Don't run the risk

GDI consulted drillers and manufacturers on how to stay safe when working on a drill site

Having safety-engineered controls on a rig is critical and should be the main focus. For example, rod-handling equipment and rotation barriers on moving parts reduce potential hazards

It comes as a surprise to no-one that drilling sites are riddled with potential hazards, from the drilling equipment itself to environmental dangers.

There are serious risks related to the overturning of drill rigs, often due to inappropriate load distribution and unstable work surfaces, as well as operating the rotating and moving parts on the machines, which can lead to injuries through entanglement or crushing.

However, the burden of responsibility for safety lies mainly with the operators themselves.

"Entanglement in the rotating parts of the machine (drill string) is more likely to occur while adding or removing the drilling equipment (rods, casings or auger sections) during drilling operations," explains Comacchio's technical manager, Michele Piotto.

"Some of the hazards are related to the improper or negligent use of the lifting equipment, such as service winches, which are designed for lifting the rods and should not be used for dragging the drilling tools and/or equipment."

Photo: Boart Longyear

Sonic Drill Corporation's Bill Fitzgerald adds: "If workers don't use the right techniques and tools, they can end up straining their backs or suffering other physical injuries from lifting loads that are too heavy. And, this can create long-term problems. The use of proper equipment to lift pipe, for example, is key to avoiding an injury."

SETTING UP

It is critical that drill rigs sit on stable ground, where they can't sink or tip over, and are properly secured to prevent movement.

Stability can be affected by factors such as the grading, ground conditions, and size and surrounding limiting factors of the drill pad.

"The size of equipment dictates a minimum drill pad size. Muddy or hard ground conditions all pose different risks with stability and must be addressed," comments Darren Sanders, regional EHS & training manager, US and Mexico, at Boart Longyear.

"If the drill pad site is not proportional to the drill rig and equipment, special provisions might be necessary to accommodate site conditions. This can

increase hazards on the site. For example, if there's not room on the drill pad to manoeuvre rods with rod-handling equipment, manual handling might need to be considered, which escalates risk on the site."

Fitzgerald continues: "When working on a slope, the old adage of 'work with the hill, not against it' applies. In some situations, the use of tracked rigs is the only safe option, especially in grassy areas or bush where a truck rig is not appropriate. Tracked rigs are far more stable, don't get stuck and can access a site easier."

Overall, it's important that the operator is aware of the surrounding workplace and of objects that can pose risks, such as overhead electric power lines or other obstructions.

"Some restrictions are related to the drill rig itself, for example, the position of the rotary head on the mast during set-up operations is normally specified in the relevant sections of the user manual provided by the drill rig manufacturer. Following the manufacturer instructions in the set-up phase is essential to prevent damage or injury," notes Piotto.

GETTING TO WORK

All safety-sensitive devices and parts on a drill rig should be checked at the start of the day or before every shift.

For example, at Boart Longyear, a pre-shift ritual should include: a safety discussion with the drill crew; a workplace assessment to identify hazards; a detailed rig checklist to ensure mast, hydraulic lines, jack legs for stability of rig, winch lines, main lines, water lines, oil and fluids levels are inspected; and a check that safety equipment and devices such as fire extinguishers, overrun limiters or crown outs, rotation barriers, emergency stops, whip checks on high-pressure lines and guards and rails are present and working properly.

"This is not a totally inclusive list, but it gives you an idea of some of the safety checks that happen at every shift on a Boart Longyear-operated drill rig," says Sanders.

"There is also the process of flagging a site set-up as 'no go' – which means no drilling is completed if something is missing from the site or needs to be repaired. Anytime there ►

The new Comacchio MC 13 F drill rig, equipped with safety guard and devices in conformity with the European safety standard EN16228

There are many hazards on drilling sites, such as energy sources, motion hazards, pinch points, chemical hazards and environmental hazards

are equipment issues or safety concerns, no work proceeds."

When it comes to safety measures on site, the client, drilling contractor and local/regional authorities will have their own sets of safety measures and requirements. "It's important that the drilling crew is aware of all requirements and not just some. It is not sufficient to meet only some rules – otherwise, accidents can happen," stresses Fitzgerald.

