
PREPARING TOMORROW'S TRANSPORTATION WORKFORCE: A MIDWEST SUMMIT

April 27-28, 2010
Iowa State University, Ames, Iowa

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IOWA STATE UNIVERSITY
Institute for Transportation



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16. Abstract Preparing Tomorrow's Transportation Workforce: A Midwest Summit, held April 27–28, 2010, in Ames, Iowa, was one of several regional transportation workforce development summits held across the United States in 2009 and 2010 as part of a coordinated initiative to ultimately develop a national strategy to address future transportation workforce issues. The initiative is being led by the U. S. Department of Transportation's (DOT) Research and Innovative Technology Administration (RITA). This particular summit was hosted by Iowa State University's Midwest Transportation Consortium (MTC) and Institute for Transportation (InTrans). The purpose of the Midwest summit was to assess the educational and training needs of the future transportation workforce and identify strategies to address those needs across various career paths. It addressed a broad spectrum of topics including strategies to attract women and under-represented minority groups, pre-college opportunities and strategies, post-secondary education, post-college continuing education, professional licensure, and specific industry perspectives. The goals of the summit were (1) to gain an improved understanding of the transportation workforce needs of Iowa and the surrounding states and (2) to identify best practices in addressing the workforce development needs. This event had two tracks: one focused on pre-college education and the other focused primarily on college education and practitioners. Attendees provided a good cross-section of the larger transportation industry. From what was learned at the summit, Iowa State University, like other regional hosts, can develop a "profile of needs" for Iowa including specific job categories over specific time horizons. The summit was also successful in identifying best practices in addressing the workforce needs that can be utilized by us and others as potential tools or in a "national-level list of attributes." Each regional summit has provided some guidance in developing statewide profiles. The collection of best practices or tools from all the regional summits can be shared and applied to address state (or regional) needs profiles to attract, develop, and retain an effective workforce.			
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**PREPARING TOMORROW'S TRANSPORTATION WORKFORCE:
A MIDWEST SUMMIT**

April 27–28, 2010

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Acknowledgments

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Executive Summary

This executive summary describes the summit's sponsors, goals, and attendees and provides an overview of salient observations and conclusions.

About the Summit

This event was one of several regional transportation workforce development summits held across the United States as part of a coordinated initiative to ultimately develop a national strategy to address future transportation workforce issues. The initiative is being led by the [U. S. Department of Transportation's](#) (DOT) [Research and Innovative Technology Administration](#) (RITA). This particular summit was hosted by [Iowa State University's Midwest Transportation Consortium](#) (MTC) and [Institute for Transportation](#) (InTrans). The summit's sponsors included RITA's [University Transportation Centers Program](#) and the Office of Technical Services at the [Federal Highway Administration](#) (FHWA).

The purpose of Preparing Tomorrow's Transportation Workforce: A Midwest Summit was to assess the educational and training needs of the future transportation workforce and identify strategies to address those needs across various career paths. It addressed a broad spectrum of topics including strategies to attract women and under-represented minority groups, pre-college opportunities and strategies, post-secondary education, post-college continuing education, professional licensure, and specific industry perspectives.

The goals of the summit were (1) to gain an improved understanding of the transportation workforce needs of Iowa and the surrounding states and (2) to identify best practices in addressing the workforce development needs. This event had two tracks: one focused on pre-college education and the other focused primarily on college education and practitioners.

Attendees included key representatives from the U.S. DOT's RITA, FHWA, and the American Association of State Highway and Transportation Officials, as well as program leaders from state departments of transportation (DOTs), other university transportation centers (UTCs), and state agency-level human resources departments. Also participating were adult education experts, various transportation-related industry association representatives, staff from public transportation agencies at all levels, and college and university educators. A complete list of participants is included as an appendix to this report.

Summary of Summit Outcomes

The presentations at the summit led to valuable discussions and deliberations on a wide variety of transportation workforce development related topics. The following items were of particular note:

1. Efforts must be made to attract women and under-represented minorities to careers in transportation, and retain them in the workforce. Examples of successful strategies include *Go!*, an on-line magazine regarding transportation for teens, and *¡Vamos!*, its Spanish edition, and programs such as Project FREE, WiSE, and Science Bound.
2. Over the past few decades, expectations of and needs for workforces have changed significantly, and these will continue to change in ways not predictable at this time. It is projected that about half the jobs 20 years into the future will be those that we do not know of now. This requires that workforce development initiatives should focus on helping individuals develop desired "core" competencies for critical abilities rather than on specific skills alone. Therefore, it is important that

efforts for workforce development help develop abilities that help individuals and organizations easily adapt to challenges of the times.

3. Addressing the educational needs to prepare the future transportation workforce will require efforts at various levels that such as pre-collegiate level (elementary schools to high schools, or K-12), community colleges, vocations colleges and universities (undergraduate and graduate levels), vocational training, continuing education, certification, and licensure. The breadth of areas of learning for these efforts is quite varied and remarkable; it encompasses disciplines such as STEM (science, technology, engineering, and mathematics), humanities and social sciences, accounting, economics, finance, law, and others.
4. Transportation workforce needs are likely to vary across regions of the nation, as well as across modes, and across specializations within modes. These needs relate to the demand for employees, the types of jobs, and the levels of expertise required. Therefore, it is important to recognize these differences while crafting national transportation workforce development strategies.
5. Making the connection between real, identified needs and the potential strategies is a significant challenge. Identifying the existing gaps in workforce supply and demand is difficult, but bridging the gap is more difficult. Further, addressing these 20+ years into the future is even more daunting. This summit identified some “best practices” for consideration. The collection of best practices or tools from all the regional summits should be shared and applied to address state (or regional) needs profiles to attract, develop, and retain an effective and diverse workforce. A national summit is an opportunity for each state or regional “leader” or group to find some specific tools/answers to how they bridge this gap. The result of the national event could be a list of action items for each regional or state “leader” for follow-up efforts.
6. Retaining educated/trained workforces in the industry beyond the first 4 to 6 years of their careers was identified as a concern.

The following is a summary of the main observations, in a few categories, from the summit:

Pre-College (K – 12)

- Parents play a very important role in the development of their child’s interest in STEM areas, so K-12 efforts should consider this aspect.
- Steering students in the K-12 level to STEM fields is still one of the most significant challenges the transportation industry faces.
- Students are attracted to engineering because they want to make a difference in areas like climate change and energy and not just because they are good at math and technology.
- Programs like Science Bound, National Association of Women in Construction, and the FREE project, and *Go!* Magazine can play a role in attracting young people, in particular women and minorities, to STEM fields.
- Support from the broader range of stakeholders would be a logical approach to securing sustained support for *Go!* and *¡Vamos!* as a method for attracting young people to transportation.
- While much of the workforce is planning to retire, it is important to ensure the public perception of transportation as an attractive career, especially for attracting young people.

University/Community College

- The college-level education “process” may need to undergo significant adaptation in order to better develop broader skill sets for tomorrow’s transportation workforce.
- Community colleges have valuable lessons on adapting to community needs and the changing workforce.

- Working with community colleges to improve the instruction will help guide students into transportation.
- A marketing challenge for the transportation industry is that transportation is somewhat “invisible”, unlike careers in medicine or health care.
- Areas where there are significant projected needs for specialized skills include: GIS, trucking, and paving.
- Coordination of the various efforts across the nation and among regional partners will be very important to developing a national strategy. Training is a necessity, and increasing technological advancements are driving training needs.
- Incorporating the “7 Habits of Highly Effective People” into workforce development training has received impressively positive feedback, and should be considered in future efforts.
- Solutions to the workforce shortage need to include significant policy-focused solutions.

