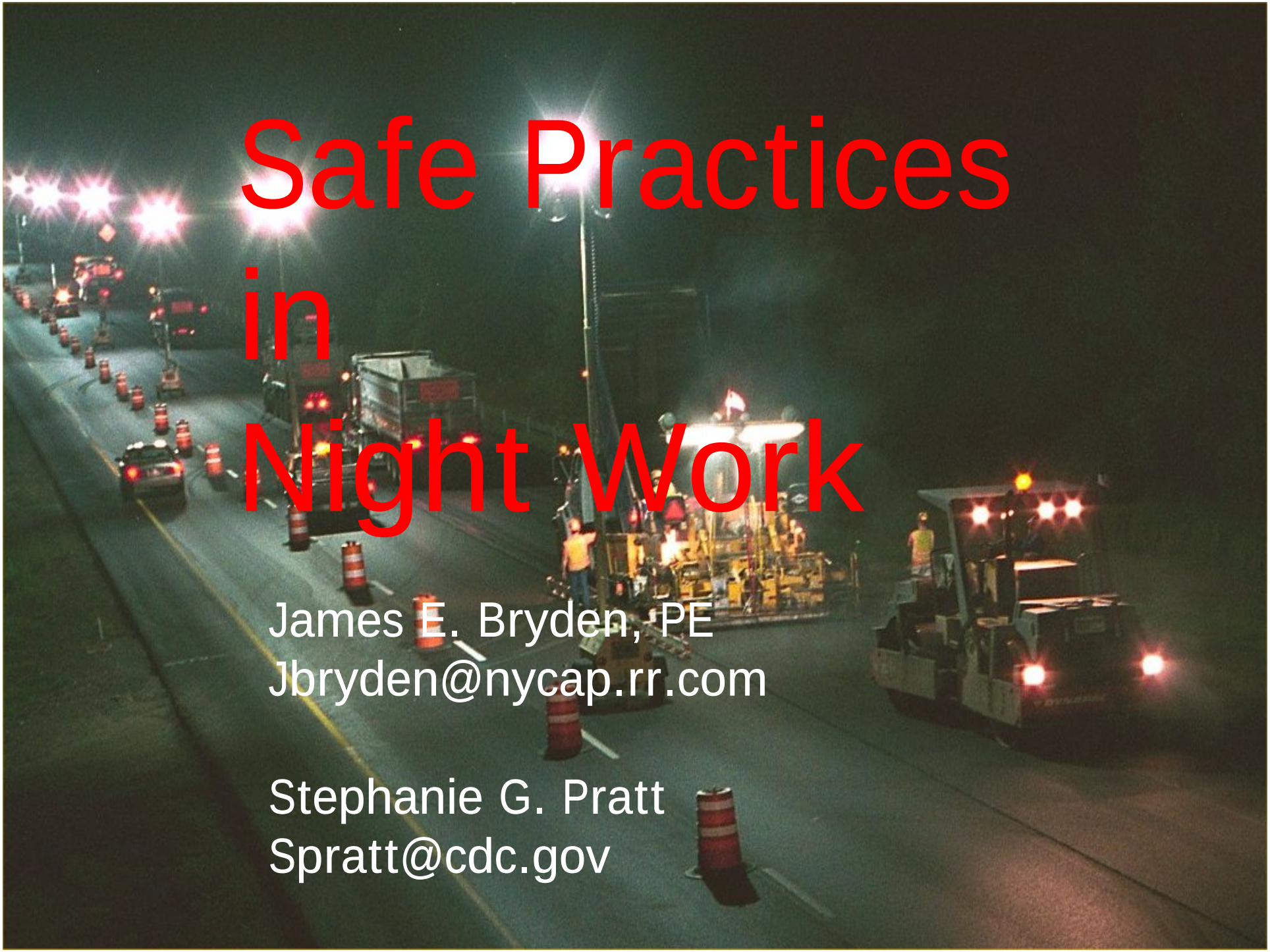


Safe Practices in Night Work

James E. Bryden, PE
Jbryden@nycap.rr.com

Stephanie G. Pratt
Spratt@cdc.gov

NCHRP 17-17

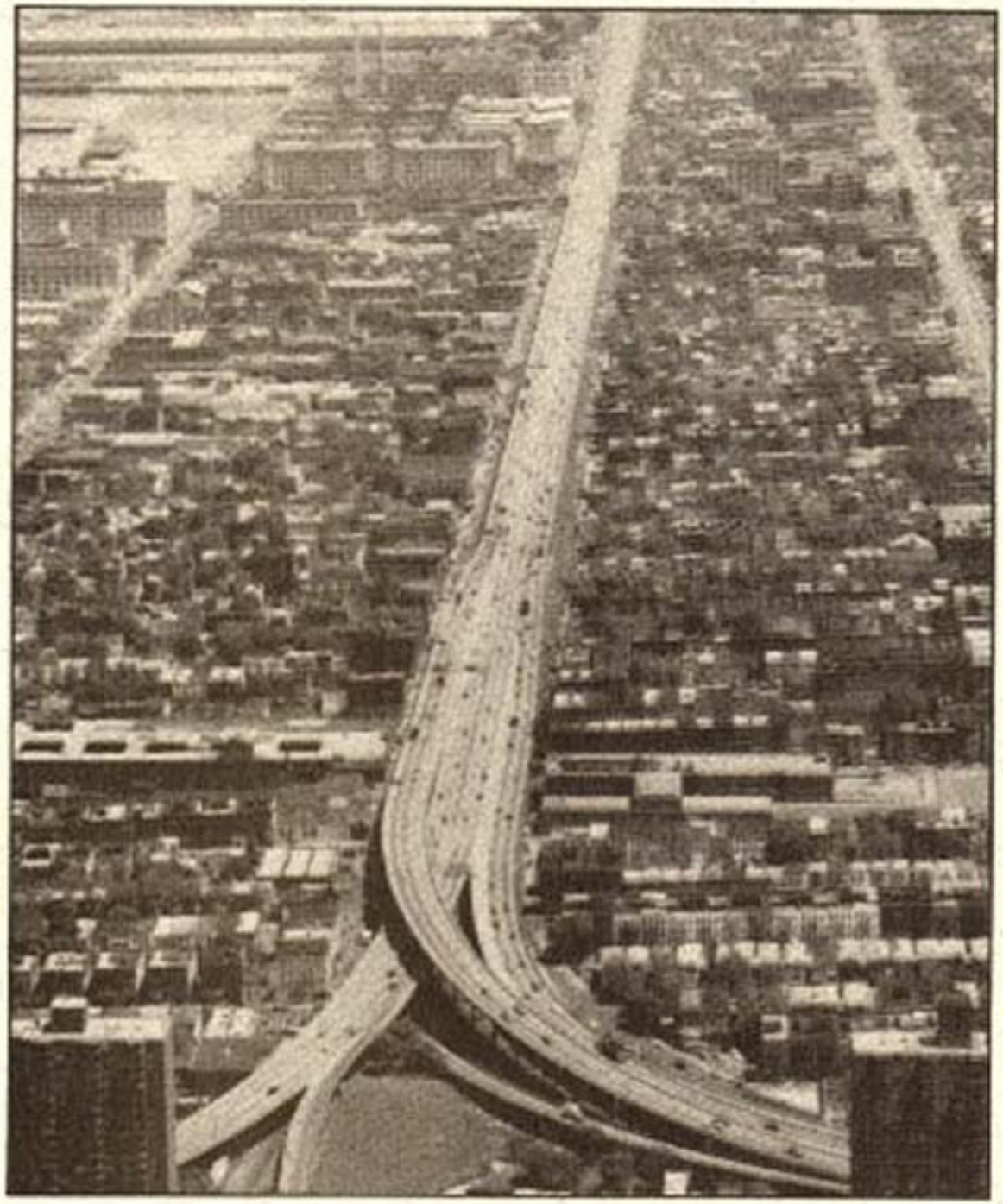
GUIDELINES FOR DESIGN AND OPERATION OF NIGHTTIME TRAFFIC CONTROL FOR HIGHWAY MAINTENANCE AND CONSTRUCTION

