英　語　版
English Version

Waterworks Construction Accident Prevention Action Plan

2024

To Further Prevent Construction Accidents

The Tokyo Metropolitan Government Bureau of Waterworks has developed the Waterworks Construction Accident Prevention Action Plan 2024, which outlines action targets for the next three-year period (FY 2024–FY 2026), to further promote the action plan developed in fiscal 2012.

Ten years after the action plan was introduced, the Action Plan 2024 identifies future measures based on the causes of past accidents and continues efforts to further reduce accidents, including those involving third parties and older persons.

東京都水道局
Bureau of Waterworks Tokyo Metropolitan Government

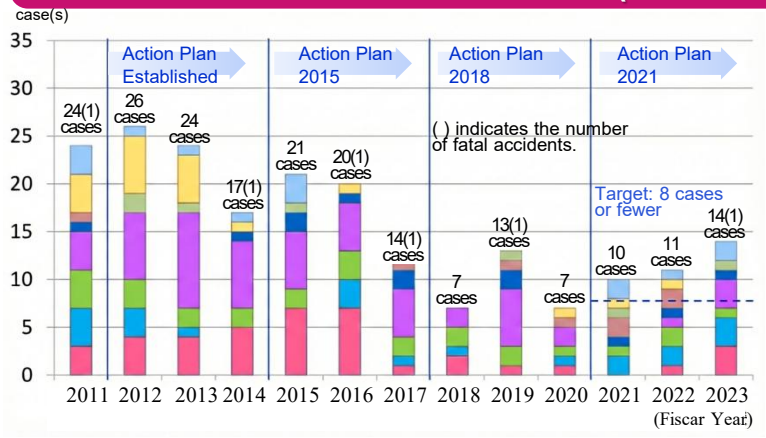
監修協力
独立行政法人　労働者健康安全機構
労働安全衛生総合研究所
National Institute of Occupational Safety and Health, Japan

Current Status of Level I or Higher Construction Accidents

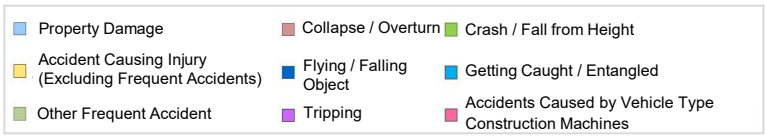
- Ten years have passed since the Action Plan was developed in FY 2012, and as a result of efforts by the Bureau's staff, personnel of policy partner organizations, and contractors during this period, the number of Level I or higher construction accidents* has been reduced to approximately half of the level recorded at the time of development.
- The measures implemented have been effective, as accidents caused by vehicle type construction machines and accidents involving third parties, which were frequent at the time the plan was developed, have decreased overall.
- The number of Level I or higher construction accidents has been increasing in recent years. Accident factors indicate that a high proportion of these incidents are frequent accidents, as was the case at the time of development, and that similar accidents occur annually.
- The number of accidents involving older workers and foreign workers has remained largely unchanged. Given the current state of the waterworks construction workforce, continued efforts will be required.

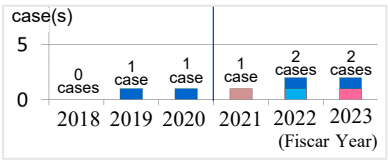
*Injuries resulting in four or more days of work absence or fatalities; injuries to third parties or Bureau personnel; and serious property damage accidents with substantial damage or impact.

Figure 1: Number of Level I or Higher Construction Accidents (FY 2011–FY 2023)

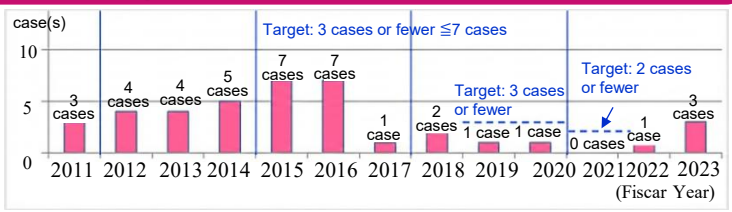


Number of Level I or Higher Construction Accidents (2011–2023)

