Crash Avoidance System

Rural ITS Application for Intersections with Restricted Sight

Gary Modi, PE
Chief, Safety Management
(717) 783-1190...gmodi@state.pa.us
Crash Avoidance System

PA 38 / PA 138 / SR 1004
Village of North Washington

PA 38 / SR 1010
Village of Hooker
PROBATION MISING: $200,000 goes on

KRIS MILLER
Staff Writer

The staff writer's financial review
of records in September revealed only
one missing deposit of $200,000.

In September, the district attorney's
office sent a letter to the police
department stating that a check in the
amount of $200,000 had been
stolen.

Butler County's Daily Newspaper
BUTLER COUNTY'S DAILY NEWSPAPER

February 3, 2000

PROBATION MISING: $200,000 goes on

The district attorney's office has
received a letter from the police
department stating that a check in
the amount of $200,000 has been
stolen.

The check was reportedly written
by a local businessman, but
the police have been unable to
locate the individual.

A local attorney, who wishes to
remain anonymous, has offered
to represent the victim of the
theft.

YOUTHS DRIVE FOR ROAD SAFETY

Citation for Road Safety

By BOB SCHULTZ
Eagle Staff Writer

CRANBERRY TWP: A local citizen
of its police office wasprograms recent events that
into the world.

The first press conference
Thursday night honored
William Ahlgren, 35,
who collapsed for

3 of 3 heros in the
over

Citation for Road Safety

By BOB SCHULTZ
Eagle Staff Writer

CRANBERRY TWP: A local citizen
of its police office wasprograms recent events that
into the world.

The first press conference
Thursday night honored
William Ahlgren, 35,
who collapsed for

3 of 3 heros in the
over

Citation for Road Safety

By BOB SCHULTZ
Eagle Staff Writer

CRANBERRY TWP: A local citizen
of its police office wasprograms recent events that
into the world.

The first press conference
Thursday night honored
William Ahlgren, 35,
who collapsed for

Both intersections are on vertical curves that restrict sight distance.

PA 38 = 4100 ADT

North Washington
PA 138 = 1000 ADT

Hooker
SR 1010 = 1100 ADT
Hooker Intersection

Eastbound, Looking Left & Right
Hooker Intersection

Westbound, Looking Left & Right
North Washington Intersection

Eastbound, Looking Left & Right
North Washington Intersection

Westbound, Looking Left & Right
What the community told us...

- Concerned for safety !!!
- Vehicles are speeding
- Garbage trucks speeding (Company names)
- Restricted sight distance
- Need to pull up into the intersections to see
- School buses using intersection(s)
What was discussed...

🔧 Traffic signal?
Not sound judgment!...
On hill, Low volumes

喳 Convex mirror?
Been there, Done that!

🔧 Reconstruct road?
Costly...and will wipe out the community!

👍 Improve pavement markings?
Did it...Not enough!

👍 Ask haulers to slow their trucks?
Did it...Not enough!

🔧 Lowering the 35mph speed limit?
Won’t work!

👍 State Police assistance?
Did it...Not enough!
What was discussed...

Special ITS signing?
- Fred Hanscom, PE, FHWA, ITS 2000, Boston
- Evaluation of signs in Virginia

From side road

Mainline sign activates when traffic is entering from either side road direction or stopped at intersection

On mainline

Side Road sign activates when mainline traffic is approaching from either direction
Crash Avoidance System Facts

- First installed in US in Virginia
- Signs made in France
  Cost beaucoup Francs!
- Before / After Study Results:

<table>
<thead>
<tr>
<th>Measure</th>
<th>Before</th>
<th>Acclimation Period</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceeding 45mph</td>
<td>61%</td>
<td>19%</td>
<td>40%</td>
</tr>
<tr>
<td>Exceeding 55mph</td>
<td>2.8%</td>
<td>0.8%</td>
<td>2.6%</td>
</tr>
<tr>
<td>&gt;45mph - activated</td>
<td>12.1%</td>
<td>3.0%</td>
<td>0.7%</td>
</tr>
<tr>
<td>55mph - activated</td>
<td>2.1%</td>
<td>0.3%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Crashes</td>
<td>20+</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
What was discussed...

