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Horse and Buggy Crash Study II: Overstretching the Slow-Moving Vehicle Emblem's Abilities: Lessons from the Swartzentruber Amish

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Abstract

For decades, the Swartzentruber sect of Amish have, for religious reasons, rejected state-level mandates for horse-drawn buggies to display the S.M.V. (slow-moving vehicle) emblem. Court cases in several states have suggested: (1) confusion over what the emblem is supposed to accomplish, and (2) questions about the emblem's superiority to alternatives. Synthesizing evidence presented in several court cases involving the S.M.V. emblem and the Swartzentruber Amish, this study clarifies what the S.M.V. emblem can be expected to accomplish and in which domains it reaches its limits. The evidence is organized categorically and presented as a series of cues presented to the motorist. Findings suggest that while S.M.V. emblem serves well as a generic indicator of something demanding attention, it is less effective in symbolic communicating what it is that needs attention and the motorist's approaching time. Further, the S.M.V. emblem may be counterproductive when a motorist passes a buggy, as the bright splash of color draws attention to the center of the buggy rather than communicating buggy width.

Keywords

Slow-moving vehicle; S.M.V. emblem; reflective tape; Swartzentruber Amish; state conflict

The Horse and Buggy Crash Studies Series

This article is the second of three by the author addressing horse and buggy crashes. The other two articles are in the same issue, pages 79-99 and 116-124.

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Introduction

As the Amish and Old Order Mennonites spread across the United States (Anderson and Donnermeyer 2013), they take with them a unique form of transportation with which motorists may have little experience: the horse and buggy. The speed differences between high-speed automobile traffic and the brittle, slow-moving buggies of the Old Orders are a crash hazard, and indeed, are one of the top risks of severe injury for Old Order populations (Aaland and Hlaing 2004; Anderson 2014; Vitale et al. 2006). The sooner a motorist is able to identify a buggy as a buggy, and hence a slow-moving vehicle, the more time he has to react. Thus, Old Order populations and government officials sought to increase buggy visibility as one solution. However, ultra-conservative groups, notably the Swartzentruber Amish, have resisted bright equipment such as the S.M.V. (slow-moving vehicle) emblem on religious grounds. In Ohio, Indiana, Wisconsin, Minnesota, New York, Pennsylvania, and Kentucky, law enforcement agents have ticketed and even jailed Swartzentruber Amish for rejecting the legislatively obligatory emblem. Though local courts often rule against the Swartzentruber Amish, state courts and state legislators typically side with them in the heat of conflict, suggesting locally-based prejudices against this separatist population may underlie prosecution (McGuigan and Scholl 2007). Nevertheless, opinion remains polarized about Swartzentruber Amish rejection of the slow-moving vehicle (S.M.V.) emblem, with vocal supporters and opponents among the general public, legislators, safety experts, and even other Amish.

These court cases offer a mixed bag of evidence—some empirical, some inductive—and can leave one feeling the issues at stake are a barrage of uncoordinated shots, each trying to be the metaphorical silver bullet to win the case. Yet, if the points were organized into a framework, these many and multifaceted arguments from both sides could provide insight into the strengths and limitations of the S.M.V. emblem and the Swartzentruber Amish's proposed alternatives. This study analyzes proceedings from major court cases in order to bring clarity to the question: what is the S.M.V. emblem supposed to do and is it doing it, and what are the limitations of the emblem? Related to these questions, what about the effectiveness and limitations of reflective tape and the buggy itself?

Background

The Old Order Amish—broadly defined—are an ethno-religious community renowned for their resilience against wholesale assimilation into modern culture. From education to health care, and from family relationships to employment prospects, the Old Order Amish have crafted a highly distinctive and multi-faceted society (Hurst and McConnell 2010). They stress a lifestyle that exhibits the general tenets in the Bible, de-emphasizing the development of complex theological dogmas that may have minimal effect on the way members live their lives (Oyer 1996). They de-emphasize abstract religiosity that says nothing about "the way people earn their living, raise their children, or furnish their houses" (Cronk 1981, 8). Thus, the many details of what they do day-to-day are imbued with religious significance.