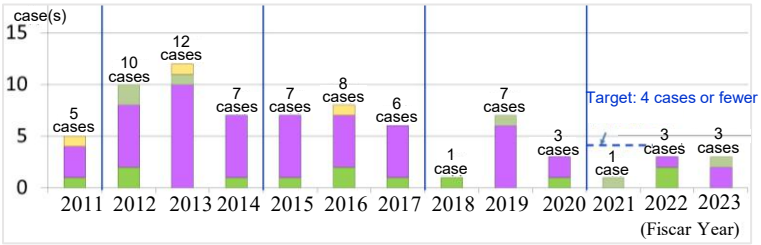




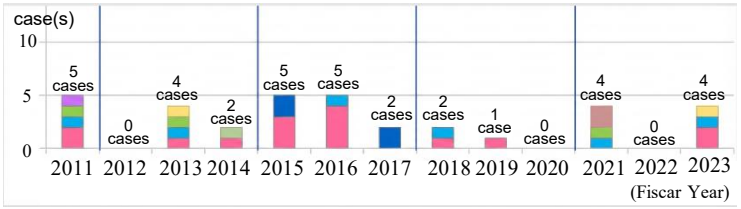
Injuries to Foreign Workers (2018–2023)



Accidents Caused by Vehicle Type Construction Machines

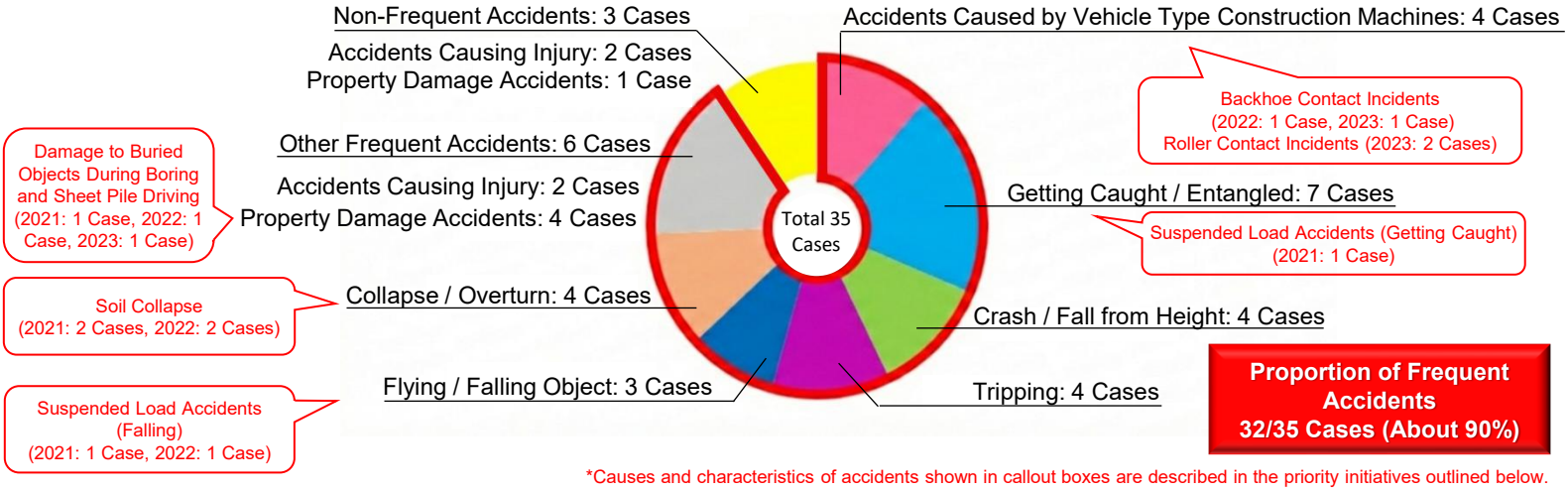


Injuries to Third-Parties



Injuries to Older Workers (Aged 60 and Over)

Figure 2: Proportion of Frequent Level I or Higher Construction Accidents (FY 2021–FY 2023)



*Causes and characteristics of accidents shown in callout boxes are described in the priority initiatives outlined below.

Waterworks Construction Accident Prevention Action Plan 2024

(Plan Period: FY 2024–FY 2026)

Action Targets

1. Eight or fewer Level I or higher construction accidents per year (ongoing)

- Aim to limit cases to eight or fewer per year, continuing the action target of the previous action plan.

