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Worker Safety in the Construction Industry: The Crane and Derrick Standard

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Worker Safety in the Construction Industry: The Crane and Derrick Standard

Abstract
[Excerpt] The safety of construction workers who toil in close proximity to cranes garnered congressional attention after tower cranes were involved in multiple fatalities at buildings under construction in 2008 (e.g., nine deaths in two incidents in New York City). Additional crane-related fatalities occurred since the House Education and Labor Committee held a hearing on construction worker safety in June 2008, including four employees of a Louisiana-based construction firm who died when the contractor's mobile crane fell at a Houston refinery.

Construction historically has been the most hazardous industry as measured by number of fatalities. With 1,178 out of 4,956 on-the-job fatalities in the private sector in 2007, no other industry ranks higher than construction. The majority of construction deaths usually result from falls and transportation accidents (e.g., 38% and 24%, respectively, in 2007), according to the classification system of the U.S. Bureau of Labor Statistics' Census of Fatal Occupational Injuries. In contrast, most construction fatalities involving cranes are caused by contact with objects and equipment (e.g., struck by a falling crane). In 2007, contact with objects and equipment accounted for 71% of crane-related deaths of workers in the construction industry. An analysis of the Occupational Safety and Health Administration's (OSHA) files of construction fatalities involving cranes most frequently found violations of the following federal construction safety standard: 29 CFR 1926 Subpart N — Cranes, Derricks, Hoists, Elevators and Escalators.

OSHA's crane and derrick standard has been virtually unchanged since its promulgation in 1971. In a July 2002 notice of intent to create a negotiated rulemaking committee, OSHA acknowledged that industry consensus standards had been updated and crane technology had changed considerably over three decades. The Crane and Derrick Negotiated Rulemaking Advisory Committee voted favorably on an extensive revision to the standard in July 2004 and submitted draft regulatory language to OSHA at that time. After slowly proceeding through the rulemaking process, OSHA submitted a draft proposed rule to the Office of Management and Budget (OMB) in June 2008. OMB completed its review on August 28, 2008. Even if OSHA publishes a notice of proposed rule making in early fall, comments of OSHA administrator Foulke at the Education and Labor Committee hearing suggest an updated crane standard is unlikely to become final before the end of 2008.

Although most of the 21 states that operate their own safety and health programs for private sector workers have adopted OSHA's standards, some have developed more stringent regulations for specific hazards in certain industries. For example, many of these states require certification of crane operators: California, Connecticut, Hawaii, Minnesota, Nevada, New Jersey, New Mexico, New York, Oregon, Utah, and Washington (in 2010). To protect the safety and property of their residents, other jurisdictions have promulgated regulations requiring certification of crane operators as well: Massachusetts, Montana, Rhode Island, West Virginia, Washington, D.C., Miami-Dade county, Chicago, Los Angeles, New Orleans, New York City, and Omaha.

Keywords
worker safety, construction, public policy, OSHA

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CRS Report for Congress

Worker Safety in the Construction Industry: The Crane and Derrick Standard

September 9, 2008

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Prepared for Members and Committees of Congress

Congressional Research Service

Worker Safety in the Construction Industry: The Crane and Derrick Standard

Summary

The safety of construction workers who toil in close proximity to cranes garnered congressional attention after tower cranes were involved in multiple fatalities at buildings under construction in 2008 (e.g., nine deaths in two incidents in New York City). Additional crane-related fatalities occurred since the House Education and Labor Committee held a hearing on construction worker safety in June 2008, including four employees of a Louisiana-based construction firm who died when the contractor's mobile crane fell at a Houston refinery.

Construction historically has been the most hazardous industry as measured by number of fatalities. With 1,178 out of 4,956 on-the-job fatalities in the private sector in 2007, no other industry ranks higher than construction. The majority of construction deaths usually result from falls and transportation accidents (e.g., 38% and 24%, respectively, in 2007), according to the classification system of the U.S. Bureau of Labor Statistics' Census of Fatal Occupational Injuries. In contrast, most construction fatalities involving cranes are caused by contact with objects and equipment (e.g., struck by a falling crane). In 2007, contact with objects and equipment accounted for 71% of crane-related deaths of workers in the construction industry. An analysis of the Occupational Safety and Health Administration's (OSHA) files of construction fatalities involving cranes most frequently found violations of the following federal construction safety standard: 29 CFR 1926 Subpart N — Cranes, Derricks, Hoists, Elevators and Escalators.

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Worker Safety in the Construction Industry: The Crane and Derrick Standard

The numerous fatalities involving cranes at building sites in 2008 prompted Congress to focus on construction worker safety. Standards promulgated by the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) address worker safety in the construction industry. So, too, do regulations issued by many jurisdictions.