Of the many Bible passages they seek to live out, several are quoted frequently:

“Be ye not conformed to this world ...” Romans 12:2

“Be ye not unequally yoked together with unbelievers...” 2 Corinthians 6:14

“My kingdom is not of this world...” John 18:36

Centuries of emphasis on these and other verses have gradually fashioned the Old Order Amish into a distinctive, separatist sub-society. Members have a high degree of loyalty to the church, both causing and creating significant social integration among Old Order Amish constituents. The sheer size of the Old Order Amish population reassures members of the importance of this collective behavior. Their rejection of automobile ownership is one of the most visible and symbolic separatist practices. Not only does the horse and buggy symbolize “our” world from “their” world, it also organizes nuanced differences within the group, providing visually coded information of one’s orientation towards the Amish social system and religious-cultural values (Enninger and Scott 1985). Thus, co-ethnics carefully monitor slight variations in the symbolic presentation of their transportation modes because of its organizational function and religious meaning. Those Amish prioritizing group identity over individual autonomy express this collective consciousness by subduing symbols that draw more attention to individual entities than the whole (Maurer 2004). Additionally, Amish acceptance of multimodal transportation has time and again contrasted with the values built around American automobile reliance, especially as the Old Order Amish make use of road networks designed with automobiles in mind. The horse and buggy consequently has become a powerful symbol of separation from mainstream American values, a very visible rejection of a culture that values individual mobility, rapid movement, and rejection of animal-powered transportation.

Because of the diversity of slow-moving vehicles using roads, road safety is a broader concern. Through the twentieth century, tractors and other self-propelled agricultural machinery increasingly shared the roads with high speed cars and trucks. Dramatic speed differences were evident in the aftermath of many collisions where an automobile rear-ended a slow-moving vehicle. In response, Ohio State University developed the slow-moving vehicle emblem in 1963. The triangularly shaped emblem was selected from a number of alternatives because it was the most visible in daytime (the 12 inch high orange fluorescent core) and nighttime when reflecting headlights (the 1.75 inch width outer perimeter). Its design was intended to alert drivers from behind (Harkness and Stuckey 1963; Asper 1972). In the years that followed, the innovation spread, adopted as an ASABE Standard soon after its debut (Rooney 1970). The U.S. Department of Transportation included the S.M.V. in the Uniform Vehicle Code in 1971. By the century’s end, slightly over half of states had adopted legislation mandating the emblem’s use for slow-moving vehicles (Garvey 2003; Glascock, et al. 1995; Zook 2003).

At first, Old Order Amish were reluctant to adopt the emblem. While they were interested in transportation safety, the bright colors—intended to alert motorists—were in conflict with

their practical day-to-day expression of modesty, humility, sober-mindedness, and group mindedness. To wear elaborate eye-catching clothes, live in a fancy house, or decorate one's mode of transportation with bright colors suggested an attempt to elevate oneself above other church members, to bring superficial attention to the individual unit at the expense of the collective unity. While this objection may seem silly to onlookers, the cultural context in which Old Order Amish, especially Swartzentruber Amish, reside emphasizes communal awareness and equality over individual expression. Significant symbolic differentiation from the church is interpreted as representative of individualism and pride.

Old Order Amish and Mennonites have never been unthinkingly against safety; legal and safe buggy operation is a concern (Burkholder [n.d.]; Eberly 2007; Pathway 1993). Yet, measures purported to bring about health and safety are weighed against their view of life, religion, and the world; one early researcher of the Amish suggested Amish would eventually adopt automobiles *despite legitimate religious reasons to do so* because of concern for members' safety (Bachman 1942). While the change never happened, he highlighted the weight Amish put on member safety. Many times Amish accept state proposals aimed at safety; sometimes, based on cultural and religious reasons largely lost to outsiders, they reject them. Most Old Order Amish eventually adopted the S.M.V. emblem as a group. The strictest Old Order Amish subgroups, however, did not adopt the emblem. In 1977, the Swartzentruber Amish, one of the most communally conscious subgroups, hammered out a compromise with Ohio officials, who agreed to permit an alternative: reflective tape along the buggy perimeter and a lantern on the side at night (see Figures 1 and 2, though it does not have the side lantern given the photograph was in

