September-October 2010

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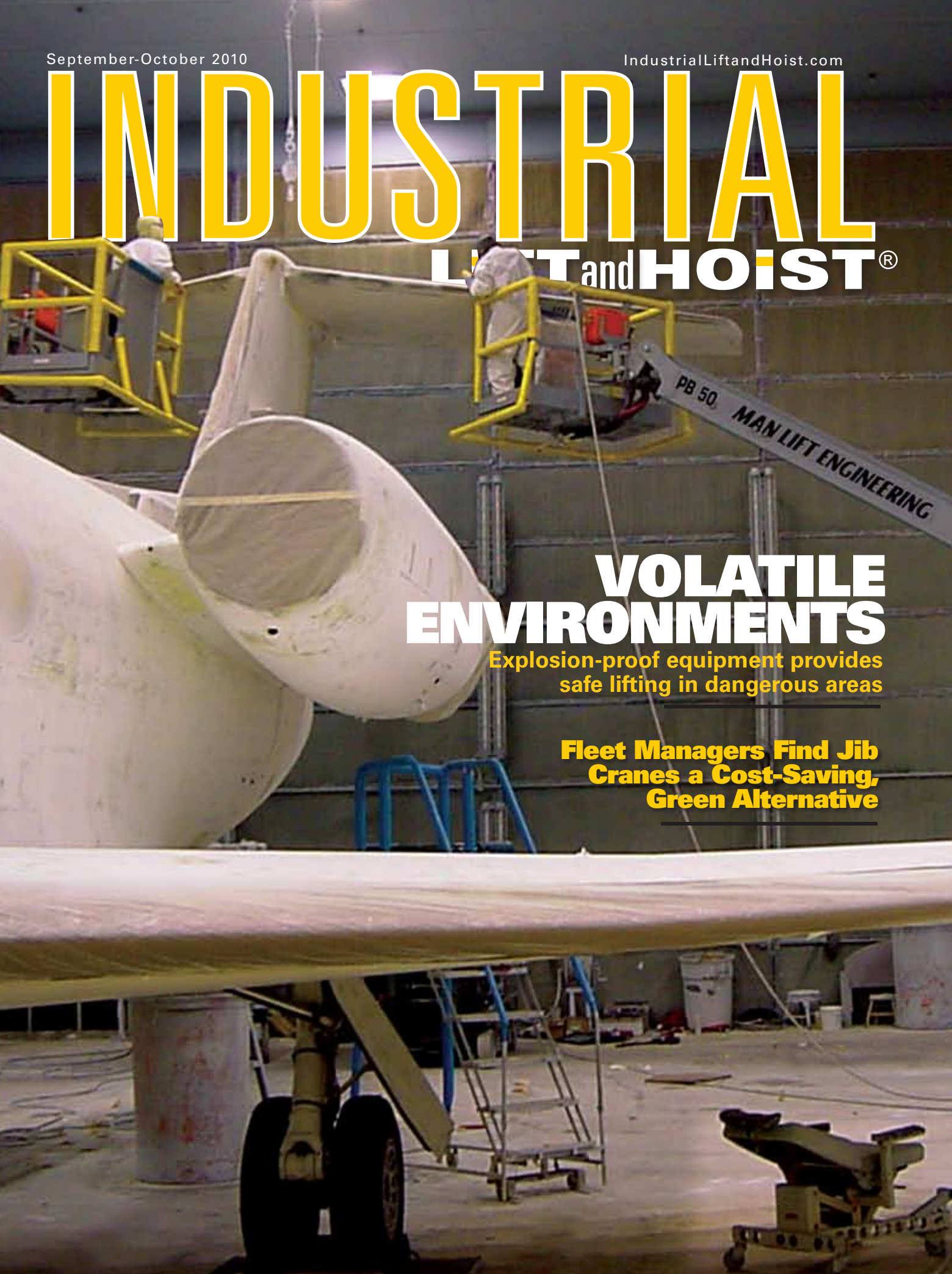

