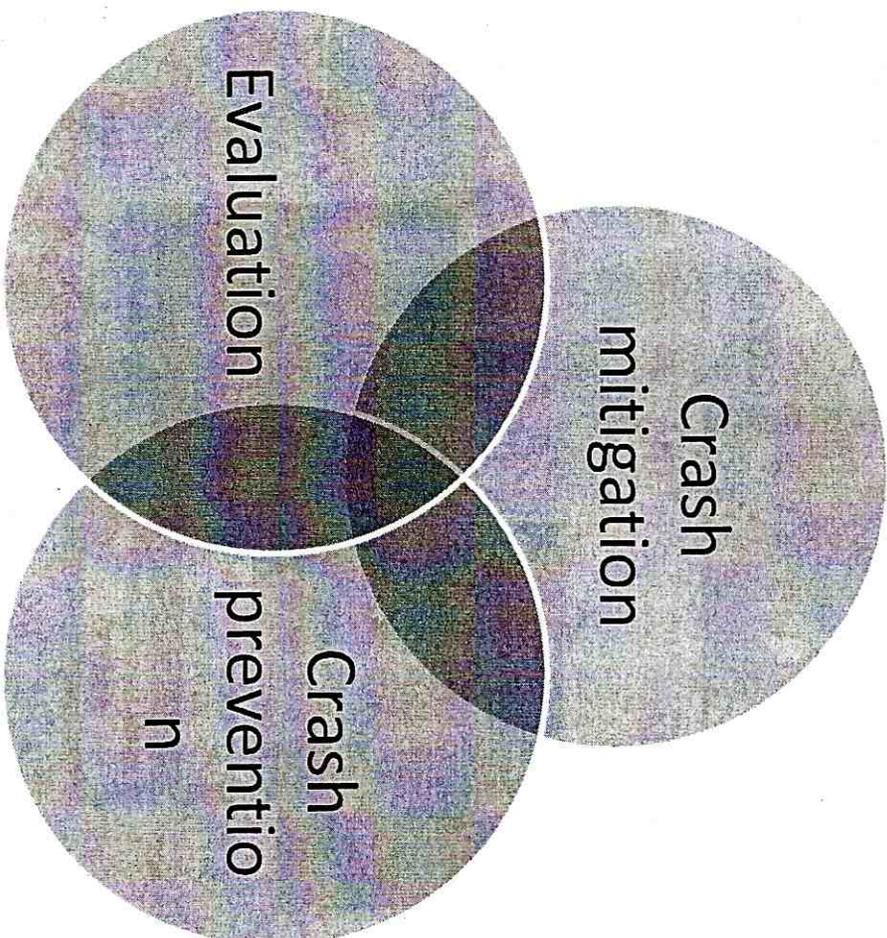
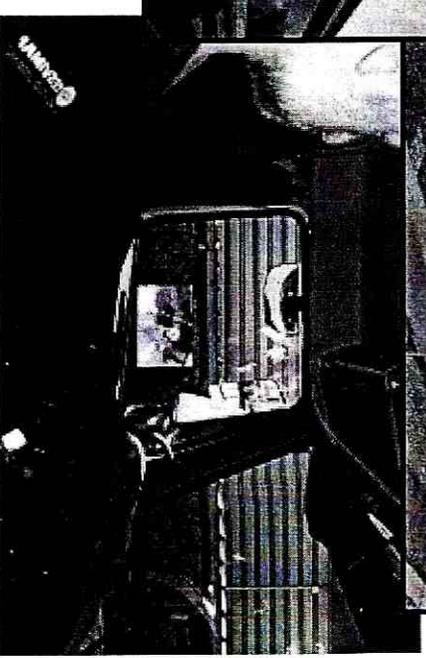
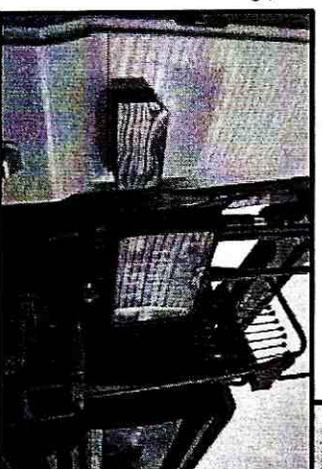
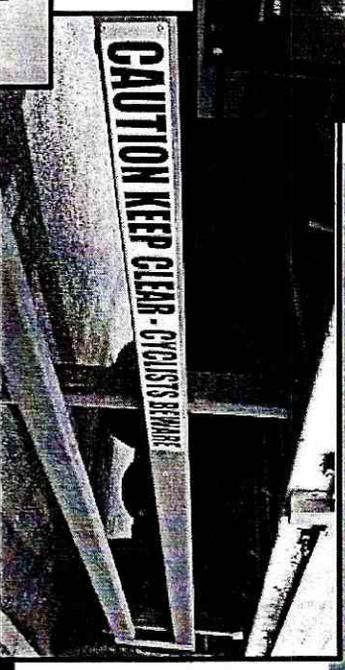
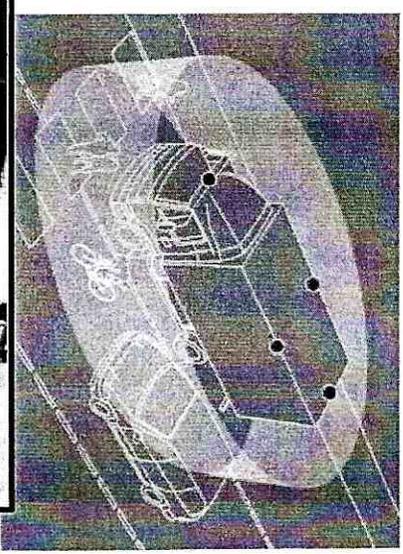
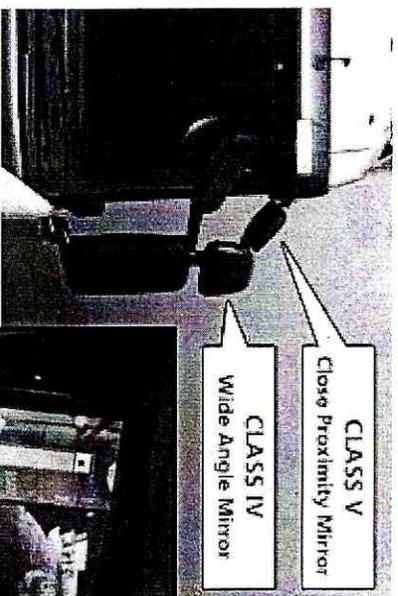


# A comprehensive "Safe Truck" approach



# Evaluate and prioritize among technologies to save the most lives

- Different sideguard designs
  - Front
  - Side
- Blind spot cameras
  - Directional
  - 360-degree
- Blind spot Fresnel lenses
- Blind spot bicyclist/pedestrian sensors
  - Ultrasonic, radar, etc.
  - Interior/exterior alerts
- Turn alarms (manual or automated)
  - Audible
  - Visual
- Human factor and operator training implications



# Opportunity for Cambridge

Lead other U.S. cities and the nation in truck-bicyclist safety

Pilot **multiple** safety technologies (including different sideguard, mirror, lens, sensor, and messaging designs) with limited U.S. experience but with international precedence

Partner with Volpe to design and perform a pilot evaluation

- Crash reports
- Operational and maintenance impacts
- Human factors/driver acceptance
- Costs
- Perceived public safety

Transfer key findings statewide or nationally to other cities via USDOT

Potentially develop voluntary program for all truck fleets that operate on Cambridge streets to install the appropriate suite of safety technologies

Start where the Boston and NYC safety initiatives with Volpe left off:

<http://www.volpe.dot.gov/news/engineers-resourcefulness-drives-investment-boston-bike-safety-initiative>

## Mayor Walsh Wants 'Truck Side Guards' on All Vehicles Contracted by the City

The guards would keep cyclists from getting pulled under a vehicle's wheels in the event that a driver doesn't see them.

