U.S. Department of Transportation
Federal Highway Administration

Georgia Division

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January 31, 2012

In Reply Refer To:
HPE-GA

Mr. Keith Golden, P.E., Commissioner
Georgia Department of Transportation
One Georgia Center
600 West Peachtree St. NW
Atlanta, GA 30308

Dear Commissioner Golden:

This letter is in response to your letter dated November 30, 2011, requesting that we reconsider our position regarding a value engineering recommendation on the widening and reconstruction project on SR 10/SR 78 in Clark/Oglethorpe Counties (PI 132660, STP00-0014-00(069). You requested to change the concept report to propose a median width of 32 feet instead of the originally proposed 44 feet.

Your letter states that the 32-ft median width is consistent with GDOT's revised median policy for roadways with design speeds $\leq$ 55 mph and that it is consistent with AASHTO criteria. Further, your letter and meetings with your staff reveal that GDOT believes that the access management plan for this project will result in numerous access points, which should serve to reduce operating speeds. Finally, you analyzed the segment using the Highway Safety Manual and noted that the results indicate that reducing the median width to 32 feet would only increase the predicted number of crashes per mile per year from 4.875 to 4.925. Based on the information contained in your letter, we concur in the value engineering recommendation and hereby approve the revised concept report.

If you have any questions or require additional information or assistance, please feel free to contact Ms. Kendra Fly at (404) 562-3644.

Sincerely,

for Rodney N. Barry P.E.
Division Administrator

Keith Golden, P.E., Commissioner

GEORGIA DEPARTMENT OF TRANSPORTATION

One Georgia Center, 600 West Peachtree Street, NW
Atlanta, Georgia 30308
Telephone: (404) 631-1000

November 30, 2011

Mr. Rodney N. Barry, P.E.
Division Administrator
Federal Highway Administration
61 Forsyth Street, SW
Atlanta, Georgia 30303

RE: **Widen and Reconstruct SR 10/US 78 in Clarke/Oglethorpe Counties (PI No. 132660)**

Dear Mr. Barry:

On September 15, 2011, the Department received a written response from FHWA Georgia Division, stating that FHWA does not concur with a value engineering recommendation to change the proposed median width on this rural arterial from 44-ft to 32-ft, "as it will have an adverse effect on safety". This letter is to communicate the Department's position on median selection and to request FHWA reconsider this recommendation.

The FHWA research (dated 1993) attached indicates that reducing existing median widths to less than 30-ft wide to enhance capacity may decrease the level of safety on the roadway. The Department supports this research however; the findings do not indicate that a 32-ft wide median will have an adverse effect on safety when widening an undivided 2-lane arterial to a divided 4-lane arterial.

The Department has several 4-lane rural collector and arterial projects similar to this project that were originally planned with 44-ft wide medians primarily because this width did not preclude reconstruction of the roadway to a 20-ft wide raised median for future through lane capacity. In June 2010, the Department revised its policy on median usage to allow the designer the flexibility to select a median width that was consistent with AASHTO criteria on geometric design and roadside safety, as well as consideration to access control, environmental impacts, and project costs. GDOT limits the use of 32-ft wide medians to arterials with design speeds $\leq$ 55 mph. 44-ft wide medians are considered appropriate for high-speed controlled access roadways.

There are currently a total of 45 residential properties and 5 commercial properties along this section of US 78. The access management plan is to continue to consider additional driveways by permit with the potential for limits-of-access being acquired at major intersections to improve operations. For this project, The AASHTO Highway Safety Manual (Predictive Method) indicates the potential for 4.875 total crashes per year per mile for a rural 4-lane divided roadway with a 44-ft median; and potentially 4.925 total crashes per year per mile for a similar roadway with a 32-ft wide median. When considering the comparative safety analysis along with the access management plan for this section of US 78, it is our opinion that the recommended 32-ft wide median is appropriate and will not have an adverse effect on safety.

We are putting additional internal controls in place to ensure VE recommendations to change "standard" cross section elements such as median width are assessed by subject matter experts in the Division of Engineering before formal revisions to Concept Reports are allowed to process forward. We appreciate your consideration in this matter. If you would like to talk further about this subject, please feel free to contact the State Design Policy Engineer, Brent Story, at (404) 631-1600.

