

# The Role of IVI in Highway Safety

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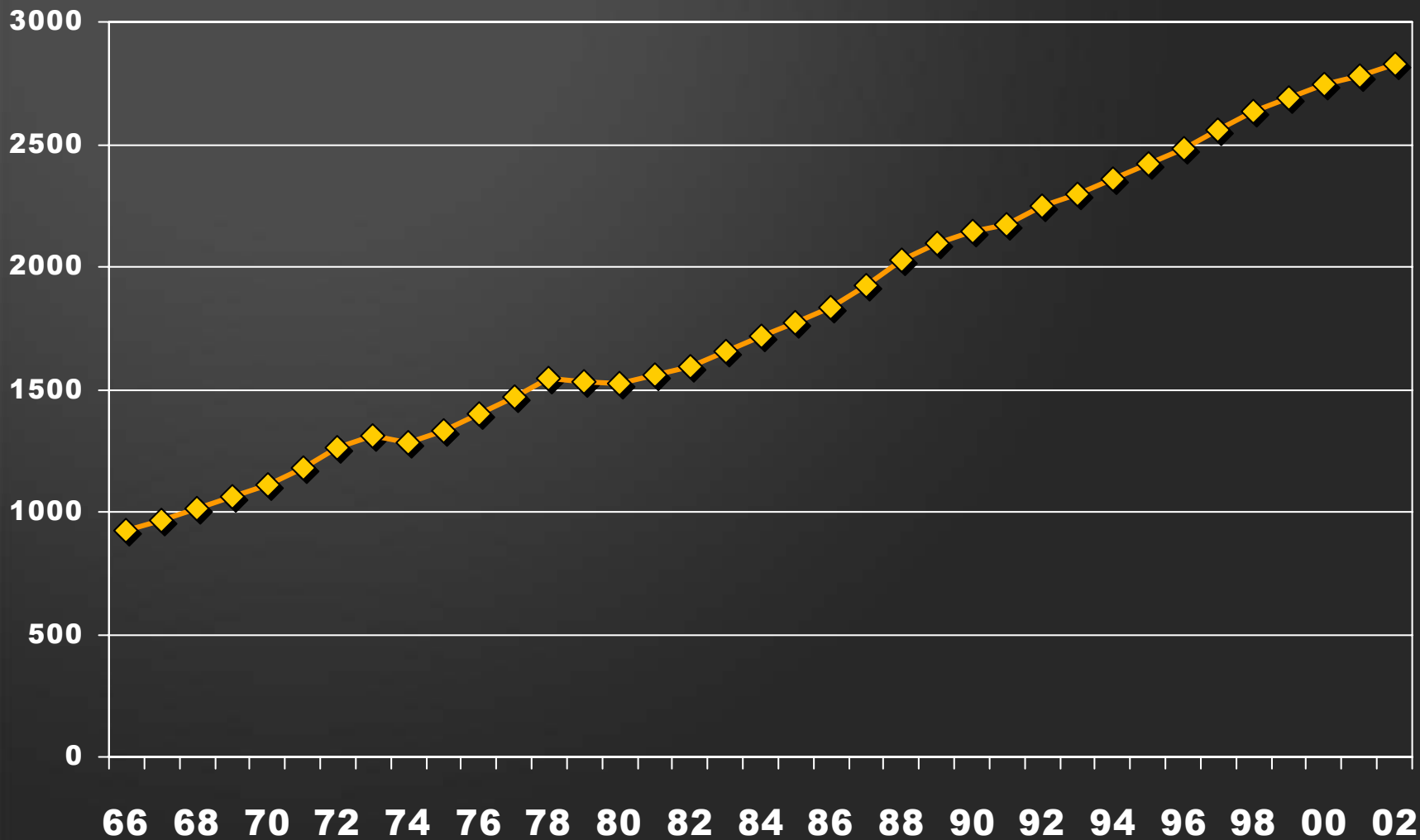
# Persons Killed and Injured In Traffic Crashes

	Year		% Change
	2001	2002	
Persons Killed	42,116	42,850	+1.7%
Persons Injured	3,033,000	2,914,000	-3.9%

Source: FARS, NASS GES

# Vehicle Miles Traveled, 1966 – 2002

(in Billions)



