The influence of leadership on the prevention of safety incidents: on risk reduction, leadership, safety principles and practices

Roggeveen, V.

The influence of leadership on the prevention of safety incidents

Portrait of author by Barend Verijzer, Den Helder
Design, graphics and typesetting: jules guldenmund layout & text, The Hague

The influence of leadership on the prevention of safety incidents

On leadership, risk reduction, safety principles and practices

PROEFSCHRIFT

ter verkrijging van
de graad van doctor aan de Universiteit Leiden,
op gezag van rector magnificus Prof. dr. ir. H. Bijl,
volgens besluit van het college voor promoties
te verdedigen op dinsdag 28 juni 2022 klokke 16:15 uur.

door

Victor Roggeveen

geboren te Amsterdam
in 1949

PROMOTORES
Prof. mr. dr. E.R. Muller
Prof. dr. J. Groeneweg

CO-PROMOTOR
Dr. M. Dechesne

PROMOTIECOMMISSIE
Prof. dr. mr. J.A.A. Adriaanse
Prof. dr. R.A. Boin
Prof. dr. C.L.J. Caminada
Prof. dr. J.A. Koops
Prof. dr. S.L. Kuipers
Prof. dr. G.L.L.M.E. Reniers (TU Delft)

To all people exposed to safety hazards and their leaders

Preface

It was September 2013 when Ferdinand Mertens asked, "Victor, how are you progressing with the writing of your book…?" When I replied rather negatively, he said, "The reason there is no book yet is that you haven't set a concrete goal! Why not work towards a PhD?" Bart van den Reek then challenged me: "Yeah, why not? Do it!" After pondering on this for a few days, and having received heartfelt support from Riet de Haan, I took the plunge and reported to Adriaan in 't Groen, who admitted me as a candidate at the Dual PhD Centre. I am grateful to you all for your encouragement.

The subject of the present study is occupational safety and the involvement of leaders at every organisational level, from frontline supervisors to CEOs. As I believe that followers' behaviours are shaped by the behaviour of their leaders, my objective was to discover how the former perceive the influence of the latter. It took me more than eight years to find what I was looking for. The material costs were affordable and the immaterial gains were priceless. In addition to my academic findings, I found that obtaining a PhD degree requires teamwork; it is impossible to complete one without the help of others. In my case, many were anonymous, some were unwitting, and several were indispensable. I would like to express my appreciation to one and all.

Yolanda de Graaf was my co-pilot and academic mentor from the project's conception. She advised me on structure, design, style, language, and many other aspects. She joined me in conducting (at least) 75 interviews and numerous presentations across the country. She read every letter I wrote, suggesting how I might re-phrase things and approving my drafts. Without her creative and committed support, this dissertation would have never existed. Yolanda, thank you so much!

I am grateful to my contacts in 33 organisations who persuaded 4,561 of their colleagues to complete my prospective survey questionnaires. No respondents, no research! This also applies to the Tripodian incident investigators and the professional risk analysis experts who anonymously shared their knowledge and experience with me to find the retrospective data I needed. I would like to thank Geesje Saijs, Linda Drupsteen, and Mark Van Houdenhoven, who convinced me that my crazy plan was a good idea and helped me kickstart it. Viola van Guldener, Frank Guldenmund, Harold Janssen, Ed Janssen, Jakko van Kampen, Geert Lentz, Roger van Meer, Ronald Pijtak, Francien Rense, Jan Treffers, Koos Visser, Marith de Vos, and Jakob van der Wal kept me on track during my journey, and Herman de Bruine made an important contribution by deep digging discussions and exposing me to his critical students.

I am indebted to Dion Woestenburg, who played a key role in generating the statistics I used to arrive at my conclusions; Steven de Bie, who advised me on how to structure the retrospective section and distil 240 pages into just seven; eagle-eyed Christiaan Verwer, who scrutinized most of the text and corrected my many language errors; Bart Kelderman, who did the beautiful oil painting on the cover of this book; and Erwin Muller, Jop Groeneweg, and the staff of the Dual PhD Centre for their inspirational guidance and support. A special thank you is reserved for my personal coach Mark Dechesne, who spent many hours trying to help me understand what writing a dissertation actually means and guiding me through the academic maze to obtain my PhD.

Also, I am grateful to Jeroen, Lars, Bianca, Janine, Lou, Guillaume and Lot for giving me time to work on this thesis by allowing me limited presence on so many family occasions.

