



American
Waterways
Operators



U.S. Coast Guard - American Waterways Operators Annual Safety Report

August 7, 2023

Established Safety Metrics

For over 30 years, the National Quality Steering Committee has used three measures to track overall trends in safety and environmental protection. While not all-encompassing, the measures are considered useful indicators of towing industry trends. The measures are:

- Crewmember fatalities per 100,000 towing industry workers.
- Gallons of oil spilled from tank barges per million gallons transported.
- The number and severity of towing vessel casualties.

This report also contains other freight carrying towing industry data and measures for the years 1994 to 2022.

Crewmember Fatalities

There were nine deaths reported to the Coast Guard in 2022 involving freight carrying towing vessels or barges. A review of these casualties revealed that four of the nine reported deaths were directly related to towing vessel operations and involved crewmembers. The following is a summary of the operational crewmember fatalities (the Coast Guard Activity Number is provided in parentheses for closed investigations):

- A crewmember fell into the water while moving a dredge pipe. The coroner reported that the crewmember suffered a cardiac arrest due to cold water exposure and that pre-existing medical conditions were a factor. (7383285)
- While crewmembers were installing deck rigging, one crewmember was struck by a line and thrown into the air, landing on another barge. The crewmember suffered a severe head injury and a fractured leg and died from the injuries.
- While engaged in crane operations, a crewmember was struck in the head by a suspended load and died from the injury.
- While locking through, a crewmember fell into the water and was crushed between the towing vessel and barge.

The following is a summary of the five crewmember fatalities reported to the Coast Guard in 2022 that were not directly related to towing vessel or barge operations:

- While the vessel was underway, the captain was found unresponsive on the main deck near the galley. No cause of death was determined, and an autopsy was not conducted. The report does not specify whether the captain was on watch when the incident occurred. (7552796)
- A crewmember died of natural causes while the vessel was moored. (7389267)
- While crewmembers were stacking barges, the master of the vessel was found unresponsive in the pilot house. The coroner determined the cause of death was natural causes. The report does not specify whether the master was on watch or if the vessel was underway at the time of the casualty. (7422083)
- While the vessel was underway pushing barges, the off-watch captain was found unconscious in the galley. The coroner determined the cause of death was a heart attack and that pre-existing medical conditions were a factor.
- While the vessel was underway, two crewmembers were found unconscious onboard the vessel due to a drug overdose. One crewmember died because of the overdose and the other crewmember was hospitalized. In addition, two other crewmembers tested positive for drugs on the same vessel. (7541758)

Because these fatalities are not attributable to towing vessel or barge operations, we do not include them in our metrics, but we provide these details for industry awareness. The following charts and tables in this section relate to the operational crewmember fatalities only.

Chart 1 displays the crewmember fatalities per year and the 5-year moving average from 1994 to 2022.

