TOLL TRUCKWAYS:

Increasing Productivity and Safety in Goods Movement

By Robert W. Poole, Jr.,
and Peter Samuel

Trucks Are America's Lifeblood

- Trucks carry 90% of all freight (by value).
- Truck shipment is a $600 billion/year business.
- 75% of truck shipping (ton-miles) crosses state boundaries.
- There's no turning back to rail for most shipping.

But Trucking Faces Serious Problems

- Inadequate Highway Infrastructure
- Increasingly Congested Interstates
- Limited Productivity Gains
- Continued Safety Problems

Inadequate Highway Infrastructure

- From 1980 to 2000, VMT grew by 80%.
- From 1980 to 2000, lane-miles increased only 4%.
- Truck VMT is growing faster than car VMT.
- 46% of National Highway System will be at or over capacity by 2020.

Interstates Becoming Congested

- Severely congested (V/SF>.95) Interstates in 2001:

  Urban: 3,084 rt.-mi.

  Rural: 523 rt.-mi.

- Moderately congested Interstates (V/SF 0.8 to 0.95) in 2001:

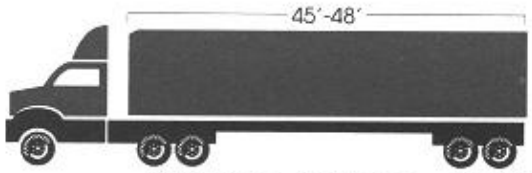
  Urban: 2,392 rt.-mi.

  Rural: 1,299 rt.-mi.

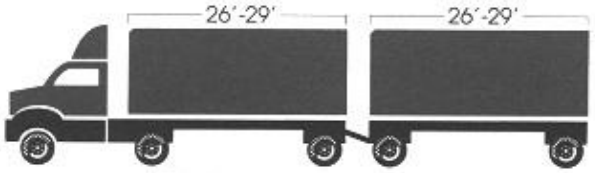
Trucking Could Be Far More Productive

- Rail labor productivity has increased four-fold since 1980.
- But in trucking, one driver still hauls (mostly) one trailer.
- Longer combination vehicles (LCVs) can more than twice as much freight as conventional 18-wheelers
- Truck shipping is $610 billion/year business; 10% saving is $61 billion

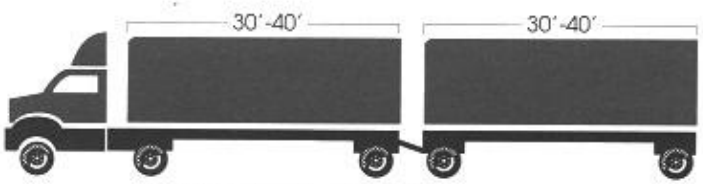
What Are LCVs?



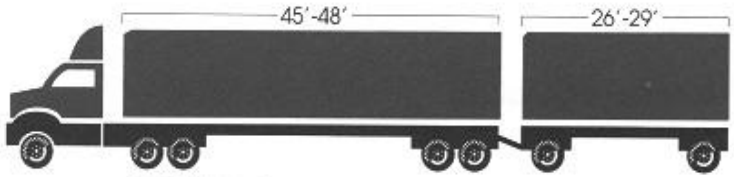
Standard Tractor - Semitrailer



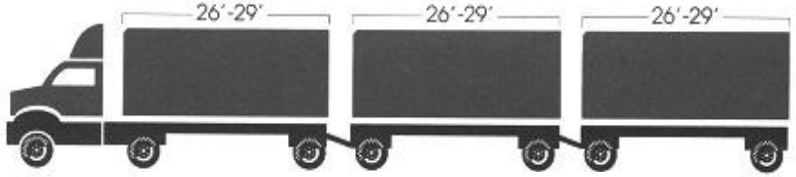
STAA Double



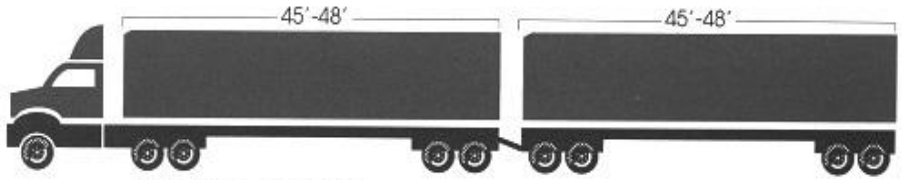
Intermediate Double



Rocky Mountain Double



Triple



Turnpike Double

Safety Issues Holding Up Change

- 5,000 deaths/year from car-truck crashes.
- Highway safety groups against expanding territory of LCVs.
- Federal (1991) “LCV freeze” restricts use to western states and a few eastern turnpikes.

