



STATE OF NEW YORK DEPARTMENT OF HEALTH

FATALITY ASSESSMENT AND CONTROL EVALUATION

Worker Crushed by a Crate of Glass at a Residential Construction Site

Case Report: 06NY001

SUMMARY

On January 9, 2006, a 60 year-old male ironworker employed by an ornamental metal working company sustained fatal injuries when a crate of glass panes fell on him at a residential construction site. On the day of the incident, the company was contracted to install curtain walls (large double-paned thermal insulated glass) at the residence. Prior to installation, the workers staged the crates containing multiple plates of glass in such a way that when the crates were opened, the plates of glass would not fall out and the top glass sheet could be easily retrieved. The workers stood the crates on their sides, tilted them to a slight angle and supported the crates with either wooden bars (legs) or another crate of similar size and weight. When crates are staged in pairs, they form an upright triangle or "A" frame with the tops of the two crates touching and supporting each other. The incident happened while the workers were staging two crates (A and B) into an "A" frame. Crate A weighed approximately 1,859 pounds (Lbs.) and Crate B weighed approximately 1,943 Lbs. At the time of the incident, the foreman was standing at the north end of the two crates and a co-worker was at the south end. The victim was at the west side of the crates facing Crate B. The foreman directed the workers to push and tilt the crates towards each other. It was witnessed by other contractors working nearby that Crate A slowly overcame the weight of Crate B. Both crates started leaning towards the victim and fell over and the victim was crushed by Crate B. The foreman called 911 to summon emergency medical services (EMS) immediately. EMS arrived at the site within minutes. The victim was pronounced dead at the scene.

New York State Fatality Assessment and Control Evaluation (NY FACE) investigators concluded that to help prevent similar incidents from occurring in the future, glass installation or ornamental metal working companies should:

- ***Ensure that a crane is used to stage large and heavy crates of glass and keep the crates attached to the crane until they are stabilized and chocked;***
- ***Ensure that the employees always chock and brace the tilted crates to prevent them from kicking back and collapsing;***
- ***Conduct a job hazard analysis during the planning phase of a glass installation project to identify potential hazards and develop and implement appropriate control measures to protect workers; and***
- ***Develop written standard operating procedures (SOP) for the safe handling and staging of glass crates and provide employee training and supervision.***

In addition, manufacturers of “A” frame carts should:

- ***Research and explore the possibility of safely adapting these products for use in construction settings.***

INTRODUCTION

On January 9, 2006, a 60 year-old male ironworker employed by an ornamental metal working company sustained fatal injuries when a crate of glass panes fell on him at a residential construction site. At the time of the incident, the company was contracted to install “curtain walls” (double-paned thermal insulated glass) at the residence. NY FACE staff learned of the incident through a newspaper article. The NY FACE investigator contacted the area office of the Occupational Safety and Health Administration (OSHA) to obtain information surrounding the fatal incident. The investigator also visited a construction site to observe local glaziers installing curtain walls. This report is based on information that was collected from OSHA, the Medical Examiner’s office and the site visit.

The victim’s employer had been in business for approximately four years as an ornamental metal working company. Part of their business was glass installation, such as installing storefront windows. All employees including the victim were members of an ironworkers’ union and received union apprenticeship training that included topics of job safety such as personal protective equipment, tool safety, scaffolding, stairway and ladder safety, and fire safety. This was the company’s first fatal incident.

INVESTIGATION

At the time of the incident, the ornamental metal working company was contracted to install curtain walls on a private residential house that was being renovated. It was the first day of the job and there were three employees of the company on site: a foreman, a co-worker and the victim.

On the morning of the incident, a delivery company delivered five crates of glass to the residence using a truck equipped with a crane. The crates were different sizes and weights and each contained multiple plates of double-paned thermal insulated glass. The crates had to be set up or staged in such a way that after they were opened, the plates of glass would not fall out and the top glass sheet could be easily removed. In order to achieve that, it is common practice in the industry to stand the crates on their sides and tilt them to a slight angle while being supported either by wooden bars (legs) or by another crate of similar size and weight. When crates are staged in pairs, they form an upright triangle or “A frame” with the tops of the two crates touching and supporting each other.