Sincerely,

Keith Golden, P.E.
Commissioner

KG:GMR:RRM:BAS

SUMMARY REPORT

This summary report is an archived publication and may contain dated technical, contact, and link information

Publication Number: FHWA-RD-93-046
Date: August 1993

The Association Of Median Width And Highway Accident Rate

Medians on divided highways may be used as recovery areas by out-of-control vehicles. In some regions, the median widths of new highways are being minimized to control the amount of right-of-way required, and in others, existing highway medians are being reduced so that additional travel lanes can be built to improve capacity. Such actions tradeoff safety to reduce costs or increase efficiency (as measured by capacity). Correcting a deficiency after a road has been built is more expensive than building without the deficiency. The design of new highways must balance safety, cost, environment, and efficiency considerations. This study examined the effect of median width on the frequency and severity of accidents on homogeneous highway sections with a traversable (nonbarrier) median.

Analysis Methods

Median width was defined as the width of the portion of divided highway separating the traveled ways for traffic in opposite directions (including the inside shoulder). In addition to median width, several roadway characteristics affect the frequency, severity, and type of accidents. To isolate the effect of median width, these other variables must be controlled either by restricting the road sections to having particular characteristics or by making statistical adjustments. Both methods were used in this study.

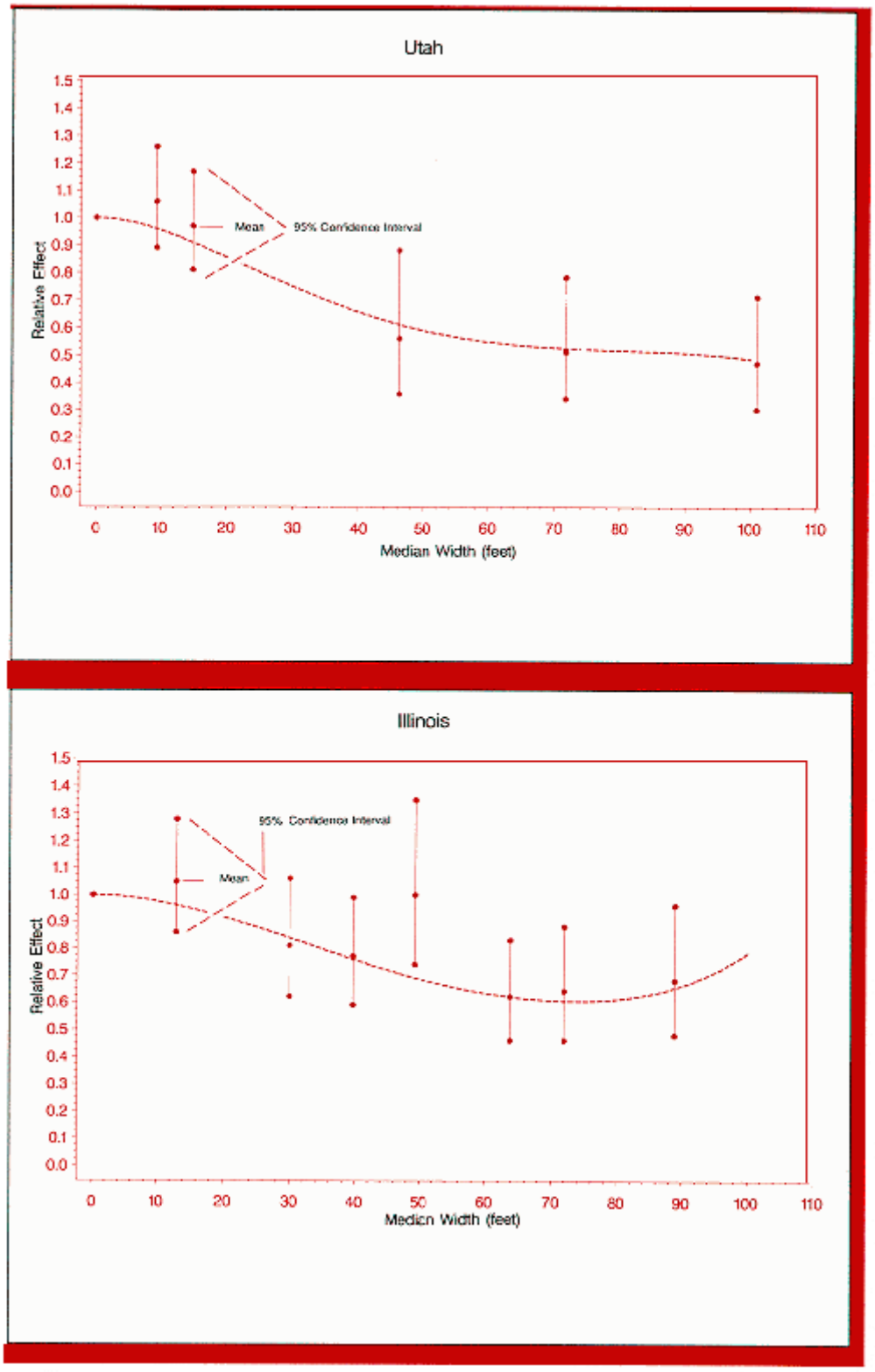
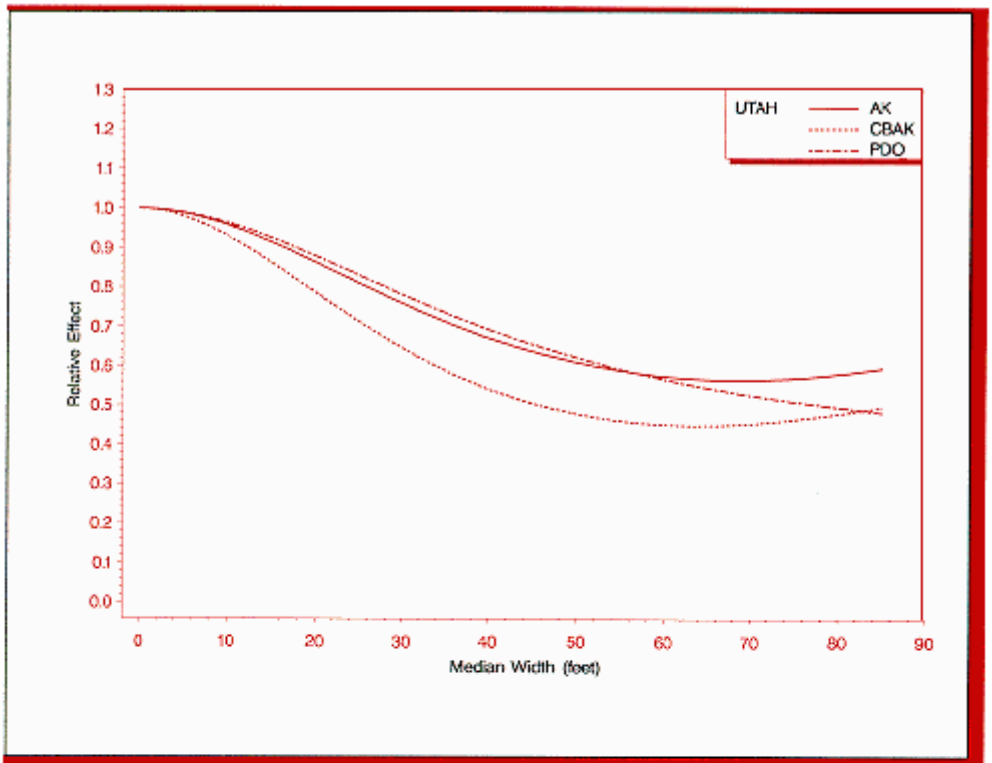


Figure 1. Relative effect of median width on total accident rate (median width represented as both a categorical variable and as a continuous variable).

The analyses were restricted to two-way, four-lane, rural and urban Interstate, freeway, and major highway road sections in Utah and Illinois of a length exceeding 0.11 km (0.07 mi), with a posted

speed limit of at least 56.3 km/h (35 mi/h), and with no median or an unprotected median no wider than 33.5 m (110 ft). In addition, the Utah analysis was restricted to road sections with 3.66-m (12-ft) lane widths. No such restriction was placed on the Illinois analysis as there was no explicit lane width variable in that data base.



