

Road-User Cost Due to Unavailability of Interstate 35W Mississippi River Crossing at Minneapolis, Minnesota

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Introduction

This study estimates the daily cost to motorists resulting from unavailability of the I-35W Mississippi River crossing in Minneapolis, following the failure of Bridge No. 9340. The bridge served an AADT of 140,000 in 2006.

Summary of Findings

Road-user cost due to the unavailability of the I-35W Mississippi River crossing is estimated to be \$400,000 per day .
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Details of the methodology and assumptions underlying this finding are presented below. The computations themselves take place in the accompanying Excel spreadsheet entitled “I-35W Mississippi River Crossing Road-User Cost Computations.”

Redistribution of traffic from I-35W to alternate routes.

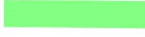
Mn/DOT has designated TH 280 as the primary detour for I-35W. While TH 280 is indeed a vital detour, not all of the 140,000 vehicles/day that had used the I-35W Mississippi River crossing will transfer to TH 280. First of all, 140,000 vehicles/day added to the volume already served by TH 280 would significantly exceed the capacity of that facility. Secondly, as congestion increases on TH 280, the impedance will prompt motorists to seek other alternates. Thirdly, depending on their origin, destination, and familiarity with the local road network, many motorists will come up with their own alternates. Finally, if driving is difficult due to congestion, the number of vehicles/day seeking to cross the river may decrease; however, this effect is expected to be small given that I-35W was a heavy commuter route serving the Minneapolis central business district and University of Minnesota, and these destinations are likely to attract the same number of trips as before, despite more difficult access.

While many routes will serve traffic displaced from I-35W—TH 280, I-94, TH 100, Hennepin Avenue, Central Avenue, Washington Avenue, Snelling Avenue, I-35E, I-694, etc.—it is not possible to determine how many vehicles will transfer to every possible alternate, nor to model the impact of added traffic on the operations and travel times on each facility. Instead, the approach taken is to assume all traffic from I-35W redistributes to one of two representative detours. The representative original and detour routes are as shown on the following pages.

Detour A

Original route 

I-35W from W Jct. I-94 (Minneapolis) to Jct. I-694 (New Brighton–Arden Hills)


Detour 

I-94 from W Jct. I-94 (Minneapolis) to Jct. I-694 (Brooklyn Center)


I-694 from Jct. I-94 (Brooklyn Center) to Jct. I-35W (New Brighton–Arden Hills)



Detour B

Original route 

I-35W from E Jct. I-94 (Minneapolis) to Jct. TH 280 (Roseville)

Detour 

I-94 from east junction I-35W (Minneapolis) to Jct. TH 280 (Saint Paul)
TH 280 from Jct. I-94 (Saint Paul) to Jct. I-35W (Roseville)



The next step is to estimate what share of the 140,000 vehicles/day from I-35W will redistribute to each representative detour, and to measure or estimate the additional distance and travel time associated with each detour. As of the preparation of this report, just a few days after the loss of the I-35W bridge, traffic patterns have not yet stabilized and it is necessary to estimate the volumes that will ultimately be carried by each detour and the resultant quality of operations on each route.

Two Professional Traffic Operations Engineers were consulted. We discussed the geometrics, capacity, and anticipated operations of each detour, taking into account the volume of traffic already served by these routes, that TH 280 has been converted to freeway operation, the geometrics of any bottlenecks along the detours, and the potential of widening the northbound TH 280 to I-35W/TH 36 connection to two lanes.

It was estimated that TH 280 may be able to serve up to 100,000 vehicles/day at the very most. Before loss of the I-35W bridge, TH 280 already served nearly 50,000 vehicles/day. Thus, TH 280 could accommodate at most about $100,000 - 50,000 = 50,000$ more vehicles/day. It was therefore assumed that 50,000 of the 140,000 vehicles/day that had used the I-35W river crossing will transfer to TH 280.

Travel speeds on TH 280 will vary significantly with the hour of the day. It is assumed 50% of the traffic on TH 280 passes during uncongested conditions, and the remaining 50% passes during congested conditions. This corresponds to roughly 3 hours of congested operations during the morning peak and 3 hours of congested operation during the afternoon peak.

With TH 280 assumed to serve 50,000 vehicles/day displaced from I-35W, the remaining vehicles displaced from I-35W will use a variety of other alternates. Principal among these will be the detour identified as Detour A above (page 2). Although not all the remaining volume of displaced motorists will use this Detour A, vehicles using other detours will experience road-user costs of a similar order of magnitude. Thus it will be reasonable for purposes of this analysis to assume all remaining displaced motorists use Detour A.

Details of the lengths and estimated average travel speeds for each route are presented in the accompanying spreadsheet.

The additional travel distance and estimated additional travel time associated with each detour are computed in the spreadsheet. Also accounted for in the computations is the cost to motorists who normally used the routes designated herein as Detour A and Detour B; these motorists will incur a cost due to slower than normal travel speeds on their route during congested periods due to the influx of vehicles displaced from I-35W.

Some additional costs will be associated with the inconvenience to drivers who would normally, but can no longer, turn onto or off of TH 280 at the at-grade intersections near the north end of the highway. Those costs are expected to be negligible compared to the costs associated with the displacement from I-35W, and thus the cost associated with the loss of access to and from TH 280 at these intersections is not counted in the analysis.

Valuation of additional travel time and distance

The additional travel time and distance are valued according to Mn/DOT standard economic values for use in SFY 2008:

Value of Time	
Auto	\$13.00/person-hour
Heavy commercial vehicle	\$21.00/person-hour
Variable Operating Costs	
Auto	\$0.27/mile
Heavy commercial vehicle	\$0.75/mile

Crash costs are not considered. The costs resulting from the various sources are summed in the spreadsheet, resulting in a total road-user cost of \$400,000 per day.

If there are any questions about this analysis, please contact Paul Jung of the Office of Investment Management at (651) 366-3758.

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