

U.S. Department of Labor

Assistant Secretary for
Occupational Safety and Health
Washington, D.C. 20210



MAR 26 2007

Mr. Brian V. Edwards
Assistant Secretary
Kiewit Industrial Co.
8215 Melrose Drive
Lenexa, KS 66214

Dear Mr. Edwards:

This letter is in response to your request to the Occupational Safety and Health Administration ("OSHA" or "the Agency") on behalf of Kiewit Industrial Co. ("Kiewit") for a multistate permanent variance and interim order from the provisions of the OSHA standards that regulate boatswain's chairs and hoist towers, specifically paragraph (o)(3) of 29 CFR 1926.452 and paragraphs (c)(1) through (c)(4), (c)(8), (c)(13), (c)(14)(i), and (c)(16) of 29 CFR 1926.552. Kiewit requests a variance from these provisions during construction of (1) small-diameter, straight-barreled chimneys ("straight-barreled chimneys"), and (2) chimneys built using slip-form techniques and procedures ("slip-form chimneys"). Kiewit proposes an alternative that it asserts will protect its employees at least as effectively as the OSHA standards. This response addresses the request for an interim order made by Kiewit in its variance application.

Background

Kiewit constructs, remodels, repairs, maintains, inspects, and demolishes tall chimneys made of reinforced concrete, brick, and steel. This work, which occurs throughout the United States, requires Kiewit to transport employees and construction material to and from elevated worksites located inside and outside the chimneys. On February 8, 2007, OSHA published an earlier variance application submitted by Kiewit (see 72 Federal Register 6002); this publication also included an interim order that permitted Kiewit to use a rope-guided hoist system to transport employees to elevated worksites when it complies with the conditions specified in the variance application. One of these conditions limited the interim order to tapered chimneys, which was the basis of previous variance grants made by OSHA to other chimney-construction companies.

Kiewit notified OSHA on February 23, 2007, that it required a permanent variance to perform work on small-diameter, straight-barreled chimneys and slip-form chimneys. Kiewit submitted the current variance application to OSHA on March 1, 2007.

The Variance Application

As stated above, Kiewit is seeking a variance from the provisions of OSHA standards that regulate boatswain's chairs and hoist towers for the construction of straight-barreled chimneys and slip-form chimneys. With respect to small-diameter, straight-barreled chimneys, Kiewit contends that their great height and restrictive configuration makes it difficult to attach a hoist tower to the interior wall of the chimney during construction. Under these conditions, Kiewit is proposing to adopt the alternative measures described below instead of complying with the relevant boatswain's-chair and hoist-tower requirements.

With respect to slip-form chimneys, Kiewit makes a similar argument, but asserts further that the unique techniques and procedures involved in slip-form construction make it difficult to attach a hoist tower to both the interior and exterior walls of the chimney during construction. Slip-form construction is an alternative to using formwork to shape concrete structures, including chimney walls. When using slip-form techniques and procedures to construct chimney walls, a contractor pours concrete into forms attached to a platform that moves slowly up a climbing rod imbedded in the previously poured concrete wall, or a mast secured to the interior floor of the chimney. The contractor's employees operate the platform, pour the fresh concrete, inspect the formed concrete, and perform other tasks both inside and outside the chimney from a work deck on the platform, as well as from scaffolds hung from the platform. As a result of this progressive construction process, the concrete wall immediately below the platform for a distance of 20 to 30 feet is insufficiently cured to safely attach a hoist tower. Consequently, during slip-form construction, it is difficult to attach a hoist tower either inside or outside the chimney wall for the purpose of transporting employees to elevated worksites, at least for the last 20 to 30 feet of elevation.

Instead of using a hoist tower to transport employees working on straight-barreled and slip-form chimneys, Kiewit proposes to use the rope-guided hoist system described in permanent variances granted previously by OSHA to other chimney-construction companies (see section below titled "Previous Variances"). Kiewit would use the rope-guided hoist system to raise and lower personnel-transport devices that include personnel cages, personnel platforms, or boatswain's chairs. While Kiewit would attach a hopper or concrete bucket to the hoist system to raise or lower material, it would use personnel cages,

personnel platforms, or boatswain's chairs solely to transport employees with the tools and materials necessary to do their work (i.e., Kiewit would not use these devices to transport only materials or tools in the absence of employees).