Three or fewer third-party accidents per year (strengthened)

- Aim for a further reduction from the action target of the previous action plan (from four cases per year to three).

2. Zero annual fatal accidents (ongoing)

- Aim to achieve zero fatal accidents per year, continuing the action target of the previous action plan.

3. Zero annual Level I or higher injury accidents caused by vehicle type construction machines (strengthened)

- Aim for a further reduction from the action target of the previous action plan (from two cases per year to zero).

Priority Initiatives

1. Strengthening Initiatives to Reduce Accidents Caused by Vehicle Type Construction Machines

1. Implementation of training sessions focused on preventing heavy machinery accidents
2. Promotion of accident prevention measures based on multi-layered protection utilizing ICT and other technologies
3. Thorough enforcement of signal confirmation between operators and heavy machinery and construction equipment guides through KY activities (hazard prediction activities) and related procedures, and strict prohibition of entry into heavy machinery operating areas
4. Horizontal rollout of recurrence prevention measures and information sharing (utilizing construction machinery accident casebooks)

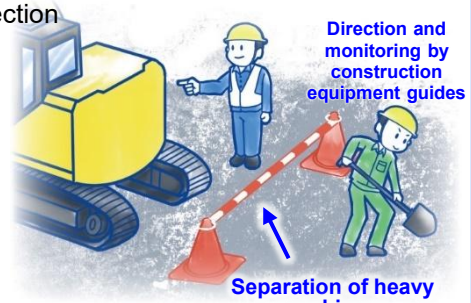
1. Implementation of training sessions focused on preventing heavy machinery accidents

«Main factors and characteristics of contact accidents between backhoes and workers occurring in FY 2021–FY 2023»

- Lack of coordination between operators and heavy machinery guides
- Lack of access restriction measures for the backhoe operating area
- Lack of heavy machinery contact prevention devices, rear-view monitors, and similar equipment

2. Promotion of accident prevention measures based on multi-layered protection

First safety measure
Soft measures (Human-based measures)



Second safety measure
Hard measures using ICT devices

Contact prevention device (Fail-safe)

Compact design allowing installation even at confined sites

*Multi-layered protective measures will be promoted across initiatives to further reduce heavy machinery accidents.

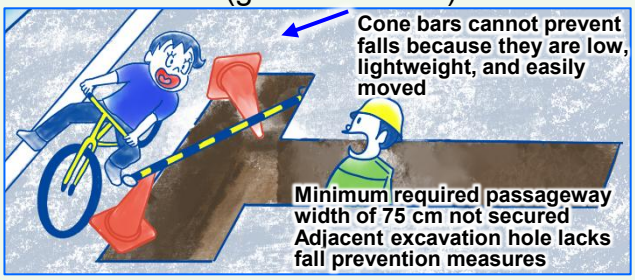
In addition to the assignment of "heavy machinery guides" for vehicle type construction machines to ensure the safety of workers (Article 158 of the Ordinance on Industrial Safety and Health), the Tokyo Metropolitan Government Bureau of Waterworks requires the assignment of "construction equipment guides" to ensure the safety of third parties and others under its specifications.

2. Strengthening Initiatives to Reduce Frequent Accidents (New)

(1) Strengthening safety management measures to prevent third-party accidents

1. On-site patrols from the viewpoint of pedestrians and other third parties (utilizing checklists, etc.)
2. Improvement of safety awareness among workers (posters and other reminders, etc.)
3. Clarification of pedestrian walkways and thorough implementation of verbal warnings and guidance for pedestrians and others
4. Utilization of safety management measures considerate of older persons and persons with disabilities (good initiatives)

Safety Management Measures (Good Initiatives) Tokyo Infrastructure Portal Web Page



Third party falls into excavation hole (FY 2022)

«Main causes and characteristics of third-party accidents in FY 2021–FY 2023»

- Lack of traffic guide assignment and insufficient warnings provided by traffic guides to bicycles and others
- Inadequate pedestrian walkways (insufficient width, lack of signage, etc.)
- Insufficient safety measures (fall prevention measures, etc.)

