

# NJ FACE INVESTIGATION REPORT



*Fatality Assessment & Control Evaluation Project*

FACE 14-NJ-08

February 5, 2016

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## **Plant Manager Crushed to Death Under Fallen Pile of Steel Beams**

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A 65-year-old male plant manager was killed after a pile of steel beams fell over and crushed him. The incident occurred in the yard of a steel beam processing and distribution warehouse facility in northern NJ. On the day of the incident, the victim was walking between an unsecured, stacked pile of steel beams and a flatbed trailer that was being loaded. As the victim walked between the pile and the trailer, the pile of beams toppled over, pinning him underneath. The victim suffered blunt impact injuries of the head and neck, and was pronounced dead on the scene by paramedics approximately twenty minutes later.

### Contributing Factors

- Unstable, unsecured stacking of beams
- Excessive amount of material stacked in yard instead of staging area

NJ FACE investigators recommend that these safety guidelines be followed to prevent similar incidents:

- **Steel beams should be properly stacked, blocked, interlocked and limited in height to ensure stability.**
- **Beams should be moved and stacked by certified crane operator, and stacks should be routinely inspected for stability by a competent person.**
- **A safety and health plan based on a job hazard analysis should be developed by the employer and followed where workers are assigned tasks.**



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## **INTRODUCTION**

In spring 2014, NJ FACE staff was notified of the death of a 65-year-old male plant manager who was killed after being pinned underneath a fallen stack of steel beams. The incident occurred in a metal warehousing and distribution facility in northern NJ. The victim had worked for this company for over 10 years, and was in charge of safety, payroll, equipment, and plant supervision (including tracking employee performance). The company provided on-site training to the 40 total workers; all crane operators received formal onsite training, but it was not mandatory to be a certified crane operator (the employer has since changed this policy requiring certification for all crane operators). Employees worked 24 hours/day split into three shifts.

A NJ FACE investigator received notification from the OSHA Area Office, and conducted an investigation. Additional information was obtained from the medical examiner's report, death certificate, police report, and the news media.

## **INVESTIGATION**

The incident occurred on a calm, dry, spring day (approximately 32° F at the time of the incident, wind speed up to seven mph), with no significant precipitation recorded. The incident site was located in the yard of the 1,000,000ft<sup>2</sup> processing and distribution warehouse (Figure 1).

This facility buys bulk quantities of structural steel beams from various steel mills (approximately 90% domestic, 10% foreign mills), and resells the steel in smaller quantities to construction companies. The bulk steel comes to the facility via rail cars or trucks. After the shipments arrive, they are unloaded via a 20-ton overhead gantry crane (Figure 1). Standard practice is to unload the steel in a staging area, where it is then organized and inventoried.

The day before the incident, there was a tractor trailer truck shortage on site resulting in the beams being unloaded onto the ground next to the rail car instead of the stocking location. Due to the truck shortage, the beams on the rail cars were being picked and piled quickly in order to access beams that were needed for an order (called a "hot" order). There was only room for one rail car and one trailer because of the excessive material stacked in the yard. On the day of the incident, the victim went into the yard to give a written order to the worker unloading the rail car for an off rail car "hot" order. Approximately 20 minutes earlier, a pile of six beams was unloaded, presumably for the same reason (a hot order), and piled them on wooden dunnage (dunnage is used to prop up a pile in order to get chains on/off for

connection to gantry crane). Figure 2 is a re-creation of this pile. As the victim was walking between the pile of steel beams and a tractor trailer flat bed, the pile toppled over, pinning him underneath (Figure 3). Paramedics were called and the victim was pronounced dead at the scene shortly afterwards.