This report first examines the incidence of fatal and nonfatal on-the-job injuries in the private sector. It next analyzes the causes of fatalities in the construction industry and the involvement of cranes in those deaths. The report then addresses the status of a proposed rule to update OSHA's crane and derrick standard. It closes with an overview of jurisdictions having safety regulations for cranes more stringent, in whole or part, than the existing federal standard.

Fatal and Nonfatal Workplace Injuries

Construction historically has been the most hazardous industry in the United States based on the *number of fatalities*, according to data from the U.S. Bureau of Labor Statistics' (BLS) Census of Fatal Occupational Injuries. With 1,178 out of 4,956 deaths of private sector workers in 2007 — almost one in four on-the-job fatalities — no other industry ranks higher than construction.[1]

Construction's *fatality rate* of 10.3 per 100,000 persons employed in the industry was more than twice the average for all private sector industries (4.0 per 100,000 employed persons) in 2007. The fatality rate in construction was exceeded in only three industry groups: agriculture, forestry, fishing, and hunting (27.3); mining (24.8); and transportation and warehousing (15.9).

Construction also is hazardous when measured in terms of nonfatal injuries. One in ten nonfatal occupational injuries were experienced in the private construction industry in 2006, according to the latest available data from BLS' Survey of

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[1] The data referenced in this report cover the private sector whenever possible because employees of governmental organizations were not fatally injured in the incidents that brought construction safety to the attention of Congress and because employees of the federal government and of state governments and their subdivisions are exempt from coverage under the Occupational Safety and Health Act (OSH Act). The private sector is composed of the following major industry groups: natural resources and mining; construction; manufacturing; trade, transportation, and utilities; professional and business services; and other services, except public administration.

Workplace Injuries and Illnesses. Accounting for 402,500 of the 3.9 million injury cases in the private sector, construction ranked higher than all but three industry groups: manufacturing (777,000), retail trade (572,700) and health care (567,300).

The construction industry's nonfatal injury rate of 5.8 cases per 100 full-time workers in the industry was above the average for the private sector (4.2 cases per 100 full-time workers). Several industries exceeded construction's nonfatal injury rate (e.g., nursing and residential care facilities, 8.5; fishing, hunting and trapping, 8.4; wood products manufacturing, 8.0; animal production, 7.8; beverage, tobacco and primary metal manufacturing, 7.8; and hospitals, 7.5).

Fatalities in the Construction Industry

The safety of construction workers who toil in close proximity to cranes garnered congressional attention after tower cranes had a role in multiple fatalities at buildings under construction in 2008: seven deaths in March and two in May in New York City, two deaths in Miami in March, and one death in Las Vegas in May. In addition to Members of Congress writing to the Labor Department about these deaths and other issues pertaining to workplace safety in construction, the House Committee on Education and Labor conducted a hearing on OSHA enforcement of construction safety standards. Members heard testimony about deaths of construction workers caused by falls specifically.[2] Witnesses also addressed fatalities involving cranes and the status of OSHA's crane and derrick standard.

Additional crane-related fatalities occurred after the Education and Labor Committee held its hearing on June 24, 2008. Among them are four employees of Deep South Crane and Rigging of Louisiana who died as the result of the construction contractor's mobile crane falling at a Houston refinery of LyondellBasell in late July 2008.[3] Reportedly, through the first seven months of 2008, at least 18 workers were killed in construction accidents in which cranes played a role.[4]

Causes of All Private Construction Fatalities

Four causes — falls, transportation accidents, contact with objects and equipment, and exposure to harmful substances or environments — accounted for 94% of fatalities in the private construction industry in 2007, on the basis of the

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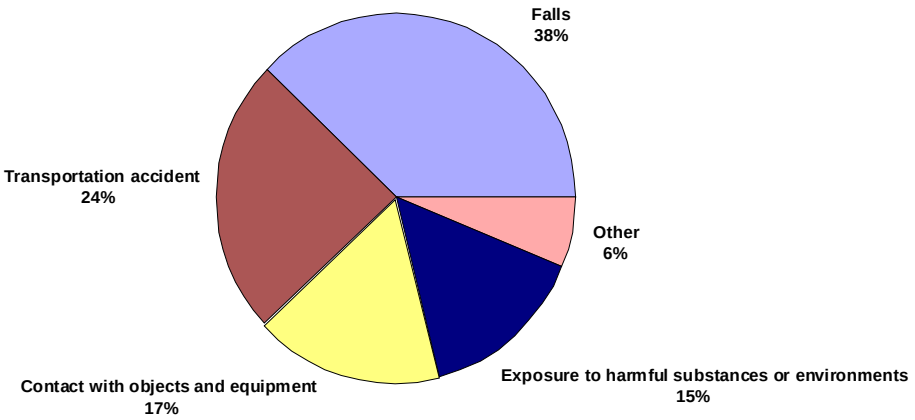
[2] OSHA standards for fall protection in the construction industry are 29 CFR 1926 Subpart E (Personal Protection Equipment and Life Saving Equipment),Subpart M (Fall Protection), and Subpart X (Ladders). Related standards include Subpart L (Scaffolds) and Subpart R (Steel Erection).

