CAROLE TURLEY VOULGARIS ANASTASIA LOUKAITOU-SIDERIS BRIAN D TAYLOR

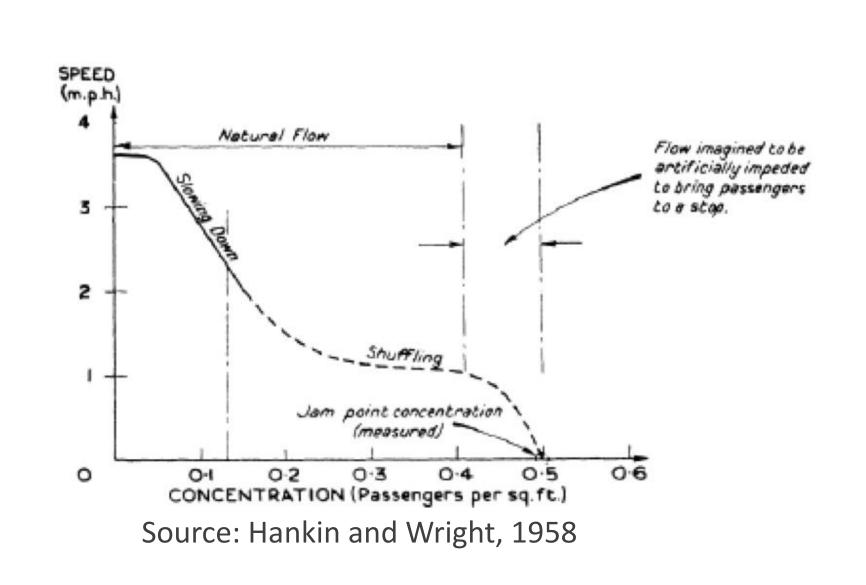
Planning for Pedestrian Flows at Rail Transit Stations

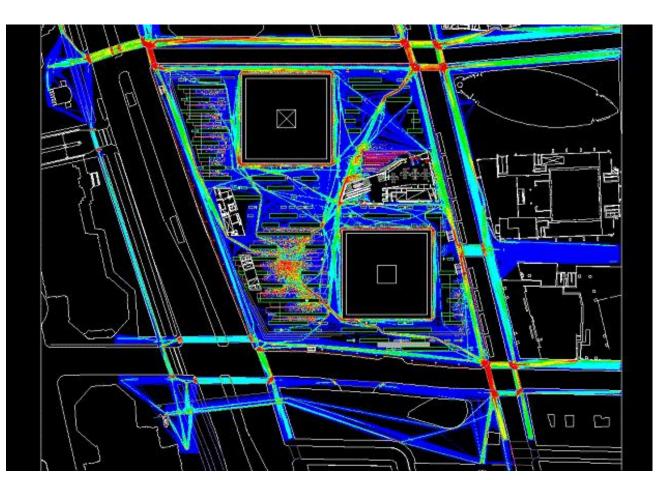
A State-of-practice Survey

INTRODUCTION

Engineers have sought to analyze pedestrian movement at transit stations for over half a century. The deterministic models developed in the mid-twentieth century eventually led to standards and codes to guide transit station design.

As modern computing allowed for more complex computations, stochastic microsimulation models were developed that allowed for more detailed analysis and visualization of pedestrian movement.





