SUMMARY REPORT 75-3(S)

AN INTERIM REPORT ON ROADSIDE SIGN VISIBILITY

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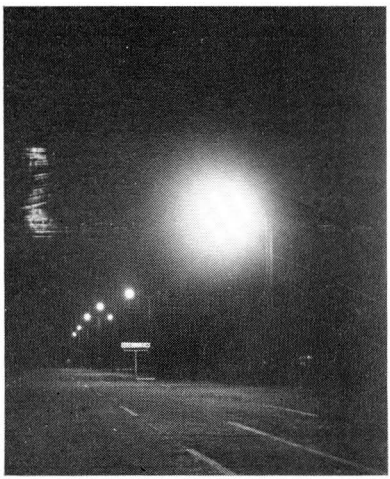

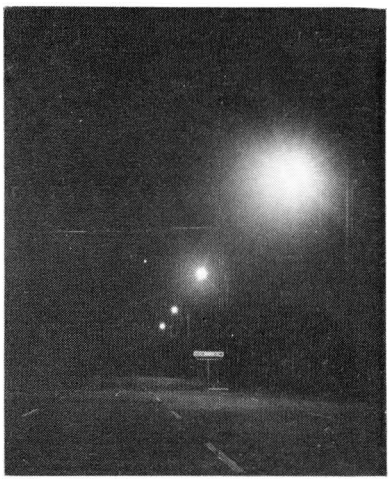

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An Interim Report on Roadside Sign Visibility

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The research covered in this report is one phase of an overall project directed to the formulation of design criteria for economical and functional roadway lighting. This phase was devoted to determination of light source mounting height effects on sign visibility. The evaluation of the relationships between visibility and luminaire locations found in this study provide valuable guides for the design of illumination-sign systems.

This investigation was conducted at the Highway Illumination Test Facilities of Texas A&M Research Annex. The facility is equipped with portable illumination towers to provide various system configurations. The facility is also equipped with various light measurement devices to facilitate photometric studies.

Four systems were selected for the sign visibility studies. These systems were:

1. Seven 400-watt luminaires, 30-foot mounting heights, 200-foot longitudinal spacings.
2. Seven 400-watt luminaires, 40-foot mounting heights, 200-foot longitudinal spacings.
3. Seven 1000-watt luminaires, 50-foot mounting heights, 300-foot longitudinal spacings.
4. Seven 1000-watt luminaires, 60-foot mounting heights, 300-foot longitudinal spacings.

An illustration of the systems studied and the experimental design followed is shown in Figure 1.

Roadside signs consisting of black letters on a white beaded background were selected for study based on previous research. Analysis of variance techniques were used to determine the statistical significance of the visibility experimental variables.

Brightness and glare measurements were made in conjunction with the visibility tests for systems numbered 1 and 2. These measurements were compared to the visibility results for photometrics-visibility correlation. The data were also expressed in terms of effective contrast, a relative measure of visibility conditions.