The mobile crane began unloading the crates and bringing them to the staging area. The smallest and lightest crate was unloaded first. The workers directed the crane operator to stand the crate vertically on its side. The victim and his co-workers unhooked the crate and proceeded to attach a wooden support bar (leg) to each side of the crate with hex screws using a screw gun. The crate was then tilted slightly and balanced on the two supporting legs.

The next four crates were larger and heavier and were to be staged in pairs (“A” frame). The crane unloaded the first of the four large crates from the truck and placed it vertically on its long side. The

workers attached one wooden bar (re-enforcing brace) on the top end and another on the bottom end of the crate frame using a screw gun with 3 ¼” (inch) hex screws. The crane then unloaded the second large crate and placed it parallel to the first one. The workers tilted the two crates until their tops met and leaned on each other. The workers screwed the other ends of the two re-enforcing braces to the second crate to stabilize the “A” frame structure (Photo 1).

The last two crates (A and B) were much larger. Crate A was unloaded first; it weighed approximately 1,859 pounds (Lbs.) and measured 110” long, 78” wide and 15” thick. The crane placed Crate A lengthwise from north to south. The workers unhooked the crate and began attaching the re-enforcing braces. Meanwhile the crane unloaded Crate B and placed it vertically on its long side parallel to Crate A. Crate B weighed approximately 1,943 Lbs. and measured 117” long, 78” wide and 15” thick. The workers unhooked Crate B, completed attaching the two braces to Crate A and positioned themselves to tilt the two crates towards each other.

At the time of the incident, the foreman was standing at the north end of the two crates and the co-worker was at the south end. The victim was at the west side of the crates facing Crate B (Figure 1). The foreman directed the workers to push and tilt the crates toward each other. It was witnessed by other contractors working nearby that Crate A slowly overcame the weight of Crate B. Both crates started leaning toward the victim and fell over. The victim was crushed by Crate B (Photo 2). The foreman immediately called 911 to summon emergency medical services (EMS). EMS arrived at the site within minutes. The victim was pronounced dead at the scene.

CAUSE OF DEATH

Blunt force trauma to torso including fractures of multiple ribs and bilateral hemothorax.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should ensure that a crane is used to stage large and heavy crates of glass and keep the crates attached to the crane until they are stabilized and chocked.

Many commercial buildings and an increasing number of residential buildings have curtain walls that are thermal insulated glass panels installed over metal framework extrusions. These glass panels are usually large and heavy; they cannot be transported or stored horizontally due to breakage when the glass flexes. Vertical transport and storage of glass panels is universal in the glass industry. At construction sites, crates of glass usually are placed standing on their sides tilting and leaning against a wall or supported by either wooden bars or another crate of similar size and weight on an “A” frame supporting structure. The crates are tilted at an angle so that after the crates are opened, the top sheet can be retrieved and the rest of the panes will remain stable and not fall out. The practice of tilting crates or “A” framing especially when the crates are large and heavy can subject workers to serious or even fatal injuries as in this case.

Employers should arrange for a mobile crane to assist with staging large and heavy glass crates. A crane spread lifting beam, a lifting attachment with two safety swivel hooks may be used to lift and stage two crates simultaneously. The crates should remain attached to the crane until they are tilted to the desired angle, stabilized, chocked and braced. Workers should position themselves at the ends of the crates and at no time should they stand in front of the crates that may fall and crush the workers.

Recommendation #2: *Employers should ensure that the employees always chock and brace the tilted crates to prevent them from kicking back and collapsing.*

Discussion: Once a crate of glass is tilted and supported either by wooden bars or by another crate of glass, the tilted crate should be chocked at its' base to prevent the crate from kicking back and collapsing. In case the crates are large and heavy as in this instance, workers may have to use multiple chocks. After the "A" frame is chocked, bracing bars should be attached to both sides of the frame to reinforce the structure.

