



You're Concerned about Congestion & Infrastructure; So Are We; Let's Work Together

Business Advisory Committee
The Transportation Center

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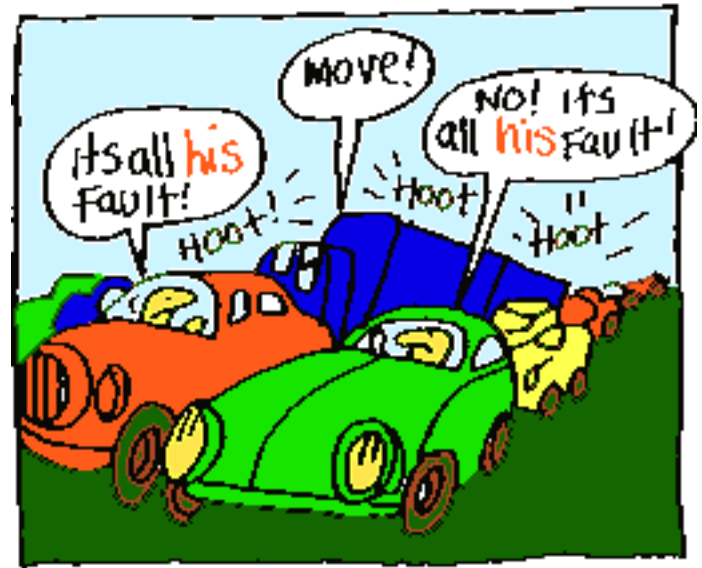
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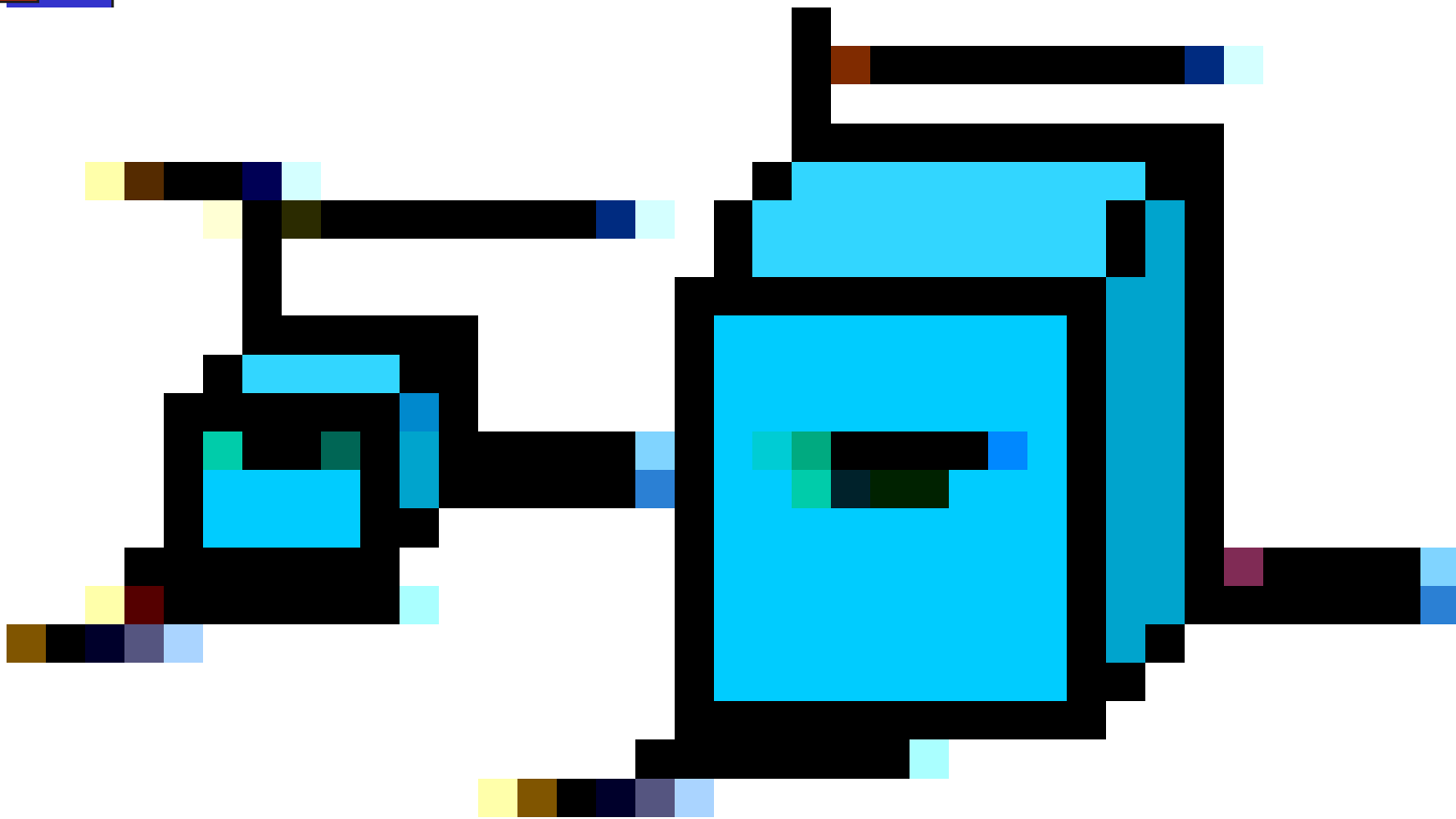
NORTHWESTERN UNIVERSITY

This Morning

- Congestion
 - How Bad?
 - Impacts?
- Infrastructure
 - Condition
 - Are we investing enough?
- Possible Research
 - Congestion pricing
 - Network surety
 - Disruption management
 - Project "success"