Chart 1 – Crewmember Fatalities

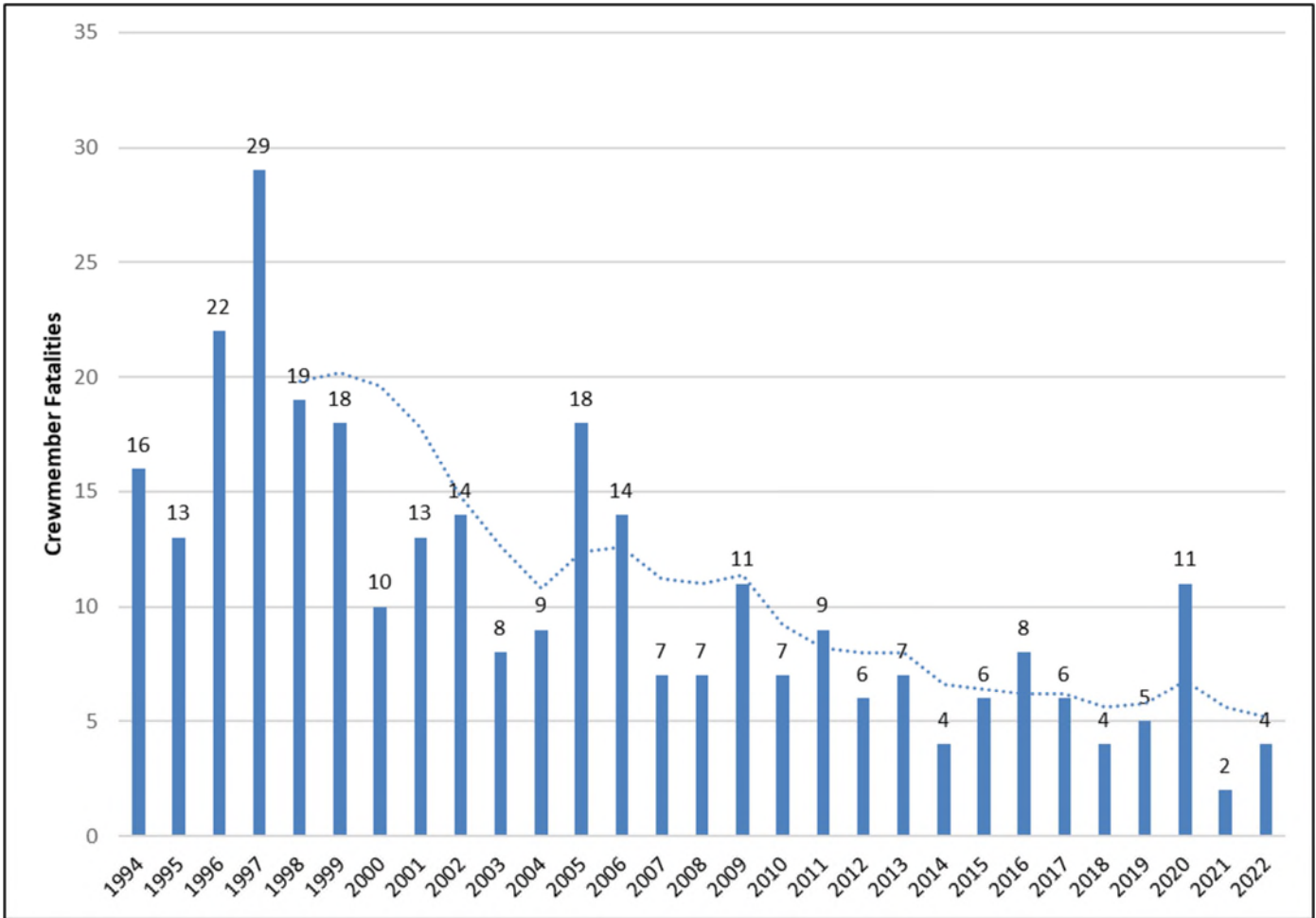


Chart 2 displays the cumulative total of crewmember fatalities by accident type from 2000 to 2022. During this period, the largest number of fatalities were attributed to “Contact Injury – Fall into Water”.

Chart 2 - Crewmember Fatalities by Accident Type (2000 to 2022)

