

# Chairman's Summary

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Transportation is far from the mainstream for most people, yet there is no element of our day-to-day lives that has a more pervasive effect on us. We need a transportation vision, especially an intermodal transportation vision, that gets the public thinking and talking about the importance of transportation and about participating in transportation policy and in the industry itself.

—Robert D. Krebs

The conference began with a keynote speech by Robert D. Krebs, Chairman, President, and Chief Executive Officer of the Burlington Northern and Santa Fe Railway Company. Krebs stated that we are still in the early stages of a transition to a truly intermodal transportation system. Progress has occurred in freight transportation, but it has been much slower in the public transportation sector. This difference is partially explained by a strong market-driven process in the freight sector that demands intermodal transportation services, whereas the impetus for such services has yet to be defined in the passenger sector. As Krebs noted, “If we’re going to adopt a true intermodal perspective, we need more time, more effort, and especially more education.” Other key points in Krebs’s presentation included the following:

- Many transportation officials do not come from transportation degree programs, which should be reflected in education and training programs for the profession.

- Core business curricula should include logistics and intermodal transportation courses as well as those in marketing, accounting, and finance.

- New applications for transportation and intermodalism do not come from a textbook; they come from real-life experiences. Therefore, we need to educate the educator.

- Private companies need to support transportation education by providing financial support, contributing teachers, and participating in courses.

- More research is needed on intermodalism, and these research results need to be incorporated into education and training.

Many of these ideas received further attention during the conference. There was general agreement that although some progress in intermodalism has occurred in the freight sector, this progress has not been at the levels expected when the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) was passed. There was also a sense that education and training were key elements in a strategy to enhance the nation’s intermodal transportation system.

## KEY CONCEPTS

Several important concepts emerged from the conference discussion, especially during the early sessions, which focused on understanding the needs and desires of transportation providers. These concepts served as basic

points of departure for the discussions that occurred later in the conference.

## Vision

There was a general sense that an intermodal transportation vision has not been effectively articulated and conveyed to the general public or to the transportation profession. Generally, this vision means understanding the important relationship between transportation and the functioning of society as we know it. More specifically, it means adopting a supply chain perspective on the movement of people and goods. There is clearly an important role for education and training in disseminating such a vision.

## Private- and Public-Sector Involvement

Conference presenters and participants spent considerable time exploring the necessary involvement of government and industry in education and training. Words such as “dialogue,” “partnerships,” and “collaboration” were used to describe potential interaction. As noted by Krebs, with agreement by conference participants, agencies and companies have a huge stake in educating and training their workforce. An educated workforce is the future of these organizations.

## Role of Curriculum in Management Training

Many of the conference participants did not have a formal education in transportation or logistics. Although a good exposure to transportation in a university program is worthwhile, it often takes more than this to be successful in the profession. Therefore, training and continuing education are important in producing and maintaining a skilled workforce. Lifelong learning suggests that knowledge and skill needs over the career of transportation employees should be important concerns for managers.

## Systems Perspective

Although a systems perspective for transportation has been the thrust of many transportation policies and educational programs, conference participants believed that this perspective still has not taken hold. Organizations, as well as individuals within these organizations responsible for transportation, do not often see the big picture—transportation needs from origin to destination, the entire supply chain, and important linkages to

the way society functions. Along similar lines, a systems perspective suggests that transportation providers need to understand the cost drivers that relate to service provision (and how costs can thus be reduced), as well as the factors that influence the demand for passenger and freight travel.

## Management of Technology and Innovation

One of the important characteristics of intermodal transportation, and of the market context within which it is offered, is the high rate of technological innovation. A serious challenge for the industry and for educators and trainers is how to prepare people to manage technology and to understand the impact of technology on organizations, especially mid- to low-level employees, who are often the first to use such technology. How can organizations develop a culture in which innovation is embraced and people are willing to take the risks associated with innovation?

## DESIRED SKILLS AND KNOWLEDGE

In the first part of the conference, the focus was on the skills and knowledge desired by transportation organizations. Not surprisingly, conference participants noted that such skills and knowledge will vary significantly by job type. However, educators and trainers need to understand what skills are necessary before they develop an education and training program aimed at preparing a transportation workforce. Several illustrations of this linkage between desired skills and the programs designed to provide these skills were presented at the conference, for example, truck driver certification and signal technician certification. In addition, it was recognized that people learn in different ways and that the most effective way to educate or train individuals will likely vary from one context to the next. There is a need to evaluate different education and training models to determine which ones work best in which contexts.

Conference participants identified a set of competencies or skills that could apply to any level or position as well as to any field in transportation. These “core competencies” included the following:

- *Technical competence:* No matter what the task, individuals must be technically competent to perform it successfully.
- *Teamwork:* Being able to work effectively as a team is becoming one of the most critical characteristics of today’s workforce.
- *Role of measurement:* Implied by measurement is any level of mathematical reasoning, from basic math-

ematical skills to the development of mathematical models.

- *Communications*: One of the important needs, and a real challenge to educators, is developing student skills in technical communications.

