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Secretary of Labor, :  
Complainant, :  
v. :  
Concrete Metal Forms, Inc., :  
Respondent. :

OSHRC Docket No. **97-1097**

**(EZ)**

Appearances:

Carla Gunnin, Esquire  
Office of the Solicitor  
U. S. Department of Labor  
Birmingham, Alabama  
For Complainant

Mr. Robert Keene  
Mr. Wayne Keene  
Concrete Metal Forms, Inc.  
Jasper, Florida  
For Respondent *Pro Se*

Before: Administrative Law Judge Ken S. Welsch

**DECISION AND ORDER**

Concrete Metal Forms, Inc.(CMF), a formwork subcontractor, erected formwork for the construction of a new Baldwin County jail in Bay Minette, Alabama. While the concrete finishing contractor was pouring concrete for the third level deck on June 2, 1997, the deck collapsed and twenty-two employees were injured. The Occupational Safety and Health Administration (OSHA) conducted an inspection of the collapse. As a result of the inspection, CMF received a serious citation for failing to erect formwork capable of supporting all reasonably anticipated loads in violation of § 1926.703(a)(1); for failing to have drawings or plans available on-site in violation of § 1926.703(a)(2); for failing to have the erected shoring inspected by an engineer in violation of § 1926.703(b)(8)(i); and for failing to have each tier of shoring diagonally braced in violation of § 1926.703(b)(8)(iv). OSHA proposes penalties totaling \$4,200. CMF timely contested the alleged violations.

The case is designated for E-Z trial proceedings pursuant to Commission Rule 200, *et seq.* The Secretary withdrew item 2, an alleged violation of § 1926.703(b)(2) (Tr. 5, 51). The hearing was held on October 24, 1997, in Jacksonville, Florida. CMF was represented by Wayne Keene, the father of CMF's vice-president.

CMF argues that the general contractor who approved the formwork plans and directed the concrete pour ignored CMF's advice about the method used to pour concrete on the third deck. CMF's arguments, however, ignore CMF's responsibility as the formwork contractor to comply with OSHA standards. The violations are affirmed.

### *The Collapse*

CMF, which was incorporated in August 1996, is managed by Robert Keene, vice-president. Keene has worked since 1969 in his father's formwork company until his father's retirement last year (Tr. 179-181). CMF is a small company with less than ten employees.

In 1997, CMF contracted with Stuart Construction Company, general contractor, to design and erect formwork for the construction of the Baldwin County jail in Bay Minette, Alabama (Tr. 74, 79). This was CMF's first project (Tr. 91, 180). The jail was to be a six-story building. The second level, or mezzanine level, was open in the center to permit guards to observe prisoners incarcerated on the first level (Tr. 62-63).

By June 2, 1997, CMF had erected the formwork to hold the third level plywood decking and metal pans (Exh. R-5; Tr. 68, 106, 131). The deck was ready for the concrete pour. George C. Smith Cement Finishing Company (Smith Cement) was responsible for pouring and spreading the concrete over the deck (Tr. 79). Fuller Stuart, job superintendent for Stuart Construction, oversaw the pouring operation. The crane used to lift the concrete was located on the north side of building. Smith Cement started pouring the concrete on the south side of the deck, working east to west (Tr. 184, 205). Twenty employees of Smith Cement were on the deck spreading the concrete as it was being poured (Tr. 37-38, 78).

While on the third deck observing the pouring operation, Robert Keene of CMF advised Stuart to spread the pour and only partially fill the pan forms to equalize the weight. Stuart told Keene not to worry about the pour (Tr. 183, 232). At approximately 9 a.m., while Keene was on the first floor, the south side of the third level deck which had been poured started to collapse. The entire deck fell (Tr. 73, 213, 216-217). Twenty-two employees were injured; there were no fatalities (Exhs. C-1, C-2(a-g); Tr. 78). The third level deck was approximately 21 feet above the first floor level (Exh. C-4; Tr. 76).