General

- In order to meet transportation and related workforce challenges, science should drive solutions, and strategies from other disciplines and across the globe should be embraced.
- Solving the workforce shortage in the transportation/construction industry will require developing a more diverse workforce.
- More than ever, creativity, teamwork, and leadership will be critical skills for tomorrow’s transportation workforce.
- Professional licensure, professional development, graduate education/certification, and professional organizations play an important role in the success of the transportation industry in coming years.
- The transportation workforce development effort will need a roadmap to address the most pressing issues including recruiting and retaining qualified personnel, filling current and future shortages in personnel, defining competencies needed for a high performance workforce, identifying and closing gaps in transportation workforce training and education, and linking workforce planning and career pathways to enhance opportunities that benefit the transportation workforce and industry.
- There are many efforts underway to assist in transportation workforce development, including Transportation Research Board committees on workforce development, National Cooperative Highway Research Program Projects 20-81 and 20-72, the AASHTO RAC administration task force on education and training needs, and university sponsored technical training.

Summit Agenda

The summit consisted of seven (7) sessions including the plenary and lunch sessions on April 27. Four of the sessions were further divided into the two tracks: pre-college and college/practitioner. The summit's program, in terms of the individual sessions and tracks, is discussed briefly next.

Plenary Session (Tuesday, April 27, 2010 from 8:00 am – 9:45 am)

- **Our Transportation Workforce: Today and Tomorrow** Shashi Nambisan, Director, Iowa State University - Institute for Transportation
- **RITA's Perspective on Transportation Workforce Development** Lydia Mercado, UTC Grants Administrator, *U.S. DOT* - Research and Innovative Technology Administration
- **CUTC's Role in Developing the Transportation Workforce** Bob Plymale, Director, Marshall University - Rahall Transportation Institute (President, Council of University Transportation Centers)
- **Welcome** Balaji Narasimhan, Associate Dean for Research and Economic Development, Iowa State University - College of Engineering

Session 1 (Tuesday, April 27, 2010 from 10:15 am – 11:45 am)

- Track A: **Go! Transportation E-Magazine for Youth** Stewart McCoy, Student Writer, Iowa State University - Institute for Transportation
- Track B: **Federal and State DOT Investments in Workforce Development** Clark Martin, Affiliate Programs Team Leader, *U.S. DOT* FHWA Office of Technical Services; Sandra Larson, Director of Research and Technology Bureau, Iowa Department of Transportation

Lunch Session (Tuesday, April 27, 2010 from 11:45 am – 1:15 pm)

National Efforts to Develop Tomorrow's Transportation Workforce Shauna Hallmark, Director of Midwest Transportation Consortium, Iowa State University - Institute for Transportation; Robert L. Bertini, Deputy Administrator, *U.S. DOT* - Research and Innovative Technology Administration

Session 2 (Tuesday, April 27, 2010 from 1:30 pm – 3:00 pm)

- Track A: **National Science Foundation Case Study: Female Recruits Explore Engineering** Monica Bruning, Director of Talent Expansion, Iowa State University - College of Engineering; Irma Becerra, Student, Iowa State University; Jacqueline Correa, Student, University of Iowa; Briana Dumstorff, Student, Iowa State University; Tuyen Nguyen, Student, Iowa State University
- Track B: **Practitioner Needs of State and Local Agencies** Kate Murphy, Iowa Department of Transportation - Division of Operations and Finance; Tom McDonald, Safety Circuit Rider, Iowa State University - Institute for Transportation

Session 3 (Tuesday, April 27, 2010 from 3:30 pm – 5:00 pm)

- Track A: **Attracting Students to Science, Technical, Engineering, and Math (STEM) Fields** Carol Heaverlo, Outreach Coordinator, Iowa State University - Program for Women in Science and Engineering; Connie Hargrave, Director, Iowa State University - SCIENCE BOUND

- **Track B: Educational Opportunities and Challenges for Workforce Development** Tim Strauss, Professor, University of Northern Iowa - Department of Geography; Dave Pfiffner, Director, Des Moines Area Community College Transportation Institute; Larry Ebbers, Professor, Iowa State University - Department of Educational Leadership and Policy Studies

Session 4 (Wednesday, April 28, 2010 from 8:00 am – 9:30 am)

National Efforts in Professional Licensure, Education, and Transportation Workforce Development Jeff Russell, Chair, University of Wisconsin - Department of Civil and Environmental Engineering; Denver Tolliver, Associate Director, North Dakota State University - Upper Great Plains Transportation Institute; Joung Lee, Associate Director for Finance and Business Development, AASHTO

Session 5 (Wednesday, April 28, 2010 from 10:00am – 11:30 am)

- **Track A: Construction and Transportation Industry Workforce Development and Training Needs** Kevin Gass, Vice President, Perishable Distributors of Iowa, Ltd.; Ed Jaselskis, Professor, Iowa State University - Department of Civil, Construction, and Environmental Engineering; Fernando Aveiga, Multicultural Workforce Specialist, Master Builders of Iowa; Jennifer Shane, Iowa State University - Department of Civil, Construction, and Environmental Engineering
- **Track B: Innovations to Meet the Pavement Industry Workforce Needs** Bill Rosener, Executive Vice President, Asphalt Paving Association of Iowa; Gordon Smith, President, Iowa Concrete Paving Association; Tom Cackler, Director of National Concrete Pavement Technology Center, Iowa State University - Institute for Transportation

Session Details

This section summarizes each of the summit sessions in greater detail.

Plenary Session

The opening session was led by Dr. Shashi Nambisan, who serves as Director of the [Institute for Transportation](#) (InTrans) at [Iowa State University](#). Dr. Nambisan provided background that framed the summit as part of the larger national transportation workforce development effort. Specifically, he noted the importance of retaining skilled workers and accelerating reinvestment in such efforts to minimize the loss of countless years of knowledge and experience. As an example, he noted that with the recent retirements of only three individuals from the Iowa DOT, the department would be losing more than 100 years of combined experience. He also stressed that over the next two decades, transportation jobs will be much different, if not unimaginable, compared to today's jobs. As a result, he added, preparing for these changes and changes in demographics regionally and nationally is a huge challenge.

Dr. Nambisan also noted several key challenges to keep in mind during the summit. In particular:

- Learning styles of today's children are different from those of recent generations. The expectations and motivations of today's students are also different. More than ever, they think beyond local issues to global perspectives. Therefore, people in education need to adapt and figure out how to excite and motivate children.
- Women and under-represented minorities are becoming a larger proportion of the labor force in transportation.
- Helping children learn to solve problems creatively and to think critically is of utmost importance. Educators need to find ways to teach students to analyze and solve problems, but also to develop leadership and interpersonal "people" skills. In other words, it will be important to integrate the technical with the artistic and capture young people's creative skills.
- Learning is life-long. We must help students learn how to learn and not stop at teaching to only "young" people.
- Ultimately, we need to identify best practices in how to do all of the above.

Dr. Nambisan then introduced Ms. Lydia Mercado. Ms. Mercado serves as University Programs Specialist for the [Research and Innovative Technology Administration](#) (RITA) of the [U.S. DOT](#), where she is charged with the oversight and management of twenty (20) university transportation centers. In this role, she manages the U.S. DOT's recently created transportation workforce development initiative, a cross-modal, multi-disciplinary collaboration in partnership with the [Council of University Transportation Centers](#) (CUTC).



