

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

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Ahaus, K. (2008). Kwaliteitssystemen in zorginstellingen.

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179–211.

Ale, B. (2009). Risk: an introduction: the concepts of risk, danger and chance. Routledge.

Ale, B., Baksteen, H., Bellamy, L. J., Bloemhof, A., Goossens, L., Hale, A., Mud, M., Oh, J., Papazoglou, I. A., Post, J., and Whiston, J. (2008). Quantifying occupational risk: The development of an occupational risk model. *Safety Science*, 46(2).

Ale B.J.M. (2012). Risico's. In A. B. J. M. Muller E.R., Ronner A. (Ed.), *Risico en risicomanagement in Nederland*. Kluwer.

Alvehus, J. (2014, september 23 2014). What is this thing called leadership? Leadership clinic, Driebergen.

Amos, B., and Klimoski, R. J. (2014). Courage: Making teamwork work well. *Group & Organization Management*, 39(1), 110–128.

Arbeidsomstandighedenwet, (1980).

Arbeidsomstandighedenwet. (2004). Arbeidsomstandighedenwet 1998: tekst per 1 april 2004. Kluwer.

Argyris, C. (1977). Double loop learning in organizations. *Harvard Business Review*, 55(5).

Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. Psychological review, 64.

Austrian Standards Institute. (2004). ONR 49002-2: Risk Management for Organisations and Systems (Part 2 Guidelines for the Integration of Risk Management

into the General Management System, Issue.

Aven, T. (2014). What is safety science? Safety Science, 67, 15-20.

Ayres, I., and Braithwaite, J. (1992). Responsive regulation: Transcending the deregulation debate. Oxford University Press.

Baguley, P. (1994). *Improving organizational performance: a handbook for managers*. McGraw-Hill. Balm, M. F. K. (2002). *Exercise Therapy and Behavioural Change*. Lemma BV.

Balm, S., Spoelstra, J., and Quak, H. (2015). Applying a behavioral change model to the adoption of freight electric vehicles: lessons for effective instruments. URBE Conference, Rome, Italy,

Bass, B. M., and Steidlmeier, P. (1999). Ethics, character, and authentic transformational leadership behavior. *The leadership quarterly*, 10(2), 181–217.

Bayerische Rückversicherung Aktiengesellschaft. (1993). Risk is a construct: Perceptions of risk perception. Knesebeck.

Beck, U. (1986). Risk society: Towards a new modernity.