Recommendation #3: *Employers should conduct a job hazard analysis during the planning phases of glass installation projects to identify potential hazards and develop and implement appropriate control measures to protect workers.*

Discussion: Before beginning a glass installation job, employers should have a competent person evaluate the task to identify any potential hazards and develop and implement appropriate control measures to protect workers. In this case, large heavy crates were to be tilted and balanced on each other. A pre-job hazard analysis may have identified the safety hazards associated with this task and led the employer to implement appropriate control measures such as using a crane to assist in staging the crates and stabilizing the crates with chocks.

Recommendation #4: *Employers should develop written standard operating procedures (SOP) for safe handling and staging of glass crates and provide employee training and supervision.*

Discussion: During the course of the investigation, the NY FACE investigator visited a job site where glaziers were installing curtain walls. Staging glass crates into an "A" frame is apparently an accepted and common practice in the glass installation trade. This practice could subject workers to fatal injury as happened in this case when large and heavy glass crates are being improperly handled. Employers should develop written standard operating procedures (SOP) for safe staging of glass crates. The SOP should include but not be limited to the following:

- Conduct a job hazard analysis for each glass installation job;
- Use a crane to assist staging large and heavy crates of glass;
- Use a crane spread lifting beam for "A" framing;
- Attach the crates to the crane at all times until the crates are tilted, stabilized, chocked and braced;
- Stand at the ends of the crates when staging and maneuvering the crates (workers should never position themselves in front of the crates); and
- Chock and brace the crates to prevent them from collapsing and kicking back

The employers should provide training to the workers and ensure that workers understand the hazards associated with staging large and heavy crates and strictly follow the safety procedure at each job site.

Recommendation #5: *Manufacturers of "A" frame carts should research and explore the possibility of safely adapting these products for use in construction settings.*

“A” frame carts (Photo 3) are available from material handling and fenestration equipment manufacturers. Currently these carts are mainly being used by the glass manufacturing industry. The “A” frame carts have angled supports and mechanisms to prevent loads from sliding and kicking back. With modification, it may be possible for the “A” frame carts to be used in construction sites and construction workers or glaziers could avoid manually tilting the crates. However, there are no standards or guidelines developed by American National Standards Institute (ANSI) or other standard setting bodies on designing, testing and using “A” frame carts. Manufacturers of the products should research and explore the possibility of safely adapting these devices for use at construction sites.

Keywords: curtain wall, glass installation, construction, crushed by, ironworker, glazier, fenestration

The Fatality Assessment and Control (FACE) program is one of many workplace health and safety programs administered by the New York State Department of Health (NYS DOH). It is a research program designed to identify and study fatal occupational injuries. Under a cooperative agreement with the National Institute for Occupational Safety and Health (NIOSH), the NYS DOH FACE program collects information on occupational fatalities in New York State (excluding New York City) and targets specific types of fatalities for evaluation. NYS FACE investigators evaluate information from multiple sources. Findings are summarized in narrative reports that include recommendations for preventing similar events in the future. These recommendations are distributed to employers, workers, and other organizations interested in promoting workplace safety. The FACE program does not determine fault or legal liability associated with a fatal incident. Names of employers, victims and/or witnesses are not included in written investigative reports or other databases to protect the confidentiality of those who voluntarily participate in the program.

Additional information regarding the New York State FACE program can be obtained from:

New York State Department of Health FACE Program
Bureau of Occupational Health
Flanigan Square, Room 230
547 River Street
Troy, NY 12180

1-866-807-2130

www.nyhealth.gov/nysdoh/face/face.htm



Photo 1 (courtesy of OSHA). The first “A” frame that was set up by the workers. The smaller crate supported by the two wooden bars is on the right.

