Aerial Lift Accidents: Operator or Machine?

Learn how the regulations and standards apply. OSHA regulations prohibit employers from forcing workers to use unsafe equipment.
by Leslie R. "Les" Knoll

Aerial lifts are used frequently in the construction industry and for a variety of maintenance applications. Many different types of lifts are used by a variety of people, both trained and untrained, including owners, users, and those who lease the equipment.
Once almost exclusively available to the trades, aerial lifts are finding their way into the consumer market, as well. Aerial lift operators have a reputation for wanting to get the job done no matter what, paying little heed to safety issues. Because of a lack of training, operators and their supervisors often are unaware they are doing anything wrong.
The most common type of accident involving an aerial lift has historically been the tip-over. Causes for this range from misuse of the equipment to a lack of maintenance. In recent years, with improved equipment and better-trained operators (primarily by OSHA/ANSI mandate), the number of spurious accidents that plagued the industry since its beginning is being reduced. Still, aerial lift accidents are an issue for the lift industry and result in litigation and insurance issues. Adequate preparation and knowledge of aerial lift accident issues can substantially reduce the problems associated with these accidents.

Litigation Scenarios and Methods Used in Defense
* *Tip-overs.* Tip-overs, the most common form of lift accident, usually are caused by misapplication of the machine, obstacles, lack of use or incorrect use of outriggers, unfamiliarity with the operator's manuals and procedures, and lack of training.
* *Misapplication of the machine.* ANSI A92.6 clearly states that a machine may not operate on grades exceeding the manufacturer's ratings. The manufacturer must fulfill different stability requirements for an aerial lift intended to operate on an incline than for those intended for use on a level surface (known as indoor machines or "slab" machines). To ensure a safety margin, ANSI requires lifts, including slab machines, to be tested for stability at a slope of five degrees greater than the machine's rating. Although manufacturers clearly mark machines intended for level surface use (i.e., "Use on level surface only"), at times operators use these slab

machines outdoors for the sake of economy or availability, often resulting in tip-overs.

In a tip-over case at a warehouse, an indoor lift was used outdoors to adjust security cameras. The lift was not equipped with outriggers because it passed all applicable stability tests for level surface operation without them. The operators drove the lift outdoors onto a relatively level sidewalk and then onto a not-so-level flower bed. Operating the machine on a surface outside the manufacturer's specified limits caused the lift to overturn, injuring the workers.

Standards clearly state lifts must be operated on a surface within the manufacturer's limits. These limits are to be clearly stated on warnings on the machine. In addition to warnings, some machines are also equipped with tilt alarms. Pre-operation inspection of the machine and environment should ensure no surprises arise.

* *Obstacles*. Tip-overs of indoor lifts specified to operate on level surfaces commonly occur because of cutouts in the concrete slabs for plumbing, wiring, and other construction features. Some manufacturers use "pothole protectors" to guard against these mishaps, but these protectors are not effective in all cases. A92.6 requires that scissors lifts pass a depression test in which a machine carrying a specified load drives at maximum speed into a 4-inch-deep depression and must remain stable. In reality, larger depressions do exist, and in these cases a look back at the required workplace inspection shows either the operator's negligence in regard to the operating area or to one of several OSHA requirements for covering such obstacles.

* *Outrigger issues*. Lack of outrigger usage or knowledge in outrigger setup because of inadequate training cause many tip-over accidents, especially with single-man lifts. In such occurrences, it should be noted whether the operator had access to the operator's manual (i.e., in the weatherproof tube in the operator's platform) prior to the occurrence and read it.

Some manufacturers place easily understood, language-independent illustrations of proper outrigger installation on the warning placards in the operator's platform. The easier it is to convey information, the more likely it will be conveyed. Establishing a history of an operator's experience can help determine whether or not an operator understands proper use of specific machines and outriggers.

An example of lack of outrigger usage might be the use of single-occupant vertical lifts to install and adjust stage lighting. A stage with scenery and props leaves little room to freely set up or maneuver a lift. Lighting and stage personnel are often more involved in their art than the mechanical operation of the lift. Stagehands often use vertical lifts without outriggers and sometimes have one person elevated in the non-outriggered lift while another pushes the lift from stage light to stage light. This action is prohibited by ANSI A92.3. A scenario involving this improper use resulted in the lift's overturning, killing the stage lighting manager. In this case, the rental

company should have trained the stage personnel in the proper use of the lift upon delivery. If the stage personnel found the proper method of lift use unsatisfactory, they should have employed an alternative means of reaching the lights, such as scaffolds or a boom lift.

