

Evaluation of the Buckeye Crossbuck at Public, Passive Railroad/Highway Grade Crossings in Ohio

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Executive Summary

Two new crossbuck designs for use at passive Railroad/Highway Grade Crossings (RRX) were evaluated. The Standard Improved and the Buckeye crossbuck were evaluated on a state-wide basis in Ohio with respect to their potential to alter driver risk taking behavior (part I), their crash reduction potential (part II), user acceptance (part III), and with respect to their photometric performance at night (part IV). It was found that the percentage of non-compliant drivers was approximately the same for both crossbuck designs with slightly more conservative risk acceptance times obtained for the Buckeye crossbuck. Based on the last 10 years of Ohio Railroad/Highway Grade Crossings crash history the overall number of crashes at passive Railroad/Highway Grade Crossings has continued to drop. Overall, the crash numbers in part II show a statistically significant ($\alpha = 0.05$) superiority of the Buckeye crossbuck: 157 crashes for Buckeye crossbuck vs. 192 crashes for Standard Improved crossbuck (22% decrease in crashes) from 1994 until June 30th, 1999. A user acceptance survey indicated an overwhelming preference of the Buckeye Crossbuck among all surveyed user groups. The Buckeye Crossbuck provides by far the strongest visual signal among the measured crossbucks at night and during daytime. Photometric crossbuck luminance measurements conducted under automobile low-beam illumination at night indicate that due to their increased reflectorization, both the Buckeye Crossbuck and Standard Improved Crossbuck provide superior visual stimuli to an approaching driver at night. The positive effect of the Buckeye Crossbuck on crash numbers is more pronounced during daytime than during nighttime. The nighttime and daytime proportions of the crash frequencies separately still favor the Buckeye Crossbuck. The multi-faceted, fully reflectorized (micro-prismatic type VII, long distance performance LPD) shield makes a Buckeye Crossbuck the brightest and visually most powerful crossbuck design evaluated in this study. In addition, the angled shield makes the Buckeye Crossbuck less sensitive to placement in approaches that are not straight or perpendicular to the railroad tracks, and the red YIELD legend on the shield has the potential to instill into drivers, close to the Railroad/ Highway Grade Crossing, the idea that they must yield to approaching trains. It is also important to note that, especially at night, both the Standard Improved Crossbuck and the Buckeye Crossbuck designs provide an approaching driver with a reflectorized (bright) target on both sides of the tracks, which makes it possible for a driver to determine if a Railroad/ Highway Grade Crossing is occupied by a train (left crossbuck either fully or partially obstructed by railroad cars).

It is recommended to amend the national standard for crossbucks at public passive Railroad/Highway Grade Crossings in the MUTCD and to include the Buckeye crossbuck as an alternate design.

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