[3] Fatalities are classified based on the industry of the deceased worker's employer, which can differ from the industry of the employer at which the fatality occurs (e.g., when on-site contractors are utilized).

[4] Kris Maher, "Democrats Seek Tougher Crane Safety Standard as Deaths Mount," *The Wall Street Journal*, July 25, 2008.

classification system of BLS's Census of Fatal Occupational Injuries (CFOI).[5] As shown in **Figure 1**, almost two in five fatalities were the result of falls (442 of 1,178). Transportation accidents were responsible for almost one in four fatalities; about half of these 283 deaths were due to highway accidents. Contact with objects and equipment caused another 17% of fatalities. About half of the 206 workers fatally injured for this reason were struck by objects and equipment (106); often, the objects and equipment were falling (81). Exposure to harmful substances or environments produced an additional 15% of fatalities. Contact with electric current (e.g., overhead power lines) caused three in five of these 179 fatalities.

Figure 1. Causes of Fatalities in Private Construction, 2007



Source: Created by the Congressional Research Service from the Census of Fatal Occupational Injuries.

A fairly similar picture of the leading causes of construction fatalities emerges from analyses prepared annually by the University of Tennessee's Construction Industry Research and Policy Center (CIRPC) for OSHA.[6] Historically, fall from/through roof has been the most frequent cause of fatalities in the construction industry, and fall from/with structure (other than roof) has been the second leading cause. This is borne out in the CIRPC's analysis of OSHA inspection records of 780 fatal events and 800 fatally injured workers in the construction industry in 2006: falls from/through roof caused almost 13% of all fatal events (98 events and 99 deaths) and falls from/with structures caused about 9% of all fatal events (72 events

[5] BLS releases preliminary CFOI data for the preceding year in August; final data, the following April.

[6] These similarities exist despite the CIRPC utilizing a classification system for causes of fatalities that differs from the BLS system, and despite the CIRPC utilizing only OSHA-inspected fatal events. In contrast, the CFOI collects information from some two dozen additional sources such as death certificates and workers' compensation records. The BLS database also covers self-employed persons among others to whom the OSH Act does not apply (e.g., mine workers, employees in highway, water, rail and air transportation industries).

and deaths).[7] The third-leading cause in 2006 was crushed/run-over of non-operator by operating construction equipment, which produced 8% of the industry's fatal events (63 events and deaths). Electric shock from equipment installation/tool use accounted for almost 8% of fatal events (61 events and deaths). Crushed/run-over/trapped of operator of construction equipment had been the fourth-leading cause in 2005, but in 2006, it dipped to fifth place with 57 fatal events and deaths, or about 7% of the total. On the basis of OSHA's inspection data and CIRPC's classification system, a large minority of fatal events in the construction industry usually are due to these five factors. In 2006, they accounted for 45% of fatal events.

Fatalities Involving Cranes

In 2007, as shown in **Table 1**, there were 35 fatalities in the private construction industry in which cranes played a primary or secondary role or where the worker activity was operating a crane.[8] These deaths represented only 3% of the 1,178 fatal work injuries in the construction industry in 2007. More than one-half of all fatalities in the private sector involving cranes occurred in the construction industry.[9]

Table 1. Fatal Injuries Involving Cranes, 2003-2007

Private Sector[a]	2003		2004		2005		2006		2007p	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All	61	100	85	100	83	100	69	100	66	100
Construction	31	51	40	47	35	42	26	38	35	53

Source: U.S. Bureau of Labor Statistics, Census of Fatal Occupational Injuries.

Note: p = preliminary. In 2003, the census changed to the North American Industrial Classification system.

a. The private sector is composed of natural resources and mining; construction; manufacturing; trade, transportation, and utilities; professional and business services; and other services, except public administration.

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[7] Construction Industry Research and Policy Center, University of Tennessee, Knoxville, *An Analysis of Fatal Events in the Construction Industry 2006*, February 2008.