**FIGURE 1. Incident site, the yard of a steel beam warehousing facility: a) gantry crane; b) stacked beams.**

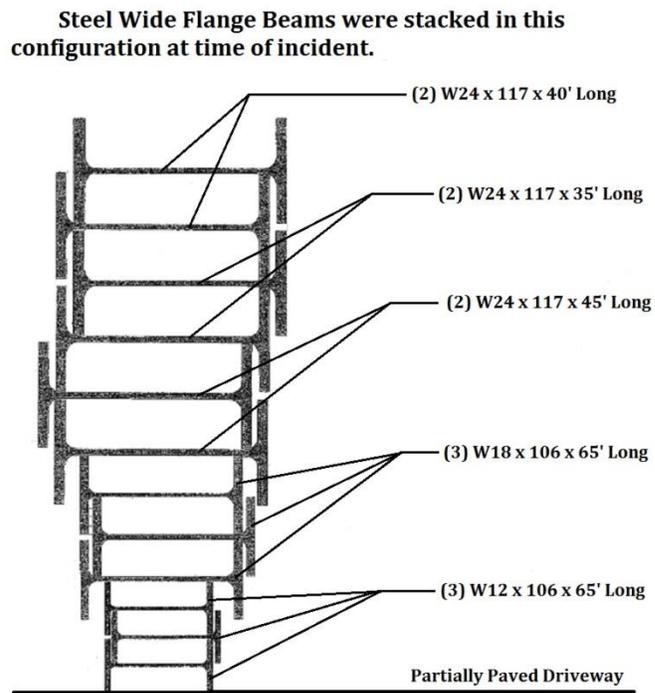


a)



b)

**FIGURE 2: Recreation of the pile before it fell (courtesy of OSHA).**



**FIGURE 3. Scene of incident.**

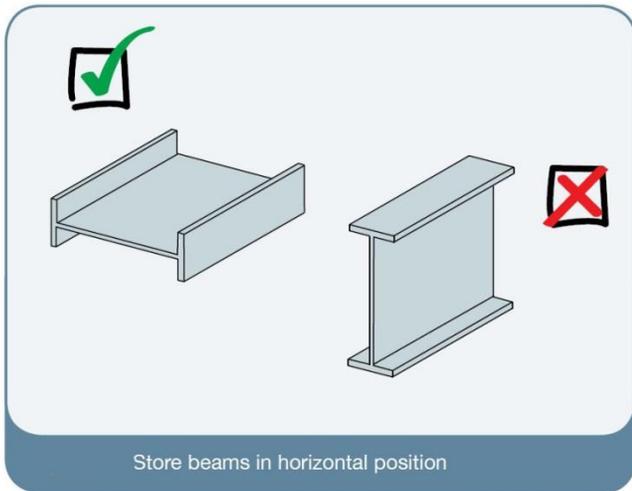


## RECOMMENDATIONS/DISCUSSIONS

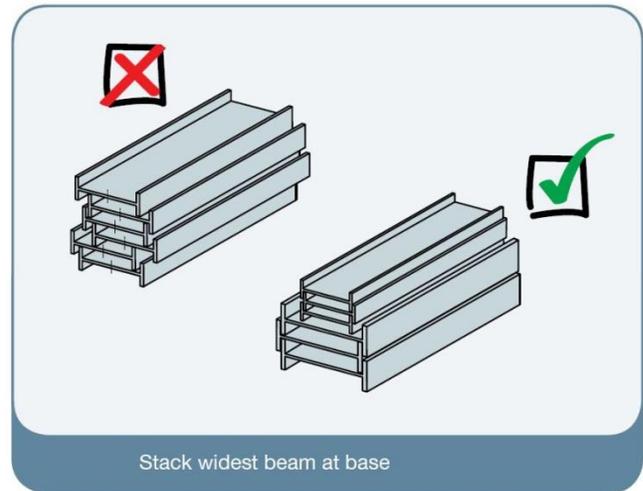
**Recommendation #1: Steel beams should be stacked, blocked, interlocked and limited in height to ensure stability.**

**Discussion:** As per 29 CFR 1910.176(b), when storing materials (such as steel beams) in tiers, the materials should be stacked, blocked, interlocked, and limited in height in such a way that the stack is stable.<sup>1</sup> With respect to steel beams, this can be accomplished in several ways. Figure 4 illustrates recommended practices for stacking beams; they should be horizontal, with the widest beams at the bottom, shorter beams on top of longer beams. In addition, the stack should be centered; Figure 5 shows a centered stack of steel beams. In this incident, the beams were stacked with the narrowest at the bottom (see Figure 2), and not centered. In addition, NJ FACE recommends the use of steel dunnage rather than wood (Figure 6a-b).