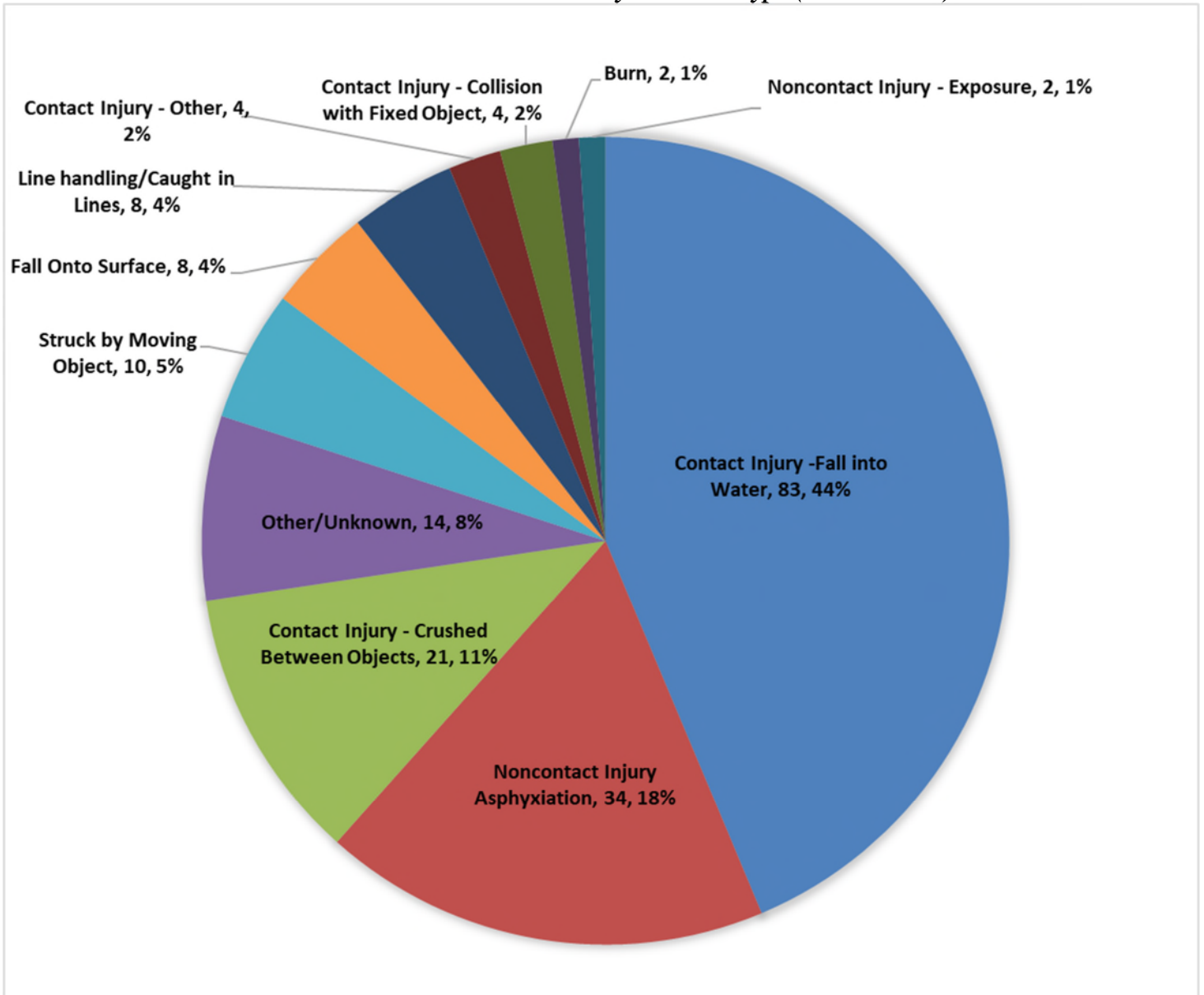


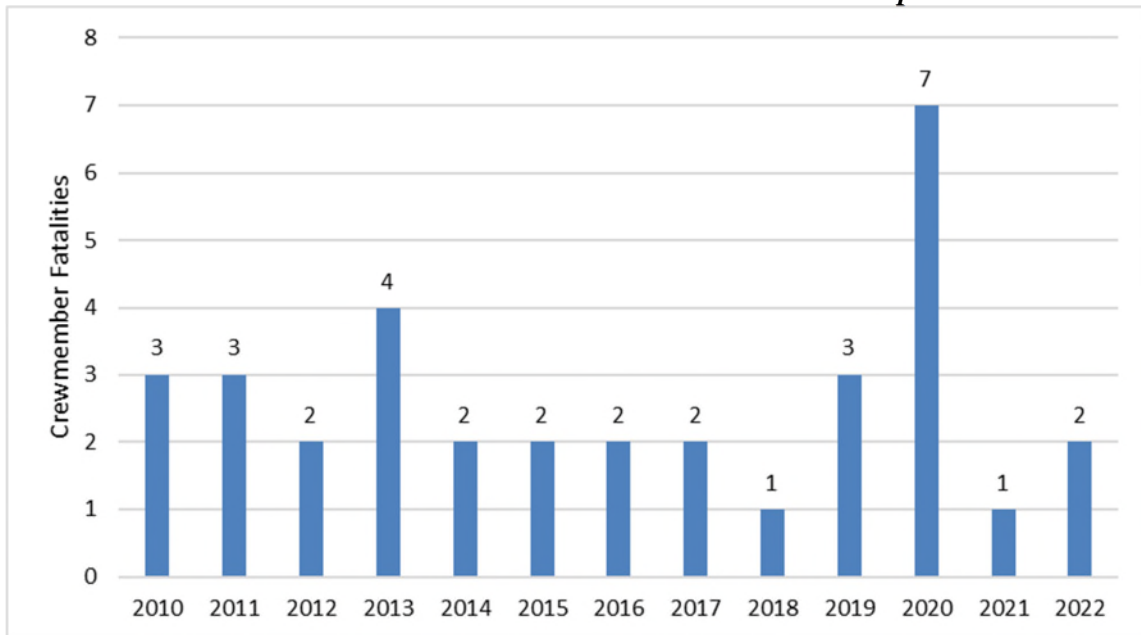
Table 1 provides a comparison of crewmember fatalities by accident type from 2018 to 2022 versus the cumulative total of crewmember fatalities by accident type from 2000 to 2022. This table allows for comparison of more recent fatality data against the cumulative fatality data.

Table 1 - Crewmember Fatalities by Accident Type 2018-2022 versus Cumulative Totals 2000-2022

| Accident Type | 2018 | 2019 | 2020 | 2021 | 2022 | Accident Type 2018-2022 | Accident Type 2000-2022 |
|---|----------|----------|-----------|----------|----------|-------------------------|-------------------------|
| Contact Injury- Fall into water | 0 | 1 | 3 | 0 | 0 | 4 (15.4%) | 83 (43.7%) |
| Noncontact Injury - Asphyxiation | 2 | 1 | 4 | 0 | 0 | 7 (26.9%) | 34 (17.9%) |
| Contact Injury- Crushed between objects | 1 | 2 | 0 | 1 | 2 | 6 (23.1%) | 21 (11.1%) |
| Other/Unknown | 0 | 1 | 3 | 1 | 0 | 5 (19.2%) | 14 (7.4%) |
| Struck by Moving Object | 0 | 0 | 1 | 0 | 0 | 1 (3.8%) | 10 (5.3%) |
| Fall Onto Surface | 0 | 0 | 0 | 0 | 0 | 0 | 8 (4.2%) |
| Line handling/Caught in Lines | 0 | 0 | 0 | 0 | 0 | 0 | 8 (4.2%) |
| Contact Injury- Other | 0 | 0 | 0 | 0 | 0 | 0 | 4 (2.1%) |
| Contact Injury- Collision with Fixed Object | 1 | 0 | 0 | 0 | 1 | 2 (7.7%) | 4 (2.1%) |
| Burn | 0 | 0 | 0 | 0 | 0 | 0 | 2 (1.1%) |
| Noncontact Injury - Exposure | 0 | 0 | 0 | 0 | 1 | 1 (3.8%) | 2 (1.1%) |
| TOTAL | 4 | 5 | 11 | 2 | 4 | 26 | 190 |

Chart 3 displays the crewmember fatalities resulting from falls overboard from 2010 to 2022. The data in Chart 3 is based on a review of the casualty investigations and accounts for all fatalities where the crewmember entered the water, regardless of the “accident type” selected by the marine investigator which is summarized in Chart 2 and Table 1.