[8] BLS defines crane-related fatalities as those in which a crane is the primary source of the injury (e.g., crane collapses on laborer), the secondary source of the injury (e.g., one crane strikes another crane which drops its load on a signal person), or in which the worker activity is operating a crane.

[9] Two other industries that regularly experience fatalities in which cranes play a role are manufacturing and mining. In 2007, crane-related fatalities at manufacturers accounted for 20% of all fatalities in the private sector; at mines, 11%.

The causes of construction fatalities involving cranes differ from the above-described pattern for the industry as a whole. The majority of crane-related construction worker deaths each year result from contact with objects and equipment (e.g., struck by crane or its load). (See **Table 2**.) More specifically, falling objects and equipment most often are to blame. Exposure to harmful substances or environments (e.g., overhead power lines) ran a distant second to contact with objects and equipment between 2003 and 2005, while falls ranked a distant second in 2006 and 2007.

Table 2. Causes of Fatalities in the Private Construction Industry Involving Cranes, 2003-2007

Causes	2003		2004		2005		2006		2007p	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All	31	100	40	100	35	100	26	100	35	100
Contact with objects and equipment	19	61	30	64	23	66	17	65	25	76
Exposure to harmful substance or environment	10	32	6	15	7	20	—	—	3	9
Falls	—	—	3	8	—	—	5	19	5	14

Source: U.S. Bureau of Labor Statistics, Census of Fatal Occupational Injuries, unpublished tabulation.

Note: p = preliminary. Dash indicates data not reported or data do not meet Bureau publication criteria. Not all columns sum to totals. In 2003, the census changed to the North American Industrial Classification system.

Employees of specialty trade contractors (e.g., foundation, structure, and building exterior contractors; building equipment contractors) usually experience the largest share of crane-related fatalities in the private construction industry according to CFOI data. In 2007, for example, 16 of the 35 construction fatalities involving cranes occurred among employees of specialty trades contractors. Another 13 workers who died in crane-related construction accidents were employed by firms erecting buildings in that year, primarily nonresidential buildings. Cranes played a role in five fatalities at companies engaged in heavy and civil engineering construction (e.g., highways and bridges) in 2007. Over the years, the second highest annual incidence of crane-related fatalities occurred in one or the other of these two subsectors of construction firms.

The CPWR — Center for Construction Research and Training of the Building and Construction Trades Department of the AFL-CIO utilized the CFOI database to study crane-related deaths in the construction industry between 1992 and 2006.[10] The report's authors calculated that there were 323 deaths of construction workers involving 307 crane incidents over the period, or 22 construction worker deaths per year on average.[11] Of the fatal crane incidents identified by CPWR, 71% involved mobile cranes. Only 5% of the incidents involved tower cranes. Another 4% involved overhead cranes, which also was the incidence for floating or barge cranes.[12] (See the following text box for descriptions of selected types of cranes.)

Selected Types of Cranes

Essentially, a crane is a machine used to lift and lower a heavy load vertically and to move it horizontally; the hoisting mechanism is an integral part of the machinery.

Mobile Crane: The boom (arm) is affixed to a movable platform. The platform can be a truck with traditional rubber wheels or resemble a four-wheel drive vehicle with wheels able to move over (un)paved surfaces. *Truck-mounted and rough-terrain cranes* generally have outriggers that first extend horizontally and then vertically to level and stabilize them. A *crawler crane* is mounted to an undercarriage with wheels designed for railroad tracks that provide both mobility and stability.

Tower Crane: Used in the construction of high-rise buildings and usually the tallest type of crane, it must be assembled/disassembled piece by piece. A tower crane resembles a very tall ladder, with the boom perpendicular to it. To provide stability and save space, a tower crane generally is fixed to the ground with the vertical part jacked up and attached to and within the structure being built.

Overhead Crane: The hoist is located on a bridge (horizontal beam). The bridge is attached to two walls or the ceiling. (An overhead crane often is used in the assembly area of a factory or in a warehouse.) The bridge of a *gantry crane*, in contrast, is supported by two or more rigid legs that move on a fixed floor-level runway. (Gantry cranes often are used in shipyards to unload and move large containers.)

Floating Crane: It is mounted on specialized barges. (The floating crane primarily is used to build bridges and ports.)

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[10] CFOI began in 1992, at which time the Standard Industrial Classification system was in use. A break in the series occurred in 2003, when CFOI began utilizing the North American Industrial Classification system.

[11] CPWR — The Center for Construction Research and Training, *Crane-Related Deaths in Construction and Recommendations for Their Prevention*, 2008. (Hereafter cited as CPWR, *Crane-Related Deaths in Construction*.)

