

# **INDUSTRIAL LOADER AND FORKLIFT FIRES**

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## **Abstract**

NFPA estimates that in 2003-2006, U.S. fire departments responded to an estimated total of 1,340 structure and vehicle fires per year in which industrial loaders or forklifts were directly involved in ignition. These fires caused an estimated average of 22 civilian injuries, and \$36 million in direct property damage per year. Ninety-one percent of the fires were coded as vehicle fires. These vehicle fires occurred in a wide variety of properties. Almost two-thirds of these fires originated in the vehicle's engine area running gear or wheel area. These estimates are based on data from Version 5.0 of the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA's) annual fire department experience survey.

Previously published incident descriptions are included to better illustrate how these fires can happen.

Keywords: Forklift, industrial loader, fire statistics

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We are also grateful to the U.S. Fire Administration for its work in developing, coordinating, and maintaining NFIRS.

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## Executive Summary

Industrial loaders, forklifts, and related material-handling vehicles are used in a wide variety of settings, including construction sites, industrial yards, manufacturing, and storage properties. Because these vehicles carry materials to and from storage, a fire involving such a vehicle can also be spread along the same path. Even properly operating material handling equipment can be a heat source if flammable liquids or gases leaked or spilled.

- In December 1997, a propane fueled fork lift was turned on after thousands of aerosol cans containing isobutene-propane propellants had been crushed in a recycling center's compactor. The resulting explosion and fire overwhelmed the sprinkler system, killed a 36-year-old employee, injured three others, and destroyed the building.<sup>1</sup>

Industrial loader, forklift or related material handling vehicle operation can also damage the structure or its contents. This damage can lead to a fire.

- In 2000, a sprinkler limited the spread of an Illinois warehouse fire that began after a forklift hit a space heater and damaged the heater's natural gas feed line.<sup>2</sup>
- In a 1987 paint warehouse fire in Ohio, cartons fell off raised pallets. Some fell on the lift truck, spilling flammable liquid, while more spilled on the floor. Sparks from the truck ignited the fire. The forklift operator was burned and the fire ultimately caused \$49 million in direct property damage (in 1987 dollars).<sup>3</sup>

During 2003-2006, U.S. fire departments responded to an estimated annual average of 1,340 structure and vehicle fires in which industrial loaders, forklifts, or related material-handling vehicles were directly involved in ignition per year. This typically means the vehicle was the heat source for the fire. These fires caused an estimated average of 22 civilian injuries, and \$36.0 million in direct property damage per year. No deaths were reported in these incidents. The 1,340 fires include 1,220 (91%) that were coded as vehicle fires. These fires caused an average of 10 civilian injuries and \$24.5 million in direct property damage per year. The 120 structure fires (9%) caused an average of 12 civilian injuries and \$11.5 million in direct property damage per year.

Almost two-thirds of these incidents that were coded as vehicle fires started in the area, running gear area or wheel area. An unclassified mechanical failure or malfunction was a factor in 27% of these fires. Electrical failures or malfunctions contributed to 26%. Leaks or breaks were factors in 14%. A flammable or combustible liquid gas, pipe, or filter was the item first ignited in more than one-third of the loader or forklift vehicle fires. In one-quarter of these incidents, electrical wire or cable insulation was first ignited.

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<sup>1</sup> Kenneth J. Tremblay, 1999, Firewatch, *NFPA Journal*, January/February, 19.

<sup>2</sup> Kenneth J. Tremblay, 2001, Firewatch, *NFPA Journal*, March/April, 24.

<sup>3</sup> Michael. S. Isner. *Flammable Liquid Warehouse Fire, Dayton, Ohio, May 27, 1987*, Quincy, MA: National Fire Protection Association Fire Investigations.

These statistics are national estimates derived from Version 5.0 of the U.S. Fire Administration's National Fire Incident Reporting System and NFPA's annual fire department experience survey. When a fire occurs in a vehicle inside a structure but does not spread to the structure, it is coded as a vehicle fire. Either equipment or mobile property may be documented. If both are involved, only one may be coded. When industrial loaders, forklifts and related equipment start a chain of events that lead to a fire but do not provide the heat that starts it, their role may not be captured in the coded data. It is likely that these statistics underestimate the frequency of fires in which this equipment plays a role.

