Safety Management

Near Miss Identification, Recognition, and Investigation

Ron C. McKinnon, CSP

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Preface

INTRODUCTION

Near miss incidents, close calls, or close shaves have often been referred to as "safety in the shadows," as this is where the heart of the accident problem lies. Near miss incidents offer management an opportunity to rectify a system breakdown before it happens. They are inexpensive learning opportunities. Because there are no losses as a result of an undesired event does not necessarily mean that the event is insignificant. Many of these seemingly unimportant events have high potential for injury and other losses. If recognized, reported, and rectified, near miss incident root causes will be eliminated leading to a radical reduction in injury-causing accidents.

MISUNDERSTOOD

For many organizations, the term *near miss* is not only misunderstood, but it is underrated with regards to the potential for a near miss incident to become a profit-draining accident and possible injury at a workplace. The term *near miss incident* also can be defined as a narrowly avoided mishap. What that means in the manufacturing, construction, or mining industry is that a person narrowly avoids an injury due to an unforeseen mishap or when there is an undesired event, which, by a stroke of luck, narrowly avoids damaging a piece of equipment, property, or material. These are missed safety signals.

Reporting and rectifying the causes of near miss incidents has many benefits. Studies of adverse events, such as accidents, indicate that near misses occur more frequently than accidents and are often precursors to accidents. In many cases, the same near miss incident has occurred numerous times prior to the actual accident.

ACCIDENT ROOT CAUSE INDICATORS

Research of thousands of undesired (accidental) events has shown that the outcome of the event cannot be predicted and that, under slightly different circumstances, the consequences could have been better or worse if it were not for some factor of luck or good fortune.

The principle of *multiple causes* indicates that accidents are usually the result of a multitude of causes and there are usually many immediate causes and numerous root causes behind every event.

These loss-producing events are termed *accidents*. Some refer to them as *incidents*, but, for clarity, they will be referred to as *accidents* in this publication. No-loss events with potential for loss will be termed *near miss incidents*.

The high risk acts of a worker or a high risk work environment riddled with hazards, or a combination of both, are the immediate causes or the closest causes of an accident, which results in accidental losses, such as death, injury, property damage,

fire, or business interruption. High risk acts and/or conditions are the most obvious accident causes, or the causes that lead to the contact with a source of energy that causes the subsequent loss.

Root, or basic, causes are the deep hidden person and job factors that give rise to the immediate causes in the form of high risk acts and/or conditions. If they are not identified and rectified, the accident problem will not be eliminated. Fixing the immediate causes rectifies the symptom, but not the root or basic cause.

Risk assessment of all near miss incidents will determine which near miss incidents warrant a full investigation to track and eliminate the source of the problem at the root.

A Proactive Approach

S. L. Smith writing in *Occupational Hazards* (1994) says:

> Near miss incidents challenge the tradition of using an accident to initiate a thorough review of safety conditions, practices, and training. Tracking near miss incidents offers organizations a better opportunity to focus their preventative efforts (p. 34).

If based on near miss incident information, these efforts will be proactive rather than reactive. As another safety professional put it:

> Letting a near miss incident go unreported provides an opportunity for a serious accident to occur. Correcting these actions or conditions will enhance the safety within your organization and provide a better working environment for everyone involved. Don't let yourself or co-workers become statistics—report near miss incidents to your supervisor. Prevent an accident that's about to happen!

H. W. Heinrich

More than 80 years ago, H. W. Heinrich suggested that one should focus on the accident rather than the injury. He was the first to propose a ratio existed between injuries and accidents that produced no injuries.

> Accidents and not injuries should be the point of attack. Analysis proves that for every mishap resulting in an injury there are many other similar accidents that cause no injuries whatsoever (p. 24).

Explaining his ratio, the first ever published, he said:

> From data now available concerning the frequency of potential-injury accidents, it is estimated that, in a unit group of 330 accidents of the same kind and involving the same person, 300 result in no injuries, 29 in minor injuries, and 1 in major or lost-time injury (p. 24).

Heinrich's Third Axiom

In 1931, H. W. Heinrich drew up a list of 10 axioms based on his safety research, which was published in *Industrial Accident Prevention,* 3rd ed. (McGraw-Hill, 1950). Axiom 3 has great significance for the concept of near miss incidents and he was the first person to derive the following conclusion:

> The person who suffers a disabling injury caused by an unsafe act, in the average case has had over 300 narrow escapes from serious injury as a result of committing the very same unsafe act. Likewise, persons are exposed to mechanical hazards hundreds of times before they suffer injury (p. 10).