THE LAST RESOURCE

Jim Bryden

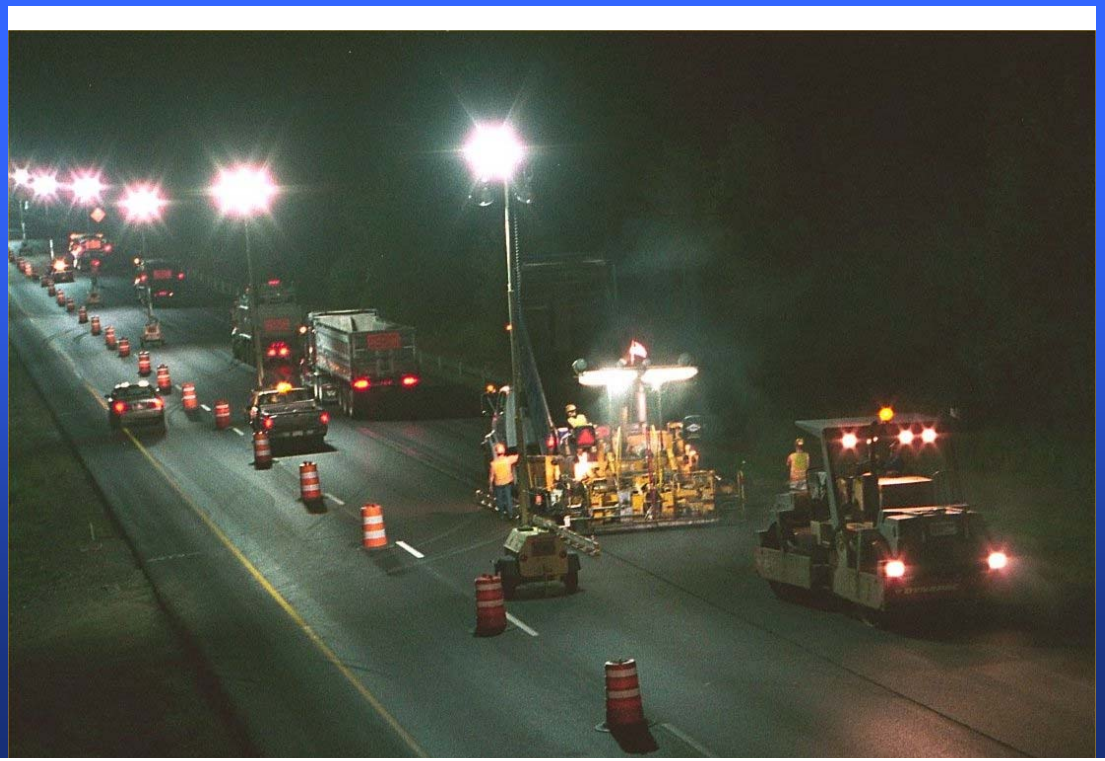
Doug Mace

MOVE IT YOURSELF WITH
RYDER
RYDER
ONE WAY

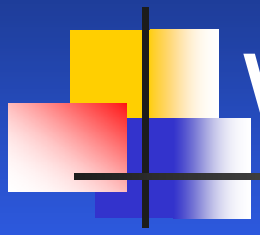


Night Work

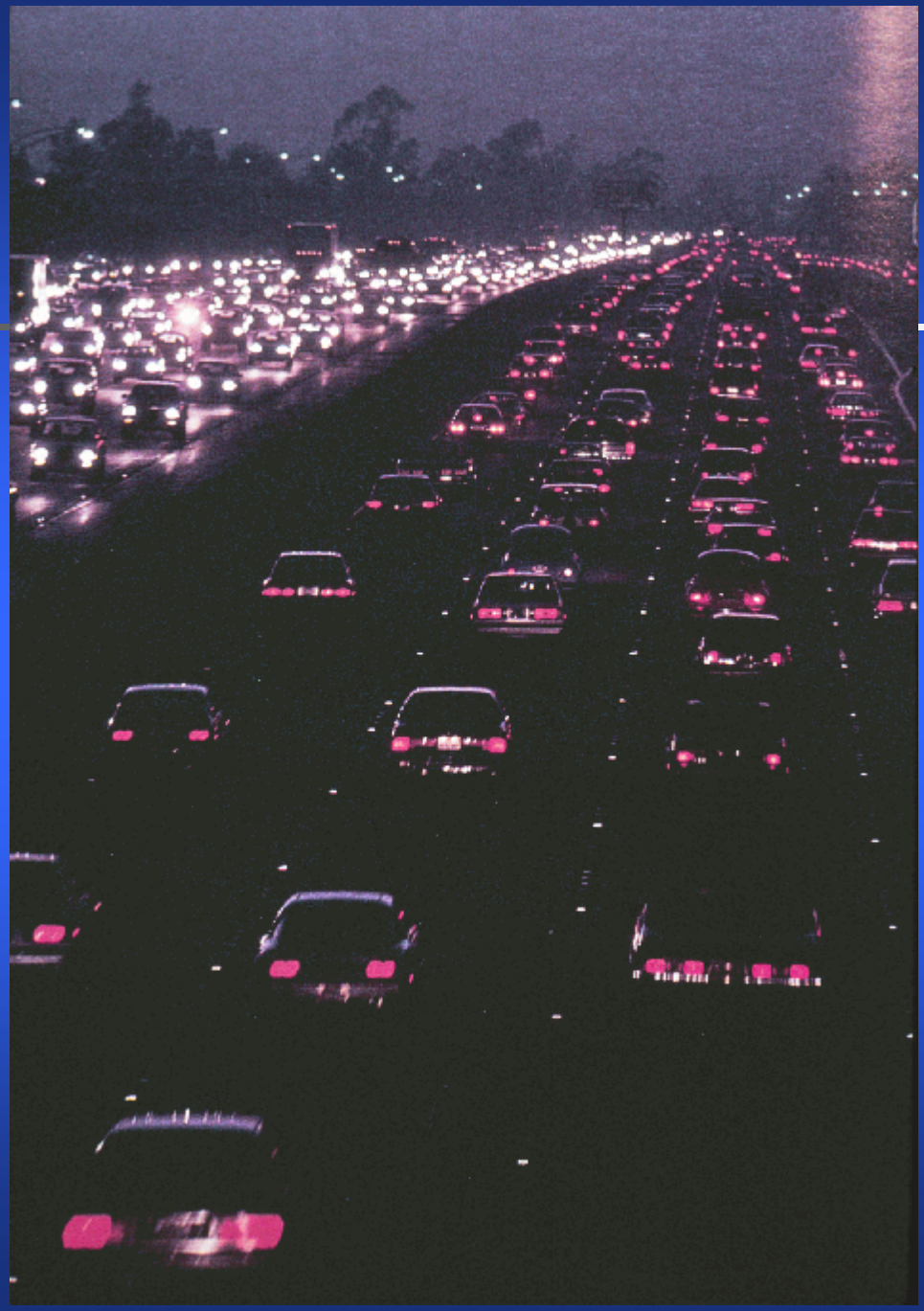
- Work takes place during night hours
- Roadway restored every day

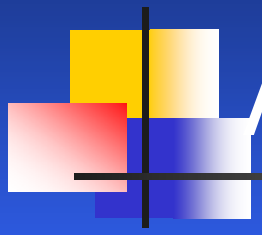


Necessary Conditions for Night Work



- Reduced traffic/business impact
- Easy reconfiguration of traffic control





Advantages

- Reduced traffic volume
- Better access to work site
- Longer work shifts – maybe
- Cooler temperatures
- Reduced business impact

Concerns

- Visibility
- Work quality
- Staffing issues
- Noise & glare
- Worker & driver alertness
- Impaired drivers
- Higher speeds
- Cost – labor, materials, traffic control
- Logistics, supervision

Concerns

Worker safety

DOHRN

Roadway Worker Deaths During Night Operations: What Do the Data Show?