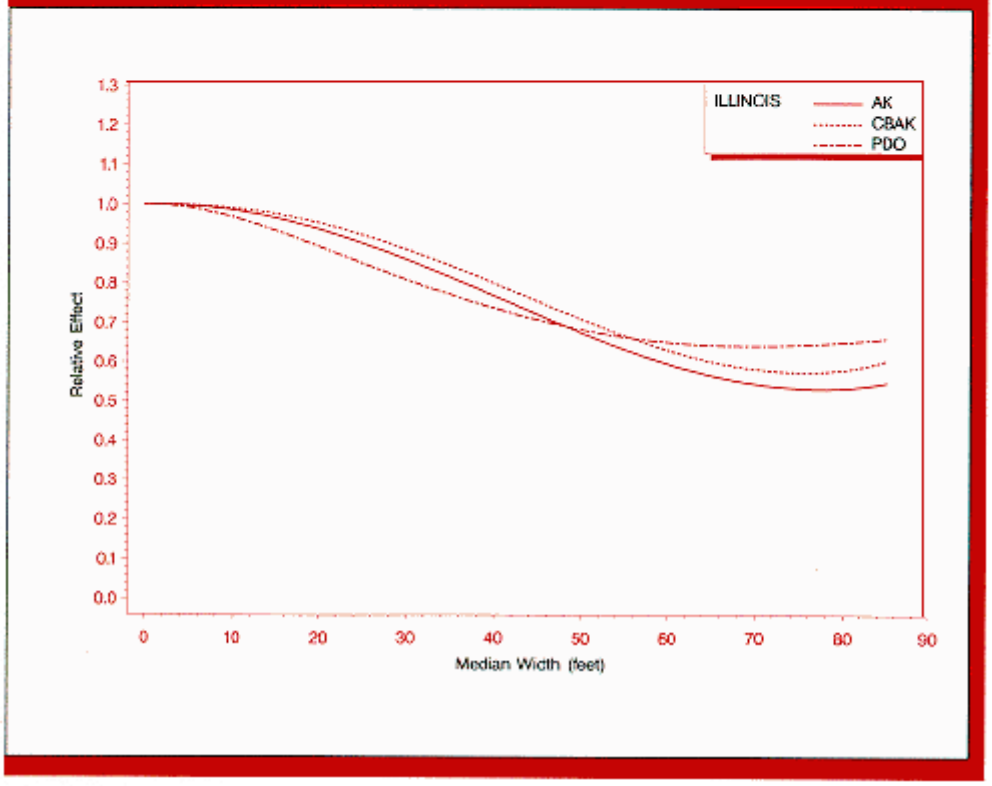


Figure 2. Relative effects of median width by accident severity (AK= severe, CBAK = all injury, PDO = property damage only).

The Utah analysis was based on 982 highway sections with an average length of 1.59 km (0.99 mi). A total of 37,544 reported accidents occurred on those sections from 1987 through 1990. The Illinois analysis involved 2,481 highway sections with an average length of 1.35 km (0.84 mi). A total of 55,706 accidents on those sections was reported over the period from 1987 through 1989.

A log-linear regression model assuming a negative-binomial variance function was used to assess the effects of median width and several other roadway variables on the accident rate. This model assumes that the effect of variables on the accident rate is multiplicative rather than additive as in a linear model. The log-linear model may be represented algebraically as:

$$\log(\lambda) = a + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k$$

where λ is a function of the accident rate, log denotes natural logarithm, and the X, are dummy variables for categorical roadway characteristics or actual values for quantitative roadway characteristics. The beta coefficients were estimated by the method of quasi-likelihood.