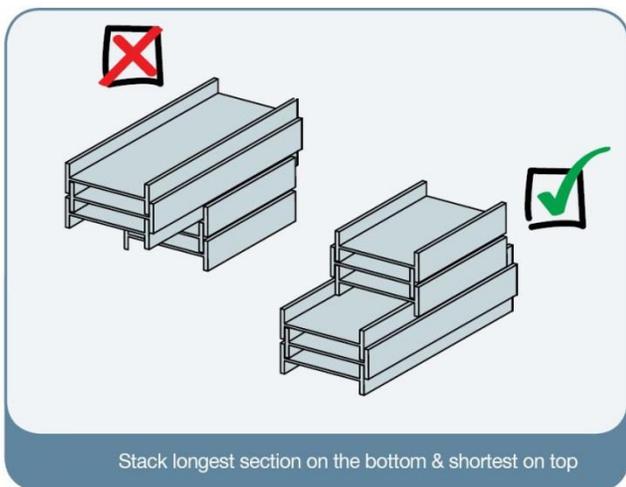
**FIGURE 4 (a-d). Guidelines of proper stacking techniques for steel beams (a. orientation of beams; b. widest beams at the bottom; c. longest beams at the bottom; d. stack should be centered). \***



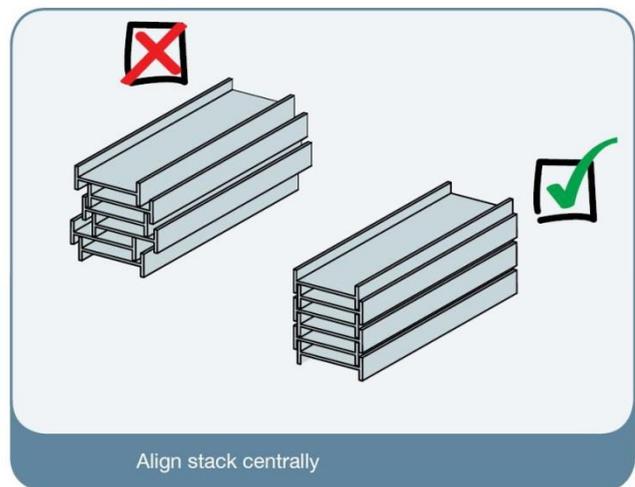
**a**



**b**



**c**



**d**

\*Used with permission from BlueScope Steel Limited.<sup>2</sup>

**FIGURE 5. Stable, centered stack of steel beams.**



**FIGURE 6a-b. Examples of different dunnage materials. a. wood; b. steel.**



**a. Wooden dunnage**



**b. Steel dunnage**

**Recommendation #2: Beams should be moved and stacked by certified crane operator, and stacks should be routinely inspected for stability by a competent person.**

**Discussion:** Only properly trained personnel, that is a certified crane operator, should stack steel beams. In addition, on regularly scheduled intervals, stacks should be inspected by a competent person (a person who is capable of identifying workplace hazards relating to the specific operation and has the authority to correct them<sup>3</sup>), to ensure they are stacked properly and are secure. This is especially important in the loading and unloading areas, where piles are frequently being moved, added to, or picked from. The competent person who inspects the piles should be properly trained how to do so, and have knowledge regarding materials handling and storage (29 CFR 1910.176(b)).

**Recommendation #3: A safety and health plan based on a job hazard analysis should be developed by the employer and followed where workers are assigned tasks.**

**Discussion:** Employers should conduct a job hazard analysis, with the participation of employees, of all work areas and job tasks. A job hazard analysis should begin by reviewing the work activities for which the employee is responsible and the equipment that is needed. Each task is further examined for mechanical, electrical, chemical, or any other hazard the worker may encounter. In this case, a pre-job evaluation may have prevented the fatality by revealing the hazard inherent in the way the steel beams were stacked. A source of information on conducting a job hazard analysis can be obtained from the US Department of Labor.<sup>4</sup>

## APPENDIX

### RECOMMENDED RESOURCES

It is essential that employers obtain accurate information on health, safety, and applicable OSHA standards. NJ FACE recommends the following sources of information which can help both employers and employees:

#### **U.S. Department of Labor, Occupational Safety & Health Administration (OSHA)**

Federal OSHA can provide information on safety and health standards on request. OSHA has several offices in New Jersey that cover the following counties:

-  Hunterdon, Middlesex, Somerset, Union, and Warren counties.....732-750-3270
-  Essex, Hudson, Morris, and Sussex counties.....973-263-1003
-  Bergen and Passaic counties.....201-288-1700
-  Atlantic, Burlington, Cape May, Camden, Cumberland, Gloucester,  
Mercer, Monmouth, Ocean, and Salem counties.....856-757-5181
-  Web site: [www.osha.gov](http://www.osha.gov)

#### **New Jersey Public Employees Occupational Safety and Health (PEOSH) Program**

The PEOSH Act covers all NJ state, county, and municipal employees. Two state departments administer the Act: the NJ Department of Labor and Workforce Development (NJDLWD), which investigates safety hazards, and the NJ Department of Health (NJDOH), which investigates health hazards. PEOSH has information that may also benefit private employers.