By Steve Hagar | Boston Daily | September 9, 2014 10:13 am



NYC FLEET  
NEWSLETTER



Bill de Blasio, Mayor  
Stacy Cumberland, DCAS Commissioner  
Kerib T. Keriman, Chief Fleet Officer

MAY 16, 2014

ISSUE 49

DCAS PARTNERS WITH US DOT TO STUDY TRUCK SIDE GUARDS KEITH KERIMAN

# Reducing the danger of Trucks and other Large Vehicles to Others

**Steve Miller**

LivableStreets Alliance, founding board member  
Healthy Weight Initiative, Harvard Sch. Public Health

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**LivableStreets** Rethinking urban transportation

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# GRIM FACTS

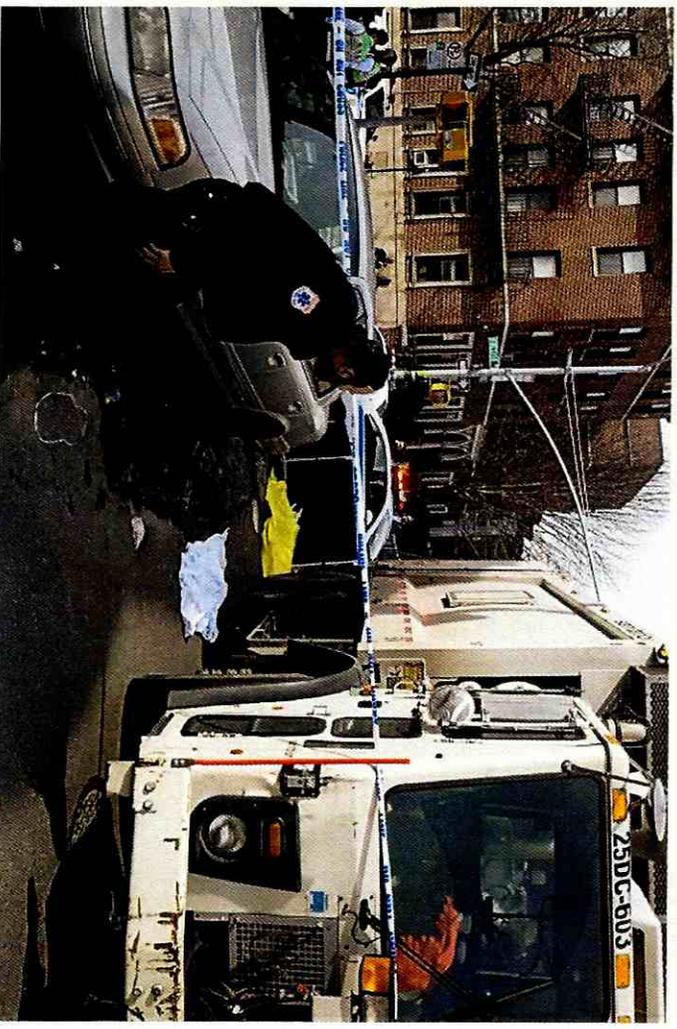
Trucks are only 4% of vehicles in US...

but cause **11%** of cyclist fatalities, **7%** of pedestrian fatalities  
In urban areas the disparity is higher...

London: trucks = 4% of vehicles; **53%** of cyclist fatalities.

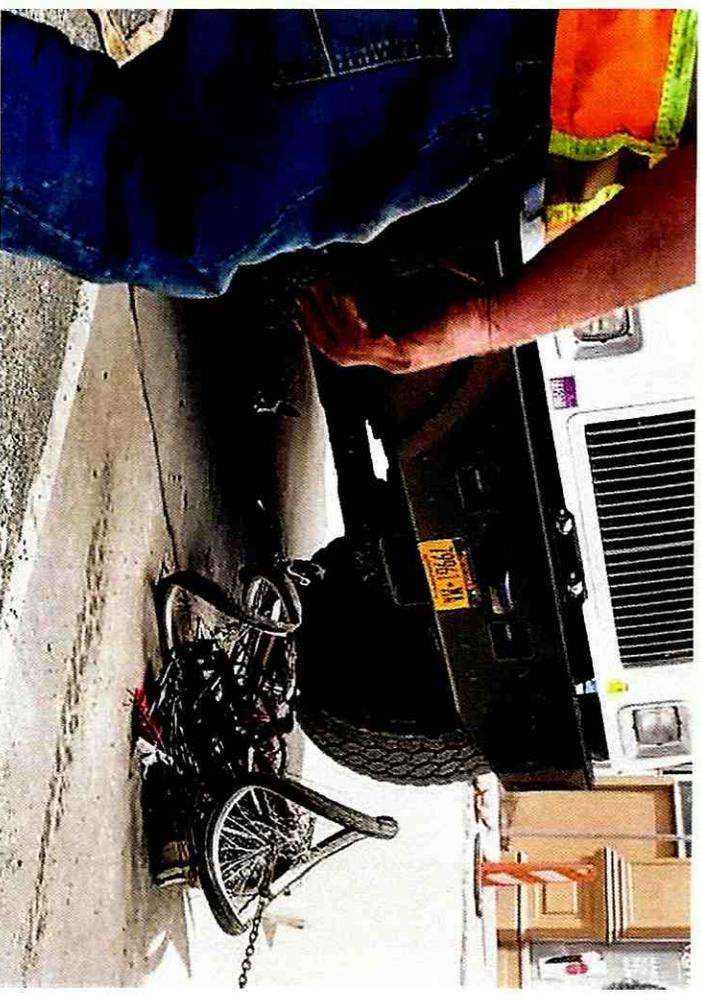
*In 2012, 5 out of the 7 Boston metro area cyclist fatalities involved heavy-duty vehicles.*

- ½ of cyclists killed by large trucks ...**
- ¼ of pedestrians killed by trucks...**
- ...first hit the side of the truck**
- ...then slide under rear wheels as**
- vehicle drifts during a right turn**
- ...then get crushed.**



# A RANGE OF CAUSES

- I. Drivers' Behaviors
  - II. Pedestrian, Bicyclist, and Other Peoples' Behaviors
  - III. Decision-Shaping Context
  - IV. Road & Intersection Designs
  - V. Vehicles
- >>>Safety vs. Health



# I. Drivers' Behaviors



(re) Training &  
(re) Licensing  
Requirements  
(2008 Laws!)