Special ITS signing? GREAT IDEA!
Pulse loops detect approaching traffic, calculate speeds, and activate side road signs according to speeds.
Presence loops detect traffic and advise mainline drivers of cross traffic.

Pulse loops identify approaching traffic, calculate speeds, and consider traffic that may enter driveways.
Presence loops on mainline detect traffic and advise mainline drivers of possible stopped traffic.
Crash Avoidance System Facts

✓ No other installation is known to exist
✓ BHSTE acquired 140 funds
✓ Designed by Trans Associates, Pittsburgh, for $52,000
  ➢ Includes 2 intersection systems
  ➢ Unique design
  ➢ Subsequent applications should be much less
✓ Contract awarded to Post Construction, New Castle, in July, 2001 for $370,000
✓ Path Master, Ohio, supplied 170 Controller
  ➢ McCain Traffic, California, developed software
  ➢ Provides an event log via modem
✓ Placed on line in November, 2003
Crash Avoidance System Facts

☑ Maintained by PennDOT
  - Fail safe - All signs flash continuously
  - Butler County stockpile nearby to monitor
  - Electrical contractor on call 24X7 @ $2,000/mo.
    - Minor repairs needed by electrical contractor twice
    - Includes cleaning every 3 months

☑ Risk management concerns
  - Malfunctions?
  - Placing faith in an electrical device?

☑ Uses a lead-acid battery back-up

☑ Rightsizing & engineering success!

Community remains extremely pleased!
Crash Avoidance System Facts

Awards:

- 2004 FHWA Excellence in Highway Design - ITS
- 2004 PPHQ Award - Safety
- 2004 Diamond Award nominee
- Urban Transportation Monitor Feature
# Crash Avoidance System Evaluation

## Hooker Intersection

<table>
<thead>
<tr>
<th>Measure</th>
<th>Before</th>
<th>2 Weeks After</th>
<th>2 Months After</th>
<th>2 Years After</th>
</tr>
</thead>
<tbody>
<tr>
<td>85th Percentile: non-activated</td>
<td>47 mph</td>
<td>48 mph</td>
<td>42 mph</td>
<td>51 mph</td>
</tr>
<tr>
<td>85th Percentile: activated</td>
<td></td>
<td>45 mph</td>
<td>41 mph</td>
<td>46 mph</td>
</tr>
</tbody>
</table>

## North Washington Intersection

<table>
<thead>
<tr>
<th>Measure</th>
<th>Before</th>
<th>2 Weeks After</th>
<th>2 Months After</th>
<th>2 Years After</th>
</tr>
</thead>
<tbody>
<tr>
<td>85th Percentile: non-activated</td>
<td>42 mph</td>
<td>No data</td>
<td>46 mph</td>
<td>49 mph</td>
</tr>
<tr>
<td>85th Percentile: activated</td>
<td></td>
<td>40 mph</td>
<td>37 mph</td>
<td>43 mph</td>
</tr>
</tbody>
</table>
## Crash Avoidance System Evaluation

### Speeds at Both Intersections

<table>
<thead>
<tr>
<th>Measure</th>
<th>Before</th>
<th>2 Months After</th>
<th>2 Years After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceeding 35 mph</td>
<td>66%</td>
<td>34%</td>
<td>59%</td>
</tr>
<tr>
<td>Exceeding 45 mph</td>
<td>17%</td>
<td>4%</td>
<td>11%</td>
</tr>
<tr>
<td>Exceeding 50 mph</td>
<td>9.2%</td>
<td>1.2%</td>
<td>4%*</td>
</tr>
</tbody>
</table>

*Actual values are: Hooker = 0% 
North Washington = 8%
<table>
<thead>
<tr>
<th>Year</th>
<th># of Crashes</th>
<th>Causation Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>0</td>
<td>Improper turning</td>
</tr>
<tr>
<td>1996</td>
<td>3</td>
<td>Pulled out too soon</td>
</tr>
<tr>
<td>1997</td>
<td>4</td>
<td>Over posted speed</td>
</tr>
<tr>
<td>1998</td>
<td>1</td>
<td>Driver drinking</td>
</tr>
<tr>
<td>1999</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>1</td>
<td>Pulled out too soon</td>
</tr>
<tr>
<td>2005</td>
<td>1</td>
<td>Careless turn (from mainline)</td>
</tr>
<tr>
<td>2006</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>
Thank You!