VOLATILE ENVIRONMENTS

Explosion-proof equipment provides safe lifting in dangerous areas

Fleet Managers Find Jib Cranes a Cost-Saving, Green Alternative

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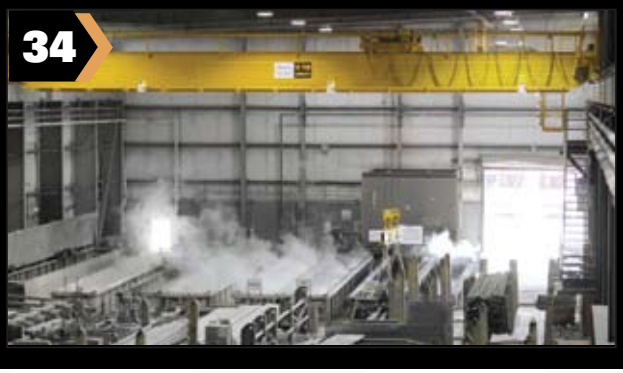

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On the Cover: Explosion-proof aerials like these EX boom lifts from Man & Material Lift Engineering increase safety in various hazardous environments like paint booths where explosive dust and gases may be present.

FEATURES

UPCOMING ARTICLES

- Aging Overhead Cranes
- Aerial Lift Fall Protection
- Forklift Operator Safety

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Compliance Boils Down to Equipment Selection

By Katie Parrish, *Contributing Editor*

POTENTIALLY HAZARDOUS ENVIRONMENTS in the aircraft, gas and petroleum, paint, manufacturing, and mining industries often require specially designed equipment that can withstand explosions and fires. Many times these areas are explosive due to the presence of flammable gases or vapors, flammable liquids, combustible dust, or ignitable fibers.

Man & Material Lift Engineering, Cudahy, Wis., reports that while federal regulations require companies to employ explosion-proof lifting equipment, there is some resistance to using these machines. Many fleet managers and equipment owners disregard the need for these units because they say they've never had an accident, or the cost of these specialty products is not in the budget. However, having covered equipment accidents for nearly 10 years now, I can't count how many newspaper articles I've read in which the equipment owner is utterly shocked by the result of an accident—even when improper safety equipment or the wrong machines are being used for the job.

Like equipment owners who refute the use of explosion-proof aerials because of a higher sticker price or the belief that they just don't need it, complying with personal protective equipment (PPE) requirements is also a challenge. Although I found it interesting, I was not entirely surprised by the results of a safety equipment compliance survey conducted by Kimberly-Clark Professional.

> ***98 percent of survey respondents observed workers not wearing proper safety gear.***

Ninety- eight percent of respondents of the poll, which took place at the American Society of Safety Engineers show in June, said they had observed workers who were not wearing necessary safety equipment while on the job. What's more, 30 percent of respondents said this occurred on numerous occasions. Kimberly-Clark Professional also conducted this survey in 2006, 2007, and 2008 at the National Safety Council Congress, which produced similar results.

Failing to wear eye protection is the most common PPE offense, followed by foregoing hearing protection. Although I do not have tangible numbers, I would lump in the use of fall protection harnesses as another common transgression—particularly with the use of aerial work platforms. Survey respondents noted comfort was their biggest PPE complaint, while others said that the equipment was too hot, not available near the work task, a poor fit, or unattractive looking.

What are ways to improve compliance of equipment and PPE? Education and training in our industry needs to constantly be at the forefront of our thoughts and discussions. Those who are ignorant of ways to protect themselves simply will not be safe. Additionally, make employees accountable for their own actions by monitoring them individually, as well as tying in compliance to performance evaluations. Finally, if you are a manager, lead by example by wearing your own protective equipment and employing the right equipment for the job. (For more information specifically on explosion-proof equipment, turn to page 27.) With the high costs of insurance and worker's compensation claims, there is no reason not to.