[12] Crane type was unavailable for the remaining 16% (66) incidents.

The CPWR report additionally analyzed the CFOI data by occupation, size of firm, and nature of employment relationship. More than one-half of those who died were construction laborers (30%) or heavy equipment (e.g., crane) operators (23%). Almost one-third of the fatally injured worked for subcontractors with fewer than 10 employees. Self-employed workers accounted for 6% of construction workers fatally injured in crane-related incidents over the 1992-2006 period.

The CIRPC decided to reanalyze OSHA inspection data over the 1991-2002 period focusing on fatalities that involved cranes or derricks because of the increased importance of cranes to the construction industry and activity to update OSHA's crane and derrick standard.[13] CIRPC conservatively estimated that the machinery played a role in 600 fatal events or 8% of all fatal events (7,479) in the construction industry investigated by OSHA compliance officers between 1991 and 2002.

The CIRPC researchers also read 125 case files of OSHA investigations of construction fatalities involving cranes between 1997 and 2003.[14] "Regarding the types of cranes involved in fatal incidents, mobile cranes represented 88.4 percent of the fatalities."[15] Tower cranes represented 4% (5) of the fatal events in the 1997-2003 period, which is about the incidence CPWR calculated based on CFOI data from 1992 to 2006.

The most frequent serious or willful (SW) violations of OSHA standards involved 29 CFR 1926 Subpart N (Cranes, Derricks, Hoists, Elevators and Escalators), according to the CIRPC authors.[16] Subpart C (General Safety and Health Provisions), Subpart M (Fall Protection), Subpart L (Scaffolds), Subpart R (Steel Erection), and Subpart K (Electrical) followed.

Because most of the construction workers who died in crane-related events were riggers[17] and laborers, the CIRPC report's authors suggested that persons working in these occupations should receive *training* in the hazards of working in proximity to cranes. In contrast, the CPWR — The Center for Construction Research and Training report's authors recommended that the qualifications of riggers be *certified*. The CIRPC researchers asserted that "several types of crane-related construction fatalities will not be reduced until crane operators are required to be *qualified and/or*

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[13] Construction Industry Research and Policy Center, University of Tennessee, *Crane-Related Fatalities in the Construction Industry*, March 2005. (Hereafter cited as CIRPC, *Crane-Related Fatalities in the Construction Industry*.)

[14] The 125 case files involved 126 cranes and 127 fatalities, with one event leading to three fatalities.

[15] CIRPC, *Crane-Related Fatalities in the Construction Industry*, p. 16.

[16] A serious violation is one where there is considerable likelihood that death or grave physical injury will occur and that the employer knew, or should have known, about the hazard. A willful violation is one an employer commits with indifference to the law.

[17] Riggers use hand signals among other means to direct crane operators who are moving objects into place. Riggers also decide what devices (e.g., pulleys) are strong enough for a given task and where to attach hooks and cables, for example, to lift loads safely.

certified."[18] The CPWR researchers further recommended that crane operators be *certified by a nationally accredited testing organization*. The CPWR would have crane inspectors be certified as well. The CIRPC report additionally proposed having a "diligent" competent person responsible for lifting operations "because often-times a *competent person* was present at the site of a crane-related fatality but did not act in a diligent manner in assuring safety at the work site."[19] Similarly, the CPWR report endorsed the regulatory language proposed in the *Consensus Document* produced in 2004 by the Crane and Derrick Negotiated Rulemaking Advisory Committee: workers engaged in (dis)assembling cranes should be under the supervision of a person "meeting both the definition of qualified person and competent person."[20]

Crane Safety Standards

OSHA establishes standards for industries covered by the Occupational Safety and Health Act of 1970 as amended (P.L. 91-596). Jurisdictions that choose to operate their own safety and health programs must either adopt OSHA's standards or promulgate regulations "at least as effective" as the federal standards. Jurisdictions also may develop regulations covering hazards not addressed by OSHA.

The Federal OSHA Standard

OSHA's safety standard on cranes, derricks, hoists, elevators, and conveyors in construction went into effect in 1971. 29 CFR 1926 Subpart N[21] is organized as follows:

1925.550(a)	General requirements;
1926.550(b)	Crawler, locomotive, and truck cranes;
1926.550(c)	Hammerhead tower cranes;
1925.550(d)	Overhead and gantry cranes;
1926.550(e)	Derricks;
1926.550(f)	Floating cranes and derricks; and
1926.550(g)	Crane or derrick suspended personnel platforms.