- Bennis, W. (1989). Why leaders can't lead. Jossey-Bass San Francisco, CA.
- Bennis, W., Nanus, B., and Garnier, F. (2007). Leaders: Their strategies for taking charge. In Pardy (Ed.), *Introducing Leadership*. Routledge.
- Bickhoff, L., Levett-Jones, T., and Sinclair, P. M. J. N. e. t. (2016). Rocking the boat—nursing students' stories of moral courage: A qualitative descriptive study. 42, 35–40.
- Bieder, C., and Bourrier, M. (2013). *Trapping Safety Into Rules: How Desirable Or Avoidable is Proceduralization?* Ashgate Pub.
- Biesaart, M. J. B. g. (2010). Voorbehouden handelingen. 61-73.
- Blok, C. d., Koster, E., Schilp, J., and Wagner, C. (2013). Implementation of the Dutch National Patient Safety Programme (VMs Veiligheidsprogramma): evaluation research in Dutch hospitals. Summary.
- Bosco, F. A., Aguinis, H., Singh, K., Field, J. G., and Pierce, C. A. (2015). Correlational effect size benchmarks. *Journal of Applied Psychology*, 100(2).
- Bratspies, R. M. (2011). Regulatory Wake-up Call: Lessons from BP's Deepwater Horizon Disaster, A. *Golden Gate U. Envtl. LJ*, *5*, 7.
- Braut, G. S., and Lindøe, P. (2010). Risk Regulation in the North Sea: A common law perspective on Norwegian legislation.
- Brown, A., and Patterson, D. A. (2001). To err is human. Proceedings of the First Workshop on evaluating and architecting system dependability (EASY'01),
- Bryden, R., Flin, R., Hudson, P., Vuijk, M., and Van Der Graaf, G. C. (2006). Holding up the Leadership Mirror Then Changing the Reflection: The Seeing Yourself as Others See You Tool. SPE International Health, Safety & Environment Conference,
- Besluit Risico's Zware Ongevallen, Staatsblad (1999).
- Buncefield Major Incident Investigation Board. (2008). *The Buncefield Incident, 11 December* 2005: *The Final Report of the Major Incident Investigation Board.* Health and Safety Executive.
- Bushe, G. R. (2011). Clear leadership: Sustaining real collaboration and partnership at work. Nicholas Brealey.
- Cauwenberghs, K. (2013). Meerlaagse Waterveiligheid: resultaten van de ORBP-studie. Symposium Meerlaagse Waterveiligheid. Vlaamse Milieu Maatschappij, Antwerp, Belgium,
- Cheyne, A., Cox, S., Oliver, A., and Tomás, J. M. (1998). Modelling safety climate in the prediction of levels of safety activity. *Work & Stress*, 12(3), 255–271.
- Cohen, J. (2013). Statistical power analysis for the behavioral sciences. Routledge.
- Cox, A. L. (2008). What's wrong with risk matrices? Risk analysis, 28(2), 497–512.
- Cullen, L. W. D. (1990). *The public inquiry into the Piper Alpha disaster* (0046–0702). (Drilling Contractor; (United States), Issue.
- Dahle, I., Dybvig, G., Ersdal, G., Guldbrandsen, T., Hanson, B., Tharaldsen, J., and Wiig, A. (2012). Major accidents and their consequences for risk regulation. In *Advances in Safety, Reliability and Risk Management*. Taylor and Francis.
- De Bruijne, M., Zegers, M., Hoonhout, L., and Wagner, C. (2007). Onbedoelde schade in Nederlandse ziekenhuizen. *EMGO instituut/VUmc en Nivel*.
- De Bruine, H. (2018). Gebruik het gevoel van ongemak [Dissertation, Tilburg University]. Tilburg.

De Hollander G. (2012). Samenleven met risico's in de leefomgeving. In A. B. J. M. Muller E.R., Ronner A. (Ed.), *Risico: Risico en risicomanagement in Nederland*. Kluwer.

- De Vries, G., Verhoeven, I., and Boeckhout, M. (2014). Governing a Vulnerable Society: Toward a Precaution-Based Approach. *Vulnerability in Technological Cultures: New Directions in Research and Governance*, 223.
- Dekker, S. (2006a). The field guide to understanding human error. Ashgate.
- Dekker, S. (2006b). Resilience engineering; Chronicling the emergence of confused consensus. In E. Hollnagel, D. D. Woods, and N. Leveson (Eds.), *Resilience engineering: Concepts and precepts*. Ashgate Publishing, Ltd.
- Dekker, S. (2011). *Drift into failure: from hunting broken components to understanding complex systems*. Ashgate Publishing, Ltd.
- Dekker, S. (2016). Just culture: Balancing safety and accountability. CRC Press.
- Dekker, S., Hollnagel, E., Woods, D., and Cook, R. (2008). Resilience Engineering: New directions for measuring and maintaining safety in complex systems. *Lund University School of Aviation*.
- Directive 2016/798 of the EU. (2016). Directive 2016/798 of the EU Parliament and of the Counsil. *Official Journal of the European Union* (L 138/102).
- Drucker, P. F. (1996). Your leadership is unique. Leadership, 17(4), 54.
- Drupsteen, L., Groeneweg, J., and Zwetsloot, G. (2013). Critical steps in learning from incidents: using learning potential in the process from reporting an incident to accident prevention. *International Journal of Occupational Safety and Ergonomics*, 19(1).
- Dweck, C. (2012). Mindset: Changing the way you think to fulfil your potential. Hachette UK.
- Dweck, C. (2016). What having a "growth mindset" actually means. *Harvard Business Review*, 13, 213–226.
- Edmondson, A. (1999). Psychological Safety and Learning Behavior in Work Teams. 44(2). https://doi.org/10.2307/2666999
- Eisenberg, M. A. (1989). Duty of Care of Corporate Directors and Officers, The. *U. Pitt. L. Rev.*, *51*, 945.
- Eisenhower, D. (1956). The essence of leadership is to get others to do something because they think you want it done and because they know it is worth while doing. Retrieved September 14 from www.eisenhowerlibrary.gov
- Elffers, H. (2014). Analysing rule compliance with the Willing-Being Able-Daring framework. *Justitiele Verkenningen*, 40(4), 65.
- Erp, J., Huisman, W., Bunt, H., and Ponsaers, P. (2008). Toezicht en compliance. *Nederlands tijdschrift voor criminologie Criminele sociologie, criminele psychologie, forensische psychiatrie, penelogie, jeugdolelinguentie, reclassering,* 83–95.
- EU OSH Framework Directive 89/391/EEC, EU Parliament (1989).
- Communication from the European Commission on the precautionary principle (COM 2000, 1, 02–02–2000), (2000).
- Fischhoff, B., and Lichtenstein, S. (1984). Acceptable risk.
- Fischhoff, B., Lichtenstein, S., Derby, S. L., Slovic, P., and Keeney, R. (1983). *Acceptable risk*. Cambridge University Press.