A new face at ILH

Over the last three years, *Industrial Lift and Hoist* has morphed into its current state as the go-to magazine for industrial lifting equipment information. Our hard work is paying off, as we've received more positive feedback now than ever before. This month, we have another exciting announcement to make: Richard Howes is joining the *Industrial Lift and Hoist* team as associate publisher and editor. Richard brings a wealth of knowledge on cranes and the industrial market, having spent the last several years editing *Cranes Today*, *Hoist*, and *OCH*. He has the means to take this publication and related events, including the Industrial Crane & Hoist Conference, to the next level. Please contact Richard at rhowes@maxcapmedia.com with any questions or comments and stay in touch, as I will remain involved as the contributing editor.

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Operating in Explosive Environments

Paint facilities and the aircraft industry are two potentially explosive locations.

Potentially dangerous areas require specially designed lifting equipment

Information provided by Man & Material Lift Engineering, Cudahy, Wis., which designs and manufactures explosion-proof equipment. MLE engineers lifts for hazardous and clean room environments, electrically insulated and high capacity lifts, self-propelled machinery carts, forklifts, pallet trucks, stackers, and electric cranes. MLE also provides advanced product testing, verification, and certification. For more information, visit manliftengineering.com.

ACCORDING TO THE National Fire Protection Association, U.S. fire departments respond to an average of 10,500 structure fires in industrial and manufacturing properties each year. Dozens of people are killed and hundreds are injured every year in fires and explosions. Additionally, hundreds of millions of dollars are lost in damages to buildings and property.

Lifting equipment not developed for these hazardous environments can be the culprit. For example, a worker was killed in a California paint facility when an industrial lift that was not rated for the hazardous environment ignited explosive gases. Similarly in Texas, a battery-powered industrial lift operating around explosive gases caught the mixture on fire and sent several people to the hospital and caused $3.2 million in damages.

It is impossible to put a price on the loss of even a single human life or the economical and ecological impact of such accidents on a community, region, or country. But for many, the reasons to adopt explosion-proof aerial lifts in their fleets still is unclear.

Oftentimes, fleet managers and equipment owners say things like, "Why should I buy explosion proof? We have never had an accident." Others may want to buy an explosion-proof lift, but use the excuse that it costs more than standard equipment, which is not in the budget. However, the federal government requires companies to use explosion-proof equipment in hazardous locations. It is a fact that flammable gases, vapors and dust are created and escape during the production, processing, transporting, and storage of many materials. These flammable gases, vapors and dust can form an explosive atmosphere. If this atmosphere is ignited, an explosion can take place, which may result in loss of life and injury, as well damage to property, equipment, and the environment.

Dangerous areas

A hazardous location is an area where a fire and/or explosion hazard may exist due to flammable gases or vapors, flammable liquids, combustible dust, or ignitable fibers. The area is classified in accordance with properties of the material responsible for the potential hazard and with the likelihood of the hazard actually being present. Hazardous locations are defined in terms of the physical properties of the materials, its similarity to other materials, and the potential risk or exposure. (See sidebar on page 29 for more details.)

Class: Denotes physical characteristic of the materials.
Division: Classifies the likelihood of the presence of the hazardous condition.
Group: Categorizes the materials by relatively similar hazardous characteristics.

Some of these potentially dangerous locations include the aircraft and aerospace, gas and petroleum, paint and chemical, manufacturing and processing, and mining and coal industries.

In the aircraft and aerospace industries, explosion-proof aerial lifts and material-handling equipment are used in commercial, recreational, and military aircraft for prepping, painting, refueling, and towing. EX lifts greatly increase the safety of various industrial processes in hazardous environments where explosive dusts and gases may be present. They also prevent and protect against property damage and the loss of life that may occur from explosion hazards.

Offshore oil drilling rigs and storage facilities employ explosion-proof protection for material handling and maintenance.

In paint and chemical and manufacturing and processing plants, facilities maintenance, receiving, storing, manufacturing to warehousing, and shipping of potentially explosive materials often require explosion-proof lifts and equipment.

Additionally, aerial lifts and equipment used in underground mines are heavily infiltrated by dust. Vehicles used in these operations, by regulation, require explosion-proof protection.

The aerial lift batteries and electric motors are typically housed in an explosion-proof box.

