Curbing Wrong Way Movements onto Michigan’s Freeways

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Why the interest?
Study Details

Only included crashes caused by **WRONG WAY ENTRY** onto the freeway system.

**Not included:**
Crashes involving vehicle *loss of control*
or
Vehicles that *crossed the median*

110 Crashes
Wrong Way Crash Severity

32% of crashes resulted in K or A-injuries
(35 of 110)
Comparison: 2% of all freeway crashes result in K or A

The 35 KA crashes severely affected 66 people:
30 Fatalities
36 Incapacitating injuries
Severity by Location

Crash on an exit ramp
6% of crashes resulted in a K or A

Crash on freeway mainline
42% of crashes resulted in a K or A
By Location

Crash occurred on:

exit ramp – 31
mainline – 71
  - entry ramp unknown – 67
  - entry ramp known – 4
freeway-to-freeway ramp – 6
entrance ramp – 2

35 Known Entry Points
Lighting Conditions

78% occurred under conditions of darkness

(86 crashes)

Question: Was there lighting at the ramp??

For 35 crashes with known entry point:

12 – daytime
15 – darkness, lighted
7 – darkness, unlighted
1 – dusk
By Time of Day

![Bar chart showing the number of crashes by time of day. The chart has a vertical axis labeled 'Number of Crashes' ranging from 0 to 18, and a horizontal axis labeled 'Time of Day' ranging from 11am to 11pm. The highest number of crashes occurs at 11am.](image-url)
By Time of Day

11 pm – 6 am: 57% of all wrong way crashes
11 pm – 6 am: 16% of all freeway crashes
Impaired Driving

(9 Crashes were drive-away – Impairment unknown)

60 Crashes, drivers were impaired:

(54 of 60 at night)

48 under the influence of alcohol
7 under the influence of drugs
5 under the influence of both
By Age of Wrong Way Driver

ALL WRONG WAY DRIVERS – AGE KNOWN - 104

NOT DRUNK OR DRUGGED - 41
Interchange Design

Can it affect wrong way crashes??
# MDOT Interchange Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
<th>Known Wrong Way Entries</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diamond</td>
<td>340</td>
<td>6</td>
<td>60% / 21%</td>
</tr>
<tr>
<td>Partial Cloverleaf</td>
<td>163</td>
<td>21</td>
<td>60% / 21%</td>
</tr>
<tr>
<td>Directional</td>
<td>206</td>
<td>2</td>
<td>11% / 3%</td>
</tr>
<tr>
<td>Full Cloverleaf</td>
<td>20</td>
<td>1</td>
<td>11% / 3%</td>
</tr>
<tr>
<td>Trumpet</td>
<td>23</td>
<td>4</td>
<td>11% / 3%</td>
</tr>
<tr>
<td>Other</td>
<td>39</td>
<td>1</td>
<td>11% / 3%</td>
</tr>
</tbody>
</table>

**Total Interchanges:** 791

**Total Known Wrong Way Entries:** 35

**Wrong Way Entries as a Percentage:** 60% / 21% / 11% / 3%
Partial Cloverleaf Interchanges
What do we already do?

From 8° angle between ramps to 11° angle.

From 30’ setback to 20’ setback for the corrugated island.
What else can we do?

LOW COST COUNTERMEASURES!
1. Lower Sign Height
2. Lollipops
3. Stop Bars & Placement
4. Off Ramp Wrong Way Arrow
5. Pavement Marking Extensions
6. Painted Island
7. Wrong Way Delineation
Potential Countermeasures:

• Lowering Signs to 4’ Bottom Height
• Reflective Sheeting on Sign Posts
• Stop Bars
• Wrong Way Pavement Markings
• Turning Guidelines
• Painted Island
• Wrong Way Delineation on Ramp
Gratiot Ave @ I-94 (Detroit)

<table>
<thead>
<tr>
<th>Alcohol</th>
<th>No Alc</th>
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<tbody>
<tr>
<td>3</td>
<td>7</td>
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</table>

<table>
<thead>
<tr>
<th>Dark</th>
<th>Daylight</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>
“Video taken at the interchange indicates that drivers may be staying to the left of the barrier because they cannot see the on-ramp on the barrier’s other side.”

Wash DOT, 2001

Public Roads, Sep/Oct 2002
Gratiot Ave @ I-94 Improvements

- Qwick Kurb
- Lower Signs
- Pavement Markings
Gratiot Ave @ I-94 Results

• ZERO wrong way crashes since June 2012

• No winter maintenance issues with Qwick Kurb
Wrong Way Detection
I-94 at Sargent Road
Pavement marking and signing changes completed in Fall 2017 to reduce driver confusion
I-94 at Sargent Road

- Location 1 & 2: 36” Wrong Way Sign w/red flasher ring
- Locations 3, 5, 6: 48” Wrong Way Sign w/red flasher ring
- Location 4: 48” Wrong Way Sign w/red flasher ring and controller
I-94 at Sargent Road