Enhanced Wildlife Warnings as a Potential Means of Reducing Wildlife-Vehicle Collisions

Laura M. Stanley
Virginia Tech Transportation Institute

Amanda Hardy & Suzanne Lassacher
Western Transportation Institute

Background

- > 1,000,000 deer-vehicle collisions/annually:
  - 200 fatalities,
  - 29,000 injuries, and
  - costing $1.1 billion in vehicle damage alone.
- Techniques that rely on altering animal behaviors:
  - roadside-reflectors,
  - vehicle-mounted whistles,
  - and wildlife fencing combined with passages under or over roads.
  - Effectiveness is limited or uncertain
- Transportation agencies may consider driver-based measures to reduce these collisions.

Objective

- **Research Question:**

  - Do enhanced wildlife advisories (simulated environment) result in a reduction of speed and/or reduce potential for wildlife-vehicle collisions?

- **Approach:**

  - Relate changes in speed, onset of braking distance, and increased awareness to reduce animal-vehicle collisions.

WTI Driving Simulation Laboratory

- DriveSafety DS500C Vection Simulator
- Fully functional Saturn sedan cab with realistic vehicle dynamics.
- Five visual channels with a 160-degree field of view.
- High fidelity visual and auditory environment.

Research Methods

- 81licensed drivers balanced according to age and gender:
  1. Standard sign group (M = 34 years);
  2. Standard sign with flashing beacon group (M = 32.4 years);
  3. VMS group (M = 35.4 years);
  4. Combination of VMS & flashing beacon (M = 35 years).
- Participants screened for Simulator Induced Discomfort.
- Subjects acclimated to simulator.

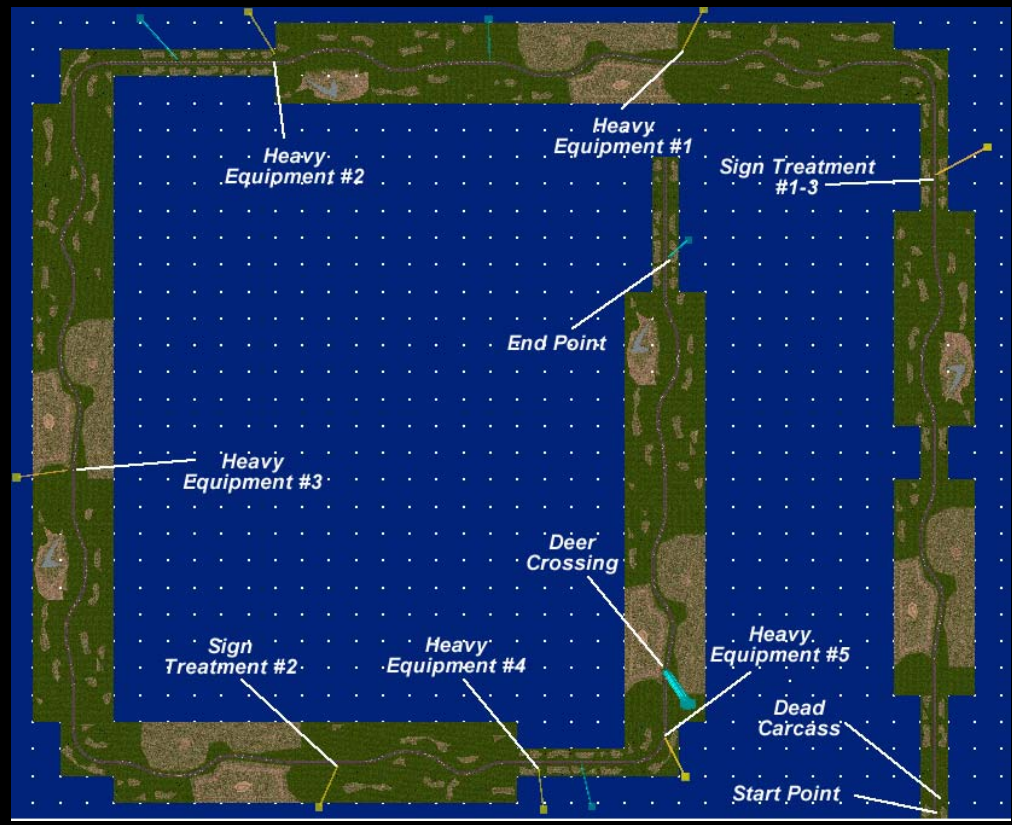
Standard sign

Standard sign with flashing beacon

Variable Message Sign

Driving Environment- “Bozeman Pass”

- ~12-mile eastbound segment of I-90 between Bozeman and Livingston
- Foliage (forested areas and open grass land), terrain (rural, mountainous, passing through a canyon pass), roadway geometry (several curves and straight sections), traffic density (low density)
- Speed limit (75 mph)
- Nighttime conditions
- Heavy equipment locations
- Sign treatment locations
- Deer crossing end of scenario