"Ultimately, using an experienced drilling supervisor is what really counts. The knowledge of hazards and how things can go wrong is invaluable and only comes with years of drilling experience.

"We never put new drillers into that position without having first worked their way through the other roles on a site and after being trained thoroughly. "

Boart Longyear also emphasises training and competency, so that its drilling crews have a strong understanding of the hazards of the work they are doing and the importance of the field-level risk assessments, even on mundane tasks.

Sonic drillers working to load pipe

"We encourage our drillers to never do a task like it's something they do every day – complacency leads to accidents," Sanders warns.

Photo: Sonic Drill Corporation

SAFER EQUIPMENT

Drilling has evolved over recent years, and drill sites are a much safer work environment nowadays. Due to innovations like rod-handling systems that minimise heavy load injuries, safety cages that protect workers from accidental contact with equipment, and personal protective equipment – which includes clothing, hard hats, safety glasses or other items designed to protect a worker from injury – drillers have fewer hazards to worry about.

The European safety standard EN16228, which came into force in 2014, has introduced a number of requirements aimed at improving the safety performance of drill rigs.

Piotto explains: "One of the major improvements is the revised requirement to protect the operators from the rotating parts and the related entanglement hazard. In line with our commitment to highest quality and safety, we have invested a lot of time and resources in the development of safety guards that can fit the many different drill rig models and configurations that we offer.

"Also, we are continuously investing in the development of automatic handling systems that eliminate the need for manual handling of rods and casings, thus reducing injuries caused by lifting and entanglement hazards."

Depending on the drill-rig size and its load capacity, Comacchio is offering different types of automatic rod/casing-handling devices, which can either be installed on the drill rig itself (rod carousels or rods and casings revolver magazines) or can be attached to small standard excavators that are used in combination with the drill rig (such as the Comacchio CPH unit).

Photo: Boart Longyear

These systems are enhanced with the Comacchio all-in-one radio control that allows drillers to control all the machine functions (tramming, set-up and drilling) and to operate the rod-loading devices.

In general, the implementation of radio-controlled technology to drill rigs, especially in the ground-engineering sector, has proven effective in reducing risks and protecting the operators on the job site, due to the ability to work at a distance from the machine, while maintaining a complete vision both of the machine in movement and the surrounding site area.

"Compared to many other types of drilling, sonic drill rigs are safer due to their unique patented technology, which uses smooth rods and casings that significantly increase operator safety and, with no auger flights, there is far less opportunity for clothing or items to be caught on rig components," states Fitzgerald. "However, no matter what rig is used, the industry, as a whole, is much safer due to the regulations, training and equipment now used."

FOR BEGINNERS

It goes without saying that a highly skilled operator working with well-maintained equipment

is the best guarantee for a safely performed job.

"Most new workers are going to be very eager and try to show that they can do the best job, but that's how injuries happen. We want to see an effort, but without the 'gung-ho' or overzealous attitude. Supervisors should direct new crew members on how to employ a measured effort that produces good results, but keeps everybody safe," notes Fitzgerald.

Extensive hazard and risk training is critical for new drillers. "Our field-level risk assessment process is a tool we use to ensure crew members work through each new or non-routine task to identify the hazards and risks, the proper tools and equipment for the job, and what controls and safeguards are needed to adequately control the risks and perform the task safely.

"It also ensures the crew is communicating adequately and has the same understanding of the work and how it is to be accomplished – getting on the same page," says Sanders.

Since 2008, drillers in Italy must have a 'driving license for drill rig operators', called Patentino; this licence is compulsory for drilling companies in order to participate in tenders.

"Specific training courses are held by specialised training centres for the building and construction industry on a regular basis," explains Piotto.

"It is important that these courses should focus not only on improving the standard of workmanship and technical competence of the operators, but on instructing them thoroughly in the safety aspects, including safe transportation, safe maintenance of the machine, safety devices equipping the machines and safety procedures to be carried out on a job site."

Close-up of the safety guard equipped on the Comacchio MC 13 F

Sanders concludes: "We encourage new drillers to be open and honest about what they know and what they don't know and be willing to admit when they are unsure of the proper and safe way to complete a task or have questions – that's the best and safest way to learn drilling."