Figure 1: Swartzentruber Amish Buggy Side (Holmes County, OH)



Photo credit: Cory Anderson

Figure 2: Swartzentruber Amish Buggy Rear (Holmes County, OH)

Photo credit: Cory Anderson

daytime). Further, in 1987, the state formally adopted legislation to permit exemptions for Amish religiously opposed to the emblem. This worked for Ohio. The Amish, however, are not a stationary group. As they outgrow one community, clusters of families seek new locations to settle. In moving to other states, the Swartzentruber Amish faced new legal encounters. Significant court cases occurred in Michigan, Minnesota, Wisconsin, Pennsylvania, and Kentucky.

Volunteers defended the Swartzentruber Amish in court, as the Amish, loath to the individualistic act of fighting for rights, were often more willing to “suffer persecution” than to instigate a defense. The Swartzentruber Amish, when testifying, argue that the emblem’s red/orange combination is too “loud” and “bright,” and that they should not put their faith in “worldly symbols” but rather trust in God (these quotes repeated across several cases). They propose the tape/lantern combination as an alternative. The case is made on religious freedom grounds: do state and federal constitutional guarantees of religious freedom extend to exemption from displaying the emblem? Does religious interest or public safety take precedent? In answering these questions, the burden of proof has switched between the state² and the defense, depending on the timing of federal legislation and Supreme Court decisions addressing laws that incidentally inhibit religious freedom (Ball 2003[1993]; Epps 2003; Glover 2011).

The court discussions have variously assessed the merits and limitations of the S.M.V.

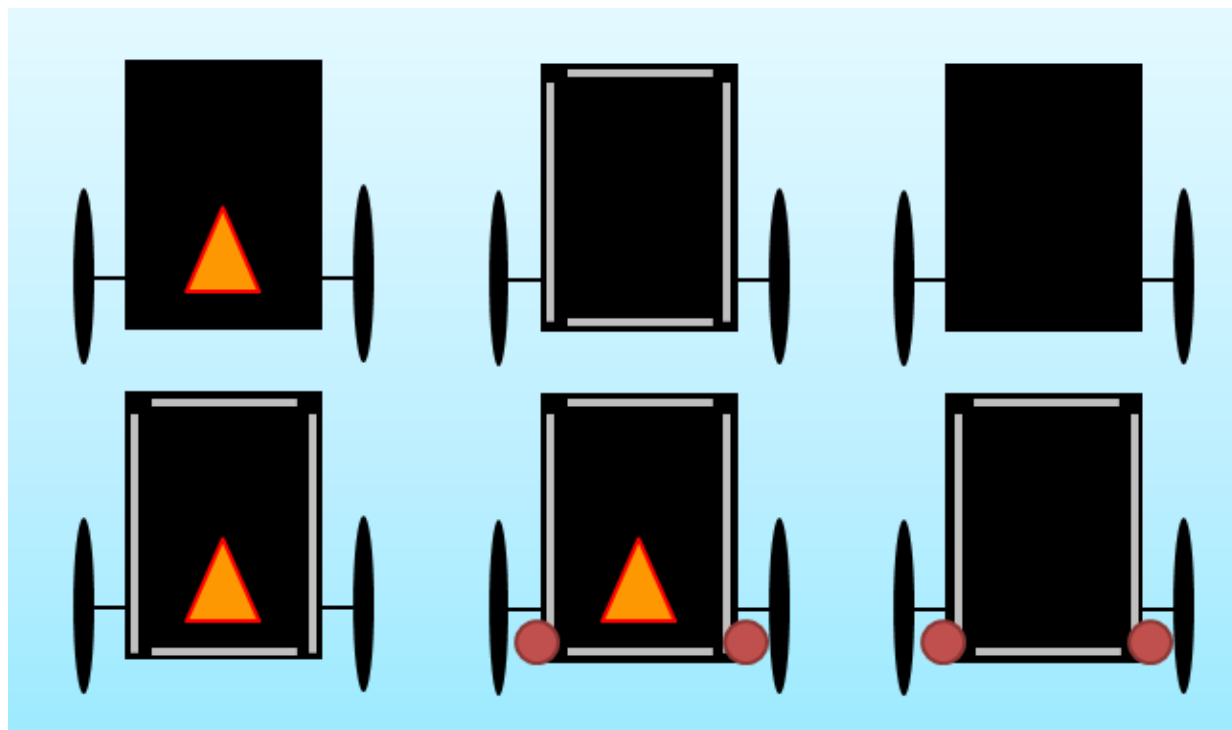
emblem, and to a lesser extent, the proposed alternatives. While case reports and related documents have cumulatively sifted the emblem's viability, the points are scattered and unorganized, obscuring a total, final picture of the issues at stake. Courts have either found in favor of the Swartzentruber Amish because the state failed to demonstrate the inferiority of the alternatives, or the courts have found in favor of the state based on "common sense" or a compelling interest demonstrated by the state. As an example of cause/effect confusion, observe this sequence of logic by one judge: "Considering the narrow, hilly, winding state roads in Graves County and Kentucky in general, small dark buggies being operated at low speeds present a hazard to themselves as well as others." In itself, true, but, no rear markings, aimed at making the buggy conspicuous when otherwise within plain view, will address varied topographies and other obstructions of view.

