



# MAKE YOUR PRESENCE KNOWN: THE VALUE OF HI-VIS APPAREL

AN ERGODYNE BRIGHT PAPER

In this age of selfies, social media, and reality TV, getting attention might seem to be the least of America's problems. But the fact is, workers are struggling to get the attention of today's increasingly distracted drivers. Given their struggle to stand out, the need for durable and effective hi-vis apparel is now more important than ever.

## STATE OF THE RISK

In the workplace, "The need to be seen is recognized as a critical issue for worker safety".<sup>1</sup> This is especially true for activities that take place on or near a roadway, where passing vehicles or mobile equipment can inflict crippling or fatal injuries to workers and pedestrians.

The National Work Zone Safety Information Clearinghouse reported 669 motor vehicle crash fatalities in U.S. roadway work zones in 2014, including all parties involved<sup>2</sup>. Multiyear studies by the U.S. Department of Labor (DOL) and Bureau of Labor Statistics (BLS) between 1995 and 2010<sup>3,4</sup> found that approximately 60 percent of road construction fatalities "were the result of workers being struck by vehicles or mobile equipment."

With over 4 billion miles of paved and unpaved public roadways in America, according to the U.S. Department of Transportation (DOT),<sup>5</sup> that is a lot of potential exposure for injury. And that total does not include private or temporary roads, or vehicle travel ways within industrial complexes, etc.

It's not just road construction workers who are at risk – the National Law Enforcement Officers Memorial Fund reported that between 2005 and 2014, almost 8 percent of U.S. law enforcement deaths were caused by a motor vehicle.<sup>6</sup> And the BLS claimed 15 percent of firefighter and related worker deaths occurred in the roadway.<sup>7</sup> Emergency medical workers, tow truck drivers, public works employees, and other occupations face similar exposures.

For all workers, the BLS reported, "The second largest number of transportation fatalities in 2014 involved pedestrian vehicular incidents (17 percent)"<sup>8</sup> – 313 pedestrian vehicular fatalities and 55 rail fatalities.

## CURRENT STANDARDS AND REGULATIONS

Clearly, controls are desperately needed. First published in 1999, the American National Standard for High-Visibility Safety Apparel and Accessories (ANSI/ISEA 107) is widely recognized as the best practice/industry standard for worker conspicuity to reduce the risk of these types of incidents.

This document recently underwent a thorough review and revision process so it could be updated based on our current technology and understanding of the hazards. It is a consensus standard, developed by members who primarily represent developers and manufacturers of hi-vis protective workwear, and the suppliers of the performance materials used. It was then reviewed and approved by a broad range of users, regulators, vendors, safety, and loss control interests.

While this is a voluntary compliance standard, regulatory and enforcement agencies, such as the DOT, Federal Highway Administration (FHWA), the Occupational Health and Safety Administration (OSHA), and others may adopt its requirements via regulations, letters of interpretation, contractual language, etc.

For example, the Manual on Uniform Traffic Control Devices (MUTCD), published by the FHWA "defines the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public travel."<sup>9</sup> The MUTCD specifically requires that, "All workers ... shall wear high-visibility safety apparel that meets ... requirements of ANSI/ISEA 107"<sup>10</sup> in specified activities.

OSHA, in turn, references the MUTCD – and thereby, ANSI/ISEA 107 – in interpreting its General Duty Clause (29 USC 654 Section 5(a)(1)) as a requirement for addressing recognized hazards in certain activities and employment.<sup>11</sup> This includes the risks posed by traffic, by mobile equipment on a jobsite, and by moving equipment in other types of environments.

## WAYS FOR WORKERS TO GET ATTENTION

While the basic principles of hi-vis are universal, certain employers or industries may have additional mandates or specific practices that exceed the standard's minimum requirements. And worker visibility requirements may be slightly different in countries outside the U.S. that may have their own standards or regulations. It would be prudent to check with both local regulatory agencies, and industry or trade associations, to confirm compliance needs and best practices within a specific area and activity.