Chart 3 - Crewmember Fatalities due to Falls Overboard per Year

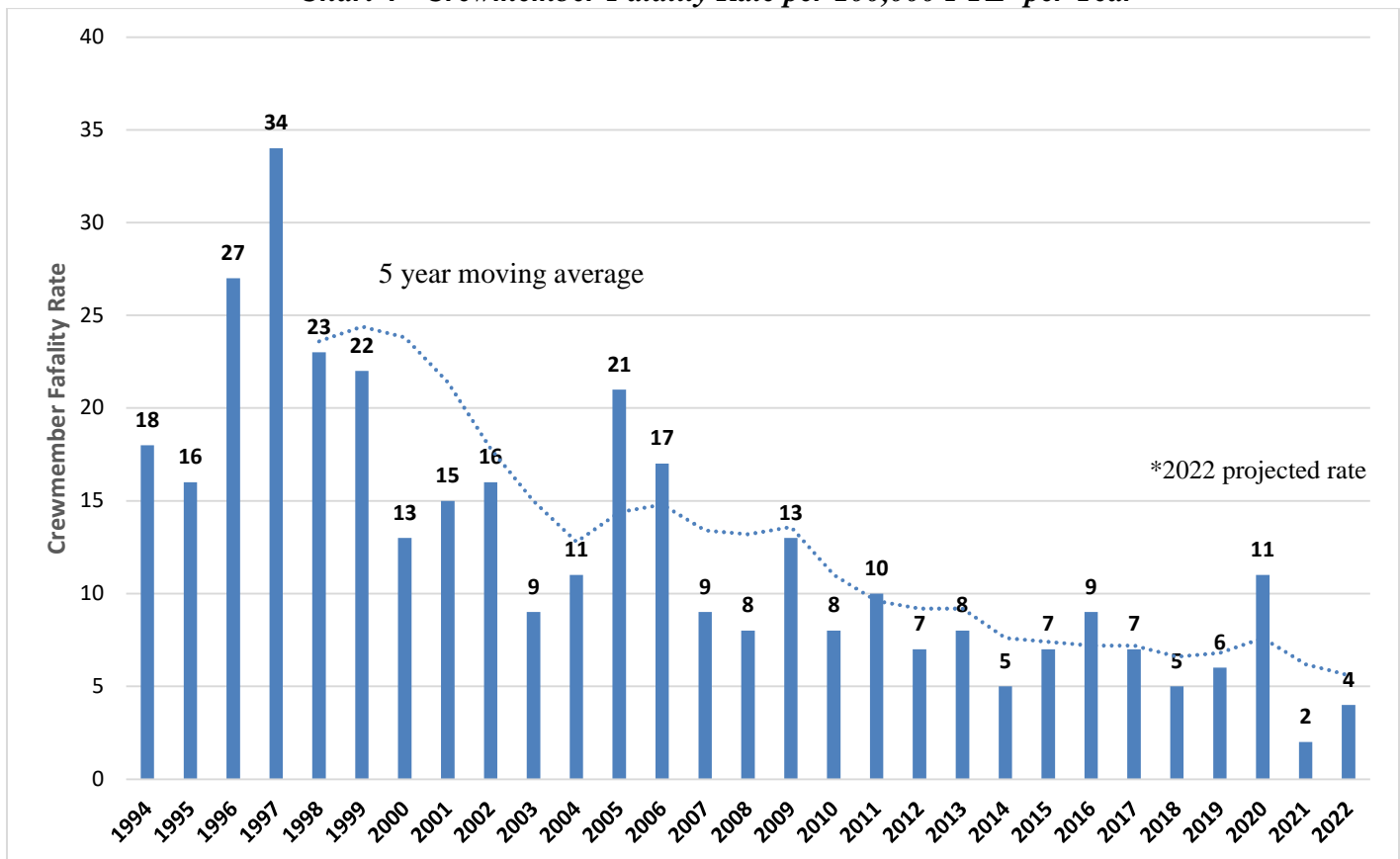


Crewmember Fatality Rate

The crewmember fatality rate for 2021 was 1.9 fatalities per 100,000 Full Time Employees (FTE). The projected crewmember fatality rate for 2022 is 3.8, which is based on the 2021 data from the U.S. Army Corps of Engineers (ACE)¹. Chart 4 displays the crewmember fatality rate from 1994 to 2022 with rates rounded up to the nearest whole number.

The crewmember fatality rate is calculated using the “Mercer Model,” which was developed through AWO-funded research. This model uses ACE data to calculate the number of FTE in the towing vessel industry. The crewmember fatality rate enables comparison against other fatality rates from the Bureau of Labor Statistics (BLS), which are also expressed by the number of fatalities per 100,000 FTE.

Chart 4 - Crewmember Fatality Rate per 100,000 FTE² per Year



¹ The crewmember fatality rate is based on data from the *Waterborne Transportation Lines of the United States* report published by the U.S. Army Corps of Engineers. The 2022 report is not yet available.

² One FTE or Full Time Employee is the equivalent of one person working a 40-hour work week for 50 weeks of the year.

For comparison, Table 2 provides the worker fatality rates as calculated by the BLS for all workers and the transportation sector from 2017 to 2021³ along with the Towing Industry Crewmember Fatality Rate.

Table 2 - Comparison of Worker Fatality Rates per Year

| Data Source | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|-------------|-------------|-------------|-------------|-------------|
| Bureau of Labor Statistics (BLS), All Fatal Work Injuries | 3.5 | 3.5 | 3.5 | 3.4 | 3.6 |
| BLS, Transportation Sector Fatal Work Injuries | 15.1 | 14.0 | 13.9 | 13.4 | 14.5 |
| Towing Industry Crewmember Fatality Rate | 6.2 | 4.1 | 5.2 | 10.6 | 1.9 |

Table 3 provides the BLS worker fatality counts and rates for all industry sectors for 2021.

Table 3 – Number and Rate of Fatal Work Injuries for 2021 by Industry Sector

| Industry | Number of fatal work injuries | Fatal work injury rate (per 100,000 full-time equivalent workers) |
|--|--------------------------------------|--|
| Construction | 986 | 9.4 |
| Transportation and warehousing | 976 | 14.5 |
| Agriculture, forestry, fishing, and hunting | 453 | 19.5 |
| Manufacturing | 383 | 2.6 |
| Retail trade | 263 | 1.9 |
| Leisure and hospitality | 243 | 2.4 |
| Other services (excluding public administration) | 242 | 3.8 |
| Wholesale trade | 177 | 5.1 |
| Educational and health services | 167 | 0.7 |
| Financial activities | 97 | 0.9 |

Key findings from the 2021 BLS Census of Fatal Occupational Injuries:

- The 3.6 fatal occupational injury rate in 2021 represents the highest annual rate since 2016.
- A worker died every 101 minutes from a work-related injury in 2021.
- Suicides continued to trend down, decreasing to 236 in 2021 from 259 in 2020, an 8.9-percent decrease.
- Workers in transportation and material moving occupations experienced a series high of 1,523 fatal work injuries in 2021 and represent the occupational group with the highest number of fatalities. This is an increase of 18.8 percent from 2020.
- Transportation incidents remained the most frequent type of fatal event in 2021 with 1,982 fatal injuries, an increase of 11.5 percent from 2020. This major category accounted for 38.2 percent of all work-related fatalities for 2021.