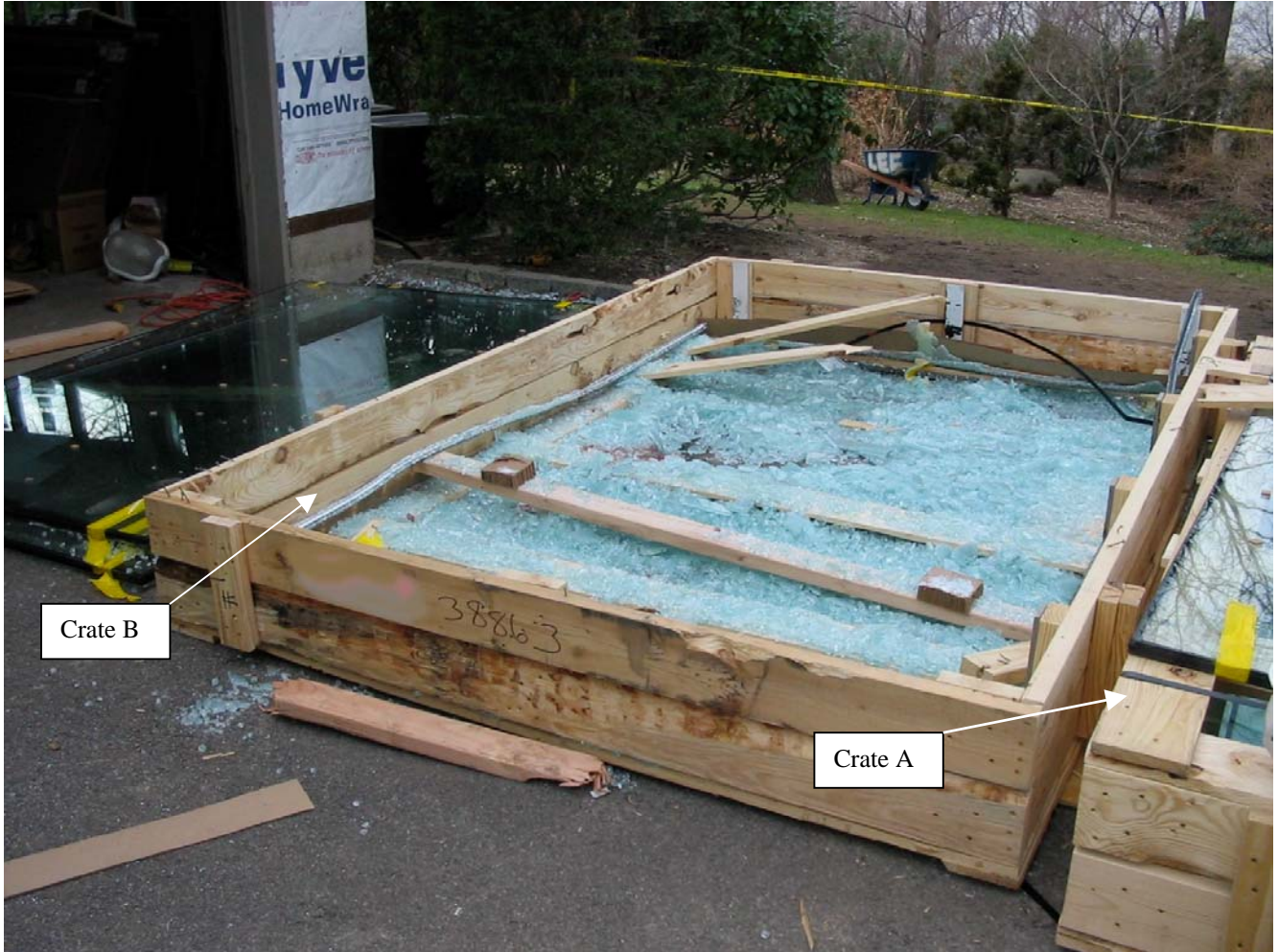


Photo 2 (courtesy of OSHA). Crate B was overcome by Crate A, fell on the victim, and crushed him.