AIM

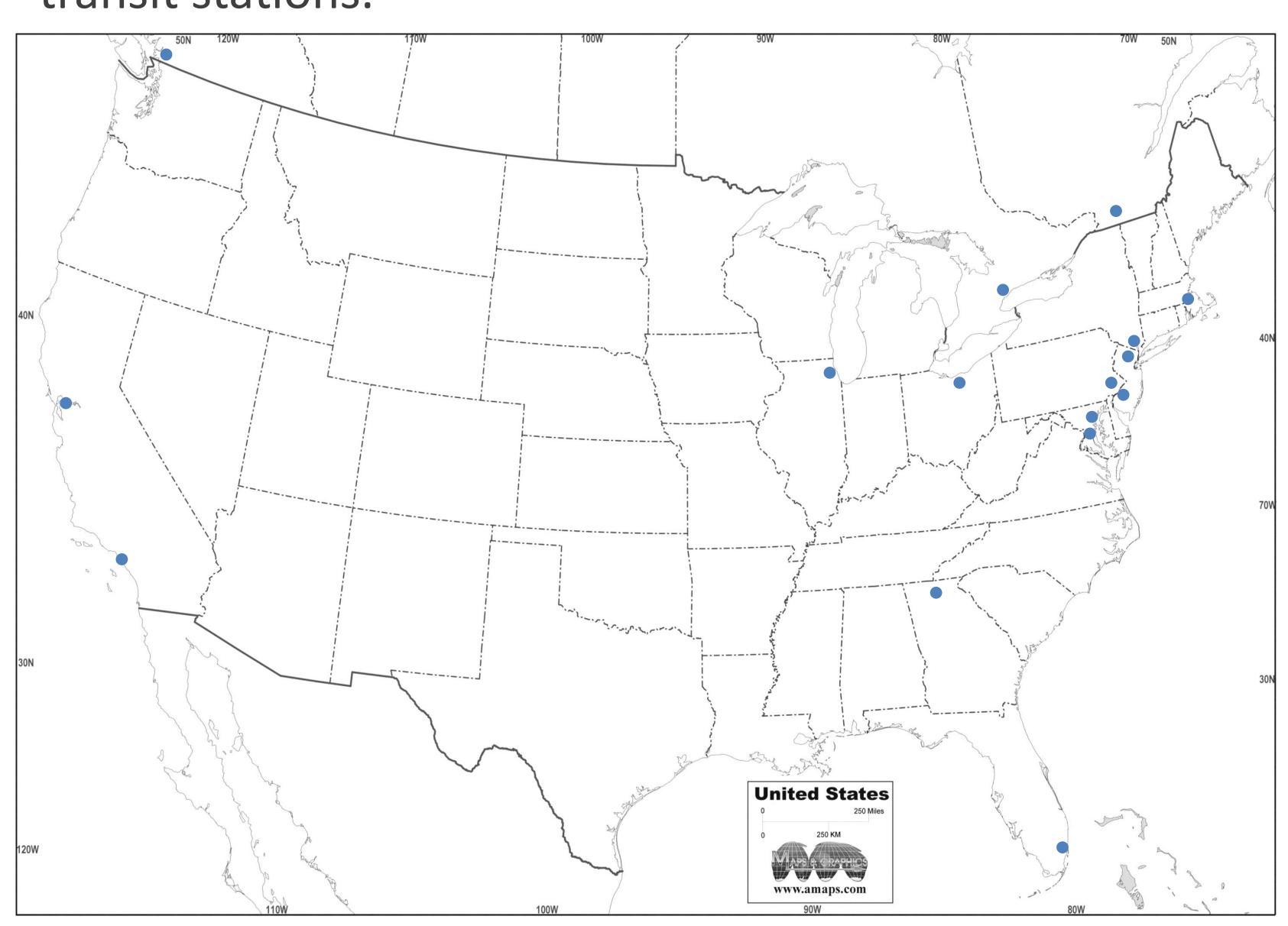
To determine how standards and codes, deterministic analysis, and microsimulation interact in the practice of planning for pedestrian flows at transit stations.

- Do standards and codes complement or supplant analysis?
- Does microsimulation complement or supplant deterministic analysis?

METHODS

Expert interviews: We conducted in-depth, semistructured interviews with 15 experts in transit station design, including architects, engineers, and transit planners. Experts included consultants as well as agency staff, and many had worked in both contexts.

Operator survey: We identified recurring themes in transit station planning for pedestrians, and prepared an online survey to be completed by planners, designers, engineers, or managers of 16 transit agencies in the United States and Canada that have below-grade rail transit stations.