Last but not least, I am beholden to Riet for her tireless listening to my 'daily progress reports'. She acted as a sounding board from the initial design of the survey questionnaire until the drawing up of the final conclusions and recommendations. She reflected on my many dilemmas and ever-changing conceptual developments. Her unlimited support during the entire development of this thesis can't be appreciated enough.

To all of my family I apologise for limited attention I have given them during this project – I promise I will never do it again!

Risk is a reflection of what we feel.

PAUL SLOVIC

Table of contents

List of figures

List of tables

List of bar charts

Glossary

Ability	Opportunity, knowledge and skills to intervene to reduce risk.
Action	Remedial action required to reduce identified risk.
Courage	Courage to put safety first if needed to intervene to reduce risk.
Dominance-oriented	Self-centred, sometimes even narcissistic behaviour, person who is only interested in his personal priorities.
Event History	Indication by survey respondents about what has gone wrong in the field of safety within an organisation in the past year.
HSEQ	Health, Safety, Environment, Quality
Intervention	Intervening act to manage risk (may imply cease of primary process)
KPI	Key Performance Indicator
Leadership orientation	Characteristic of a leader's behaviour.
Motivation	Internal will to intervene to reduce risk.
P&ID	Piping and Instrumentation Diagram
Primary process	The process by which an organisation produces its added value (also 'Risk Generator').
Process-oriented	Behaviour focused on improvement of processes with fundamental respect for quality and safety related aspects of the primary process.
Production-oriented	Behaviour primarily focused at meeting production targets.
Recognition	Awareness and acknowledgement of risks.
Relation-oriented	Behaviour that values interpersonal relationships and cares for the social climate at the work place.
Remedial Action	See Action
Risk Potential	Indication by survey respondents about the potential risk of accidents
Risk Reduction Capacity	The aggregated scores of the five phases of the Risk Reduction Cycle.
Risk Reduction Cycle	A five-phase model to measure the ability of an organisation to reduce safety risks.
Safety Leadership	The aspects of leadership focused on risk reduction
Safety Leadership Model	A model displaying the hypothesized relationships between leaders' behaviours, risk management and safety.
Sense of Safety	Indication by survey respondents how safe they feel in their organisation.

All descriptions are not equal; some seem accurate and informative while others are fanciful or absurd.

KENNETH GERGEN, 2009

Reading guide

The objective of this research is to discover the relationship between leadership characteristics and the occurrence of safety incidents. Chapter 1 (Introduction) is the introduction to this research. The core of this dissertation are the relationships between 'safety', 'risk management' and 'leadership'. In Chapter 2 (Theory, Concepts and Context) we discuss the relevant theory, concepts and operational context. In Chapter 3 (Empirical Research), we describe the scope of the research, our basic assumptions, the research questions and the methodology. The research takes two approaches, following a prospective path and a retrospective path. The prospective study is described in Chapter 4 (Safety Leadership Model). Here the core notions (safety, risk management and leadership) are synthesised into a 'Safety Leadership Model', which specifies the interrelationship between leadership characteristics, risk management and the prevention of safety incidents. The core notions are also complemented in this chapter by specific characteristics (i.e., the behavioural orientations of leaders, risk reduction phases and safety characteristics), and then these characteristics are included in the Safety Leadership Model. Chapter 5 (Prospective Study (pilot survey)) describes the design, procedure, materials and results of a prospective pilot survey. Chapter 6 (Extended Prospective Research) covers the design, procedure and materials, results and the statistical analysis of the follow-up to the pilot survey, the extended prospective survey. Chapter 7 (Reconsideration of Primary Prospective Analysis) presents the reconsidered results of the prospective survey and the concluding taxonomy of survey indicators, as well as the Safety Leadership Model, as modified on the basis of the reconsidered analysis. The results of the prospective survey are presented in Chapter 8 (Prospective Survey Results). Chapter 9 (Retrospective Views) contains information about the retrospective approach. The views of incident investigators, risk analysis experts and the Dutch Safety Board are reported here. Finally, the findings of this research study are interpreted, the research queries resolved, and the meaning of these findings discussed in Chapter 10 (Valorisation). Our final conclusions and recommendations are provided in Chapter 11 (Conclusions and Recommendations). Chapter 12 (Summary) is a summary of this research (in the English and Dutch language). The Author index, References and Appendices are located in Chapters 13, 14 and 15.