Highway Congestion Is Getting Worse

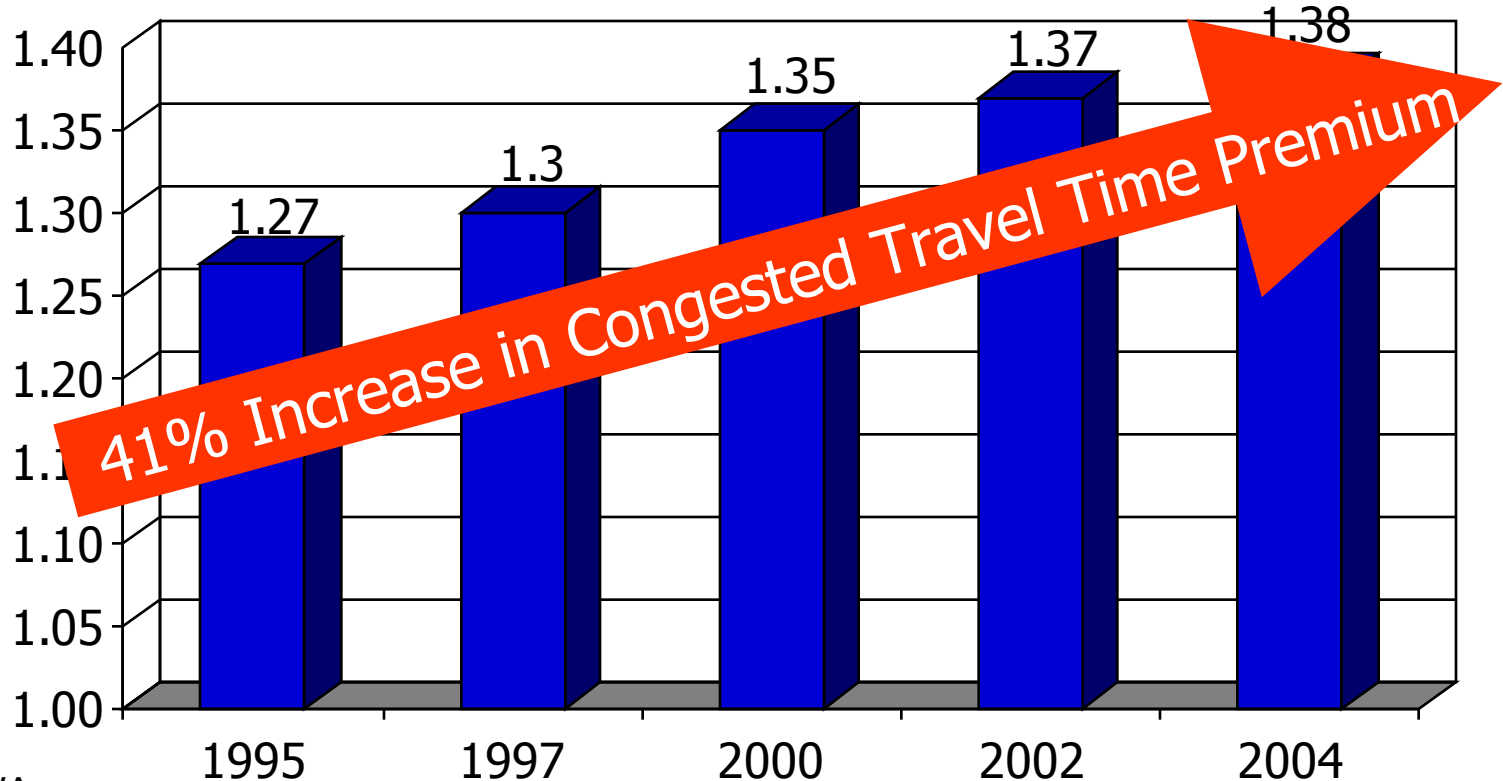


Source: FHWA

Need to Be Careful about Definitions

Highway Congestion - Measured by Travel Time Index

$$TTI = \frac{\text{Peak Period Travel Time}}{\text{Uncongested Travel Time}}$$



Source: FHWA

Average TTI for all US Urban Areas, 1995-2004

Congestion Not Just a Highway Problem

- Rail, water, pipeline, air all face capacity constraints
- **Require substantial investments simply to hold current market share**
- All depend on roads for “intermodalism”



