

Health, safety and environment policy of Croscos, integrated drilling & well services co., ltd. – application of HSE practice in onshore drilling

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PROFESSIONAL PAPER

The paper considers the approach to and aspects of occupational safety in drilling operations based on Croscos experience, and synergy of professional expertise in onshore deep drilling and knowledge of existing regulations in this area. Key preconditions for achieving such synergy are human resources that, apart from professional expertise, have good training in quality management, health, safety and environmental protection. Comparison of injury frequency rate in Croscos and other international drilling contractors shows that Croscos has good track record, but there is always room for improvement. Good HSE results, apart from achieving compliance with prescribed rules, contribute to higher level of satisfaction of employees, the client and other stakeholders, company's image and finally to overall performance of the company.

Key words: onshore drilling, HSE, implementation of occupational safety, environmental protection

1. INTRODUCTION

Today, almost every oil company, including oilfield service contractors, place safety of their employees highly on their agenda. In this respect, Croscos, the only Croatian drilling and oilfield service company, is not an exception. When competing in international market Croscos must meet stringent quality and HSE standards. However, it was not always so. Current HSE regulations evolved through the long history of oil industry. Before gradual HSE improvement, there were numerous cases of severe and fatal injuries in onshore and offshore drilling operations executed by various international contractors. Work on the well site is considered as one of the most difficult and dangerous jobs. Therefore it was imperative to introduce various protection and prevention measures in order to mitigate injury risks and fatal injury rate. Protection of health and safety of employees was accompanied by concern for the environment and today oil companies have in place HSE regulations which must be followed in carrying out various oil operations. Effective implementation of HSE measures represents an important competitive advantage in the international market and contributes to oil company reputation. As a result of technology development and improved health and safety measures, the number of injuries, particularly fatal injuries, significantly decreased. Growing concern for HSE was recorded first in the Western countries driven by high indemnification costs that resulted from inflicted injuries and pollution of the environment. In the East and in undeveloped countries HSE issues were not highly praised at the beginning, however, the situation has changed, first in the rich Arabian countries, but in other parts of the world as well. Despite oil companies' efforts to improve HSE measures, even today injuries and those

with fatal end happen during different well operations, mainly as a result of human error. In order to prevent such outcomes it is important to implement quality training of employees engaged in well operations through application of advanced technology and by pursuing prescribed occupational safety measures.

2. HSE REGULATIONS

Croscos carries out operations fully in compliance with HSE regulations effective in the Republic in Croatia⁶ but also in other countries in the world where drilling and other oilfield services are performed. Croatian labour act in Article 28 requires employer to provide documentation on maintenance of plants, equipment, tools, work site and access to the site and to ensure workplace safety so as to protect lives and health of employees. The employer is obliged to acquaint employees with potential hazards of a workplace and provide adequate safety training. This also refers to lodging facilities if the employer committed to ensure workers lodging on specific site. Occupational safety act is focused on prevention of injuries, occupational diseases, other job related diseases and workplace protection. Part of provisions of Croatian mining law⁴ deal with the issues related to operation of drilling rigs and other equipment used in oil and gas exploration and production. Safety measures in this area are prescribed in Articles 70 through 76.

As for the HSE regulations in foreign countries, they differ from country to country. However, there is a considerable degree of similarity when dealing with specific oil industry problems and generally they prescribe similar obligations. It would be quite impractical that, for example, engineers and responsible persons of a

contractor were obliged to pass professional exams in each country of operation.

Fortunately, scope of Croatian legislation and required expertise level prescribed by Croatian "Regulation on necessary training and expertise for carrying out mining operations"³ ensures sufficient skills required for performance of oil services abroad. Some foreign clients (operators) ask for certificates on professional exams passed by key personnel in country of origin in order to verify HSE skills.

3. IMPLEMENTATION OF OCCUPATIONAL SAFETY MEASURES IN PRACTICE

Technology advances that have been gradually introduced in entire oil industry, enabled decrease of fatal injuries rate and work related injury rate, however these rates did not entirely follow technology developments. For this reason it was necessary to introduce specific occupational safety measures. The introduction of health and safety at work² in Great Britain is very illustrative in this respect. Detection of problems and work related incidents, induced passing of regulations which forbid use of some equipment and tools which proved to be unsafe, but it resulted in some backlogs in application of new technologies.

In order to tackle these problems in Great Britain, Lord Roben, who was at that time engaged in improvement of

HSE related to mining sector, was invited to analyse problems of injuries at work, particularly in relation to activities in industries that were not covered by specific HSE regulations. In 1972 he presented the findings which had significant impact on passing of the new "Health and Safety at Work etc. Act 1974". Namely, it was established that specific HSE regulations did not follow technology advancements sufficiently. Consequently, companies were obliged to identify risks and make risk assessments, eliminate or at least mitigate risks, and, of course, to observe existing laws and regulations. This Act is applied by British oil industry, but similar approach is also adopted by other European states.

