Human Factor and Highway Design

**Human Factors in Highway Geometric Design**  
Journal of Transportation Engineering, January/February 1996

This paper reviews the researches of human factors in highway engineering and the design guidelines of the United States, Germany, and Great Britain. This paper shows that although a variety of highway design assessment methods with respect to the aforementioned research areas have been suggested in literature, the relevant findings have not yet been set and satisfactorily worked with most highway design guidelines. Based on the findings and existing design guidelines from previous researches, a framework of new guideline is discussed. The suggested design guidelines in this paper consider the “non-design” road users, such as older drivers, and also incorporate with the highway safety as a feedback in the design process.

**Improvements to Sight Distance Algorithm**  
Davd J Lovell, Jyh Cherng Jong, Peter C Chang.

This paper describes improvements developed for an existing algorithm that calculates sight distance profiles based on horizontal geometry. Exact expressions are developed for vector derivatives for plane curves including clothoid spirals. Coordinate and derivative vectors are developed for partial spirals that possess nonzero curvature at both ends, frequently used as transitions between circular curves of different radii. As with complete spirals, the coordinate vectors are approximate and the derivative vectors are exact. Finally, an exact method for measuring distance along an offset curve to a clothoid spiral is developed. Taken together with the results in a previous referenced paper, this represents a complete recipe for computing sight distance profiles along arbitrary horizontal alignments. A numerical example is included to illustrate the use of the algorithm.

**Investigation Of Stopping Sight Distances Validity During Nighttime**  
Road and Transportation Research Association, Germany

Here the authors state that the existing models for estimating stopping sight distances are based on daytime driving solely and calculations are carried out separately for horizontal and vertical crest curves, using simple vehicle dynamics. It is therefore believed that according to the existing policies, these distances are addressed inadequately. In the paper an effort was made to address the problems and provide some specific data. The results show that the influence of night visibility to the definition of safe stopping sight distance is crucial. Furthermore, combinations of vertical and horizontal curvature may lead to a significant loss of sight distance, which may be attributed to the fact that the cut slope or other roadside obstacle obstructs sight. The overall resulting shorter sight distances during nighttime driving may lead to considerable unsafe driving conditions. They therefore concluded that design policies should
reconsider the issue of safe stopping sight distance at nighttime to include the additional necessary influencing parameters.

**Older Driver Highway Design: The Development Of A Handbook And Training Workshop To Design Safe Road Environments For Older Drivers**

Swedish National Road And Transport Research Institute

Older drivers are involved in significantly more serious injury and casualty crashes per kilometer driven than younger drivers and this rate is expected to increase as older people drive more and the population ages. Road design plays a major role in road safety, however, and it has generally not taken the older road user into consideration. There is, therefore, a need to take effective action to reduce risk levels to older road users by designing roads that accommodate the needs and capabilities of this vulnerable road user group. This paper describes a research program that examines the suitability of road design in Australasian for older drivers. The findings from an older driver crash 'black-spot' site study highlight the difficulty experienced by older drivers of selecting safe gaps at intersections, which is exacerbated by factors such as limited sight distance, high task complexity, high traffic volumes, high approach speeds and wide, multi-lane carriageways. Some recommendations are made to target this problem for older drivers including replacing stop and give-way signs with fully controlled traffic signals, provision of roundabouts, and provision of fully controlled right-turn phases (left-turn in US and some European countries). A handbook and training package are under development to promote these recommendations to ensure they receive maximum use by Australasian road authorities and provide awareness of the difficulties experienced by older drivers.