Kiewit would use a hoist engine, located and controlled outside the chimney, to power the rope-guided hoist system. The system also would consist of a wire rope that: spools off the hoist drum; passes to a footblock that redirects the rope from the horizontal to the vertical planes; goes from the footblock through the overhead sheaves above the elevated platform; and finally drops to the bottom landing of the chimney where it connects to the personnel or material transport. The cathead, which is a superstructure at the top of a derrick, supports the overhead sheaves. The overhead sheaves (and the vertical span of the hoist system) move upward with the derrick as chimney construction progresses. Two guide cables, suspended from the cathead, eliminate swaying and rotation of the load. If the hoist rope breaks, safety clamps activate and grip the guide cables to prevent the load from falling. Kiewit would use a headache ball, located on the hoist rope directly above the load, to counterbalance the rope's weight between the cathead sheaves and the footblock.

The interior diameters of straight-barreled and slip-form chimneys vary substantially in size, with some chimneys wide enough to easily accommodate a personnel cage, and others so narrow that only a boatswain's chair can travel the length of the chimney. Therefore, Kiewit requested to use a personnel cage, personnel platform, or boatswain's chair to transport its employees to and from elevated worksites when working inside straight-barreled chimneys or inside and outside slip-form chimneys; Kiewit would select the type of transport device based on the diameter of the chimney.¹ Accordingly, Kiewit would use a personnel cage attached to the rope-guided hoist system as the primary device for transporting employees inside chimneys; however, it proposes to use a personnel platform when the diameter of the chimney will not accommodate a personnel cage for this purpose, and a boatswain's chair only when the diameter of a chimney will not accommodate a personnel cage or a personnel platform.

The places of employment affected by Kiewit's variance application are projects where Kiewit constructs straight-barreled and slip-form chimneys. These projects are located in states under Federal authority, as well as State-plan states that have safety and health plans approved by OSHA under Section 18 of the Occupational Safety and Health (OSH) Act (29 U.S.C. 667) and 29 CFR part 1952. Kiewit certifies that it provided the employee representative of the employees who would be affected by the permanent variance with a copy of its variance

¹The lack of space restrictions on the outside of a slip-form chimney makes using a personnel platform or boatswain's chair unnecessary. Therefore, Kiewit would use only a personnel cage to transport employees to and from elevated worksites on the exterior walls of slip-form chimneys.

application; this employee representative is Mr. James Flemming, President of the Central Illinois Building and Construction Trades Council. Kiewit also certifies that it notified its employees of the variance application by posting a copy of the application at locations where it normally posts notices to its employees. In addition, Kiewit attests that it informed its employees and their representative of their right to petition the Assistant Secretary of Labor for Occupational Safety and Health for a hearing on the variance application.

Previous Variances

Since 1973, the Agency has granted permanent variances to a number of chimney-construction companies from the provisions of the OSHA standards that regulate boatswain's chairs and hoist towers, specifically paragraph (o)(3) of 29 CFR 1926.452 and paragraphs (c)(1) through (c)(4), (c)(8), (c)(13), (c)(14)(i), and (c)(16) of 29 CFR 1926.552. The alternatives used by these companies are essentially the same apparatus and procedures that Kiewit is now proposing to use in its variance application; however, those variances differed from this variance application, and the interim order set forth below, because they were designed for tapered-chimney construction. The Agency published the permanent variances for these companies at 38 FR 8545 (April 3, 1973), 44 FR 51352 (August 31, 1979), 50 FR 20145 (May 14, 1985), 50 FR 40627 (October 4, 1985), 52 FR 22552 (June 12, 1987), 68 FR 52961 (September 8, 2003), 70 FR 72659 (December 6, 2005), 71 FR 10557 (March 1, 2006), 72 FR 6002 (February 8, 2007).

