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| <p>16. Abstract (Limit: 200 words) This testimony concerned specific issues raised by OSHA in its advance notice of proposed rulemaking (ANPR) for concrete, concrete forms, and shoring. OSHA suggested there may be a need for broader coverage of precast concrete operations. NIOSH was engaged in a project to develop comprehensive safety recommendations for the Precast Concrete Products Industry. NIOSH recommended that OSHA evaluate the results of this work prior to taking other action. The ANPR suggested there may be significant hazards associated with placement of precast concrete products and yet neither the general nor specific sections of the ANPR addressed the hazards of precast concrete placement. The ANPR requested information concerning test methods for determining the in-situ early strength of concrete. NIOSH had an ongoing research project to develop a set of prediction equations for calculating the in-situ strength of concrete via nondestructive test methods. The results of this project should meet the needs of OSHA in this regard. Other items considered included the bracing of masonry walls during construction, the need for worker health protection when working with cement and concrete, hazard controls for post/tension or pre/tension operations, hazard controls for working with and around concrete pavers, and quality control programs for cast in place concrete.</p> |  |                                  |                                                |                       |
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# NIOSH

## Comments to DOL

NIOSH COMMENTS ON OSHA  
CONCRETE, CONCRETE FORMS, AND SHORING  
ADVANCE NOTICE OF PROPOSED RULEMAKING (ANPR)

April 19, 1982

These comments address the specific issues raised by OSHA in its February 9, 1982 Concrete, Concrete Forms, and Shoring ANPR concerning Subpart Q of 29 CFR Part 1926, Docket No. S-301. The first three comments address issues on which NIOSH is presently conducting technical research activities, and the remaining issues have been addressed based on previous NIOSH research and the field experience of our staff at concrete construction sites.

1. In the ANPR background statement, OSHA noted that there may be a need for broader coverage of precast concrete operations. The NIOSH Division of Safety Research (DSR) is presently engaged in a project to develop comprehensive safety recommendations for the Precast Concrete Products Industry (SIC 3272). Although this project addresses precasting as a manufacturing procedure, the work flow and tasks required are essentially the same as those needed for precasting at a construction site. Therefore, the safety hazards and recommendations identified in the DSR project should have direct applicability to the on-site precasting of concrete products in the construction industry. NIOSH recommends that OSHA evaluate the results of this work prior to revising Subpart Q. The NIOSH document on precast concrete products should be ready for publication October 1982 and a copy will be forwarded to your office at that time.

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2. The ANPR suggests that there may be significant hazards associated with placement (erection) of precast concrete products. However, neither the general nor specific sections of the ANPR address the hazards of precast concrete placement. Of particular interest, are four fall protection standards which have created some implementation problems in the field. Connectors and contractors have sometimes found it difficult to comply with these standards, which require that connectors be secured by a safety belt and lanyard to the structure (29 CFR 1926.104). It has been argued that connectors must remain mobile during the initial placement and connection of structural members to allow them to avoid a member should it swing out of control and towards the connector. It has been additionally argued that the use of lanyards and lifelines may create tripping hazards, and that there is often no overhead structure to which a lifeline may be secured. Some contractors have also found it difficult to provide safety nets as specified in 29 CFR 1926.105 and 29 CFR 1926.750(b)(1)(ii) since the location of such protection must be constantly changed due to the continually changing area of placement as each member is attached to the structure. Therefore, in many cases, the time necessary to install, test, and remove the nets may exceed the time necessary to complete the erection process. Additional arguments state that the nets might interfere with the movement of cranes and with the placement process itself. Because of these potential problems, construction contractors, workers, and others believe that the most practical method of protecting connectors at the point of erection is through on the job training (29 CFR 1926.21(b)(2)) and experience. These issues should be addressed by the ANPR. The NIOSH Division of Safety Research is completing its study of connectors and a copy will be forwarded

to your office upon availability. This study includes an examination of the various points of view concerning the standards, an overview of situations which characterize the difficulties/connectors of precast members have with complying with these standards and recommendations for resolution of these problems.

3. Part (B)(1) of the ANPR requests information concerning test methods for determining the in-situ early strength of concrete. NIOSH has an ongoing research project to develop a set of prediction equations for calculating the in-situ strength of concrete via non-destructive test methods. The results of this project will permit the determination of the in-situ, early strength of concrete which has cured at various temperatures by the non-destructive pull-out and maturity methods. In order to develop these equations, 12 concrete mixes are being tested: two cements, type 1 and 2; two aggregates, crushed limestone and gravel; and three water/cement ratios yielding approximately 3000, 4000 and 5000 psi compressive strengths at constant temperatures of 40°, 55°, and 72° F. Several forms of these equations will be tested until the optimum one is determined. The equations will then be tested at varying temperatures by curing specimens out-of-doors and comparing the predicted strengths to the strengths obtained by destructive testing. The constant temperature tests are scheduled to be completed by May, 1982 and the final report should be available by March, 1983. Upon completion, a copy of the report will be forwarded to your office.

4. The ANPR also addressed the bracing of masonry walls during construction. Masonry walls are occasionally blown over because of either poor bracing methods or no bracing at all. When the wind strikes a simple free standing structure such as a wall, the wind is forced to diverge and pass around the edges of the wall causing a push-pull action. Without temporary support bracing, the wall could topple over. It must be recognized that this effect not only occurs on masonry walls, but also on load bearing precast concrete walls during the building erection process. These walls are unstable when subjected to wind loads until the floor or roof components are attached to them. Therefore, they should also be braced temporarily.

5. Subpart Q should address the need for worker health protection when working with cement and concrete. Exposure may produce various forms of occupational skin disorders or chronic irritation of the eyes and respiratory system due to the alkaline, hydroscopic, and abrasive properties of cement and wet concrete. In some cases, workers may develop an allergic sensitivity to constituents of cement.

6. Other safety issues to be considered are:

(a) Hazard controls for post-tension or pre-tension operations.

The hazards associated with these operations result from the tension that is applied to the elongated wire strands or steel rods, which may break when stressed to approximately 200,000 psi.

Additionally, if the vise is improperly cleaned or seated so that the grips do not adequately contact the strand or rod, then slippage may occur. These conditions may also cause the jack to swing violently from its support should it slip from the vise.

Safe work practices for controlling the unexpected release of this energy should be addressed in Subpart Q. Such practices include the inspection of steel strand or rods for knicks, corrosion, or accumulations of mud or oil. Chuck vises must be clean when in use. Safe areas must be designated. Barrier protection must be provided at the jacking end. Safe detensioning methods must be used prior to removing forms.

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(b) Hazard controls for working with and around concrete pavers.

These pavers are in continuous motion during a concrete placement operation. As they move forward, they also distribute, tamp/vibrate, screen and finish the concrete. They have many moving parts which should be adequately guarded. These moving parts create hazards for the employees working near the machinery.

(c) Quality control program for cast-in-place concrete.

Cast-in-place concrete which provides for structural integrity should be scrutinized through a quality control program, the purpose of which is to assure that the concrete mix yields the

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10

designed strength of concrete when cured. The program should address testing methods such as slump tests, air content tests, destructive and non-destructive testing, and tests for assuring proper use of curing accelerators and other admixtures for attaining designed concrete strengths.