Methods

The goal of this study is to synthesize the arguments made in court concerning the S.M.V. emblem and the Swartzentruber Amish's proposed alternatives. To do this, I used content analysis to code arguments recorded in court documents. These include case summaries from LexisNexis, judges' published and unpublished opinions, expert witness reports, and prosecution and defendant briefs. After listing all arguments, I assembled identified strengths and weaknesses of rear marking into possible paths by which a motorist may identify the buggy well enough to respond. I also included points made by the small body of peer reviewed literature addressing the S.M.V. in relation to the Swartzentruber Amish (Eicher, et al. 1997; Garvey 2003; Ives and Brotman 1990; Lehtola 2007; Zook 1989). Amish buggies come in several different shapes and sizes. This study refers only to the standard enclosed buggy; other styles complicate the range and possibility of rear markings.

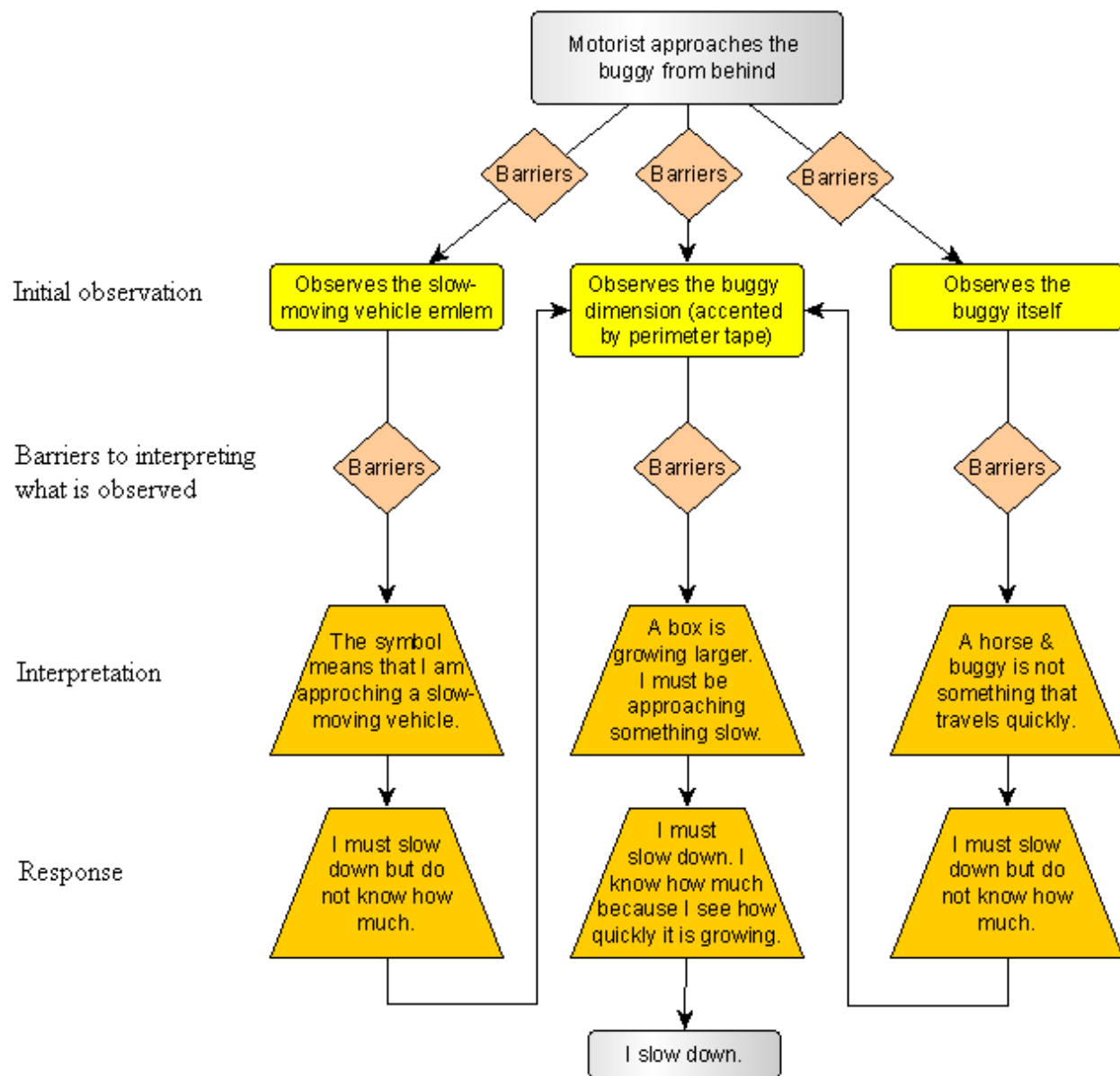
Results

The key goal of rear markings is to make the buggy conspicuous from behind, alerting motorists to the slow-moving vehicle in time to avoid collision. Figure 3 mixes-and-matches the S.M.V. emblem, reflective tape, and rear lights / lanterns. In different combinations. The S.M.V. emblem is intended to address conspicuity and conspicuity alone. It is not intended to address illumination or obstruction of view, two other types of visibility that factor into buggy crashes (Anderson 2014). The motorist may first detect the buggy in one of three main ways. First, he may observe the S.M.V. emblem. Second, he