Congestion Impacts

- Wasted

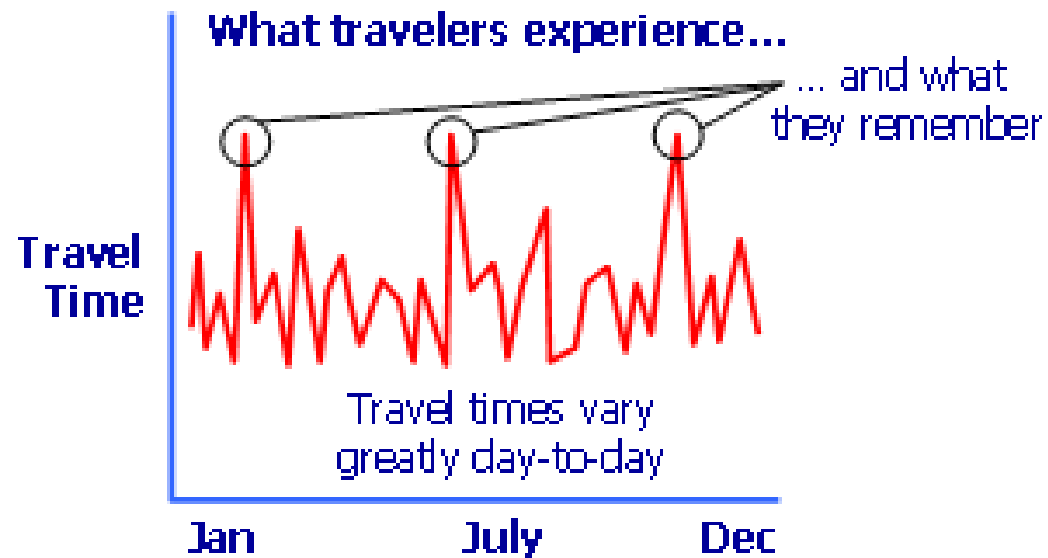
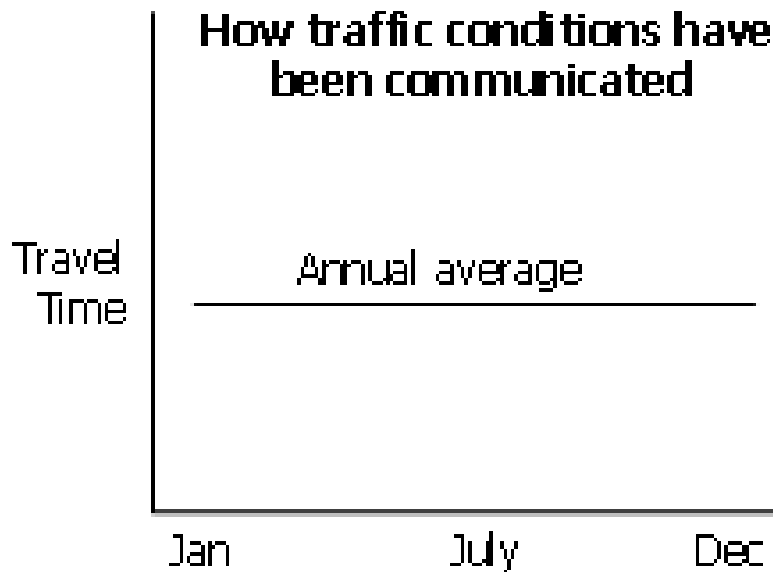
- Travel time
- Fuel
- Emissions
- Vehicle wear