##### NJDLWD, Office of Public Employees Safety

-  Telephone: 609-633-3896
-  Web site: [www.nj.gov/labor/lse/lspeosh.html](http://www.nj.gov/labor/lse/lspeosh.html)

##### NJDOH, Public Employees Occupational Safety & Health Program

-  Telephone: 609-984-1863
-  Web site: [www.nj.gov/health/peosh](http://www.nj.gov/health/peosh)

##### On-site Consultation for Public Employers

-  Telephone: 609-984-1863 (health) or 609-633-2587 (safety)
-  Web site: [www.state.nj.us/health/eoh/peoshweb/peoshcon.htm](http://www.state.nj.us/health/eoh/peoshweb/peoshcon.htm)

## **New Jersey Department of Labor and Workforce Development, Occupational Safety and Health On-Site Consultation Program**

This program provides free advice to private businesses on improving safety and health in the workplace and complying with OSHA standards.

☎ Telephone: 609-984-0785

💻 Web site: [www.nj.gov/labor/lsse/lsonsite.html](http://www.nj.gov/labor/lsse/lsonsite.html)

## **New Jersey State Safety Council**

The New Jersey State Safety Council provides a variety of courses on work-related safety. There is a charge for the seminars.

☎ Telephone: 908-272-7712.

💻 Web site: [www.njsafety.org](http://www.njsafety.org)

## **Internet Resources**

Other useful Internet sites for occupational safety and health information:

- CDC/NIOSH – [www.cdc.gov/niosh](http://www.cdc.gov/niosh)
- USDOL Employment Laws Assistance for Workers and Small Businesses – [www.dol.gov/elaws](http://www.dol.gov/elaws)
- National Safety Council – [www.nsc.org](http://www.nsc.org)
- NJDOH FACE reports – [www.nj.gov/health/surv/face/index.shtml](http://www.nj.gov/health/surv/face/index.shtml)
- CDC/NIOSH FACE – [www.cdc.gov/niosh/face/faceweb.html](http://www.cdc.gov/niosh/face/faceweb.html)
- OSHA – [www.osha.gov](http://www.osha.gov)
- ANSI – [www.ansi.org](http://www.ansi.org)

## **REFERENCES**

1. 29 CFR 1910.176(b); Handling materials—general; *Secure Storage*.
2. BlueScope Steel Limited. 2013. Guidelines for storage and handling Blue Scope Steel's products. Document Reference Number: BZ-PS-G-03.01. Revision 0. Available at: <http://www.bluescopesteel.com.au/files/dmfile/GuidelinesStorageAndHandlingBlueScopSteelProductsMarch2013.pdf> . Accessed October 13, 2015.
3. OSHA Safety and Health Topics. Competent Person. Available at: <https://www.osha.gov/SLTC/competentperson/> . Accessed February 4, 2016.
4. *Job Hazard Analysis*. US Department of Labor Publication # OSHA-3071, 1998 (revised). USDOL, OSHA Publications, PO Box 37535, Washington DC 20013-7535

**Fatality Assessment and Control Evaluation (FACE) Project**  
**Investigation # 14-NJ-08**

This report was prepared by staff members of the New Jersey Department of Health's Occupational Health Surveillance Unit. The goal of FACE is to prevent fatal work-related injuries by studying the work environment, the worker, the task, the tools the worker was using, the energy exchange resulting in the fatal injury, and the role of management in controlling how these factors interact. FACE gathers information from multiple sources that may include interviews of employers, workers, and other investigators; examination of the fatality site and related equipment; and reviewing OSHA, police, and medical examiner reports, employer safety procedures, and training plans. The FACE program does not determine fault or place blame on employers or individual workers. Findings are summarized in narrative investigation reports that include recommendations for preventing similar events. All names and other identifiers are removed from FACE reports and other data to protect the confidentiality of those who participate in the program.

NIOSH-funded state-based FACE Programs include: California, Iowa, Kentucky, Massachusetts, Michigan, New Jersey, New York, Oregon, and Washington. Please visit the NJ FACE Web site at [www.nj.gov/health/surv/face/index.shtml](http://www.nj.gov/health/surv/face/index.shtml) or the CDC/NIOSH FACE Web site at [www.cdc.gov/niosh/face/faceweb.html](http://www.cdc.gov/niosh/face/faceweb.html) for more information.

The NJ FACE Project is supported by the Centers for Disease Control and Prevention (CDC). The contents of this report are solely the responsibility of the authors and do not necessarily represent the official views of the CDC.



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