Flin, R. (2003). "Danger—men at work": Management influence on safety. *Human Factors and Ergonomics in Manufacturing & Service Industries*, 13(4), 261–268. https://doi.org/10.1002/hfm.10042

Flournoy, A. C. (2011). Three meta-lessons government and industry should learn from the BP Deepwater Horizon Disaster and why they will not. *BC Envtl. Aff. L. Rev.*, *38*, 281.

French John Jr, R., and Raven, B. H. (1959). The bases of social power.

Gabriel, Y. (2015). The caring leader–What followers expect of their leaders and why? *Leadership & Organization Development Journal*, n(3), 316-334.

Gawande, A. A., Thomas, E. J., Zinner, M. J., and Brennan, T. A. (1999). The incidence and nature of surgical adverse events in Colorado and Utah in 1992. *Surgery*, 126(1), 66–75.

Gergen, K. J. (2009). An invitation to Social Construction. Sage.

Gerlings, P. O., and Hale, A. R. (1991). Certification of safety services in large Dutch industrial companies. *Safety Science*, 14(1), 43–59.

Goerlandt, F., Khakzad, N., and Reniers, G. (2017). Validity and validation of safety-related quantitative risk analysis: A review. *Safety Science*, 99, 127–139.

Gowland, R. (2011). Why do we still have major accidents?—Lessons learnt from the chemical industry. *European Process Safety Centre*, 9–10.

Gregory Stone, A., Russell, R. F., and Patterson, K. (2003). Transformational versus servant leadership: A difference in leader focus. *Leadership & Organization Development Journal*, 25(4).

Groeneweg, J. (1992). Controlling The Controllable. DSWO Press.

Groeneweg, J. (2019). Just Culture [Oration, TU Delft]. Delft.

Groeneweg, J., Hudson, P. T., Vandevis, T., and Lancioni, G. E. (2010). Why Improving the Safety Culture Doesn't Always Improve the Safety Performance. SPE International Conference on Health, Safety and Environment in Oil and Gas Exploration and Production,

Guldenmund, F. W. (2010). Understanding and exploring safety culture.

Hale, A. R., and Glendon, A. I. (1987). Individual behaviour in the control of danger. Elsevier Science.

Hale, A. R., Guldenmund, F. W., Van Loenhout, P., and Oh, J. (2010). Evaluating safety management and culture interventions to improve safety: Effective intervention strategies. *Safety Science*, 48(8), 1026–1035.

Hansen, I. (2012). Het spoor wordt uitgewoond. Delft Integraal (3), 16–17.

Heimplaetzer, P., and Busch, C. (2006). Safety management in rail infrastructure. 3rd International Conference 'Working on Safety,

Heinrich, H. W. (1941). Industrial Accident Prevention. A Scientific Approach. (Second Edition).

Hollnagel, E. (2009). The ETTO principle: efficiency-thoroughness trade-off: why things that go right sometimes go wrong. Ashgate Publishing, Ltd.