* *Interlocks*. Interlocks, which are required on only some types of machines, are a recurring issue in lift accidents when associated with outrigger use. Past interlock issues include reliability, a user's false sense of security, and inability to sense alternate outrigger configurations (against a wall versus free-standing). Outrigger interlocks are no substitute for a well-trained operator with common sense who follows proper operating procedures.

Operator Training Issues

All aerial lift standards require operators to read the operator's manual prior to use. Without this familiarization, an aerial lift is a potentially dangerous tool. Casual users--those who need this information the most--often omit this step.

In a California case, a young man who had no previous lift experience or knowledge about outriggers and had not read the manual, borrowed a vertical lift to put up a "grand opening" sign at a restaurant. The young man positioned the lift on an inclined sidewalk without outriggers and consequently the lift overturned, causing injury. The man then sued the manufacturer for making an unsafe product.

In court, his attorney inquired about the possibility of setting up the machine with incorrectly installed outriggers. While this is physically possible, the young man could have set up and leveled the machine correctly if he had read the operator's manual. The attorney pressed on to determine whether the machine could be improperly set up without reading the manual. The response suggested that if an operator has not read the manual, he has no business using the machine. Consequently, the court sided with the defendant lift manufacturer.

In the event of the inability of operators to read or understand the language of the manuals, ANSI standards have provisions that allow others to explain the manuals.

The issue of training is in a state of change. Previously, an experienced operator (one with sufficient familiarity or training with a given machine) would be held more responsible for his or her own actions than an inexperienced operator. Currently, with the recent ANSI A92.6 standard, the employer must ensure all employees operating self-propelled aerial work platforms have proper familiarization (training as well as reading the operator's manual) before use.

If the present ANSI A92.6 standard had covered the lift operated by the young man putting up the restaurant sign, the restaurant owner would have needed to ensure his proper training. In situations when the employer cannot provide training, he or she must seek out someone who can. Likewise, the lender of a machine is responsible for

the proper familiarization of the borrower. However, this responsibility cannot reasonably be held to the manufacturer.
The date of occurrence is critical in determining which training standards apply. The operator's effort to gain familiarity with a machine may be important in an older occurrence or potentially irrelevant in a current occurrence, when the responsibility of operator training lies with the employer. Casual lending of machines may lead to severe consequences when concerning the issues of training and familiarization.

Machine Inspection and Maintenance
Some type of pre-start inspection generally is required for all types of aerial lifts. These can cover controls, safety devices, machine components, and warning signs and decals. After an accident, asking the operator about the pre-start inspection can establish the operator's level of safety awareness.
In a matter concerning an allegedly faulty step on a scissor lift, the operator was asked whether he had noticed the condition of the step before he allegedly slipped off. The operator replied, "Oh yeah, I've been up and down those steps a hundred times." After a drop-off accident, another operator claimed he could not read the control labels indicating the machine's direction because they were obscured by paint. He had been on the lift several times before, and the control labels were "always like that." In both cases, the pre-start inspection obviously did not serve its purpose or was never done.
Standards state that aerial platforms not in proper operating condition should be immediately removed from service until repaired. However, in practice, operators often will use a machine in need of repair several times without incident, allegedly out of fear their employer will take action against them for refusing to use the malfunctioning machine. OSHA regulations prohibit employers from forcing workers to use unsafe equipment.

Proper Repairs with Equivalent Replacement Parts
Aerial lift standards require all repairs to be made by a qualified person using equivalent replacement parts. Substitution of parts results in a potential for accidents. An example case involves the replacement of a vertical lift's motor controller relay, which is similar to the starter relay found on older model cars. Assuming all starter relays are alike, the maintenance department substituted the lift's starter relay with one from an auto parts store. The replacement part was not configured like the original even though it "looked the same."
As a result, when the operator pressed the "up" button, the lift rose but would not stop when the "up" button was released. It pinned the operator against the ceiling until the lift's battery cables were disconnected.

Unauthorized Use

Unauthorized use of a machine, including theft, often results in accidents because the person using the machine usually has not been properly trained. Locking up the machine, keeping keys off the premises, or securing the machine in a non-accessible area easily guards against unauthorized use.