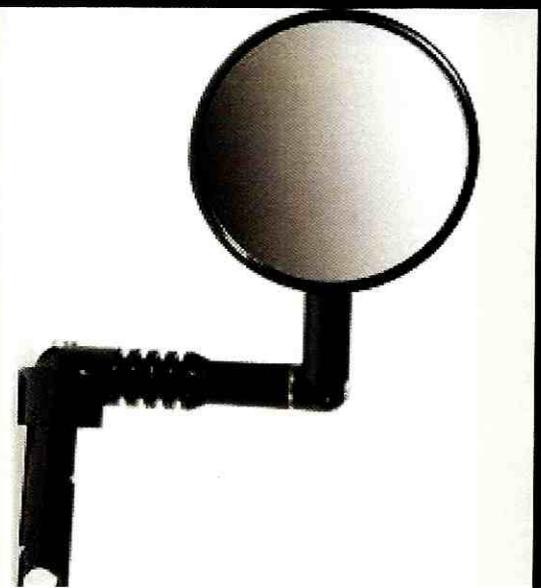
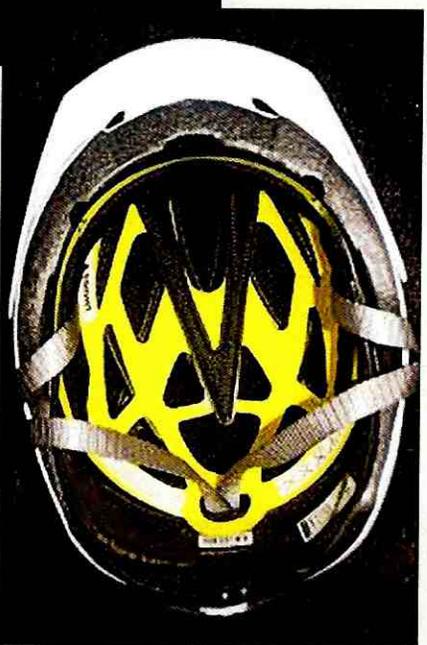
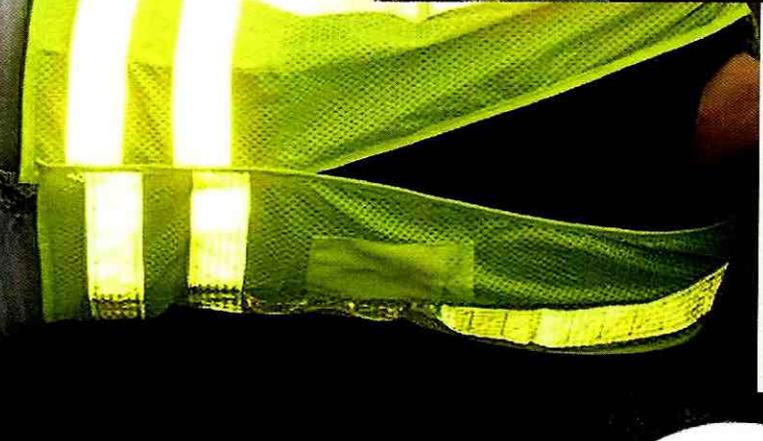
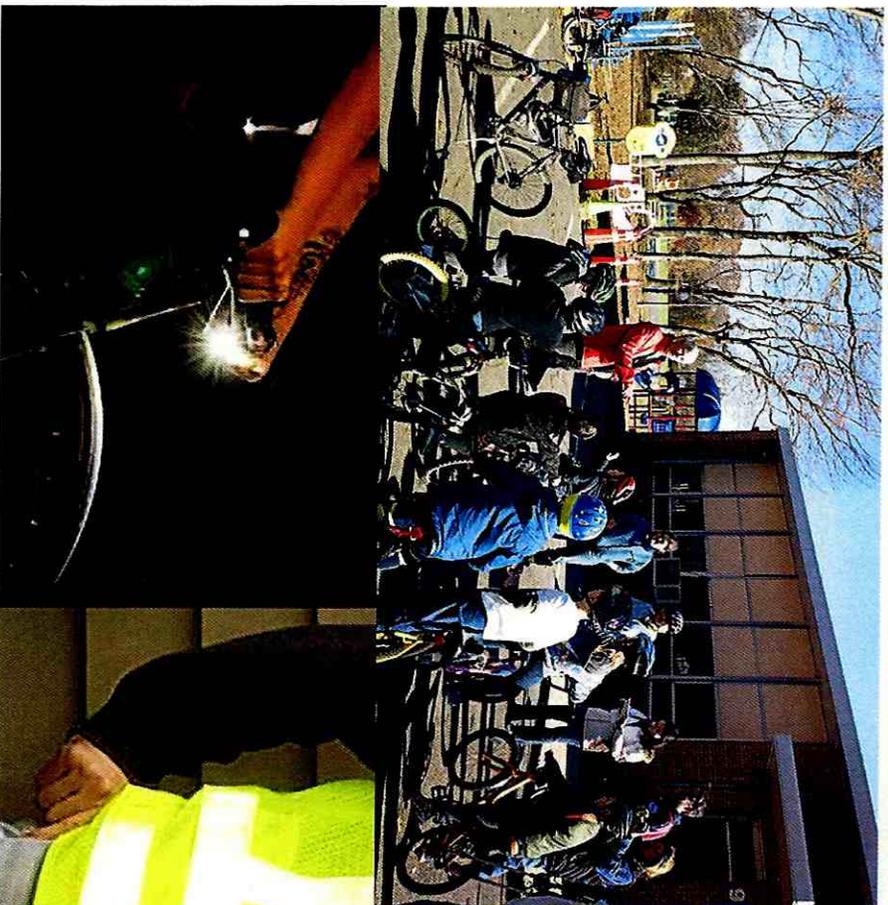
Time & Mileage  
Limits

Enforcement

# II. Pedestrian, Bicyclist, and Other Peoples' Behaviors

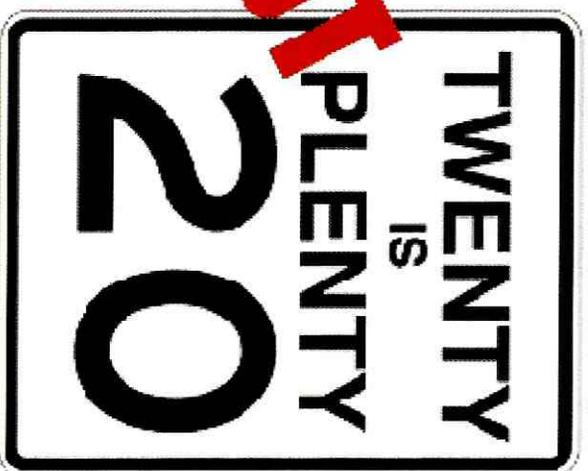
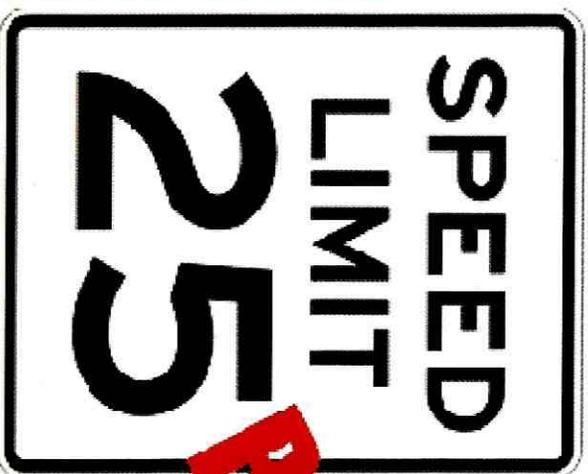