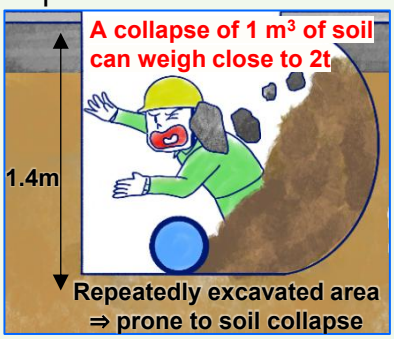
(2) Strengthening measures for Level I and higher injury and property damage accidents

Based on accident data from FY 2021 to FY 2023, initiatives will be strengthened with a focus on the most frequent accidents. In particular, sufficient guidance will be provided to new contractors and subcontractors to ensure the implementation of initiatives to prevent frequent accidents.

1) Prevention of accidents causing injury to workers

1. Soil collapse within excavation trenches

Even in areas with relatively shallow excavation depths, soil collapse may occur depending on construction conditions, including high groundwater levels. For this reason, if any poor ground conditions are detected through KY activities (hazard prediction activities) and related procedures, it shall be thoroughly communicated that operations must proceed only after the required earth retention is in place.



Soil collapse at an excavation depth of 1.4 m (FY 2022)

«Main causes and characteristics of Level I accidents in FY 2021–FY 2023»

- Ground collapse at excavation depths of less than 1.5 m, where earth retention is not required
- Ground collapse near earth retention temporarily removed to allow for water pipe installation
- Ground collapse from groundwater seepage areas (without earth retention reinforcement, etc.)
- Ground collapse due to earth-retaining support not being implemented as planned

2. Falling loads from cranes and backhoes, and workers being caught by suspended loads

Many accidents are caused by "shortcut actions" taken without following prescribed procedures. For this reason, work procedures shall be thoroughly confirmed in advance during KY activities (hazard prediction activities) and related procedures. In addition, it shall be thoroughly communicated that operations must proceed only after appropriate workers, such as qualified personnel, are assigned.

*Given the frequent occurrence of construction material fall accidents, including the bridge girder fall incident in Shizuoka (2023.7) and the steel frame fall incident in Yaesu, Tokyo (2023.9), measures will be further strengthened.

Injured while holding the bottom of an H-shaped steel member (FY 2022)

«Main causes and characteristics of Level I accidents in FY 2021–FY 2023»

- Operator moved heavy machinery without receiving a signal from the signaler
- Lifting operations conducted without using a guide rope
- Unplanned worker activity:
  - Heavy machinery operated by personnel other than the operator
  - Slinging performed by personnel other than the slinging supervisor

2) Prevention of property damage accidents

○ Damage to buried objects (water pipes, underground cables) during boring and sheet pile driving

Because insufficient awareness of buried objects and inadequate prior confirmation of their locations are the main factors, the status of buried objects shall be reconfirmed before work, using drawings and markings, and all workers shall thoroughly share information.

Damage to a buried object during drilling with an earth auger led to extended lane restrictions until restoration, causing widespread traffic congestion. (FY 2023)

«Main causes and characteristics of Level I accidents in FY 2021–FY 2023»

- **Lack of coordination for adjacent construction, failure to request on-site attendance**
- **Lack of information sharing on-site (mutual confirmation of drawings, markings, and hazards)**
- **No drawings of buried objects displayed on-site, lack of markings**

*Main causes of damage to buried objects, which account for the majority of property damage accidents

- Failure to perform or adequately implement prior hand excavation around buried objects
- Lack of prior research and confirmation of buried objects

3. Educational Support for Contractors (Subcontractors) and Supervisors

1. Implementation of training utilizing VR and safety education materials to improve risk sensitivity
2. Utilization of audiovisual materials for safety education of foreign workers
3. Utilization of worksite environment checklists with consideration for older persons and others
4. Holding safety promotion meetings and other events aimed at preventing the recurrence of gas explosion accidents

2. Audiovisual materials for safety education of foreign workers

Web page for audiovisual education materials

4. Holding safety promotion meetings

«Introduction of Materials for Safety Education Use»