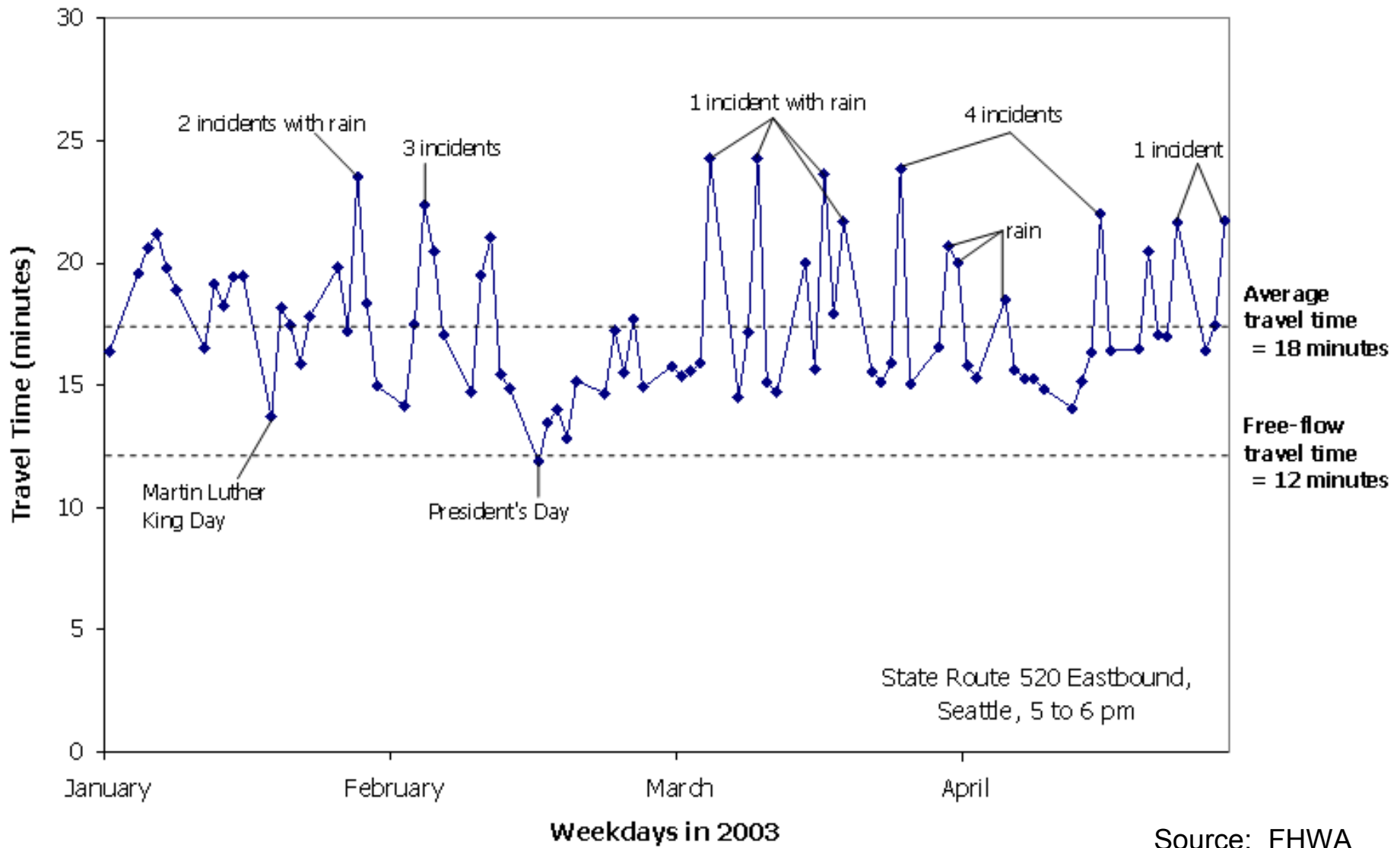
- Decreased transport time reliability

- Leads users to build in cushion
 - "Buffer"
 - Businesses & families

Travelers Build in "Buffer" Representing Near-Worst Case

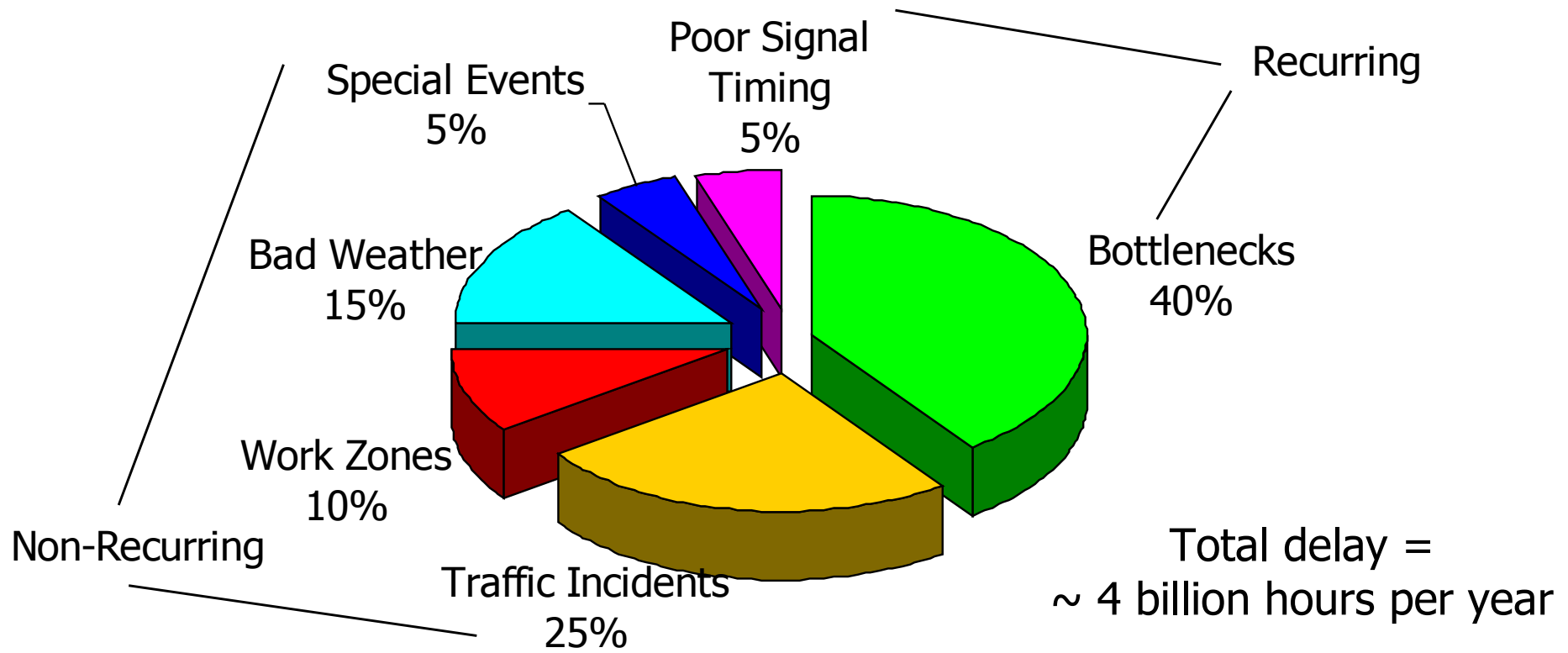


Source: FHWA



What do transport-dependent businesses do?

Causes of Highway Congestion



Source: FHWA



We Think We Know What to Do (?)

- Incident Management
- Operations Improvements
- Construction Project Coordination & Management
- Transit
- Demand Management
 - Pricing
- Additional Capacity
- Land Use



Do We Know How Effective Tools Are? Can We Target Congestion Causes?