- *Critical thinking*: Referred to by some as “problem-solving,” in essence this skill involves the ability to figure out the logical path from an existing status to a desired one.

As noted earlier, these core competencies are generic in the sense that they could be applied to any type of position. Conference participants also identified higher-level skills and knowledge that were appropriate for those involved with intermodal transportation:

- *Customer orientation*: Given the market context for intermodal transportation, the transportation workforce must understand customer desires and needs.

- *Systems perspective*: As noted earlier, intermodal transportation requires a systems perspective in the planning, operations, and management of services and facilities.

- *Economics and forecasting*: A basic understanding of how economies operate and how transportation fits into this economic context is needed.

- *Data, modeling, and information systems*: In a complex world, transportation officials need to understand how to use data in a decision support context, which could include developing models and information systems.

- *Basic research understanding*: This skill includes developing a research design, conducting experiments, and drawing conclusions.

As an example of how different levels of competency can relate to different levels of education, one conference group developed illustrative programs at different levels of entry for those interested in intelligent transportation systems (ITS). For example, two-year programs should include computer-assisted drafting and design (CADD), computer programming, electronics, quality control, and traffic control systems. Undergraduate programs should include a broad understanding of other engineering disciplines, crosscutting skills such as those in communications and business, and problem solution. Graduate programs should include broad knowledge of a major field and a subspecialty, computer tools, ITS and management information systems (MIS), and related multidisciplinary courses.

Conference participants also suggested that an increasingly important characteristic of intermodal transportation is understanding transportation service provision in an international context, which encompasses the following areas: economics, transportation characteris-

tics, geographic considerations, supply chain management, government role, delivery distribution, transportation and logistics strategy, and management of change and innovation. Many of the companies represented at the conference manage global operations, and they strongly believe that employees of the future will need to understand their company's place in the global market.

## FINDINGS AND CONCLUSIONS

The conference findings and conclusions fall into three major areas: education and training pedagogy, industry-government and education-training partnerships, and policy and program initiatives.

### Education and Training Pedagogy

#### *M.B.A. Programs*

Logistics and intermodal transportation courses should be incorporated into core M.B.A. programs. Many conference participants representing private transportation companies strongly believe that M.B.A. programs do not expose students sufficiently to transportation and logistics issues. Logistics curricula are often found, but the broader context of the transportation industry and service issues is often not present.

#### *Core Competencies*

Core competencies should be defined by academia and stakeholders for all levels of entry into the workforce. The concept of core competencies was viewed by many as a key point of departure for education and training programs. These core competencies should be developed jointly by all major stakeholders and constituencies and should provide input for program development.

#### *Collaborative Work Projects in Education*

Effective teamwork on projects is a key educational and training objective. Universities and training programs should actively seek opportunities to involve government and industrial partners in developing projects that not only benefit the organization but also provide important educational exposure for students.

#### *Case Studies on Systems Perspective*

Adopting a systems perspective in transportation courses is an important pedagogical strategy. Inherent in this approach, however, is the need to illustrate the

systems perspective through case studies. Conference participants believed that intermodal transportation case studies that show the systems nature of intermodal service provision should be developed and shared among education and training institutions.

### *Improved Communications*

The ability to communicate on paper and in group presentations is a critical skill for all transportation professionals, as has been noted by many different groups and is well known in the transportation education community. Placing greater emphasis on effective communications skills should be an important goal of education and training programs.

### *Alternative Learning Methods*

Many conference participants noted that the traditional teaching-training model that features an instructor in front of a class might no longer be appropriate for today's world. There was a strong belief that the U.S. Department of Transportation (DOT) and other organizations interested in transportation education and training should assess the effectiveness of alternative learning methods, which could include, but not be limited to, use of the Internet, internal organizational networks, distance learning, virtual university, and self-learning.

### **Industry-Government and Education-Training Partnerships**

Conference participants identified many ideas for developing partnerships between industry and governmental agencies and education and training programs. No specific recommendations were made about which group should take the lead in establishing these types of interactions because their implementation would clearly depend on individual circumstances. In some cases, the education and training program might take the initiative, whereas in others, industry or government might take the first step. The sense of the conference was that each of the following approaches have merit and should be pursued when the opportunity arises.

### *Education of the Educator*

Opportunities should be provided for those teaching to experience the practical world of transportation so that this experience can be incorporated into the classroom. These opportunities might range from hiring a teacher for a limited duration to establishing professional relationships between individual teachers and companies.

### *Student Interns*

One of the most effective learning mechanisms is to have students experience firsthand the environment within which they will eventually work. Student internships provide a unique opportunity to do this. In setting up the internship, both the educational institution and the company or agency must agree to the terms of internship, for example, what activities count toward academic credit.

### *Professional Sabbaticals*

It is also important to provide opportunities for transportation professionals to experience advanced educational experiences. Not only will this help the individual professional, but it will also provide useful input to the educational institution.

### *Job Rotation*

One means of providing training opportunities within an organization is to rotate new employees among different functional units. This rotation provides new employees with opportunities to better understand the workings of the organization and to become more sensitive to the system within which the employee will operate during his or her career.