Existing LCV Routes

Toll Truckways: a win-win proposition

- Heavy-duty lanes designed for LCVs
- Built in existing right of way on Interstate routes
- Open (voluntarily) to all trucks; mandatory for LCVs in non-LCV states
- Self-funding from tolls, charged electronically

Phase I Study: Simulation Modeling

Civil engineering team at CCNY

- Pavement design
- Productivity-gain estimates
- Economic feasibility
- Financial feasibility

Phase II Study: Pilot Long-Distance Corridors

- National FHWA database
  1. Freight Analysis Framework
  2. Hwy. Performance Monitoring System
- Relative Financial Feasibility:
  1. Revenue criteria
  2. Cost criteria

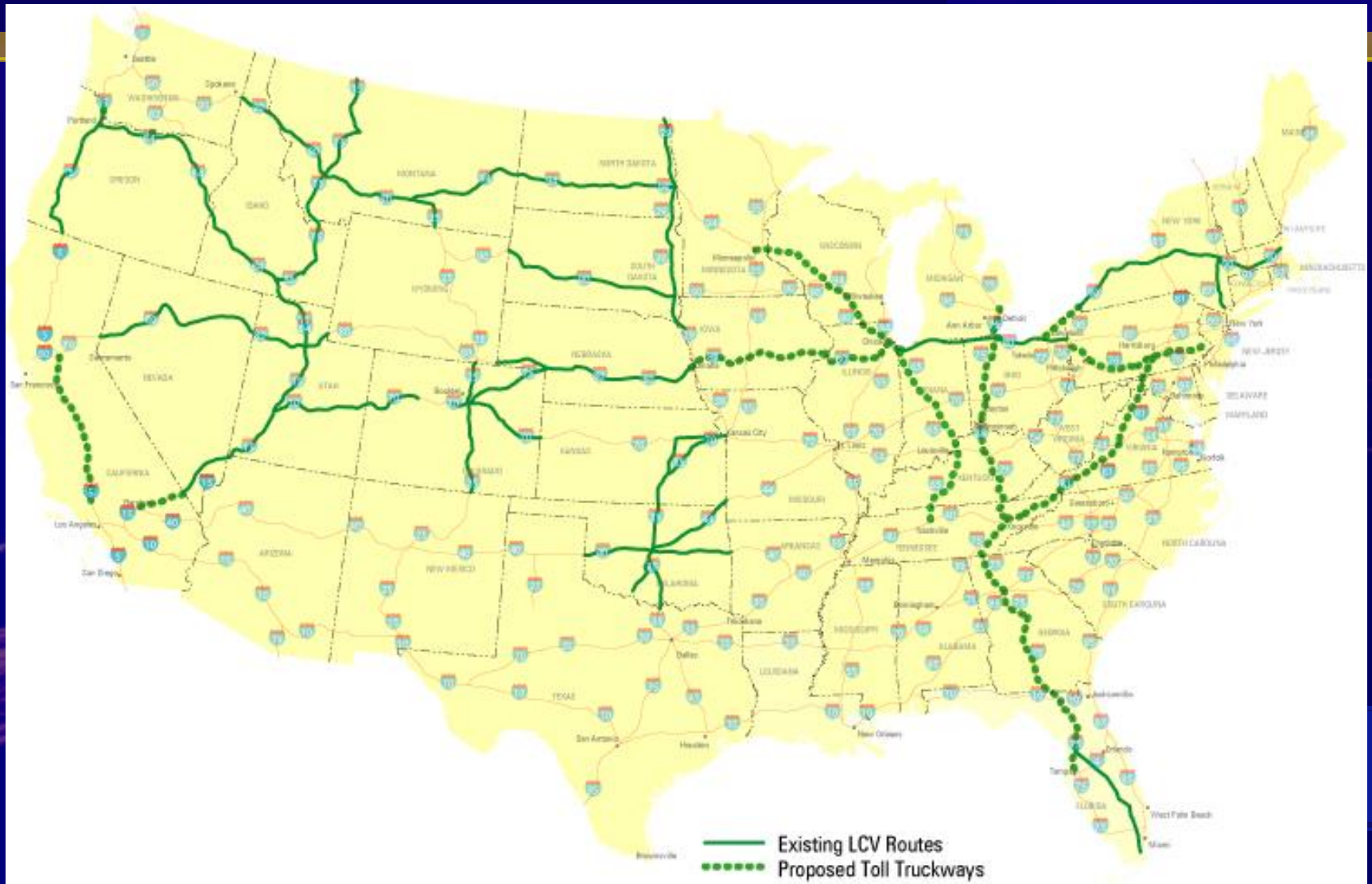
Revenue Criteria

- Gross truck volume (2020)
- Long hauls
- Congestion
- Connectivity to existing LCV routes
- Trucking industry input

