5213 Center St.
Pasadena, Texas 77505
(713) 645-0923

Industry Business Roundtable

Alternative Method for Preparing Fixed Equipment Lifts

Loosening skirt rings from foundation by using expanding grout.

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Overview

The Industry Business Roundtable's (IBR) Crane & Rigging (C&R) Committee, composed of SMEs from owners and contractors, collaborated to develop this "Best Practice" **to enhance safety when lifting existing process equipment.** The challenge that owners and contractors have is to ensure the safety of their employees and equipment while maintaining a productive work environment.

Industry Business Roundtable's purpose is to educate participating companies, so that every company represented will be better informed and can make their own decisions. IBR members are not required to adopt the IBR recommendations or policies but to review and apply the best practices that will benefit their workforce where applicable.

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Overview

1.0 Purpose

This practice provides key focus areas **for managing the preparation of fixed existing process equipment for lifting with LHE** and establish “Best Practice” guidance for action plans to eliminate potential damage to process equipment, personnel, and other assets. Provide a Safety resource for employers and employees alike.

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2.0 Applicability

2.1 This practice applies to all entities that **perform fixed existing process equipment lifting** activities.

2.2 Local, state, or federal regulations precede an activity also covered by the crane travel guidance document.

2.3 When the crane travel practice exceeds local, state, or federal regulatory requirements, sites shall also comply with the additional requirements.

3.0 Definitions

3.1 **LHE – Load Handling Equipment**, Equipment used to move a load vertically or horizontally, includes cranes, hoists, derricks, excavators used for lifting, etc.

4.0 Best Practice

Utilizing Expanding Grout to lift and separate a process tower and break the seal between base of tower and tower foundation to prepare for lifting with LHE.

4.1 Material Used

- Dexpan Expanding Grout type 2 (23F-50F)
- Water
- Thinset mixing paddle

Cordless drill

4.2 Prework

- Eight equally spaced locations beneath the tower's base support ring were prepared to receive expanding grout by chipping channels into the existing grout.
- Quick-Crete was applied as a temporary forming material to contain grout within the chipped channels; formwork was required only on the exterior side of the base ring for this project but may vary on future installations.
- Anchor bolts and nuts were pre-prepped to ensure unobstructed removal following grout expansion.

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- Anchor bolt nuts were intentionally left hand-tight prior to grout placement to allow proper lift and expansion behavior.

4.3 Execution

- All required equipment (piping, instrumentation, electrical) was removed to provide full access for grout installation.
- Anchor bolt nuts were backed off in accordance with Dexpan expansion-rate calculations to ensure proper lift behavior.
- Grout was mixed strictly following manufacturer instructions to maintain correct reaction characteristics.
- Grout was placed into the prepared channels immediately after mixing to ensure consistent expansion.
- Water-saturated canvas sacks were placed over exposed grout to maintain moisture and to serve as a safety barrier in the event of material popping during the exothermic reaction, per manufacturer warnings.
- Grout moisture and reaction progress were monitored on an hourly basis to prevent premature drying and ensure proper expansion.

4.4 Results

- The expanding grout completed its reaction cycle and produced approximately 3/8 inch of vertical lift, achieving the required separation between the column base ring and the existing grout.
- The tower was successfully lifted off its foundation using load-handling equipment (LHE) in approximately 15 minutes, demonstrating rapid readiness following grout expansion.
- The use of expanding grout ensured full separation of the tower from the existing foundation prior to engaging the LHE, reducing mechanical resistance and improving lift predictability.
- The approach ensured that rigging tension reflected the true weight of the tower, eliminating the risk of hidden adhesion causing excessive or misleading load readings.
- The method eliminated manual separation techniques (jacks, wedges, sledgehammers), reducing labor hours and removing associated safety risks.

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Performing the initial separation well in advance of the crane lift date provided schedule flexibility, reduced critical-path pressure, and improved overall lift planning reliability.

4.5 Lessons Learned

- Temperature is the primary performance driver for expanding grout; both ambient and product temperatures must align with manufacturer specifications to ensure proper expansion and lift.
- Correct product selection is essential; grout kits must match the anticipated temperature range, and multiple temperature-rated kits may be required in regions with variable conditions.
- Water adjustments are mandatory based on temperature conditions to maintain proper reaction behavior and ensure consistent lift performance.
- Standardized mixing and application practices including immediate use after mixing and continuous monitoring—are required to maintain uniform expansion and predictable results.
- Approved use cases include tanks, drums, machinery, and other equipment requiring controlled lift, contingent on adherence to temperature-specific product requirements.