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[18] CIRPC, *Crane-Related Fatalities in the Construction Industry*, p. 17. A qualified person is defined at 29 CFR 1926 Subpart C (general safety and health provisions for construction) as "one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project."

[19] Ibid., p. 17. A competent person is defined at 29 CFR 1926 Subpart C (general safety and health provisions for construction) as "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them."

[20] CPWR, *Crane-Related Deaths in Construction*, p. 4.

[21] [http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10760].

It was revised minimally (in 1988 and 1993) in the nearly four decades since its inception.

The 1971 rule is based partly on industry consensus standards from the mid-to-late 1960s. In a July 2002 notice of intent to create a negotiated rulemaking committee, OSHA acknowledged the updating of industry consensus standards and the substantial changes in crane technology that occurred during the three decades since the regulation's publication.[22] It also noted that various stakeholders had asked the agency to update what they considered to be an obsolete standard and that some representatives had been working since 1998 with a cranes workgroup of the Advisory Committee for Construction Safety and Health to develop changes to Subpart N. Among the numerous key issues OSHA wanted the negotiated rulemaking committee to address were the equipment to be covered by the rule; qualifications of persons who operate, maintain, repair, assemble, and disassemble cranes and derricks; work zone control; crane operations near power lines; load capacity and control procedures; crane inspection/certification records; verification criteria for the structural adequacy of crane components; and stability testing requirements.

In July 2004, the members who had been appointed to the Crane and Derrick Negotiated Rulemaking Advisory Committee (C-DAC) a year earlier voted favorably on an extensive revision of the safety standard. One of the most difficult and last issues to be resolved concerned verification of the skills of crane operators.[23] Under the existing standard, the qualifications of operators need not be validated. The C-DAC draft regulatory language requires certification of crane operators and provides procedural options for doing so (e.g., certification by an accredited operator testing organization).[24]

The C-DAC *Consensus Document* contains language that is much more comprehensive and precise than the existing standard.[25] For example, to supplement the 1971 rule having the employer follow the manufacturer's instructions when assembling and disassembling (A/D) cranes, the C-DAC draft regulations include a detailed list of hazards an A/D supervisor must address in order to protect employees. The draft language also focuses much more than the existing standard on the specific hazard of operating a crane near power lines. In addition, the C-DAC

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[22] Occupational Safety and Health Administration, "Notice of Intent to Establish Negotiated Rulemaking Committee," *Federal Register*, vol. 67, no. 136, July 16, 2002. (Hereafter cited as *Intent to Establish Negotiated Rulemaking Committee*, FR 2002.)

[23] "Final Agreement Reached on All Issues at Crane Rulemaking Group's Last Meeting," *Daily Labor Report*, July 14, 2004; and "With C-DAC Proposal in Hand, Next Step in Rulemaking Up to OSHA," *Daily Labor Report*, July 29, 2004.

[24] In 1999, OSHA entered into an agreement with the National Commission for the Certification of Crane Operators that recognizes the organization's program as verification of crane operators meeting the agency's requirement for the employment of a qualified person. "OSHA Reaffirms Agreement with National Commission for the Certification of Crane Operators," *OSHA Trade News Release*, August 6, 2002.

[25] The consensus document is available at [http://dockets.osha.gov/vg001/V046A/00/48/45.PDF].

Consensus Document addresses such other key issues as adequacy of ground conditions for crane setup to help prevent tipovers; qualification requirements for signal persons; updated requirements for cranes located on barges; and "safety devices, operational aids, signals, specific types of equipment (such as derricks and tower cranes), inspections, wire rope, prototype design and testing, crushing and overhead hazards, fall protection and equipment modification."[26]

C-DAC submitted the consensus regulatory language to OSHA in mid-2004. OSHA previously had stated, by reference to the Negotiated Rulemaking Act, that

> the agency, to the maximum extent possible consistent with legal obligations of the agency, will use the consensus of the committee with respect to the proposed rule as the basis for the rule proposed by the agency for notice and comment.[27]

OSHA presented its initial regulatory flexibility analysis of the draft proposed rule to a panel convened in mid-2006 under the Small Business Regulatory Enforcement Fairness Act (SBREFA). The SBREFA panel was composed of staff from the Office of Management and Budget (OMB), the Small Business Administration, and OSHA. The panel issued its report to OSHA in October 2006 on the views it had elicited from small business representatives with regard to the draft proposed standard.[28] The SBREFA report recommended that OSHA review its cost estimates related to the proposal's sections on certification of crane operators, which small businesses thought were understated, and then solicit comments on the revisions. In addition to issues dealing with crane operator certification, the panel's report highlighted concerns of small businesses about fall protection, inspections, and ground conditions, among other things. It urged OSHA to address these matters. Also in October 2006, OSHA's Advisory Committee on Construction Safety and Health (ACCSH) unanimously approved the draft rule in its then current form and encouraged the agency to quickly move it forward through the rulemaking process.[29]

