Mobile Cranes
Harbor High
Accident Potential

Today's mobile cranes are an engineering marvel. They enable construction and general industry to perform tasks that in the past seemed impossible. They come in a variety of sizes, some with over 1000-ton capacity and 600 foot plus boom and jib lengths. Such machines usually represent the largest monetary investment on the job site—but they also harbor the most potential for destruction.

Mobile crane accident statistics are difficult to obtain in the United States. Unless there is a fatality or serious injury, the accident is usually not reported. It is estimated that as few as one in 10 are reported. D.E. Dickie states in a 1983 article, “Mobile Crane Accidents,” that during a 10-year period in Ontario (1969-1978) 20 percent of all construction fatalities were crane-related.

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Inadequate planning created an overload situation seen in picture 1. Note the crane lifting off the ground at left. In a multicrane lift, the failure of one crane usually spells disaster for the others, as seen in photo 2.
In a recent phone conversation, he said that from 1978 to 1985 the percentage had fallen to 11.8, although U.S. figures have remained around 20 percent.

In simpler terms, one out of five construction fatalities is a result of a worker’s interaction with the crane. If mobile cranes are so dangerous and the cost of accidents can soar into the millions of dollars, why is there so little effort directed toward solving the problem?

**INADEQUATE TRAINING.** Mobile cranes have evolved into very sophisticated and complicated machines. Occupational Safety and Health Administration and industry standards require that only “qualified” personnel operate mobile cranes. The word qualified is used interchangeably with “certified” and “competent” and is defined by OSHA as “one who has had special previous training.”

Since OSHA’s mobile crane standards (1926.550 and 1910.180) do not outline such a training program, we must turn elsewhere for the answer. American National Standard Institute (ANSI) B30.5, a national consensus standard on mobile cranes, is the most referenced industry standard.

Although broad in scope, it delineates two areas of training required to provide an adequate program. The first is technical or theory of operation. Under qualifications for operators, the standard notes that “operators shall be required by the employer to pass a written or oral examination.” This examination is to be limited to a specific type of mobile crane.

For an operator to pass this type of examination, he would need certain training. Technical data supplied by the manufacturer would have to be learned along with information related to the actual crane operation. The operator must learn how to perform a daily, monthly and annual safety inspection. But, more important, he would need specific training on how to interpret load charts.

The load chart is the operator’s life-line and insurance policy—the single most important aspect of a mobile crane. Because of the possible crane configurations, load charts can be very difficult to understand and interpret. The manufacturer gives important information which, if not followed, can result in an upset or the crane being damaged structurally.

Most operators are concerned only with the crane overturning. In reality, crane ratings are based not only on the crane’s ability to resist tipping, but also on the crane’s structural strength. We are far removed from the day when an operator can determine the crane’s ability to lift a load by the outriggers raising off the ground.

Many companies rely on the operator’s competence to provide the required safety and yet, at the same time, are reluctant to provide adequate training to maintain competency.

When an accident occurs, the operator usually is looked upon as being at fault. More than 90 percent of mobile accidents are attributed to operator error. When a closer look is taken, we find the real cause: The employer has not provided the necessary training to ensure safety.

The second area of training required for safe crane operation is “practical” or “hands-on.” ANSI B30.5 states that “cranes shall be operated only by qualified designated persons and trainees under the direct supervision of a designated person.”

Too often, a person with no prior training in either area is thrust into a...
crane and told to read the operator's manual and follow directions. More often, all the employee gets is a little field training from an unqualified operator that results in learning only bad habits.

This has been perpetuated by the emergence of the hydraulic crane and the erroneous idea that it requires less skill to operate. In some situations, the hydraulic crane is more likely to incur structural damage or upset than a conventional crane.

**CRANE USERS.** Although the majority of training should be directed toward the operator, two other groups should be trained. The first is the crane user, including individuals in such trades as carpenters, pipefitters, millwrights and ironworkers.

It is imperative that this group receive at least basic rigging training. A certain percentage of mobile crane accidents are attributed to poor rigging practices. ANSI B30.5 states that the operator is to be held responsible for those operations under his direct control.

"Direct control" pertains to the crane itself and not rigging the load, because this becomes the responsibility of the crane user. It is the user's job to determine the proper selection of slings, rigging hardware and load weight.

Other standards written for the crane user such as ANSI A10.13 (safety requirements for steel erection) set forth these same requirements. For the crane user to assume this responsibility and perform the job safely, he must be proficient in this area.

Additionally, the crane user should understand basic mobile crane terminology. When conferring with the operator, he should be able to communicate exactly how he intends to employ the crane. Referring again to ANSI B30.5, we find that "the operator shall respond to signals from the person who is directing the lift or an appointed signal person."

Signaling an operator is directing a crane and, in many situations, the signal person becomes the operator. As the signaler’s directions are followed, the operator places his confidence in that person’s ability to keep the crane out of dangerous positions.

Lastly, the crane user may find himself in a position where he has the final responsibility for the job lift. When this happens, ANSI B30.5 states that "when loads which are not accurately known are to be lifted, the person responsible for the job lift shall ascertain that the weight of the load does not exceed the crane ratings at the radius at which the load is to be lifted."

This standard reveals a basic crane user responsibility. The crane user’s first determination is to select the proper crane, one capable of performing all the lifting tasks that are anticipated.

**SUPERVISOR TRAINING.** The last group to require training includes the supervisors. In some very small operations, the supervisor can be found overseeing the crane or rigging department. Of all the groups discussed, supervisors have the greatest responsibility, although often it is ill-defined.

Frequently, he learns of crane and related standards only through a court of law. He is often the last person to
attend a crane safety course, feeling his time is better spent elsewhere. Although his responsibilities are of a supervisory nature, he often needs to possess the knowledge of an operator and rigger. This requires training. As the ANSI B30.5 standard delineates the supervisor’s responsibilities, it also reveals the knowledge required he to fulfill those duties.

First, he must have the ability to select the mobile crane operators. The standard states that “operators are required by the employer to pass a written or oral examination and a practical operating examination unless able to furnish satisfactory evidence of qualifications and experience.”

The employer usually is represented by the supervisor unless an outside agency is employed. The supervisor generally has the final say in who is or is not qualified and he must be qualified to make this determination. A wrong decision could result in loss of life and property.

Second, he is responsible for safety. ANSI B30.5 states that “whenever there is any doubt as to safety, the operator shall consult with the supervisor before handling the loads.”

At this point, the supervisor should be able to determine the capabilities and limitations of the crane. Also, his background and training should enable him to make a safety judgment.

Third, he is responsible for planning. ANSI B30.5 states “when two or more cranes are used to lift one load, one designated person shall be responsible for the operation.” The supervisor can assume this responsibility himself or he can delegate. But, one thing is certain, he must understand the dangers involved in such an operation.

Cranes must be positioned relative to their pick points. Changing the pick point a few feet can result in the crane being overloaded. This takes considerable planning and usually requires the services of a qualified engineer. Whatever it takes to ensure safety becomes the supervisor’s responsibility.

We will never totally eliminate mobile crane accidents. However, we should always strive to reduce the number of accidents, through a combined effort from the operator, crane user and supervisor.