# II. Pedestrian, Bicyclist, and Other Peoples' Behaviors & Equipment

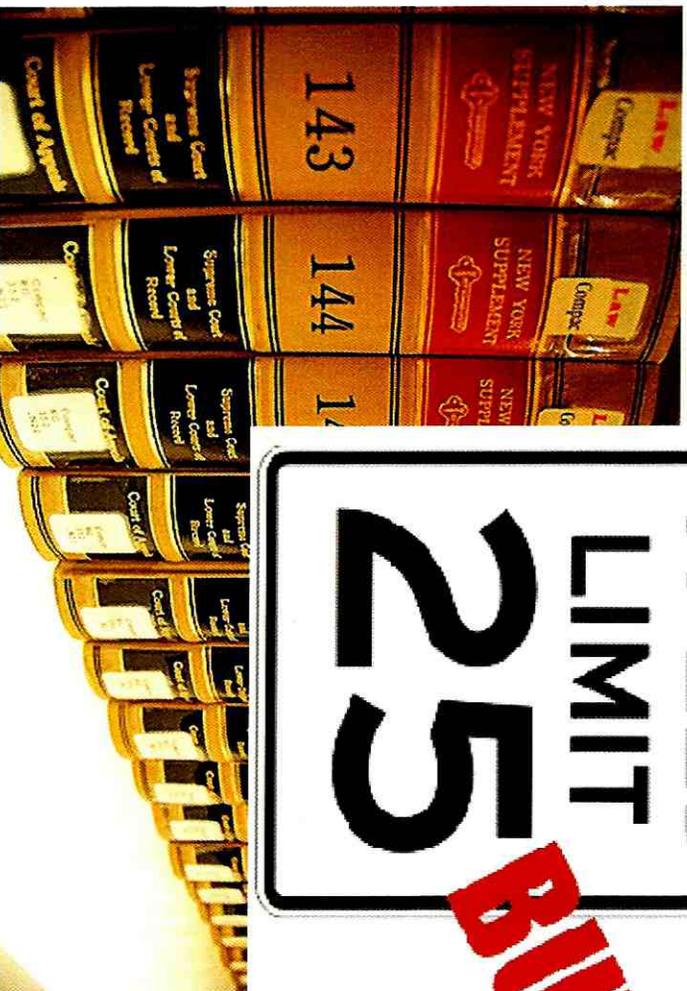


# III. Decision-Shaping Context

INSURANCE                      LAWS & REGULATIONS  
COMPANY POLICIES



**BUT**



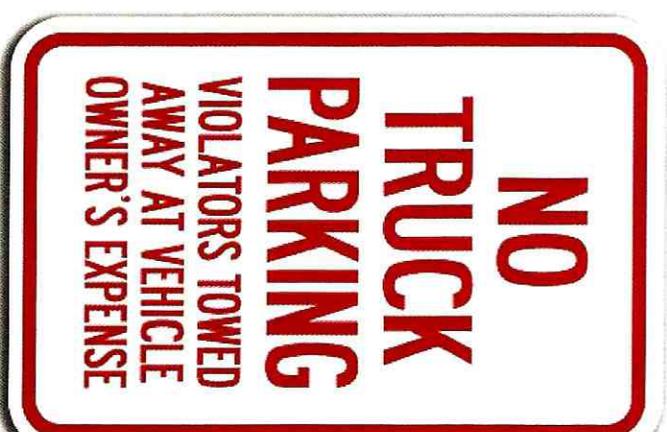
ance  
icy



# LIMITS ON TIME, SIZE, LOCATION.....OR SELECTIVE BANS

In Paris, only trucks less than 29m can deliver between 10pm and 5pm, larger trucks can only deliver at night (10pm to 7am) and trucks bigger than 43m can't drive in Paris at all without special dispensation .

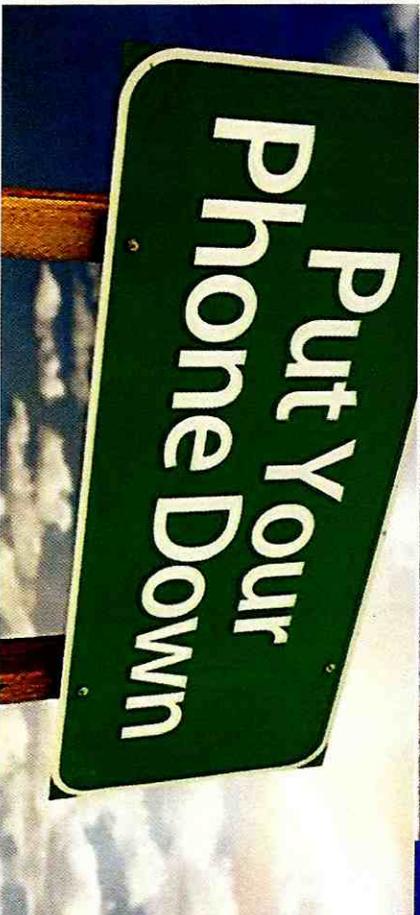
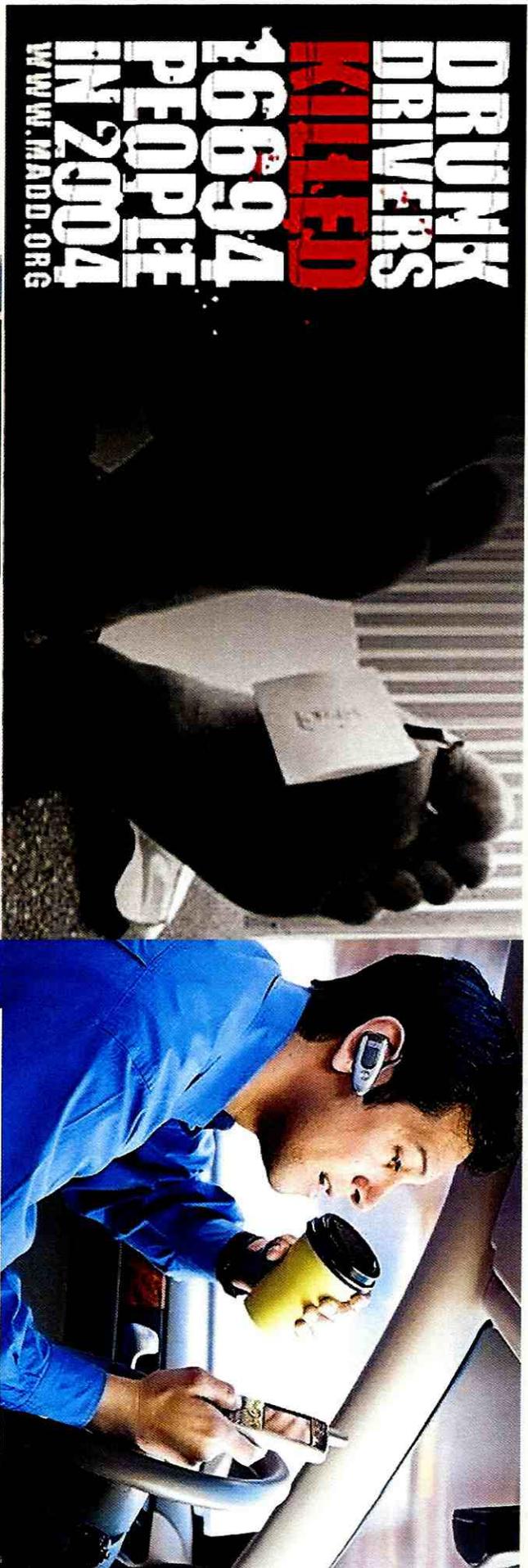
Dublin has had a large truck (HGV) Management Strategy since 2007. This provides for a ban on 5+ axle vehicles during the hours of 7am-7pm, seven days a week within a designated cordon, with permits available for vehicles needing to load/unload