His fourth axiom was the first recorded theory that fortune or luck may play a part in determining not only the outcome of an undesired event, but also the severity of consequent injury.

> The severity of an injury is largely fortuitous—the occurrence of the accident that results in injury is largely preventable (p. 10).

Despite these major findings, near miss incidents have mostly been overlooked in industry despite history of major-loss events confirming the theory that there are many near misses or warnings before the occurrence of major accidental losses. Near miss incidents are truly the foundation of major injuries, the building blocks of accidents, and warning signs that loss is imminent.

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Acknowledgments

With so much information and work that has culminated in this book, numerous people need to be thanked. I would like to thank the industrialists and miners that I have dealt with over the past 38 years. I learned industrial safety from them and a great deal about near miss incidents from their near miss investigation systems and from their experiences in dealing with the aspect of "safety in the shadows."

The safety pioneers that I have quoted in this book need to be thanked for their diligent research into one of safety's hidden secrets and for exposing what could be a key to injury reduction at the workplace—near miss recognition, reporting, and rectification. They were the propounders of the important theory that near misses are the foundation of a major injury, and, in modern terms, precursors to major accidental events.

To my many mentors, I thank you for sharing your safety knowledge and for the support and encouragement that you offered me. To my associates, colleagues, and "safety *boytjies*" who I have worked with in many countries, it was a privilege to have met and worked with you. You taught me a great deal.

Thanks to Lisa Nevitt, projects manager, safety and training, Phoenix Water Services Department, City of Phoenix, for the case study and examples of their near miss incident reporting card. Thanks to Chuck Gessner, former Magma/BHP Copper director of safety and loss control, for the Magma Copper case study.

For making this publication possible, I thank my wife, Maureen McKinnon, who spent numerous weeks typing and editing this manuscript. This support warrants my deep gratitude.

The contents of this document are dedicated to the thousands of men and women in industry and mines who have died as a result of occupational injuries and diseases, and to the millions who have been and are injured every year in industries and mines around the world. *Note*: If warnings in the form of near miss incidents had been heeded, I am sure a large number of these accidents could have been prevented.

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About the Author

Ron C. McKinnon, CSP, is an internationally experienced and acknowledged safety professional, author, motivator, and presenter. He has been extensively involved in safety research concerning the cause, effect, and control of accidental loss, near miss reporting, accident investigation, and safety promotion.

McKinnon received a national diploma in Technical Teaching from the Pretoria College for Advanced Technical Education; a diploma in Safety Management from Technikon SA, South Africa; and a management development diploma (MDP) from the University of South Africa in Pretoria. He also has a master's degree in Safety and Health Engineering from Columbia Southern University in Alabama.

From 1973 to 1994, McKinnon was affiliated with South Africa's National Occupational Safety Association (NOSA) in various capacities, including safety and health training and motivation. He is experienced in implementation of safety programs, safety culture change interventions, auditing safety systems, and production of training films and videos. During his tenure with NOSA, he implemented safety systems and provided training in seven different countries.

From 1995 to 1999, McKinnon was safety consultant and safety advisor to Magma Copper and BHP Copper North America, respectively. At BHP Copper, he was a catalyst in the safety revolution in the copper industry that resulted in an 82-percent reduction in the injury rate and an 80-percent reduction in the severity rate.

In 2001, he spent two years in Zambia introducing the world's best safety practices to the copper mining industry. From there, he accepted a two-year contract in the Kingdom of Bahrain, Arabian Gulf, where he successfully implemented a safety culture change for the country's second largest employer.

After spending two years in Hawaii at the Gemini Observatory, he retired back to South Africa. He now is a consultant to organizations in the United States and is often a keynote speaker at international safety conferences.

McKinnon is the author of *Cause, Effect and Control of Accidental Loss,* published by CRC Press in 2000, and *Changing Safety's Paradigms,* published in 2007 by Government Institutes, USA. He also wrote the book, *Safety and Health at Work: An Introduction,* currently being reviewed for publication.

McKinnon is a professional member of the ASSE (American Society of Safety Engineers), Tucson Chapter past president, and an honorary member of the Institute of Safety Management. He is currently a safety consultant, safety culture change agent, motivator, and trainer.

Contents