Variance from 29 CFR 1926.452(o)(3)

As noted above, it may be necessary to use a boatswain's chair to transport employees to and from elevated worksites when doing work inside a straight-barreled or slip-form chimney because the small diameter of the chimney will not accommodate a personnel cage or personnel platform. Paragraph (o)(3) of 29 CFR 1926.452, which regulates the tackle used to rig a boatswain's chair, states that this tackle must "consist of correct size ball bearings or bushed blocks containing safety hooks and properly 'eye-spliced' minimum five-eighth (5/8") inch diameter first-grade manila rope [or equivalent rope]." This provision allows an employee to safely control the ascent, descent, and stopping locations of the boatswain's chair. However, Kiewit notes in its variance application that the required tackle is difficult or impossible to operate on some chimneys because of space limitations. Therefore, when the small diameter of a chimney requires Kiewit to use a boatswain's chair, and when additional space limitations preclude the safe use of the block and tackle required by 29 CFR 1926.452(o)(3), Kiewit proposes to attach a boatswain's chair to the rope-guided hoist system described above to transport its employees to the elevated worksite (i.e., Kiewit would attach the boatswain's chair to the hoisting cable only when the structural

arrangement inside a chimney precludes safe use of the block and tackle required by 29 CFR 1926.452(o)(3)).

Variance from Paragraph (c) of 29 CFR 1926.552

This provision specifies the requirements for enclosed hoist systems used to transport personnel from one elevation to another. Paragraph (c)(1) of this standard requires employers to enclose hoist towers on the side or sides used for entrance to, and exit from, the chimney; these enclosures must extend the full height of the hoist tower. Paragraph (c)(2) specifies that employers must enclose all four sides of a hoist tower; this enclosure also must extend the full height of the tower.

As an alternative to complying with the hoist-tower requirements of 29 CFR 1926.552(c)(1) and (c)(2), Kiewit proposes to use the rope-guided hoist system described previously in this letter to transport its employees to and from elevated worksites. Use of this hoist system would eliminate the need for Kiewit to comply with other provisions of 29 CFR 1926.552(c) that specify requirements for hoist towers. Therefore, Kiewit is requesting a permanent variance from the following provisions:

- (c)(3) – Anchoring the hoist tower to a structure;
- (c)(4) – Hoistway doors or gates;
- (c)(8) – Electrically interlocking entrance doors or gates that prevent hoist movement when the doors or gates are open;
- (c)(13) – Emergency stop switch located in the car;
- (c)(14)(i) – Using a minimum of two wire ropes for drum-type hoisting; and
- (c)(16) – Construction specifications for personnel hoists, including materials, assembly, structural integrity, and safety devices.

Grant of an Interim Order

As noted earlier, Kiewit requested an interim order that would remain in effect until the Agency makes a decision on its application for a permanent variance. During this period, Kiewit would comply fully with the conditions of the interim order as an alternative to complying with the tackle requirements provided for boatswain's chairs by 29 CFR 1926.452(o)(3) and the requirements for hoist towers specified by paragraphs (c)(1) through (c)(4), (c)(8), (c)(13), (c)(14)(i), and (c)(16) of 29 CFR 1926.552.

Based on its previous experience with permanent variances from these provisions granted to other companies performing construction work on tapered chimneys, OSHA believes that an interim order is justified in this case. As noted

previously in this letter, the Agency has granted a number of permanent variances from these provisions since 1973. Over this period, the affected companies have used effectively the alternative conditions specified in the variances. Based on its experience and knowledge with the rope-guided hoist system, the Agency finds that Kiewit's request for a permanent variance in this instance is consistent with the permanent variances OSHA granted previously to other employers in the chimney-construction industry when they performed construction work on tapered chimneys.

In this regard, the conditions of the interim order requested by Kiewit substantially duplicate the conditions approved recently in the permanent variance granted to American Boiler and Chimney Co. and Oak Park Chimney Corp. (see 68 FR 52961). In granting a permanent variance to American Boiler and Chimney Co. and Oak Park Chimney Corp., the Agency stated, "[W]hen the employers comply with the conditions of the following order, their employees will be exposed to working conditions that are at least as safe and healthful as they would be if the employers complied with paragraph (o)(3) of 29 CFR 1926.452, and paragraphs (c)(1) through (c)(4), (c)(8), (c)(13), (c)(14)(i), and (c)(16) of 29 CFR 1926.552." (See 68 FR 52967.)