Unauthorized usage cases can show the extremes of litigation in the area of lifts. In one case, the son of the owner of a rental yard took his girlfriend up on a scissors lift late at night without properly extending the outriggers. One thing led to another up on that platform, and the lift rocked so that it overturned. One of the parties suggested a decal warning against such activities (a red circle with a slash over a picture depicting the activity in which the young couple was engaged) be added to the machine. The proposed decal was never produced. The matter was resolved based upon the fact that the young man was an experienced operator who should have known better than to operate the lift without outriggers.

Another case involved several men who decided to entertain some children by taking them up in a stolen man lift. In injury and product defect cases, obtaining a lift though illegal means does not affect the way a case is presented. The best defense in these cases may be that because of the unauthorized use (and in cases of theft, hasty use, as well), the operators did not familiarize themselves with the machine, read the manual, or take safety precautions--no different than if the machines were legally obtained.

Electrocution

Aerial lifts used outdoors face the possibility of contact with power wires. Similarly, use of lifts by electricians can expose them to electrical hazards. ANSI A92.2 specifies the special type of aerial lift to be used for live power line maintenance. These machines have insulated boom sections and must pass strict dielectric or current leakage tests.

All other lifts (i.e., all-terrain, larger scissors lifts, boom lifts in the construction industry) expose the operator to the risk of electrocution when in contact with power lines. The operator's compartment and the operator's manual (ANSI required reading) must contain specific warnings or decals. ANSI also requires that operators survey the work area for potential hazards, which includes power lines.

Flash Over

A flash over is a highly specialized type of electrocution-related accident. It involves current flow through hydraulic lines that have air pockets in them. In these cases, the best course of action is to have an engineering concern experienced in this area investigate the event from the start. These specialists, knowing what to look for, may uncover pertinent evidence otherwise overlooked.

Regulations and Standards

In events surrounding an aerial lift accident, shortcomings of a machine or actions of an operator are often described as "not according to ANSI." The Occupational Safety & Health Administration makes the laws regarding the use and maintenance of aerial lifts and the training of operators. The American National Standards Institute's standards are thought of and referred to far more often in this industry.

ANSI standards in reality are simply *consensus standards*--standards usually created and agreed upon by a body of manufacturers engaged in a particular and often specialized area, such as aerial lifts. The Scaffold Industry Association writes the standards regarding lifts and users.

In 1974, OSHA adopted many of the existing ANSI and NFPA (National Fire Protection Association) standards in order to promulgate safety rules. At the time, the only available aerial lift standard was A92.2-1969 for vehicle-mounted elevating and rotating work platforms, which was incorporated through reference by citation in 29 CFR 1926.453. Since then, ANSI has created and updated many other standards for various types of aerial lifts. OSHA observes consensus standards, especially if cited within a rule, and also recognizes that ANSI standards are updated more frequently that OSHA rules and are therefore a good source of what is "state of the art."

OSHA recognizes the updated and additional ANSI standards through interpretation and compliance letters, which state that OSHA:

". . . accepts employers' use of the current revision to national consensus standards in place of earlier versions incorporated by reference or adopted into OSHA standards. This acceptance is predicated on using the current revision such that at least the same level of safety and health is provided as required by complying with OSHA standards."

OSHA has stated in compliance letters with respect to scissors lifts that it does not have specific standards but defers to ANSI, saying:

"For additional information regarding scissors lift safety, please refer to national consensus standards ANSI/SIA A92.3, Manually Propelled Elevating Aerial Platforms, and ANSI/SIA A92.6, Self Propelled Elevating Aerial Platforms."

OSHA addresses boom supported elevating work platforms in a compliance letter, stating in part:

". . . 1910.67 would cover self propelled boom-supported elevating work platforms. Boom-supported elevating work platforms are also covered by the American

National Standard for 'Boom Supported Elevating Work Platforms,' ANSI A92.5. Employers are encouraged to comply with current versions of national consensus standards as long as the current version provides at least the level of safety and health otherwise provided by complying with applicable OSHA standards."

In a compliance letter clarifying which type of work platforms are covered by specific requirements, OSHA asserts that:

". . . if an employer is in full compliance with the requirements of the relevant document of the ANSI A92 series, OSHA would consider that compliance as providing an appropriate degree of safety for employees."

OSHA points to ANSI/SIA standards for particular details regarding aerial lifts. Following is a discussion of these standards as to how they apply to various parties and equipment.

