Rich Blaho and Bob Button are with Safety in Motion (SIM) Inc. in Portland, OR. In this interview, they discuss the causes of musculoskeletal disorders (MSDs) within the oil and gas industry and offer guidelines for identifying, assessing and controlling the risk of MSDs in oil and gas operations.

**OGS**: Please provide a brief description of your professional backgrounds and of your positions with SIM Inc.

**RB**: I have been a senior consultant with SIM Inc. for 12 years. I have field work and consulting experience in both upstream and downstream operations with ConocoPhillips, Chevron, Exxon and BP. For 3 years, I was a facilitator of behavior-based safety (BBS) and ergonomics process for ARCO Alaska.

**BB**: I am the founder and director of SIM Inc. I have served as an ergonomics instructor for ASSE’s professional development courses, and I have presented at ASSE’s annual Professional Development Conference since 1991. I have more than 20 years’ experience in the oil and gas industry.

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experience in upstream and downstream operations for ConocoPhillips, Exxon, Chevron and BP. I hold an M.S. in Rehabilitation Services for the Physically Disabled.

OGPS: What kinds of MSDs are most prevalent in the oil and gas industry, particularly in offshore operations? What activities cause these MSDs?
RB/BB: Employees and contractors working in the oil and gas industry are exposed to the full range of both MSD risk factors and MSD injuries.

Reported injuries include sprains and strains, muscle spasms in the low back, tendonitis in hands and forearms, tears of ligaments and cartilage in shoulders and knees and nerve entrapments, such as sciatica and carpal tunnel syndrome.

We classify the causes of MSD injuries into three categories:
1) Acute incidents include sprains and strains caused by force due to lifting and using heavy parts and tools in awkward postures.
2) Body reaction incidents include spasms and strains caused by slippery conditions, uneven surfaces and frequent use of body mechanics that do not position the legs to manage balance effectively.
3) Cumulative wear, tear and inflammation are the result of long-term exposure to awkward postures and extreme fatigue.

The range of activities that result in MSDs includes:
• the heavy work of pushing, pulling, assembling and disassembling equipment on the drill floor and maintenance operations;
• more mundane activities that occur in transportation activities, supply management, food and housekeeping operations and office activities;
• off-the-job activities at home and in recreation.

OGPS: Demand for oil and gas is always increasing. Has this led to the emergence of any new types of MSDs not previously seen within the industry?
RB/BB: We are not seeing significant changes in the types of MSDs reported or in risk factors due to demand. In fact, our clients have seen significant reductions in the frequency and severity of these injuries over the last 10 years. This does not mean the risk factors have disappeared. However, continuous improvement in education, ergonomic investments, body mechanics and wellness has had a positive impact.

OGPS: What is the best way to identify, assess and control risk of MSDs in oil and gas operations?
RB/BB: We have identified specific and observable risk factors based on force, posture and fatigue that can be identified by both the individual employee and safety professionals.

Easy-to-recognize risk factors include:

**FORCE**
• weight of items being lifted, handled, pushed or pulled;
• sudden torque caused by tool use;
• sudden stop of task action;
• contact pressure on hands, wrists or knees.

**POSTURE**
• elbow position = green, yellow or red zones;
• wrist position = end-range flexion or extension;
• shoulder-hips-foot alignment = compound twist and bend in the low back or knees;
• foot position in relation to direction of push, pull or lift = same-side hand and foot forward.

**FATIGUE**
• repetitive-task motions;
• prolonged periods of static posture during task;
• lack of rest and recovery between tasks.

Our risk reduction system includes:
1) improvements to work setup and tool selection;
2) small changes in body position that reduce unnecessary stress on muscles, tendons, joints and nerves;
3) activities that take less than 60 seconds to help restore circulation and range of motion.
**OGPS:** Can BBS be implemented to reduce the risk of MSDs in oil and gas operations?

**RB/BB:** Oil and gas operations have implemented many successful BBS processes.

However, many of these implementations do not have sufficiently useful definitions of MSD risk factors that observers should look for in the field. For example, many data sheets have definitions, such as “body positioning” or “overextension.” These definitions are too broad and make productive interactions and data analysis difficult.

MSDs are typically the number one cause of work-related injury in oil and gas operations. When the specific behaviors that contribute to increased risk of MSDs are clearly defined, interactions and data analysis are easier and more productive for the observer, the employee and the data analysis team.

**OGPS:** What type of plan do you develop for your clients within the oil and gas industry who wish to reduce MSDs among workers but do not know where to start?

**RB/BB:** We provide a long-term process that:

1) educates management and field employees to apply basic techniques that reduce the stress of reaching, pushing, pulling, carrying, tool use and lifting;
2) identifies action items for risk reduction in operations;
3) develops process leaders and customizes the implementation plan to fit the client’s operations and organization.
4) updates the process plan to achieve continuous improvement and maximize the integration of our services into existing SH&E and operational procedures.

**OGPS:** What is most challenging about preventing or reducing MSDs within the oil and gas industry?

**RB/BB:** The oil and gas industry is exceptionally diverse in terms of environment, facilities and range of tasks. For example, a practical field ergonomics process must successfully address factors, including specific job tasks, equipment design, an aging workforce, long shifts and hours, weather conditions and doing more with less.

The key to success is a process that helps workers understand the personal value and practicality of making small high-value changes in the ways they do everyday tasks.

**OGPS:** How can safety training within the oil and gas industry better address MSD prevention? What needs to change?

**RB/BB:** To reduce MSDs in the oil and gas industry, field ergonomics training needs to be an integral part of an MSD risk reduction process.

Employees and leaders need knowledge, skills and direction that provide:

1) simple prework assessment of task risk factors;
2) checklists of practical task risk reduction options that make the best use of existing resources;
3) audits for risk factors that are beyond the control of individual employees and work groups and then prioritizing the use of human and capital resources to address these risk factors.

**OGPS:** Based on your experience with clients, can workplace wellness programs help prevent or reduce MSDs, or at least make workers more aware of their postures and positions?

**RB/BB:** In a word, yes. World-class safety performance is the result of a continuous cycle of improving risk recognition, personal risk reduction and business-process risk reduction. This includes wellness.

For example, understanding the physical requirements of job tasks and developing appropriate warm-up and fitness activities can help prepare employees for specific work activities and can reinforce field ergonomics.

Health fairs can also reinforce the value of small changes in the way employees position and use their bodies to do everyday tasks, both on and off the job.

Sustained reduction of MSD injuries of 60% to 90% are not just a possibility, they are a reality in many sites and operations.

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