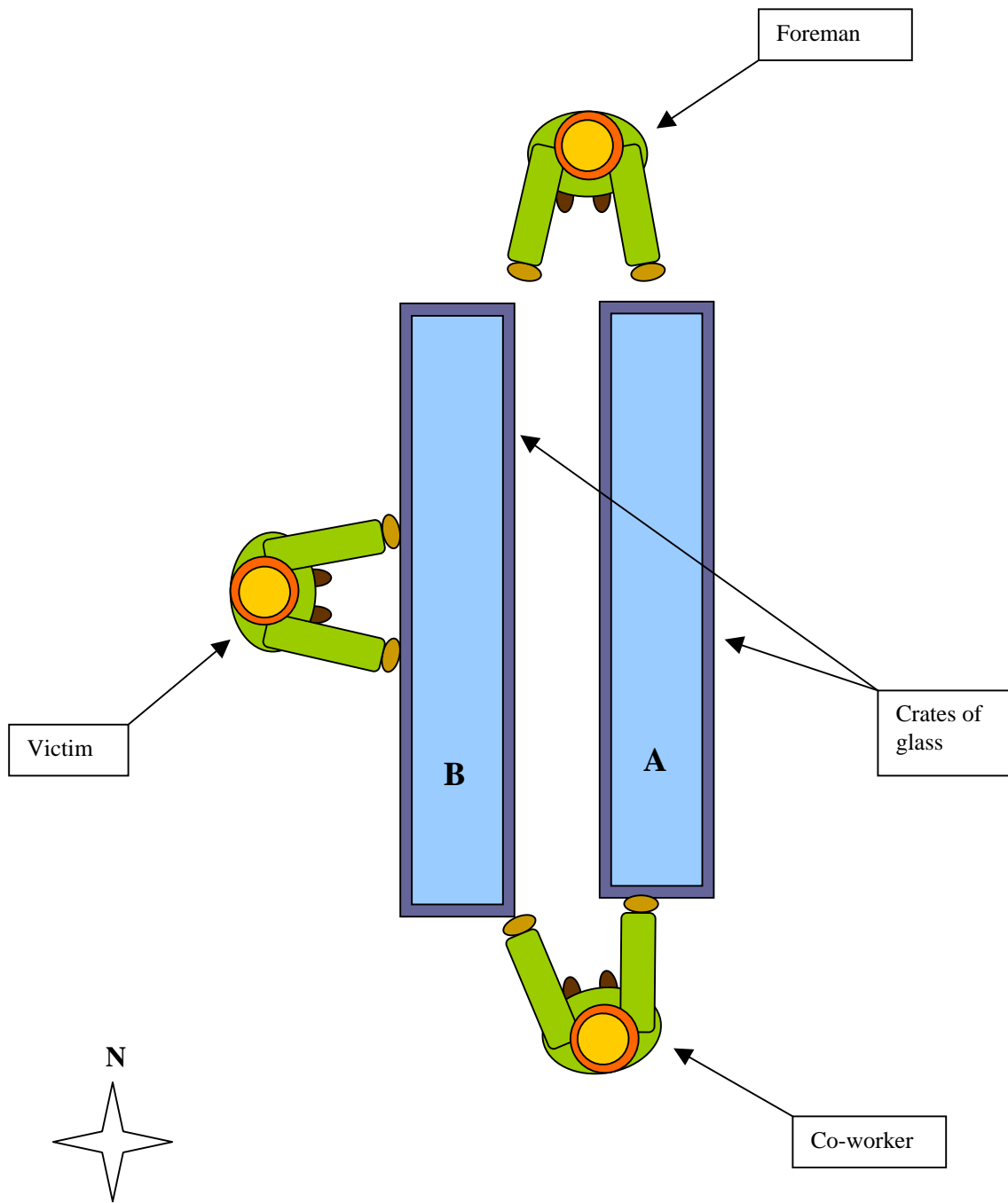


Figure 1. The positions of the victim and his co-workers and the two crates of glass.



Photo 3. An example of “A” frame cart. *

**New York State Fatality Assessment and Control Evaluation (NY FACE) does not endorse any specific commercial product.*