretary of Transportation by President George W. Bush in 2001, where he served until he joined Hill & Knowlton in July 2006. Following the terrorist acts of September 11, 2001, Mineta guided the creation of the Transportation Security Administration—an agency with more than 65,000 employees—the largest mobilization of a new federal agency since World War II. Secretary Mineta was also a Vice President of Lockheed Martin, where he oversaw the first successful implementation of the EZ-Pass system in New York State.

Recognized for his leadership, Secretary Mineta has received numerous awards, including the Presidential Medal of Freedom (our nation’s highest civilian honor), and the Wright Brothers Memorial Trophy, which is awarded for significant public service of enduring value to aviation in the United States.

While in Congress, he was the co-founder of the Congressional Asian Pacific American Caucus and Chair of the National Civil Aviation Review Commission in 1997. He is a graduate of the University of California, Berkeley.

JANET P. OAKLEY

American Association of State Highway and Transportation Officials (AASHTO) Director of Policy and Government Relations

Janet Oakley joined the American Association of State Highway and Transportation Officials (AASHTO) as Director of Policy and Government Relations in July of 1999. In this capacity she is responsible for managing a national transportation policy development and advocacy program on behalf of the association's member transportation departments in the 50 states, the District of Columbia, and Puerto Rico. Ms. Oakley works closely with Congressional staff, the Administration, and representatives of various national transportation associations and state and local public interest groups to formulate and advance a transportation policy and program agenda. Ms. Oakley was responsible for directing the association's policy development and advocacy efforts leading up to the 2005 reauthorization of the federal highway and transit programs.

Prior to joining AASHTO, Ms. Oakley was Director of Government Affairs for the National Association of Regional Councils. She was involved in the 1994 formation of the Association of Metropolitan Planning Organizations (AMPO) and served for five years as its first director. During that time, AMPO's membership increased four-fold and its operating budget tripled.

Ms. Oakley began her career as a transportation planner for the Kentucky Department of Transportation, where she had responsibility for multimodal transportation policy and program development. In 1980, Ms. Oakley moved to Washington, DC, where she worked as a Transportation Planner for the Federal Highway Administration specializing in statewide planning, programming, and finance. Ms. Oakley held subsequent positions as a budget analyst for the U.S. House of Representatives' Transportation Appropriations Subcommittee and as director of regional affairs for the American Trucking Associations, with responsibility for establishing and managing a metropolitan transportation program.

Ms. Oakley is a graduate of Eastern Kentucky University with a B.A. in Regional Planning and a Master's Degree in Planning and Geography.

Ms. Oakley is a member, as well as past Vice President and Secretary, of the Washington Chapter of the Women's Transportation Seminar, is currently Chairman of the Washington Road Gang, and serves on the steering committees of and as liaison to a number of special TRB committees.

STEPHANIE PINSON

Gilbert Tweed Associates, Inc. President/CEO, and APTA Executive Board and Human Resources Committee Member; MTI Trustee

Stephanie Pinson, President of Gilbert Tweed Associates, has been with the firm since 1981 and is a member of the Board of Directors. Her work with transportation, government, and industrial companies is global in nature, and she directs our Indian-based offices in New Delhi, Bangalore, and Mumbai.

Ms. Pinson is the Director of GTA's Transit and Transportation Practice and Government Services Practice, having consulted to large and small authorities, aviation, and other transportation providers and their global suppliers as well as to the Departments of the Interior and Transportation. In all cases, she has created unique solutions to complex senior staffing problems within all functional areas. She is accustomed to working with boards of directors, mayors and city administrators and has a strong track record for success in all sectors.

Active in industry and community affairs, Ms. Pinson represents GTA at the American Public Transportation Association (APTA) where she served on the Executive Committee and is past Chair of the Business Member Board of Governors. Ms. Pinson was named APTA's "Outstanding Business Member" and continues her activities in a variety of Board and Committee assignments for APTA. She serves on the Board of Directors of Digital Recorders, Inc., a transit provider, and is a Trustee of the Mineta Transportation Institute. Ms. Pinson is a member of the TOPS Committee, the policy maker and granting entity of the Transit Cooperative Research Program of the U.S. National Academy of Sciences. She is past President of the New Jersey Chapter of the International Association of Corporate and Professional Recruiters. Ms. Pinson is a frequent speaker on change management and leadership development, and in 2004 she was awarded the second annual Diversity Leadership Award given by the Women's Transportation Seminar.