Given the Agency's history with the variances granted for tapered chimney construction, OSHA has preliminarily determined that the alternative conditions proposed by Kiewit will protect employees at least as effectively as the requirements of paragraph (o)(3) of 29 CFR 1926.452 and paragraphs (c)(1) through (c)(4), (c)(8), (c)(13), (c)(14)(i), and (c)(16) of 29 CFR 1926.552; therefore, OSHA has decided to grant an interim order to Kiewit pursuant to the provisions of 29 CFR 1905.11(c). Accordingly, in lieu of complying with paragraph (o)(3) of 29 CFR 1926.452 and paragraphs (c)(1) through (c)(4), (c)(8), (c)(13), (c)(14)(i), and (c)(16) of 29 CFR 1926.552, Kiewit will: (1) comply with the conditions listed below in "Specific Conditions of the Interim Order" for the period between the date of this letter and the date the Agency publishes its final decision on Kiewit's application in the Federal Register; and (2) provide notice of this grant of interim order to the employees affected by the conditions of the interim order using the same means it used to inform these employees of its application for a permanent variance. This interim order will remain in effect during this period unless OSHA modifies or revokes it in accordance with the requirements of 29 CFR 1905.13.

Specific Conditions of the Interim Order

The following conditions apply to the interim order being granted by OSHA to Kiewit Industrial Co. as part of its application for a permanent variance described elsewhere in this letter. These conditions specify the alternatives to the

requirements of paragraph (o)(3) of 29 CFR 1926.452 and paragraphs (c)(1) through (c)(4), (c)(8), (c)(13), (c)(14)(i), and (c)(16) of 29 CFR 1926.552. These conditions include:

1. Scope

This interim order applies to:

- (a) Small-diameter, straight-barreled chimneys when Kiewit demonstrates that it cannot attach a hoist tower to the interior wall of the chimney.
- (b) Any chimney under construction using slip-form construction techniques and procedures ("slip-form chimneys").

2. Application

- (a) Kiewit may use a rope-guided hoist system as specified in this interim order to raise or lower its employees between the bottom landing of a chimney and an elevated work location while performing inside chimney construction on small-diameter, straight-barreled chimneys and inside and outside chimney construction on slip-form chimneys.
- (b) Prior to initial use of the rope-guided system, Kiewit must have all drawings containing designs and construction details showing the integration of the rope-guided hoist system with the slip-form system sealed by a professional engineer registered in the United States. Subsequent modifications to these drawings also must be approved by a professional engineer registered in the United States.
- (c) When using a rope-guided hoist system, Kiewit must:
 - (i) Use the personnel cages, personnel platforms, or boatswain's chairs raised and lowered by the rope-guided hoist system solely to transport employees with the tools and materials necessary to do their work; and
 - (ii) Attach a hopper or concrete bucket to the rope-guided hoist system to raise and lower all other materials and tools.
- (d) Except for the requirements specified by 29 CFR 1926.452 (o)(3) and 1926.552(c)(1) through (c)(4), (c)(8), (c)(13), (c)(14)(i), and (c)(16), Kiewit must comply fully with all other applicable provisions of 29 CFR parts 1910 and 1926.

3. Replacing a Personnel Cage with a Personnel Platform or a Boatswain's Chair

- (a) For raising or lowering its employees to or from an elevated work location inside a small-diameter, straight-barreled or slip-form chimney, Kiewit may use a personnel platform or a boatswain's chair under the following conditions:
 - (i) Using a personnel platform. Kiewit may only use a personnel platform when it demonstrates that the diameter of the chimney precludes using a personnel cage for transporting employees.
 - (ii) Boatswain's chair. Kiewit may only use a boatswain's chair when it demonstrates that the diameter of the chimney precludes using a personnel cage or a personnel platform for transporting employees; when using a boatswain's chair for this purpose, Kiewit must comply with the block-and-tackle

requirements specified by 29 CFR 1926.452(o)(3) unless it can demonstrate that the structural arrangement of the chimney precludes such use.

(b) When using the rope-guided hoist system for raising or lowering its employees to or from an elevated work location outside a slip-form chimney, Kiewit must always attach a personnel cage to the system.