Hi-vis apparel and accessories on workers should not be the only control used to prevent struck-by vehicle and traffic injuries. They must be used along with other protective measures including:

- » Signage
- » Signaling
- » Flagging
- » Protective barriers and lane closures
- » Workzone layout
- » Lighting
- » Vehicle backup cameras and alarms
- » Work practices
- » Training and awareness

The specific measures used will vary depending on the situation. For example, practices for planned highway construction involve advanced notification to traffic through signage, road cones or barrels, flaggers, gradual lane closures, etc. These provide drivers with extended time to recognize a workzone, and to look out for expected construction workers and other personnel.

Conversely, an unexpected event, such as a collision, vehicle breakdown, spinout, or rollover, provides little warning in either time or distance and can suddenly obstruct part or all of the roadway. The time frame of these events typically precludes the set up and use of elaborate traffic control procedures but may involve responders including:

- » Law enforcement personnel
- » Fire/Rescue Responders
- » Emergency Medical Service (EMS) personnel
- » Public Works personnel
- » General rescue/recovery personnel

An unexpected event could even involve a driver changing a tire. The unpredictability of this type of situation poses additional risk for both drivers and pedestrians. Hi-vis apparel, if readily available, may be the primary means to make individual workers visible in unexpected events.

Non-traffic work environments can also benefit from conspicuity, especially complex production settings, locations where workers may only be present intermittently, warehouses, supply yards, etc. Delivery drivers, survey crews, utility workers, transportation, and airline workers are all candidates for regular hi-vis wear. Construction and excavation workers can make themselves more visible to equipment operators working nearby. And visitors, who might not be familiar with plant or facility hazards, others who may need to be located quickly in an emergency, or whose presence may not be expected by others, can easily be identified and located. Hi-vis apparel should be as automatic as wearing safety glasses in those situations.

## STAND OUT AND STAY COMPLIANT

Again, the underlying principle is not just to be seen, but to stand out, day or night, even against a complex background in a variety of weather conditions. The design requirements of the revised ANSI/ISEA 107 Standard go well beyond merely "wearing a vest." Specific testing criteria assure purchasers and users that the items meet performance standards, and durability requirements, so that they hold up for their expected use.

Specific fluorescent colors, which enhance daytime visibility, are prescribed for use as background materials. Garments are required to have minimum amounts of this fluorescent background material, based on their type and described performance classification. But the material must be resistant to fading, able to withstand cleaning and laundering, and meet minimum strength requirements, according to recognized fabric testing standards. For FR applications, materials need to meet additional flame resistance standards. Not all bright fabrics can meet these requirements.

Reflective material is required to not only disperse light, but return a majority of it back to its source: this is described as “retroreflective.” Retroreflective materials do not emit light themselves, but use lumens supplied by vehicle headlights to alert drivers in traffic, or equipment operators in work zones. The retroreflective must also stand up to recognized testing standards for abrasion, flexibility, laundering, and both cold weather and wet performance.

A key concept recurrent in the ANSI/ISEA 107 Standard is the arrangement of the fluorescent background material and retroreflective material to define the human form. That is, in addition to minimum square inches required of each, the garment design should distinguish the wearer from road cones, equipment, or other items with bright or reflective materials. This requires compliance with the size, location, and spacing of the reflective material, including balanced front and back designs, provision for 360-degree visibility, and limits on breaks or interruptions.

The ANSI/ISEA 107-2015 Standard bases its definition of “Garment Types” on anticipated work activities, including: Off-road and Non-roadway Use (Type “O”); Roadway and Temporary Traffic Control Zones (Type “R”); and includes a special class for Emergency and Incident Responders and Law Enforcement Personnel (Type “P”), which was formally a separate standard.

It also defines “Performance Classes” with increasing levels of visibility, noting that adding retroreflective bands on workers' arms and legs helps further define the human form, and may attract attention with movement. The higher-class ratings can be especially important near higher speed traffic, during poor weather, working around emergency lights, or with distracted or drowsy drivers. Accessories like hi-vis gloves, arm and leg bands, and headwear can enhance conspicuity.

