



Transit-Based Emergency Evacuation Simulation Modeling

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Research Goal

This study seeks to address some of the current shortcomings in a mass evacuation planning by developing **first-of-its-kind** model that integrates both the auto-based and the transit-based aspects of a mass evacuation process.

Methodology

1. Transit Evacuation Plans Data Collection



2. Coding Transit Evacuation Plans in TRANSIMS



3. Developing Alternative Evacuation Scenarios



4. Integrating the Transit-Based Evacuation Model
with the Auto-Based Evacuation Model



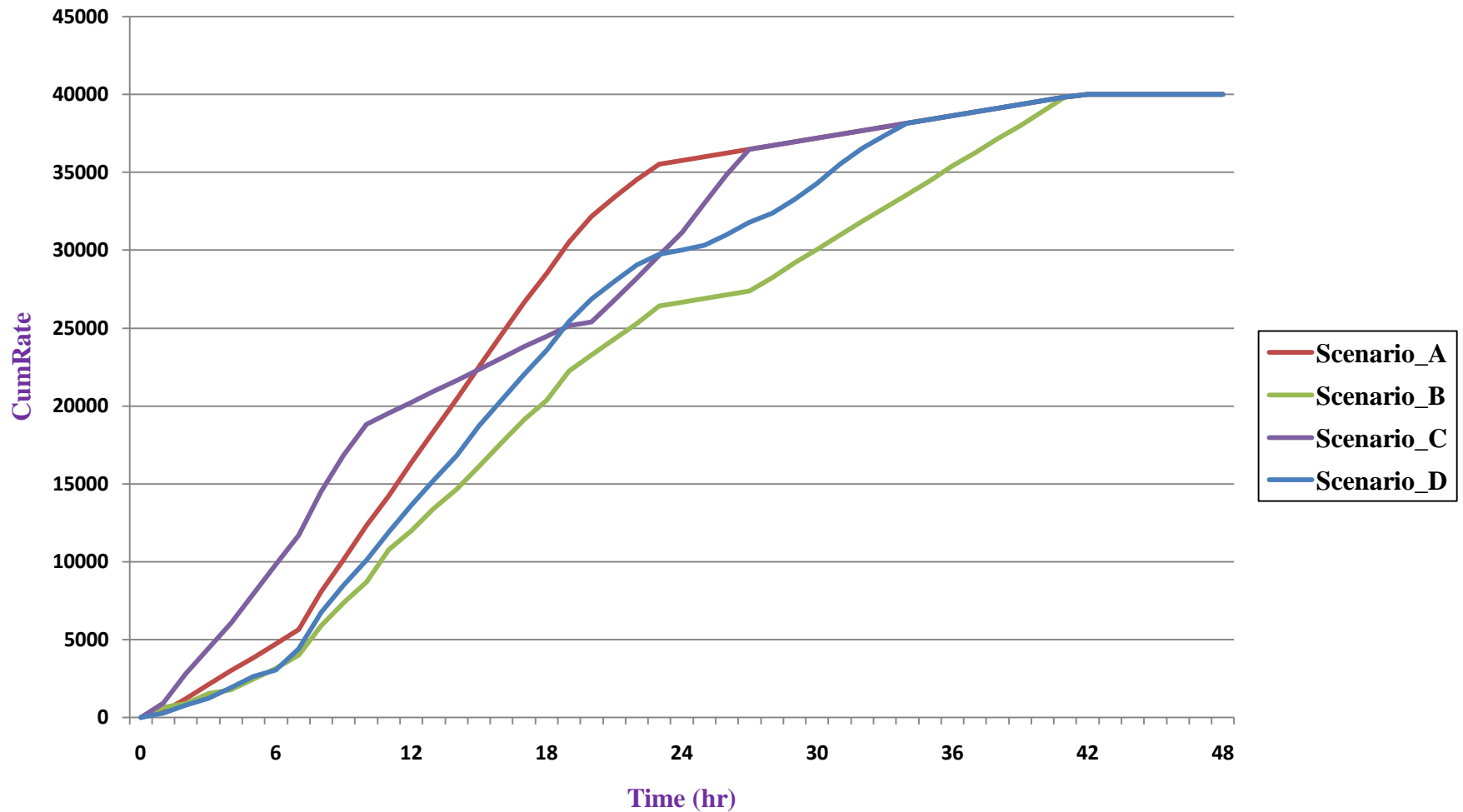
5. Analyzing and Comparing all Scenarios by the
Appropriate MOEs

Transit Network



Methodology

Network Loading Scenarios



Results

Once the TRANSIMS simulation is completed, then the output was used to calculate various measure of effectiveness for the scenario comparison purposes.

- Total evacuation time
- Average travel time

Results

Total evacuation time

Comparing Different Network Loading Scenarios on the Same Routing Scenario

Evacuation Route	Total Evacuation Time by Scenario (hr)				Hypothesis Test Result
	1A	1B	1C	1D	
I-10	34.95	47.27	29.89	41.35	<i>Reject</i>
US-61	32.79	46.44	25.76	36.49	<i>Reject</i>

I-10				
Evacuation Scenario	1C	1A	1D	1B
1C				
1A	14.47%			
1D	27.71%	15.49%		
1B	36.76%	26.07%	12.52%	
US-61				
Evacuation Scenario	2C	2A	2D	2B
2C				
2A	21.44%			
2D	29.42%	10.16%		
2B	44.53%	29.40%	21.42%	

Comparing Similar Network Loading Scenarios on Different Routing Scenarios

Evacuation Scenario	Total Evacuation Time (hr)		Percent Reduction
	I-10	US-61	
A	34.95	32.79	6.18%
B	47.27	46.44	1.76%
C	29.89	25.76	13.83%
D	41.35	36.49	11.75%

Results

Average travel time

Comparing Different Network Loading Scenarios on the Same Routing Scenario

Evacuation Route	Average Travel Time by Scenario (hr)				Hypothesis Test Result
	1A	1B	1C	1D	
I-10	4.81	5.03	4.54	4.80	<i>Reject</i>
	2A	2B	2C	2D	
US-61	2.55	2.84	2.20	2.61	<i>Accept</i>
	2A	2B	2C	2D	

I-10				
Evacuation Scenario	1C	1D	1A	1B
1C				
1D	5.42%			
1A	5.61%	0.21%		
1B	9.74%	4.57%	4.37%	

Comparing Similar Network Loading Scenarios on Different Routing Scenarios

Evacuation Scenario	Average Travel Time (hr)		Percent Reduction
	I-10	US-61	
A	4.81	2.55	46.99%
B	5.03	2.84	43.54%
C	4.54	2.20	51.54%
D	4.80	2.61	45.63%

SUMMARY AND CONCLUSION

- This research was motivated by the failure of recent evacuations involving low-mobility populations
- The project and results described centered on the hypothetical multimodal evacuation of New Orleans during Katrina evacuation using TRANSIMS microscopic simulation model
- In this study, the analyses was conducted under conditions in which plans, policies, and conditions were manipulated to hypothetically control, guide, or influence:
 - how urgently the evacuation took place
 - the routes that evacuees were able to take within the transportation network

SUMMARY AND CONCLUSION

Findings	Total Evacuation Time	Average Travel Time
Off Peak Evacuation	45%	10%
Alternative Evacuation Route	14%	52%

Thank You