Types of Lift Equipment

Becuase there can be no "catch all" standard, different sets of standards apply to different types of equipment. Mechanical configurations, the working environment, and ownership scenarios affect the particular standards for given equipment.

ANSI A92.2, titled *"The American National Standard for Vehicle Mounted Elevating and Rotating Aerial Devices,"* covers articulating boom lifts, which are generally truck-mounted. These highly specialized machines, used mostly for electrical line maintenance and aerial tree trimming, usually are owned by the entity that uses them. This ANSI standard covers mechanical, structural, electrical, hydraulic, and structural requirements and also contains extremely detailed electrical insulating requirements and testing that must be completed at the time of manufacture as well as in the field to ensure safe operation in the hazardous environments in which these machines function.

ANSI A92.3, titled *"The American National Standard for Manually Propelled Elevating Aerial Platforms,"* covers all aerial platforms not capable of moving under their own power. The most common of these are the push-around, one-occupant vertical lifts generically called "Genies," although a number of manufacturers make them. Other aerial platforms under this standard include single or multi-occupant articulating boom lifts, unpowered scissors lifts, and trailer-mounted aerial lifts. The fact that the lift mechanism is powered has no bearing on what standard applies to these lifts. A92.3 emphasizes manufacturing standards, stability, inspection before use, training requirements, and the actions of owners, operators, and leasing entities.

ANSI A92.5, titled *"The American National Standard for Boom Supported Elevating Aerial Platforms,"* covers self-propelled units with a platform that can be positioned

completely beyond its base. These units contain controls on the platform for all machine functions, including propelling the unit, and A92.5 emphasizes the location, function, and interlocking of these required controls. Because these machines are most often used outdoors or on inclines and rough terrain, this standard clearly defines test requirements for stability. And because this type of aerial lift is often rented, A92.5 also stresses the responsibilities of all involved parties--the manufacturer, dealer, lessor, user, and operator--as well as clearly defining rental inspection and operator education and training.

ANSI A92.5, titled "*The American National Standard for Self Propelled Elevating Work Platforms,"* covers most scissors lifts as well as other various platforms that elevate by means of articulating arms. This standard especially emphasizes stability and operator inspection. It requires specific tests that define the incline (or lack thereof) on which a machine may be operated and requirements for outrigger interlocks on machines that need outriggers for stability. Like the A92.5 machines, this type of aerial lift is often rented. This standard, like A92.5, stresses responsibilities of all involved parties, rental inspection, and operator education and training.

People Involved with Aerial Lift Activities

In addition to classifying types of lifts, ANSI standards also classify the types of people or entities involved with them.

A *manufacturer* builds and initially offers the lifts for sale. Manufacturers can sell to an end user (e.g., a construction company or electric power company doing its own maintenance) or to a rental company, which in turn rents or leases the lifts to individual customers. Responsibilities for manufacturers initiate at the design level and include structural, mechanical, electrical, and hydraulic aspects of the lift, stability performance, required warnings, and safety devices.

A *dealer* buys from the manufacturer or distributor and generally sells, rents, and services aerial lifts. Responsibilities include providing manuals, training, pre-delivery preparation, recordkeeping, maintenance safety, training on delivery, record retention, modifications, adherence to manufacturers' safety bulletins, and assistance to owners and operators.

An *owner* has possession of an aerial lift by virtue of purchase. Owners usually are companies that have dedicated use for these lifts or perform most of their services while in a lift (e.g., large contractors, power line maintenance facilities, or tree trimming services). Responsibilities, more rigorous versions of the dealer's, include maintenance throughout the period of ownership, inspection, training of operators and maintenance personnel, and adherence to manufacturers' safety bulletins.

A *user* places an aerial lift into operation and often can be a business (e.g., a lighting contractor or sprinkler fitter) that rents or leases lifts for individual jobs. Users have

the responsibility of keeping and maintaining operator's and maintenance manuals (operator's manuals are to be kept on the machine, not in an office), inspecting and maintaining the machine, and training operators.

An *operator* directly controls the machine in use and falls under the direct application of the standards discussed under the user section. Operators must perform required pre-start inspections of the machine, as well as the workplace, in order to avoid possible unsafe conditions such as drop-offs, holes, bumps, floor obstructions, debris, overhead obstructions, inadequate surface support, and hazardous wind and weather conditions. Operators must report machine malfunctions and damage, as well as ensure the lift is handled within the limits set by the manufacturer. The safety of the operator as well as others depends on the actions of the operator; therefore, the operator must follow good safety practices accordingly.