- Safety and Health Measures for Foreign Workers (Ministry of Health, Labour and Welfare), video materials and text
  [Supported languages vary by material (11 languages maximum)]
- Audiovisual Materials for Foreign Construction Workers (Japan Construction Occupational Safety and Health Association (JCOSHA))
  [Available Languages: English, Chinese, Vietnamese, Indonesian]
- Guidelines for Ensuring the Safety and Health of Older Workers (Age-Friendly Guidelines) (Ministry of Health, Labour and Welfare)
- Checklist of Workplace Improvement Tools for Ensuring the Safety and Health of Older Workers (Age Action 100)
  (Japan Industrial Safety and Health Association (JISHA))

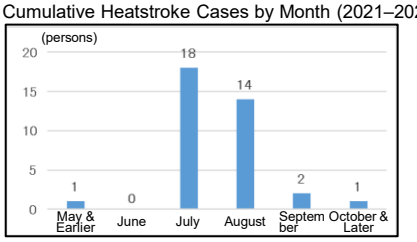
Others: Heatstroke Prevention Measures

The summer of 2023 recorded record-breaking heat, and for the first time since records began, all days in August were classified as tropical days in Tokyo. According to the World Meteorological Organization (WMO), this high-temperature trend is expected to continue in 2024. Records from the three most recent years (FY 2021–FY 2023) show that high temperatures continue particularly in July and August, and heatstroke often occurs at construction sites. Therefore, it is important to thoroughly plan prevention and implement countermeasures.

References:

- Workplace heatstroke prevention information
  (Heatstroke prevention measures based on materials from the Ministry of Health, Labour and Welfare)
- Examples of heatstroke prevention measures from the "Good Practices for Construction Accident Prevention" on the Tokyo Infrastructure Portal
  (Heatstroke prevention measures according to construction site conditions and work activities)

Cumulative Heatstroke Cases by Month (2021–2023)



Number of Extreme Heat / Tropical Days in July and August

	Extreme Heat Days	Tropical Days
2021	2 days	44 days
2022	10 days	44 days
2023	22 days	60 days

Frequent Waterworks Accidents & Prevention Measures

In the action plan developed in FY 2012, the 13 frequent accidents listed below were identified based on analysis of accident and near-miss data from works ordered by the Bureau. These frequent accidents continue to account for the majority of the Bureau's construction accidents, and prevention measures targeting them must be prioritized.

Frequent Waterworks Accidents

1 Third-Party Accidents

(1) Falling into an excavation hole (2) Contact with a dump truck or backhoe
(3) Tripping and falling (pavement steps, subsidence around cover plates, cables, hoses, etc.)

2 Accidents involving workers and guides caused by general vehicles (vehicle at fault)

3 Accidents caused by the movement of dump trucks and other heavy machinery

4 Accidents caused by excavation work

Part 1: Workplace accidents involving backhoes
(1) Getting caught / entangled (2) Run over while reversing (3) Debris falling from the bucket
Part 2: Property damage accidents
(1) Buried pipes and cables (2) Overhead lines
Part 3: Soil collapse accidents

5 Paving work: Roller collision accidents

6 Accidents during assembly and dismantling of earth retaining support

(1) Falling from support structures (2) Support materials falling
(3) Damage to buried objects during sheet pile driving

7 Accidents during loading and unloading operations using cranes and backhoes

(1)Cranes overturning (2) Suspended loads falling
(3) Getting caught between suspended loads
(4) Accidents specific to loading and unloading operations using backhoes

8 Accidents specific to pipe installation work

(1) Dislodgement of water pipes (2) Getting caught or entangled during pipe lifting operations
(3) Workplace accidents during pipe cutting operations

9 Accidents involving falls from ladders

10 Accidents involving workers tripping

(1) Slipping and falling (2) Tripping and falling

11 Accidents related to machinery and equipment operations

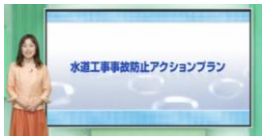
(1) Falling from openings, buildings, and equipment
(2) Getting caught in, entangled, or electrically shocked by machinery and equipment

12 Accidents caused by strong winds (flying construction signs, etc.)

13 Accidents during tree cutting and felling operations

Measures to prevent the recurrence of the 13 frequent accidents listed above are outlined in the action plan developed in FY 2012.

Text (PDF)



Video Materials

*This Plan is also available for download from the Tokyo Metropolitan Government Bureau of Waterworks website.
(https://www.waterworks.metro.Tokyo.lg.jp/)