³ Census of Fatal Occupational Injuries – Current, <https://www.bls.gov/news.release/cfoi.nr0.htm>

Oil Spill Volumes

Approximately 3,109 gallons of oil were spilled into U.S. navigable waterways as a result of 48 operational tank barge pollution incidents in 2022. Chart 5 displays the total gallon quantity of oil spilled from tank barges from 1994 to 2022.

Chart 5 – Total Gallons of Oil Spilled from Tank Barges

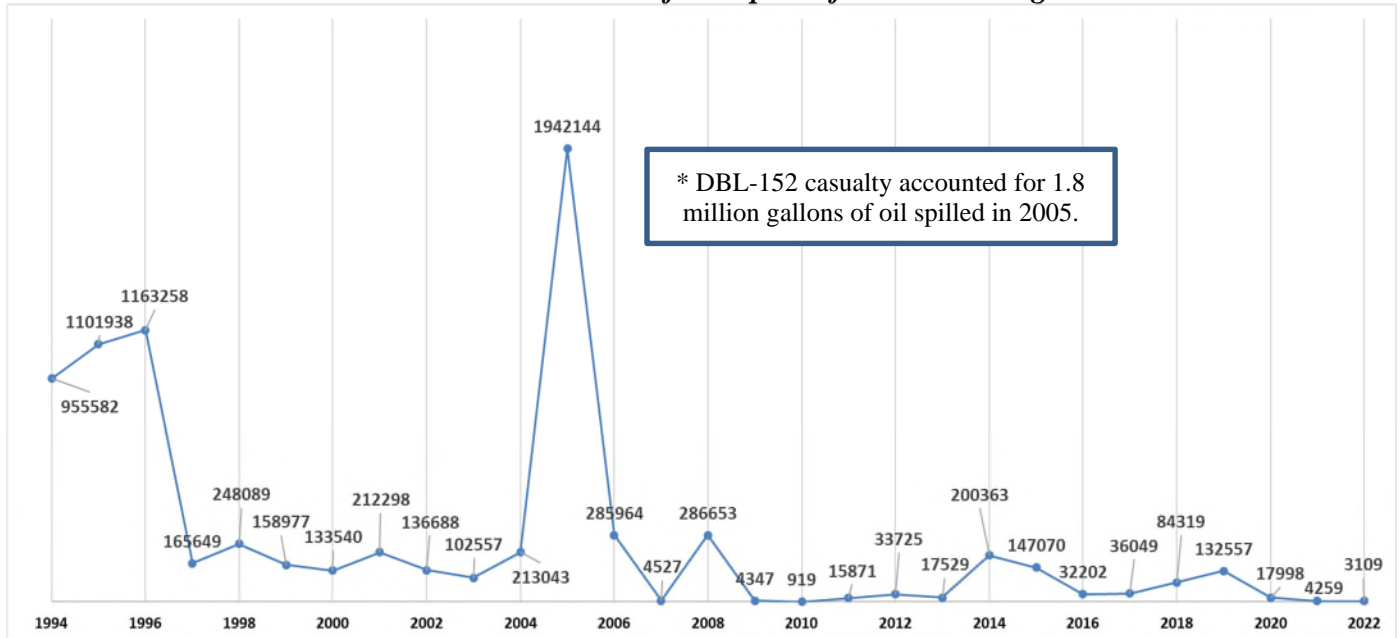


Table 4a provides the number of tank barge oil spills by discharge category. The quantity of oil spilled from the four largest tank barge oil spills is also noted in Table 4a. The four largest oil spills account for 86.9% of the total volume of oil spilled from tank barges in 2022.

Table 4a - Tank Barge Oil Spills by Spill Size Category for 2022

| Discharge Category | Number of Tank Barge Spills | Amount of Oil Discharged Top 4 Spills Only |
|---------------------------|------------------------------------|---|
| less than 1 | 3 | - |
| 1 to 10 | 33 | - |
| 10 to 100 | 8 | - |
| 100 to 1000 | 4 | 222, 630, 850, 1000 |
| 1000 to 10000 | 0 | - |
| Total | 48 | |

The following is summary of the causes for the four largest oil spills involving tank barges:

- A transfer hose was pinched between two vessels and ruptured, resulting in an oil spill.
- A malfunction with the transfer hose handle resulted in overfilling of the day tank on the vessel.
- A tankerman failed to follow transfer procedures by not monitoring tank levels adequately, resulting in the overfilling of a tank and subsequent oil spill.
- A tankerman failed to follow transfer procedures by not reducing the flow rate when nearing completion of the transfer, resulting in the overfilling of a tank and subsequent oil spill.

In the last two incidents, the high-level alarm and overfill alarms malfunctioned.

The National Quality Steering Committee has requested the inclusion of information on the number and volume of oil spills from towing vessels. Table 4b provides the number of towing vessel oil spills and total volume spilled by oil spill discharge category. The three largest oil spills account for 85.7% of the total volume of oil spilled from towing vessels in 2022.