Stephanie Pratt

National Institute for Occupational Safety and Health

Centers for Disease Control and Prevention

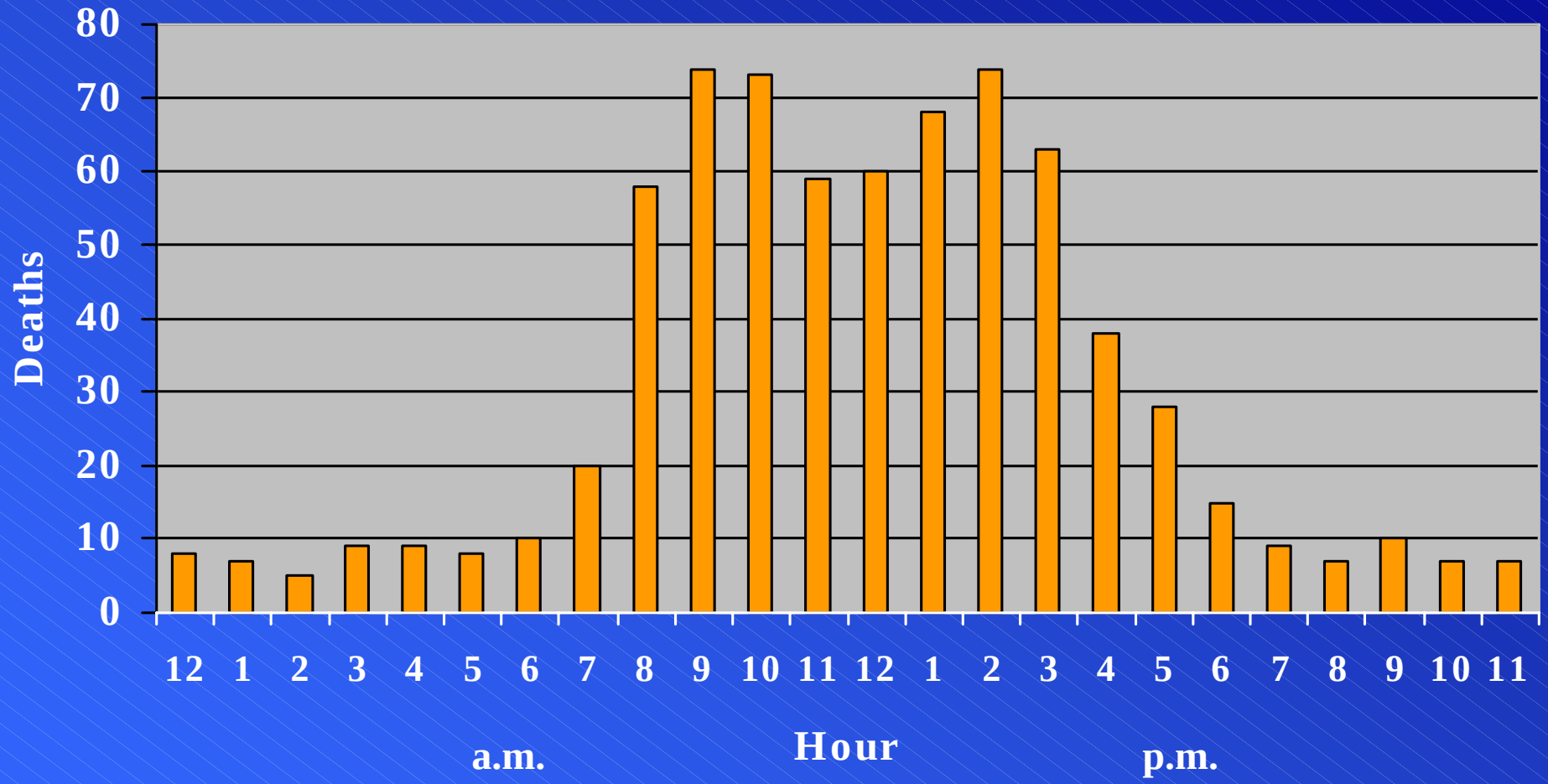
Data Source

- Census of Fatal Occupational Injuries, 1992-2000
- Identified fatalities using:
  - Coded data
  - Keyword searches
  - Narratives

Worker Deaths in Work Zones

- 910 worker deaths 1992-2000
- 826 (91%) were vehicle or equipment-related (traffic vehicle, construction vehicle, or both)

Worker Fatalities in Roadway Work Zones, by Time of Day, 1992-2000 (n=726*)



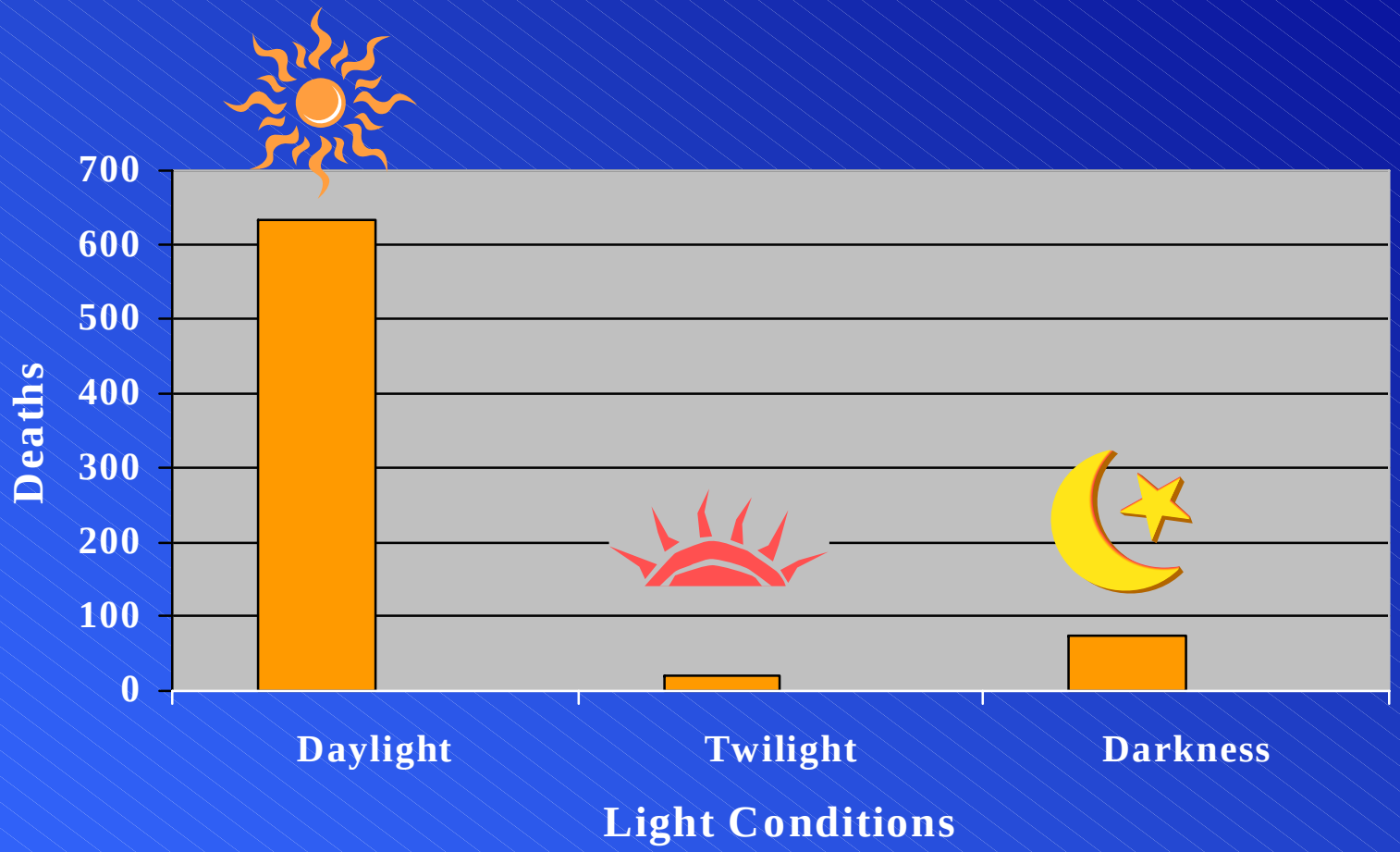
*Excludes 184 cases for which time of incident was not reported.

Source: Census of Fatal Occupational Injuries, special research file (excludes NYC)

CDC SAFER·HEALTHIER·PEOPLE

NIOSH

Worker Fatalities in Highway Work Zones, by Light Conditions, 1992-2000 (n=729*)