She is a graduate of Douglass College and qualified for her Ph.D. at Rutgers University where she taught English Literature for several years.

ROBERT H. PLYMALE

Nick J. Rahall II Appalachian Transportation Institute Director

Since 2001, Robert H. Plymale has served as director of the Nick J. Rahall II Appalachian Transportation Institute. RTI is located in Huntington, West Virginia, and is a University Transportation Center that focuses on transportation research, education, and technology transfer. Under his direction, RTI has received millions of research dollars and completed projects relating to economic development, safety, and enhancement of the Appalachian region's road, river, and rail systems.

In addition, Senator Plymale has extensive state and national legislative experience. He is currently serving his fourth four-year term in the West Virginia State Senate, representing District 5 which consists of Western Cabell and Wayne Counties. He is Chairman of the Senate Education Committee and a member of the House/Senate Budget Conferee Committee. He formerly served as Chairman of the Senate Committee on Transportation, Chairman of the Senate Committee on Pensions, and the Chair of the Select Committee on the Public Employee Insurance Agency as well as a member of the Coal Truck Overweight Task Force 2002, which was passed by the legislation.

On the national level, Senator Plymale was appointed in 2003 to the Southern Regional Education Board's Board of Control by Governor Bob Wise. He was reappointed to the SREB in 2006 by Governor Joe Manchin and now serves on the executive committee. In 2004–05, he became a member of the National Conference of State Legislatures (NCSL) National Task Force on “No Child Left Behind” and from 2005–2006, he was Chair of the National Conference of State Legislature (NCSL) Education Committee, 2005–2006. In addition, Senator Plymale was a member of the NCSL Blue Ribbon Commission on Higher Education, 2005–2006.

He has also received a Distinguished Service Award from the West Virginia Athletic Directors Association (2000) and the Distinguished Service to the Community Award from Marshall University (2005). In 2004 he received a Presidential Citation from Glenville State College and the Michael Prester Award of Excellence in recognition of contributions made in improving the lives of those with behavioral health issues. Recently, Senator Plymale has become Co-President of the Keith Albee Theater Performing Arts Center, Inc. and has been instrumental in reviving and maintaining this Huntington landmark as a performing arts and community center.

U.S. REP. NICK RAHALL, D-WV

Committee on Natural Resources Chairman and Committee on Transportation and Infrastructure Vice Chairman

Congressman Nick Rahall of Beckley represents the Third Congressional District of West Virginia. First elected in 1976, he is currently serving his 16th term and is the Dean of the West Virginia Delegation to the U.S. House of Representatives. He is a Congressional leader on mining-related issues, a veteran of every federal highway bill since 1976, and an outspoken advocate for our men and women in uniform, our veterans, and access to affordable healthcare and education.

Congressman Rahall is recognized for his dedicated efforts to promote the diversification of the economic base of southern West Virginia through his “three Ts” agenda— transportation, technology, and tourism. He was a key architect in the formulation of the Transportation Equity Act for the 21st Century (known as TEA 21). In that bill, he established the Rahall

Transportation Institute (RTI), a consortium of five Southern West Virginia colleges, housed at Marshall University.

In 2006, following the tragedies at Sago and Aracoma mines in West Virginia, Congressman Rahall was instrumental in guiding landmark mining safety legislation through Congress. The MINER Act includes requirements for more oxygen to be made available to trapped and escaping miners. It calls immediately for redundant communications devices to link miners underground with rescuers on the surface, and it requires two-way telecommunications and tracking devices to be in the mines by mid-2009. It also calls for fines to be levied on mines that fail to timely report accidents, a provision that has already been put to use by Mine Safety and Health Administration. The same year, Congressman Rahall worked to bring together a \$4 million statewide mine safety and technology consortium, to be housed at WVU Technical and Community College. The Mine Safety Technology Consortium will be a catalyst in transforming West Virginia coal mining know-how, skills, and capabilities to produce superior coal mine safety and health technology, products, and services.