**VISION ZERO**

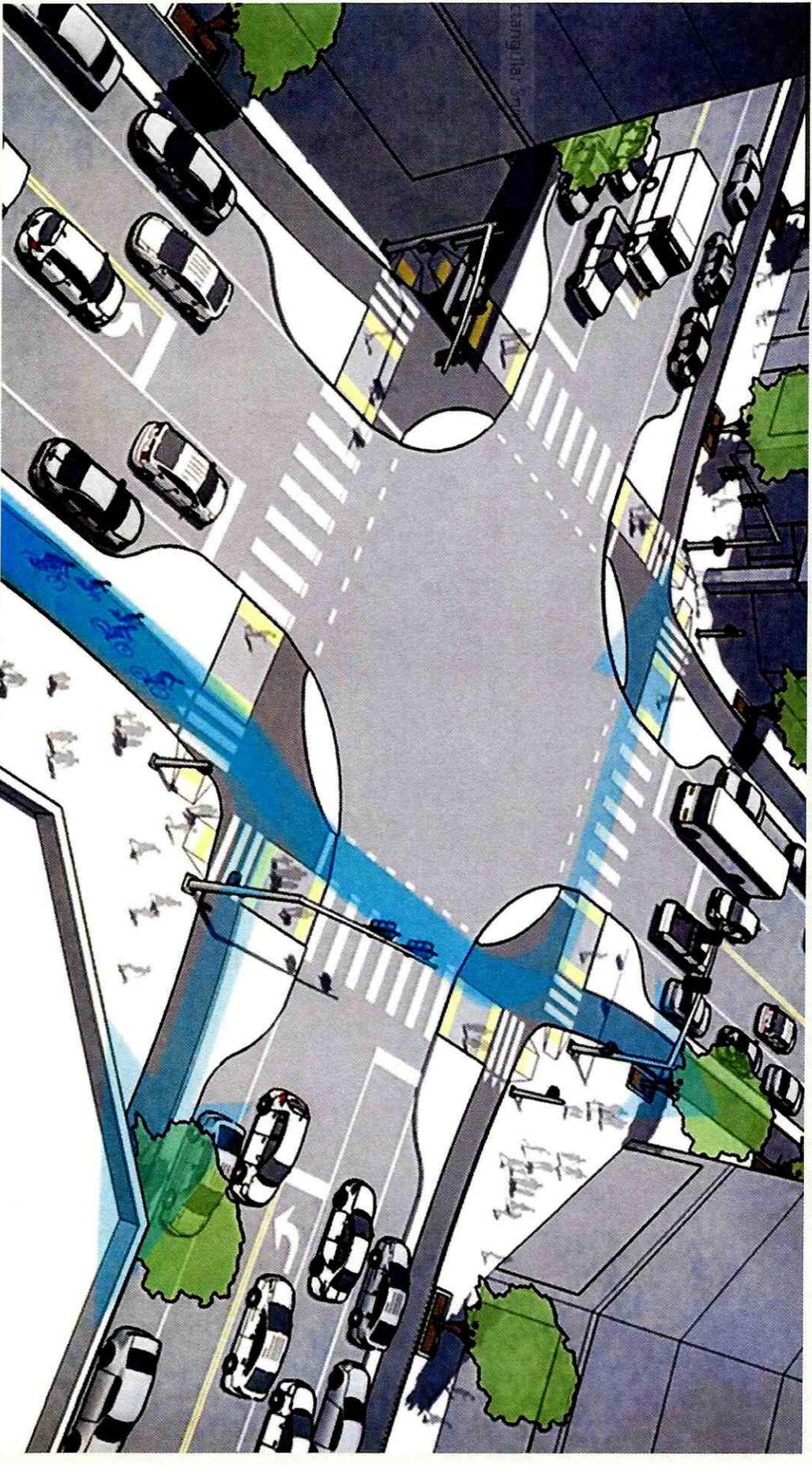
- DEATH
- INJURY
- FEAR OF TRAFFIC

# Decision-Shaping Context; Public Campaigns



**VISION**  
**ZERO**  
nyc.gov/visionzero

# IV. Road & Intersection Design



“Road diets reduce all traffic crashes by an average of 29 percent.”

US Dept. of Transportation

# A RANGE OF CAUSES

- I. Drivers' Behaviors
  - II. Pedestrian, Bicyclist, and Other Peoples' Behaviors
  - III. Decision-Shaping Systems
  - IV. Road & Intersection Designs
  - V. **Vehicles**
- >>>Safety vs. Health



# VI. Vehicles

## KEY ISSUES

Outside Person's Unawareness: on-coming pedestrian or cyclist is unaware and unwarned that truck is turning.

Large Blind Areas: in front, along sides (especially right side), and in rear.

Turning Drift: when turning to the right, driver can not see approaching pedestrians or cyclists from cab mirrors; and truck body drifts to right in ways that are hard to people next to the vehicle to anticipate.

Side Under-run: when a truck's cargo bed height (typically 50 inches) is high enough to throw a pedestrian or cyclist under the vehicle in a side impact.



# ACCIDENT PREVENTION

## LETTING PEDESTRIANS/CYCLISTS KNOW

Outside Warning Stickers.

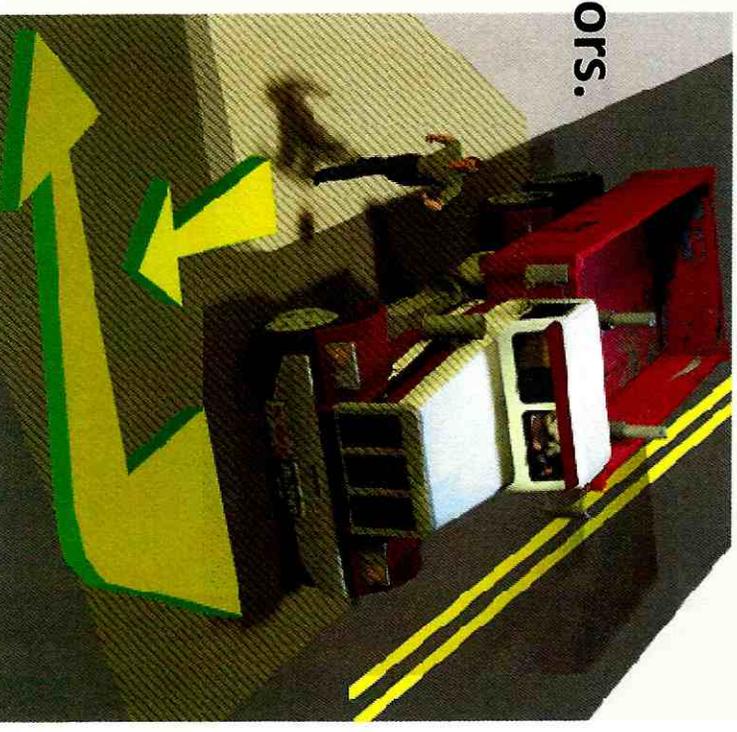
Side-of Vehicle Turning Blinkers & Audible Turning Warning.

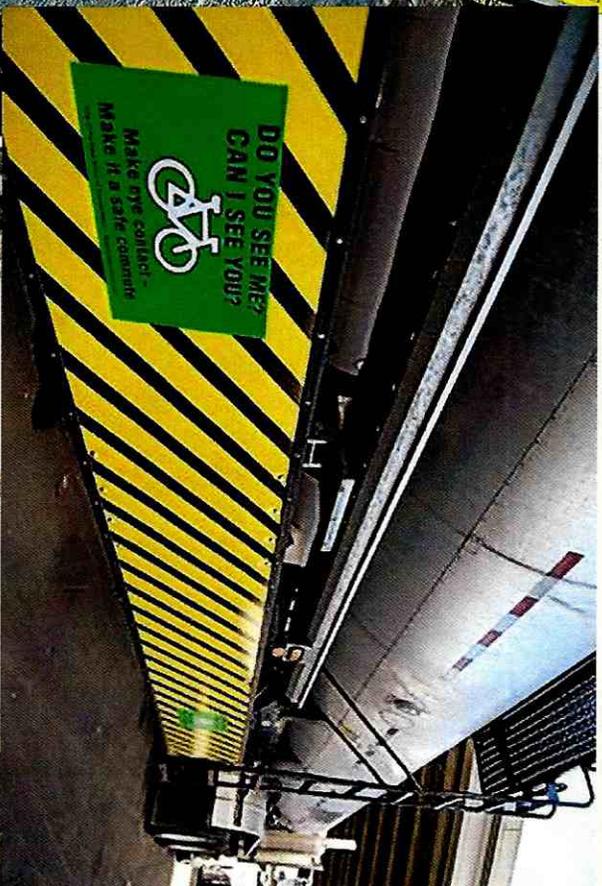
## LETTING DRIVERS KNOW

Blind Area Mirrors & Fresnel Lenses.

Inside Visual or Audible Proximity Sensors.