Equipment operation

To safely operate aerial lifts and other powered equipment in hazardous environments, the machines must meet either the NFPA DY or EX designation. It is important to note that many professionals are confused about these designations and often believe that equipment designated as EE is approved for explosive environments. However, EE machines have minimal spark protection and do not comply with the strict electrical requirements of NFPA 70 (NEC) for hazardous environments.

As a regulating body with the enforcement authority, local fire departments can identify and classify a hazardous area during routine inspections. They also can determine if equipment used in a hazardous area conforms to the appropriate approval rating. However, this level of inspection detail is often overlooked as inspections are mainly focused on debris, extinguishers, exit signage, and fire plans. OSHA also has regulatory and enforcement authority, deriving its standards from NFPA and ANSI, but it usually does not perform inspections unless a complaint is received or an accident has occurred. Other influencing factors are insurance companies and in-house safety committees and professionals.

■ Tires use a specially compounded electrically conductive rubber to ground the machine.

Once the machine and environment designations are established, equipment owners need to decide what type of power they prefer. Batteries are the most popular, and a battery-powered scissor lift used in a paint booth, for example, would typically house the battery box and electric motor inside an explosion-proof box. All electrical controls would be intrinsically safe or hydraulic, and rigid, sealed conduit pipes enclose all wiring. Tires use specially compounded electrically conductive rubber to ground the machine to prevent electric sparks.

If the application is complex, a custom lift may be required. For example, very hard-to-reach surfaces, such as the interior fuselage of an aircraft, may need to have a telescoping boom that extends horizontally but also moves vertically while remaining horizontal, as well as provide sideways access with the addition of a jib. In this case, the same codes have to be followed with respect to producing an EX lift.

For equipment owners using aerial lifts and other lifting equipment in volatile environments, one of the key considerations is the primary power source. Next is the configuration of the machine—will a scissor lift provide enough access to all application areas, or is an articulated straight boom lift necessary? Finally, owners also should consider that if the application is too complex, a custom-designed machine may be needed.

Hazardous Classes

The NFPA divides hazardous areas into three classes, two divisions, and seven groups. The purpose of creating the complex designation scheme was to match conditions with protection methods. The three main classes are flammable gases (I), combustible dusts (II), and ignitable fibers and flyings (III). Subsequently, there are two divisions.

Division 1 is the more serious hazardous area and is defined as:

- Locations where volatile flammable liquids or liquefied flammable gases are transferred from one container to another;
- Interiors of spray booths and areas in the vicinity of spraying and painting operations where volatile flammable solvents are used;
- Locations containing open tanks or vats of volatile flammable liquids; drying rooms; or compartments for the evaporation of flammable solvents;
- Locations containing fat- and oil-extraction apparatuses that use volatile flammable solvents;
- Portions of cleaning and dyeing plants where hazardous liquids are used;
- Gas generator rooms and other portions of gas manufacturing plants where flammable gas can escape;
- Inadequately ventilated pump rooms for flammable gas or for volatile flammable liquids;
- Interiors of refrigerators and freezers in which volatile flammable materials are stored in open, lightly stoppered, or easily ruptured containers; and
- All other locations where hazardous concentrations of flammable vapors or gases are likely to occur in the course of normal operations.

Division 2 areas are less hazardous and are defined as:

- Areas where volatiles are confined within closed containers or closed systems from which they can escape only in the event of the accidental rupture or breakdown of such containers or systems or in the event of abnormal operation of equipment;
- In locations in which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation but where such concentrations can become hazardous through failure or abnormal operation of the ventilating equipment;
- In locations adjacent to Class 1, Division 1 locations and to which ignitable concentrations of gases or vapors can occasionally be communicated.

The Seven Groups

The seven groups are categorized based upon a material's relative volatility as compared with those of acetylene. They are acetylene **(A)**, ethylene **(B)**, hydrogen **(C)**, and propane **(D)**, as well as metal dusts **(E)** and other combustible dusts including coal, coke, carbon black, and charcoal dusts **(F)**, and grain and wood dust **(G)**. These are used as points of reference as to the degree of volatility of a given area.