Hollnagel, E. (2014). Is safety a subject for science? Safety Science, 67, 21-24.

Hollnagel, E., Woods, D. D., and Leveson, N. (2006). *Resilience engineering: Concepts and precepts*. Ashgate Publishing, Ltd.

Holzheu, F., and Wiedemann, P. M. (1993). Perspectives on risk perception. In B. Rückversicherung (Ed.), Risk is a construct: perceptions of risk perception. Bayerische Rückversicherung Aktiengesellschaft.

Hopkins, A. (2006). Studying organisational cultures and their effects on safety. *Safety Science*, 44(10), 875–889.

Hopkins, A. (2008). Failure to learn: the BP Texas City refinery disaster. CCH Australia Ltd.

Hopkins, A. (2011, 2//). Risk-management and rule-compliance: Decision-making in hazardous industries. *Safety Science*, 49(2), 110–120. https://doi.org/http://dx.doi.org/10.1016/j. ssci.2010.07.014

Hopkins, A. (2014). Issues in safety science. Safety Science, 67, 6–14.

Horner, M. (1997). Leadership theory: past, present and future. *Team Performance Management:* An International Journal, 3(4), 270–287.

Institute of Medicine. (1999). To Err is Human,

Building a safer health system (Vol. 112).

Institute of Medicine. (2001). *Crossing the quality chasm: a new health system for the 21st century.*National Academy Press.

International Standards Organisation. (2018). ISO 31000-2018, Risk Management - Guidelines.

Jungermann, H., and Slovic, P. (1993). Perspectives on risk perception. Risk is a construct: perceptions of risk perception,

Kahneman, D. (2012). Ons feilbare denken: thinking, fast and slow. Business Contact.

Klein, J. A. (2009). Two centruries of Process Safety at DuPont. Process Safety Progress, 28(2).

Kluin, M. (2014). *Optic Compliance: Enforcement and Compliance in the Dutch Chemical Industry* TU Delft, Delft University of Technology].

Knight, F. H. (1921). Risk, uncertainty and profit. In B. J. M. Ale (Ed.), *Risk: An introduction*. Routledge.

Kotter, J. P. (1982). What effective general managers really do. Harvard Business Review.

Kotter, J. P. (1999). What leaders really do. Harvard Business Press.

Ladkin, D. (2010). Rethinking leadership: A new look at old leadership questions. Edward Elgar Publishing.

Langelaan, M., Baines, R., Broekens, M., Siemerink, K., Steeg, L., Asscheman, H., De Bruijne, M., and Wagner, C. (2010). Monitor zorggerelateerde schade 2008: dossieronderzoek in Nederlandse ziekenhuizen.

Langelaan, M., Broekens, M., de Bruijne, M., de Groot, J., Moesker, M., Porte, P., Schutijser, B., Singotani, R., Smits, M., and Zwaan, L. (2017). Monitor zorggerelateerde schade 2015/2016: dossier-onderzoek bij overleden patiënten in Nederlandse ziekenhuizen.

Langelaan M., D. B., MC, Baines, R., Broekens, M., Hammink, K., Schilp, J., Verweij, L., Asscheman, H., and Wagner, C. (2013). Monitor Zorggerelateerde Schade 2011/2012: dossieronderzoek in Nederlandse ziekenhuizen.

Lauder, M. (2015). In Pursuit of Foresight: Disaster Incubation Theory Re-imagined. Routledge. https://books.google.nl/books?id=Ruc1CwAAQBAJ

Lee, P., Gillespie, N., Mann, L., and Wearing, A. (2010). Leadership and trust: Their effect on knowledge sharing and team performance. *Management Learning*.

Leistikow, I. P. (2010). *Patientveiligheid: de rol van de bestuurder-Patient Safety: the role of the Board.* TU Delft, Delft University of Technology.

Lindhout, P. (2019). Unknown risk: The safety engineer's best and final offer? *Chemical Engineering Transactions*, 77, 847–852.