Research Methods

- Dependent variables included:
  - Velocity - filtered 500 ft./152.4 m before and after the sign (1000 ft/304.8 m)
  - Onset of braking - point where participant began to decelerate to apply brake (i.e., when the participant removed his/her foot from the accelerator pedal)
  - *Collisions* - whether the participants collided with the deer

Research Methods

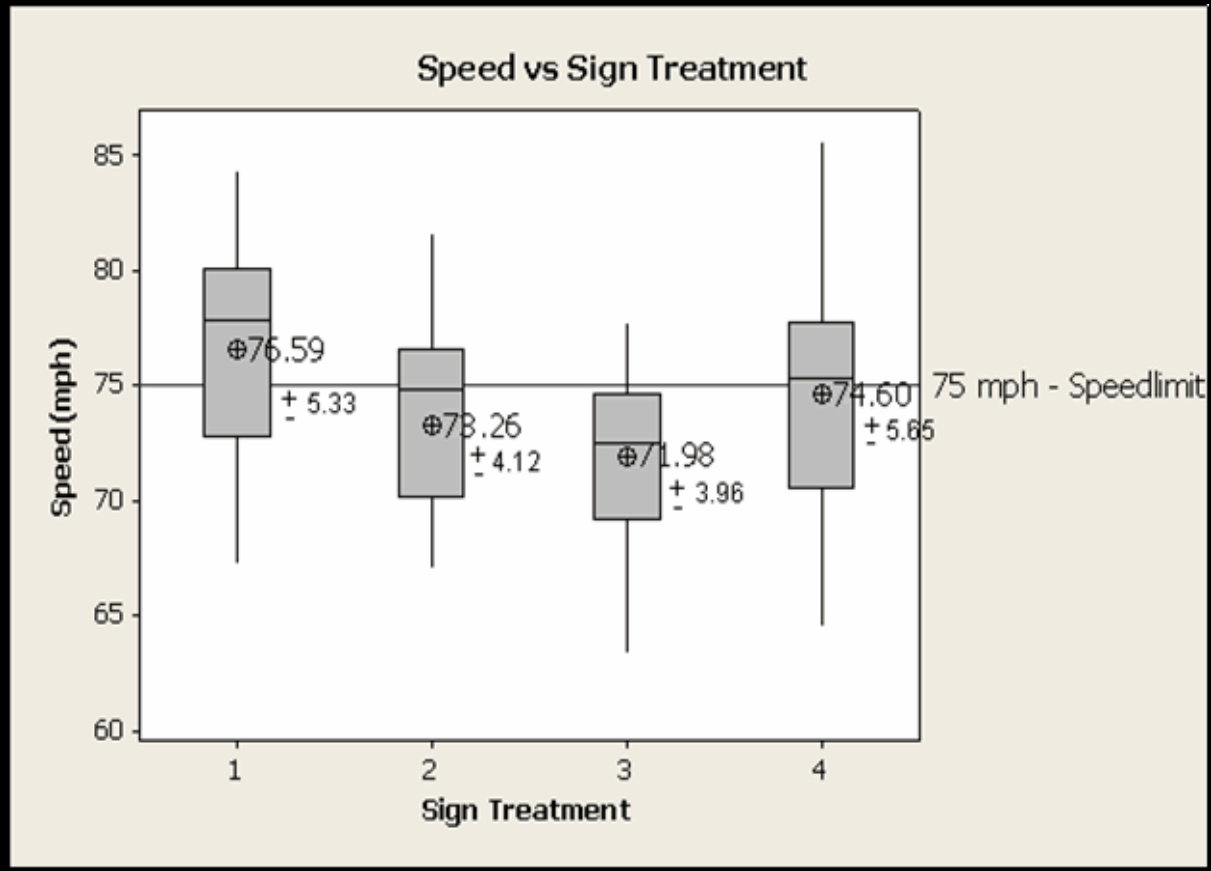
- Upon completion of the session, participants were given a four-part questionnaire to determine:
  - (1) the types of signs and messages they remembered seeing;
  - (2) if, and how, the signs altered their behavior;
  - (3) the number of construction equipment vehicles in the scenario; and
  - (4) a personal history of animal-vehicle collisions.
- Each subject also completed a post-test questionnaire related to their experience with SID.

Results - Velocity vs. Treatment

- Enhanced signs = slower speeds than standard sign.

- VMS group - statistically significant reduction in speed over the standard sign ($p<.05$), by 4.6 mph.

- Small speed changes however, if drivers traveling at 76.6 mph (112.3 ft/sec) reduced their speed to 72.0 mph (105.6 ft/sec) = additional reaction time to avoid a collision.

