

**HBR**

**Crane, Rigging & Lifting Committee Meeting**

**Pasadena, TX, 8Nov2022**

# **Double Fatality Crane Collapse**

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**Safety Engineer**

**Houston South Area Office**

# OSHA Inspection Activity

- Initiated as a Media Referral
- Workplace Incident - Civilian Fatalities
- Inspection under Crane Regional Emphasis Program



LOCAL NEWS

## Two Friendswood men killed after crane falls into traffic along IH-10 just west of Beaumont Thursday

DPS Troopers received reports about the crash around 4:30 p.m. Thursday.



# Company Background



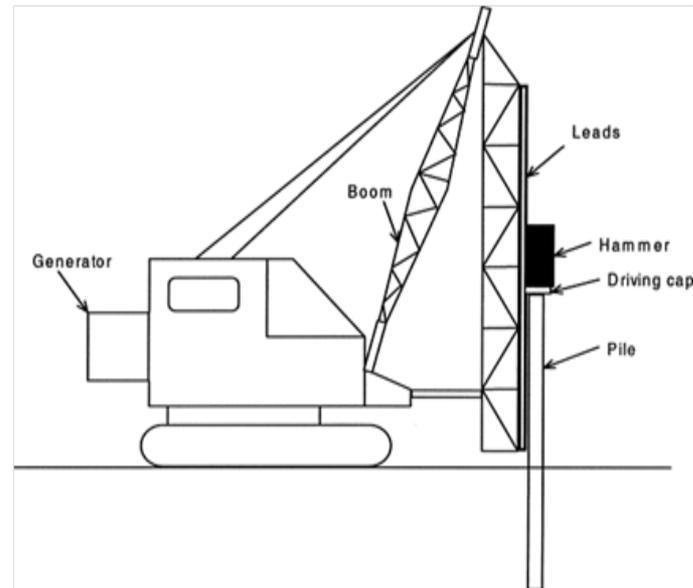
- Pile Driving Subcontractor
- Task: Driving 24-inch square and 40-foot long concrete piles into the ground their entire length by the pressure of the hammer
- Purpose: Providing support and stability for the elevated Interstate 10



# Pile Driving Overview

## Four Main Pieces of Equipment:

- A crawler-mounted crane
- Hammer
- Hammer Rails or Leads
- Two-piece box helmet or 24-inch driving cap



# Situation Leading to the Collapse

- Finished driving the concrete pile into the ground.
- Part of the box helmet was buried in dense mud.
- Using crane to remove the box helmet.

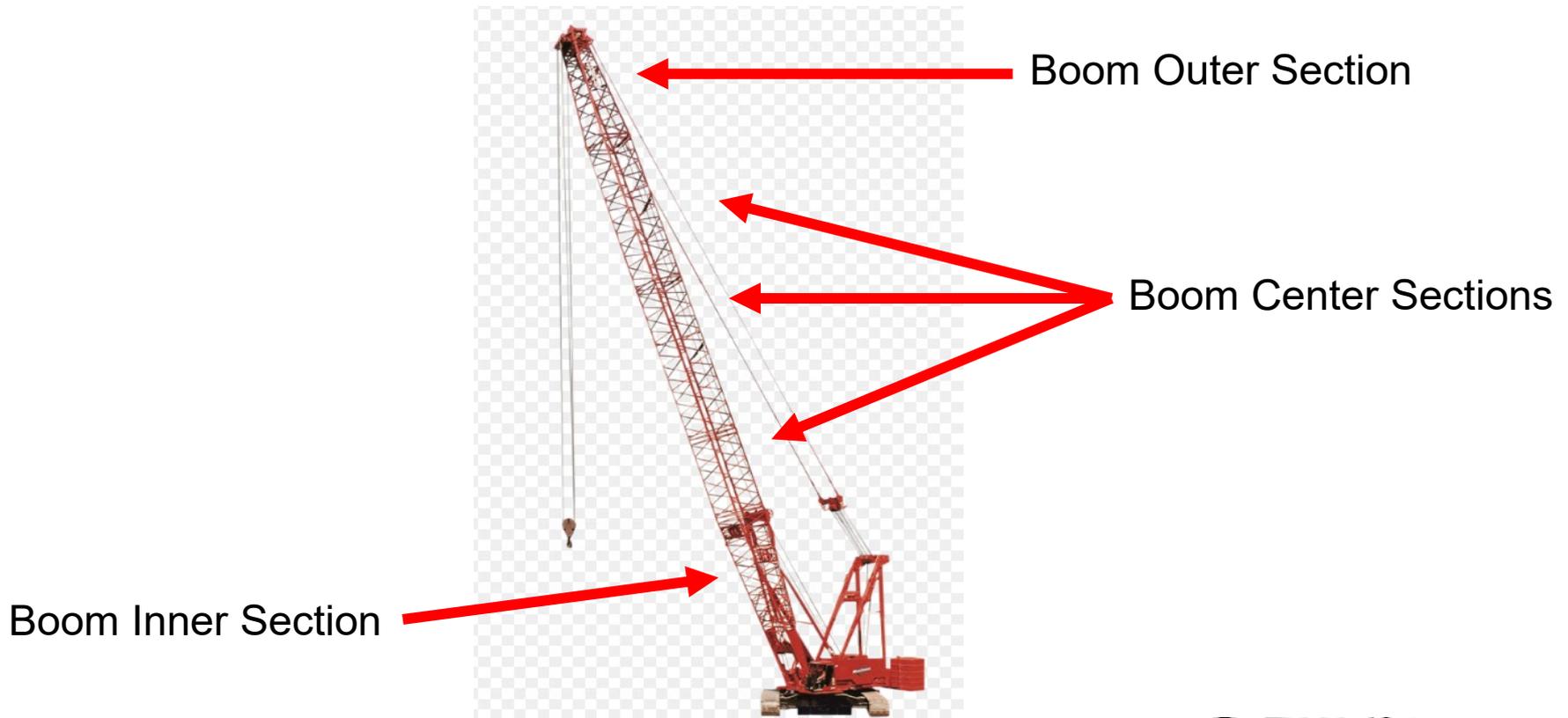


# Why the incident happened?

- DPS preliminary conclusion: Crane “malfunction”
- OSHA Conclusion:
  - Failure to assemble a crane boom properly
  - Failure to determine the correct weight of the load, causing overloading
  - Side pulling a load