At a January 2008 meeting of ACCSH, some members expressed frustration at the years-long delay in issuing a proposed rule. The director of OSHA's Office of Construction Standards and Guidance explained to the ACCSH that the C-DAC proposal was very detailed, which made writing a history, explanation, and justification in the preamble very time-consuming. The director also noted that other

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[26] "Consensus Reached on Recommendation for OSHA Cranes and Derricks Standard," *OSHA Trade News Release*, July 13, 2004.

[27] *Intent to Establish Negotiated Rulemaking Committee*, FR 2002.

[28] "Impact of Certification, Training Costs Needs Clarity," *Daily Labor Report*, December 4, 2006. The panel's report is available at [http://www.sba.gov/ADVO/laws/is_cranertp06_1017.pdf].

[29] "ACCSH Advises Moving Forward with Agency Crane, Derrick Standard," *Daily Labor Report*, October 19, 2006. Transcripts of the meeting are available at [http://www.osha.gov/doc/accsh/transcripts/accsh_101106.html] and [http://www.osha.gov/doc/accsh/transcripts/accsh_101206.html].

standards moving through the agency's rulemaking process competed for his office's limited resources.[30]

In May 2008, the director of OSHA's Office of Construction Standards and Guidance again appeared at a meeting of the ACCSH and informed it that an economic impact analysis of the draft standard had been completed.[31] The Labor Department's Policy Planning Board completed its review, and the proposed rule was submitted to OMB in June for up to 90 days of review. After OMB clearance, OSHA can publish a notice of proposed rule making in the *Federal Register*.

Individuals met with OMB in June, July, and August about the proposed standard. Among those at the four meetings were representatives of organized labor (e.g., International Union of Operating Engineers; International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers) and management (e.g., Specialized Carriers & Rigging Association, Steel Erectors Association of America) as well as other interested parties (e.g., Nations Builders Insurance, National Commission for the Certification of Crane Operators). Most of these groups reportedly want the updated standard to move forward, with the National Association of Home Builders urging differentiation "between light, mobile cranes and large industrial cranes ... so that the rule can properly address the needs and safety requirements for residential and light commercial crane use."[32]

On August 28, 2008, OMB completed its review of the draft proposed standard. Even if OSHA publishes a notice of proposed rule making in early fall, replies of Assistant Secretary for OSHA Edwin Foulke to questions from Members at the June 2008 hearing of the Education and Labor Committee suggest the regulation is unlikely to become final before the end of the year. Foulke noted that the rest of 2008 could well be taken up by a public comment period and public hearings.

Standards of Jurisdictions

Most of the 24 states, Puerto Rico, and Virgin Islands that operate their own safety and health programs for private or public sector workers have adopted OSHA's standards.[33] Some have developed their own regulations concerning

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[30] The transcript of the January 2008 meeting is available at [http://www.osha.gov/doc/accsh/transcripts/accsh_012408.html].

[31] "OSHA Staff Completes Economic Analysis of Crane Rule," *Daily Labor Report*, May 21, 2008.

[32] "Crane Safety Addressed in Georgia Word Stand-Down," *Nation's Building News*, August 25, 2008.

[33] Section 18 of the Occupational Safety and Health Act encourages states to develop and operate their own programs, which must be deemed by OSHA to be at least as effective as comparable federal standards. OSHA provides up to 50% of the operating costs of an approved plan. Alaska, Arizona, California, Connecticut, Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, New Jersey, New York, North Carolina, Oregon, South Carolina, Tennessee, Utah, Vermont, Virginia, Washington and Wyoming currently have approved plans. So too do Puerto Rico and Virgin Islands. The

(continued...)

specific hazards in certain industries. For example, according to OSHA's 2001 report on "state-plan" activities,[34]

> Oregon requires certification for operators of cranes that are five tons or more.
>
> The [California] Division of Occupational Safety and Health (DOSH) inspects tower cranes ... twice a year. DOSH must be notified 24 hours in advance whenever a tower crane begins operation, is climbed or dismantled — and when a mobile tower crane begins operation. [Subsequently, California required certification of crane operators and made other changes to its standard.[35]]