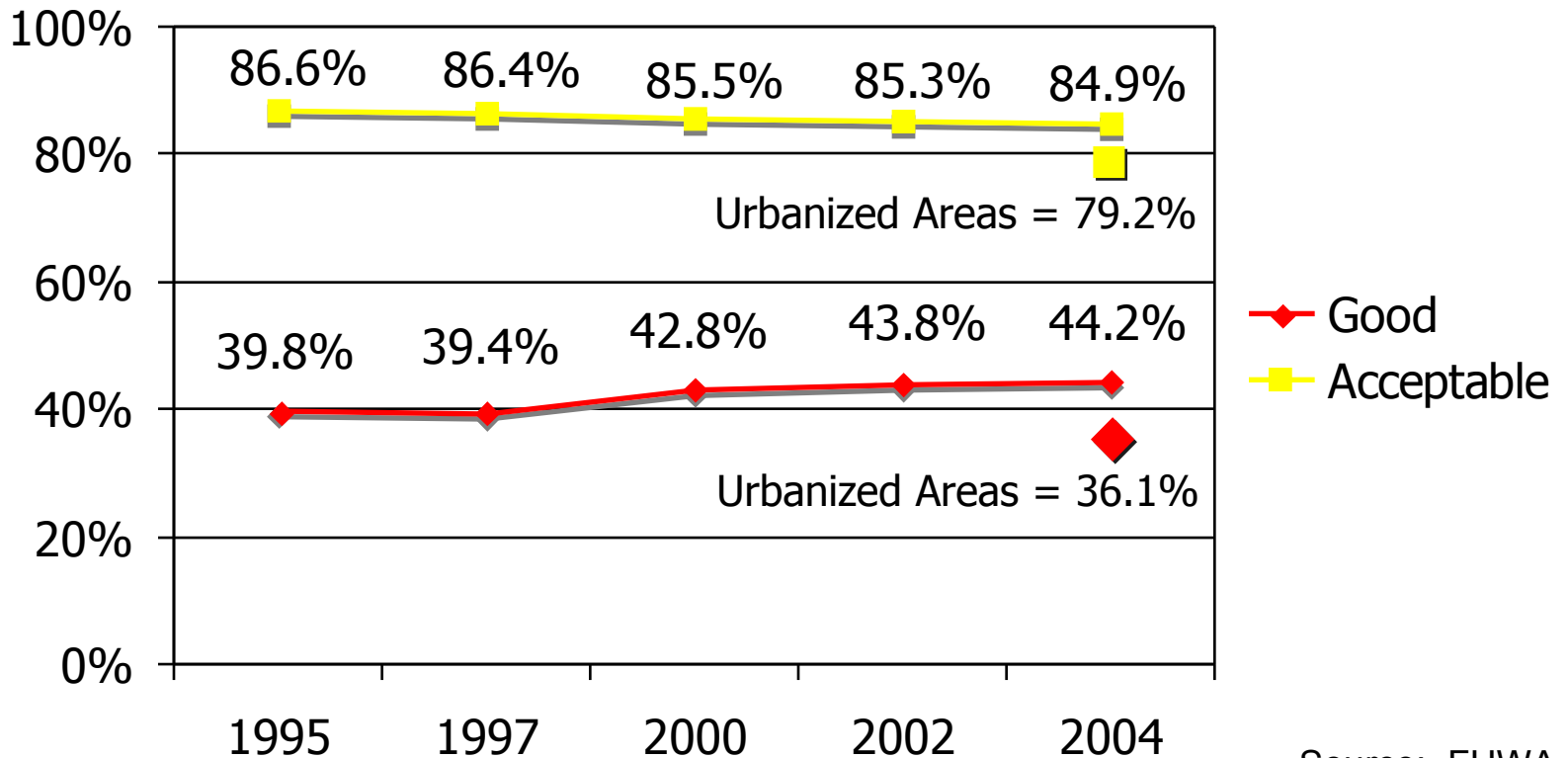


2 Concerns about Infrastructure

- Capacity
 - Federal euphemism = “Bottlenecks”
- Condition
 - Defined 2 ways
 - Physical condition/utilization measures
 - Needed reinvestment