Recognizing that some machines are more often rented than owned, ANSI differentiates between the *lessor* and *lessee*. ANSI defines a *lessor* as the entity who rents, lends, or provides an aerial lift to another for use. Lessors can include the dealer, owner, user, or operator and as such, have the respective responsibilities. ANSI defines a *lessee* as the entity to whom an aerial platform is provided through lease, rental, loan, or other arrangement. Lessees can take the role of the user or operator and as such, have the respective responsibilities, as well.

There are many possible combinations of these roles. For example, owners or lessees can at once be both users and operators. Similarly, dealers using a lift on their premises also could be considered users and operators. Standards state that assuming these various roles includes assuming their responsibilities.

Changing Technologies

State of the art in regard to aerial lifts is as dynamic as in any other industry. Although the basic configuration of scissors, vertical, and boom lifts remains unchanged, hybrid versions of standard configurations are constantly being introduced and reintroduced.

In a welcomed improvement of hydraulic systems, sophisticated proportional controls have replaced the on/off, or "bang-bang," valves found in older machines, especially boom lifts. Other developments include hydrostatic closed circuit drives that result in a more efficient and easily controlled drive circuit, four-wheel drive, microprocessor controlled anti-slip traction systems, and individual motors and brakes on each wheel, which eliminate solid axles and can be integrated within a single unit.

More sophisticated electronics in control circuits improve safety, productivity, and ease of functioning, while multiplexing systems can reduce cabling. LCD and other types of readouts offer more information to the operator and maintenance technician. Extremely advanced lifts communicate via satellite directly with the manufacturer in

cases of malfunction and receive immediate maintenance recommendations. Lift OEMs also are developing computer-based control systems, DC drives, level sensors, and load monitoring systems. However, these more sophisticated devices result in a reduction in the number of field personnel with qualified maintenance experience and an increase in the level of necessary expertise for accident investigations.
Innovation by one manufacturer drives the others in competition. Last year's technical breakthrough could well be next year's standard equipment.
The use of more exotic materials allows for lighter weight units, while in contrast, new and heavier-duty machines provide more power and greater capacity. More detailed analysis of structural components results in more advanced and cost-effective structural design.
Previously used technologies have re-emerged, such as the reintroduction of the self-propelled vertical one man lift, taking this machine out of the A92.3 category. Greater varieties of articulating boom and jib lifts also have been developed for "up and over" applications, while more trailer-mounted lifts, which generally fall under the non-self-propelled lifts of A92.3, are appearing.

Changing Standards
The most recently revised aerial lift standard, ANSI A92.6-1999 (effective January 2, 2000) requires employers to ensure that all scissors lift operators, under the direction of a qualified person, have been trained in the general use of scissors lifts and are familiar with the specific lift in use. This revision shifts the training emphasis from the owner of the equipment (lessor) to the user (lessee).
In response to this need for training, training facilities have emerged, mostly within the rental companies themselves. Large rental corporations may prove to have the most resources to handle this training. Employers should review the training status for all employees who use aerial lifts. If the employer chooses to train only key individuals who will then, in turn, train fellow employees, that employer must ensure training for all remains consistent.
Other aerial device standards may soon follow the trend of revisions. A92.3 and A92.5 committees are already drafting new standards, and the shift in training seen in A92.6 could easily carry over to these areas, as well. OSHA's more stringent regulation changes in the training of forklift operators (CFR 29 1910.178 and 1926.602) may have future influence on aerial platform standards. In wording as well as in practice, A92.6, 92.5, and 92.3 often emulate one another. There is a substantial amount of cross-committee membership that leads to freely shared ideas and concepts. A92.2, however, is more unique. The types of aerial devices, primary functions of these devices, and circumstances of ownership are somewhat different from other types of lifts. These machines literally go where others "fear to tread."

In regard to fall protection equipment on scissors lifts, the revisions of A92.6 now consider the guardrail itself to be fall protection. If a task requires lanyard use and tie-off, operators must use tie-offs provided by the manufacturer and not the guardrails.

Implications of an Expanding User Base

The move to make some lifts such as small scissors or trailer mounts available to general consumers may increase the seriousness of the issues of training and familiarization, as well as raise the issues of product liability and changing standards. The last several years have seen a decline in the number of accidents and injuries within the trades and among other professionals who regularly use this equipment. Although the equipment is admittedly evolving in design, a good portion of this reduction can be attributed to better-trained, more aware operators. As the general public gains access to such machines, the issues that faced the lift industry early on might well surface again with consumer use.