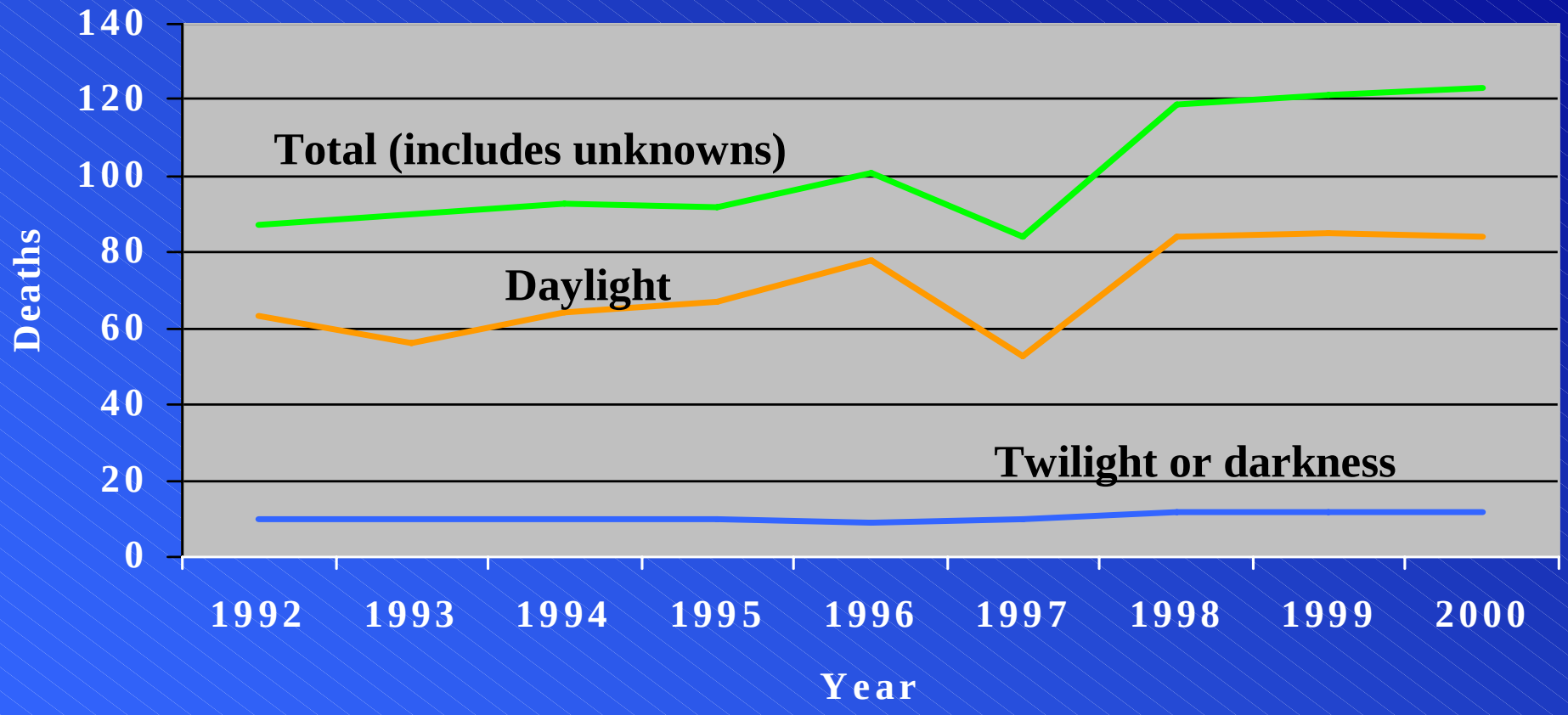


* Excludes 181 cases for which light conditions could not be determined.
Source: Census of Fatal Occupational Injuries, special research file (excl. NYC)

CDC SAFER·HEALTHIER·PEOPLE

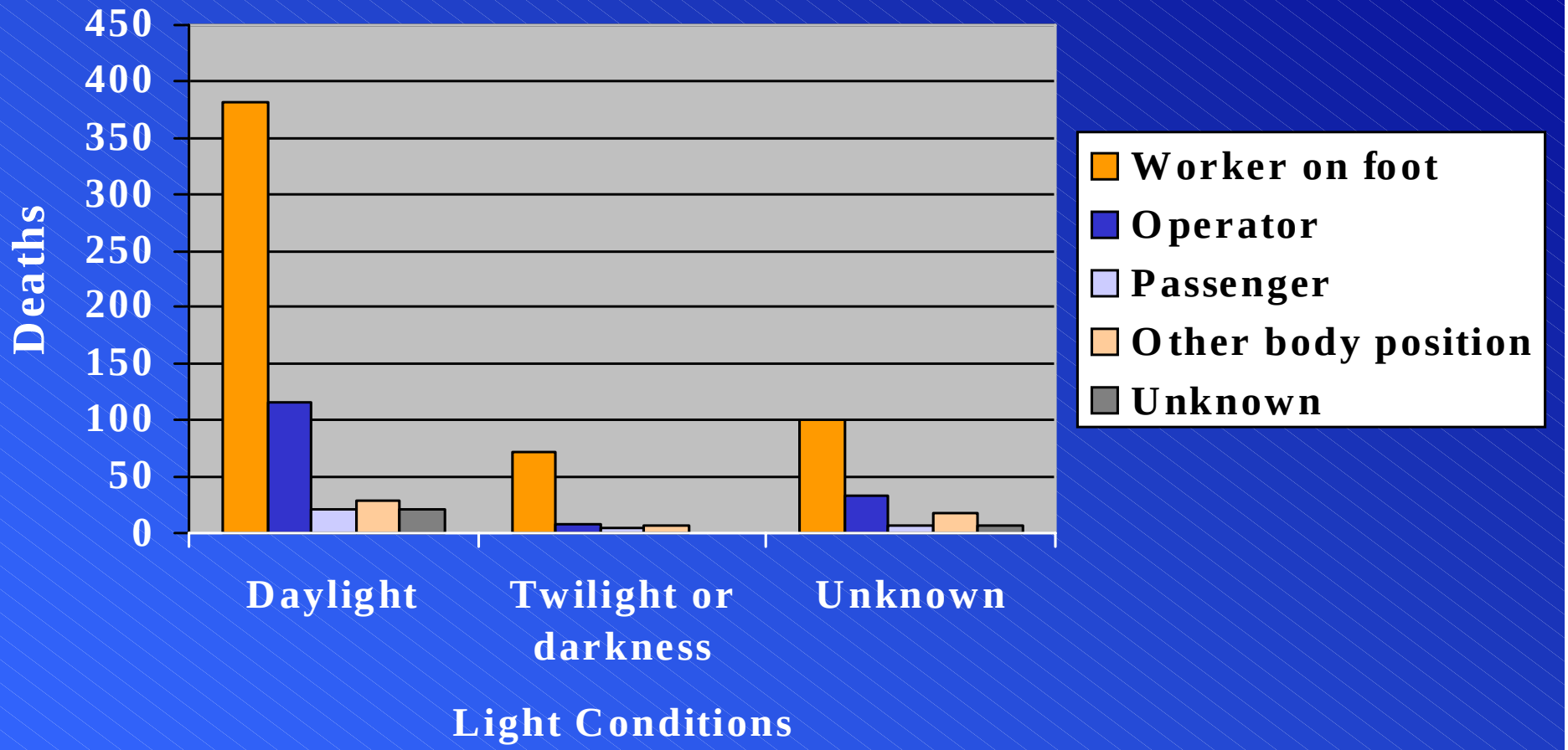
NIOSH

Worker Fatalities in Highway Work Zones, by Light Conditions and Year, 1992-2000 (n=910)



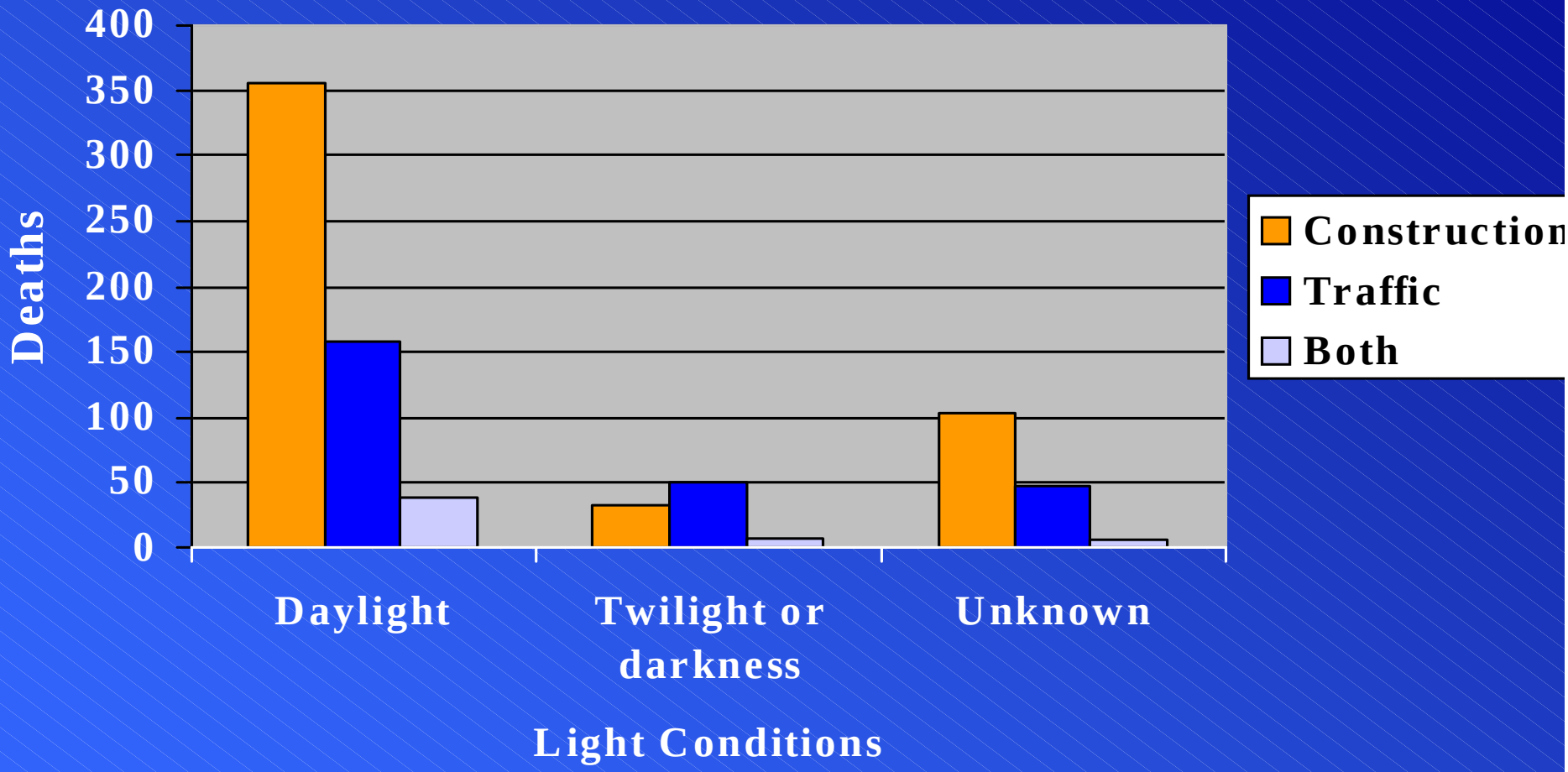
Source: Census of Fatal Occupational Injuries, special research file (excludes NYC)