4. Qualified Competent Person

(a) Kiewit must:

(i) Provide a qualified competent person, as specified in paragraphs (f) and (m) of 29 CFR 1926.32, who is responsible for ensuring that the design, maintenance, and inspection of the rope-guided hoist system comply with the conditions of this grant and with the appropriate requirements of 29 CFR part 1926 ("Safety and Health Regulations for Construction"); and

(ii) Ensure that the qualified competent person is present at ground level to assist in an emergency whenever the hoist system is raising or lowering employees.

(b) Kiewit must use a qualified competent person to design and maintain the cathead described under Condition 8 ("Cathead and Sheave") below.

5. Hoist Machine

(a) Type of hoist. Kiewit must designate the hoist machine as a portable personnel hoist.

(b) Raising or lowering a transport. Kiewit must ensure that:

(i) The hoist machine includes a base-mounted drum hoist designed to control line speed; and

(ii) Whenever it raises or lowers a personnel or material hoist (e.g., a personnel cage, personnel platform, boatswain's chair, hopper, concrete bucket) using the rope-guided hoist system:

(A) The drive components are engaged continuously when an empty or occupied transport is being lowered (i.e., no "freewheeling");

(B) The drive system is interconnected, on a continuous basis, through a torque converter, mechanical coupling, or an equivalent coupling (e.g., electronic controller, fluid clutches, hydraulic drives);

(C) The braking mechanism is applied automatically when the transmission is in the neutral position and a forward-reverse coupling or shifting transmission is being used; and

(D) No belts are used between the power source and the winding drum.

(c) Power source. Kiewit must power the hoist machine by an air, electric, hydraulic, or internal-combustion drive mechanism.

(d) Constant-pressure control switch. Kiewit must:

(i) Equip the hoist machine with a hand- or foot-operated constant-pressure control switch (i.e., a "deadman control switch") that stops the hoist immediately upon release; and

- (ii) Protect the control switch to prevent it from activating if the hoist machine is struck by a falling or moving object.
- (e) Line-speed indicator. Kiewit must:
 - (i) Equip the hoist machine with an operating line-speed indicator maintained in good working order; and
 - (ii) Ensure that the line-speed indicator is in clear view of the hoist operator during hoisting operations.
- (f) Braking systems. Kiewit must equip the hoist machine with two (2) independent braking systems (i.e., one automatic and one manual) located on the winding side of the clutch or couplings, with each braking system being capable of stopping and holding 150 percent of the maximum rated load.
- (g) Slack-rope switch. Kiewit must equip the hoist machine with a slack-rope switch to prevent rotation of the winding drum under slack-rope conditions.
- (h) Frame. Kiewit must ensure that the frame of the hoist machine is a self-supporting, rigid, welded-steel structure, and that holding brackets for anchor lines and legs for anchor bolts are integral components of the frame.
- (i) Stability. Kiewit must secure hoist machines in position to prevent movement, shifting, or dislodgement.
- (j) Location. Kiewit must:
 - (i) Locate the hoist machine far enough from the footblock to obtain the correct fleet angle for proper spooling of the cable on the drum; and
 - (ii) Ensure that the fleet angle remains between one-half degree ($1/2^\circ$) and one and one-half degrees ($1-1/2^\circ$) for smooth drums, and between one-half degree ($1/2^\circ$) and two degrees (2°) for grooved drums, with the lead sheave centered on the drum.¹
- (k) Drum and flange diameter. Kiewit must:
 - (i) Provide a winding drum for the hoist that is at least 30 times the diameter of the rope used for hoisting; and
 - (ii) Ensure that the winding drum has a flange diameter that is at least one and one-half ($1-1/2$) times the winding-drum diameter.
- (l) Spooling of the rope. Kiewit must never spool the rope closer than two (2) inches (5.1 cm) from the outer edge of the winding-drum flange.
- (m) Electrical system. Kiewit must ensure that all electrical equipment is weatherproof.
- (n) Limit switches. Kiewit must equip the rope-guided hoist system with limit switches and related equipment that automatically prevent overtravel of a personnel cage, personnel platform, boatswain's chair, or material-transport device at the top of the supporting structure and at the bottom of the hoistway or lowest landing level.