After receiving a telephone call reporting the collapse, Dimitrios Critopoulos, an OSHA safety engineer, arrived at the site around noon on the same day (Tr. 17-18). As a result of his inspection, CMF received a serious citation.

#### *Discussion*

In order to establish a violation of a safety standard, the Secretary must show by a preponderance of the evidence that (1) the cited standard applies to the alleged condition; (2) the terms of the standard were not complied with; (3) employees were exposed to or had access to the violative condition; and (4) the employer knew or could have known of the violative condition with the exercise of reasonable diligence. *Seibel Modern Mfg. & Welding Corp.*, 15 BNA OSHC 1218, 1221-22 (No. 88-821, 1991). The Secretary has the burden of proof.

CMF does not dispute, and the record supports a finding that, the standards cited are applicable to the formwork installed by CMF; that employees, including employees of Smith Cement, were exposed to the condition of CMF's formwork; and that CMF knew or should have known of the conditions in the formwork erection. Robert Keene was present on-site and supervised the erection of the formwork.

The issue remaining as to each alleged violation is whether CMF violated the terms of the standard cited.

## Alleged Violations

### Failure to Support Anticipated Loads

The citation alleges “the formwork was not capable of supporting the weight of the concrete being poured on the second floor.<sup>1</sup>” Section 1926.703(a)(1) provides:

Formwork shall be designed, fabricated, erected, supported, braced and maintained so that it will be capable of supporting without failure all vertical and lateral loads that may reasonably be anticipated to be applied to the formwork.

The standard requires formwork to be capable of supporting all reasonably anticipated loads. The anticipated load for the third level deck included the weight of the plywood decking, metal pans, bridging, and the concrete slab. The anticipated load may also include the rate and order of placing concrete. As noted by the American Concrete Institute (ACI), “failure to regulate properly the rate and order of placing concrete on horizontal surfaces or curved roofs may produce unbalanced loading and consequent failures of formwork” (Exh. C-5). It recommends that “in beam and slab construction, fill the beams first and then work outward equally on both sides in placing the slab” (Exh. R-7). Mark Kiester, structural engineer, testified that concrete should be placed no thicker than 12 to 18 inches and in layers to avoid overloading one area of the formwork with wet concrete (Tr. 110-111).

CMF argues that the method used in pouring the concrete on the third level deck overloaded the formwork and caused the collapse. Robert Keene, who was on the deck observing the pour, testified that the metal pans for the beams were being completely filled with concrete, and Smith Cement was not equalizing the weight (Tr. 225). Robert Keene advised the general contractor “to pour this area slower and fill the pan end caps at bridging and beams half-full and then come back and top it off with the finish pour” (Exh. R-8). Keene testified that he told Fuller Stuart, job superintendent:

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The second floor is referred to as the third level in this decision, and the mezzanine is the second level.

I told him we need to pour the beams half full, the bridging half full, and to equalize weight, more or less to keep -- we have end caps on the end of them, on the pans, and they're 14 inches high. And ain't but three nails in the bottom of them. If you pour a lot of concrete in it, you're going to push the nails out. And that makes it fill up with concrete. So I told , "You need to back off there, off of it, and pour the rest" (Tr. 183).

Also, it is undisputed that Stuart rejected Keene's advice. When asked by OSHA, Stuart stated that nothing was done "because it shouldn't have made any difference" (Tr. 233).

Robert Keene was the only person with first-hand knowledge to testify about the pouring operation on the third level (Tr. 183, 225). To what extent filling the beams and bridging with concrete may have caused an unbalancing of the slab is unknown. The issue, however, is whether the method of pouring the concrete should have been anticipated in the design, fabrication, erection, and bracing of the formwork. The requirement of the standard that formwork "be capable of supporting . . . load" is plainly a performance requirement. *Worcester Steel Erectors Inc.*, 16 BNA OSHC 1409, 1418 (No. 89-1209, 1993.) (The Commission rejects presumption of non-performance if there is unapproved deviations from a manufacturer's specifications.) In the *Worcester* case, the Commission determined that to prove a violation of § 1926.703(a)(1), "the Secretary has the burden to show that, more likely than not, the erected formwork was not strong enough to support the reasonably anticipated load." The employer "can rebut by showing that, more likely than not, the erected formwork was strong enough to support such a load." OSHC at 1419.