Table 4b – Towing Vessel Oil Spills by Spill Size Category for 2022

| Discharge Category (in gallons) | Count of Discharge Category | Sum of Discharge Amount into Water |
|--|------------------------------------|---|
| less than 1 | 11 | 2.4 |
| 1 to 10 | 120 | 446 |
| 10 to 100 | 36 | 1357 |
| 100 to 1000 | 5 | 2869 |
| 1000 to 10000 | 2 | 8062 |
| more than 10000 | 1 | 20000 |
| Total | 175 | 32736 |

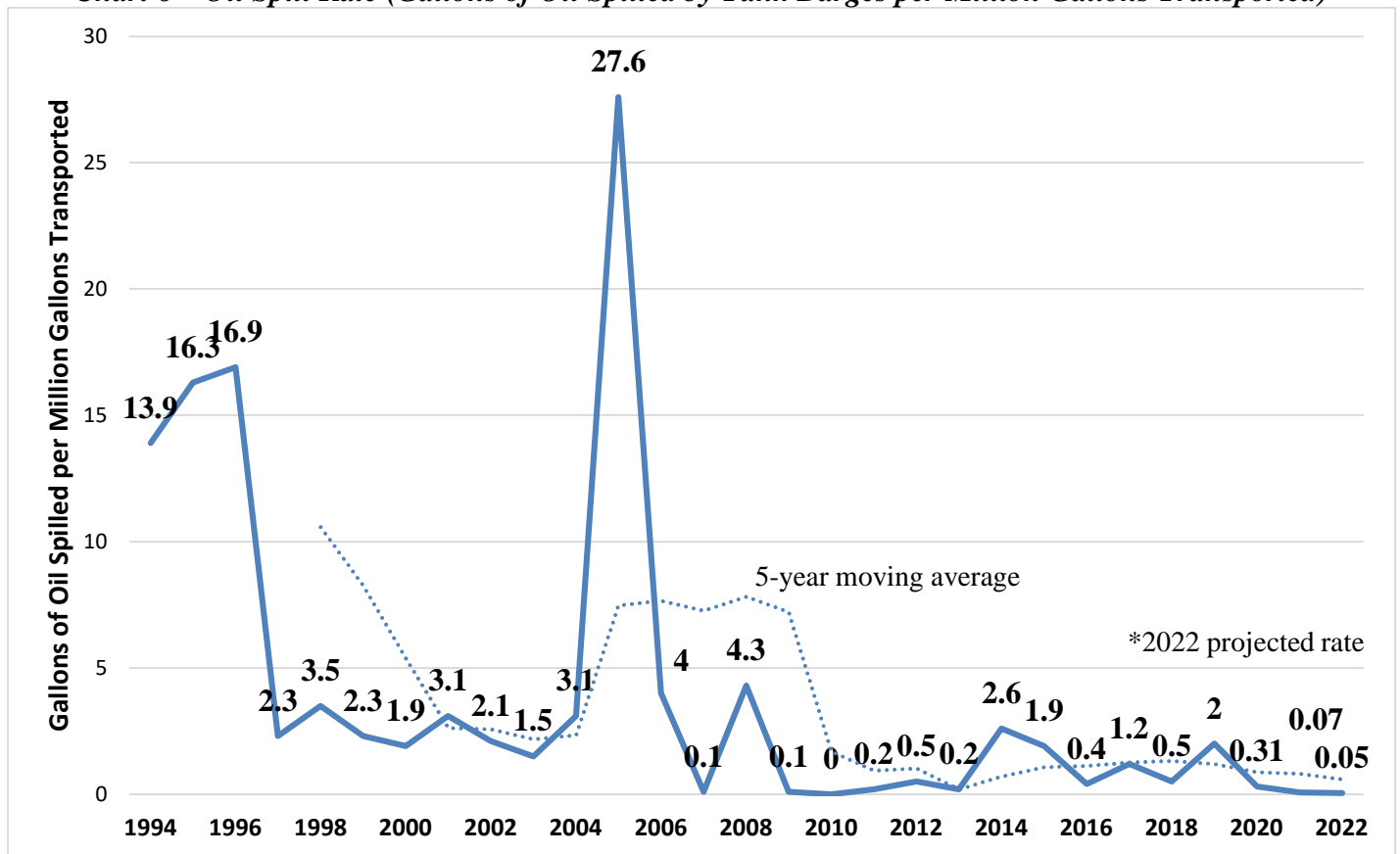
The following is a summary of the causes of the three largest oil spills involving towing vessels:

- A crewmember left the engine room while an internal transfer was being conducted, resulting in the overfilling of a tank and an oil spill.
- While maneuvering into drydock, a beam fell and punctured a fuel tank on the towing vessel, resulting in an oil spill.
- Two moored towing vessels were found submerged at the pier resulting in an oil spill. The cause of the sinkings was not determined.

Oil Spill Rate

The tank barge oil spill rate is calculated using data from both the Coast Guard and the ACE. Based on the latest data from the ACE, the oil spill rate for 2021 was 0.07 gallons of oil spilled for every million gallons of oil transported, and the projected oil spill rate for 2022 is 0.05 gallons spilled per million gallons transported. Chart 6 shows the oil spill rates for the years 1994 to 2022.

Chart 6 – Oil Spill Rate (Gallons of Oil Spilled by Tank Barges per Million Gallons Transported)



For reference, the following table provides the tank barge commodity data from the ACE from 2014 to 2021.

Table 5 - Petroleum Transported by Tank Barges per Year

| Calendar Year | Petroleum Transported by Tank Barge (in short-tons) | % change (year to year) |
|----------------------|--|------------------------------------|
| 2014 | 278,851,000 | +2.11% |
| 2015 | 282,993,000 | +1.49% |
| 2016 | 272,757,000 | -3.62% |
| 2017 | 258,582,089 | -5.20% |
| 2018 | 244,432,497 | -5.47% |
| 2019 | 245,970,000 | +0.06% |
| 2020 | 214,134,000 | -12.9% |
| 2021 | 217,009,000 | +1.3% |

Severity of Vessel Incidents

There were 1,245 incidents in 2022 involving towing vessels or barges that were investigated by the Coast Guard. All incidents for 2022 were scored using the scale developed by the National Quality Steering Committee (below). Each incident is counted only once, regardless of the number of vessels involved or events recorded by the Coast Guard during the marine casualty investigation. Table 6 provides the number of towing vessel incidents by USCG-AWO Severity Class from 2018 to 2022.