RESULTS

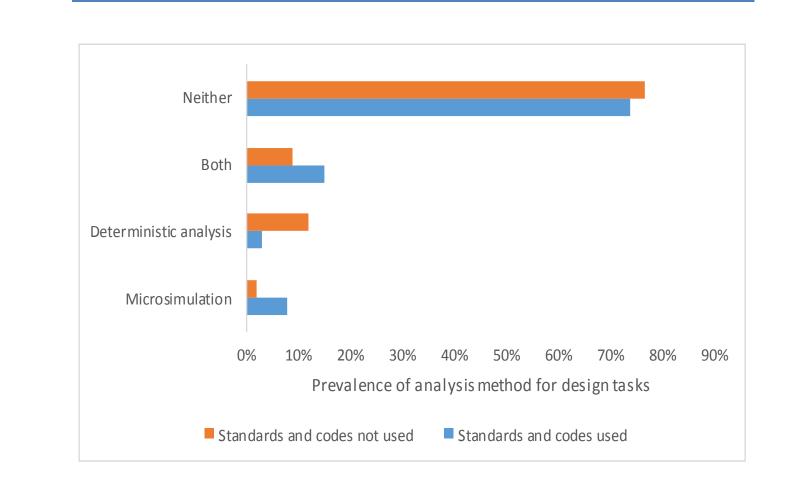
Experts indicated that published standards often obviated the need for detailed analysis, since standards incorporate conservative assumptions, resulting in a generous safety factor.

However, survey results indicate that when standards and codes are used, designers are actually *more* likely to apply microsimulation analysis, either together with deterministic analysis or alone. They are more likely to use deterministic analysis alone when standards and codes are not applied.

Experts also indicated that deterministic analysis is generally adequate for most design tasks. They also expressed concern about the danger of becoming too reliant on sophisticated "black box" microsimulation models.

Operators reported being as likely or more likely to use microsimulation than deterministic analysis for most design tasks. They are also as likely to use both together as either alone.

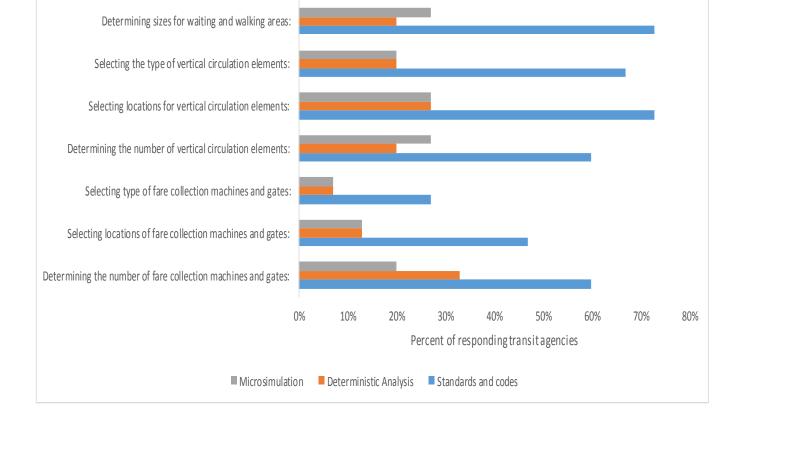
A lot of that kind of technical work is embedded in standards associated with the design. So, as long as you follow the standards, typically you have enough ...entrance capacity to satisfy safety requirements associated with transit stations. (Interview 1)



Surprisingly, a lot of what we do right now with pedestrian flow, the basic theory is from John Fruin, his book is called Pedestrian Planning and Design. ... and most of the stuff that he has in here are the guidelines that are still used today. (Interview 7)

Everything then was done by hand, which was fine, in fact it is still fine, using spreadsheets to get through your work. (Interview 4)

I'm afraid it's gotten a little too much of a black box.... So my concern is that as the models have become more ... sophisticated, that the people operating them don't really understand what's going on inside them and ... what the outcome is telling them. (Interview 2)



CONCLUSIONS

The results of our expert interviews and subsequent operator survey suggest that the application of published standards and codes, deterministic spreadsheet models, and microsimulation models interact in complex ways to inform planning for pedestrian flows in the design and redesign of underground rail transit stations. As bases for station design, they are as likely to complement as to substitute for one another.



ACKNOWLEDGEMENTS

This research was supported by a grant from the Federal Transit Administration through the Mineta Transportation Institute, and the authors are grateful for this support.





