WorkZone
Safety Products Inc.

To: All Law Enforcement and Traffic Safety Departments

From: Bruce Bullick, General Manager of WorkZone Safety Products Inc.

Re: Quantifying how Road Flares combined with Activated Light Bars Increase Safety Zone

Everyone knows that flares make passing traffic slow down. How is officer safety increased when flares are deployed and can we increase the "safety zone" around disabled vehicles and routine traffic stops? Orion the primary manufacturer of flares contracted with Pennsylvania State University Transport Institute to find some answers so that we could share the results with those most directly affected – the law enforcement community. Attached are the following:

1. a one page "Safety Bulletin" illustrating how flares improve officer safety.

2. a summary sheet of study hypothesis and results.

The results are not particularly surprising – when road flares are deployed the safety zone is dramatically increased due to the following factors:

- Flares cause a 16% reduction in speed of passing traffic

- Flares cause an 85% increase in lateral separation from the road side vehicles

- Flares cause an 89% reduction in right lane volumes (89% of the traffic moves to the passing lane when flares are deployed - this is huge for increasing officer safety)

- Flares in combination with activated light bars create the best safety results.

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The Penn State study utilizes a number of variables, including the number of flares deployed. The study shows that there is an incremental increase in safety as more flares are deployed. So, from a practical standpoint, officers will need to continue to evaluate the road traffic and atmospheric conditions to determine the right amount of flares to deploy and they can be assured that each additional flare they deploy adds to their safety and the safety of those they are assisting.

Please see the attached material to further educate the officers in your department about the advantages of flares. Flares create a universal message of "CAUTION" they do not need to be retrieved from the roadway, they are less apt to be run over and become flying projectiles as is the case with electronic signals, they are not battery dependent and they clearly work - thereby enhancing the safety zone! Please contact us directly @ 905-864-1116 if you would like the full detailed study results issued by Penn State. Our website is workzonesafetyproducts.ca

WorkZone Safety Products Inc. Is a master stocking distributor of CIL/Orion road flares/fusees and primary supplier to all Police Department.

Best Regards,

Bruce Bullick

General Manager

Workzone Safety Products Inc.