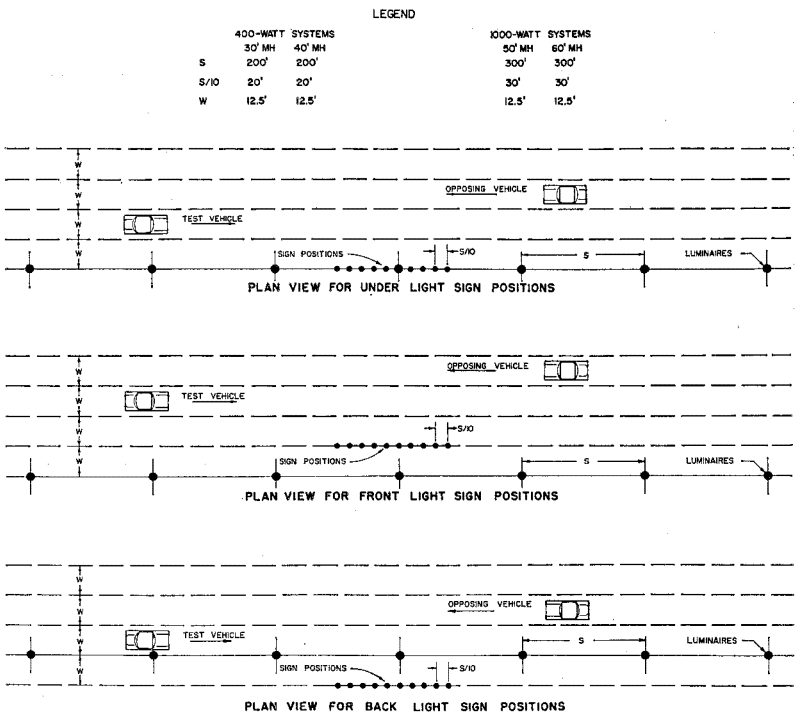
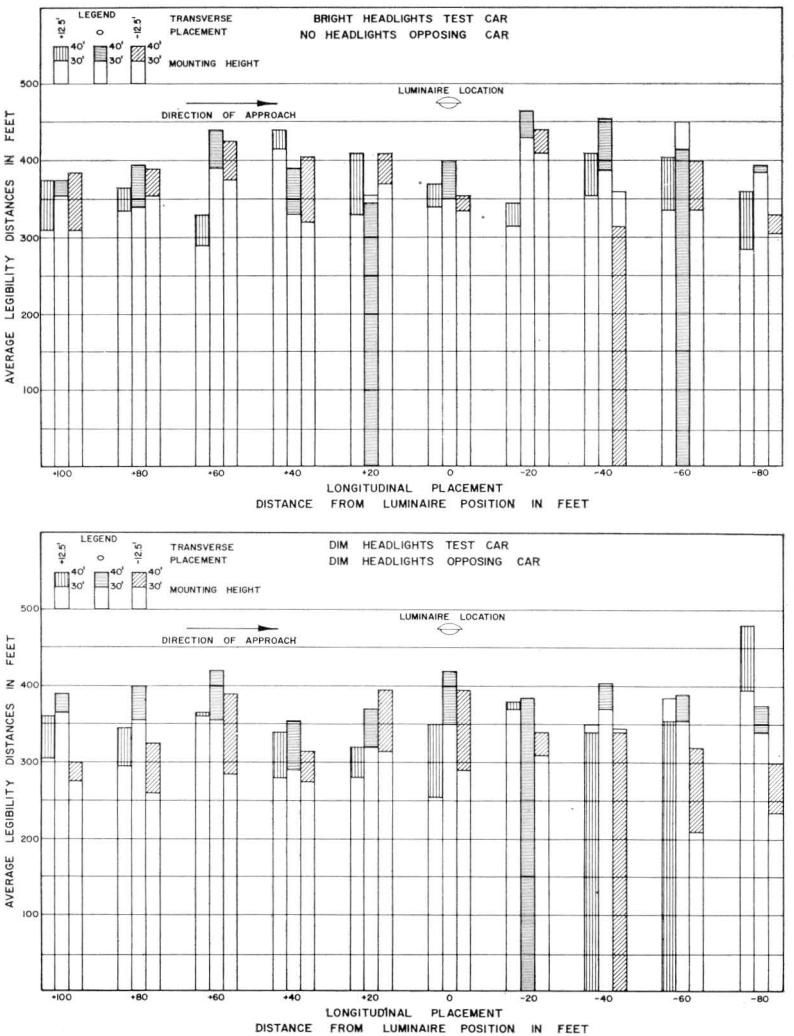


Figure 1.

The analysis of the studies warranted several observations:

1. Improved lighting uniformity can be achieved by increasing the mounting height of luminaires.
2. Significant increases in sign legibility are realized by increasing the mounting height of 400-watt luminaires from 30 to 40 feet (Figure 2). No significant difference is realized in changing the mounting heights of 1000-watt units from 50 to 60 feet.
3. Careful attention should be given to the placement of reflectorized roadside signs in an illumination system consisting of 400-watt units at 30-foot mounting heights while no particular problem is encountered in 40-foot mounting heights or in 50- and 60-foot mounting heights of 1000-watt units.
4. The higher mounting heights of 400-watt units resulted in a system of lower sign brightness and glare levels but increased legibility distance.
5. Effective contrast analysis did not define one system as being optimum with respect to the other. However, the values of effective contrast were nearly constant at .70



EFFECTS ON LEGIBILITY DISTANCE FOR CONDITIONS SHOWN

Figure 2.

indicating that a minimum value of effective contrast is necessary for a particular visual task.

It is recognized that any change in the illumination geometry can alter vision. Therefore, the results of this study can be applied only to illumination systems with similar parameters. However, the relationships found between system parameters and visibility provide valuable guides for the design of future systems.