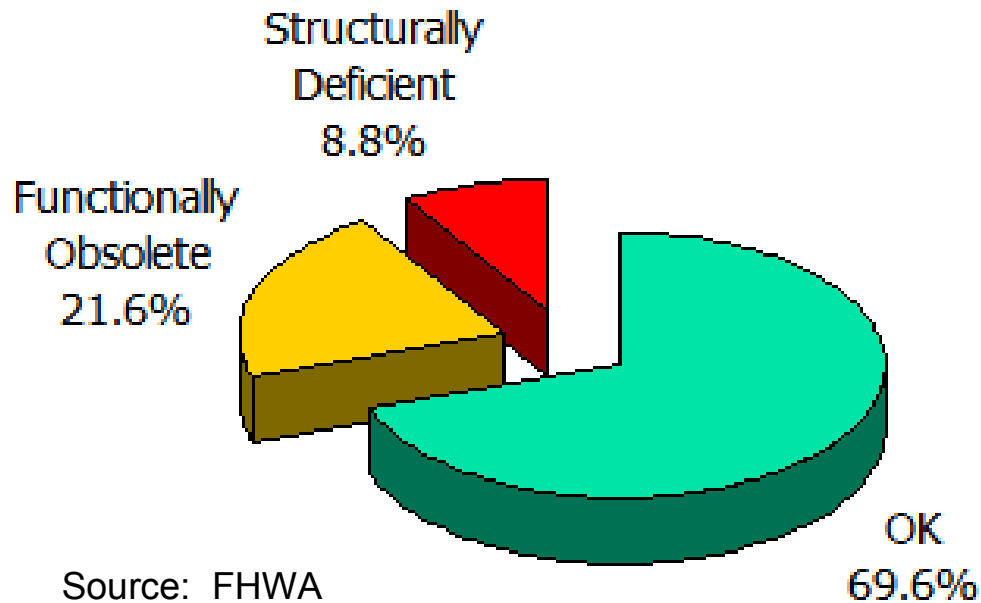


Highway Ride Quality



Vehicle-Miles Traveled on Roads
with Acceptable/Good Ride Quality, 1995-2004

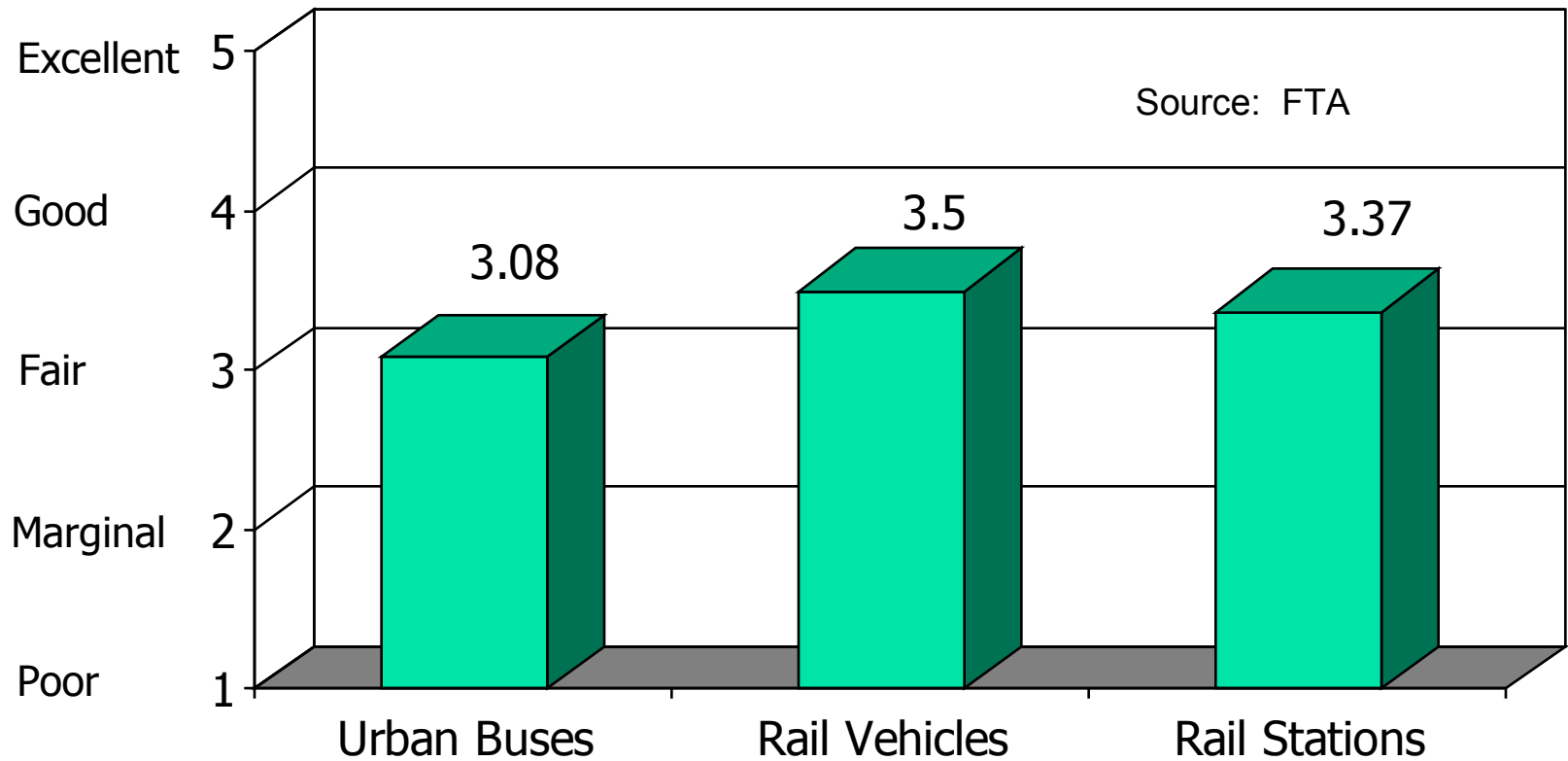
Highway Bridge Condition



Urban Bridge Deficiencies, 2004

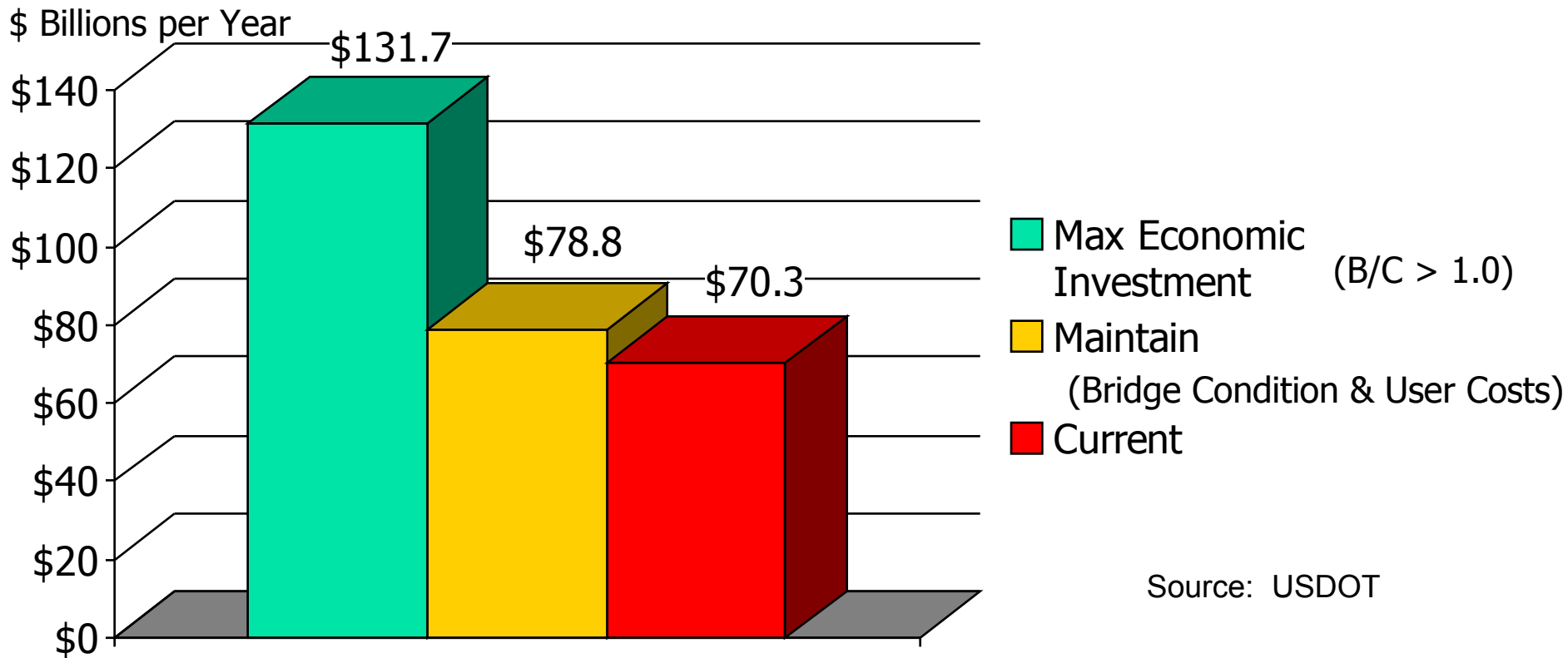


Transit Capital Stock Condition



Condition of Urban Transit Capital Stock, 1-5 Scale, 2004

USDOT Analysis Indicates We Aren't Spending Enough on Roads

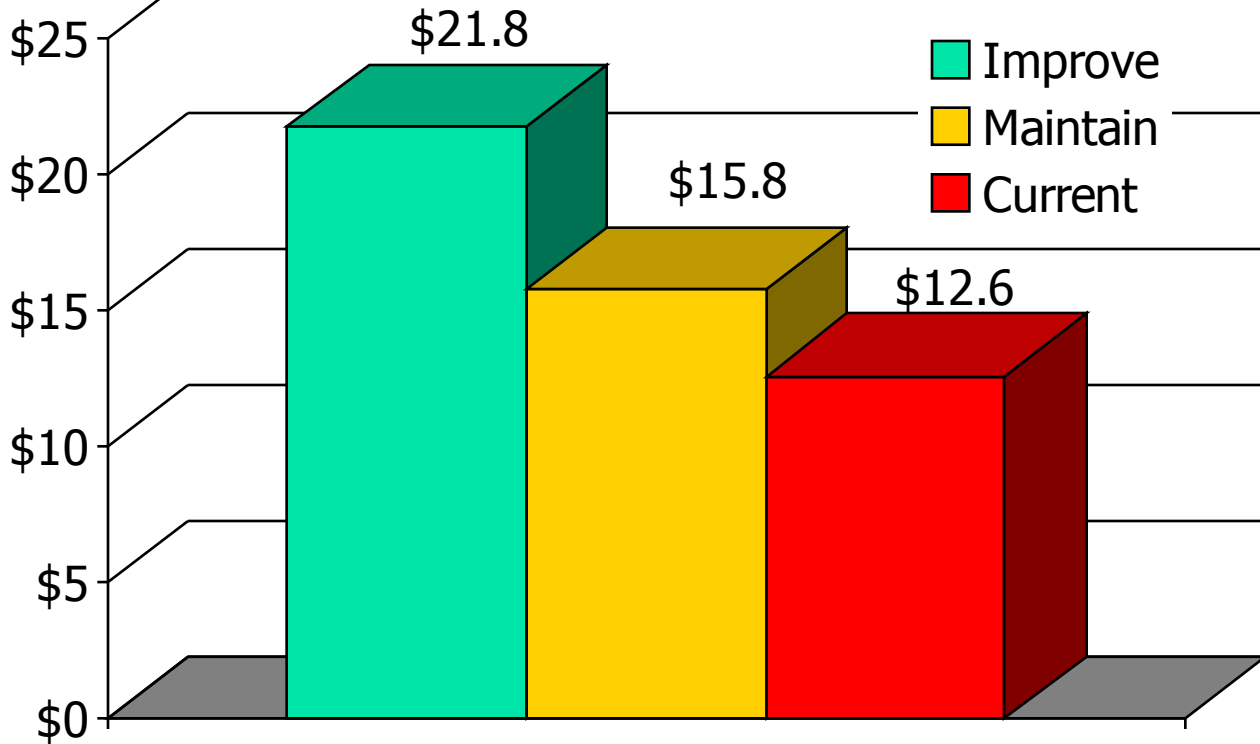


Current Bridge/Highway Annual Capital Investment