### *Team Teaching*

The concept of team teaching includes courses with instructors from both transportation practice and the educational and training program. This concept is not new; many programs have been using this technique for some time.

### *Advisory Boards*

Many programs have advisory boards to provide guidance on overall program direction and to help secure funding for strategic initiatives. Several company representatives at the conference suggested that use of advisory boards would be a good way for the private sector to influence future employees' formal education.

### *Guest Lecturers and Adjunct Professorships*

A concept similar to team teaching, adjunct professorships were suggested by conference participants as a useful way of formally incorporating practice-oriented considerations into education programs. This concept has been used by many universities with great success.

### *Curriculum Development*

The example used to illustrate this approach was Sea-Land Services' interaction with the U.S. Merchant Marine Academy in developing a curriculum that is directly related to the maritime industry. Not only does this interaction foster the exchange of ideas, but it could also generate financial support for innovative approaches to curriculum development.

### *Support of Research*

Private and governmental support for transportation and logistics research can provide an important foundation for incorporating new ideas into transportation education and training curricula. At major universities, for example, research plays an important role in generating new ideas, which are then incorporated into the curriculum.

### *Endowed Chairs*

Perhaps the most significant way in which private companies can influence the direction of transportation and logistics research and education is by endowing faculty chairs. Such endowments provide resources and guidance to educational institutions on the important topics that should be addressed by higher education.

### *Monitoring and Feedback*

Education and training programs become most effective when there is monitoring and feedback on program effectiveness. Whether this occurs through advisory board membership or through formal evaluation procedures, this feedback loop is important.

## **Policy and Program Initiatives**

### *Return on Investment in Training*

Support for training programs by high-level management usually reflects an understanding of the company's return for investing in such programs. It is important to provide some level of understanding of how such a return could be measured and communicated to those in charge of investing in the organization's future. Conference participants suggested that this effort was something that DOT might undertake as part of its training programs.

### *Effectiveness of Alternative Learning Models*

Conference participants believed strongly in the need for an assessment of alternative learning models. This assess-

ment could be supported by a consortium of public and private organizations concerned with providing the most effective approach toward training for their employees.

### *National Transportation Skills Standards*

Several conference participants suggested that a set of national transportation skill standards be developed that could be applied throughout the United States and that could then become the core competencies at which education and training programs would be aimed. This idea was the most controversial of any suggested at the conference. Many participants were concerned about the loss of flexibility if a uniform set of standards were applied. Others thought that it would be difficult to find agreement on what these skills should be. There was no consensus on this initiative.

### *National Policy for Workforce Development*

Several conference participants suggested that a national policy be developed linking transportation investment to the development of employee skills. Many other participants did not agree on the importance of this initiative. However, there did appear to be general agreement that including human resource development in the mission statement of transportation agencies was an important step in recognizing the linkage between organizational effectiveness and the availability of trained staff.

### *Clearinghouse for Curriculum*

There was agreement that it would be very useful to develop a site on the World Wide Web to act as a clearinghouse for curriculum innovations. The Transportation Research Board could possibly take the lead in this development.

### *Federal Support of Education, Training, and Research*

There is an important linkage among research, education, and training. Most conference participants, and all private-sector participants, strongly suggested that federal support of intermodal transportation research, education, and training should be a priority area for DOT. It needs to be recognized that through research, one can have a great deal of influence on the direction of the U.S. transportation system. Likewise, through education and training, future transportation professionals can become more sensitive to this direction.

### *Follow-Up Conferences*

Most participants believed that this conference was a good initial step for the exchange of ideas on how to best

provide intermodal transportation education and training. Examples of innovative state-level training programs that could have excellent application elsewhere were presented. There was a clear sense that the next step was to have periodic meetings at which examples of good practice could be presented to the transportation community and examined for application elsewhere. There was strong support for TRB to consider cosponsoring a conference on international intermodal education.

*Garrett A. Morgan Technology and Transportation Futures Program*

The Garrett A. Morgan program was viewed by many conference participants as a major initiative in providing incentives and support for attracting the best students to a career in transportation. Because the program had just been organized when this conference was held, support was for the most part voluntary and unfunded. Conference participants believed strongly that the program should be supported with funding from DOT and with support from other agencies and corporations.

## RESPONSE TO CONFERENCE FINDINGS AND CONCLUSIONS

The steering committee and participants were honored to have the Firing Line Panel, which consisted of distinguished transportation professionals representing a broad spectrum of the transportation industry, present on the final day of the conference to respond to the preliminary findings and conclusions. The panel included Tay Yoshitani, Maryland Port Administration; Joni Casey, Intermodal Association of North America; William R. Lucas, Military Traffic Management Command; Lawrence Dahms, Metropolitan Transportation Commission; Edward Wytkind, Transportation Trades Department of the AFL-CIO; and Lana Batts, Truckload Carriers Association. Although a number of the comments and responses from the panel were incorporated into and are reflected in this summary, many of the key points raised by panelists are highlighted in the section Firing Line Panel Response to Conference Findings later in these proceedings.