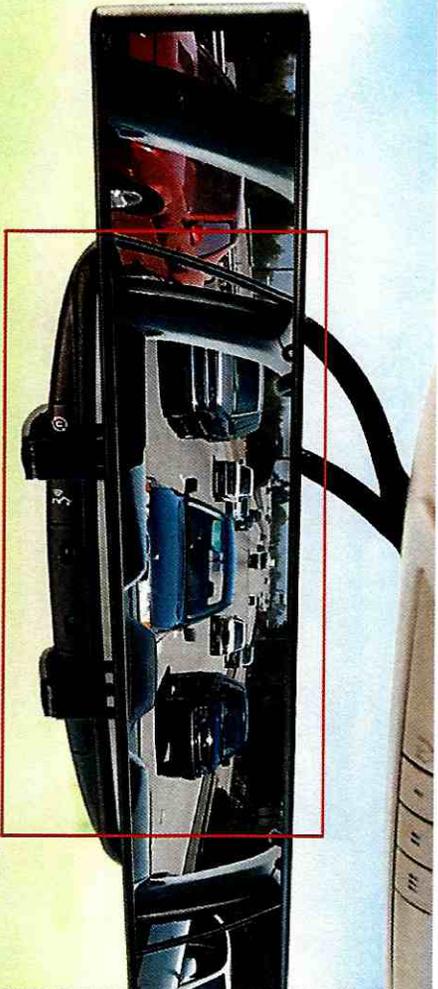
Blind Area Cameras.





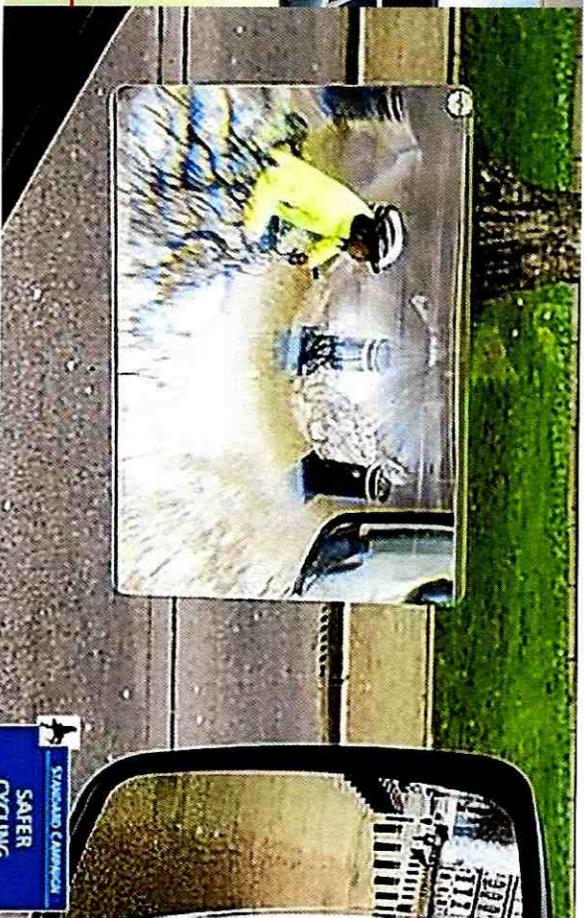
# Warning Signs



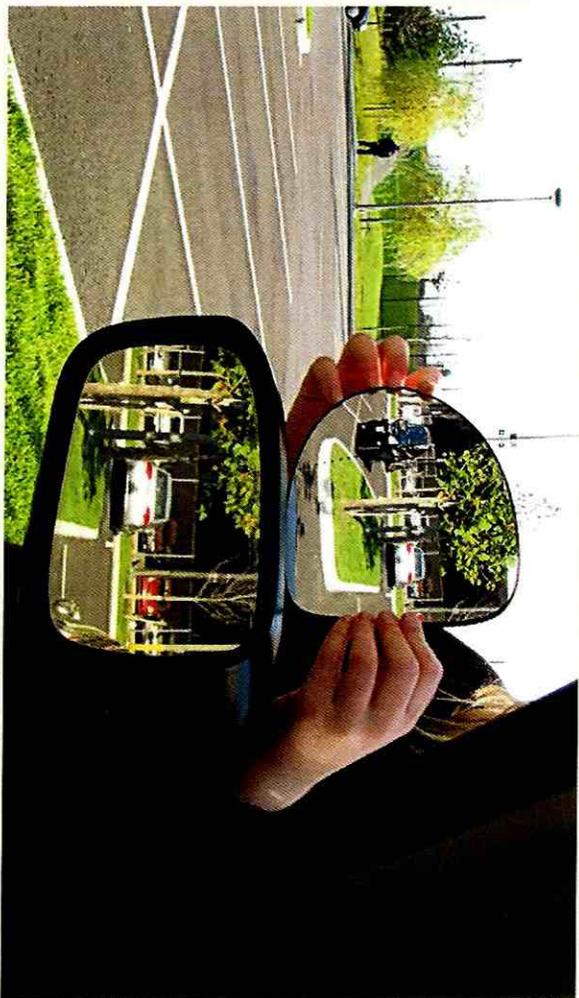
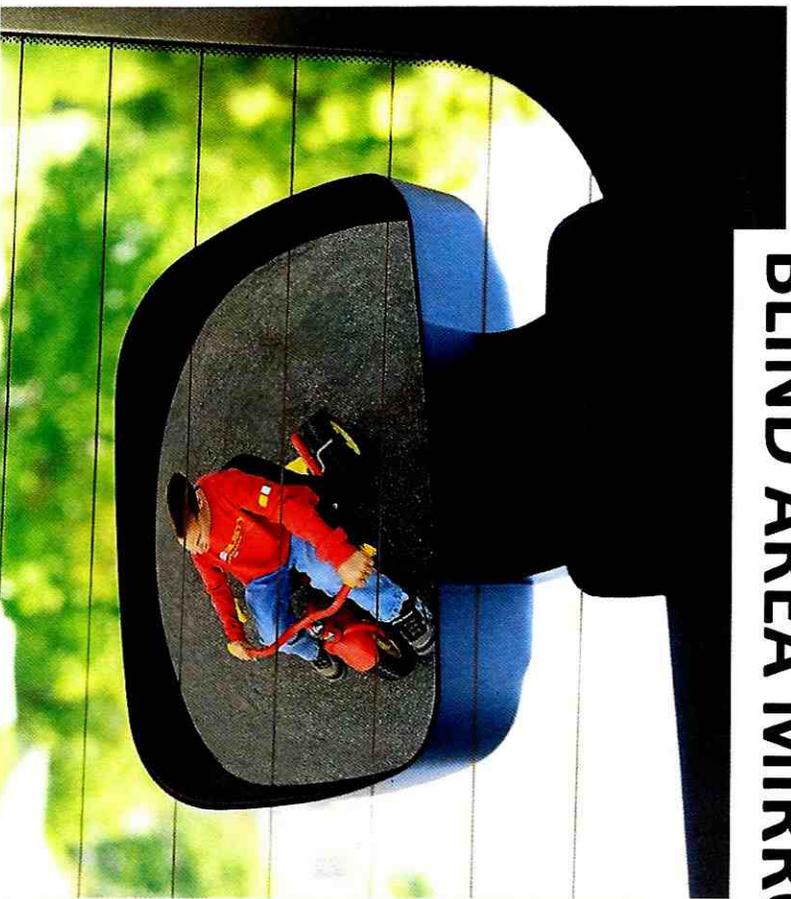