Vs. Cost to "Maintain" vs. Maximum Economic Investment

Or Transit



\$ Billions per Year



- Improve
- Maintain
- Current

"Maintain"
Current asset conditions
Vehicle occupancy levels

"Improve"
Average asset condition
to "Good,"
Reduce vehicle occupancy,
Increase speed

Source: USDOT

Current Transit Annual Capital Investment
Vs. Cost to "Maintain" vs. Cost to "Improve"

Other Modes Have Similar Condition/Capacity Issues



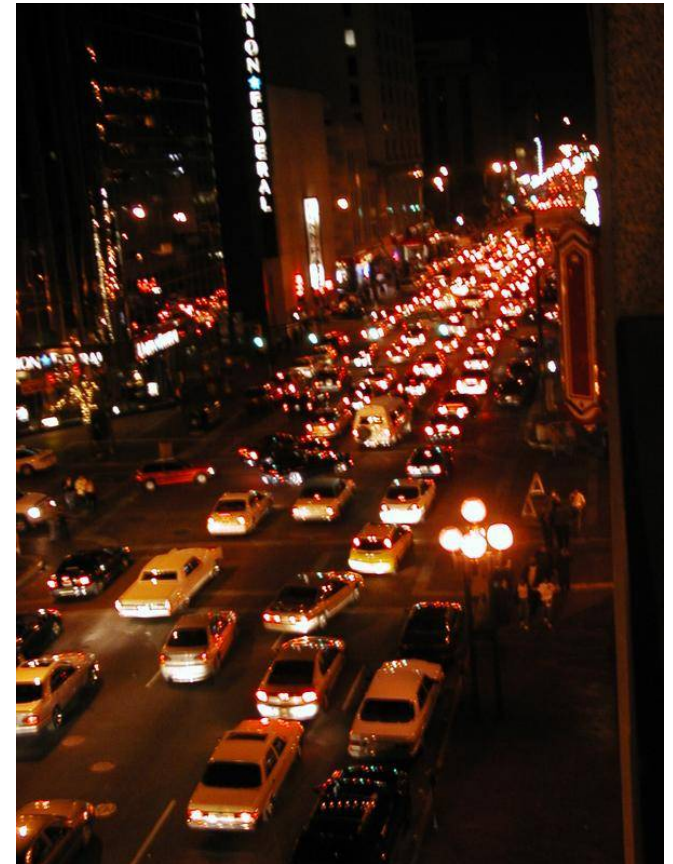
Are There Areas of Research Interest Here for Northwestern?





