



## Rx for SMV Highway Safety: Be Conspicuous

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### Overview

Most agricultural producers need to move production equipment on public roads for planting, cultivating, and harvesting crops. Safely traveling roadways with agricultural equipment requires an extra degree of caution from the equipment operator and from general vehicle drivers sharing the road. For the relatively small number of miles traveled by slow moving vehicles (SMV), there are a disproportionately high number of highway accidents (Bean and Lawrence, 1992). Many of these accidents are worse than a typical fender-bender.

Greater visibility plays an important role in roadway accident prevention by providing increased sight distance for decision making and stopping. In an effort to increase visibility of agricultural equipment on roadways, the American Society of Agricultural Engineers (ASAE) has developed new recommendations for lighting and marking equipment.

The following information identifies “rules of the road” for machinery lighting and safety marking. These rules are established by Pennsylvania law, as well as the new recommendations developed by the American Society of Agricultural Engineers.

### What is conspicuity material and what does it do?

Conspicuity material does what it says: it makes the equipment stand out or be more conspicuous. The reason you want your equipment to stand out when on roads is to give motorists lots of time to notice you and avoid you. **Fluorescent material** aids daytime visibility and **reflective material** aids nighttime visibility, but the materials don’t last forever. The orange fluorescent center portion of the SMV emblem will fade and turn color over time, changing from orange to yellow, pink or white. This portion is the most vulnerable to light and moisture degradation because fluorescent dyes decompose. Maintaining fresh emblems with maximum fluorescence makes a big difference, especially in early morning or late evening hours.



New SMV meeting old ASAE standard    New SMV meeting new ASAE standard    Used SMV

**Retroreflective material** as found in the outer border of the SMV emblem is intended to reflect the headlights of vehicles approaching from the rear at night. Retroreflective material holds up longer than fluorescent material. Of great importance is the fact that retroreflective readings on SMV emblems meeting the new ASAE standard are over ten times greater than most of the readings on SMV emblems currently in use. Most SMV emblems tested in *Successful Farming’s* SMV overhaul project had retroreflective readings in the 20s whereas the average retroreflective readings on new enhanced SMV emblems was 278. This showed up as nearly 14 times brighter in a night-time visibility test than the old emblem with a reading of 20. The new retroreflective border material in the SMV is made differently than the old and can be detected as far as a mile away. Typical site distance from old SMV reflector tape was only a few hundred feet. Which one do you want on your slow moving agricultural equipment?