Standard rearview mirror 52°

The No Blind Spot Rear View Mirror 180°



# BLIND AREA MIRRORS...FRESNEL LENS



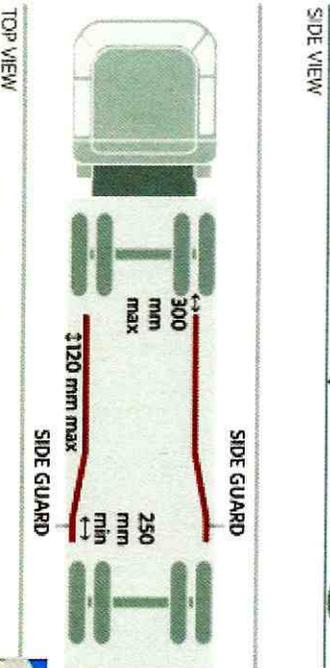
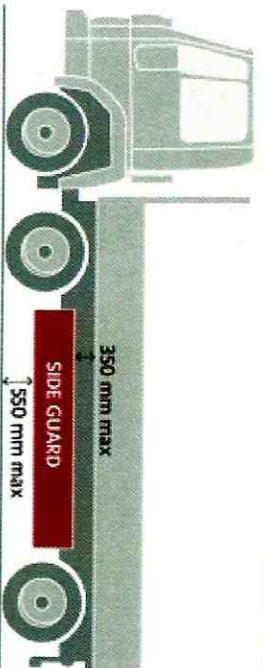
***91% of operators surveyed found the safety technology easy to use.***

***91% of trial participants felt that blind spot technology would reduce the number of incidents between trucks and cyclists.***

Test run by Transport for London

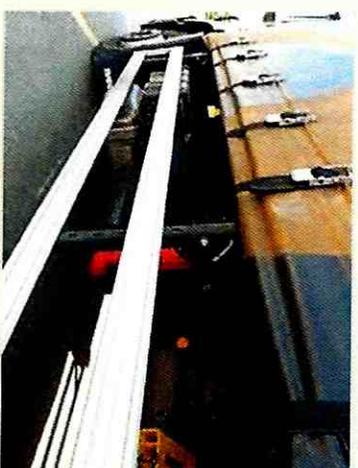
# INJURY REDUCTION

## SIDEGUARDS



61% decrease in cyclist fatalities in UK in side-impact crashes with large trucks after national sideguard law implemented

20% decrease in same types of pedestrian fatalities

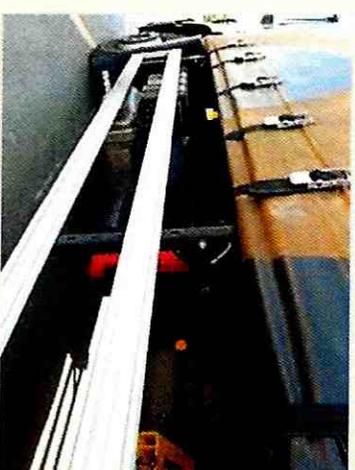
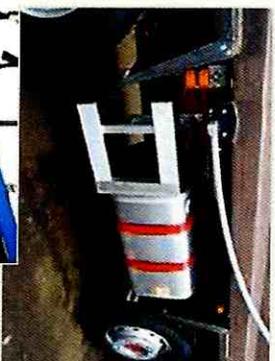
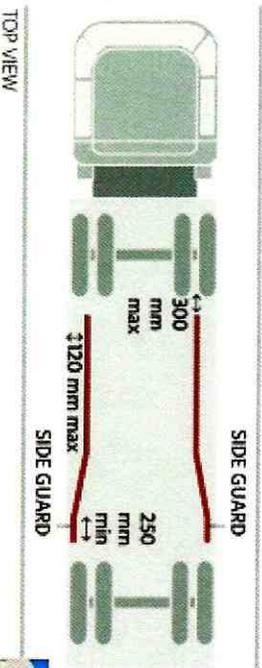
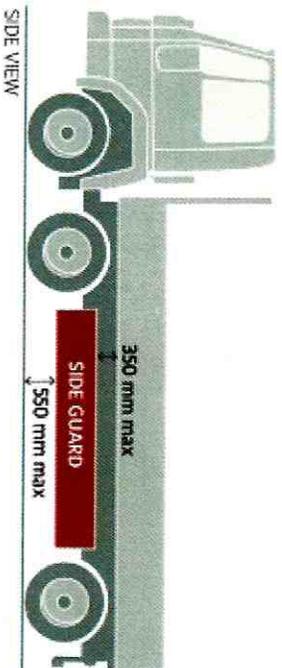


# TRUCK INJURY REDUCTION

## SIDEGUARDS

61% decrease in cyclist fatalities in UK in side-impact crashes with large trucks after national sideguard law implemented

20% decrease in same types of pedestrian fatalities



PROVEN GLOBALLY OVER 30 YEARS:

UK, European Union, Japan, China, Brazil all have mandatory sideguard laws.

IN US: Portland, Washington DC, Boston, Cambridge, Somerville, Newton, NYC – various approaches.

Pending NYC bill: **all** trucks over 26,000 lbs. and operating in NYC to install sideguards.  
NY State law: **all** trucks registered in NYS over 26,000 lbs. and operating in NYC must install convex crossover mirrors for frontal blind spot

**European Union sideguard law (Regulation 73)**

Applies to all vehicles in the European Union over 3.5 metric tons (7,700 lbs.)  
Can be met by vehicle design **or** sideguards; tool boxes, spare wheels, etc. can be integrated. Sideguards can use horizontal rails or continuous flat surface:  
Flush with vehicle, smooth face, max ground clearance 550 mm / 21.7”;  
Standards for strength (1 kN or 225 lbs horizontal static force)

**Mayor Walsh Wants ‘Truck Side Guards’ on All Vehicles Contracted by the City**

The guards would keep cyclists from getting pulled under a vehicle’s wheels in the event that a driver doesn’t see them.

By Steve Annear | Boston Daily | September 9, 2014 10:13 am



**NYC FLEET NEWSLETTER**



Bill de Blasio, Mayor  
Society Cumberbatch, DCAS Commissioner  
Kathie T. Kerman, Chief Fleet Officer

MAY 16, 2014

ISSUE 49

DCAS PARTNERS WITH US DOT TO STUDY TRUCK SIDE GUARDS **KATHIE KERMAN**

# Safety AND Health AND Sustainability

2013 – NHTSA estimate: 35,200 traffic fatalities vs. 53,000 annual “premature deaths” from “road transportation emissions”

**Combustion-caused particles cause up to 15% of all US death each year:** and take about 2 years off the average life span.

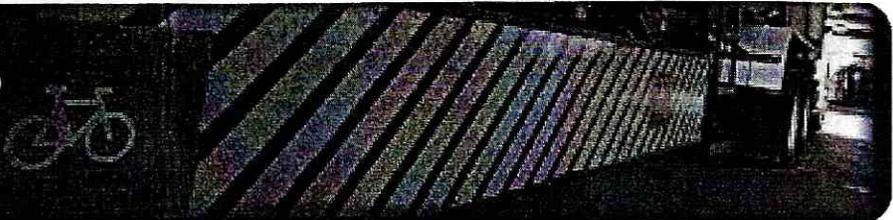
**Transportation related air quality health costs -- \$50 to \$80 billion a year.**

>Cambridge Vehicle Trip Reduction Ordinance and Growth Policy Statement.





# SIDE GUARDS SAVE LIVES



**4%**  
of vehicles in US



Cause

**11%**



And

**7%**



About half of all cyclists killed by large trucks and about a fourth of all pedestrians killed by trucks first hit the side of the truck and might have been saved by sideguards.  
- Alex Epstein, USDOT



Boston Area cyclist  
Fatalities 2012-2014



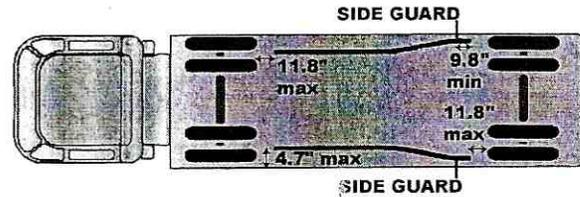
8 out of the 9 involved large vehicles,  
at least four might have been  
prevented by truck sideguards.