Dimitrios Critopoulos, OSHA safety engineer, testified that to determine if the method of pouring the concrete should affect the stability of the formwork, he contacted Smith Cement; the engineer who approved the blueprints for the project; L and A Construction Company, another formwork contractor; and a technical expert in OSHA's regional office. All advised Critopoulos that, if properly erected, the method of pouring the concrete should not have affected the stability of the formwork (Tr. 234-235). Smith Cement told him that the normal method was used to pour the concrete. The engineer and OSHA's technical office stated that the purpose for layering the concrete (partially filling the metal pans) is to avoid air bubbles and make it easier for the vibrator (Tr. 235). Although hearsay, the out-of-court statements to Critopoulos are given weight because they are

unrefuted and are consistent with other evidence. Mark Kiester, CMF's expert, agreed that layering the concrete is important from a finish standpoint because it is easier to use the vibrator and develop good consolidation by reducing the air bubbles (Tr. 159).

Also, contrary to CMF's concerns, there is no showing that prior to the concrete pour, CMF advised the project superintendent or Smith Cement as to a specific method of pouring concrete or of any limitations in the formwork (Tr. 228). The shop drawings and plans did not contain any instructions on pouring concrete (Tr. 227-228). The ACI requires that the "rate and sequence of concrete placing should follow any limitations shown on the formwork drawings" (Exh. R-7). No limitations on the rate and sequence of concrete placing were identified by CMF. Mark Kiester, CMF's expert, testified it is necessary for the formwork contractor to make allowances or notify the contractor placing the concrete how the formwork is designed. It is required by the ACI (Tr. 147).

Although Keene advised the project superintendent against the method of pour, it was not shown he gave warning that the formwork was incapable of supporting the load (Tr. 147). If concerned about the load on the formwork, Keene probably would not have continued working *underneath* the third level deck. Also, it was not shown that he removed the two or three other CMF employees from the project or advised Smith Cement whose employees were working on the deck. Although placing 40 cubic yards of concrete an hour was considered a little quick, Kiester, CMF's expert, agreed it was not an unusual pour. He also agreed that it was not unusual to start pouring on one side and work across the deck (Tr. 124, 157-158). Kiester conceded he had seen no evidence that the concrete was not poured in layers at the time of the accident. Also, photographs he had seen of the concrete pours after the accident showed concrete placed full deck (Tr. 169). Therefore, the record does not establish that the method used to place the concrete was unreasonable or unexpected when erecting formwork.

Even if the method of pouring concrete contributed to causing the collapse, the record shows that the formwork was deficient in its design, erection, and bracing. CMF does not dispute that its shop plans showed the use of only a single-tier system instead of a multi-tier system. CMF used a multi-tier system to hold the third level deck (Tr. 127, 164). It is also undisputed that the second tier of shoring supporting the third floor deck was not diagonally braced (Tr. 202, 204). The structural engineers for the project noted that the ACI considers multi-tier shoring a dangerous practice because the “method of shoring requires a considerable amount of two-directional bracing since the column or vertical load-bearing element is discontinuous within its length. This results in a hinge within the height of the shores that must be stabilized” (Exh. C-4). Further, unrefuted by CMF was Critopoulos’s observation that horizontal pieces of lumber joined inside the T-caps<sup>2</sup> were not properly aligned (Tr. 33-34, 80-81). CMF acknowledges that the formwork system erected was not inspected by an engineer or anyone else after erection (Tr. 202-203). These unrefuted deficiencies in CMF’s formwork system were not shown to be capable of supporting the anticipated load.