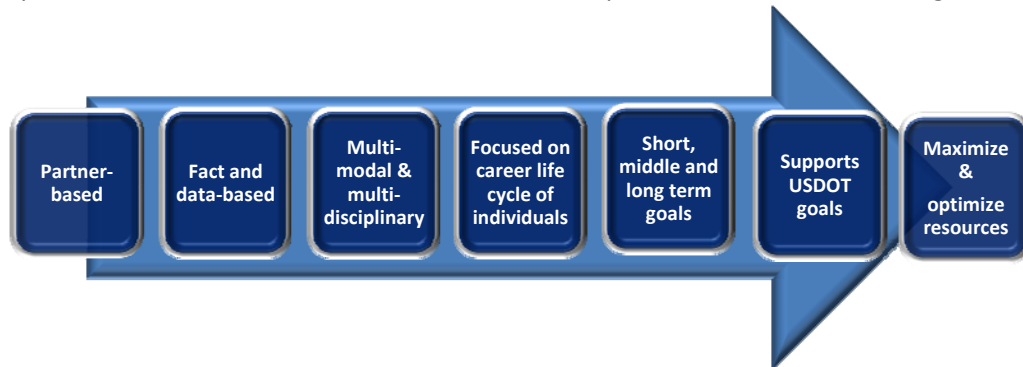
Lydia Mercado, RITA, U.S. DOT

Ms. Mercado began her presentation by providing insight into RITA and CUTC perspectives on workforce development. She noted that the first step in the national workforce initiative was to define the framework for such an effort by asking why the focus on developing the nation's transportation workforce was important. She noted three primary reasons:

- The transportation workforce is critical to the health of the nation's transportation industry.

- The transportation workforce is a key to innovation and creativity.
- The transportation workforce ultimately promotes excellence and competitiveness.

Ms. Mercado noted that the resulting national strategy for transportation workforce development had seven components, which she discussed in brief. These components are shown in the figure below:



She also noted the following:

- The national strategy is focused on the goals of safety, state of good repair, economic competitiveness, livable communities, and environmental sustainability.
- It will be important to be innovative and creative in addressing the many issues affecting transportation.
- To best address the issues facing the transportation workforce, we need to address all phases of education, from K-12 to technical school and community colleges to universities.

Next, Dr. Robert Plymale, who serves as CEO and Director of the [Rahall Transportation Institute](#) at [Marshall University](#) as well as the current CUTC President, provided his perspective on developing the nation’s transportation workforce. Dr. Plymale briefly discussed the predicted shortages driving a coordinated transportation workforce development effort and the need to make data-driven decisions about the solutions. He also stressed the importance of the regional summits, noting that the solutions will likely come from the local and regional levels.



Robert Plymale, Rahall Transportation Institute (speaker)

“I challenge you to flush out the problems on your local level, prioritize solutions, identify obstacles that stand in the way of implementing those solutions, and then let us pass those on to the powers to be. The crisis is not going to be solved on a national level. The obstacles and solutions will be implemented on a local level.” – Dr. Robert Plymale

Dr. Plymale then explained how the results of the regional summits will be the basis for a National Transportation Workforce Development Strategy. As a result, he expects the following approaches to evolve:

- A coordinated, national approach among contributing partners.
- New policy solutions to address workforce issues and produce a high performing transportation workforce in the next 20 years.
- A roadmap to address the most pressing issues, including recruiting and retaining qualified personnel, filling current and future shortages in personnel, defining competencies needed for a high performance workforce, identifying and closing gaps in transportation workforce training and education, and linking workforce planning and career pathways to enhance opportunities that benefit the transportation workforce and industry.

Dr. Plymale then discussed some specifics of West Virginia’s summit in 2008, noting that it recognized new and emerging occupations, obstacles to finding qualified workers, and a mismatch between the supply side and the demand. After also discussing other regional efforts, he noted that the difficult work from such an event is ultimately articulating the results and action plans. Therefore, he urged the attendees and event coordinators to capture as much specific detail about obstacles and solutions as possible.



Robert Plymale, Rahall Transportation Institute

After Dr. Plymale presented specifics of the national data analysis plan, discussion followed concerning how community and technical colleges have supplied the grassroots side of educating the workforce, while the universities and industry have had more difficulty doing so. As a result, it was noted that the education “process” may need to undergo significant adaptation. In fact, it was noted that lessons on adapting to community needs and a changing workforce may be learned from community colleges.

“Universities are focusing too much on the specifics of each class or research project. Instead, we should be focused on the process of learning. We need curious students with critical thinking skills more than just students who know one topic very well.” – Dr. Peter Taylor, InTrans, Iowa State University

It was also noted by several in attendance that steering students in the K-12 level to science, technology, engineering, and mathematics (STEM) fields is still one of the most significant challenges the transportation industry faces. One positive to build on may be that now, more than ever, students are attracted to engineering because they want to make a difference in areas like climate change and energy and not just because they are good at math and technology.

The final speaker of the plenary session was Dr. Balaji Narasimhan. Dr. Narasimhan serves as Associate Dean of Research and Graduate Studies in the [College of Engineering](#) at Iowa State University. He formally welcomed the attendees, noting that it was an honor to host the regional summit. He then briefly discussed Iowa State University's rich heritage in transportation research, education, and outreach that reaches far beyond Iowa. Furthermore, he noted the challenges facing our society in numerous areas that transcend people, cultures, counties, and disciplines. In order to meet these challenges, he added, we must let science drive engineering solutions, as well as embrace solutions from other disciplines.

At the end of the formal presentations, Dr. Nambisan wrapped up the session by summarizing the main points and big picture issues, such as changing learning styles and the world economy. He also discussed the diverse breadth of attendees at the event and noted that they were charged with identifying what has and has not worked in developing the transportation workforce in order to define best practices.

In addition, the following points were made:

- Denver Tolliver agreed that the workforce of tomorrow needs a much broader set of skills.
- Lydia Mercado noted that the creativity and leadership are also critical skills for tomorrow's workforce.
- Roger Schletzbaum noted that these challenges are very tough for a local agency.
- Charlie Nemmers stressed the need for leadership and teamwork skills, noting that the [University of Missouri](#) has made an effort to re-emphasize "softer" skills.

Session 1A: *Go!* Transportation E-Magazine for Youth

The focus of this session was Iowa State University's online transportation-related magazine for young people called [Go!](#). The topic was presented by Mr. Stewart McCoy, an Iowa State University graduate student and student writer for *Go!*. He began by providing a brief history of *Go!* and its Spanish-language companion publication [¡Vamos!](#). He noted that each issue of *Go!* has a transportation-related theme, with past themes that included public transit, space transport, sustainability, traffic safety, freight and rail, fuels, navigation, and pavements. He also reviewed some of the e-magazine's popular departments, including articles by teens and contests in each issue.



Stewart McCoy, InTrans, and Lydia Mercado, RITA, U.S. DOT

Mr. McCoy then discussed the magazine's content in greater detail, including its relationship to STEM curriculum, noting that the magazine has included STEM content since it was first published in 2007. For example, he explained, each feature article includes a "curriculum connection" sidebar that explains basic STEM concepts used in a variety of transportation careers. Future issues will include more hands-on activities related to STEM fields and a second writing contest, he added.

He also pointed out that everything in *Go!* and *iVamos!* is related somehow to the overall transportation workforce, with some content specifically calling attention to careers. For example, he noted, the entire January–February 2009 issue was about the “unsung heroes” of transportation, including maintenance workers, motor vehicle enforcement officers, light rail managers, and pedestrian planners. Mr. McCoy also noted that in the fall of 2009, *Go!* initiated a new department called “Career Spotlight.” This department focuses on the careers discussed in each issue. Spotlitged careers have included director of maintenance for a city transit system, marketing specialist, NASA intern, machinist, microbiologist, logistics manager, and diesel retrofitter. In the future, he added, there are plans for a “transportation career profiles database.” He also noted that another department *Go!* runs is “School Spotlight,” which highlights transportation programs at the vocational, 2-year, 4-year, or graduate level. He then discussed how *Go!* and *iVamos!* have targeted their audience through social media.

He noted that the challenge for the transportation industry is that transportation is somewhat “invisible,” unlike careers in medicine or health care, and young people don’t connect careers in transportation with contributing to society. He also noted that the idea of careers in transportation means very little to people outside the transportation community, noting that a small study *Go!* conducted showed that young people mostly think about transportation in terms of operations such as driving trucks and buses or scheduling and piloting flights.

