CENTER FOR TRANSPORTATION RESEARCH

Evaluate Economic Impacts of Freight Corridor Projects

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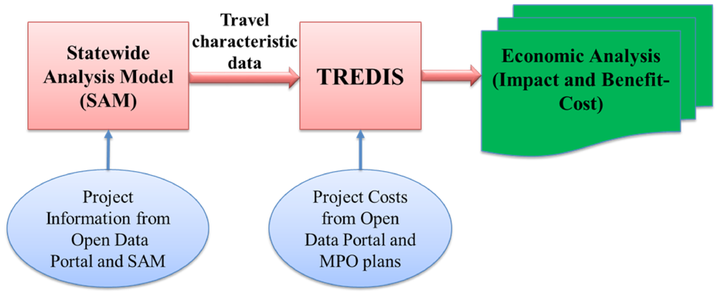
THE UNIVERSITY OF TEXAS AT AUSTIN
WHAT STARTS HERE CHANGES THE WORLD

Background and Motivation

- One project may help improve the traffic conditions at the local level, but the group effects of a set of projects on the entire road network might be different due to shifts in modes and routes.
- A consistent framework for evaluating the network-wide economic impacts of planned or proposed freight corridor projects is needed.
- This system can be used to address complicated questions, such as determining the economic impact and value of complex scenarios or testing new technologies and policies.

Study Framework



Automated Data Process

The study team created an automated data processing procedure that can take travel characteristics from SAM outputs and generate the input data required by TREDIS to perform an economic analysis. This procedure provides a range of outputs that can also be used for other types of analysis.

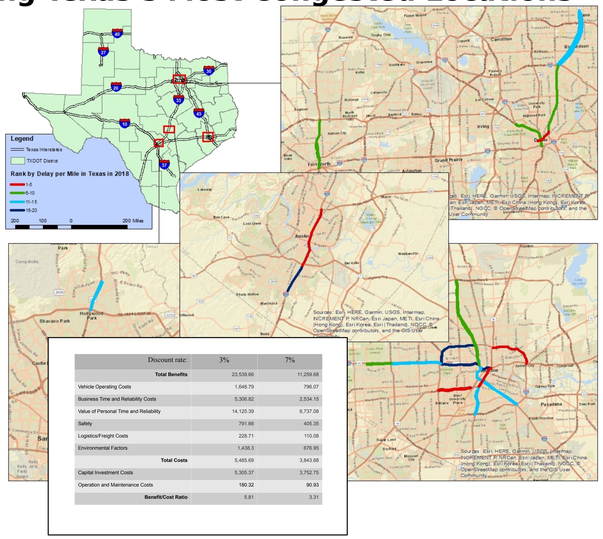
Detailed Safety Benefits Analysis

- Different types of roadways have different crash rates
- Links in SAM have functional classifications according to FHWA categories
- The study team used TxDOT's CRIS database to estimate Texas's average crash rate (on a per-vehicle mile basis) and apply those rates to each roadway category in the network

Example Scenarios

Addressing Texas's Most Congested Locations

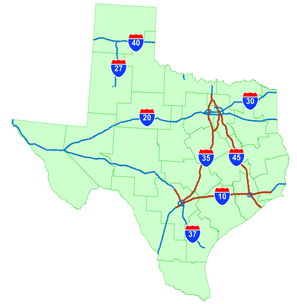
Based on TTI's ranking of the most congested roadways in the state, the study team built a scenario around all of the proposed projects associated with the top twenty congested locations



Discount rate:	3%	7%
Total Benefits	23,539.66	11,259.68
Vehicle Operating Costs	1,648.79	796.07
Business Time and Reliability Costs	5,306.82	2,534.15
Value of Personal Time and Reliability	14,125.39	6,737.08
Safety	797.66	405.36
Logistics/Freight Costs	228.71	110.08
Environmental Factors	1,438.3	676.95
Total Costs	5,485.69	3,843.68
Capital Investment Costs	5,305.37	3,752.75
Operation and Maintenance Costs	180.32	90.93
Benefit/Cost Ratio	9.81	3.31

