Using Artificial Intelligence – The Darkside

Northwest Minnesota TZD Workshop

May 1, 2025

Real World Example

- Intersection Memorandum completed by consultant
- Project was reviewing an existing signalized intersection for conversion
  - Urban Area, Housing, Commercial Buildings, classical small town development
- Thru-Stop, All-way Stop, and Signal replacement were under consideration
- Due to cost participation needs, City was having a difficult time accepting costs.
  - Signals are over $750,000 – often a city needs to pay a portion
- Topic has/is a politically “hot” issue for the district.
- OTE was asked to review the Technical Memorandum

The Report Itself

Assessment

Removing an existing signal from an intersection that meets signal warrants can lead to increased crash rates, particularly for severe crashes like right-angle or T-bone collisions, which are more likely at unsignalized intersections. Studies have shown that signals often reduce the risk of these types of accidents by managing vehicle conflicts and providing clear right-of-way assignments.

Signals provide dedicated crossing opportunities for pedestrians and cyclists. Converting to a stop control may reduce pedestrian safety, as vehicles may not yield as consistently, especially at SSSC intersections. AWSC may improve pedestrian safety compared to SSSC by making all vehicles stop, but this depends on driver compliance and the volume of pedestrians.

Several studies have been conducted to investigate the impact of converting an existing signal control at intersections where signal warrants are met. A couple of these studies are discussed below.

The Report Itself

- Federal Highway Administration (FHWA, 2004)[1] indicated a rise in crash rates after removing signals, particularly at intersections that previously had high traffic volumes.
- The FHWA Safety Program (2012)[2] provides an in-depth look at crash modification factors (CMFs) related to intersection control changes. The report outlines the increased crash severity potential when converting signalized intersections to stop control, especially at locations with moderate to high traffic volumes.
- A study conducted by Virginia Department of Transportation (VDOT) in 2016[3] completed a comprehensive analysis of the effects of converting signalized intersections to all-way stops. It found that such conversions can lead to an increase in total crashes, particularly right-angle collisions. The study noted an average increase in crash rates of about 40% after the conversion.
- MnDOT (2017)[4] evaluated intersections that were converted from signal control to all-way stop control and found that the conversion resulted in increased crash rates, particularly for angle crashes. Intersections with high pedestrian activity also saw a rise in pedestrian-related crashes, as vehicles did not yield as consistently to crossing pedestrians.

The Report Itself

- MnDOT (2018)[5] study evaluated pedestrian and bicycle safety at intersections before and after signal removal. It concluded that removing signals can increase conflicts between vehicles and non-motorized users, leading to higher crash rates for pedestrians and cyclists
- A study conducted by New York State Department of Transportation (NYSDOT) in 2018[6] examined the implications of removing signals at various intersections throughout New York. The findings showed that converting to stop control increased crash incidents and raised concerns about pedestrian safety.
- A study conducted by Florida Department of Transportation (FDOT) in 2021[7] evaluated the safety outcomes associated with signal removal and found that crash rates increased significantly, with reported increases of 30% to 60% at locations where signals were removed and stop control was implemented.

The Report Itself

[1] Federal Highway Administration. (2004). *Signalized intersections: Informational guide* (Report No. FHWA-HRT-04-091). U.S. Department of Transportation.
[2] Federal Highway Administration. (2012). *Crash modification factors in practice* (Report No. FHWA-SA-12-012). U.S. Department of Transportation.
[3] Virginia Department of Transportation. (2016). *Evaluation of the safety impact of converting traffic signal control to all-way stop control* (VDOT Report No. 2016-03).
[4] Minnesota Department of Transportation. (2017). *Analysis of crash rates and safety impacts at intersections converted from signal control to stop control*. MnDOT.
[5] Minnesota Department of Transportation. (2018). *Evaluation of pedestrian and bicycle safety impacts of traffic signal removal* (Report No. MN/RC 2018-14)
[6] New York State Department of Transportation. (2018). *Impact of traffic signal removal on crash rates at intersections in New York State* (Report No. 2018-02).
[7] Florida Department of Transportation. (2021). *Traffic signal removal: Safety analysis and best practices* (FDOT Report No. 21-01).

The Report Itself

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[4] Minnesota Department of Transportation. (2017). *Analysis of crash rates and safety impacts at intersections converted from signal control to stop control*. MnDOT.

[5] Minnesota Department of Transportation. (2018). *Evaluation of pedestrian and bicycle safety impacts of traffic signal removal* (Report No. MN/RC 2018-14)

Following Up

- Something wasn't feeling right
- Checked the web for these reports
- Plan
  - Check the actual claims (cherry picking)?
  - Contrast with other reports?
- Clarify and add context
- Asked staff to review and verify
  - Couldn't find the reports
- MnDOT Library
  - Couldn't find reports
- Asked to get consultant to provide reports/documents/links

Response

*"The references in the memo were being sourced **unintentionally** from **Google AI** instead of **the actual MnDOT documents** being searched for. After digging into the references, they were inaccurate sources, and we have removed those bullets / information from the ICE Memo.*

It has served as a "learning opportunity" for our younger traffic group staff…

Basically; the AI made up the sources and the claims. None of those documents, especially the MnDOT ones, ever existed nor those claims made.

Response

MnDOT was put in a position where:

1. The city was already upset with what we have paid to study this issue
2. We had claims that were not real or even credible
3. Lack of trust even before this moment (with MnDOT and government in general)
4. Fortunately, this didn’t change the outcome of the recommendation

Lessons Learned

- Think of AI as a young intern;
  - can do a lot of work
  - Do a lot of work quickly
  - Eager to please!
  - But verify and check the work; use your expertise
- If someone is telling you the answer you want to hear; verify elsewhere
- Similar to the past with plagiarism, fake news, propaganda, etc….

Thank You!

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