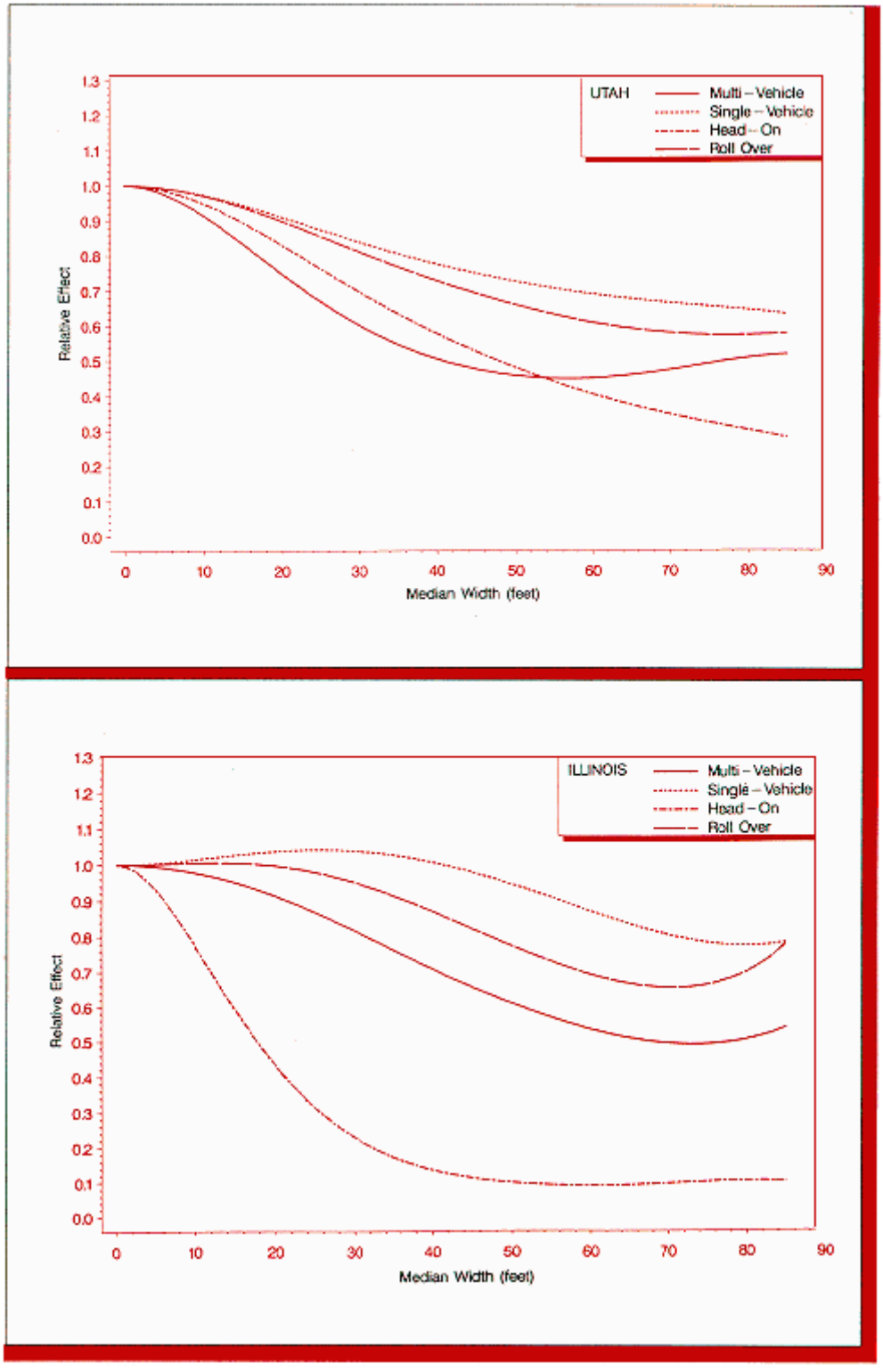


Figure 3. Relative effects of median width by accident type.

Results

The total accident rate appears to decline steadily with increasing median width from 0 to 33.5 m (0

to 110 ft). For Utah it declines by a factor of six, and for Illinois, it declines by a factor of 13. Over this range of median width, the rates of serious injury, all injury, and property-damage-only accidents also decline by up to a factor of 15. The rate of multivehicle accidents declines steadily with increasing median width. The rate of single-vehicle accidents in Utah shows little relationship to median width, however.

Due to confounding by other variables, the observed reductions in the accident rate cannot all be attributed to the effect of increasing median width. After adjusting for these other variables, the decline in the total accident rate persists, though to a lesser degree (figure 1). This figure depicts the relative effect of median width on total accident rates in Utah and Illinois when median width is represented both as a categorical and as a continuous variable relative to the rate for medians of zero width. The upper and lower values are the boundaries of the 95-percent confidence interval for median width as a categorical variable. Over the range of median widths, Utah accident rates drop about one-half and Illinois rates drop about one-third.