Source: FHWA

## 10 Leading Causes of Death, United States 2000, All Races, Both Sexes

Rank	Age Groups										All Ages
	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	
1	Congenital Anomalies 5,743	Unintentional Injury <u>1,826</u>	Unintentional Injury <u>1,391</u>	Unintentional Injury <u>1,588</u>	Unintentional Injury <u>14,113</u>	Unintentional Injury <u>11,769</u>	Malignant Neoplasms 16,520	Malignant Neoplasms 48,034	Malignant Neoplasms 89,005	Heart Disease 593,707	Heart Disease 710,760
2	Short Gestation 4,397	Congenital Anomalies 495	Malignant Neoplasms 489	Malignant Neoplasms 525	Homicide <u>4,939</u>	Suicide <u>4,792</u>	Unintentional Injury <u>15,413</u>	Heart Disease 35,480	Heart Disease 63,399	Malignant Neoplasms 392,366	Malignant Neoplasms 553,091
3	SIDS 2,523	Malignant Neoplasms 420	Congenital Anomalies 198	Suicide <u>300</u>	Suicide <u>3,994</u>	Homicide <u>4,164</u>	Heart Disease 13,181	Unintentional Injury <u>12,278</u>	Chronic Low. Respiratory Disease 10,739	Cerebrovascular 148,045	Cerebrovascular 167,661
4	Maternal Pregnancy Comp. 1,404	Homicide <u>356</u>	Homicide <u>140</u>	Homicide <u>231</u>	Malignant Neoplasms 1,713	Malignant Neoplasms 3,916	Suicide <u>6,562</u>	Liver Disease 6,654	Cerebrovascular 9,956	Chronic Low. Respiratory Disease 106,375	Chronic Low. Respiratory Disease 122,009
5	Placenta Cord Membranes 1,062	Heart Disease 181	Heart Disease 106	Congenital Anomalies 201	Heart Disease 1,031	Heart Disease 2,958	HIV 5,919	Cerebrovascular 6,011	Diabetes Mellitus 9,186	Influenza & Pneumonia 58,557	Unintentional Injury <u>97,900</u>
6	Respiratory Distress 999	Influenza & Pneumonia 103	Benign Neoplasms 62	Heart Disease 165	Congenital Anomalies 441	HIV 2,437	Liver Disease 3,371	Suicide <u>5,437</u>	Unintentional Injury <u>7,505</u>	Diabetes Mellitus 52,414	Diabetes Mellitus 69,301
7	Unintentional Injury <u>881</u>	Septicemia 99	Chronic Low. Respiratory Disease 48	Chronic Low. Respiratory Disease 91	Cerebrovascular 199	Diabetes Mellitus 623	Homicide <u>3,219</u>	Diabetes Mellitus 4,954	Liver Disease 5,774	Alzheimer's Disease 48,993	Influenza & Pneumonia 65,313
8	Bacterial Sepsis 768	Perinatal Period 79	Influenza & Pneumonia 47	Cerebrovascular 51	Chronic Low. Respiratory Disease 190	Cerebrovascular 602	Cerebrovascular 2,599	HIV 4,142	Nephritis 3,100	Nephritis 31,225	Alzheimer's Disease 49,558
9	Circulatory System Disease 663	Benign Neoplasms 53	Septicemia 38	Influenza & Pneumonia 40	Influenza & Pneumonia 189	Congenital Anomalies 477	Diabetes Mellitus 1,926	Chronic Low. Respiratory Disease 3,251	Suicide <u>2,945</u>	Unintentional Injury <u>31,051</u>	Nephritis 37,251
10	Intrauterine Hypoxia 630	Chronic Low. Respiratory Disease 51	Two Tied 25	Benign Neoplasms 37	HIV 179	Liver Disease 415	Influenza & Pneumonia 1,068	Viral Hepatitis 1,894	Septicemia 2,899	Septicemia 24,786	Septicemia 31,224

# Cost of Motor Vehicle Crashes - 2000



- Total annual cost - **\$230.6 billion**
- Highlights
  - Non use of belts - \$20 billion
  - Impaired driving - \$51 billion
  - Speeding - \$40 billion

