

A STUDY OF REAR VIEW MIRRORS ON THE CUTAWAY OR MINI COACH BLIND SPOTS IN THE OPERATORS FIELD OF VISION AND THEIR ELIMINATION

The purpose of this study is meant to provide information to the operators of the cutaway or mini coach on the importance of proper rear view mirroring of their vehicles at time of acquisition. The problem is giving the operator a mirror system that does not address the issue of blind spots, which for the purposes of this study are defined as areas around the sides of the vehicle that cannot be seen by the operator in the rear view mirrors, requiring the operator to take his/her eyes off the road and physically look into the area before taking the vehicle into that area. Blind spots usually cause the most problems during turning or lane change maneuvers. The operator is forced to make a decision either not to take his/her eyes off the road and look into the area and run the risk of hitting a person or object in the blind spot or, take their eyes off the road while the vehicle is moving forward and run the risk of hitting upcoming objects.

Although the topic of blind spots has been the subject of a great deal of study and talk, there is not a great deal of guidance by the government or anyone else. The only standard for these vehicles is Federal Motor Vehicle Safety Standard 111, which provides simply that a vehicle of 10,433 pounds (4536 kg) or more must have a mirror on each side that is at least 49 square inches (323 cm) of reflective surface. Once the manufacturer of the vehicle places that size mirror on the vehicle their responsibility ends under the law. Anyone who has driven a vehicle knows that this requirement does not begin to give the operator enough of a view of the area around the sides of the vehicle so the topic of supplemental mirrors becomes the issue. Historically, this has been handled by the addition of a convex mirror of some type or size to be used in conjunction with the flat mirror to aid the operator in coping with blind spots.

The first step in our study was to see if there was some kind of common thread in what people in the industry were doing with supplemental mirrors to use as a guide. We found none. Instead we found vehicles with small bubble-type convex mirrors pasted on the flat mirror, case type mirrors with a convex mirror incorporated in the case with the flat mirror, separate convex mirrors mounted either above or below the flat mirror and we even found situations where the vehicles only had flat mirrors. The only common thread in all of these configurations was still the existence of blind spots of varying degrees, especially on the passenger side of the vehicle.

Since we could find no common ground we arbitrarily selected for the purpose of this study a Champion Challenger that was mirrored with a 7" x 10" flat mirror and a separate 6" x 5 ½ " convex mirror, which was mounted above the flat mirror as being indicative of a common approach to blind spots by the industry.

The first part of our study was to look at the mirroring system from the operators seat. What is the operator looking at when the mirrors are needed? In figure one we include a photo of the view from the operators seats.



This photo illustrates two items of importance. Since the area behind a mirror cannot be seen by looking into the mirror it becomes important to place the supplemental mirror as far to the front of the vehicle as possible and secondly the physical construction of the mini coach itself creates blind spots. The posts on the side of the vehicle mean simply that even if the operator takes his/her eyes off the road to physically look into the area, objects may be in the blind zone and still may not be seen by the operator because they are behind the various construction supports. The indirect view provided by the mirror system becomes that much more important.

The second part of our study was to show what area around the vehicle the operator was actually looking at when looking into the mirrors. Here we placed tapes at the edge of the field of vision provided by the various mirrors. Figure 2 shows the results.



The two tapes on the left of the photo along the side of the bus shows the field of view provided by the flat mirror and the convex mirror on the vehicle. We measured these areas and the results were that the flat mirror provided a view of an area 2 feet from the center of the rear axle and the addition of the convex mirror added an area of 7 feet more. In Figure 2 there is a third tape on the right side of the picture. This was produced by removing the convex mirror and substituting it with the BDS Dead Angle Spot Mirror. This mirror is cut from wide-angle glass in such a manner that it produces a field of view that is 65% or greater than a convex mirror of a comparable size. The BDS mirror measures 9" x 6" and as the photo shows makes the entire side of the vehicle visible to the operator and our measurements here were that it added an additional 61 feet from the center of the rear axle of the vehicle that the operator could see with just a glance in the mirror.

Conclusion:

The technology exists to eliminate blind spots. Once this is known, the operator of mini coaches requesting this technology when ordering vehicles can be assured that he/she is placing those vehicles on the road in the safest possible condition for the passengers, the operator, and the rest of the traveling public.