may observe the buggy itself. Third, he may observe the buggy perimeter accented by reflective tape. As the motorist processes any of these observations, he may also process the others in conjunction. For the sake of simplicity, each is discussed in isolation. The remainder of this section analyzes each of the three, first addressing obstacles to making the observation, and then obstacles to interpreting what the observation means, and finally, the path of thought and action that follows (see Figure 4).

Figure 3: Horse and Buggy Rear Marking Combinations***The S.M.V. Emblem***

The emblem was designed to be conspicuous and communicate a message. Several barriers exist to observing the emblem. At night, the reflective material along the perimeter of the emblem is not as bright as the reflective tape on the perimeter of the buggy (and therefore, will not be seen at as great a distance). Also at night, the solid orange center is only visible when fully illuminated by headlights (and therefore, will only be seen as it enters the expanse of headlights). During dawn and dusk, neither the reflective perimeter of the emblem nor the solid orange center performs particularly well. The same is true during adverse conditions. Finally, terrain or other obstructions of view may hide the S.M.V. emblem from sight. These points suggest that both the reflective and the central components of the emblem are fully dependent on illumination (natural or mechanical), whereas L.E.D.-powered lights or a lantern persists despite illumination's absence. As with any markings or lights, the emblem is ineffective when obstructed from view.