# 1.0 Fatalities

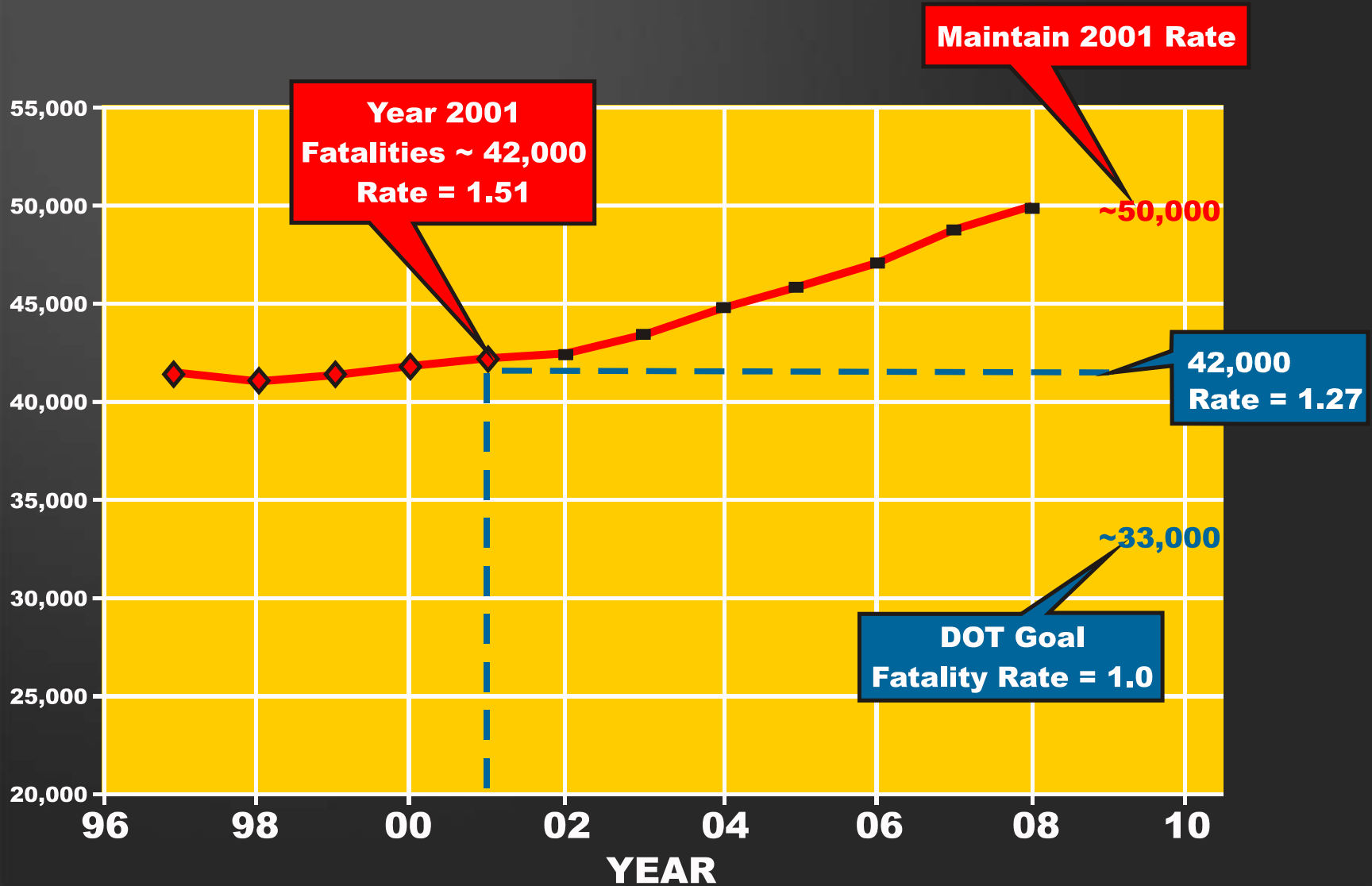
per 100M VMT by 2008



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# 2008 Goal Is Challenging

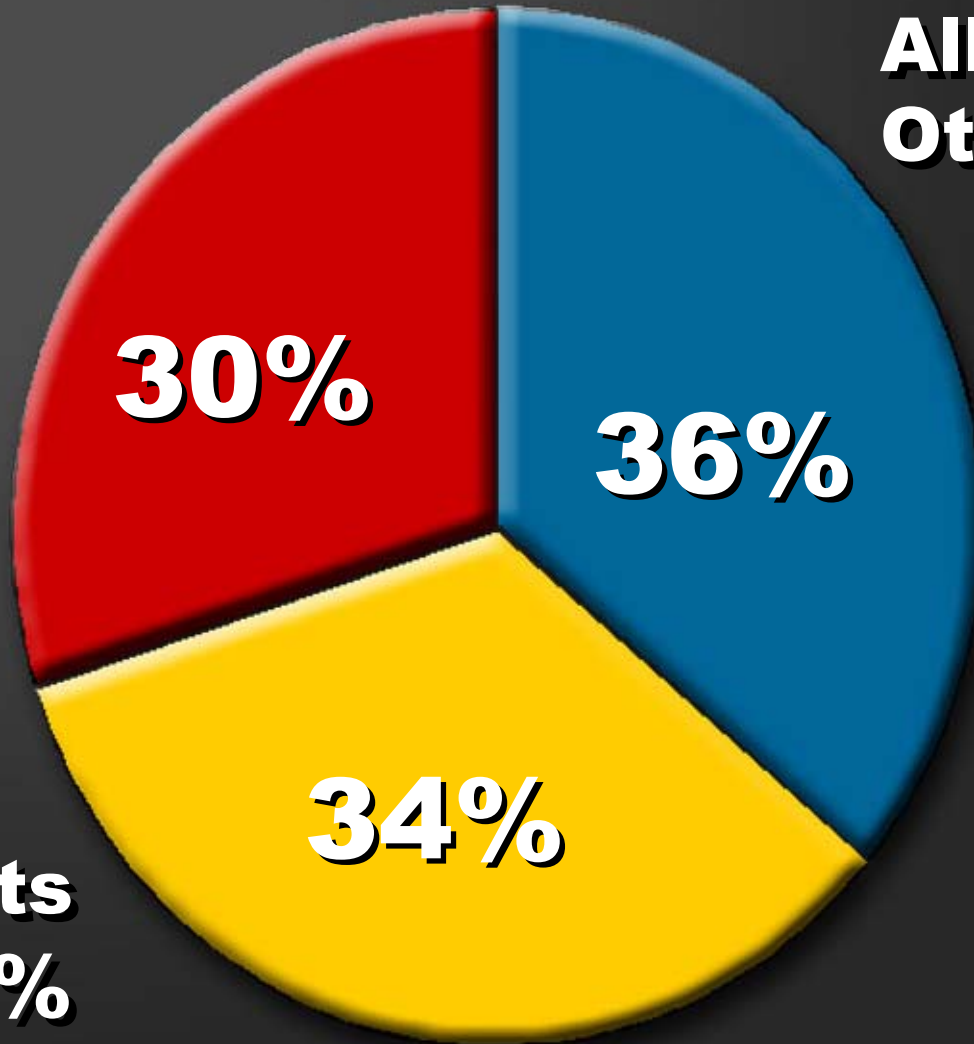




# Predicted Lives Saved by Countermeasure

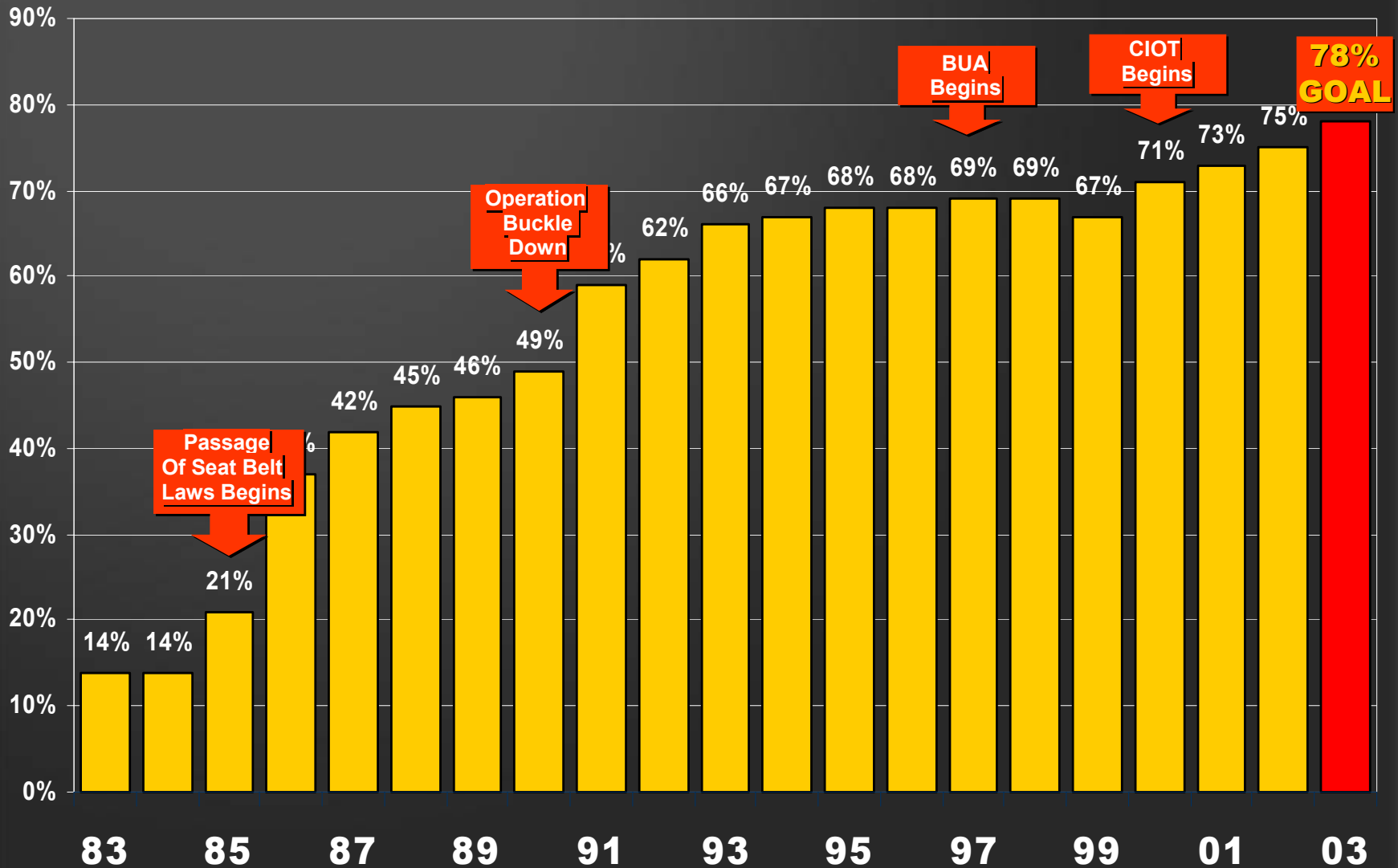
**Impaired Driving**  
[Reduce a/r rate to  
.44 per 100M VMT  
(2000 baseline of .61)]

