

# Highways for Efficient and Safe Goods Distribution

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**M**ichael Walton identified four key issues to evaluate when designing highways for the improvement of North American economies:

- Productivity,
- Safety,
- Pavement, and
- Bridges.

## DOMESTIC FREIGHT TRANSPORTATION ISSUES

Walton identified 13 issues that require new or further research:

- Characteristics and growth of freight demand;
- Efficiency, safety, and public policy for rail and truck competition;
- Institutional arrangements and compatibility of federal and state truck regulations;
- Collection, use, and adequacy of user fees;
- Long-term availability of highway and bridge capacity;
- Transportation safety, including perceptions and operator behavior;
- Productivity benefits of truck size and weight changes;
- Energy consumption and air quality;
- Highway geometrics and truck compatibility;
- Enforcement;
- Pavement construction alternatives to reduce life-cycle costs;
- International practices; and
- Rail disinvestment.

## INFLUENCE OF INCREASED TRUCK SIZE AND WEIGHTS ON GEOMETRIC DESIGN PRINCIPLES

- Stopping and passing sight distance,
- Pavement widening on curves,

- Critical length of grades,
- Lane and shoulder widths,
- Minimum design for sharpest curves,
- Width for turning roadways,
- Sight distance at at-grade intersections, and
- Median openings.

### OPPORTUNITIES FOR IMPROVING TRUCK SAFETY

- Equipment specifications, operating practices, and driver training;
- More stringent driver controls;
- Improved truck controllability;
- Upgraded geometric design of highways;
- Dedicated, comprehensive safety management by trucking firms through monitoring and training of drivers, maintaining equipment, employing safety professionals, acquiring accident data, and considering safety versus short-term cost; and
- More effective enforcement of truck safety regulations.

### ISSUES

In the bridge area, the questions are as follows:

- What is the long-term capacity of the highway and bridge system?
- What is the quality of data on bridge conditions?
- Are bridge posting and design practices too conservative?
- Are larger trucks eroding safety margins?
- Does conservatism in design hide a reserve of unused load-carrying capacity in bridge systems?
- Could estimated replacement costs be reduced by better screening for actual capacity?

### VISION OF INTELLIGENT VEHICLE-HIGHWAY SYSTEMS

Commercial vehicles operate on North American highway systems with the same ease as passenger vehicles while ensuring regulatory compliance and user safety.

### GOALS OF INTELLIGENT VEHICLE-HIGHWAY SYSTEMS

- Benefit North American industry through increased productivity for commercial vehicle operations,
- Increase efficiency for government,
- Improve traffic safety and highway operations,
- Continue technology development and implementation, and
- Enhance industry and government partnering.

### SAFETY

- Real-time driver and vehicle safety monitoring,
- Hazardous materials tracking,
- Site-specific highway warning systems, and
- Automatic mayday capability.

## PRODUCTIVITY

- Electronic permitting,
- Electronic logbook and fuel tax reporting,
- Automatic credential and weight checking,
- Real-time information systems, and
- Comprehensive data collection for planning.

## NEAR-TERM DEPLOYMENT

- Weigh in motion,
- Automatic vehicle identification (AVI),
- AVI and automatic vehicle classification (AVC),
- Automatic vehicle location systems, and
- Static network routing and scheduling.

## MIDDLE-TERM DEPLOYMENT

- Vehicle safety monitoring system for driver use,
- Highway speed toll collection (AVI and AVC),
- Automated vehicle and driver credential reporting (AVC),
- Highway safety warning systems (including ramp radii, height limits, and grade speeds),
- Computerized fleet tracking and dispatching,
- Automated hazardous materials identification and location,
- State line beacon network, and
- Dynamic or combined static-dynamic network routing.

## LONGER-TERM DEPLOYMENT

- Electronic tax and permit systems, and
- Automated vehicle and driver condition monitoring and reporting.

## KEYS TO SUCCESSFUL COMMERCIAL VEHICLE OPERATIONS PROGRAM

- Partnerships;
- Joint goals and plans;
- Costs, benefits, and market; and
- Solving institutional problems.