Once the emblem is observed, the motorist seeks to interpret the symbol. The original intention of the emblem was not just to be noticed, but to symbolically represent the concept of a slow-moving vehicle. Several deficiencies are apparent in motorist comprehension of the emblem's meaning. First, the emblem's meaning is not broadly diffused. Most state driver's manuals include inadequate or no instruction about the emblem, and two surveys suggest that a majority of people do not interpret the meaning as "slow-moving vehicle" (Garvey 2003; Lehtola 2007; Kroeker and Mann 2010). Second, even if instruction is successful and people are taught

Figure 4: Motorist Response to Seeing a Given Attribute of the Buggy

the meaning, the emblem itself takes on multiple appearances, and therefore, as a symbol is inconsistent in its representation. It has a different appearance depending on if it is fully illuminated versus reflecting headlights at night (a solid triangle versus a hollow triangle). In addition, its features are ambiguous from a distance, and the emblem resembles an orange blob. Third, even if the meaning was broadly taught and the symbol was consistent at all time, its inconsistency in application dilutes its meaningfulness. States mandate and enforce its use to varying degrees. None require it for all slow-moving vehicles. Bicycles, mopeds, scooters, golf carts, tractors, horse-drawn vehicles, and other motorized and non-motorized may be exempt or overlooked in enforcement. Therefore, it does not truly represent all slow-moving vehicles. Further, it is commonly—yet incorrectly and illegally—applied to stationary objects like a fence

or building as a generic reflective device (see Figure 5), and may only be thought of as such; Garvey (2003) conducted a field observation documenting the prevalence of incorrect application (recent measures, such as placing a sticker on the emblem detailing legal use, may reduce this problem in the future). It is also easily confused with similar street symbols, such as a roadside hazard triangle or road construction paraphernalia. To interpret the emblem as representing a stopped vehicle, a construction warning, or a stationary roadside object is to misinterpret the symbol.

If the emblem has been observed and correctly interpreted as identifying a slow-moving vehicle, the motorist must react. The natural and typical reaction would be to slow down. However, the emblem does not convey any information about how much to slow down, because shape or size of the emblem does not lend itself to interpreting depth or calculating approach. The motorist must pursue this information through other cues. This point will be revisited later.

Figure 5: A Slow-Moving Vehicle Emblem Incorrectly Used (Ohio)



Photo credit: Cory Anderson

The Buggy Itself

The buggy is not explicitly designed to be visible, though neither is it designed to preclude it. Many objects people encounter daily in their life do not feature special properties to heighten conspicuity, but rely on its existence, in and of itself, to be seen. The buggy is not invisible or microscopic, and so, to a degree, is conspicuous for no other reason than its sizeable presence. However, there are several barriers to being noticed (controlling for all additional conspicuity markings). During full illumination, its dark blue or black color may blend into the landscape (as happens with motorized vehicles, as well).³ At night, the buggy itself must be illuminated by headlights or street lights to be seen. Similarly, at dawn or dusk when illumination is low and headlights are ineffective, the buggy may not be easily spotted. Finally, terrain or other obstructions of view may hide the buggy from sight.

Once the buggy is observed, the motorist must interpret what it is. The sequence of logic is that the motorist must recognize the buggy as horse-drawn or otherwise not capable of high-speed travel, and from that recognition, deduces that it is a vehicle which is slow-moving. The buggy relies on the motorist interpreting what it is (a horse-drawn buggy), unlike the emblem, which appeals to the onlooker to interpret a symbol that represents a category of vehicles, not the specific type of vehicle. Neither the court cases nor previous research suggests what obstacles motorists face in interpreting the buggy as a slow-moving vehicle. Obviously, this may be a matter of noticing cues such as the constitution of the object or that it is pulled by a horse. The motorist who frequently encounters horse-drawn buggies will require fewer cues to understand the object as a horse-drawn buggy (and thus, a slow-moving vehicle) than the motorist who infrequently and/or unexpectedly encounters one. Posting silhouetted horse-and-buggy road signs in the vicinity of such travel may help motorists interpret what they see.