Mr. McCoy also provided details about producing the online magazine, targeting a variety of audiences, and the general *Go!* and *iVamos!* business model. In summary, he gave several reasons why an online magazine can be an effective tool for reaching potential additions to the transportation workforce:

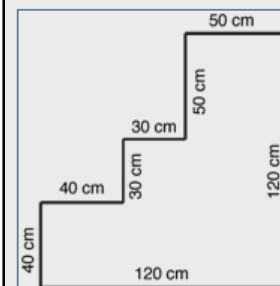
- It is more effective than print media in reaching young people due to being online and international.
- It can reach transportation practitioners and parents as well.
- Many people find *Go!* by searching for a topic online.
- Production and distribution costs are lower than print publications.
- *Go!* content is adaptable for individual use or as part of a formal curriculum.
- A well-managed, content-rich, multi-functional website can juggle the content to meet users’ needs, providing for more options for re-using existing content.

Mr. McCoy concluded his presentation by discussing the challenges *Go!* and *iVamos!* face, noting that the magazine sits at a crossroads, with the coming year being very important to determining what happens in the long run. He noted that they are ready to broaden partnerships and expand the impact of *Go!* and *iVamos!*. In order to do this, he added, they will be taking a long-term strategic approach that will require sustained funding for the next 3 to 5 years. Significant discussion followed, wherein the attendees agreed that a vehicle like *Go!* is an effective way to stimulate the K-12 educational pipeline into steering students to transportation. It was also agreed that asking for support from the broader

Curriculum connection

Many spacecraft, like the Dragon and the International Space Station, depend on power from sunlight converted into electricity and stored in batteries. Sunlight is absorbed by solar cells that are attached directly to the spacecraft (see the [solar aviation article](#) in this issue for more info on solar cells), or arranged on attached solar panels. Engineers find out how many solar cells are needed by finding out how much power a spacecraft needs to operate, and then figuring out what the spacecraft’s surface area is.

The diagram below represents the surface of a spacecraft. Solve the 3 problems below to find out if there’s enough surface area for solar cells to supply its electrical needs.



1. What is the perimeter of the spacecraft?
2. What is the area?
3. The solar cells being attached to this spacecraft can provide .03 watts per square centimeter, and the spacecraft needs 257 watts. Does the spacecraft have a surface area large enough to meet its electrical needs?

The math problem above is adapted from content available on NASA’s [Educators’ portal](#).

CUTC or UTC Program membership would be a logical approach to securing sustained support for *Go!* and *¡Vamos!*.

Session 1B: Federal and State DOT Investments in Workforce Development

This session was dedicated to investments in workforce development at the state and federal level. The session's first presenter was Ms. Sandra Larson, Director of the [Research and Technology Bureau](#) at the [Iowa Department of Transportation](#) (Iowa DOT). In this role she is responsible for planning, developing, and implementing the department's research and intelligent transportation systems (ITS) program. Ms. Larson began by noting the challenges related to workforce development at this point in history. Specifically, she noted that as the baby boomer generation retires, a smaller hiring pool due to slumping birth rates in the 1980s must fill the void left by the baby boomers. This, coupled with new skill requirements such as communicating technical issues to a less technical public, has created this "perfect storm" she added. According to Ms. Larson we are doing more with less: while challenges are getting greater, there are fewer workers and fewer available funds.



Sandra Larson, Iowa DOT

Ms. Larson then identified and discussed three areas that will continue to challenge the transportation industry in the near future:

- Training – Training is a necessity for both future and existing employees, and increasing technological advancements are driving training needs.
- Recruiting and Hiring – While much of the workforce is planning to retire, we need to ensure the public perception of transportation as an attractive career, especially for attracting young people. The Iowa DOT is reaching out to potential employees in community colleges and universities through campus presentations, internships and co-ops, job shadowing, career fairs, and online recruiting.
- Funding and Competition – We need to learn to do more with fewer employees and fewer available funds, but training needs are going to be greater as well.

Next, Ms. Larson briefly reviewed the national efforts underway to assist in transportation workforce development, including Transportation Research Board committees on workforce development, [National Cooperative Highway Research Program](#) (NCHRP) Projects 20-81 and 20-72, the AASHTO RAC administration task force on education and training needs, and university sponsored technical training. Specifically, she noted the importance of numerous university sponsored technical training opportunities provided by the Institute for Transportation. She explained how university technical briefs are getting people's attention and getting people interested in technical subjects. Recent intelligent compaction sponsored training was just one example of valuable technical training from the Institute for Transportation, she added.

Ms. Larson also discussed the outreach potential at all levels of education, starting with K-12 up to continued professional training. Discussion ensued, stressing the importance for a centralized resource location for effective presentations at career days for K-12. Ms. Larson stressed the importance of not only webinar training, but also face to face training. She described how the Iowa DOT opens up sessions to DOT employees as well as other agencies and contractors. She also commented on how technology

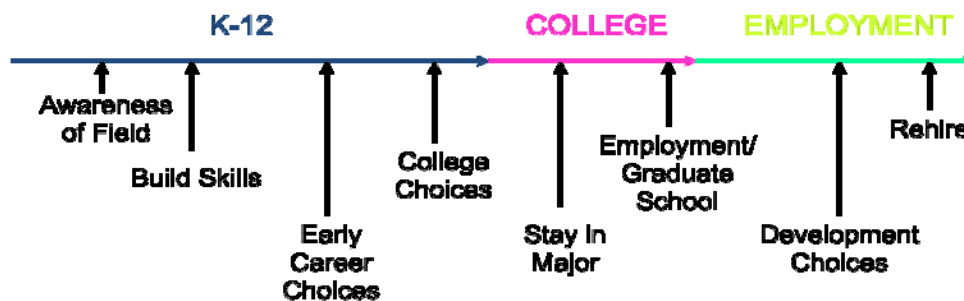
will need to be utilized to get information out to professionals who need continuing education. Further areas covered in Ms. Larson’s presentation included the success of the Road Less Traveled program aimed at educating K-12 girls on career opportunities in engineering related fields and continued success of other technical training programs such as the FHWA’s [Local Technical Assistance Program \(LTAP\)](#), Iowa’s Transportation Research Symposium, and peer exchanges.

The session’s second presenter was Mr. Clark Martin. Mr. Martin serves as Affiliate Programs Team Leader for the FHWA’s Office of Technical Services. He began his presentation by reiterating many of the points made by Ms. Larson concerning the “perfect storm” hitting the transportation workforce, then followed up by discussing the continued development of education programs nationally. He provided very thorough background on the SAFETEA-LU legislation and how it has initiated the spending of nearly \$41 million by 31 states on workforce development. In particular, he explained a program by the state of West Virginia that incorporated the “Seven Habits of Highly Effective People” into workforce development training and how the program received impressively positive feedback.



Clark Martin, U.S. DOT FHWA Office of Professional and Corporate Development

Mr. Martin also discussed the need for educating four main groups (K-12, community colleges, universities, and professionals) on the four major discipline areas of engineering, construction, logistics distribution, and system management. He noted that there are “big picture” strategies to reach out to these areas, but the question is where to get into the workforce development process/continuum.



Mr. Martin also noted that, while a great deal of funding comes from the federal government, the majority of funding and workforce are at the state and local levels. While the “highway” workforce encompasses planning, construction, engineering, maintenance, finance, safety, and environmental work, and since about 80 percent of state DOT employees work in the highway area, the private sector will be a key partner in delivering results. He stressed how more strategic approaches are needed for K-12 education as well as incorporating courses into community college curriculums. Before concluding, Mr. Martin stressed the importance of attending the National Workforce Development Summit and the need to “bring answers and not just questions” to the summit to make it more effective.

Lunch Session

Dr. Shauna Hallmark, who serves as Director of the Midwest Transportation Consortium at Iowa State University, began the lunch session by thanking all of the attendees for their participation. She then gave a brief explanation of how the Midwest Transportation Consortium and the Institute for Transportation at Iowa State University fit into the workforce effort. Dr. Hallmark then introduced the day's lunch speaker, Dr. Robert Bertini.