Accident Investigation

Preservation of evidence and artifacts following an accident is critical. Often, after an accident, the rental contractor is immediately contacted and the response consists of sending out a replacement unit and immediately removing and repairing the unit involved in the accident. This destroys the evidence "trail" before the investigation even begins.

Insurers should instruct clients to inform them immediately of an accident and to assume litigation is already involved. Toll-free numbers may expedite the flow of information to the appropriate contacts. The first call should capture the basic facts of the event (i.e., questions of injury, property damage, possible witnesses).

Insurance claims personnel should respond immediately, ideally with the rental company manager or other involved parties, and hire an engineering investigator who can investigate the situation while the evidence is fresh. A prearranged relationship with an engineering investigator saves much time and ensures a thorough analysis that ideally is parallel to the investigation the property owner would later conduct. Witnesses should also give preliminary interviews while their memories are still fresh.

The professional investigator knows how to cooperate with all OSHA, fire, law enforcement, and medical responders, as well as how to minimize the spoiling of evidence and the safety risk involved when altering lift machinery during rescue operations. The investigator also will document which manuals were on the machine at the time of the incident and then remove and secure the literature as evidence. After the site investigation, the involved machinery and documentation should be removed, taken to the owner's facility, tagged as having been in an accident, and

then--most importantly--retained without repair or alteration. The investigator should obtain a 12-month rental service and repair history for analysis. Preparation for litigation at this time is wise, even if litigation never occurs. An accurate documentation of the evidence needed for an insurance investigation will have been created.

In several cases, mistakes result in the subject lift being put back into service, repaired, sold, or even moved across the country even before litigation begins. One such case involved a manufacturer where exemplar machines, most of them more than 10-15 years old, could not be found even in the construction-intensive Chicago area. One model similar to the subject was found in Florida but was scrapped shortly thereafter. When equipment is not set aside, examination of exemplars may be costly to the client when additional inspection is required.

How to Mitigate the Frequency of Accidents and the Cost of Losses

* Develop maintenance and documentation procedures for rental yard clients; be sure to emphasize the need to document pre-delivery and return inspections, as well as training.
* Don't forget safety, even during machine maintenance. Remember that maintenance personnel expose themselves to risks and danger not seen in normal machine usage.
* Emphasize the checkoff of all items on inspection documents. Discourage the use of a catch-all, "no defects found" checkoff or box. These are too easily used and often lead to less-than-thorough inspections.
* Make sure clients using the machines understand the shift of burden of training to the employer in ANSI A92.6-1999. Encourage employers in the areas where standards have not yet shifted to still make sure operators have proper training. Training is a good investment in accident prevention.
* Follow the example of auto insurers that offer discounts for safe drivers and examine the possibility of offering similar discounts for clients who demonstrate good maintenance, documentation, and training procedures.
* A pre-established working relationship with an engineering company experienced in lift usage will assist you in prompt and thorough accident investigations and help your clients become responsible users and lessors.
* Rental clients should already know the requirements of ANSI and OSHA, but reminders of the above items will emphasize the importance of proper maintenance, inspections, and training in accident prevention.

The Need for Specialized Consultants

With the number and types of standards applicable for specialized equipment such as aerial lifts, the investigator should know the correct standard, issue date, relation to

OSHA, and practice of the particular equipment, as well as be familiar with aerial lift components, systems, and requirements in order to proceed properly.
Depth of available services (i.e., metallurgical, failure, and structural analysis; human factors; accident reconstruction) allows for a thorough investigation. If these are from the same investigative source, interaction between the disciplines can be quick and seamless. Although a string of degrees, licenses, patents, and publications can produce "experts," documented experience in the lift industry makes reports and testimony more credible than academic credentials alone. Many times these "experts" have never operated an aerial lift, even though hands-on experience is essential in this industry.
Aerial lift accident investigations possibly may involve many disciplines, and one investigator may not have the necessary credentials in all of them. An engineering source with multiple specialists as well as laboratory and testing facilities assures the most expedient, consistent, and cost-effective investigation possible.
It would be unwise to initiate the search for an engineering consultant on the day an accident occurs. An ongoing relationship with a multi-disciplinary engineering organization provides a channel of communication, source of knowledge, and an availability of resources should an accident occur and an investigation need to be initiated. [OHS endbug]

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