Worker Fatalities in Highway Work Zones, by Light Conditions and Person Type, 1992-2000 (n=910)



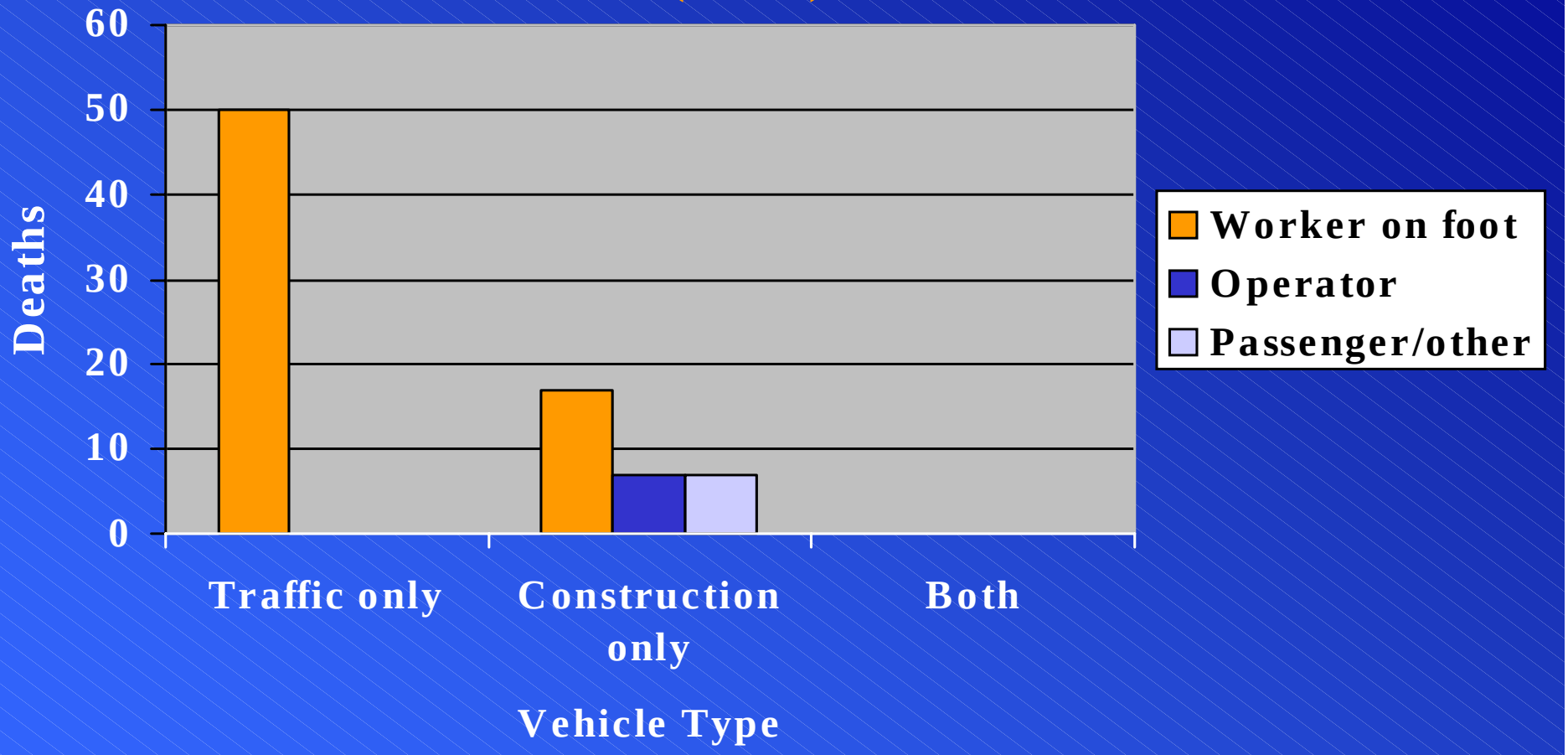
Source: Census of Fatal Occupational Injuries, special research file (excl. NYC)

Worker Fatalities in Highway Work Zones, by Light Conditions and Vehicle Type, 1992-2000 (n=910)



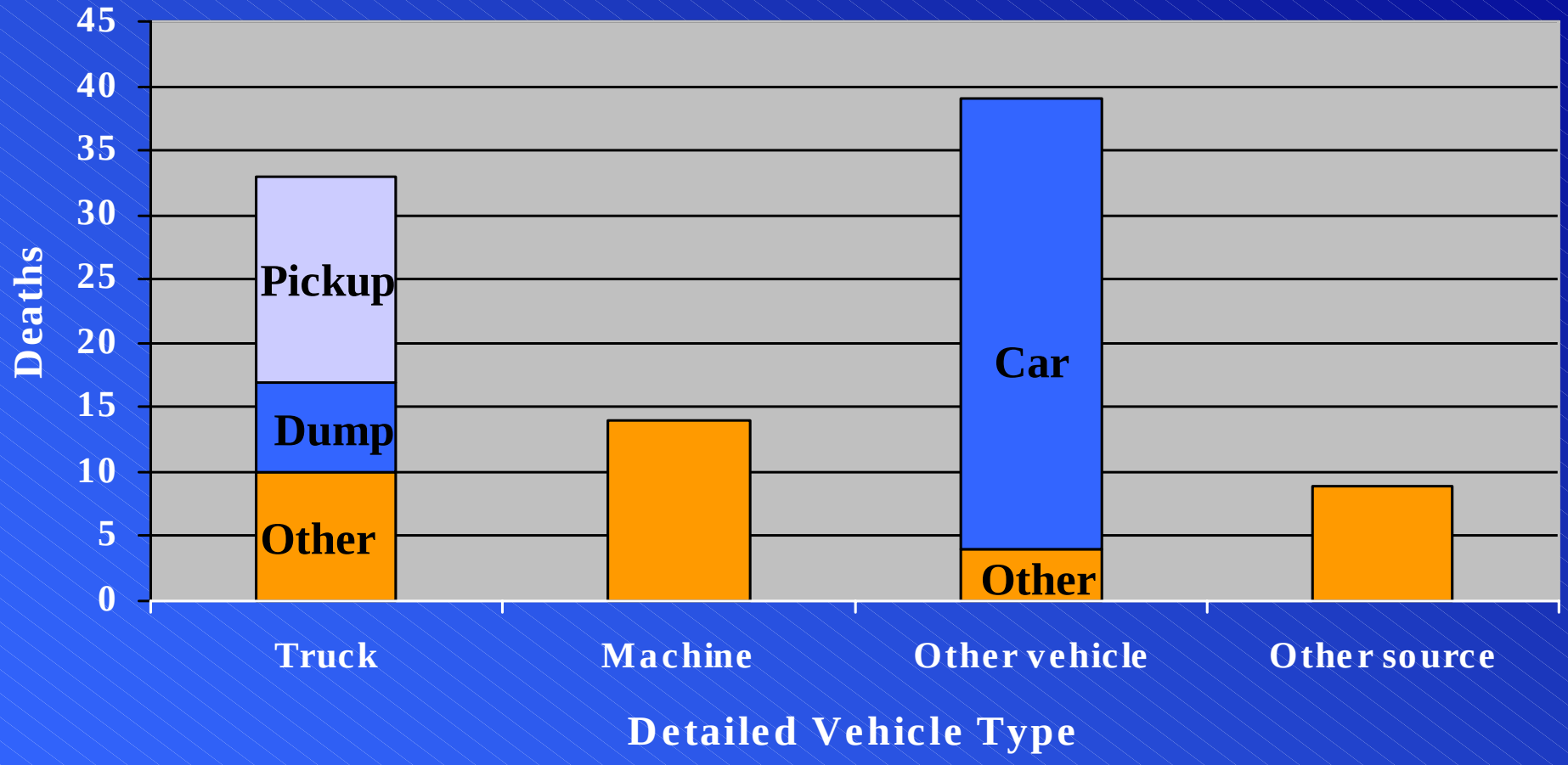
Source: Census of Fatal Occupational Injuries, special research file (excl. NYC)