Mark Kiester, structural engineer who testified as an expert for CMF, agreed that the shoring needed to be “X-braced” (Tr. 118). He agreed that CMF’s formwork was deficient. He testified, “No, I mean, the formwork was obviously part of the problem” because it fell down (Tr. 153, 160). Even Wayne Keene, the father who represented CMF at the hearing, concluded in closing that there had to be some fault with the shoring or “they wouldn’ta fell” (Tr. 252).

A violation of § 1926.703(a)(1) is affirmed.

#### Lack of Tiered Drawings

The citation alleges “the tiered drawings for the floor forms were not available.” Section 1926.703(a)(2) provides:

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<sup>2</sup> A T-cap, or T-head, is a T-shaped metal clamp which fits on top of the vertical post. T-caps are used every 16 feet to tie the together to support the deck (Tr. 122-123).

Drawings or plans, including all revisions, for the jack layout, for mwork (including shoring equipment), working decks, and scaffolds, shall be available at the jobsite.

CMF does not dispute that its shop drawings of the formwork system for the jail project showed a single tier of shoring. It is also undisputed that CMF was actually using a two-tier system of shoring. Mark Kiester, CMF's expert witness, agreed this was a two-tiered shoring system (Tr. 127, 164). The shop drawings submitted by CMF, therefore, did not reflect the formwork system used for the third level deck (Tr. 42-43, 85, 87, 202) .

The standard requires that formwork drawings or plans be available at the jobsite. CMF's shop drawings were available at the jobsite. However, the requirement to maintain drawings on-site presumes that the drawings accurately reflect the formwork system used at the jobsite. Otherwise, the requirement to have drawings available on-site would be meaningless.

CMF argues that its shop drawings were submitted and approved by the general contractor (Tr. 255). The argument does not show compliance. It ignores the responsibility of the formwork contractor to provide accurate drawings of its system. It is CMF's responsibility to comply with the requirements of the formwork standards and provide accurate drawings. According to Kiester, shop drawings are provided by the subcontractor to show how the job would be accomplished. The drawings are submitted for approval by the engineer of record (Tr. 133). The subcontract agreement required CMF to submit shop drawings "at Subcontractor expense, to Contractor, the Architect and Engineer" (Exh. C-6). CMF's drawings did not have a stamp from the architect or engineer showing approval (Tr. 135).

A violation of § 1926.703(a)(2) is affirmed.

#### No Inspection of Formwork

The citation alleges "the erected two tiers of shoring were not inspected by an engineer qualified in structural design." Section 126.703(b)(8)(i) provides:

The design of the shoring shall be prepared by a qualified designer and the erected shoring shall be inspected by an engineer qualified in structural design.

The requirement for inspection by an engineer applies to situations when single post shores are used one on top of another (tiered). There is no dispute that two-tiered post shores were used by CMF to support the third level deck. Also, CMF acknowledges that an engineer or other qualified person did not inspect the shoring after erection (Tr. 202-203). Mark Kiester, CMF's expert, testified that his practice for multi-story concrete work is to require the shoring drawings be signed and sealed by the designer and the engineer of record (Tr. 108). He agreed that CMF's formwork drawings did not show approval by the engineer or architect (Tr. 135).

CMF argues it was not required by the job specifications and was unaware of OSHA's requirement for inspecting erected shoring (Tr. 203, 254). An employer is presumed to know the requirements of the standard. Robert Keene knew that the formwork was not inspected after erection. Although this was CMF's first project, Robert Keene has worked in the formwork business for more than twenty-five years. Keene testified that he maintained a copy of OSHA standards and was generally aware of its requirements for concrete (Tr. 201).

A violation of § 1926.703(b)(8)(i) is affirmed.

### No Diagonal Bracing

The citation alleges "the upper tier of shoring was not diagonally braced in the same two directions." Section 1926.703(b)(8)(iv) provides:

The single post shores shall be adequately braced in two mutually perpendicular directions at the splice level. Each tier shall also be diagonally braced in the same two directions.

CMF does not dispute the second tier of shoring was not diagonally braced. The lower tier was braced. Also, at the point of joining the lower and upper tiers, the posts were laced (Tr. 204, 251).