Croscos is continuously working on prevention of injuries at work and the results are visible in our company statistics for the recent years. The health and safety system is in place for a long time. In 1998 the system was completed with Croscos's own risk assessment for every job position. It was successfully adjusted with OHSAS 18001:1999 requirements, implemented and audited. Soon after that the environmental protection management system was also adjusted to ISO 14001:2004 norm and implemented. Today, Croscos is certified according to the most recent standards, including OHSAS 18001:2007, and it is a proof of progress achieved and continuous work on improvement of health and safety of employees and environmental protection. Figure 1 indicates the decline of lost time injuries since 1997 and in this respect Croscos follows the trend of other interna-

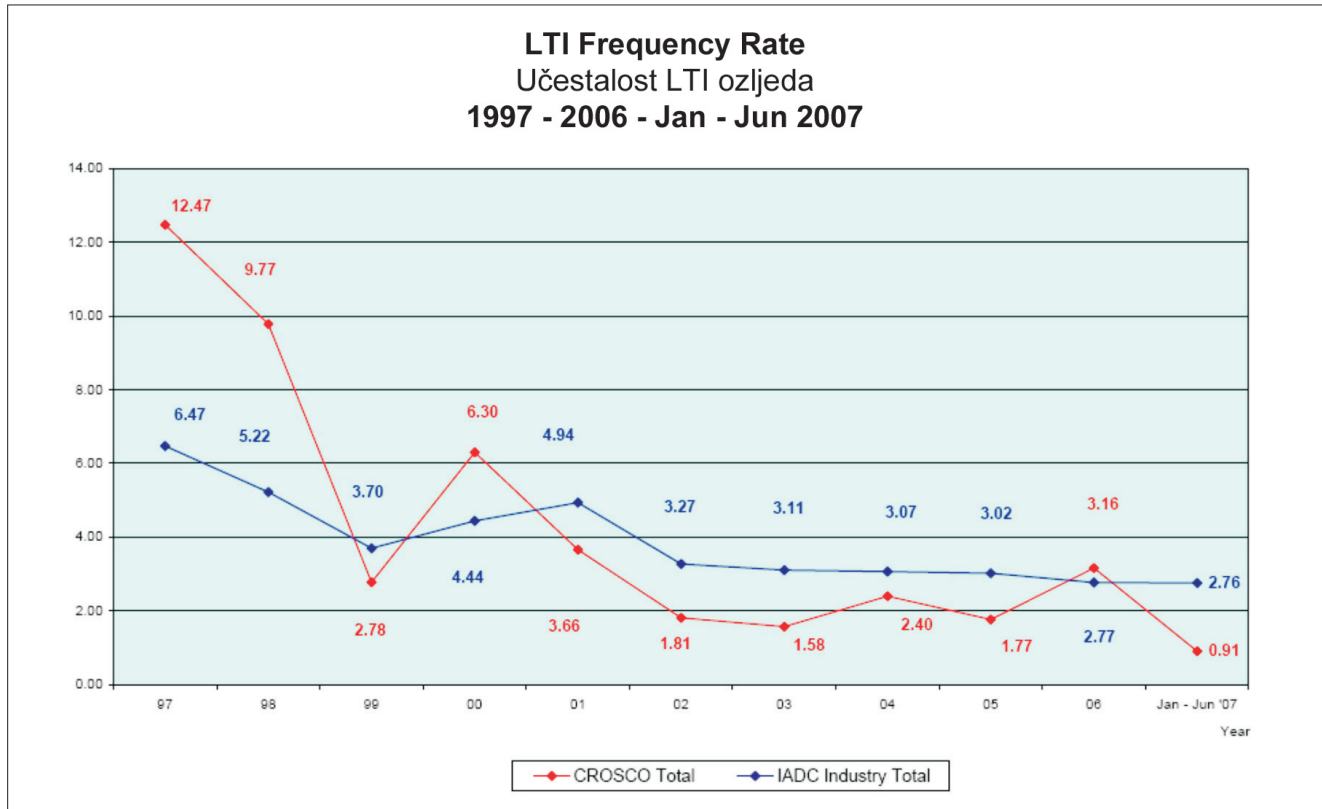


Fig. 1. Lost Time Injury Frequency
Sl. 1. Učestalost ozljeda s izgubljenim radnim vremenom

tional service companies associated in International Association of Drilling Contractors – IADC.

These data indicate that Croscos can compete successfully in international market, both with quality of services and compliance with HSE requirements.