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ORION THE FLARE EXPERTS

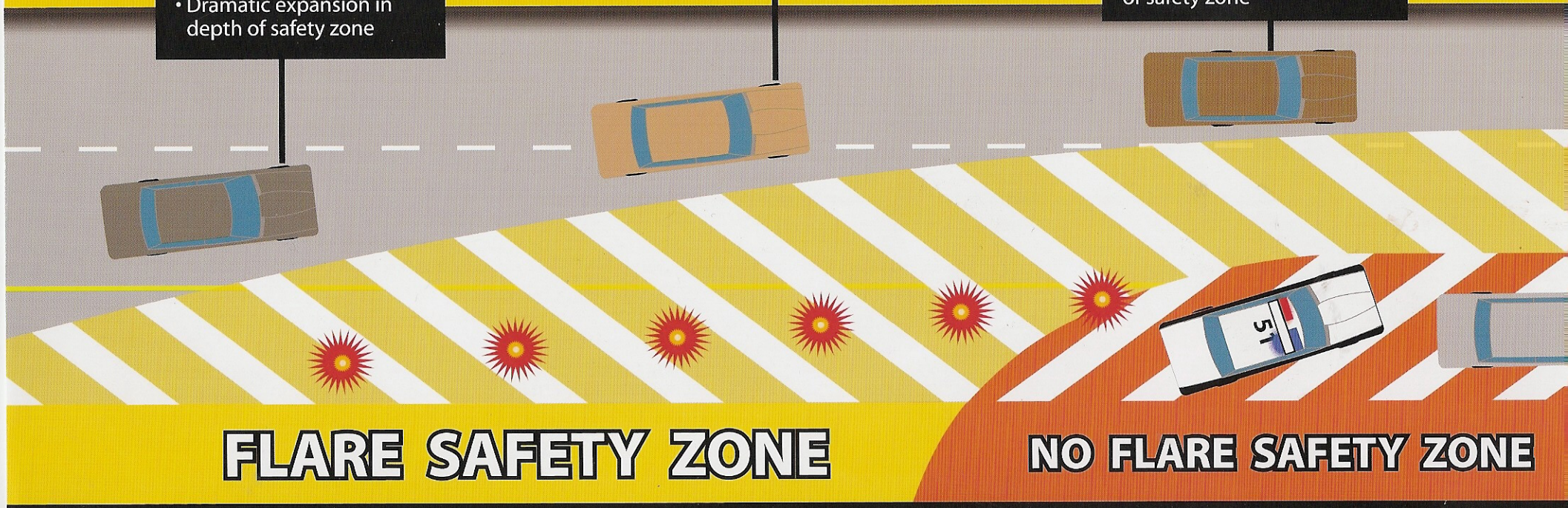
SAFETY BULLETIN

PENN STATE STUDY QUANTITATIVELY DEMONSTRATES
FLARES DRAMATICALLY INCREASE THE SAFETY ZONE

Flares Cause 16% Reduction in Speed
- Earlier perception of emergency ahead
- Increased braking distance
- Dramatic expansion in depth of safety zone

Flares Cause 85% Increased Lateral Separation
- Gets passing traffic farther from emergency scene

Flares Cause 89% Right Lane Volume Reduction
- Creates better visibility around emergency scene
- Dramatic lateral expansion of safety zone



FLARE SAFETY ZONE

NO FLARE SAFETY ZONE

- **Safety response in passing traffic improves as more flares are deployed**
- **Use of road flares with police cruiser light bar activated maximizes safety zone**
- **Increasing the safety zone will save lives...maybe yours!**

Study Regarding Emergency Road Flare Effectiveness in Enhancing the "Safety Zone"

CONCLUSIONS & SUMMARY RESULTS

HYPOTHESIS	CONCLUSIONS & SUMMARY RESULTS
1. The combined effect of police presence with activated light bar and deployment of emergency road flares will generate the greatest impact on the behavior of passing motorists, creating a significantly larger safety zone than police presence with activated light bar and no emergency road flares.	True. When flares were deployed along with a police presence and activated light bar: (i) the speed of passing traffic was reduced 16.2% or 11.2 mph, representing a 5.1% improvement (3.1mph decrease) as compared to a police car alone with no flares; (ii) 95.7% of the passing traffic changed lanes to avoid the emergency event, representing a 5.3% improvement compared to the police car alone with no flares; and (iii) lateral separation (for those few vehicles that did not change lanes) increased 85% (an additional 32.2 inches), representing a 16.3% improvement (or an additional 9.8 inches) compared to a police car alone with no flares. To maximize the safety zone, flares should be deployed in combination with an activated police light bar.
2. Deploying more flares will have a greater impact on the behavior of passing motorists than configurations with fewer flares – use of more flares enlarges and enhances the safety zone.	True. In all deployment scenarios involving a police car with flare deployment, the use of 6 flares created a larger safety zone than that created by using 3 flares (i.e., when 6 flares were deployed instead of 3, the speed of passing traffic was further reduced, more vehicles moved to the left lane and lateral separation from the emergency event increased). While testing constraints only allowed for a comparison of 3 versus 6 flares, real-world variables will dictate the actual number of flares needed (i.e., traffic volume and speed, lighting conditions, terrain, atmospheric conditions, severity of event, etc.).
3. Deployment configurations with flares spaced more closely together (5 paces apart) will have a greater impact on the behavior of passing motorists than flares spaced farther apart (10 paces apart).a	Primarily true. The most significant speed reduction and lane-changing behavior occurred with flares spaced 5 paces apart.
4. The combined effect of police presence with activated light bar and deployment of emergency road flares will generate the greatest impact on the behavior of passing trucks, creating a significantly larger "safety zone" than police presence with activated light bar and no emergency road flares.	True. When flares were deployed along with a police presence and activated light bar (i) the speed of passing trucks was reduced 11% or 7.2 mph, representing a 4.1% incremental improvement (2.6 mph decrease) as compared to a police car alone with no flares; and (ii) 98% of all trucks changed lanes to avoid the emergency event, thereby enlarging the safety zone.
5. The deployment of emergency road flares, even in the absence of a police presence with activated light bar, will have a dramatic safety impact on the behavior of passing motorists by enlarging the safety zone around the emergency event.	True. The use of emergency road flares without any police presence or activated light bar caused passing traffic to undertake significant speed reduction (12.2% or a decrease of 8.4 mph), dramatic lane-changing behavior (79.4% improvement) and increased lateral separation from the emergency event (97.6% improvement or increase of 36.8 inches). The data illustrate that a disabled vehicle deploying flares will create a safety zone around the emergency event nearly equal to that created by a police car with activated light bar.