Dr. Bertini serves as Deputy Administrator of the [Research and Innovative Technology Administration](#) (RITA) of the U.S. DOT, where he is tasked with increasing collaboration across the U.S. DOT and within RITA. Dr. Bertini is also focused on developing the transportation workforce of today and tomorrow by attracting people to the transportation field and ensuring that the tools and knowledge they need will be readily accessible through training and lifelong learning opportunities. Dr. Bertini began his presentation by thanking the event hosts. He then reviewed his own personal experiences within the UTC Program as a student, a faculty member, a recipient of research funding, and a center director. Through his experiences within the UTC Program and now with RITA, he noted, he has become increasingly aware of the many future challenges facing the nation's transportation workforce as we move forward.



(L to R) Robert Bertini, RITA, U.S. DOT; Robert Plymale, Rahall Transportation Institute; Reginald Souleyrette, InTrans

Next, Dr. Bertini discussed several national initiatives, including TIGER grants, high-speed rail, open government, and cross-modal issues, and how they fit into U.S. DOT Secretary LaHood's priority areas:

- Safety – Improve public health and safety by reducing transportation-related fatalities and injuries.
- Livability – Promote place-based policies that provide transportation choices and improve the quality of life for all Americans.
- State of Good Repair – Ensure the United States proactively maintains its critical transportation infrastructure.
- Economic Competitiveness – Foster transportation investments and policies that serve the traveling public and freight movement to bring lasting economic and social benefit to the nation.
- Environmental Sustainability – Pursue transportation policies and investments that reduce carbon emissions and foster protection of critical watersheds and ecosystems.

Dr. Bertini also discussed the greater role of research at RITA, noting that there is a need to invest in robust, forward-thinking transportation research that reflects the reality on the ground and promotes collaboration with external stakeholders. He added that RITA is committed to making policy and investment decisions based on sound science and rigorous analysis. He also noted that Secretary LaHood has stated that solid transportation research would be a hallmark of this administration's DOT.

Therefore, RITA will serve as a catalyst for major steps forward in achieving national goals. Dr. Bertini stated that workforce development was his main initiative. RITA, he added, is serious about the need to attract, recruit, orient, retain, develop, and mentor a diverse, engaged, collaborative, and high performance workforce. He went on to note that this was why, in collaboration with stakeholders, they

have launched a multimodal workforce development initiative that anticipates demographic shifts and will increase the education and training level of the workforce. Several U.S. DOT workforce programs and resources are focused on this, he added.

Dr. Bertini then discussed the next steps in the workforce development process:

- Continue outreach to partners and stakeholders.
- Implement data gathering and analysis plan.
- Integrate regional summit data and recommendations.
- Draft National Transportation Workforce Development Strategy.
- Move into perpetual development and improvement.

In conclusion, Dr. Bertini called upon the attendees to join and support this effort, noting that there is no field in which one can impact more lives than the field of transportation. In order to succeed, he added, we must work in a spirit of collaboration, break down the silos and institutional barriers, be interdisciplinary, think internationally/globally, be involved in defining sustainability and livability in our own lives and communities, link research to rulemakings and legislation, implement good ideas, and ask the tough “so what” question.

Session 2A: National Science Foundation Case Study: Female Recruits Explore Engineering

This session focused on research conducted by Dr. Monica Bruning. Dr. Bruning serves as Director of Outreach and Recruitment for the [College of Engineering](#) at Iowa State University. Dr. Bruning’s research, the [FREE Project](#) (Female Recruits Explore Engineering), was funded by the [National Science Foundation](#) (NSF) and looked at how academically able, college bound high school females explore careers in engineering. She began by noting that the project started with sophomore girls from three states (Colorado, Iowa, and Ohio). The girls were from a mix of rural and urban settings, ethnically diverse, and academically able to succeed in engineering, she continued. The research followed their journey over the course of one or two years during which they learned about engineering.



(L to R) Monica Bruning, Iowa State University; Nadia Gkritza, InTrans; Irma Becerra, Tuyen Nguyen, Briana Dumstorff, Iowa State University students

Dr. Bruning noted that the girls were given opportunities to learn about engineering in a variety of different settings, including the Iowa State University Engineering Career Fair, the internet, and field trips. They also met once a month at their school and had some guided study, she added. Dr. Bruning also noted that the FREE Project had four main learning objectives:

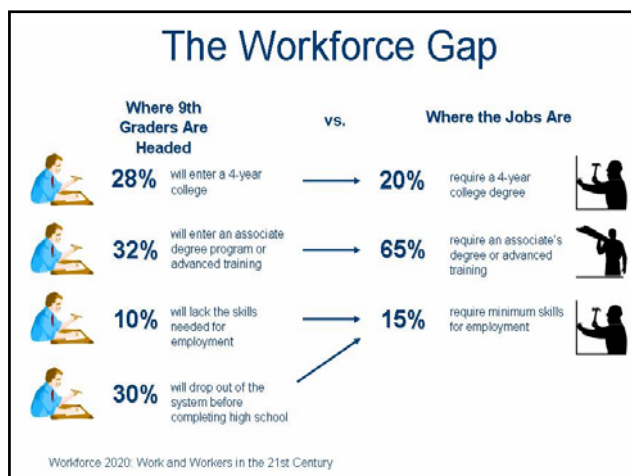
- What girls want to know about engineering
- How the prospect of engineering fits into their lives
- How social positioning affect perspectives on engineering
- How and why interests change over time

Four of the students who participated in the study were present at the session to offer their perspective on the FREE Project. Each girl provided background and answered questions about how they learned about engineering, how engineering fit into college life, and how college decisions changed over time.

Overall, the girls had little knowledge of what engineering was when they started and had little exposure to it prior to college. Dr. Bruning noted that the study found that few of the girls who participated knew little about engineering at first, but over time were able to identify more types and characteristics of engineering fields and interest in those fields. She also noted that, by the end of the study, nearly 40 percent of the girls were still considering engineering. Discussion followed, wherein the group discussed the availability of advanced placement classes in high schools and availability of information on careers. Before ending her presentation, Dr. Bruning noted that much more information can be found on the FREE Project website.

Session 2B: Practitioner Needs of State and Local Agencies

The focus of Session 2B was the needs of practitioners at state and local agencies. The first presenter was Ms. Kate Murphy, who serves as Workforce Administrator for the Iowa DOT's [Operations and Finance Division](#). Ms. Murphy first talked about future workforce needs at the Iowa DOT. Specifically, she noted her work with a group of futurists/forecasters at state DOTs and that one of the areas they have worked in is future career/workforce issues. She noted that college majors are becoming more specialized and that employers may focus on new technologies like geographic information systems (GIS), for example, and will prefer to hire GIS specialists. Next, Ms. Murphy discussed what she called "the workforce gap" in detail. Specifically, she noted that statistics show that 30 percent of high school students drop out, while the remaining students compete for jobs that may require more education than they are seeking today.



The next presenter was Mr. Tom McDonald. Mr. McDonald serves as Safety Circuit Rider at the Institute for Transportation at Iowa State University. Mr. McDonald began by briefly introducing safety related issues and the work he was involved in. First, he illustrated the local agency perspective on staffing concerns due to the aging workforce. This presents a significant need for training and numerous available positions for engineers and public workers. Mr. McDonald noted the Interstate construction as an example of how retirement can leave a significant vacuum in experience.

Next, Mr. McDonald discussed several areas in which tomorrow's local agency workforce, both experienced and new workers, will need professional development support. These areas include fundamental mathematics, surveying, basic construction inspection, bridge inspections, equipment operations, and safety. In addition, he noted that local agencies in Iowa face much the same problems as larger state agencies, reiterating earlier points made by other presenters that many jurisdictions will struggle to meet obligations for services with reduced staff numbers and experience. Therefore, he concluded, a concerted effort in training workers will be needed to offset this deficiency in experience, with more focused training needed in engineering and throughout public works. He noted that there are numerous resources beyond LTAP available to assist in training.