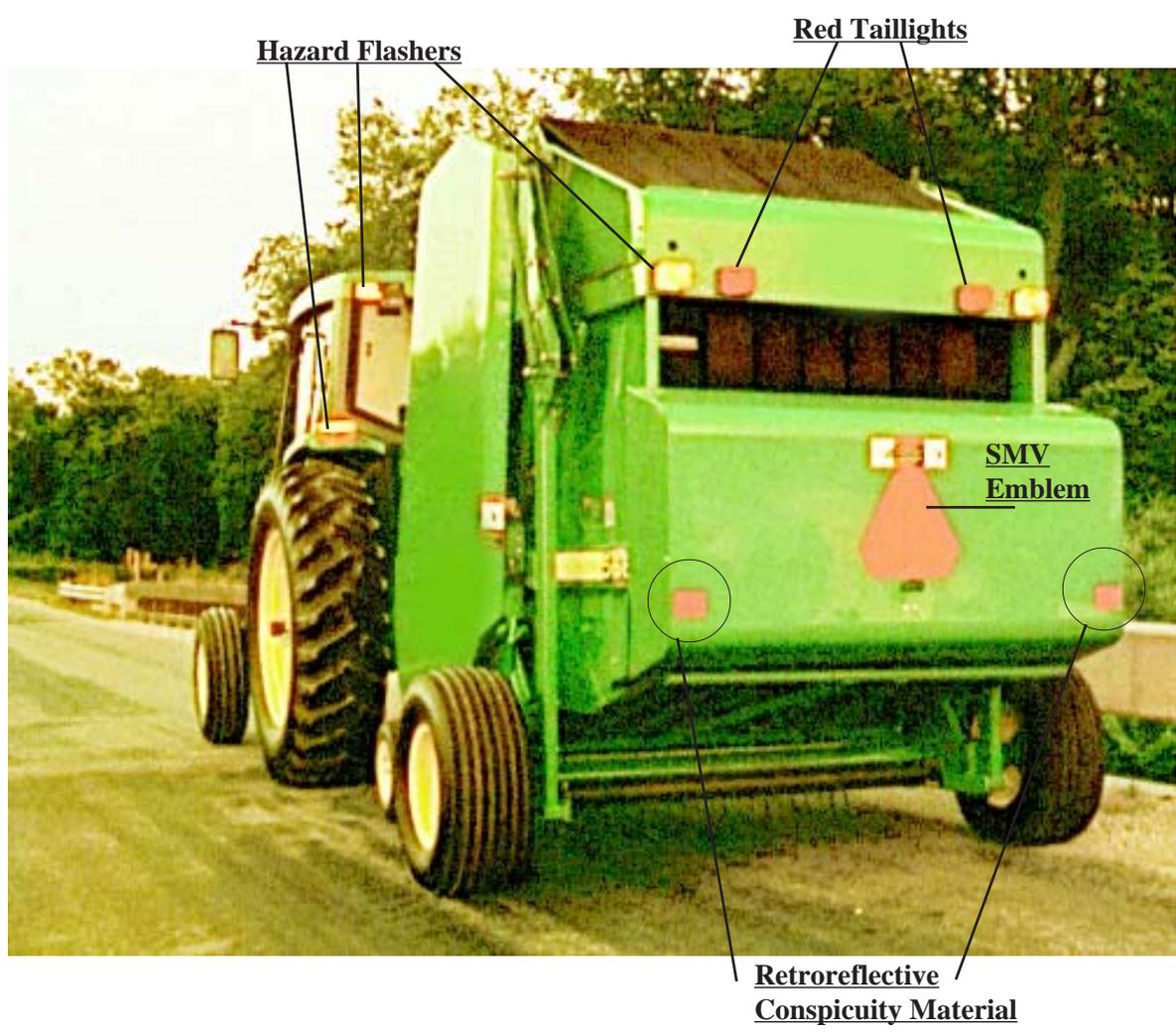
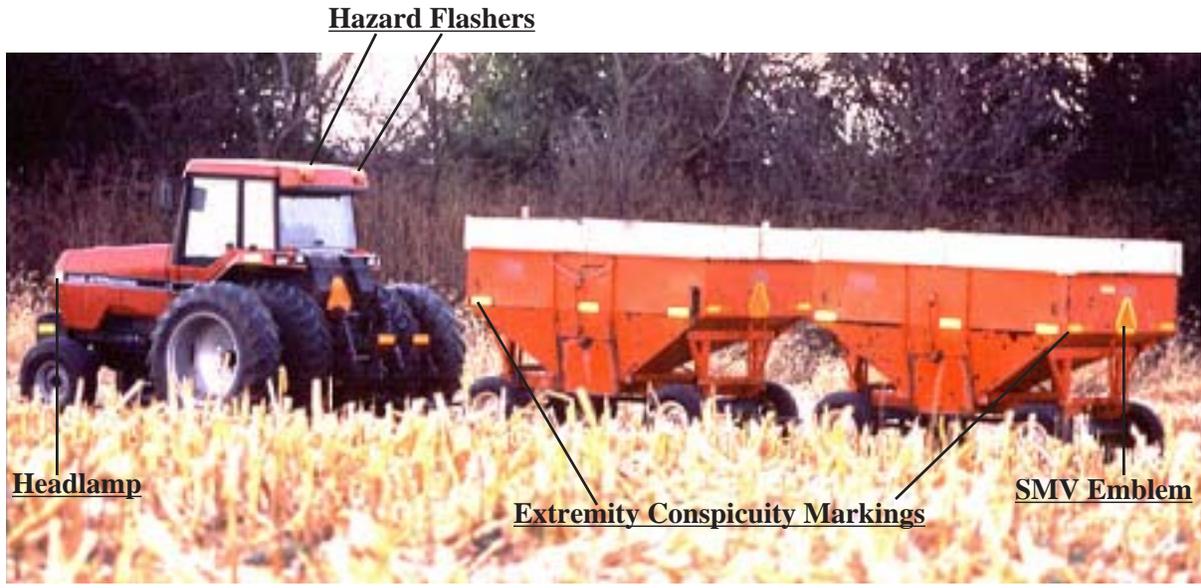


Table 1. ASAE recommendations and PA requirements for lighting and marking of agricultural equipment on highways.

