

MANUAL CONTROLS FOR MATURE DRIVERS

- 1. Scope**—Since little data exists to provide appropriate values for control parameters that would be appropriate for mature drivers, the following recommendations are of a general nature. However, they are based upon the current understanding of the aging processes that characterize mature drivers.

Notwithstanding the lack of an extensive amount of data in this field, the dissemination of this SAE Information Report is considered to be appropriate and timely in light of the large increase in the number of mature drivers on the public roads, and because of the need to at least initiate efforts toward developing an information report covering this issue.

It is realized that there may be cases where specific recommendations may conflict with vehicle packaging and/or operational requirements. Deviation from the recommendations may be necessary and permissible to achieve the best overall system performance.

A "mature" driver is defined as one who is over the age of 50 since visual changes become noticeable at about this age. Degenerative cognitive and skeletal changes visually become more apparent at a later age (Reference 1).

2. References

- 2.1 Applicable Publications**—The following publications form a part of this specification to the extent specified herein.

1. Pike, J. A., "The Elderly and Vehicle-Related Injury," Society of Automotive Engineers, SAE #881753
2. Murrell, K. F. H., "Ergonomics," Chapman & Hall, London, 1965
3. Woodson, W. E., "Human Factors Design Handbook," McGraw-Hill Book Company, New York, 1981
4. Bradley, James V., "Optimum Knob Crowding," Human Factors, June 1969
5. Smith, S. L., "Letter Size and Legibility," Human Factors, 21, 6, December 1979
6. Pirkel, J. J. and Babic, A. L., (Chart) Generic Guidelines, Syracuse University, 1988
7. Green, P., "Ergonomics of Automotive Displays," SPIE/ESD International Symposium on Optical Engineering and Industrial Sensing for Advanced Manufacturing Technologies, Dearborn, MI, June 1988
8. Weale, R. A., "The Aging Eye," H. K. Lewis, London, 1963
9. Schieber, F., Fozard, J. L., Gordon-Salant, S., and Weiffenbach, J. M., "Optimizing Sensation and Perception in Older Adults," International Journal of Industrial Ergonomics, 7, 133-162, 1991
10. "Ease: Education in Aging for Scientists and Engineers," American Society on Aging (undated)

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11. Koncelik, A. J., "Aging and the Product Environment," Hutchinson Ross Publishing Co., Stroudsburg, 1982
12. Schmidt, I. and Connolly, P. L., "Visual Considerations of Man, the Vehicle, and the Highway," SAE Report SP-279, 1966
13. Kallman, D. A., Plato, C. C., and Tobin, J. D., "The Role of Muscle Loss in the Age-Related Decline of Grip-Strength: Cross-Sectional and Longitudinal Perspectives," Journal of Gerontology, 45, 3, M820-88, 1990

3. Changes in Vision Due to Aging—Changes in vision due to aging that are of primary concern in the design of controls are those that affect:

- a. Accommodation (near vision)
- b. Contrast sensitivity
- c. Light transfer capability

3.1 Accommodation—It is common for adults who have reached the age of 50 to use glasses with multifocal or "reading" lenses to overcome their loss of accommodation (e.g., bifocals; see Figure 1). Since the focal length of the "reading" lens is about 40 cm (16 in) but that of the far lens begins about 200 to 300 cm (79 to 118 in), control systems that are located between these distances often will be less well defined for mature drivers. This is especially true for controls used in entertainment and climate control systems.

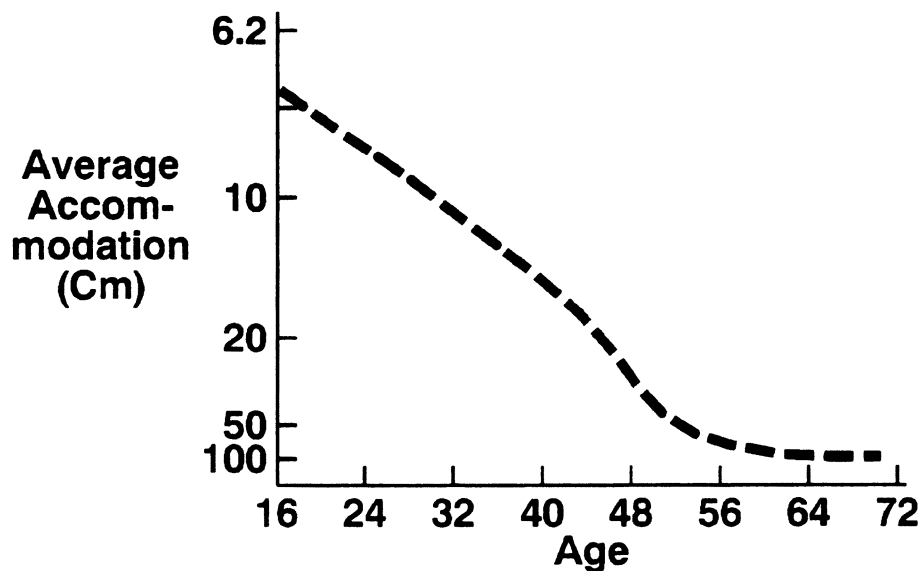


FIGURE 1—AVERAGE ACCOMMODATION VERSUS AGE