The interpretation of these relative effects is that when all the other variables are the same and the only difference is the median width, the relative effect describes the proportional reduction in the total accident rate. For example, using the Illinois model shown in figure 1, the total accident rate for an average median width of 12.2 m (40 ft) is about 76 percent of the rate for median width zero (no median), and for an average median width of 19.5 m (64 ft), it is 62 percent of the zero width rate. If, in designing a new highway, the engineer wants to consider the safety benefits of increasing the median width from 12.2 to 19.5 m (40 to 64 ft), this is obtained as (0.62-0.76)/0.76 = -0.18. Therefore, you would expect an 18-percent reduction in the accident rate. Similarly, if you reduce an existing 19.5-m (64-ft) median to a 12.2-m (40-ft) one, you would expect a 23-percent increase in the total accident rate [(0.76-0.62)0.62 = 0.23].

Relative accident rates for more specific accident sevaities or types (such as serious accident or head-on/sideswipe opposite direction (HO)) generally declined with increasing median width (figures 2 and 3). Figure 2 shows that in Utah, for instance, relative accident rates for both serious (AK) and injury accidents (CBAK) declined steadily as median width increased from 0 to 12.2 m (0 to 40 ft). These rates remained stable for median widths exceeding 12.2 m (40 ft). The relative accident rate for property-damage-only accidents (PDO) fell steadily as median width increased from 0 to 24.4 m (0 to 80 ft). In Illinois, the AK and CBAK relative accident rates fell until median width had increased to 21.3 m (70 ft). Although the data indicate a slight increase beyond 21.3 m (70 ft), it is believed this is an artifact of the small sample sizes available at this median width. The relative accident rates would be expected to remain constant beyond 21.3 m (70 ft).

According to figure 3, relative accident rates for rollover accidents (Roll) in Utah fell to a minimum when median width had increased to 21.3 m (70 ft). The relative rates for multivehicle accidents (MVeh), single-vehicle accidents (SVeh), and head-on/sideswipe opposite direction accidents generally declined with increasing median width. For Illinois, the relative rate for head-on/sideswipe accidents dropped sharply, then stabilized around 0.12 at a median width of approximately 12.2 m (40 ft). For multivehicle accidents, the relative rates generally fell, though not as rapidly. Relative rates far single-vehicle accidents dropped slightly with increasing median width, while for rollover accidents the relative rates remained between 0.65 and 0.90 for median widths of 12.2 m (40 ft) or wider.

State Databases Used

Illinois and Utah were the only HSIS States with accident and roadway data sufficiently complete and reliable to permit an analysis of the effect of median width on accident rates for those medians without barriers.

Study Implications

The general findings indicate that accident rates do decrease with increasing median width for unprotected medians. On the other hand, there was very little decrease for the first 9.1 m (30 ft) of median width suggesting that when constructing new highways, medians need to be at least 9.1 m

(30 ft) wide to have a positive safety effect. The data also indicates that the safety benefits of medians increase until widths of 18. 3 to 24.4 m (60 to 80 ft) are reached. While it is difficult to determine the exact accident width where the safety effect is lost, the data suggest that decreasing existing medians to less than 6.1 to 9.1 m (20 to 30 ft) wide to enhance capacity may decrease the level of safety on the roadway.

Unfortunately, the HSIS data set could not be used to determine the median width at which a positive barrier should be used. At the current time, the HSIS States contain only a limited number of miles of roadway with barrier, and the variation in median width on these roadways is insufficient for a statistically valid study. Three to four additional States will be added to the HSIS by the end of 1994. It is anticipated that this will provide a sufficient sample size to conduct this type of analysis.

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Updated: 06/13/2011

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United States Department of Transportation - Federal Highway Administration

U.S. Department of Transportation
Federal Highway Administration

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September 15, 2011

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In Reply Refer To:
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Mr. Keith Golden
Interim Commissioner
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One Georgia Center
600 West Peachtree St. NW
Atlanta, GA 30308

Dear Mr. Golden:

This letter is in response to the Revised Project Concept Report for Project STP00-0014-00(069), PI# 132660- in Clarke and Oglethorpe Counties. The revised report requests to change the following features: 2 – 12' travel lanes in each direction to 1 – 12' outside travel lane and 1 – 11' inside travel lane in each direction; 44' depressed grassed median to 32' depressed grassed median; and 6.5' paved outside shoulder to 4' paved outside shoulder. FHWA concurs with the changes in travel lane width and shoulder width. FHWA does not concur with the change in median width as it will have an adverse effect on safety.

If you have any questions or require additional information please contact Ms. Kendra Bunker at (404) 562-3644.

Sincerely,

for Rodney N. Barry P.E.
Division Administrator

Cc: Brent Story, State Design Policy Engineer