- Lindhout, P., and Ale, B. J. (2009). Language issues, an underestimated danger in major hazard control? *Journal of hazardous materials*, 172(1), 247–255.
- Lindhout, P., Kingston-Howlett, J., Hansen, F. T., and Reniers, G. (2020). Reducing unknown risk: The safety engineers' new horizon. *Journal of Loss Prevention in the Process Industries*, 104330.
- Lundberg, J., Rollenhagen, C., and Hollnagel, E. (2009). What-You-Look-For-Is-What-You-Find—The consequences of underlying accident models in eight accident investigation manuals. *Safety Science*, 47(10), 1297–1311.
- Madden, T. J., Ellen, P. S., Ajzen, I. J. P., and Bulletin, s. p. (1992). A comparison of the theory of planned behavior and the theory of reasoned action. 18(1), 3–9.
- McClelland, D. C. (1967). Achieving society (Vol. 92051). Simon and Schuster.
- McClelland, D. C. (1987). Human motivation. CUP Archive.
- McClelland, D. C., & Burnham, D. H. (1976). *Power is the great motivator*. Harvard Business Review Press. (1976)
- Merton, R. K. (1995). The Thomas theorem and the Matthews effect. Social Forces, 74.
- Mijnbouwwet. (2003). Mijnbouwwet: Wet van 31 oktober 2002, Stb. 2002, 542 (Vol. 145). Kluwer.
- Ministerie van Infrastructuur en Milieu. (2013). Publicaties en rapporten.
- Moan, T. (1981). *The Alexander L Kielland accident*. Sea Grant College Program and the Department of Ocean Engineering Massachusetts Institute of Technology.
- Motet, G., & Bieder, C. (2017). The illusion of Risk Control. Springer.
- Muller E.R. (2012a). Crisismanagement. In A. B. J. M. Muller E.R., Ronner A. (Ed.), *Risico en risi-comanagement in Nederland*. Kluwer.
- Muller E.R. (2012b). Risico en risicomanagement in perspectief. In A. B. J. M. Muller E.R., Ronner A. (Ed.), *Risico en risicomanagement in Nederland*. Kluwer.
- Murray, J. S. J. O. J. o. I. i. N. (2010). Moral courage in healthcare: Acting ethically even in the presence of risk. 15(3).
- Nembhard, I. M., & Edmondson, A. C. (2006). Making it safe: The effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care teams. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior, 27*(7), 941–966.
- NEN. (2016). NTA 8620:2016, "Specification of a safety management system for major accident hazards".
- NEN. (2018). NEN 8009:2018, "Safety management system for hospitals and institutions that provide hospital care".
- Nevicka, B., Van Vianen, A. E., De Hoogh, A. H., & Voorn, B. (2018). Narcissistic leaders: An asset or a liability? Leader visibility, follower responses, and group-level absenteeism. *Journal of Applied Psychology*, 103(7), 703.
- O'Dea, A., & Flin, R. (2001). Site managers and safety leadership in the offshore oil and gas industry. *Safety Science*, *37*(1), 39–57.
- Onderzoeksraad voor Veiligheid. (2005). Door rood op Amsterdam CS.

Onderzoeksraad voor Veiligheid. (2007). *Explosie aardgascondensaattank* (Onderzoek bij de NAM te Warffum, Issue.

Onderzoeksraad voor Veiligheid. (2008a). Brand in een operatiekamer Twenteborgziekenhuis.

Onderzoeksraad voor Veiligheid. (2008b). *Een onvolledig bestuurlijk proces: hartchirurgie in UMC St Radboud* (Den Haag, april, Issue).

Onderzoeksraad voor Veiligheid. (2011). *Vernieuwing op drift* (Onderzoek naar maagverkleiningsoperaties in het Scheper Ziekenhuis te Emmen, Issue).

Onderzoeksraad voor Veiligheid. (2012). Brand bij Chemiepack te Moerdijk.

Onderzoeksraad voor Veiligheid. (2013a). De veiligheid bij Odfiell Terminals Rotterdam 2010–2012.

Onderzoeksraad voor Veiligheid. (2013b). Kwetsbare zorg: Patstelling in het Ruwaard van Putten Ziekenhuis.

Onderzoeksraad voor Veiligheid. (2013c). Treinbotsing Amsterdam Westerpark.