¹This provision adopts the definition of, and specifications for, fleet angle from Cranes and Derricks, H. I. Shapiro, et al. (eds.); New York: McGraw-Hill; 3rd ed., 1999, page 592. Accordingly, the fleet angle is “[t]he angle the rope leading onto a [winding] drum makes with the line perpendicular to the drum rotating axis when the lead rope is making a wrap against the flange.”

6. Methods of Operation

(a) Employee qualifications and training. Kiewit must:

- (i) Ensure that only trained and experienced employees, who are knowledgeable of hoist-system operations, control the hoist machine; and
- (ii) Provide instruction, periodically and as necessary, on how to operate the rope-guided hoist system to each employee who uses a personnel cage, personnel platform, or boatswain's chair for transportation.

(b) Speed limitations. Kiewit must not operate the hoist at a speed in excess of:

- (i) Two hundred and fifty (250) feet (76.9 m) per minute when a personnel cage is being used to transport employees;
- (ii) One hundred (100) feet (30.5 m) per minute when a personnel platform or boatswain's chair is being used to transport employees; or
- (iii) A line speed that is consistent with the design limitations of the system when only material is being hoisted (i.e., using a dedicated material-transport device such as a hopper or concrete bucket).

(c) Communication. Kiewit must:

- (i) Use an electronic voice-communication system² to maintain communication between the hoist operator and the employees located in or on a moving personnel cage, personnel platform, or boatswain's chair;
- (ii) Stop hoisting if, for any reason, the communication system fails to operate effectively; and
- (iii) Resume hoisting only when the site superintendent determines that it is safe to do so.

7. Hoist Rope

(a) Grade. Kiewit must use a wire rope for the rope-guided hoist system (i.e., "hoist rope") that consists of extra-improved plow steel, an equivalent grade of non-rotating rope, or a regular lay rope with a suitable swivel mechanism.

(b) Safety factor. Kiewit must maintain a safety factor of at least eight (8) times the safe workload throughout the entire length of hoist rope.

(c) Size. Kiewit must use a hoist rope that is at least one-half (1/2) inch (1.3 cm) in diameter.

(d) Inspection, removal, and replacement. Kiewit must:

- (i) Thoroughly inspect the hoist rope daily;
- (ii) Maintain the proper diameter-to-diameter ratios between the hoist rope and the footblock and the sheave by inspecting the wire rope regularly (see Conditions 7(c) and 8(d) below); and
- (iii) Remove and replace the wire rope with new wire rope when any condition specified by 29 CFR 1926.552(a)(3) occurs.

²OSHA is revising the phrase "a voice-mediated intercommunication system" used in previous variances to "an electronic voice-communication systems" to clarify the requirement.

(e) Attachments. Kiewit must attach the rope to a personnel cage, personnel platform, or boatswain's chair with a keyed-screwpin shackle or positive-locking link.

(f) Wire-rope fastenings. When Kiewit uses clip fastenings (e.g., U-bolt wire-rope clips) with wire ropes, it must:

(i) Use Table H-20 of 29 CFR 1926.251 to determine the number and spacing of clips;

(ii) Use at least three (3) drop-forged clips at each fastening;

(iii) Install the clips with the "U" of the clips on the dead end of the rope; and

(iv) Space the clips so that the distance between them is six (6) times the diameter of the rope.

8. Footblock

(a) Type of block. Kiewit must use a footblock:

(i) Consisting of construction-type blocks of solid single-piece bail with a safety factor that is at least four (4) times the safe workload, or an equivalent block with roller bearings;

(ii) Designed for the applied loading, size, and type of wire rope used for hoisting;

(iii) Designed with a guard that contains the wire rope within the sheave groove;

(iv) Bolted rigidly to the base; and

(v) Designed and installed so that it turns the moving wire rope to and from the horizontal or vertical direction as required by the direction of rope travel.

(b) Directional change. Kiewit must ensure that the angle of change in the hoist rope from the horizontal to the vertical direction at the footblock is approximately 90°.

(c) Diameter. Kiewit must ensure that the line diameter of the footblock is at least 24 times the diameter of the hoist rope.

9. Cathead and Sheave

(a) Support. Kiewit must use a cathead (i.e., "overhead support") that consists of a wide-flange beam, or two (2) steel-channel sections securely bolted back-to-back to prevent spreading.