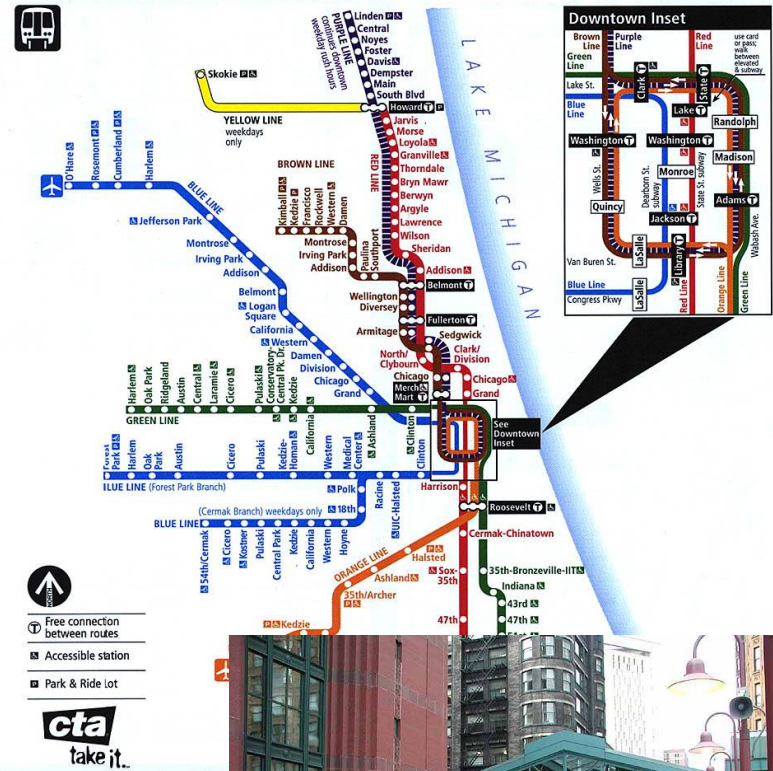
Congestion

- Faculty group formed & meeting
- Focus on pricing?
- Looking to catch up with international leaders
- Interested in **reliability impacts**



Network Surety

- Faculty group formed & meeting
- Focus on network resiliency, disruption management?
- CTA interested



Disruption Management



Recovery:
Post Mortem,
Redesign,
Reconstruction

Response:
Life-Safety, Damage Control,
Extinguishment,
Functional Restoration

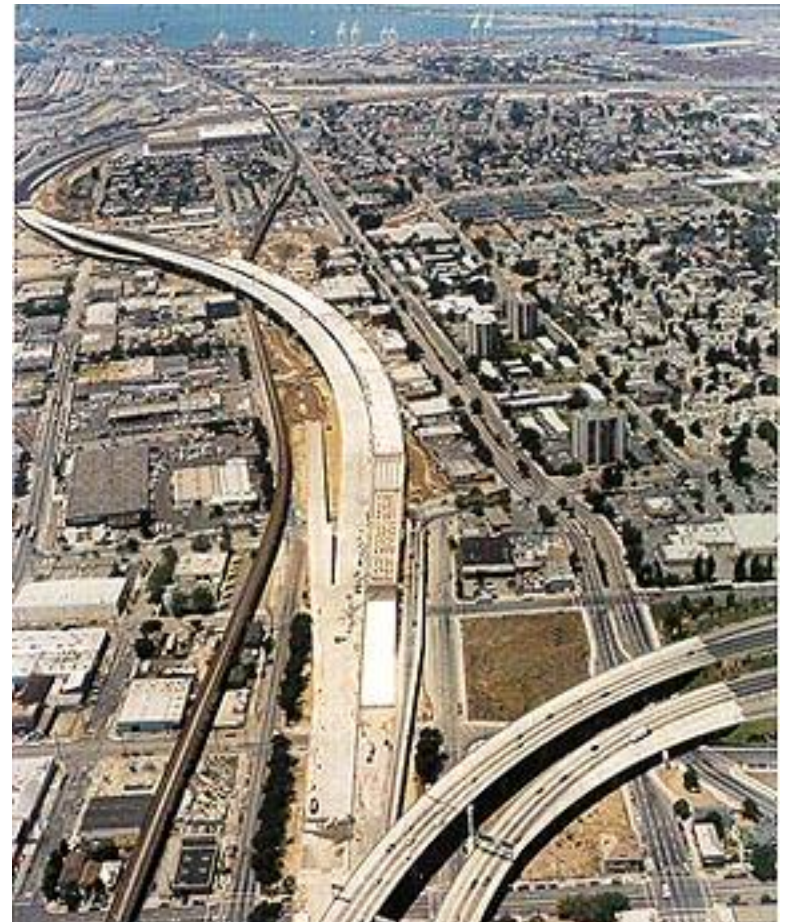
Alert:
Detection, Diagnosis,
Response Prescription,
Communication

Disruption



Project Success

- Informal effort since 2004
- Working with RISE, others



Conclusion

- Congestion worsening
 - Top national priority
- Infrastructure investment not keeping up
- Needs & opportunities for important research
 - Congestion
 - Network surety
 - Disruption management
 - Project success
- Let's get to it!