Table 6 – Incidents by USCG-AWO Severity Class

| AWO Severity Class | 2018 | 2019 | 2020 | 2021 | 2022 | Total |
|---------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Low | 912 | 1,024 | 975 | 964 | 952 | 4827 |
| Medium | 139 | 130 | 130 | 109 | 142 | 650 |
| High | 73 | 124 | 157 | 163 | 151 | 668 |
| Total | 1,124 | 1,278 | 1,262 | 1,236 | 1,245 | 6145 |

The “Initiating Event” is the first unwanted event in a casualty sequence. Identifying the Initiating Event facilitates analysis of the causal factors leading to the first event in the casualty sequence. The five Initiating Event types most commonly associated with high severity incidents for 2022 were:

- In 79 of the 151 (52.3%) high severity incidents, the injury of a crewmember was determined to be the Initiating Event.
- In 18 (11.9%) of the high severity incidents, an allision was determined to be the Initiating Event.
- In 15 (9.9%) of the high severity incidents, a material failure or malfunction was determined to be the Initiating Event.
- In 6 (4.0%) of the high severity incidents, a vessel maneuver was determined to be the Initiating Event.
- In 6 (4.0%) of the high severity incidents, the death of a crewmember determined to be the Initiating Event.

USCG-AWO Severity Classes for Towing Vessel Casualties

| Incident Severity | Description |
|--------------------------|--|
| Low | Damage: \$0 - \$50,000 or not reported No injuries or deaths Pollution: 0 - 10 gallons of oil spilled CG Casualty Class: None/Routine |
| Medium | Damage: \$50,001 - \$250,000 No injuries or deaths Pollution: 11 - 1,000 gallons of oil spilled CG Casualty Class: “Significant” |
| High | Damage: \$250,001 or more ANY injuries or deaths Pollution: 1,001 or more gallons spilled CG Casualty Class: “Serious” or “Major” |

Crewmember Injuries

There were 95 incidents involving towing vessels or barges in 2022 that resulted in 101 injuries to crewmembers. Table 7 displays the number of injuries by USCG injury severity category from 2018 to 2022. For reference, the USCG Injury Severity Scale is provided on the following page.

Table 7 - Number of Injuries by Severity Category

| Injury Severity | 2018 | 2019 | 2020 | 2021 | 2022 | Total | % Total |
|-----------------|-----------|------------|------------|------------|------------|------------|---------------|
| Critical | 0 | 1 | 0 | 0 | 2 | 3 | 0.6% |
| Severe | 2 | 5 | 5 | 2 | 3 | 17 | 3.1% |
| Serious | 15 | 22 | 22 | 24 | 15 | 98 | 18.1% |
| Moderate | 35 | 50 | 45 | 56 | 40 | 226 | 41.8% |
| Minor | 37 | 42 | 38 | 39 | 41 | 197 | 36.4% |
| Total | 89 | 120 | 110 | 121 | 101 | 541 | 100.0% |

Table 8 provides a breakdown of the critical, severe, and serious injuries by accident type for 2022.

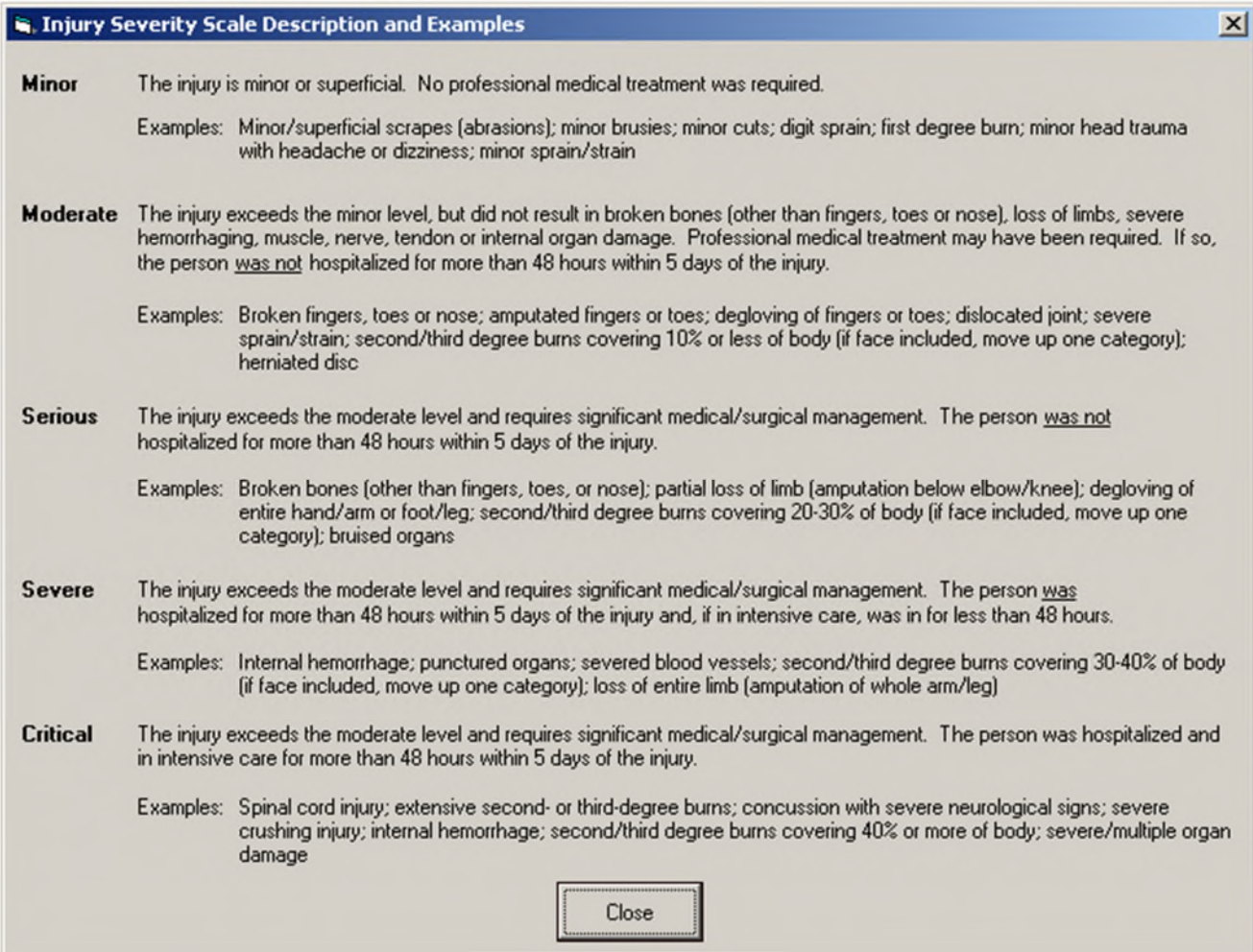
Table 8 - Critical, Severe, Serious Injuries by Accident Type for 2022