Worker Fatalities in Work Zones During Twilight or Darkness, by Vehicle Type and Person Type, 1992-2000 (n=88)



Source: Census of Fatal Occupational Injuries, special research file (excludes NYC)

Worker Fatalities in Work Zones During Twilight or Darkness, by Detailed Vehicle Type, 1992-2000 (n=95)

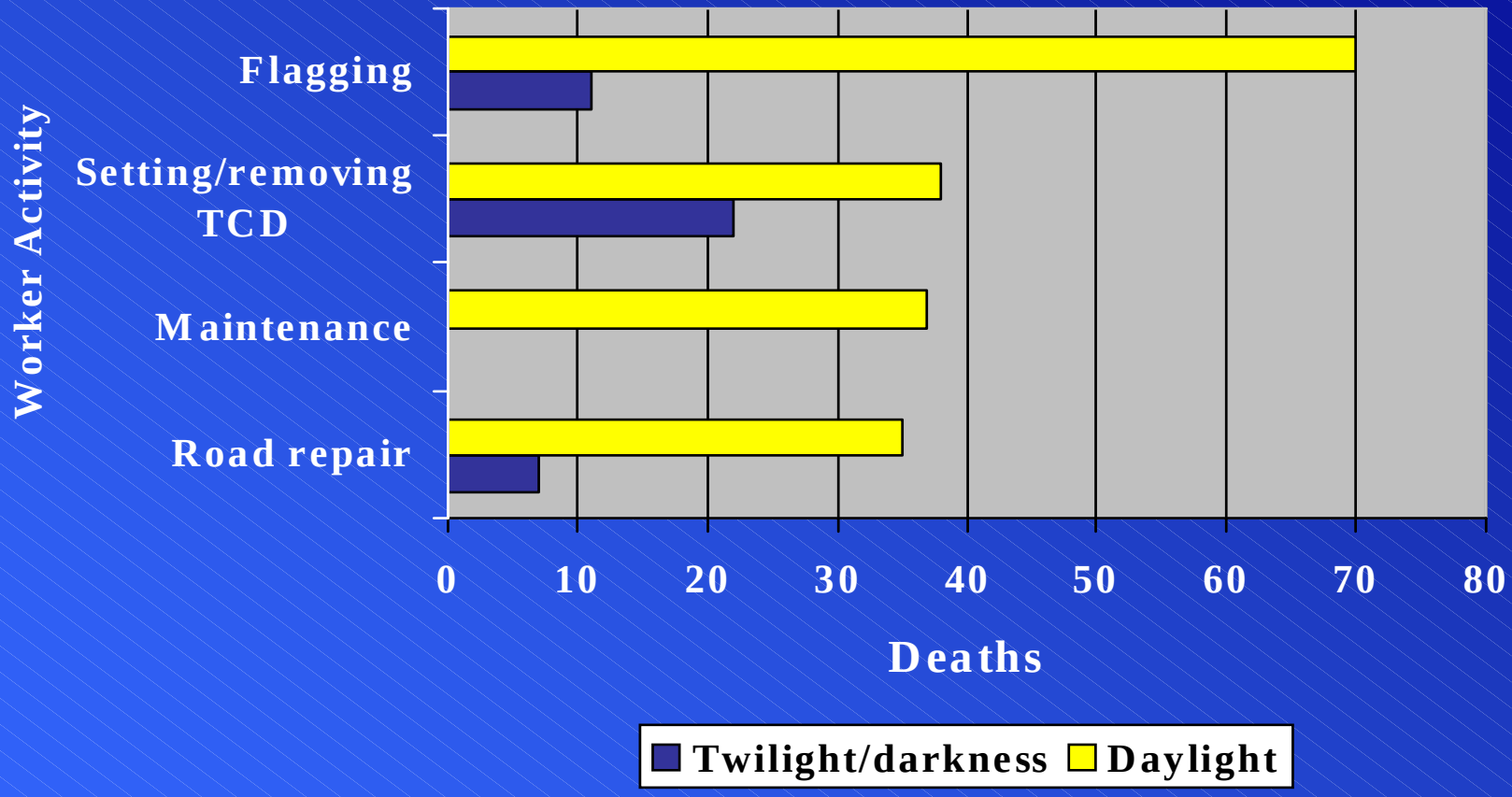


Source: Census of Fatal Occupational Injuries, special research file (excludes NYC)

CDC SAFER·HEALTHIER·PEOPLE

NIOSH

Worker Deaths in Work Zones by Activity -- Daylight vs. Twilight or Darkness

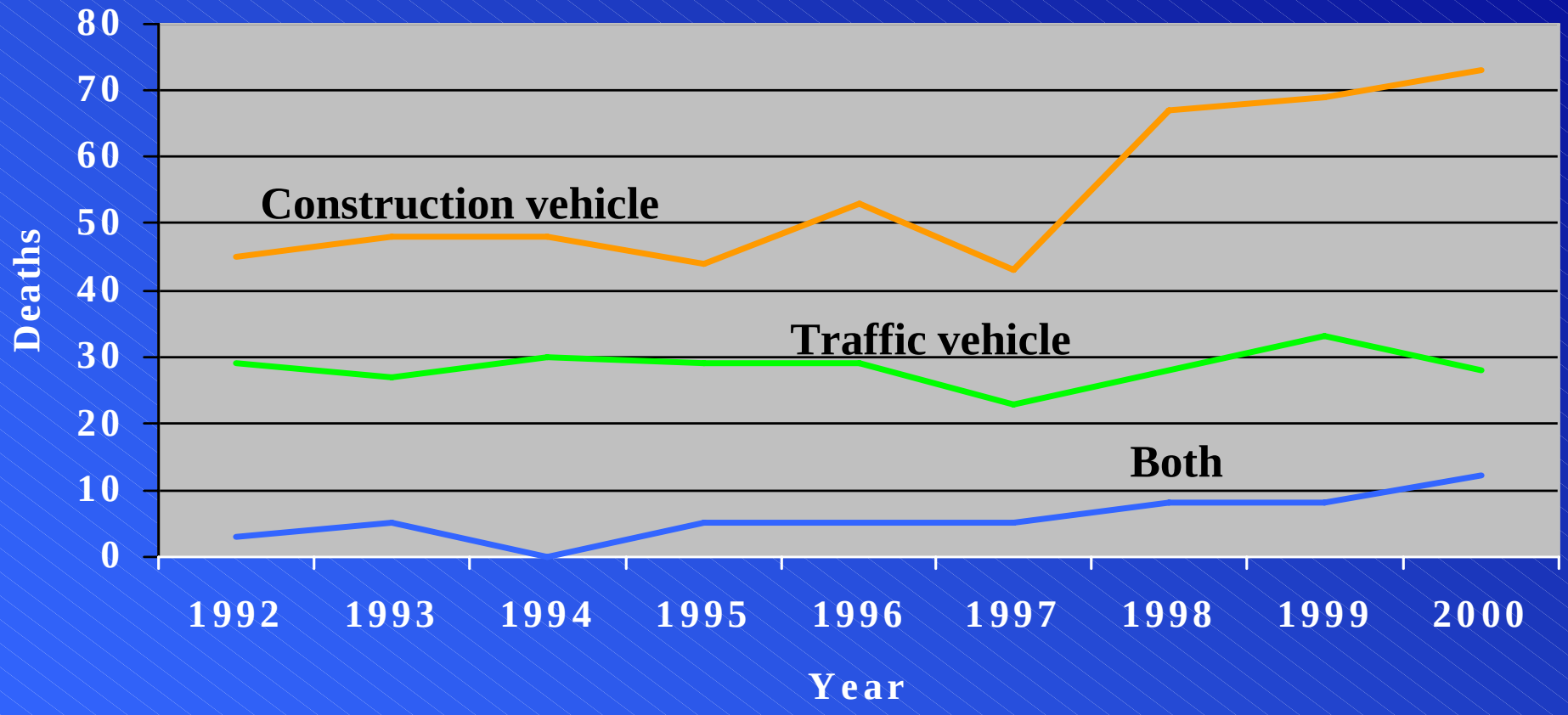


Source: Census of Fatal Occupational Injuries, special research file (excl. NYC)

Worker Deaths in Work Zones During Twilight and Darkness (n=95) What Factors Contributed?