Session 3A: Attracting Students to Science, Technical, Engineering, and Math (STEM) Fields

This session was focused on the issue of attracting students to science, technical, engineering, and math (STEM) fields. The first presenter was Ms. Carol Heaverlo, who serves as Outreach Coordinator for Iowa State University's [Program for Women in Science and Engineering](#) (WiSE). This program is aimed at increasing the awareness of young women about STEM fields. She presented the findings from a survey that sought to find the underlying factors and facts regarding low enrollment of female students in STEM fields. She noted that data were collected on statistics associated with female students' enrollment in STEM, characteristics of teachers/counselors, after school activities, etc.

Ms. Heaverlo noted that the research found that extra-curricular activities the students participated in were not highly related to participation in STEM activities. It was also noted that some counselors even discourage female students from taking STEM classes, and many students responded that either STEM related activities were not offered by their schools or they did not pursue them due to other activities. Ms. Heaverlo also noted that students had relatively low confidence and interest in engineering in many cases, while middle school students reported higher confidence scores in the STEM related activities than high school students. Through the survey, teachers expressed the need for more STEM-related professional gatherings or other forums for sharing ideas. The research also identified that even when females enter STEM fields, they often do not stay in them, especially when they get married or have children.

Discussion that followed related to challenges faced by women, their sources of information on STEM, and the environment provided to them in school, home, and peer groups to develop interest in STEM, etc. It was also noted that parents play an important role in the development of interest in STEM areas. In conclusion, Ms. Heaverlo noted that there is a need for building a community of support for students where peer mentors serve as role models and where leadership initiatives, hands-on experiences, and academic support are available.

The second presenter of the session was Dr. Connie Hargrave, who serves as Director of Iowa State University's [Science Bound](#) program. The Science Bound program is focused on helping under-represented students pursue STEM related degrees and careers. Dr. Hargrave explained that under this program, capable seventh and eighth grade students are asked for a five-year commitment to pursue STEM-focused education. In return, Iowa State University offers a nine-year, \$30,000 commitment to each student. She noted that about 34 percent of students recruited fulfilled the five-year commitment, with 217 students completing the Science Bound program to date, and that Science Bound students who attend Iowa State University graduate at a higher rate than other students at the university. She also noted that the key to the program is the belief that students will succeed when given challenges backed by proportional support and facilities.



Photo courtesy of Science Bound, Iowa State University

Dr. Hargrave explained that the program's approach is to have a high level of contact with the students, with an emphasis on personal accountability and a personal connection among teachers, students, and parents. The program's activities operate as an after-school club giving students exposure to science and

technical material, providing them an opportunity to judge for themselves if STEM fields are appropriate for them. Dr. Hargrave noted that career explorations, study skills sessions, and science field trips are some of the forums for empowering students in college navigation skills. Dr. Hargrave noted that the primary sources of funding for the program are allocations from Iowa State University and some private sources.

Session 3B: Educational Opportunities and Challenges for Workforce Development

This session focused specifically on educational opportunities and challenges for workforce development. The first presenter was Dr. Tim Strauss, who serves as Associate Professor in the [Department of Geography](#) at the [University of Northern Iowa](#). Dr. Strauss presented on the topic of integrating GIS into the transportation workplace. Dr. Strauss began by noting that GIS technologies have been increasingly integrated into the transportation workplace, creating both the potential for improvements in data collection, integration, and analysis, as well as challenges for transportation professionals and educators. Concerning the workforce challenges, Dr. Strauss noted increases in the worldwide market for GIS, new jobs requiring GIS skills, and GIS-related job vacancies. He then went on to outline the components and capabilities of GIS technologies for transportation applications, typical career paths of GIS students, workplace issues in integrating GIS technologies, and educational challenges in meeting the needs of the workforce. Dr. Strauss noted that GIS is becoming a larger presence in the transportation field and related workforce. Therefore, he added, there is a large market for students to learn GIS-related skills that cover a wide range of interest areas.

Dr. Strauss then discussed his own experiences and educational challenges, stressing the relationship his department has with [Kirkwood Community College](#) in Cedar Rapids, Iowa, as an example of how to attract new students. In summary, he noted several challenges for publicly funded training programs in the geospatial industry:

- In new industries, where entry-level workers are often not aware of the potential that the industry offers, there is a need to identify job openings and internships to build interest with the population.
- Hiring a newly trained person is often very expensive for companies, and sometimes it is easier to hire someone already trained. In addition, many jobs require more preparation than short-term training (e.g., at least a bachelor's degree).
- Employment opportunities in the geospatial industry appear to be somewhat regional in nature. People trained in one state/region may have to relocate to find jobs.
- Technology keeps changing and getting updated. Industry workers must keep up their training.
- Accessibility to training can be limited, and the training itself expensive, particularly given the expense of GIS training software.
- There is currently insufficient training capacity, including a lack of instructors who possess geospatial knowledge and the skills to teach it. (High Growth Job Training Initiative – Geospatial Report)



Participants comment on presentations during the summit

The second speaker in this session was Mr. Dave Pfiffner. Mr. Pfiffner serves as Director of the [Des Moines Area Community College \(DMACC\) Transportation Institute](#). His presentation focused on the shortage of drivers in the commercial vehicle (or trucking) industry. He first reviewed the larger picture surrounding the transportation industry and its relation to the world economy, noting that the trucking industry is a key link in this growing interdependency. The demand for trucking and truck drivers will grow again as the economy rebounds, he added.

He then discussed ways the trucking industry is identifying/defining this shortage and planning to fill the positions long-term. His key points included the following:

- Key demographic group for long haul truck drivers is ages 35–54.
- From 2004–2014, total numbers in this group will decline by approximately 3 million.
- Growth in total labor force will slow in the next decade.
- Recessions in 2001 and 2008/2009 have affected the overall need for drivers in the short term, but will not change the underlying fundamentals in the long term (10+ years).
- The trucking industry needs to be more competitive with their major competitor, the construction industry, as far as wage levels and benefits.

The final presenter was Dr. Larry Ebbers, who serves as Professor in the [Department of Educational Leadership and Policy Studies](#) at Iowa State University. Mr. Ebbers presented information on Iowa State University's community college leadership program and STEM initiatives. He began by noting the wave of retirements of instructors at Iowa's community colleges. He explained that his program interfaces with STEM initiatives through the [Iowa Mathematics and Science Education Partnership](#) (IMSEP) Core Project 3. The purpose of Core Project 3 is to address the shortages of math and science instructors at community colleges as well as to educate current and next generation instructors by launching a special STEM learning and teaching community college teaching certificate, he added.

Mr. Ebbers stressed that his goal was to improve the training of presidents and instructors at community college so that they improve their teaching skills, as many of their students could come into the transportation field. He stressed the need for strong training and educational courses to accomplish this. He then reviewed various teaching certificates and courses Iowa State University has developed to help train and improve the instructors at the community college level who will then train developing professionals.

In conclusion, Dr. Ebbers noted the importance of strong partnerships. Examples of these partnerships at work include the following:

- STEM Science and Math Teacher Educators Summit (Grand View University) – The purpose of the summit is to open dialog on Iowa's need for exemplary teachers and how we can work together toward that goal.
- Iowa Science Teachers Annual Conference (ISTAC) Fall 2010 Career Day – This event is scheduled to coincide with the ISTAC at Iowa State University.
- Iowa State University IMSEP team members served as exhibitors at ISTAC in fall 2009.
- 2009 Iowa Summer Science Institute.