4. SAFETY AT WORK DURING PREPARATION FOR DRILLING AND PERFORMANCE OF DRILLING OPERATIONS

During preparation of drilling rigs and drilling operations on the well site, there are many risks for a drilling crew. As derricks and other drilling equipment are very heavy, even the smallest component of a rig poses a potential risk from injury. The works on the well site usually start with moving of the derrick and complete equipment, frequently including housing units, to the well site. There are also considerable risks for employees during transport and handling of heavy freight. Therefore it is necessary to follow strictly all regulations related to use of lifting equipment, as well as loading and offloading operations. Configuration of the land, soil properties, functionality of lifting equipment and crew's skills, are very important factors that have high impact on potential injuries during transport and handling of equipment.

When rig components are transported to the well site, drilling rigs need to be assembled and made ready so that drilling operations can start. Good communication and coordination of all crew members and following of drilling operator's procedure during drill rig erection, are essential for safety of employees. As numerous activities are carried out at heights, all personnel must wear all protective equipment, including equipment for work at heights. It could be assumed that observance of operator's procedures would exclude injuries. But in some cases it is not possible to meet all safety requirements, particularly those related to work at heights. In such cases proper training of the crew is very important for avoiding injuries.

During drilling, a lot of attention must be paid to adherence to prescribed fire protection measures, because theoretically, hydrocarbons may appear on the surface at any time. If case of dangerous gases appearance, such as hydrogen sulphide (H₂S), carbon monoxide (CO), carbon dioxide (CO₂) or other, the entire crew must be trained for proper reaction in such cases, because carbon monoxide is highly toxic and lethal even in small concentrations, carbon monoxide is toxic and carbon dioxide is suffocating.

In practice, several subcontractors are usually working at the same time on the well site, both operator's and service company's crews. The operations involve a number of workers executing different activities, therefore high quality coordination and follow up of prescribed procedures of each subcontractor is essential for avoidance of injuries and incidents. The above described risks are not the only hazards that may appear during drilling, therefore well operations are very risky and unpredictable.

Generally, all companies have in place prescribed procedures and their common goal is to prevent injuries at

work. Basic procedures and guidelines may have different names, but all of them include some of the requirements as listed below:

- Workers are obliged to wear personal protective equipment – PPE, which generally includes protective headwear, goggles, footwear, gloves and protective clothing. Some operations require special protective equipment, as for example work at height, protective mask, protective equipment against noise, PPE against chemical exposure.
- Pre-job safety meetings, preparations for obtaining permit to work which include job safety analysis or risk assessment.
- Regular drills for any possible hazard situation that may occur during drilling operations such as fire drill, kick drill, rescue drill. For this reason at least two muster points must be designated at which all site workers must gather in case of emergency, apart from the teams assigned for rehabilitation of emergency situation.

Depending on company's procedures or work conditions, other safety systems can be applied:

- **STOP CARD system** is based on insights about attitudes and behaviour of safety personnel: involvement of all workers on the site in the system of identifying and reporting on hazards with the purpose to decrease potential injuries to the minimum by means of written STOP cards. These cards are useful for analyzing the frequency of hazardous work procedures and workers behaviour which might lead to injuries.
- **TOUR CARD system** is implemented on locations with expected or existing possibility of hydrogen sulphide appearance. The system involves wearing of identity card by each and every individual employee working on the site so as to detect at any moment whether any employee is in hazardous zone in case of hydrogen sulphide or other hazardous gas appearance. Some companies implement Tour Card system on sites even if there is no danger of hazardous gases.

In addition to the above quoted procedures and systems aimed at minimising injuries, importance of safe work practices and proper training should not be forgotten. For this reason, today all companies pay a lot of attention to refreshing of workers' knowledge and skills, verify procedures and systems implemented for pursuing safe operations. It is important to organize regular meetings with all workers with the purpose to refresh knowledge and explain the purpose of each procedure or safety system. Preventive activities generally render positive results in occupational safety and health protection.

5. CONCLUSION

Today, it is a general practice that exploration operators hire specialised service contractors for execution of drilling and other oilfield services, thus the scope of HSE activities expanded. Drilling operations are frequently executed in undeveloped countries and the works are usually contracted with subcontractors offering the lowest price. On the other side, undeveloped countries insist on maximum engagement of local workforce which lacks

appropriate skills and expertise. Such practice led to numerous accidents which then caused dissatisfaction of local authorities.

Therefore, the focus is shifted to prevention of injuries during execution of all drilling operations onshore and particularly offshore, due to isolation of offshore well sites and more difficult access in case of emergency. Despite that, injuries and fatal injuries still happen, although to lesser extent. Nevertheless, wide implementation of occupational safety measures is absolutely necessary. It is no wonder then that HSE experts are wanted by operators and contractors. It is clear that HSE will continue to have a prominent role in oil industry.

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