

# Flawed Reports and Tests

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## Introduction

Reports which have occasionally been cited that allege the failure or ineffectiveness of the STRIETER-LITE system (and/or the Swareflex Reflector system) in reducing deer-vehicle collisions have been found of dubious value.

The reasons these reports should be dismissed entirely are one of the following:

- **They apply to different reflector systems**
- **They have used flawed testing procedures**
- **No testing was done by the authors**

One particular report of a study done by investigators associated with the University of Georgia (UGA) in 2006 concludes that the STRIETER-LITES are not effective. However, a close look at their methodology reveals a number of flawed assumptions and protocols. For example, observations were made of docile "campus deer" on a Wildlife Refuge rather than observing "deer in the wild" which are more alert and react to any movement while running. Furthermore, the conclusions of this study contradict an earlier Georgia Department of Transportation (GDOT) 2-year research project involving a half mile stretch with properly installed STRIETER-LITES that showed a 100% reduction in deer-vehicle collisions. Please read this

- **Critique of the UGA study**

It is our response to an article entitled "*Evaluation of Wildlife Warning Reflectors for Altering White-Tailed Deer Behavior Along Roadways*", D' Angelo et al, Wildlife Society Bulletin, Vol. 34, No. 4, 2006.

## Apply to different reflector systems

An obvious flaw in many citations is the inclusion of reports that reference entirely different systems or equipment. None of the following reports, cited in connection with the evaluation of the STRIETER-LITE system, were in fact studies involving the system; they dealt with an entirely different class of devices:

1. Queal, L. M. 1967. Effectiveness of roadside mirrors in controlling deer-car accidents. Michigan Department of Conservation, Research Division Report 103.
2. Gordon, D. F. 1969. "Deer mirrors - a clearer picture". Colo. Div. Game of Parks. Game Information

Leaflet 77.

3. Beauchamp, D. E. 1970. Deer Mirror Evaluation. California Department of Fish and Game.
4. T. N. Woodward, and T. D. I. Beck. 1979. Regional deer-vehicle accident research. U. S. Department of Transportation Federal Highway B4:C4Administration Report No. FHWA-RD-79-11. National Technical Information Service, Springfield, Virginia.
5. Williamson, L. 1980. Reflectors reduce deer-auto collisions. Outdoor News Bulletin 34:2.
6. Gilbert, J. R. 1982. Evaluation of deer mirrors for reducing deer-vehicle collisions. United States Federal Highway Administration report FHWA-RD-82-061.

The following report refers to an early version and test model of the Swareflex reflector system that was recognized as being under development, sponsored by Swareflex in Austria:

1. Woodward, T. N., D. F. Reed, and T. M. Pojar. 1973. Effectiveness of Swareflex wildlife warning reflectors in reducing deer-vehicle accidents. Colorado Division of Wildlife

Generally speaking, reports prior to 1982 refer to either entirely different installation methods or test versions of the Swareflex Reflector system. The system was not formally introduced in the United States prior to 1981.

## Flawed testing procedures

The STRIETER-LITE system is a carefully designed, tested, and balanced system of reflectors placed at specified distances and direction of reflection from each other and the road. It is not simply hardware that is driven into the ground on the shoulders adjoining a highway.

Consultation with the Strieter Corporation is required prior to and during installation. Furthermore, maintenance is required to properly achieve the intended purpose of the system; a disturbance in the placement of the reflectors, one or several missing reflectors, bent or twisted posts may all render the system inoperable.

Failure *cannot* be attributed to the STRIETER-LITE system if tests are conducted without prior consultation, if there is improper installation or maintenance, or if there is inaccurate monitoring of night time collisions or locations of collisions within the test site.

The following reports violate basic principles of sound testing procedures:

1. Griffis, J. L.. 1984. Effects of Swareflex Wildlife Highway Warning Reflectors on Behavior and Mortality of White-Tailed Deer.
2. Reeve, A. F.. 1989. Vehicle-related Mortality of Mule Deer in Nugget Canyon, Wyoming. Wyoming Cooperative Fishery and Wildlife Research Unit, Laramie, Wyoming.