**Safety Belts  
at 90%**



**All Other**

# Safety Belt Use Rates - 1983-2003

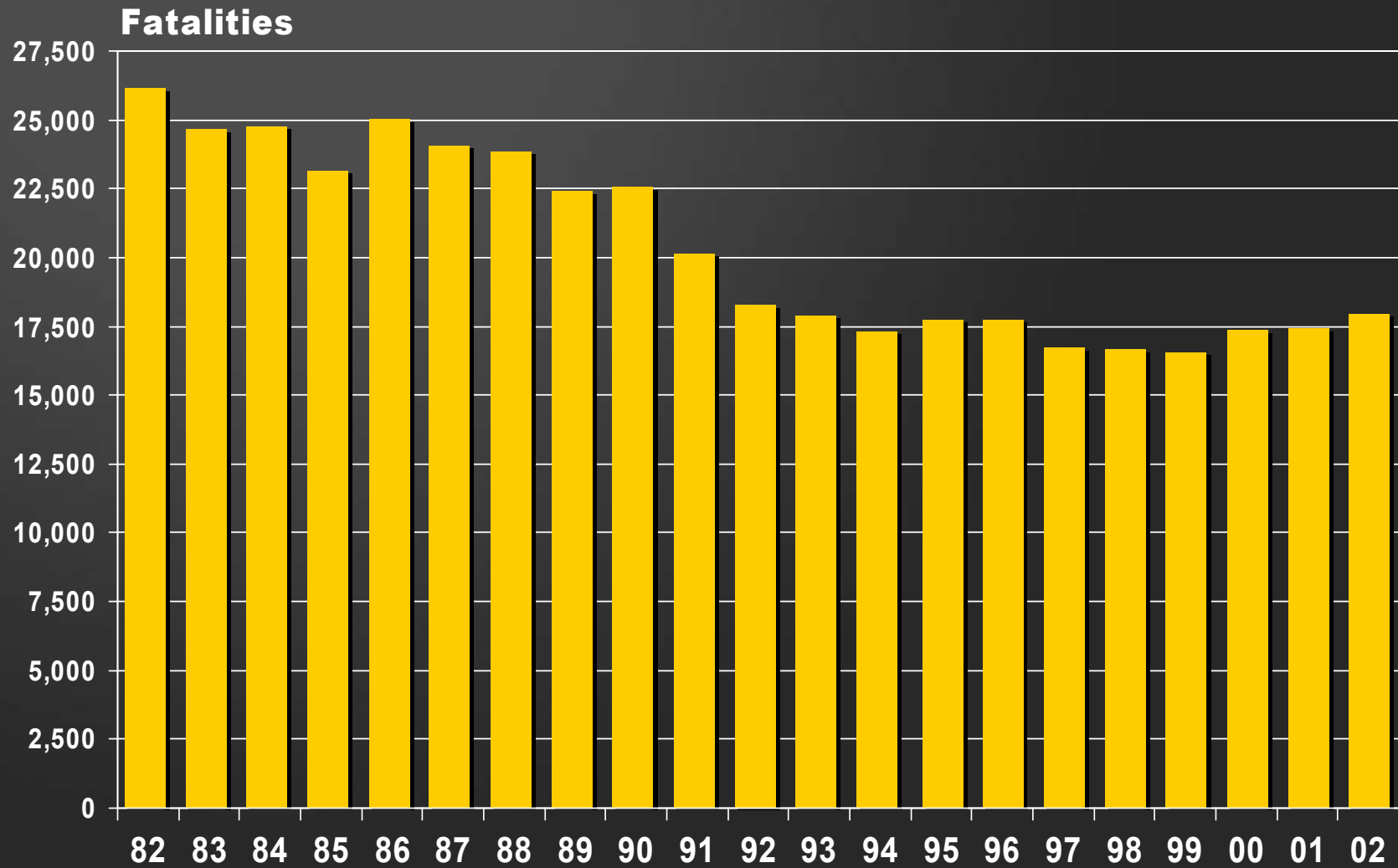


# Safety Belt Benefits

- **For each 1% increase in belt use**
  - **2.8 million more people buckling up**
  - **250 lives saved**
  - **\$800 million cost saved**
  - **Reduce severity of 4,400 moderate-to-critical injuries**