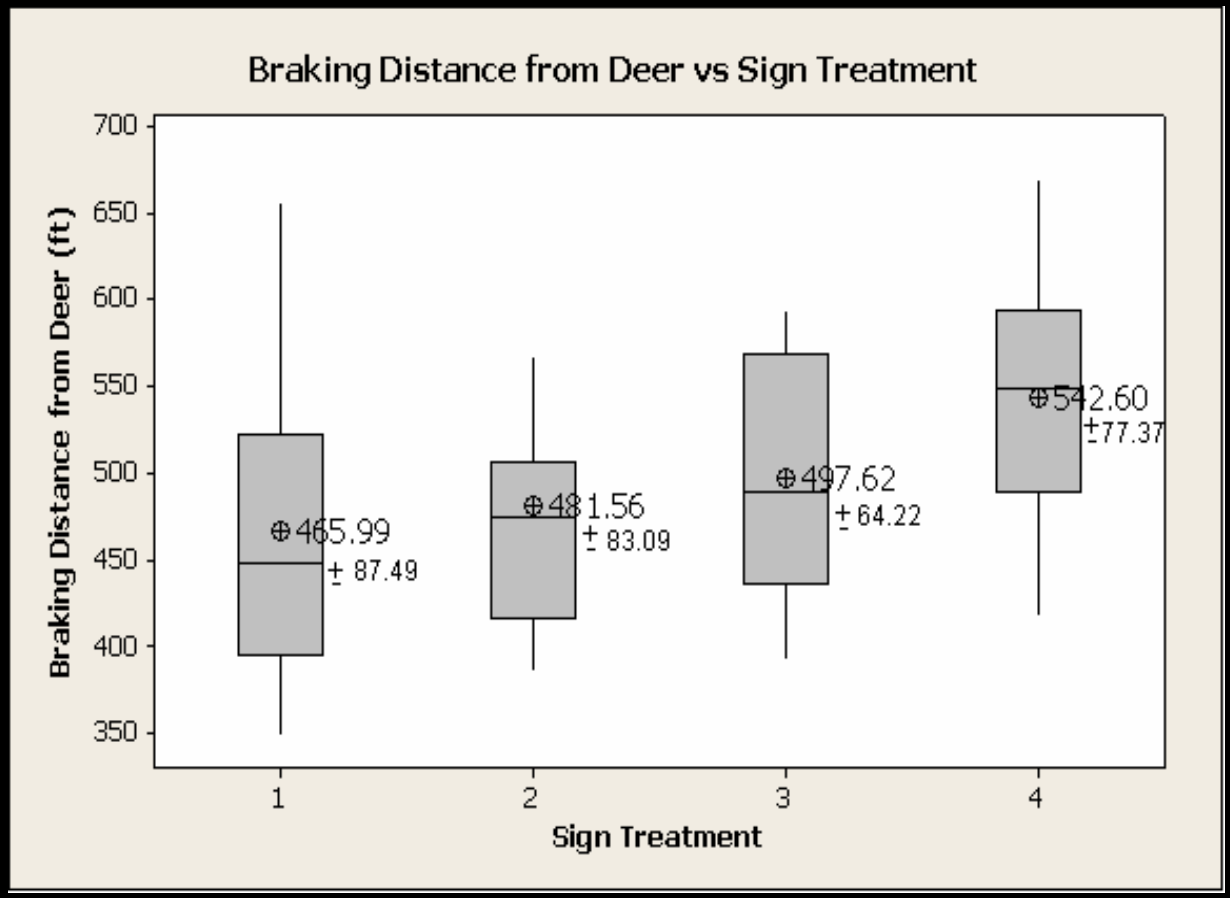


1 = Standard Sign, 2 = Standard Sign w/Flashing Beacon, 3 = Variable Message Sign, 4 = VMS & Standard Sign w/Flashing Beacon.

Results - Onset of Braking vs. Treatment

- Enhanced signage treatments = increased braking distance vs. standard sign.

- Combination treatment provided the greatest statistically significant onset of braking distance ($p<.05$), increase of 76.61 ft



1 = Standard Sign, 2 = Standard Sign w/Flashing Beacon, 3 = Variable Message Sign, 4 = VMS & Standard Sign w/Flashing Beacon.

Results - Survey & Collision

- Participants reported not seeing advisories:
  - 30% Standard sign group,
  - 5% Standard sign with flashing beacon group,
  - 18% VMS sign group, and
  - 0% VMS and flashing beacon group.
- Collision percentages:
  - 15% in the standard sign group,
  - 10% in the standard sign with flashing beacon group,
  - 18% in the VMS group, and
  - 5 % in the combination VMS and flashing beacon group.

Conclusions

- All enhanced signage treatments resulted in decreased speeds and an increased onset of braking distance.

- VMS sign:
  - statistically significant reduction in speed over the standard sign.

- VMS & Flashing Beacon sign:
  - “Positively identified” most often,
  - Least number of collisions, and
  - Provided the greatest statistically significant onset of braking distance over standard sign.

Acknowledgements

- Jaime Eidswick, Mike Kelly, Jimmy Mehlos, Amy Galt, study participants, Virginia Tech Transportation Institute

Photo: Trisha White