3. Scholten, G., G. Loveland, and J. Spinazola. 1989. The Effectiveness of Swareflex Reflectors. Idaho Department of Fish and Game.
4. Dalton, L. B. and M. C. Stanger. 1990. Effectiveness of Swareflex Reflectors at Reducing Mule Deer-vehicle Collisions. Utah Division of Wildlife Resources.
5. Woodham, D. 1991. Evaluation of Swareflex Wildlife Warning Reflectors. Colorado Department of Transportation. CDOT-DTD-91-11.
6. Oregon Highway Division and Dept. of Fish and Wildlife. 1991, Study of the Swareflex Wildlife Warning Highway Reflector System.
7. Waring, G. J., J. L. Griffs, and M. E. Vaughn. 1991. White-tailed deer roadside behavior, wildlife warning reflectors, and highway mortality. *Applied Animal Behavioral Science* 29: 2156-223.
8. Armstrong, J. J. An Evaluation of the Effectiveness of Swareflex Deer Reflectors. 1992. Ontario Ministry of Transportation. MAT-91-12.
9. Ford, S. G., and S. L. Villa. 1993. Reflector Use and the Effect They Have on the Number of Mule Deer Killed on California Highways. Report FHWA/CA/PD-94/01.
10. Reeve, A.F., and S. H. Anderson 1993. Ineffectiveness of Swareflex reflectors at reducing deer-vehicle collisions. *Wildlife Society Bulletin* 21:127-132.
11. Cottrell, Jr., B. H. 2003. Technical Assistance Report Evaluation of Deer Warning Reflectors in Virginia. Virginia Transportation Research Council. VTRC 03-TAR6.
12. D' Angelo et al, Evaluation of Wildlife Warning Reflectors for Altering White-Tailed Deer Behavior Along Roadways, *Wildlife Society Bulletin*, Vol. 34, No. 4, 2006.

## No testing was done by the authors

Some authors allege the inefficacy of STRIETER-LITE systems when they never conducted tests themselves but merely cited other studies that had already been shown to be of dubious significance. Reiterating faulty reports doesn't make their claims any better. The following reports fall into this category:

1. White Water Associates, Inc 1995. Investigating Methods to Reduce Deer-vehicle Accidents in Michigan. FHWA-MI-RD-96-02.
2. Decker, D. J.; Loconti Lee, K. M. and Connelly, N. A. 1990. Deer-related vehicular accidents in Tompkins County, New York: incidence, costs, and implications for deer management. *Transactions of the Northeast Section of the Wildlife Society* 47: 21-26.
3. Romin, L. A., and J. A. Bissonette. 1996. Deer-vehicle collisions: status of state monitoring activities and mitigation efforts. *Wildlife Society Bulletin* 24:276-283.
4. Danielson, B. J. and M. W. Hubbard. 1998. A literature Review for Assessing the Status of Current Methods of Reducing Deer-Vehicle Collisions.
5. Ujvari, M., H. J. Baagoe, and A. B. Masen. 1998. Effectiveness of wild life warning reflectors in reducing deer-vehicle collisions: a behavioral study. *Journal of Wildlife Management* 62: 1094-1099. DVCR Working Group. 2000. Final Report: Deer Vehicle Collision Reduction Working Group Conference. Madison, WI: Sand County Foundation.
6. Norman, P. C. 2001. Reducing Deer-Vehicle Collisions by the Use of Reflectors-A Summary of

#### Current Research and Literature.

7. DeerCrash. 2003. Countermeasures toolbox. Madison, WI: University of Wisconsin, Madison, Deer-Vehicle Crash Information Clearinghouse. Available at: [www.deercrash.com/toolbox/index.htm](http://www.deercrash.com/toolbox/index.htm).
8. Putman, Professor R. J., Dr. J. Langbein and Professor B. W. Staines. 2004. Deer and Road Traffic Accidents: A Review of Mitigation Measures: Costs and Cost-effectiveness. Report for the Deer Commission for Scotland.
9. Curtis, Paul D. James H. Hedlund - Reducing Deer-Vehicle Crashes. Wildlife Damage Management Fact Sheet Series published by Cornell University, Cooperative Extension 2005.
10. Hedlund, J. H., Paul E. Curtis, G. Curtis, and A. F. Williams. 2003. Methods to Reduce Traffic Crashes Involving Deer: What Works and What Does Not. Insurance Institute for Highway Safety.

### Other reports

This report shows a methodological error in testing as they used captive born, pen-raised deer as test subjects:

1. Zacks, J. L. 1985. An investigation of Swareflex wildlife warning reflectors. Federal Highway Administration Report FHWA-MI-RD-85-04, Washington, D.C.

Obviously, the reaction of pen-raised deer to human actions, equipment and conditions is different from that of wild animals.

Some case studies cited have no known bearing to the function of the STRIETER-LITE system. This study investigates the reaction of deer to the color red:

1. Zacks, J. L. 1986. Do white-tailed deer avoid red? An evaluation of the premise underlying the design of Swareflex wildlife reflectors. Transportation Research Record 1075: 35-43.

The STRIETER-LITE system does not depend on any particular color; in fact, blue-green reflectors work just as well as red.