Item	ASAE Recommendations			Pennsylvania Requirements
	#	Color	Mounting	
Headlights	2	White	On either side of vehicle centerline at same height	Same as ASAE recommendation <sup>1</sup>
Taillights	2	Red	Symmetrically mounted to rear between 3.3' & 10' high from 2' to 5' on left & right of machine center	1 mounted at each side on rear <sup>1</sup>
Hazard Flashers	2 or more	Amber	3.3' to 12' high & spaced as widely apart as practicable to be visible from front & rear	2 if double-faced with amber to front & red to rear. 4 if single faced - amber on front corners & red on rear <sup>1</sup>
Turn Indicators	2	Amber & Red	Hazard flashers to also function as turn signals	Not required
SMV Emblem	1	Fluorescent orange for daylight & red retroreflective border for night	On rear center or rear left for maximum visibility of six hundred feet day or night; 2' to 10' above ground	All implements of husbandry designed to operate at 25 mph or less shall display the SMV on rear of vehicle at all times on highways
Reflectors which may be part of tail lamp lens or conspicuity material	2	Red on rear of machine	Size to be 2" wide by 4.5" long for machines ≤6.7' wide. Size to increase to 2" by 9" for wider machines	1 red reflex reflector or reflective tape at rear on each side & 1 amber reflex reflector or reflective tape at front on each side with size of reflector to be 3 square inches or more <sup>1</sup>
	2	Yellow on front of machine		
Conspicuity material to better define size and to increase visibility	Red retro-reflectors & fluorescent markers on rear corners & ≤6 foot apart on rear. Front: change reflector color to yellow <sup>2</sup>	Red retro-reflective & red-orange fluorescent	Visible to rear  All mounted as horizontal & in line as practicable	SMV only
		Yellow retro-reflective	Visible to front  Reflectors to be within 16" of outside corners and fluorescent material within 25" of outer corners.	
Rotating Beacons	Not Addressed			2 yellow rotating beacons required if transporting perishable crops

<sup>1</sup>between sunset & sunrise & during reduced visibility

<sup>2</sup>for trailing equipment > 16.4' behind hitch point, display amber/yellow reflectors spaced <16.4' apart on sides.



### Animal-Drawn Vehicle Lighting & Safety Marking

- Upgrade the SMV emblem to the new emblem made with the better retroreflective material that can be detected over a mile away.
- Place a **red reflex reflector or red reflective tape**  $\geq 3$  square inches on vehicle rear at each side if traveling roads at night or during periods of reduced visibility. Do the same with **amber reflex reflectors or amber reflective tape** on the front of each side of the vehicle.
- Equip buggies with **headlamps and tail lamps**, one on each side of vehicle centerline, and with **hazard lamps**, red to rear and amber to front, if you will be on the road at night or during reduced visibility.
- Consider safety extras such as additional retroreflective tape in silver on the buggy and harness to increase visibility at night and reflective horse leg wraps to help protect your animals and you.

### Typical Accidents: facts and figures

For years 1994 through 1996, Pennsylvania Department of Transportation (PA DOT) figures for farm equipment crashes show:

- ◆ 319 crashes with the highest number involving equipment moving straight ahead and the next highest involving equipment entering a driveway.
- ◆ Angle collisions predominated. Rear-end crashes were second.
- ◆ Crash numbers peaked between 3:00 and 6:00 P.M.
- ◆ Peak months were June and November.

Ohio highway accident data for 1989 through 1992 show similar findings:

- ◆ accidents peaked between 3:00 and 6:00 P.M.
- ◆ sideswipe and angle collisions predominated
- ◆ rear-end collisions were major crash cause

PA DOT accident records for years 1994 through 1996 show:

- ◆ 226 horse and buggy crashes — 89 rear-end and 79 angle
- ◆ Highest number of crashes were between 2 and 6 P.M. and in December

Use of the newly developed retroreflective material is recommended to help prevent farm equipment and buggy accidents. County farm bureau offices have Saf-Pak™ FARM™ Kits available at discounted prices. Kits are also being marketed through farm equipment dealerships.

**For more detailed information, refer to ASAE Standard 279.10, *Lighting and Marking of Agricultural Equipment on Highways* and ASAE S276.5, *Slow-Moving Vehicle Identification Emblem*.**

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