# Alcohol-Related Fatalities Trend



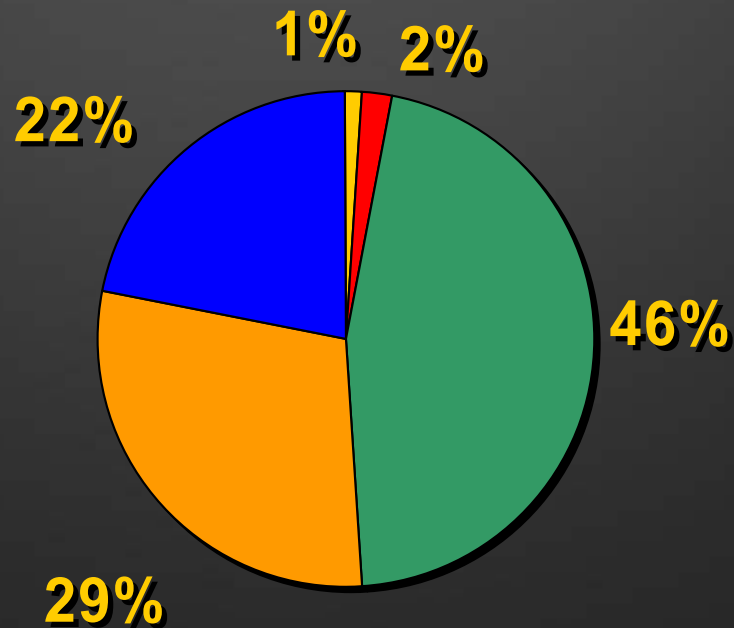
# Alcohol-Related Fatalities in the United States

	Year		%
	2001	2002	Change
Total Deaths	17,448	17,970	+3.0%
Fatality Rate Per 100M VMT	0.63	0.64	