- Traffic vehicle entered work area (37)
- Impaired driver (9)
- Worker stepped into path of traffic vehicle (7)
- Safety equipment not in use (7)
- Worker struck by machine part (5)
- Backing (5)

Worker Fatalities in Highway Work Zones, by Vehicle Type and Year, 1992-2000 (n=797)



Source: Census of Fatal Occupational Injuries, special research file (excludes NYC)

CDC SAFER·HEALTHIER·PEOPLE

NIOSH

Take-Home Messages

- Work at night is not responsible for the overall increase in worker deaths
- Planning for safe night operations should address both construction vehicles and traffic vehicles

Nighttime Safety Concerns

- Irresponsible driver behavior
- High speed
- Driver confusion
- Work space intrusions
- Poor visibility
- Irresponsible worker behavior

NCHRP 476

Guidelines for Design and Operation of Nighttime Traffic Control for Highway Maintenance and Construction

Guideline Goals

- Bridge gap – MUTCD and the needs for Night Work
- Provide operational guidance

Basis of Guidelines

- MUTCD
- Agency guidelines and experience
- Engineering principles
- Experience of researchers

Police Enforcement

ONE WAY
2 WATERVLIET
9 SARATOGA
9 ALBAN
VOLVO
STATE POLICE
Jeep
K-9 UNIT

EXIT
Port of
Albany
EXIT
SOUTH

EXIT 2
Port of
Albany

STATE LAW
FINES
DOUBLED FOR
SPEEDING
IN
WORK ZONES

Effective Driver Information

DETOUR
WEST
INTERSTATE
694

DETOUR
INTERSTATE
80
EAST

EXIT
EXIT
13 S

HOW WILL THIS PROJECT IMPACT TRAFFIC?

Traffic delays will be kept to a minimum, whenever possible, during the project. Most of the roadwork is scheduled to take place at night, when there is less traffic. Between May and early June, there will be three weekends when northbound Highway 99 will be reduced to two lanes at the Florin Road over crossing. The northbound Highway 99 off-ramp to westbound Florin Road and the eastbound Florin Road on-ramp to northbound Highway 99 will also be closed. These lane closures will begin Saturday evening at 6:00 p.m. and continue until Monday morning at 5:00 a.m. Caltrans' Highway Advisory Radio (530AM or 1610AM) will be activated and changeable message signs, which will be placed at key locations on the highway, will advise motorists of alternative routes and the expected time of delay.

WHY WORK ON THE WEEKEND?

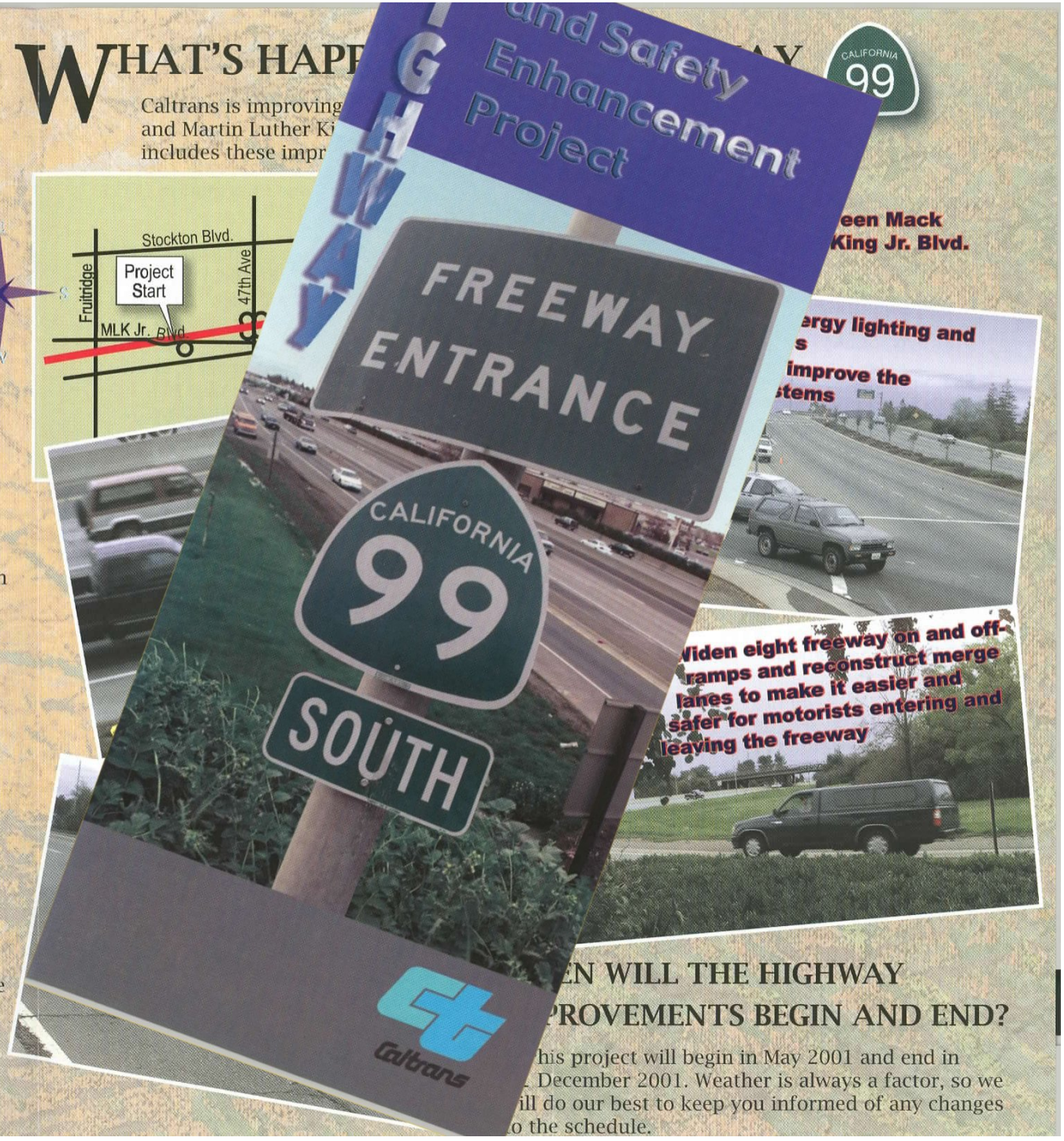
Traffic is lighter on the weekend. Caltrans and its contractors will be able to operate more efficiently and get the job done quicker by working continuously on the weekends. *These methods will:*

- Minimize the impact on traffic
- Cost less

If we did not work continuously on the three weekends previously mentioned, this project would take longer, cost more and the quality of the work would suffer. Work crews would have to set up and take down their equipment each night, leaving only a couple of hours to actually work on the project.

WHAT'S HAPP

Caltrans is improving
and Martin Luther Ki
includes these impr



EN WILL THE HIGHWAY PROVEMENTS BEGIN AND END?

his project will begin in May 2001 and end in December 2001. Weather is always a factor, so we ill do our best to keep you informed of any changes o the schedule.

Channelizing and Guiding Devices

- Channelizing device types
- Device spacing
- Retroreflectivity
- Condition
- Impact performance and ballast
- Warning lights
- Pavement markings
- Delineation

ROAD
CLOSED

SPEED
ZONE
AHEAD
9
TO
90

9
SARATOGA
ACURA

Other Traffic Control Devices and Safety Features

- Changeable message signs
- Flashing arrow panels
- Temporary signals
- Rumble strips
- Crash cushion
- Shadow vehicles with TMA
- Traffic barriers
- Arrestor nets and intrusion alarms

NIGHT
WORK
SUN
MARKET
STOP

GREENBK
AND
SUNRISE
STOP

EXPECT
5 MIN.
DELAYS
STOP

LANE
CLOSED
WET
PAINT
TRAFCON
Accent
Stripe
Inc.
Orchard Park, N.Y.
Baltimore, Md.