Users of hi-vis garments and accessories have responsibilities in order for them to be effective. This includes wearing, laundering, and replacing stained, torn, or faded garments. Purchasers should start looking for “ANSI/ISEA 107-2015” on new or replacement garments, and choose products from a reputable manufacturer, backed by testing, to ensure compliance with the updated standard.

Ultimately, you can't control if a truck driver has been behind the wheel for 24 hours straight or Mindy is late for work and doing her makeup behind the wheel. All you can do is equip your crew with the highest-quality, most comfortable, and well-designed hi-vis apparel, choosing styles, sizes, and features that fit your workers and their tasks.

## RESOURCES

1. *American National Standard for High-Visibility Safety Apparel and Accessories (Foreword)*. ANSI/ISEA 107-20xx, September 2015 – 2nd Consensus/Public Review Copy

2. *The National Work Zone Safety Information Clearinghouse*  
<https://www.workzonesafety.org/about/>  
[https://www.workzonesafety.org/crash\\_data/](https://www.workzonesafety.org/crash_data/)

3. *An analysis of fatal occupational injuries at road construction sites, 2003–2010*  
Stephen Pegula - US Bureau of Labor Statistics  
<http://www.bls.gov/opub/mlr/2013/article/an-analysis-of-fatal-occupational-injuries-at-road-construction-sites-2003-2010.htm>

4. *Fatal occupational injuries at road construction sites*  
Stephen Pegula - US Bureau of Labor Statistics  
<http://www.bls.gov/opub/mlr/2004/12/ressum2.pdf>

5. *Public Road and Street Mileage in the United States by Type of Surface*

[http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national\\_transportation\\_statistics/html/table\\_01\\_04.html](http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_01_04.html)

6. *Causes of Law Enforcement Deaths*

National Law Enforcement Officers Memorial Fund

<http://www.nleomf.org/facts/officer-fatalities-data/causes.html>

7. *Census of Fatal Occupational Injuries Summary, 2014*

United States Department of Labor, Bureau of Labor Statistics

<http://www.bls.gov/news.release/cfoi.t03.htm>

8. *Census of Fatal Occupational Injuries Summary, 2014*

United States Department of Labor, Bureau of Labor Statistics

<http://www.bls.gov/news.release/cfoi.nr0.htm>

9. *Manual on Uniform Traffic Control Devices*

United States Department of Transportation - Federal Highway Administration

<http://mutcd.fhwa.dot.gov/>

10. *Interpretation Letter 6(09)-004 (I) - Use of ANSI/ISEA 107-2010 High-Visibility Safety Apparel*

United States Department of Transportation - Federal Highway Administration

[http://mutcd.fhwa.dot.gov/resources/interpretations/6\\_09\\_004.htm](http://mutcd.fhwa.dot.gov/resources/interpretations/6_09_004.htm)

11. *Whether use of high-visibility warning garments by construction workers in highway work zones is required.*

U.S. Department of Labor - Occupational Safety & Health Administration

[https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=INTERPRETATIONS&p\\_id=27155](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=27155)

Facts and Statistics - Work Zone Injuries and Fatalities [http://www.ops.fhwa.dot.gov/wz/resources/facts\\_stats/injuries\\_fatalities.htm](http://www.ops.fhwa.dot.gov/wz/resources/facts_stats/injuries_fatalities.htm)

*Road Construction Hazards Fact Sheet*

Laborers' Health and Safety Fund of North America

[https://www.workzonesafety.org/files/documents/crash\\_data/factsheet.pdf](https://www.workzonesafety.org/files/documents/crash_data/factsheet.pdf)

*Inspection and Citation Guidance for Roadway and Highway Construction Work Zones*

U.S. Department of Labor - Occupational Safety & Health Administration

[https://www.osha.gov/OshDoc/Directive\\_pdf/CPL\\_02-01-054.pdf](https://www.osha.gov/OshDoc/Directive_pdf/CPL_02-01-054.pdf)