# Vehicles and Fatalities by Collision Type 2002

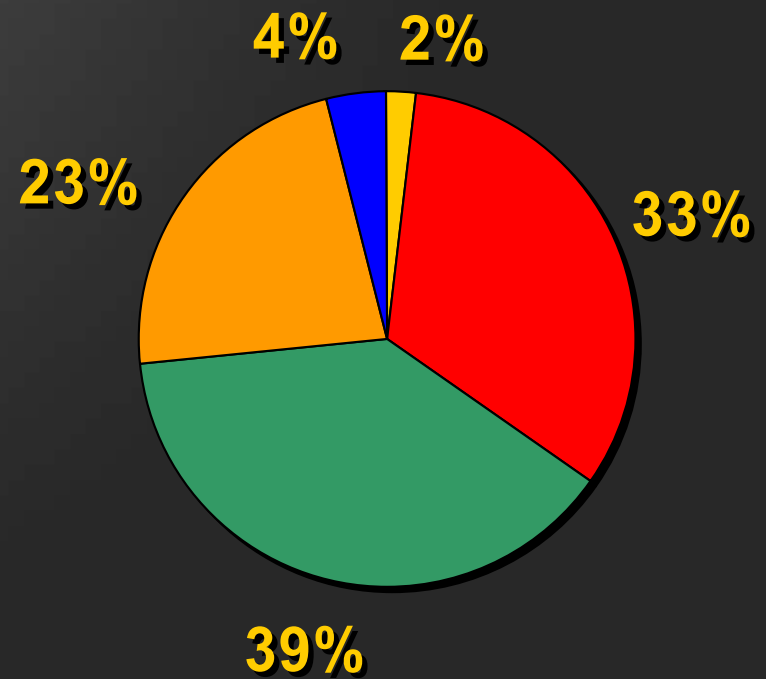
## Passenger Vehicles in Crashes

Approx. 10.6 million vehicles involved



## Passenger Vehicle Occupant Fatalities

32,335 total occupants killed



■ Rollover ■ Front ■ Side ■ Rear ■ Other

# Reauthorization: ***SAFETEA***

**S**afe

**A**ccountable

**F**lexible and

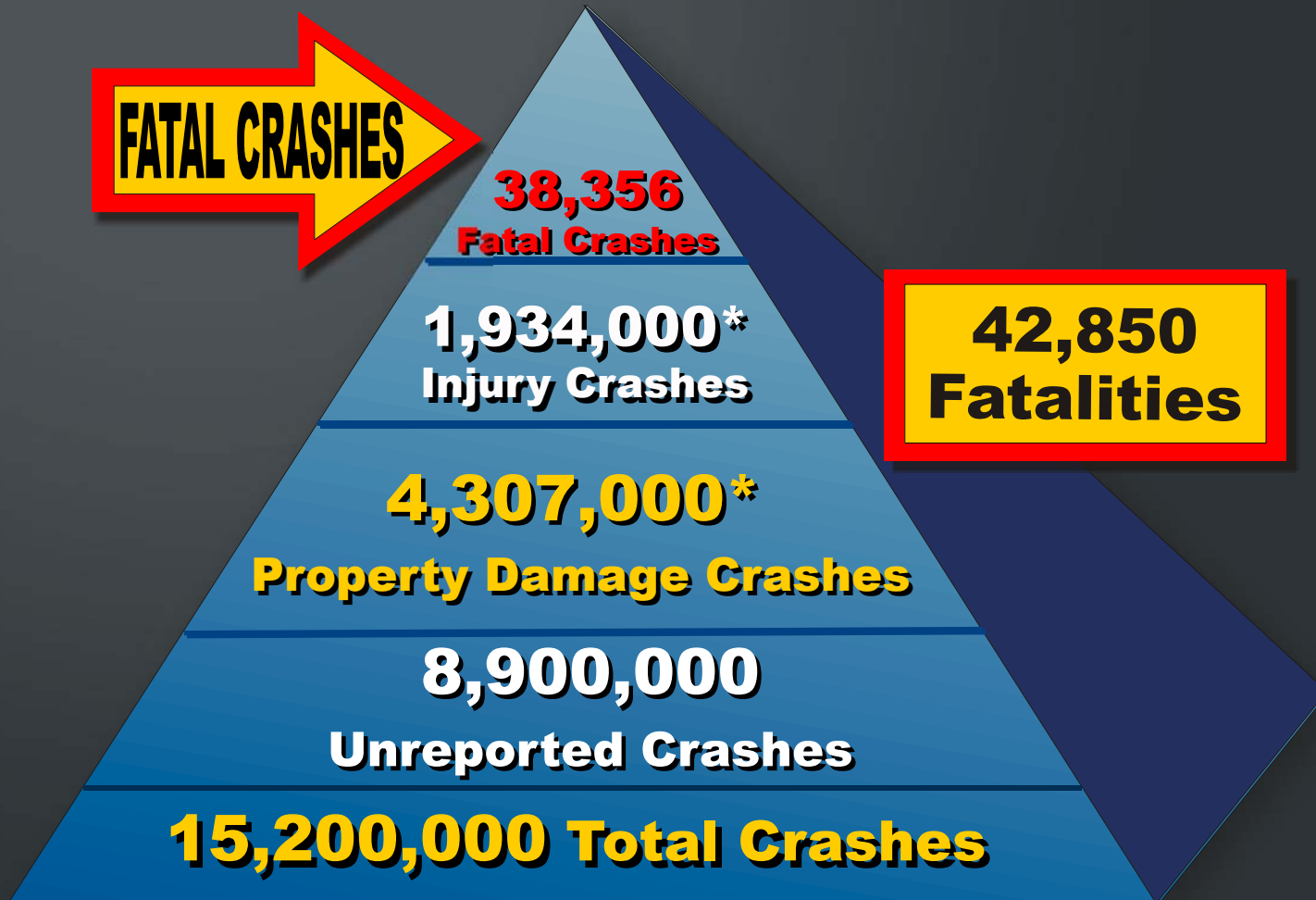
**E**fficient

**T**ransportation

**E**quity

**A**ct of 2003

# The Crash Epidemic 2002



\*Police-Reported