## WHAT ARE THEY?

The National Transportation Safety Board (NTSB) recommends sideguards on heavy single-unit trucks, trailers, and truck tractors. ----single-unit trucks over 10,000 lbs., trailers over 10,000 lbs., and truck tractors over 26,000 lbs.

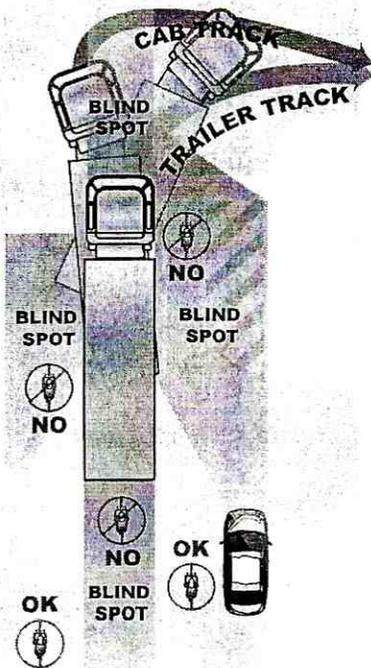


SIDE VIEW



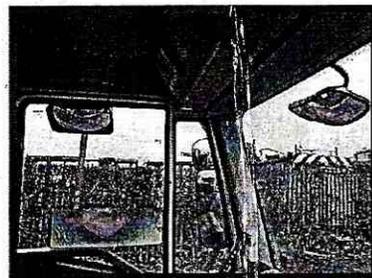
TOP VIEW

## BLIND SPOTS



## OTHER SAFETY PRECAUTIONS

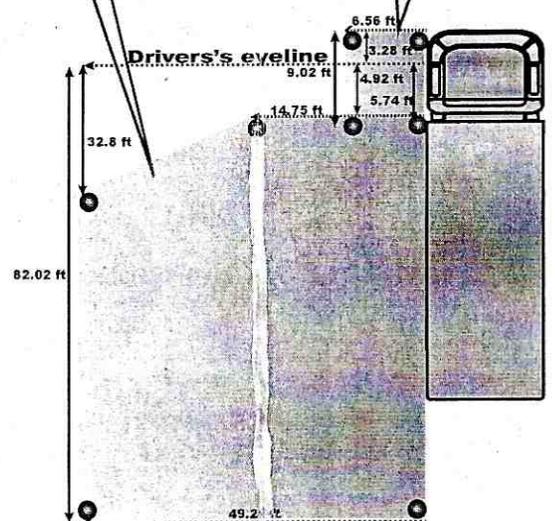
### Crossover Mirrors & Wide-angle Lenses



Drivers View

**Area A**  
Class IV wide angle  
mirror field of vision

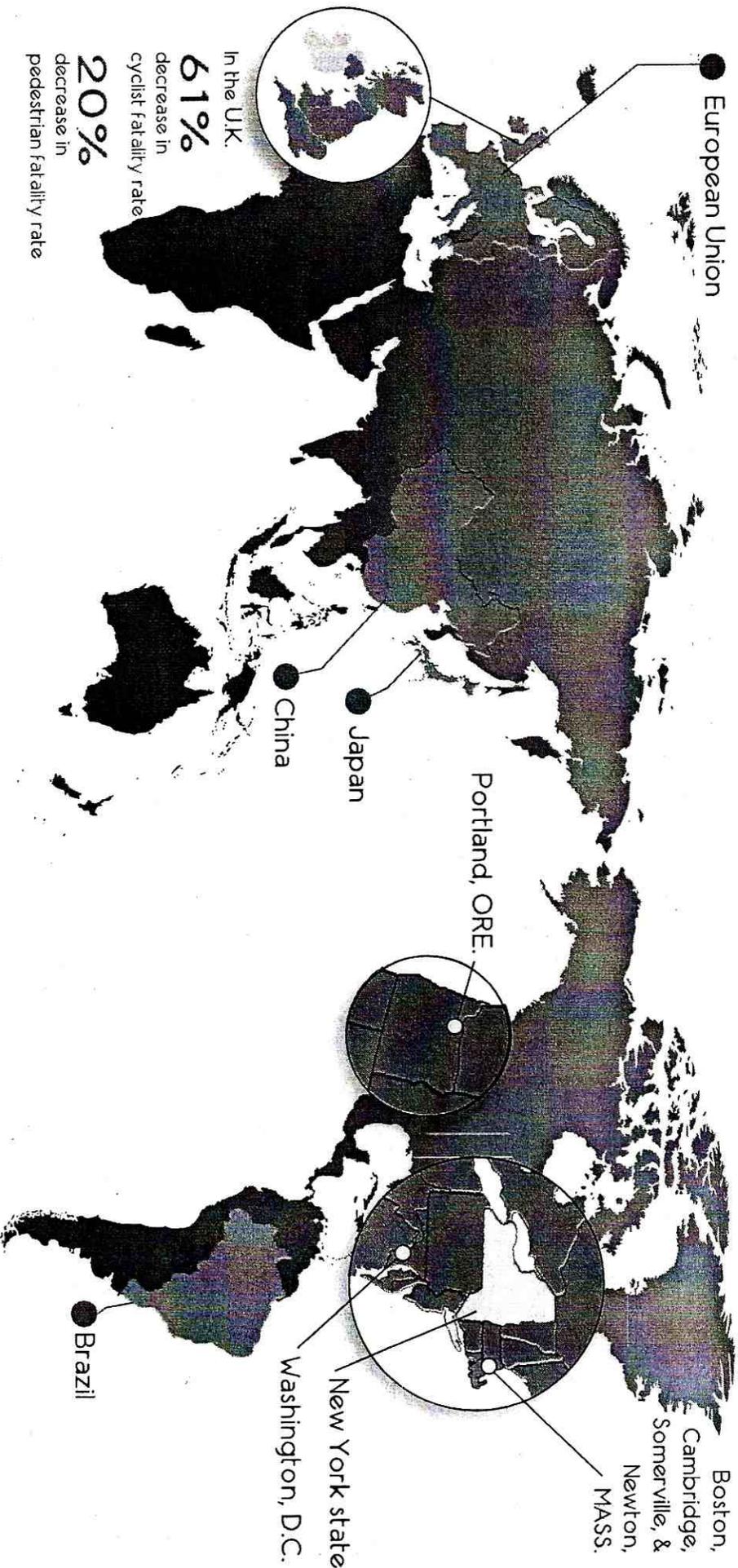
**Area B**  
Class V close proximity  
mirror field of vision



THREMBURG

# Making it a law

The European Union, Japan, China, and Brazil have mandatory sideguard laws. Legislation or other mandates pending in the US: Portland, Washington DC, Boston, Cambridge, Somerville, Newton and NYC – various regulations and pilots.



## Legislation implemented

**EU sideguard law (Regulation 73)** Applies to all vehicles in the European Union over 3.5 metric tons (7,700 lbs.) Can be met by vehicle design or sideguards: tool boxes, spare wheels, etc. can be integrated Sideguards can use horizontal rails or continuous flat surface: Flush with vehicle, smooth face, max ground clearance 550 mm / 21.7"; Better: 350 mm/13.8" Standards for strength (1 kN or 220 lbs. horizontal static force); Better: 2 kN/440 lbs.

## Legislation or other mandates pending

A Pending NY State bill: trucks over 26,000 lbs. and operating in NYC to install sideguards.  
 NY State law: trucks registered in NYS over 26,000 lbs. and operating in NYC must install crossover mirrors for forward blind spot.