| Accident Type | Critical | Severe | Serious | Total |
|---|----------|----------|-----------|-----------|
| Contact Injury- Collision with Fixed Object | | | 1 | 1 |
| Contact Injury- Crushed between objects | 1 | | 3 | 4 |
| Contact Injury- Fall onto surface | | | 4 | 4 |
| Contact Injury- Line handling/caught in lines | | 1 | 3 | 4 |
| Contact Injury- Struck by Moving Object | 1 | 1 | 2 | 4 |
| Other Injury Type | | 1 | 1 | 2 |
| Overexertion Injury- Strain or sprain | | | 1 | 1 |
| Total | 2 | 3 | 15 | 20 |

There were five incidents that resulted in critical or severe injuries to crewmembers.

- In four of the incidents, the crewmembers were working with lines or wires when they were injured. In two of these incidents, the crewmember was also working with a winch.
- In one incident, the crewmember lost his balance and fell, resulting in a severe injury.

USCG Injury Severity Scale



Injury Severity Scale Description and Examples

Minor The injury is minor or superficial. No professional medical treatment was required.
Examples: Minor/superficial scrapes (abrasions); minor bruises; minor cuts; digit sprain; first degree burn; minor head trauma with headache or dizziness; minor sprain/strain

Moderate The injury exceeds the minor level, but did not result in broken bones (other than fingers, toes or nose), loss of limbs, severe hemorrhaging, muscle, nerve, tendon or internal organ damage. Professional medical treatment may have been required. If so, the person was not hospitalized for more than 48 hours within 5 days of the injury.
Examples: Broken fingers, toes or nose; amputated fingers or toes; degloving of fingers or toes; dislocated joint; severe sprain/strain; second/third degree burns covering 10% or less of body (if face included, move up one category); herniated disc

Serious The injury exceeds the moderate level and requires significant medical/surgical management. The person was not hospitalized for more than 48 hours within 5 days of the injury.
Examples: Broken bones (other than fingers, toes, or nose); partial loss of limb (amputation below elbow/knee); degloving of entire hand/arm or foot/leg; second/third degree burns covering 20-30% of body (if face included, move up one category); bruised organs

Severe The injury exceeds the moderate level and requires significant medical/surgical management. The person was hospitalized for more than 48 hours within 5 days of the injury and, if in intensive care, was in for less than 48 hours.
Examples: Internal hemorrhage; punctured organs; severed blood vessels; second/third degree burns covering 30-40% of body (if face included, move up one category); loss of entire limb (amputation of whole arm/leg)

Critical The injury exceeds the moderate level and requires significant medical/surgical management. The person was hospitalized and in intensive care for more than 48 hours within 5 days of the injury.
Examples: Spinal cord injury; extensive second- or third-degree burns; concussion with severe neurological signs; severe crushing injury; internal hemorrhage; second/third degree burns covering 40% or more of body; severe/multiple organ damage

Close

This verbiage is taken from the Marine Information for Safety and Law Enforcement (MISLE) Incident Investigation Activity User Guide, which provides data entry guidance for Coast Guard Investigating Officers.

Instructions for Reviewing Incident Investigation Reports on the USCG Maritime Information Exchange

The USCG Maritime Information Exchange (CGMIX) is a public portal that provides access to Incident Investigation Reports (IIR) that have been closed by the Coast Guard.

To access an IIR:

1. Go to: <https://cgmix.uscg.mil/IIR/IIRSearch.aspx>
2. Enter the Activity Number for the IIR.



USCG Maritime Information Exchange Incident Investigation Reports

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Involved Vessel:

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General Keyword:

Start Date Range: From: To: End Date

Search

Reset

This page provides reports for closed investigations of reportable marine casualties investigated by the U.S. Coast Guard from October 2002 to present.

Cases closed after October 2002 may have a start date range several years prior

Last Update:
Monday, July 24, 2023

3. Click on the View Details hyperlink to see the redacted IIR.



USCG Maritime Information Exchange Incident Investigation Reports

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Search By: Activity Number - 7383285

NOTICE: These search results are based on the vessels and parties listed in the investigation report. Not all vessels and parties listed were directly involved in the incidents, such as vessels providing emergency assistance or witnessing the event. Please select the link next to the Investigation Title for additional details.

| View Details | Title | Start Date | End Date |
|------------------------------|---------------------------|-------------|-------------|
| View Details | BAYOU DAWN - Loss of Life | 19-Jan-2022 | 14-Jul-2022 |

1 Records Returned.

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Monday, July 24, 2023