The standard is clear and unambiguous. It requires diagonal bracing for "each tier" of shoring. There was no bracing on the second tier. Mark Kiester, CMF's expert witness, testified that two-tiered shoring needs to be cross-braced (Tr. 118-119). He agreed that bracing only the bottom tier was not in compliance (Tr. 161-162). The structural engineers for the project noted that the ACI considers multi-tier shoring a dangerous practice requiring "a considerable amount of two-directional

bracing” to stabilize (Exh. C-4).

A violation of § 1926.703(b)(8)(ii) is affirmed.

#### Serious Classification

In determining whether the violations are serious, the Secretary must show that CMF knew or should have known, with the exercise of reasonable diligence, of the presence of the violations and there was a substantial probability that death or serious physical harm could result from the condition.

The record establishes that CMF knew or should have known of the formwork requirements. CMF is in business to install formwork. Robert Keene was present at the jail project and supervised the formwork (Tr. 180). Although this was CMF’s first project, Robert Keene has worked with his father in the formwork business for more than twenty-five years. He maintained a copy of the OSHA standards and was generally aware of the requirements for concrete construction (Tr. 201). Also, while working in his father’s formwork company, he was inspected by OSHA (Tr. 229).

There is no question that failure to comply with the cited formwork standards could result in serious injury or death. There were twenty-two employees injured from the collapse on the third level decking. The deck was approximately 21 feet above the first floor. Therefore, the violations cited are properly classified as serious.

#### Penalty Consideration

The Commission is the final arbiter of penalties in all contested cases. In determining an appropriate penalty, the Commission is required to consider the size of the employer’s business, history of previous violations, the employer’s good faith, and the gravity of the violation. Gravity is the principal factor to be considered.

CMF is a small company with less than twenty employees. Depending on the nature of the work, there were two to eight employees working on the jail project (Tr. 180). On the day of the accident, there were two employees on-site. CMF has no history of prior violations; this was CMF’s first project (Tr. 41, 180). There is no evidence that CMF did not cooperate during the inspection or failed to take corrective action.

A grouped penalty of \$1,000 is reasonable for violations of §§ 1926.703(a)(1) and 1926.703(a)(2). Robert Keene advised the project superintendent to layer the concrete pour throughout the third level deck to avoid overloading a portion of the deck. According to the ACI, layering is the preferred method of concrete pouring. The project superintendent ignored Keene's advice. Although the lack of cross-bracing and non-aligned horizontal lumber joined inside the T-caps were not shown capable of supporting the anticipated loads, the method of concrete pour may have also contributed to the collapse. Also, the general contractor approved the shop drawings showing a single-tier system.

With regard to the violation of § 1926.703(b)(8)(i), a penalty of \$900 is reasonable. The drawings were approved by the general contractor.

A penalty of \$900 is also appropriate for a violation of § 1926.703(b)(8)(ii). The lower tier shoring was braced, and the connection points were laced. The height of the second tier was approximately 6 feet (Tr. 90).

**FINDINGS OF FACT AND  
CONCLUSIONS OF LAW**

The foregoing decision constitutes the findings of fact and conclusions of law in accordance with Rule 52(a) of the Federal Rules of Civil Procedure.

**ORDER**

Based upon the foregoing decision, it is ORDERED that Serious Citation No. 1 be disposed of as follows:

1. Item 1a, in violation of § 1926.703(a)(1), and item 1b, in violation of § 1926.703(a)(2), are affirmed and a grouped penalty of \$1,000 is assessed.

2. Item 2, in violation of § 1926.703(b)(2), is withdrawn by the Secretary.
3. Item 3, in violation of §1926.703(b)(8)(i), is affirmed and a penalty of \$900 is assessed.
4. Item 4, in violation of § 1926.703(b)(8)(iv), is affirmed and a penalty of \$900 is assessed.

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KEN S. WELSCH  
Judge

Date: December 5, 1997