Determining Optimal Techniques to Create Complete Streets that are Effective in the Northern New York Environment

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1. ABSTRACT

With motor vehicles being at the center of focus for today's road infrastructure, roughly 6,000 pedestrians die in car accidents each year and another 129,000 experience non-fatal injuries (Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, 2017). Coupled with environmental concerns and decreasing physical activity, these factors indicate that many of our current roads are no longer safe or effective. Complete Streets are those that the United States Department of Transportation has defined as streets that are "designed and operated to enable safe use and support mobility for all users" (US Department of Transportation, 2015). Different communities have discrete needs, so designing an effective complete streets program becomes a challenge. Therefore, an analysis of past methods needs to be completed to determine which traffic calming techniques are effective or not in certain situations. In order to determine the best techniques for a specific program or design application, the Analytical Hierarchy Process with weighted matrices will be employed.

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2. INTRODUCTION

- Many complete street policies have been installed in either urban areas or places with a more temperate climate than Northern New York.

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vs.

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- With added challenges like low town budgets, harsh winters, Amish communities, and different needs of towns across the region, creating complete street policies for Northern New York towns is often challenging.
- Some added hurdles: snow removal and storage, effectiveness year round, maneuverable for all vehicles including Amish buggies
- The purpose of this research is to streamline creating a complete street policy in a Northern New York township by prioritizing certain traffic calming techniques.

3. METHODS AND MATERIALS

- An extensive literature review was completed and statistics about 22 were compiled into a spreadsheet.
- Sheets have traffic calming techniques on the columns with effects like speed reduction and interference with snow removal on the rows.

Effects	Mid-Block Crosswalk
Reduces vehicle speeds	Yes – by up to 35%
Reduces number of accidents	Yes – by up to 40%
Disrupts emergency vehicles	Minimally – 3-5 second delay
Affects roadway drainage	Yes – drains need to be placed above crosswalk
Requires maintenance	Yes
Expensive	Moderate - $5,000

Example table

- The statistics and percentages were given values 1-3, with 3 being most effective (least interference for some). This was turned into a weighted matrix by adding multipliers to each effect. The multipliers would be valued based on their effect's importance to the community. The final score of each technique was summed and the highest one was deemed the most effective technique

4. Analysis

	Easily maneuverability for all vehicles *7		Does not reduce snow storage area *6		Sum of Weighted Scores
	Score (1-3)	Weighted score (Score *7)	Score (1-3)	Weighted score (Score *6)	
Mid-block crosswalk	3	21	3	18	157
Roundabout	3	21	3	18	140
Transverse lane markings	3	21	3	18	139
Bike boxes	3	21	2	12	137
Transverse rumble strips	2	14	3	18	135
Signs within crosswalks	2	14	3	18	124

Excerpt of weighted matrix with sums at the end

Ranked scored(1-3), multipliers in bold (x7, x6), sums of the weighted scores show which techniques are the best

4. RESULTS

After constructing the weighted matrix and adding up scores for each traffic calming technique, the following techniques scored the highest for each category.

7 Mid-Block Crosswalk

3 Roundabout

4 Shoulder Widening

5 Transverse Lane Markings

5. DISCUSSION

This matrix can be used in any North country town's complete streets policy to determine the best techniques for that specific town. For this summer, the matrix was used to make designs for a complete street on Judson Street in Canton, New York. These designs have been shown to the Canton town board for construction approval.

These best technique results are specific to Canton's needs, but they may not be appropriate for all Northern New York townships. The best way to determine a town's priorities is a door to door survey of the residents and see what effects (speed reduction, cost of implementation, etc.) are most important to them.

6. CONCLUSIONS

Mid-Block Crosswalks scored the highest in the weighted matrix, so they are the most effective technique.

More importantly, an important tool has been created to move towards a streamlined process to install complete streets policies in Northern New York.

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