These vehicles and their loads can also bump into and damage sprinkler systems. Should a fire occur, a damaged sprinkler system may be less effective or may not operate at all. A damaged sprinkler may also release water when no fire is present.

The incident descriptions included in this analysis show what can happen. They are not a source to learn about what typically occurs. Most of the fires in this collection were more severe than the typical incident.

Both the incidents and the statistics show the importance of following proper procedures when using these vehicles. The 2006 edition of NFPA 505, *Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operation* provides guidance on their safe operation.

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## Industrial Loader and Forklift Fires

During 2003-2006, U. S. fire departments responded to an estimated average of 1,340 structure and vehicle fires in which industrial loaders, forklifts, and related material handling vehicles were directly involved in ignition per year. These fires caused an annual average of 22 civilian fire injuries, and \$36.0 million in direct property damage. No deaths were reported from these fires.

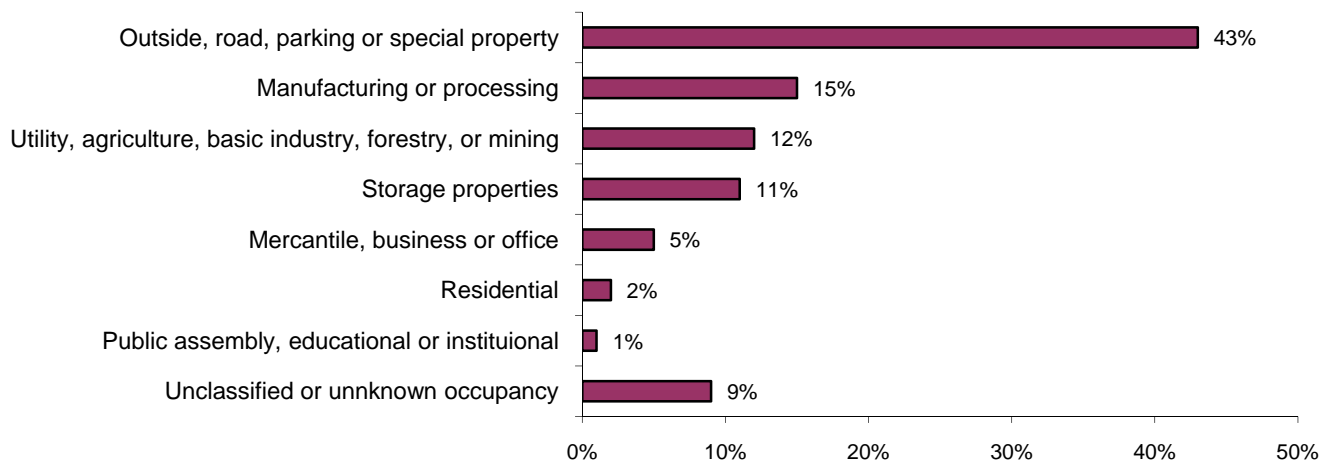
These fires include annual averages of

- 1,220 vehicle fires (91%) that resulted in 10 civilian injuries (47%) and \$24.5 million in direct property damage (68%) and
- 120 structure fires (9%) that resulted in 12 (53%) of the civilian injuries, and \$11.5 million in direct property damage (32%).

These fires occur in a wide variety of occupancies. The graph shows the occupancies where these vehicle fires took place.

- 43% occurred in outside, road, parking or special properties, such as open land, construction sites, industrial plant yards, and dumps or landfills.
- 15% occurred on manufacturing properties.
- 12% were in utility, agriculture, basic industry, forestry, or mining properties; and
- 11% occurred in storage properties

### Occupancies where Industrial Loader or Forklift Vehicle Fires Occurred: 2003-2006



- An unclassified mechanical failure malfunction was a factor in 27% of industrial loader or forklift vehicle fires.
- Electrical failures or malfunctions were factors in 26%.
- These vehicles or their loads can also damage the structure, its sprinkler system, or its contents. Such damage can result in fire, impaired sprinkler performance, or unintentional sprinkler activations.