Session 4: National Efforts in Professional Licensure, Education, and Workforce Development

This session focused on national efforts in professional licensure, education, and overall workforce development. The first presenter was Dr. Jim Alleman, who serves as Chair of the Department of Civil,

Construction, and Environmental Engineering at Iowa State University. Dr. Alleman presented materials on behalf of Dr. Jeff Russell, who serves as chair of the Department of Civil and Environmental Engineering at the University of Wisconsin. This first presentation focused on professional licensure in the field of civil engineering. He reviewed several key points concerning this issue, including the following:

- Civil engineers (CE) face an increasingly complex world requiring more professional breadth and specialization.
- The CE Body of Knowledge (BOK) is the foundation that defines the knowledge, skills, and attitudes necessary to enter the practice of civil engineering at the professional level.
- “It is evident that the exploding body of science and engineering knowledge cannot be accommodated within the context of the traditional four-year baccalaureate degree.” (*Educating the Engineers of 2020*, National Academy of Engineering 2005)
- The BOK embraces the generally-accepted model of a professional’s education that includes (1) fundamentals in math and natural science, (2) breadth in the humanities and social sciences, (3) technical breadth, (4) professional practice breadth, and (5) technical depth or specialization.



Jim Alleman, Iowa State University

Dr. Alleman reviewed these points, noting that professional licensure and professional development over time beyond a traditional bachelor’s-level engineering education are critical to the success of the transportation industry in coming years.

The second presentation was given by Dr. Denver Tolliver, who serves as Associate Director of the [Upper Great Plains Transportation Institute](#) at [North Dakota State University](#). Dr. Tolliver detailed the newly initiated [Transportation Leadership Graduate Certificate](#) (TLGC) being sponsored by the regional University Transportation Centers. He explained that this program is intended to provide further, broader education for transportation professionals and ultimately build leaders for the 21st century. Dr. Tolliver reviewed the background of this program and a few main points concerning its structure and operation, including the following:

- The new online certificate program will begin in fall 2010.
- The program offers distance learning, flexible delivery.
- A consortium of universities is involved in offering courses.
- The program is interdisciplinary and open to professionals in a variety of transportation-related careers.

Dr. Tolliver also discussed the collaboration between several UTCs that made the TLGC possible. He also noted that the program was built on earlier concepts like ITS education, and its workforce development role is to further develop professionals with four to five years of experience who are viewed as leaders by their employers. This certificate could also be a gateway to a graduate or other transportation degree, he added. Discussion followed, wherein Dr. Tolliver explained specific program entry requirements, courses, and program themes that include policy, management, operations, systems analysis, economics, and logistics.

The third presenter was Mr. Joung Lee, who serves as Associate Director for Finance and Business Development for the [American Association of State Highway and Transportation Officials](#) (AASHTO). His

presentation focused on developing young professionals in the transportation field. Mr. Lee explained his experience with the [Young Professionals in Transportation](#) (YPT) group in the Washington, D.C., area. He noted that YPT is open to all young transportation professionals anywhere with goals of professional development, fellowship, and networking. To date, he continued, the group's membership is very diverse, covering all aspects of transportation.

Mr. Lee also reviewed several of the group's activities, including social events, guest seminars, blogs, and other social media outlets. Future plans involve continued development of leadership seminars, a quarterly newsletter, a monthly e-bulletin, policy forums, an annual dinner, a TRB reception, and establishment of regional chapters. Discussion followed, and attendees agreed that such a young professionals group could have benefits to the professional workforce in many areas.

Session 5A: Construction and Transportation Industry Workforce Development and Training Needs

The focus of this session was workforce needs in the transportation construction area. The first presenter was Mr. Kevin Gass, who serves as Vice President of [Perishable Distributors of Iowa, Ltd.](#) Mr. Gass began by discussing the outlook for jobs in the trucking industry today. He stated that driving a truck is a tough job and that trucking is one of the highest regulated industries, noting that the industry must ensure motorists', drivers', and equipment safety at the same time. He also discussed some of the details and technologies behind trucking hours of service.

Concerning the demand for labor, Mr. Gass noted the following:

- A national shortage of 20,000 long-haul truck drivers is expected if current demographic trends stay their course.
- The supply of new long-haul drivers will grow at an annual rate of just 1.6 percent in the next decade. However, economic growth will generate a need for a 2.2 percent average annual increase (320,000 jobs overall).
- 219,000 drivers will be needed to replace drivers who retire over the next decade.
- Trucking wages will also have to return to the wage position that prevailed in the 1990s (they are currently 1.5 percent below the average weekly earnings in construction).

He then went on to discuss an outreach program targeted at minorities, women, and high school students. In addition, he noted the formation of a task force of company owners, drivers, and community colleges created to develop short- and long-term goals to address the ongoing problem.

The next presenters were Dr. Ed Jaselskis, who serves as a Professor in the [Department of Civil, Construction, and Environmental Engineering](#) at Iowa State University, and Mr. Fernando Aveiga, who serves as Multicultural Workforce Specialist for [Master Builders of Iowa](#). The topic of this presentation was development of a high-performing multi-cultural workforce. The presenters began by noting that Iowa's Hispanic population is projected to double between 2010 and 2030. In addition, the average age of this workforce is younger than that of the general workforce. As a result, this workforce is going to play a major part in the transportation industry in coming years, they noted.



Shashi Nambisan, InTrans; Fernando Aveiga, Master Builders of Iowa; Ed Jaselskis, Iowa State University

Next, Mr. Aveiga noted the language and communication issues that have led to Iowa State University's research into better understanding the cultural barriers that exist in industry with Hispanic populations. The research found that seven out of ten Hispanic workers have never taken a course to learn English, especially in construction terminologies, although 92 percent of Hispanic workers would like to take a course to learn English. At the same time, a higher number of Hispanic workers have had a construction-related accident than the general population of construction workers. Many more details of the research project were discussed, but the main findings of the research were as follow:

- Communications is more than just learning another language.
- Integration of workers during training exercises yields best results.
- An educational process was developed for success and crew cohesion.

The presenters noted that, in summary, solving the workforce shortage in the transportation/construction industry will include developing a more diverse workforce, which will require building relationships/links between the multicultural workforce program and several partners. These partners include human services groups, charities, the Construction Sector Board, unions, community colleges, high schools, and others.

The final presenter of this session was Dr. Jennifer Shane, who serves as Assistant Professor in the [Department of Civil, Construction, and Environmental Engineering](#) at Iowa State University. Dr. Shane's presentation focused on women in construction engineering. She began by showing the trends of the number of undergraduate females at Iowa State University and in various construction-related degree programs, noting that there is a need to recruit more females into both Civil Engineering and Construction Engineering. She noted that, to help more female students understand what construction engineering is, a learning community is available through which they can get together with industry people. It is called [National Association of Women in Construction](#) (NAWIC). NAWIC involves several activities, including a "girls night out" and barbeque at the end of each semester. She noted that groups like NAWIC are important to attract and retain females in the transportation/construction industry.

Session 5B: Innovations to Meet the Pavement Industry Workforce Needs

This session focused on workforce needs of the pavement industry. The first presenter was Mr. Bill Rosener, who serves as Executive Vice President of the [Asphalt Paving Association of Iowa](#). Mr. Rosener began by providing his definition of workforce in the asphalt industry, which was broken down into four categories:

- Laborer – low skill with high turnover
- Skilled labor or operators – including equipment operators and lab technicians
- Middle management – includes foreman, superintendents, and estimators
- Managers and owners – president or vice president of the company with 10–50 years experience

Next, Mr. Rosener talked about the current state of asphalt industry in Iowa, noting the following:

- The asphalt industry in Iowa employs 3,000 employees. Many of them are minorities, and a small percent are women.
- In Iowa, the asphalt industry produces 5,000,000 tons of hot-mix asphalt per year, but production will likely be down 40 percent in tonnage in 2010 and 2011.
- Several new technologies available could help the asphalt industry respond to economic pressures by becoming greener. At the same time, due to these new technologies, by 2030 the overall asphalt

workforce will shrink due to greater production with less manpower, with a higher percentage of minorities and women.

Finally, At last, Mr. Rosener noted the greatest economic challenge facing the asphalt industry facing today is the need for federal and state government to make real and long lasting investment in U.S. infrastructure by increasing user fees to motorists.