(b) Installation. Kiewit must ensure that:

(i) All sheaves revolve on shafts that rotate on bearings; and

(ii) The bearings are mounted securely to maintain the proper bearing position at all times.

(c) Rope guides. Kiewit must provide each sheave with appropriate rope guides to prevent the hoist rope from leaving the sheave grooves when the rope vibrates or swings abnormally.

(d) Diameter. Kiewit must use a sheave with a diameter that is at least 24 times the diameter of the hoist rope.

10. Guide Ropes

(a) Number and construction. Kiewit must affix two (2) guide ropes by swivels to the cathead. Kiewit must ensure that the guide ropes:

(i) Consist of steel safety cables not less than one-half (1/2) inch (1.3 cm) in diameter; and

(ii) Be free of damage or defect at all times.

(b) Guide rope fastening and alignment tension. Kiewit must fasten one end of each guide rope securely to the overhead support, with appropriate tension applied at the foundation.

(c) Height. Kiewit must rig the guide ropes along the entire height of the hoist-machine structure.

11. Personnel Cage

(a) Construction. Kiewit must ensure that the personnel cage is of steel-frame construction and capable of supporting a load that is four (4) times its maximum rated load capacity. Kiewit also must ensure that the personnel cage has:

(i) A top and sides that are permanently enclosed (except for the entrance and exit);

(ii) A floor securely fastened in place;

(iii) Walls that consist of 14-gauge, one-half (1/2) inch (1.3 cm) expanded metal mesh, or an equivalent material;

(iv) Walls that cover the full height of the personnel cage between the floor and the overhead covering;

(v) A sloped roof constructed of one-eighth (1/8) inch (0.3 cm) aluminum, or an equivalent material; and

(vi) Safe handholds (e.g., rope grips – but not rails or hard protrusions³) that accommodate each occupant.

(b) Overhead weight. Kiewit must ensure that the personnel cage has an overhead weight (e.g., a headache ball of appropriate weight) to compensate for the weight of the hoist rope between the cathead and footblock. In addition, Kiewit must:

(i) Ensure that the overhead weight is capable of preventing line run; and

(ii) Use a means to restrain the movement of the overhead weight so that the weight does not interfere with safe personnel hoisting.

(c) Gate. Kiewit must ensure that the personnel cage has a gate that:

(i) Guards the full height of the entrance opening; and

(ii) Has a functioning mechanical lock that prevents accidental opening.

(d) Operating procedures. Kiewit must post the procedures for operating the personnel cage conspicuously at the hoist operator's station.

(e) Capacity. Kiewit must:

³To reduce impact hazards should employees lose their balance because of cage movement.

- (i) Hoist no more than four (4) occupants in the cage at any one time; and
- (ii) Ensure that the rated load capacity of the cage is at least 250 pounds (113.4 kg) for each occupant so hoisted.
- (f) Employee notification. Kiewit must post a sign in each personnel cage notifying employees of the following conditions:
 - (i) The standard rated load, as determined by the initial static drop test specified by Condition 10(g) ("Static drop tests") below; and
 - (ii) The reduced rated load for the specific job.
- (g) Static drop tests. Kiewit must:
 - (i) Conduct static drop tests of each personnel cage that comply with the definition of "static drop test" specified by section 3 ("Definitions") and the static drop-test procedures provided in section 13 ("Inspections and Tests") of American National Standards Institute (ANSI) standard A10.22-1990 (R1998) ("American National Standard for Rope-Guided and Nonguided Worker's Hoists – Safety Requirements");
 - (ii) Perform the initial static drop test at 125 percent of the maximum rated load of the personnel cage, and subsequent drop tests at no less than 100 percent of its maximum rated load; and
 - (iii) Use a personnel cage for raising or lowering employees only when no damage occurred to the components of the cage as a result of the static drop tests.