# Crane Boom Schematic



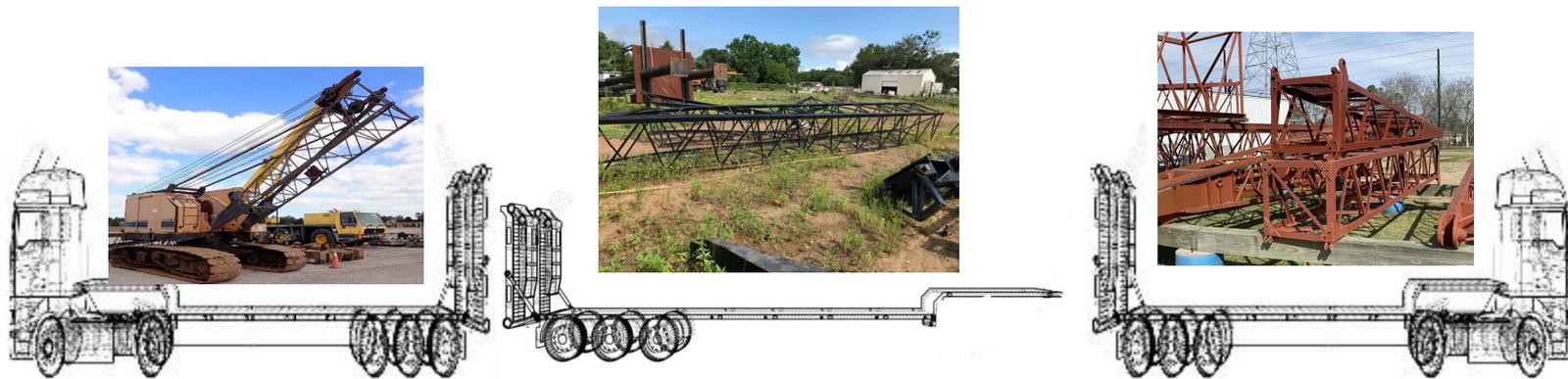
# Crane Boom Assembly

Length	Inner Section	Center Section	Center Section	Outer Section
Manufacturer Configuration	20 feet	20 feet	40 feet	20 feet
Employer Configuration	20 feet	40 feet	20 feet	20 feet



# Selection of crane configuration

- Convenience: Save time, and money
- Owner experience: Configuration used multiple times without incident



# Intermixed Boom Section

- OSHA investigation: Reviewed crane repair records
  - 40-ft buckled section: SR
  - Other 20-ft sections: HR



**Heavy Duty- HR (4")**



**Standard- SR (3.5")**

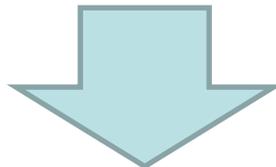
# Assembly Hazards

## Crane manufacturer Hazard Analysis

Incorrect Boom Segment + Intermixed Boom Section



Invalidating Load Chart



Catastrophic Event

# Determining the Load

- Employer Method:

- Load Estimation: Pulled from memory

Load Object	Estimated Weight (lbs)	Actual Weight (lbs)
Hammer	16,000	18,118
Two-piece box helmet	6,000	8,770
<b>Total</b>	<b>22,000</b>	<b>26,888</b>

- ❖ OSHA rejected this method in Crane Regulation Preamble 2010

- Tipping Test: Increasing load weight before tipping off the crane

- ❖ ASME B30.5- Prohibited practice for crane user

# Side Pulling a Load

- Load was to the side of crane cabin.
- ASME B30.5, Section 5-3.2.1.5- Prohibited Practice



# Summary of Citations Issued

- Two (2) serious violations
  - **1926.651(c)(2)** No adequate means of egress for employees working inside the excavation
  - **1926.1417(o)(1)** The crane was operated in excess of its rated capacity.
- Three (3) willful violations
  - **1926.1404(m)(1)(i)** The crane was not set-up in the configuration required by the manufacturer
  - **1926.1417(o)(3)** The employer did not verify that the load was within the rated capacity of the crane
  - **1926.1417(q)** The crane was used to pull loads sideways

**Total proposed penalty = \$212,599**

# How to prevent similar incidents?

- Follow OSHA's crane and derrick regulations
  - Assembling the crane based on manufacturer specifications
  - Determining a load by weighing each pile driving piece of equipment
  - Operating a crane within its capacity
  - Lifting objects directly under the tip of the crane boom

# Lessons Learned

- Always follow safety instruction from MOM!!!
- If in doubt, ask the manufacturer
- Conducting prohibited practices multiple times without an incident  $\neq$  safe practice
- Always follow OSHA and recognized industry standards to decrease incidence rates

**MOM = Manufacturer Operation Manual**

**Questions?**



**[www.osha.gov](http://www.osha.gov)**

**800-321-OSHA (6742)**