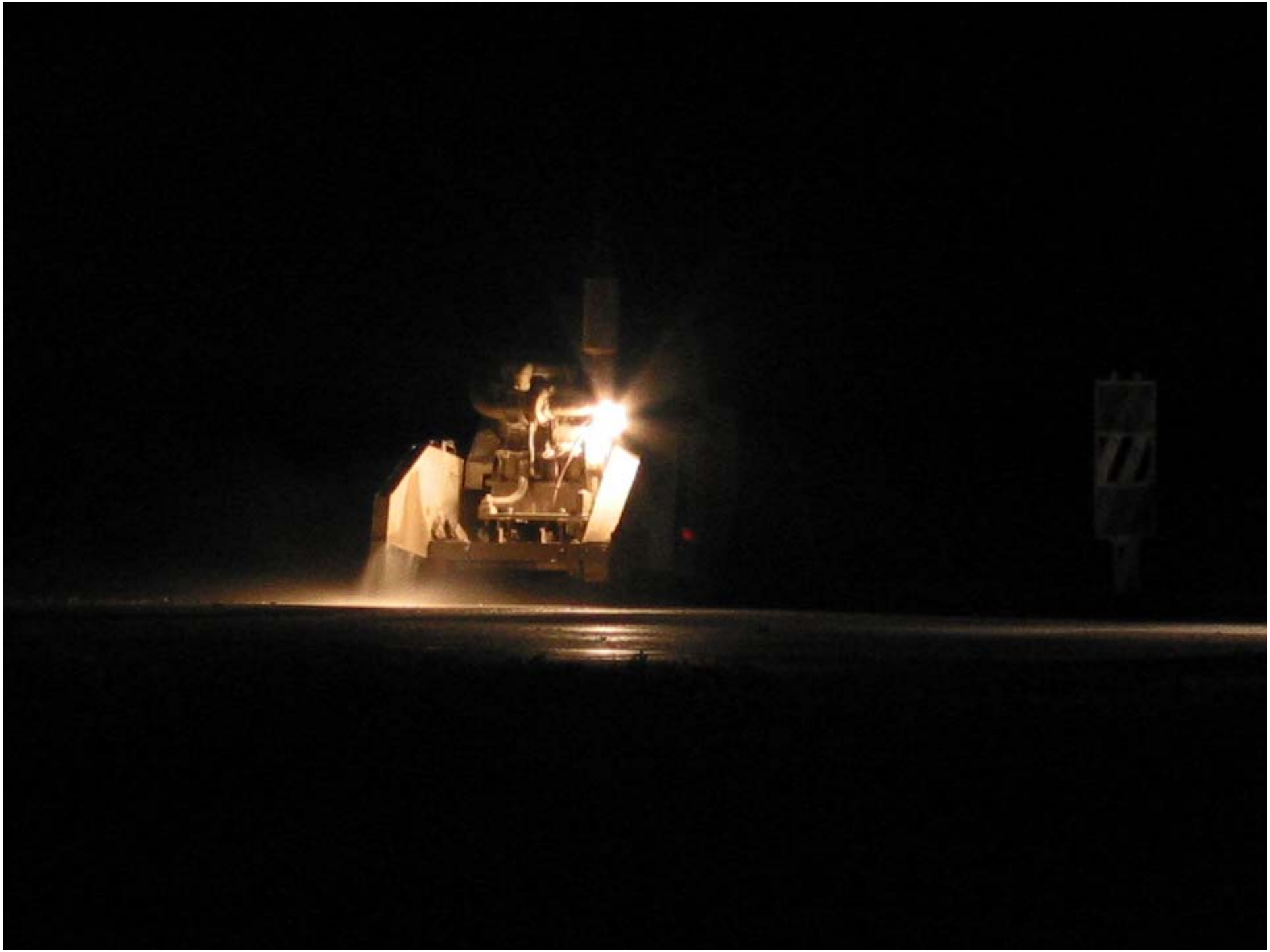
HIGH
VOLTAGE

LANE
CLOSED
WET
PAINT
TRAFCON
Accent
Stripe
Inc.
Orchard Park, N.Y.
Baltimore, Md.

Lighting Requirements

- Illumination requirements by task
- Illumination criteria
- Paving and milling operations
- Uniformity and glare
- Equipment and systems
- Lighting plan

DOHRN



SLOW

TEXACO

amida
AL4000

amida
AL4000
amida

VOLVO
amida

High Visibility Apparel

ONE WAY
SPEED LIMIT 35
amida
amida
AL4000

Overview of Night work Concerns

- Night work entails additional risks
- Night work can be safe for workers and travelers
- Enhanced traffic controls reduce risks
- Planning is critical for safe, efficient operations

Key References for Night Work

- MUTCD Part 6
- NCHRP Report 475 - Procedure
- NCHRP Report 476 - Guidelines
- NCHRP Res. Results Digest 216 - Lighting

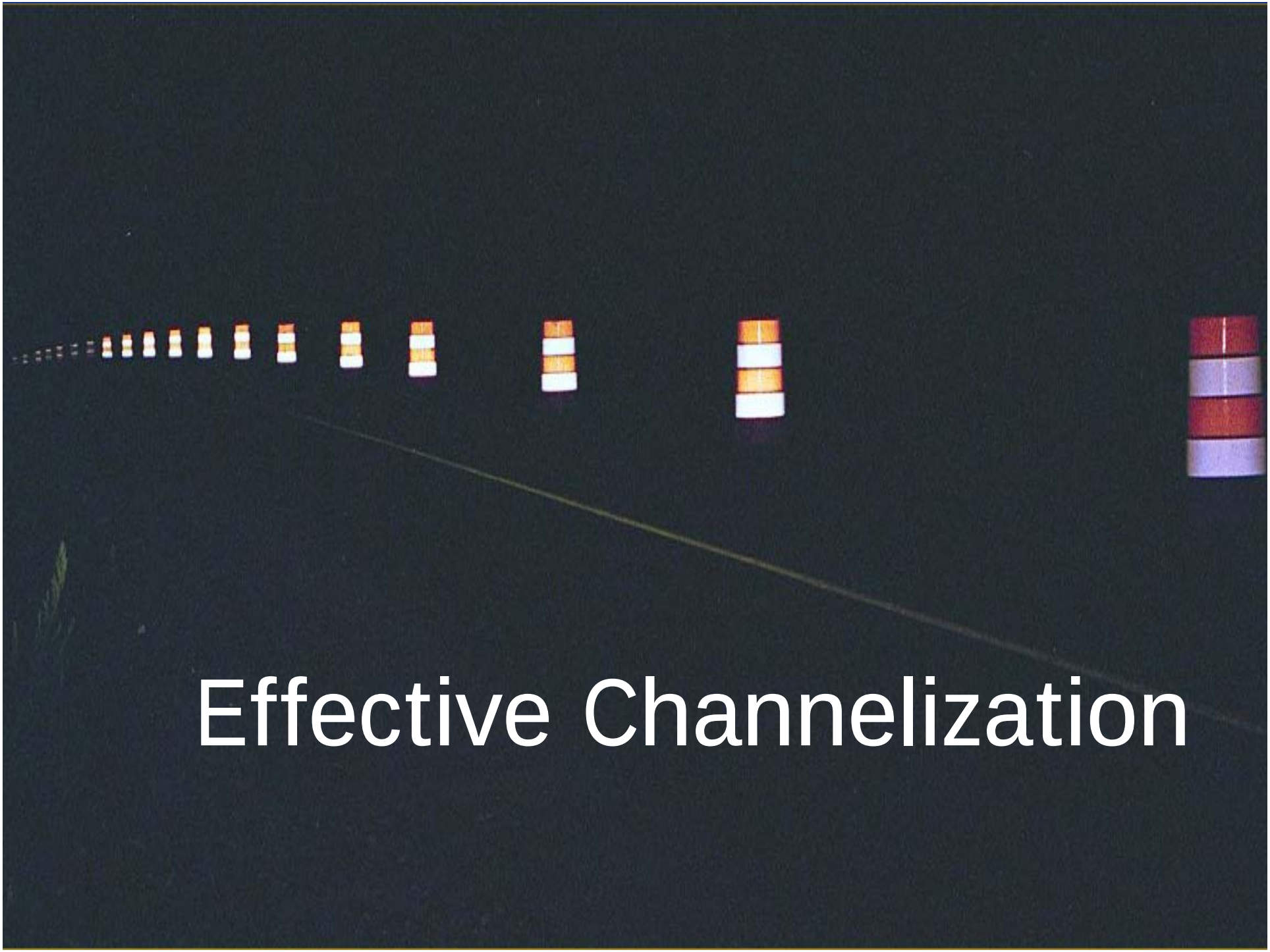
www.trb.org

http://mutcd.fhwa.dot.gov

Take Home Messages
For
Safe Night Work

Adequate Enforcement

Clear Driver Guidance


Effective Channelization

Worker Safety Features

High Visibility Apparel

Effective
Lighting