Recognized for his dedicated efforts to promote the diversification of the economic base of southern West Virginia, Congressman Rahall's commitment to the Southern Highlands Initiative is helping to support the development of new industrial and business parks to be located within each of the southern coalfield counties. His dedication to promoting high technology development is also clear through his establishment of the Connected Technology Corridors Program. Working with local community and economic development leaders, the Congressman is encouraging a sustainable approach to economic development, one that focuses on the advance of small businesses and entrepreneurial enterprises along major transportation corridors such as Interstates 64 and 77. To assist with fostering new business development, Congressman Rahall has secured millions of dollars for the construction of new Technology Centers at Concord University, Greenbrier Valley Airport, Raleigh County Airport near Beckley, and in Hinton.

MICHAEL S. TOWNES

President/CEO of Hampton Roads Transit, APTA First-Vice Chair; MTI Trustee

Mr. Townes has devoted his career to public transportation since 1980. He joined the Peninsula Transportation District Commission (Pentran) in 1986 and was appointed executive Director in July 1989. In 1999, Mr. Townes became the Executive Director of the newly formed Transportation District Commission of Hampton Roads (Hampton Roads Transit), the consolidation of the Peninsula and Tidewater Transportation District Commissions.

Upon his arrival at Pentran, one of his first major projects included managing the construction of the \$7.6 million operations, maintenance and administrative facility in Hampton, Virginia, which broke ground in May 1989. From 1990–1992, Pentran was awarded the highest honor in the state as the recipient of the VDOT, Outstanding Public Transportation System

Achievement Award. Nationally, Pentran was recognized by APTA in 1993 with the Public Transportation System Outstanding Achievement Award.

Mr. Townes is the recipient of several distinguished awards including the Conference of Minority Transportation Officials (COMTO) Executive of the Year award, the Women in Transit Committee Achievement Award, and the Distinguished Public Service Award from the Conference of Minority Public Administrators. He currently serves as Chair of APTA, and is the legislative Chair for COMTO and the Virginia Transit Association. He is also on the Board of Directors for the Virginia High Speed Rail Development Committee.

Mr. Townes has served as the Chair of the TCRP Oversight and Project Selection (TOPS) Committee. As an active member of the Transportation Research Board, he participates on many TCRP Panels and his involvement keeps him well informed of issues relating to transit and technology. Through the assistance of these programs, transit agencies have investigated and researched technologies that are adaptable for them.

He is a graduate of Virginia Commonwealth University, with a Masters of Urban Regional Planning awarded in 1980 and a Bachelor of Arts in Political Science awarded in 1978.

DAVID L. TURNEY

DRI Chairman/President/CEO; and MTI Board of Trustees Chair

David L. Turney has been DRI's Chairman, President, and Chief Executive Officer since May 1998, and a company director since May 1996. Mr. Turney was Co-Founder, Chairman, and Chief Executive Officer of Robinson Turney International, Inc., which was merged into the company in April 1998. A consulting firm, RTI engaged in business development, marketing services, advisory services, and merger, acquisition, and financing assignments for selected clients.

Until the merger, the company was an RTI client; all RTI clients were in the transit and transportation equipment industries. From March 1994 to December 1995, Mr. Turney was also engaged in strategic planning and development consulting services for his former employer, Mark IV Industries, Inc., an NYSE® listed company prior to its acquisition by a private investor. Mr. Turney founded the Mark IV Transportation Products Group, a group of nine companies, subsidiaries, and operating units serving transit and transportation markets worldwide, and served as its Group Executive from February 1991 to February 1994.

From 1984 to 1991, Mr. Turney was President of the Luminator Division of Gulton Industries, Inc., which became a wholly owned subsidiary of Mark IV in 1987. Prior to 1984, he served in various managerial and engineering capacities in four corporations spanning the telecommunications, industrial hard goods, consumer electronics, and electromagnetic components industries.

Mr. Turney is active in APTA. A former chair of APTA's Business Members' group, he presently serves on the APTA Business Members' Board of Governors as well as other industry elected and appointed positions. Mr. Turney received his B.S. in Industrial Management from the University of Arkansas, Fayetteville, and he has participated in numerous postgraduate study courses on finance, mergers and acquisitions, public company administration, and operations.

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