Testing Truck-only Lanes

The study team used the analysis procedure to test truck-only lanes along the major highways of the Texas Triangle.



all values in $millions	Full Exclusion	Truck-choice Lanes
Present Value of Benefit Stream	**15 195**	**35 261**
Travel Benefits	**18 883**	**31 417**
Value of Vehicle Operating Cost (VOC)	4 881	8 329
Value of In-Vehicle Travel Time (IVTT)	-10 378	-973
Value of Improved Travel Time Reliability	17 333	13 459
Value of Safety Improvement	7 066	10 602
Environmental and Social Benefits	**1 559**	**1 553**
Value of Emission Reduction For Mobile Source Pollutants	347	-158
Value of Emission Reduction For Carbon Dioxide	1 243	1 711
Wider Economic (Productivity) Benefits	**-5 248**	**2 291**

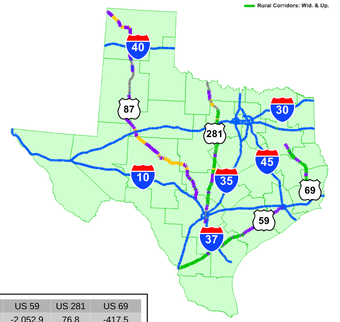
all values in $millions	Full Exclusion	Truck-choice Lanes
Present Value of Cost Stream	**5 217**	
Project Costs	**6 882**	
Capital Investment Costs	6 638	
Operation and Maintenance Costs	244	
Cost Adjustments	**-1 666**	
Benefit Cost Ratio (Benefits / Costs)		
Transportation System Efficiency - Traveler Benefits Only	3.6	6.0
Traditional BCA - Traveler Benefits + Environmental Benefits	3.9	6.3
Full Societal BCA - All Benefit Categories	2.9	6.8

Expanding Texas's Rural Corrido

The methodology was applied to segments of four rural corridors:

- US 281
- US 59
- US 87
- US 69

Each corridor was simulated with expansion to the minimum standard of a four-lane divided highway



	values in $millions; calculated at a 3% discount rate	US 87	US 59	US 281	US 69
Benefits	Value of Vehicle Operating Cost (VOC)	-264.1	-2 052.9	76.8	-417.5
	Value of In-Vehicle Travel Time (IVTT)	1 976.4	-1 339.8	994.3	2 491.8
	Value of Improved Travel Time Reliability	557.2	1198	87.4	77.0
	Value of Safety Improvement	-144.2	-2822.3	90.4	-355.5
	Total Travel Benefits	2 125.4	-5017	1 248.9	-104.1
	Value of Emission Reduction For Mobile Source Pollutants	-3	-84.1	24.3	-22.0
	Value of Emission Reduction For Carbon Dioxide	-42.8	-334	7.9	-82.1
	Total Environmental Benefits	-45.8	-418.1	32.2	-104.1
	Wider Economic (Productivity) Benefits	344.2	299.7	183.9	320.8
	Present Value of Benefits Stream	**2 424**	**-5 135**	**1 465**	**2 012.5**
Costs	Capital Investment Costs	1 203.43	1 455.3	1 702.1	450.1
	Operation and Maintenance Costs	381.66	461.5	539.8	102.5
	Residual Value of Capital Spending	-105.66	-402.9	-471.2	-58.2
	Present Value of Cost Stream	**1 479.43**	**1 513.9**	**1 770.7**	494.4
B/C	**Benefit-Cost Ratio (Benefits / Costs)**				
	Transportation System Efficiency - Traveler Benefits Only	1.31	-3.31	0.71	3.63
	Traditional BCA - Traveler Benefits + Environmental Benefits	1.28	-3.59	0.72	3.42
	Full Societal BCA - All Benefit Categories	**1.49**	**-3.53**	**0.86**	4.07

The Freight Modelling Lab Research Group would like to acknowledge the dedicated feedback from TxDOT's Freight Division, which has greatly improved the quality and shaped the direction of this project

collaborate. innovate. educate.