INTRODUCTION

Safety performance has traditionally been measured and reported by lagging measurements such as an accounting of the injury/incident frequencies, associated costs, and other effects on people, equipment, and the environment. As a result of these accidents/incidents, much effort is put forth performing accident/incident investigations to determine causal factors. Though critically important, these efforts are all post-accident/incident and may not accurately reflect the current status of safety in the maritime (and other) industries. In fact, a low reported accident rate, even over a period of years, is not necessarily a guarantee that risks are being effectively controlled, or does not ensure the absence of injuries or accidents in the future (Lindsay, 1992).

In the past couple of decades there has been a realization that the safety of complex work systems (such as found in the maritime industry) may be improved by proactively identifying issues that may be associated with positive safety performance. Improved safety performance has been associated with a number of measurable activities in various industries (e.g. financial level of safety budget, safety audit scores, number of safety inspections, number of safety meetings/training (specifically involving management), etc.). An example of leading indicator measurement programs is the hazard identification and analyses for offshore oil and gas in the United Kingdom (Step Change in Safety, 2009).

This Leading Indicator Ergonomic Design and Safety Toolkit Module is based upon successful maritime application of the techniques discussed, as well as state-of-the-art science in a variety of peer-reviewed sources.

TERMS/DEFINITIONS

Accidents: Accidents are undesired events that result in personal injury.

Lagging Indicators: Measures of a system taken after events to assess outcomes and occurrences.

Leading Indicator: The National Academy of Engineering defines leading indicators as conditions, events, and sequences that precede and lead up to accidents (NAE, 2004). In essence, leading indicators are defined as conditions, events or measures that precede an undesirable event, and have some value in predicting the arrival of the event, whether it is an accident, incident, near miss, or undesirable safety state (Toellner, 2001).

Metrics: Metrics are a set of measurements that quantify results.

Non-parametric Test: A non-parametric statistical test does not require scores on the outcome variable to be normally distributed.

Spearman Rank Correlation: The Spearman's rank correlation coefficient or Spearman's rho is designed to measure the relationship between two ordered sets of ranks. It is similar to Pearson's Correlation except Pearson's uses values instead of ranks.

Spearman rank correlation (.): The Spearman's rank correlation coefficient or Spearman's rho, is a non-parametric measure of correlation – that is, it assesses how well an arbitrary monotonic function could describe the relationship between two variables, without making any other assumptions about the particular nature of the relationship between the variables. The Spearman Correlation Coefficient can be considered as an indicator that a relationship exists between two variables even though it is non-linear.