Cost Criteria

- Right of Way Availability
  - Minimum 48 ft. median
  - One lane each direction plus shoulders
  - Concrete center and side barriers
  - Passing lanes every few miles
- Terrain Factors
  - Flat
  - Hilly
  - Mountainous

Proposed Toll Truckway Pilot Corridors



Phase III: Urban Toll Truckways

Need to quantify:

- Time savings
- Payload increase
- Higher-cost lane additions

Urban Toll Truckway Productivity

	Mixed freeway semi-trailer	Mixed freeway double-shorts	Truckway semi trailer	Truckway double-short	Truckway triple-short	Truckway double-long
Payload	45,000 lbs	45,000 lbs	45,000 lbs	45,000 lbs	67,500 lbs	90,000 lbs
metric tons	20t	20t	20t	20t	30t	40t
100 mile delivery - 2004 freight rates	$500	$500	$500	$500	$750	$1,000
Average speed on the road	38mph	38mph	60mph	60mph	60mph	60mph
Miles driven in 8-hr shift (6 hrs driving)	228 miles	228 miles	360 miles	360 miles	360 miles	360 miles
Revenue from 6 hrs payload at 2004 rates	$1,140	$1,140	$1,800	$1,800	$2,700	$3,600
Variable costs	$684	$684	$684	$684	$1,007	$1,165
Available for overhead, profits, tolls	$456	$456	$1,116	$1,116	$1,693	$2,435
Extra earnings from using truckway/shift/day			$660	$660	$1,237	$1.979
Drop assumption of no change in freight rates						
Assume the extra productivity split 3 ways			3x$220	3x$220	3x$412	3x$660
Shipper's savings on 100 mile delivery, %			$61 12.2%	$61 12.2%	$76 15.2%	$91 18.3%
Additional for trucker overhead & profit/day			$220 43%	$220 43%	$412 90%	$660 x1.45
Truck tollway - possible toll per mile			61c/mile	61c/mile	$1.15/mile	$1.83/mile

Key Urban Truckway Features

- Two (14') lanes each way
- Concrete jersey barrier separation
- Separate access/egress ramps
- Nodes (make-up/breakdown yards)
- Variable tolling, all-electronic
- Voluntary for conventional rigs, mandatory for LCVs
- Located in existing freeway corridors

Twin Ports to Nevada Truckway

- I-710,I-210, SR 60, I-10 among top 7 truck volumes nationally (2020)
- Trucks often 10% of traffic, 30% of capacity
- 4-lane truckway ports to I-15, 2-lane (+ passing lanes) I-15 to NV border
- Urban segment: 292 lane-mi., $8.4B
- Rural segment: 380 lane-mi., $2.0B

Ports - Nevada Toll Truckway

Analysis of Ports-Nevada Truckway

- Assume 3% annual truck traffic growth
- Medium-term urban: 50% of trucks @ $1.00/mi (2004) average toll
- Medium-term rural: 60% of trucks @ $0.40/mi. (2004) average toll
- Results: both segments financially feasible (urban NPV = $16.7B, rural NPV = $5.5B)

Oakland-Valleys Truckway

- Link Port of Oakland to Silicon Valley and Stockton/Tracy
- 80% of Bay Area goods-movement is by truck
- 325 lane-miles, all 4-lane
- $9.1B construction cost (using SCAG figures)

Oakland – Valleys Toll Truckway

Analysis of Oakland-Valleys Truckway

- Truck traffic from federal FAF
- Medium-term: 60% of truck traffic
- $1.00/mile average toll (2004)
- Results: financially feasible (NPV of $12.4B vs. cost of $11.9B, in 2004 $)

Needed Policy Changes

- Provision of right of way in Interstate and freeway corridors (federal and state)
- Liberalized size & weight limits on Toll Truckway lanes (federal and state)
- Removal of ban on Interstate tolling for Toll Truckway lanes (federal and state)
- State enabling legislation for tolling, regional joint powers authorities

Conclusion: toll truckways could be a win-win proposition

- Increased goods-movement capacity, paid for by users
- Reductions in shipping costs
- Increased highway safety
- Reduced highway emissions

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