The final presenters were Mr. Gordon Smith, who serves as President of the [Iowa Concrete Paving Association](#), and Mr. Tom Cackler, who serves as Director of the [National Concrete Pavement Technology Center](#) at Iowa State University. Mr. Smith began by explaining what his organization does and how it has taken on workforce development in the pavement industry. He also noted that, as one of the largest such organizations in the country, members of the Iowa Concrete Paving Association employ about 1,500 Iowans. He also explained that, in order to prepare tomorrow's transportation workforce, the Iowa Concrete Paving Association provides training for different workforce groups and areas that include the following:

- Craft training through [Associated General Contractors](#) and industry (equipment manufacturers, material suppliers) to provide on-the-job experience
- Technician training through the [National Ready Mixed Concrete Association's](#) educational offerings
- Iowa DOT certifications
- Seminars provided by the National Concrete Pavement Technology Center
- Engineering education through university and technical school programs

In conclusion, Mr. Smith noted that similar workforce development challenges apply not only to the concrete pavement industry but also to the concrete pavement engineers in DOTs, contractors, and other civil engineering fields.

"While the challenges may be many, the opportunities for advancement of our crafts and technology through partnerships dedicated to workforce development will prepare the highway construction industry to be a good steward of the environment while providing a transportation network unequalled in quality and economy." – Gordon Smith

Mr. Cackler also provided background on the National Concrete Pavement Technology Center, noting that the center's professional practice training program includes research and reports, technology manuals, technical presentations, seminars and workshops, and demonstration projects. He noted that the products produced by CP Tech center have several characteristics:

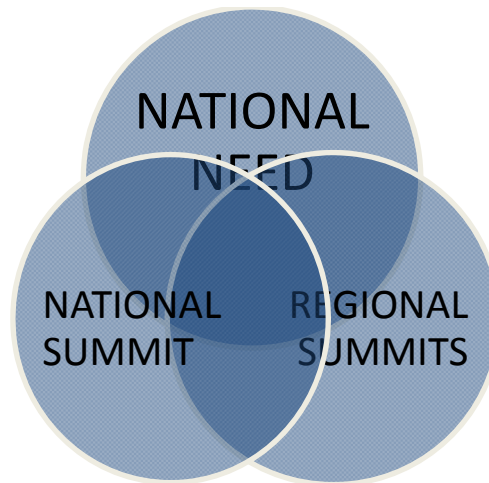
- Good technical material
- Customized for audience needs
- Multiple delivery strategies (workshops, web training, etc.)



Tom Cackler, National Concrete Pavement Technology Center, InTrans

Summit Conclusions

Preparing Tomorrow's Transportation Workforce: A Midwest Summit was successful in providing a better understanding of workforce needs of Iowa and surrounding states. Attendees provided a good cross-section of the larger transportation industry. From what was learned at the summit, Iowa State University, like other regional hosts, can develop a "profile of needs" for Iowa including specific job categories over specific time horizons. The summit was also successful in identifying best practices in addressing the workforce needs that can be utilized by us and others as potential tools or in a "national-level list of attributes." Each regional summit has provided some guidance in developing statewide profiles. The collection of best practices or tools from all the regional summits can be shared and applied to address state (or regional) needs profiles to attract, develop, and retain an effective workforce.



From the summit, it is apparent that one of the greatest challenges we face is guiding youth into the key transportation career paths where they are needed. So also is the challenge of attracting women and individuals from under-represented minority communities. Workforce development strategies should include retooling the approaches used in formal and informal educational settings. Re-examining college-level curriculum and continuing education is also important, but the K-12 timeframe seems to be just as critical. Programs such as Project FREE, WiSE, and Science Bound are illustrative of successful extra-curricular approaches. Contemporary approaches such as social media and networking and the use of other web-based tools need to be adopted to help this cause. Examples of such successful strategies include *Go!*, an on-line magazine regarding transportation for teens, and *jVamos!*, its Spanish edition. These examples from Iowa show that the state is well positioned to be a leader in this area.

The national summit on transportation workforce development will be an opportunity for each state or regional "leader" or group to find some specific tools/answers for bridging the gaps in workforce supply and demand. The result of the national event could be a list of action items for each regional or state "leader" to pursue. In some cases, the tools may need to be nationally focused, such as large promotions or enhanced curricular initiatives.

Appendix: List of Attendees

Last Name	First Name	Organization
Albrecht	Chris	InTrans, Iowa State University
Aldemir-Bektas	Basak	InTrans, Iowa State University
Alleman	Jim	Iowa State University
Anderson	Kimberly	U.S. DOT - FHWA
Aveiga	Fernando	Master Builders of Iowa
Bales	Becky	Associated General Contractors of Iowa
Becerra	Irma	Iowa State University
Bertini	Rob	U.S. DOT - RITA
Bogenreif	Corey	InTrans, Iowa State University
Bohn	Jody	North Dakota State University, Mountain Plains Consortium
Brink	Marcia	InTrans, Iowa State University
Bruning	Monica	Iowa State University
Cackler	Tom	InTrans, Iowa State University
Correa	Jacqueline	University of Iowa
Dougherty	Barbara	Iowa State University
Duan	Huishan	InTrans, Iowa State University
Dumstorff	Briana	Iowa State University
Dunn	Mark	Iowa DOT
Ebbers	Larry	Iowa State University
Gass	Kevin	Perishable Distributors of Iowa, LTD
Gkritza	Nadia	InTrans, Iowa State University
Greenwood	Katie	InTrans, Iowa State University
Hallmark	Shauna	InTrans, Iowa State University
Hanley	Paul	University of Iowa
Hans	Zach	InTrans, Iowa State University
Hargrave	Connie	Iowa State University
Heaverlo	Carol	Iowa State University
Hochstein	Joshua	InTrans, Iowa State University
Hossain	Mustaque	Kansas State University
Jaselskis	Ed	Iowa State University
Jiang	Weiwei	InTrans, Iowa State University
Larson	Sandra	Iowa DOT
Laudencia	Elvie	Iowa DOT
Lee	Joung	AASHTO
Lents	Joan	AGC Workforce Development Committee
Manandhar	Chandra	Kansas State University
Martin	Clark	U.S. DOT - FHWA
McCoy	Stewart	InTrans, Iowa State University

Last Name	First Name	Organization
McDonald	Tom	InTrans, Iowa State University
Mercado	Lydia	<i>U.S. DOT</i> - RITA
Mudgal	Abhisek	InTrans, Iowa State University
Murphy	Kate	Iowa DOT
Nambisan	Shashi	InTrans, Iowa State University
Narasimhan	Balaji	Iowa State University
Nemmers	Charles	University of Missouri
Nguyen	Tuyen	Iowa State University
Oneyear	Nicole	InTrans, Iowa State University
Pfiffner	Dave	DMACC Transportation Institute
Plymale	Bob	Nick J Rahall II Appalachian Transportation Institute
Reed Jr	Walter	Iowa DOT
Richardson	Nancy	Iowa DOT
Rollins	Anita	Iowa State University
Rosener	Bill	Asphalt Paving Association of Iowa
Russell	Jeff	University of Wisconsin, Madison
Schletzbaum	Roger	Marion County Engineer, Iowa
Shane	Jennifer	Iowa State University
Simodynes	Tim	Iowa DOT
Smith	Gordon	Iowa Concrete Paving Association
Souleyrette	Reg	InTrans, Iowa State University
Strauss	Tim	University of Northern Iowa
Sutter	Larry	Michigan Tech Transportation Institute
Taylor	Peter	InTrans, Iowa State University
Tinjaca	Mabel	American Public Works Association
Tolliver	Denver	North Dakota State University, Mountain Plains Consortium
Vencil	Evan	InTrans, Iowa State University
Wang	Teng	InTrans, Iowa State University
Wiegand	Paul	InTrans, Iowa State University
Williams	Chris	InTrans, Iowa State University
Zalaznik	Scott	Iowa DOT
Zmolek	Lindsey	Iowa State University