Hawaii, Nevada and New Mexico among others also are identified by OSHA in its 2001 report as being among state-plan states having their own crane regulations. Both Hawaii and New Mexico require that hoist machine operators be certified, for example.[36] Nevada instituted stricter crane regulations in 1997, after a crane collapse in Laughlin resulted in three fatalities. The regulations require Nevada's occupational safety and health administration

> oversight when cranes are erected or taken down and require contractors to cordon off areas around cranes carrying particularly heavy loads. The law also requires cranes to undergo reviews by certified inspectors who don't work for crane owners. In 2005, just in time for the surge in growth on the Strip, lawmakers updated crane regulations to require that operators pass a certification test conducted by an outside organization.[37]

Minnesota and Utah require certification of crane operators as well.[38] Their regulations also differ from the federal crane standard in other ways. So, too, do Michigan's regulations.[39]

Effective in 2010, Washington will require that crane operators be certified. Washington's occupational safety and health department, labor and management

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[33] (...continued)
Connecticut, New Jersey, New York and Virgin Islands plans cover only state and local government employees.

[34] [http://www.osha.gov/dcsp/osp/oshspa/2001_report/state_standareds.html]

[35] [http://www.dir.ca.gov/Title8/5006_1.html], [http://www.dir.ca.gov/Title8/sb7g13.html]

[36] [http://hawaii.gov/labor/hiosh/pdf/standards/8-28-07/12-136.1_pt3_8-29-07.pdf] and [http://www.nmcpr.state.nm.us/nmac/parts/title16/16.043.0002.htm]

[37] Alexandra Berzon, "Construction Worker Deaths on the Strip," *Las Vegas Sun*, June 30, 2008.

[38] [http://www.leg.state.nv.us/nac/nac-618.html], [https://www.revisor.leg.state.mn.us/rules/?id=5205.1210], [http://le.utah.gov/~code/TITLE58/htm/58_55_050400.htm]

[39] [http://www.michigan.gov/documents/CIS_WSH_part10c_35505_7.pdf], [http://www.michigan.gov/documents/CIS_WSH_stdpt18_35537_7.pdf], [http://www.michigan.gov/documents/CIS_WSH_part19_51245_7.pdf]

developed the extensive crane regulation following collapse of a tower crane in Bellevue that killed one person in 2006.[40]

Jurisdictions also may regulate work performed at building construction sites in an effort to protect the safety and property of their residents. For example, after a fatal crane accident occurred in Florida's Miami-Dade county in 2006, local officials worked "with industry leaders on an ordinance that would beef up inspections and safety measures for lifting cranes."[41] The ordinance became effective March 28, 2008; sections pertaining to the qualifications and certification of crane operators will not go into effect until January 1, 2011.[42] The responsible agency is the county's building code commission. Similarly, New York City's building code contains regulations pertaining to construction, including the operation of hoisting machinery.[43] After multiple fatalities occurred in two crane-related incidents in 2008, however, the city's building department developed additional crane safety proposals.[44]

According to the National Commission for the Certification of Crane Operators (NCCCO), 15 states and 6 cities require crane operators to be certified or licensed. Many of these states have state-plan programs: California, Connecticut, Hawaii, Minnesota, Nevada, New Jersey, New Mexico, New York, Oregon, Utah, and Washington. Other states that require licensing of crane operators are Massachusetts, Montana, Rhode Island and West Virginia. Most of the 15 states require or recognize NCCCO certification. Cities that require licensing of crane operators are Chicago, Los Angeles, New Orleans, New York, Omaha and Washington, DC, with New Orleans and Omaha requiring or recognizing NCCCO certification.[45]

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[40] [http://www.lni.wa.gov/wisha/rules/construction/HTML/296-155L_1.htm#WAC296-155-525]

[41] Matt Sedensky, "Crane Accident at Florida Construction Site Causes Fatalities," *Insurance Journal*, March 27, 2008.

[42] [http://www.miamidade.gov/building/popupdatareader.asp?blobtopop=149]

[43] [http://www.nyc.gov/html/dob/downloads/bldgs_code/bc27s19.pdf], [http://www.nyc.gov/html/dob/downloads/bldgs_code/bc26s2.pdf], [http://www.nyc.gov/html/dob/html/applications_and_permits/crane_home.shtml]

[44] William Neuman, "City Tightens Its Regulation and Inspection of Cranes," *The New York Times*, March 26, 2008; Sharon Otterman, "City Proposes More Regulations to Improve Construction Safety," *The New York Times*, June 25, 2008.

[45] [http://www.nccco.org] The NCCCO, an independent non-profit group, was created in 1995. It began offering tests for mobile crane operators the following year. In the mid-2000s, tower crane and overhead crane operator certification programs were added.