If the buggy itself has been observed and correctly interpreted as a horse-drawn buggy (a specific type of slow-moving vehicle), the motorist must react. The natural and typical reaction would be to slow down. The buggy itself provides some clues as to how much to slow down, because of its shape and size, but not the optimal information to interpreting depth. As with the S.M.V. emblem, the motorist must pursue better information through other cues. This cue is found in the buggy's perimeter.

The Buggy Perimeter, Accented by Reflective Tape

Reflective tape accents the box shape of the buggy's rear. Several barriers exist to observing the accented perimeter. In full illumination, reflective tape does not catch the attention of motorists at as great a distance as the solid orange center of the S.M.V. emblem; yet, the tape increases the conspicuity of the buggy itself by the tape's contrast with the buggy's tone (white/grey on black) and in tracing the outline of the buggy. During dawn/dusk, the reflective tape does not perform particularly well. The same is true during adverse conditions. Finally, terrain or other obstructions of view may hide the reflective tape from sight; however, if the

buggy has just crested the hill, the tape on the top perimeter of the buggy may be visible even if the rest of the buggy is obscured. These points suggest that the reflective tape is fully dependent on illumination (natural or mechanical), whereas LED-powered lights or a lantern remains constant absent of illumination. Similar to these markings, though, the tape is ineffective when obstructed from view, but may be visible sooner than the emblem, accenting the buggy's top when just beyond the crest of a hill.

Once the perimeter is observed, the motorist seeks to interpret the meaning. No barriers were identified in the literature or court cases that would prevent the motorist from interpreting the accented perimeter as some sort of slow-moving vehicle. The accented perimeter is neither a symbol nor a general object. Rather, as the tape is observed, the motorist also simultaneously views how quickly the box-shape is growing large. This observation not only communicates that the object the motorist is approaching is slow-moving but also the closing time, so that the motorist knows how much to slow down.

Both the S.M.V. emblem and the buggy itself cue the driver to reduce speed once the object has been identified as slow-moving, but neither optimally communicates depth and approaching time. The motorist decodes this information in eyeing the dimensions of the buggy and the quickness in which the object grows. The perimeter, therefore, provides the best information to a motorist for approaching time, though it makes no attempt to identify exactly what this object is that is moving slowly, as the S.M.V. emblems and the buggy itself by default attempts. In catching one's attention, the orange center does attract attention. The orange center is superior to the reflective tape. No data compare it to the buggy itself. At night, reflective tape is superior to the reflective perimeter of the emblem.

Discussion

In emphasizing the rear markings of a buggy, we must also ask, is "visibility" even the key issue in rear-end collisions? And, related, do the rear-markings deter or contribute to other types of crashes? In that the emblem has been under intense scrutiny in several states' courts, its importance may be inadvertently overemphasized at the expense of other safety considerations. The emblem—and rear markings in general—have their place, but are neither the only consideration nor even the most important in preventing accidents.

Several other studies suggest that crash causes are multi-dimensional and diverse; that the driver just did not see the buggy in time to avoid a rear collision is but one of many crash types, and perhaps not even the most common. Anderson (2014) identified four major types of crashes between horse-drawn buggies and motor vehicles, one of which concerned direct rear-end collisions (about half of all cases). Yet, conspicuity was neither a major issue nor a possible cause in most rear-end crashes, but rather, factors like the sun's glare, distracted driving, impaired driving, or obstruction of view were found frequently. The other crash types were (2) a motorist fails to pass a buggy, (3) a motorist strikes a buggy from the side while the buggy is

attempting to cross an intersection, and (4) a motor vehicle strikes a buggy while the buggy is making a left turn. Half a century ago, Smith (1958) observed similar crash types, noting three basic types: rear-end collisions caused by speed, low illumination at night, and motorist miscalculation of the buggy's speed; the motorist's careless attempted pass of the buggy; and the motorist attempts to pass the buggy when it attempts a sudden left turn. Dewalt and Bradley (2013) observed many (uncategorized) rear-end collisions, but note as well a diversity of other non-visibility factors involved in crashes, such as driver carelessness and the sun's glare. Piacentini (2003) further includes a crash scenario where the horse spooks.