# Haddon Matrix

**Human**

**Vehicle**

**Environment**

**Pre-Event**



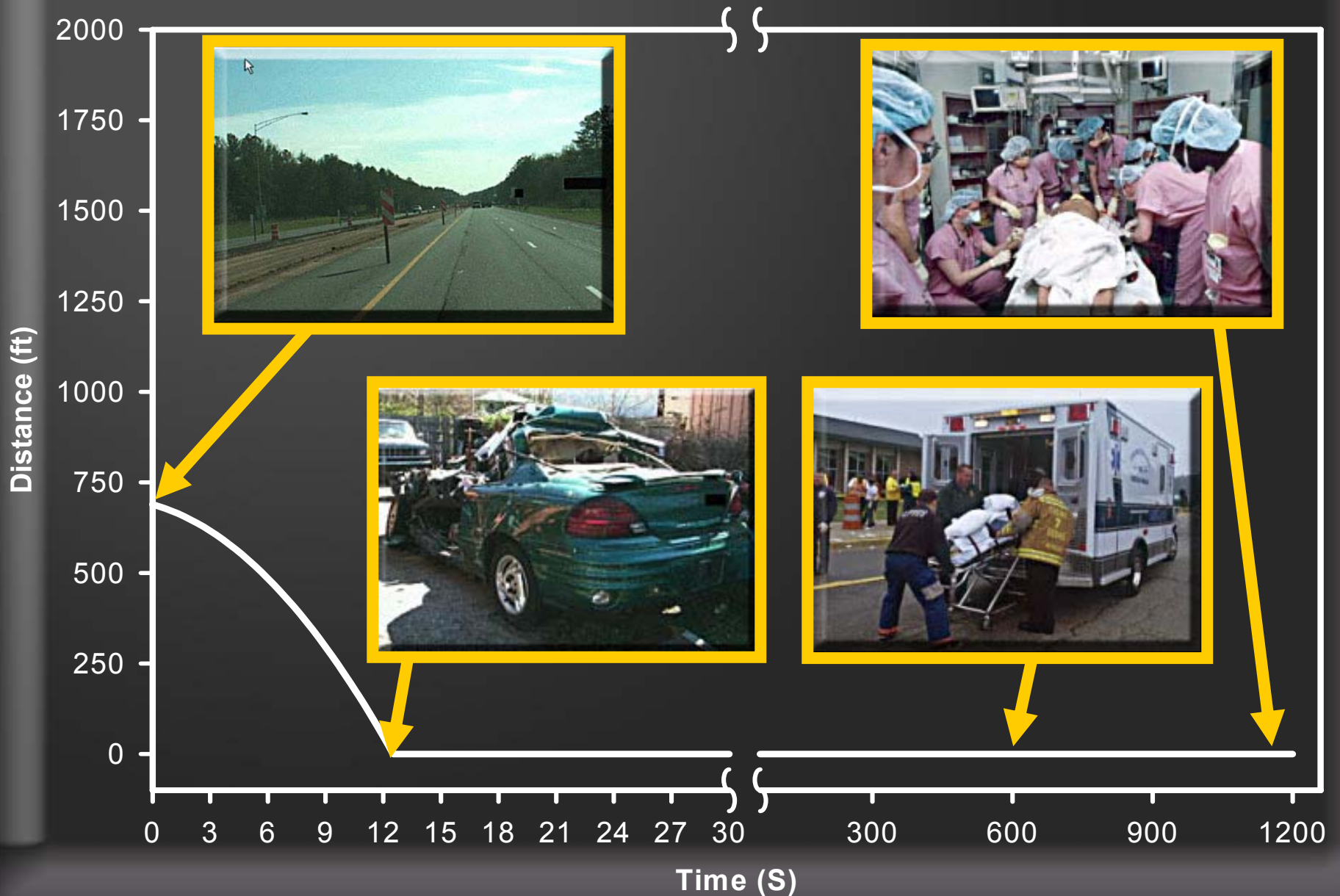
**Event**



**Post-Event**



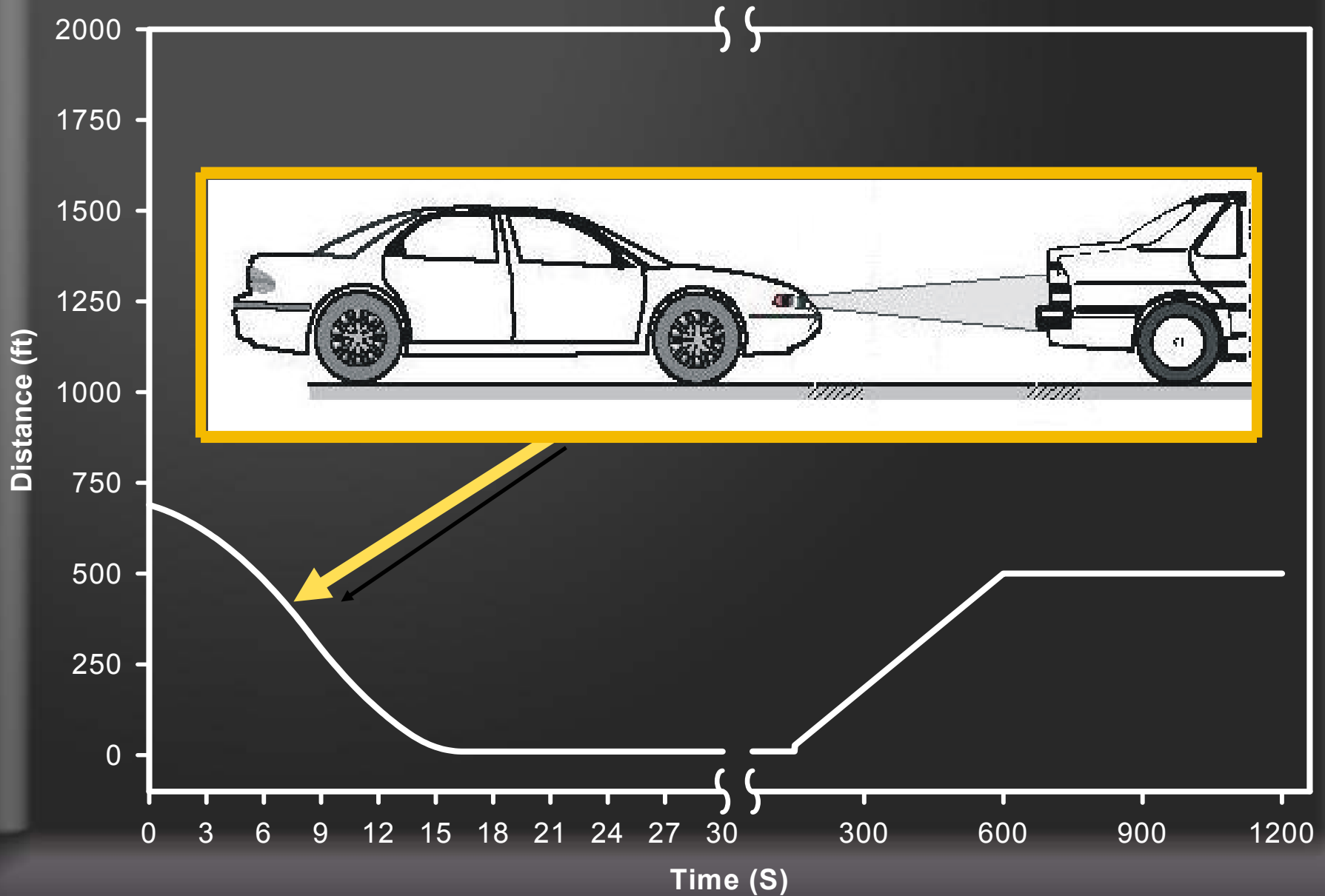
# Timeline for a Deadly Crash



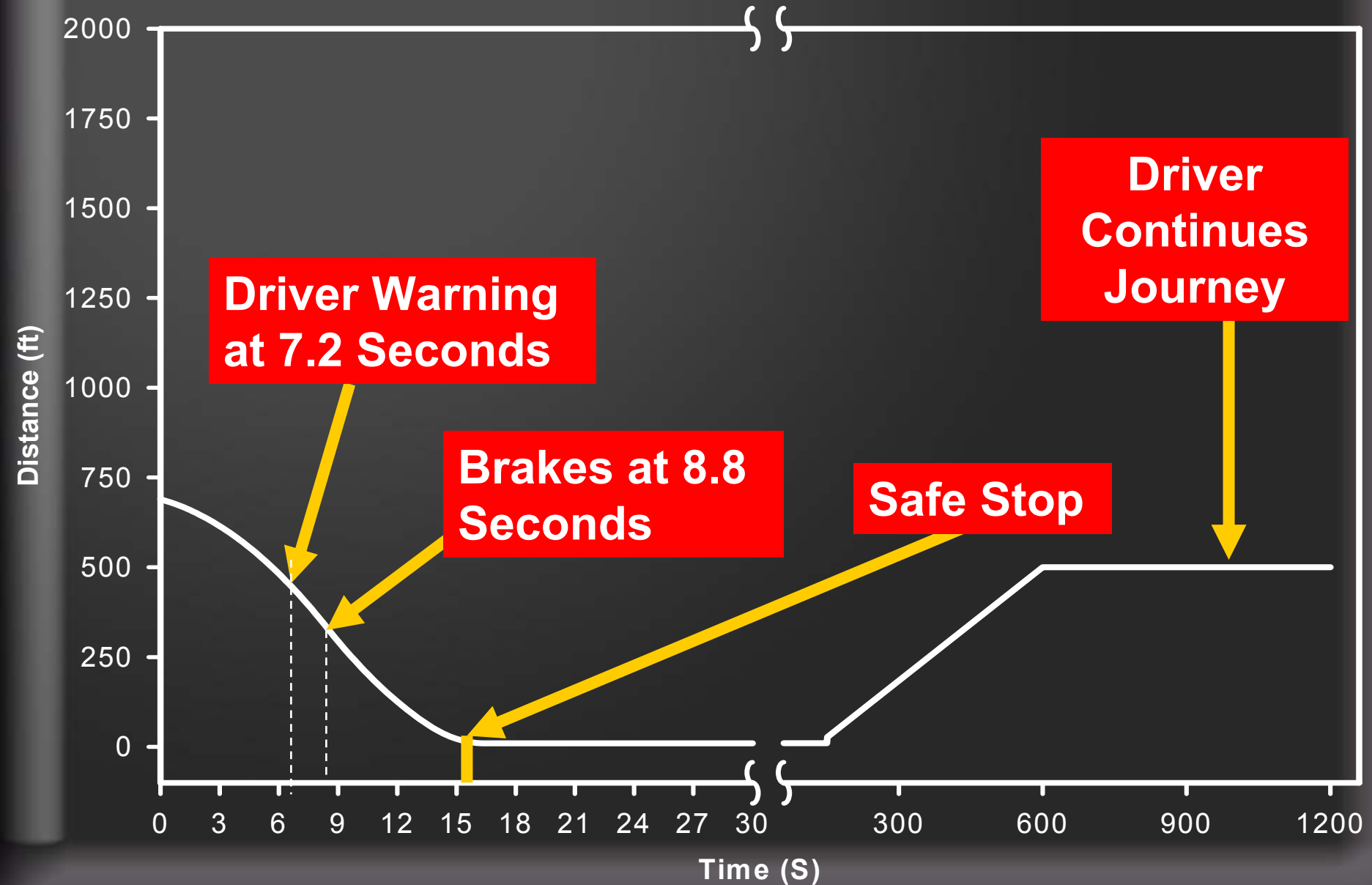
# Rear End Collisions

- **Adaptive cruise control**
- **Rear-end crash warning**
- **Distraction mitigation**
- **Driver drowsiness mitigation**
- **Millimeter-wave microwave radar**
- **Head-up displays**

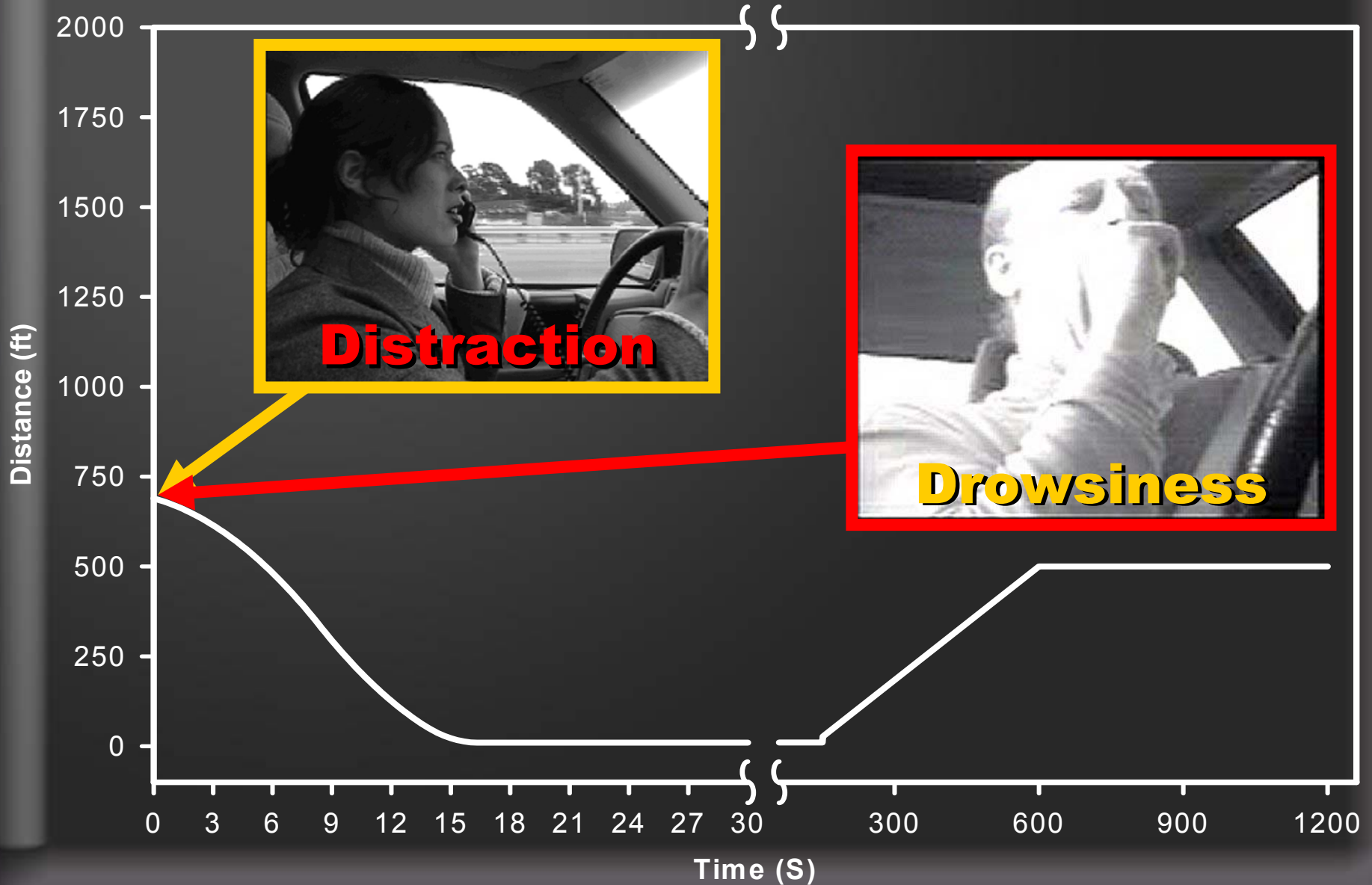
# Adaptive Cruise Control



# Crash Warning Systems



# Distraction and Drowsiness



# Road-Departure Crashes

- **Road-departure crash warning**
- **Distraction mitigation**
- **Driver drowsiness mitigation**
- **Cameras with image processing and lane prediction capability**
- **Haptic driver warning cues**

# **Intersection Collisions**

- **Stop sign violations**
- **Left-turn-across-path crashes**
- **Crossing-path crashes**
- **Global positioning systems**
- **Cooperative communication links with infrastructure data sources**



# Timeline for a Deadly Crash