12. Safety Clamps

- (a) Fit to the guide ropes. Kiewit must:
 - (i) Fit appropriately designed and constructed safety clamps to the guide ropes; and
 - (ii) Ensure that the safety clamps do not damage the guide ropes when in use.
- (b) Attach to the personnel cage. Kiewit must attach safety clamps to each personnel cage for gripping the guide ropes.
- (c) Operation. Kiewit must ensure that the safety clamps attached to the personnel cage:
 - (i) Operate on the "broken rope principle" defined in section 3 ("Definitions") of ANSI standard A10.22-1990 (R1998);
 - (ii) Be capable of stopping and holding a personnel cage that is carrying 100 percent of its maximum rated load and traveling at its maximum allowable speed if the hoist rope breaks at the footblock; and
 - (iii) Use a pre-determined and pre-set clamping force (i.e., the "spring compression force") for each rope-guided hoist system.
- (d) Maintenance. Kiewit must keep the safety-clamp assemblies clean and functional at all times.

13. Overhead Protection

- (a) Kiewit must install a canopy or shield over the top of the personnel cage that is made of steel plate at least three-sixteenth (3/16) of an inch (4.763 mm) thick, or material of equivalent strength and impact resistance, to protect employees (i.e., both inside and outside the chimney) from material and debris that may fall from above.
- (b) Kiewit must ensure that the canopy or shield slopes to the outside of the personnel cage.⁴

14. Emergency-Escape Device

- (a) Location. Kiewit must provide an emergency-escape device in at least one of the following locations:
 - (i) In the personnel cage, provided that the device is long enough to reach the bottom landing from the highest possible escape point; or
 - (ii) At the bottom landing, provided that a means is available in the personnel cage for the occupants to raise the device to the highest possible escape point.
- (b) Operating instructions. Kiewit must ensure that written instructions for operating the emergency-escape device are attached to the device.
- (c) Training. Kiewit must instruct each employee who uses a personnel cage for transportation on how to operate the emergency-escape device:
 - (i) Before the employee uses a personnel cage for transportation; and
 - (ii) Periodically, and as necessary, thereafter.

15. Personnel Platforms and Fall-Protection Equipment

- (a) Personnel platforms. When Kiewit elects to replace the personnel cage with a personnel platform in accordance with Condition 3(a) above, it must:
 - (i) Ensure that an enclosure surrounds the platform, and that this enclosure is at least 42 inches (106.7 cm) above the platform's floor;
 - (ii) Provide overhead protection when an overhead hazard is, or could be, present; and
 - (iii) Comply with the applicable scaffolding strength requirements specified by 29 CFR 1926.451(a)(1).
- (b) Fall-protection equipment. Before employees use work platforms or boatswain's chairs, Kiewit must:
 - (i) Equip the employees with, and ensure that they use, full-body harnesses, lanyards, and lifelines as specified by 29 CFR 1926.104 and the applicable requirements of 29 CFR 1926.502(d); and
 - (ii) Ensure that employees secure the lifelines to the top of the chimney and to a weight at the bottom of the chimney, and that the employees' lanyards are attached to the lifeline during the entire period of vertical transit.

⁴Paragraphs (a) and (b) were adapted from OSHA's Underground Construction Standard (29 CFR 1926.800(t)(4)(iv)).

16. Inspections, Tests, and Accident Prevention

(a) Kiewit must:

(i) Conduct inspections of the rope-guided hoist system as required by 29 CFR 1926.20(b)(2);

(ii) Ensure that a competent person conducts daily visual inspections of the rope-guided hoist system; and

(iii) Inspect and test the rope-guided hoist system as specified by 29 CFR 1926.552(c)(15).

(b) Kiewit must comply with the accident-prevention requirements of 29 CFR 1926.20(b)(3).

17. Welding

(a) Kiewit must ensure that only qualified welders weld components of the rope-guided hoist system.

(b) Kiewit must ensure that the qualified welders:

(i) Are familiar with the weld grades, types, and materials specified in the design of the system; and

(ii) Perform the welding tasks in accordance with 29 CFR part 1926, subpart J (“Welding and Cutting”).

Pursuant to 29 CFR 1905.11(c)(3), OSHA will publish this interim order in the Federal Register, along with Kiewit’s request for a permanent variance, and seek comments from the public on the request. If you have any questions concerning this interim order, please contact Ms. MaryAnn Garrahan, Director of the Office of Technical Programs and Coordination Activities in the Directorate of Science, Technology and Medicine, at (202) 693-2110.

Sincerely,


Edwin G. Foulke, Jr.