Thus, discussions of conspicuity must be undertaken with other crash types and causes in mind. These other crash types further reveal the strengths and weaknesses of each of the three visibility types (conspicuity, illumination, and obstruction of view). As a precursor to further discussion, in which situations would all three be nearly or totally ineffective? These would include motorist striking a buggy while it is making a left turn (a matter of miscommunication or risk-taking), obstruction of vision, distracted driving, impaired driving, and the sun's glare.

In order to successfully pass a buggy, the motorist must consider several factors. One of the most important considerations for the motorist is, how far to the left must I go to pass? Failed passes are a major cause of crashes between a motor vehicle and horse-drawn buggy. The impact point for a failed pass was often at the rear-left corner, indicating the pass failed at its onset (Anderson 2014). This suggests the motorist under-calculated the buggy's width, and thereby, the room needed to pass. The buggy itself is the most obvious indicator of width. The width may be further accented by tape along the perimeter. On the other hand, the S.M.V. emblem, by its size and dominating presence within the scheme of rear-markings, attracts attention to the buggy's center. This information is counterproductive to internalizing the buggy's width. On the other hand, the Swartzentruber Amish's lantern protrudes from the left side of the buggy, suggesting to the motorist the left-most extent and thereby the room required to pass. Thus, it may be hypothesized that the reflective tape and lantern is actually superior to the S.M.V. emblem and reflective tape in executing a successful pass, a significant issue in collisions.

Similarly, the "moth effect" may contribute. Crash analysts have observed that motorists tend to steer in the direction of a well-lit emergency vehicle on the shoulder at night. The idea is that the carnival of lights attracts too much attention, and the motorist is drawn towards it, like a moth to light in the night (Green 2006). A buggy decorated with an emblem, reflective tape, and additional L.E.D. lights may draw too much attention, and motorists may be drawn towards it when attempting to pass. At night, buggies would seem best served by having clear markings that indicate width and dimension, similar to the reflective markings and lights on the back of semis or the simple pattern of two red lights on either end of an automobile (the bottom right option in Figure 3). Alternatively, the S.M.V. emblem could be mounted on the far left (Figure 6) or sliced down the middle and mounted on either side (Figure 7), which some Amish are already doing (albeit for other reasons, as with hitching a cart to the rear or installing rear wheel-chair access).

Figure 6: S.M.V. Emblem Mounted on the Upper Left Rear (Ohio)



Photo credit: Cory Anderson

Figure 7: S.M.V. Emblem Split and Mounted on the Rear Sides (Indiana)



Photo credit: Cory Anderson

In conclusion, the S.M.V. emblem may alert drivers to something going on, but can be an extra step in identifying the horse and buggy as such. In addition, the emblem is not effective—and may actually be counterproductive—in crash situations where the motorist is aware of the buggy's presence, such as when attempting to pass. The solid orange center is effective in attracting motorist attention, though no comparison is made to the ability of the buggy itself to attract attention. Thus, while we can expect the S.M.V. emblem to alert the motorist to something of importance, the emblem is weak in communicating to the motorist what it represents (a slow-moving vehicle) and how to respond. Further, it does not assist the motorist in any of the most common crash types.

Endnotes

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²The oft-used Sherbert Test investigates the conflict between the religious group and the law by investigating (1) whether the religious belief is sincere, (2) whether the law burdens the person, (3) whether the government has a compelling interest in enacting the law, and (4) whether there are any less burdensome alternatives to achieving the state's goal.

³While most buggies and black and some are blue, one small subgroup has yellow buggies and one small subgroup has white buggies both in central Pennsylvania. Swartzentruber Amish have black buggies.

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