5.0 Process Tower Base Ring

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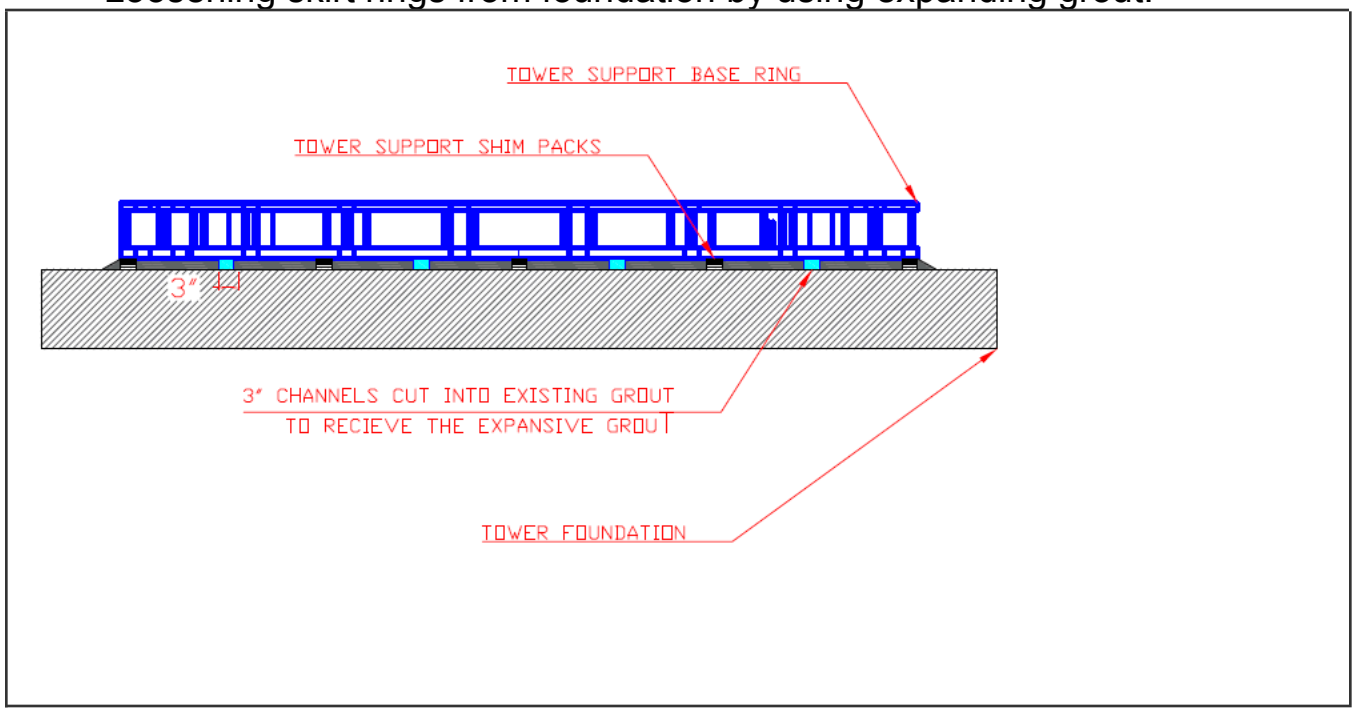

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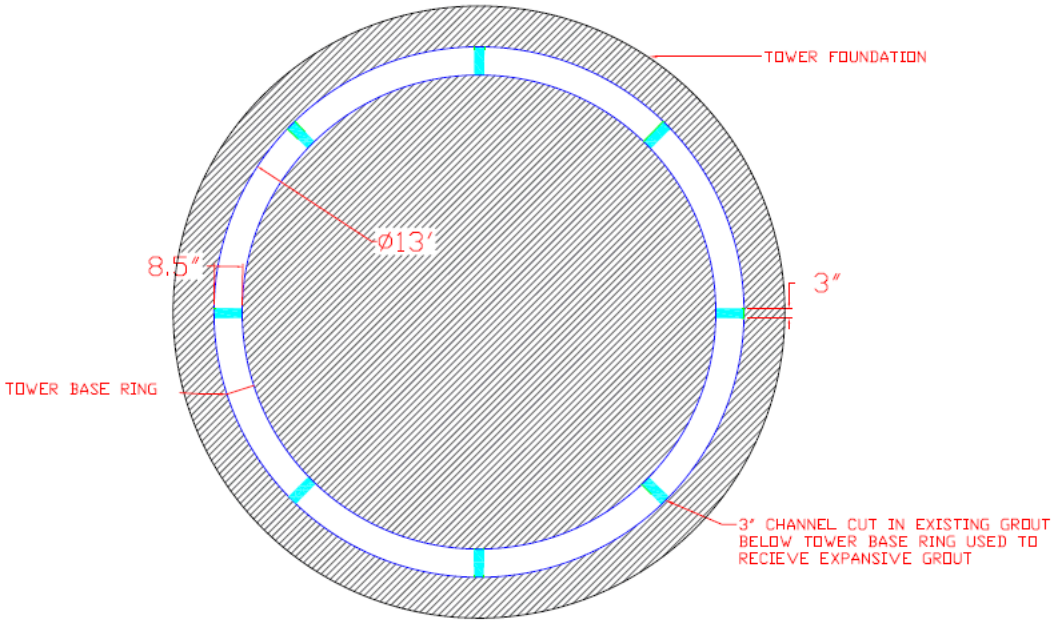

5.0 Training

1. Sites should identify roles for training on this guidance document.

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