Onderzoeksraad voor Veiligheid. (2013d). Veiligheid in perspectief.

Onderzoeksraad voor Veiligheid. (2015). Explosies MSPO2 Shell Moerdijk.

Onderzoeksraad voor Veiligheid. (2019). Advice to AZ football club.

Oostendorp, Y., Zwaard, W., & van Gulijk, C. (2013). Introductie van het begrip risico binnen de veiligheidskunde in Nederland.

Osswald, S., Greitemeyer, T., Fischer, P., & Frey, D. (2010). What is moral courage? Definition, explication, and classification of a complex construct. In S. J. L. Cynthia L. S. Pury (Ed.), *The psychology of courage: Modern research on an ancient virtue* (Vol. 149, pp. 164). American Psychological Association.

Oxford University Press. (1989). Oxford English Dictionary.

Pardey, D. (2007). Introducing leadership. Routledge.

Pasman, H. (2015). Risk analysis and control for industrial processes. Butterworth Heineman.

Perrow, C. (1999). Normal accidents: Living with high risk technologies. Princeton University Press.

Petersen, D. (2001). Safety management: A human approach. Amer Society of Safety Engineers.

Peuscher, W., & Groeneweg, J. (2012). A Major Oil Companys Approach to Significantly Reduce Fatal Incidents. International Conference on Health, Safety and Environment in Oil and Gas Exploration and Production,

Pilbeam, C. (2014). Safety Leaders: Who are they? What do they do?

Pittet, D., Hugonnet, S., Harbarth, S., Mourouga, P., Sauvan, V., Touveneau, S., & Perneger, T. V. (2000). Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. *The Lancet*, 356(9238), 1307–1312.

Popma, J. (2011). Inkrimping Arbeidsinspectie in strijd met ILO Verdrag 81. *Academie voor Arbeidsrecht, 2011* (november).

Post, J. M. (2004). Leaders and their followers in a dangerous world: The psychology of political behavior. Cornell University Press.

Purdy, G. J. (2010). ISO 31000: 2009—setting a new standard for risk management. *Risk analysis*, 30(6), 881–886.

Raad voor de Transportveiligheid. (1999). Botsing tussen twee reizigerstreinen te Dordrecht.

Rasmussen, B. (1988). Occurrence and impact of unwanted chemical reactions. *Journal of Loss Prevention in the Process Industries*, 1(2), 92–95.

Rasmussen, J. (1983). Skills, rules, and knowledge; signals, signs, and symbols, and other distinctions in human performance models. *IEEE transactions on systems, man, and cybernetics*(3), 257–266.

Rasmussen, J. (1997). Risk management in a dynamic society: a modelling problem. *Safety Science*, 27(2), 183–213.

Reagan, R. (1987). "Trust but verify". In J. M. Post (Ed.), *Leaders and their followers in a dangerous world: The psychology of political behavior*. Cornell University Press.

Reason, J. (1990). Human error. Cambridge university press.

Reason, J., Hollnagel, E., & Paries, J. J. J. o. C. E. (2006). Revisiting the Swiss cheese model of accidents. 27(4), 110–115.

Reason, J. T. (1997). Managing the risks of organizational accidents (Vol. 6). Ashgate Aldershot.

Reniers, G. (2020). Weg met de zondebok. Chemisch logistiek magazine(4), 23-24.

Rijkswaterstaat. (2013). Tussenrapportage Tankopslag.

Rijkswet Onderzoeksraad voor veiligheid, Kluwer (2004).

Rip, A. (2017). Practices in the danger culture of late industrial society. In G. Motet & C. Bieder (Eds.), *The illusion of Risk Control*. Springer.

Ronner, A., & Ronner, H. (2012). Enterprise Risk Management. In A. B. J. M. Muller E.R., Ronner A. (Ed.), *Risico en risicomanagement in Nederland*. Kluwer.

Rosenthal, S. A., & Pittinsky, T. L. (2006). Narcissistic leadership. *The leadership quarterly, 17*(6), 617–633.

Rosenthal, U. (2001). Crisis: oorzaken, gevolgen, kansen. Kluwer.

Ruijters, M. C. P. C., & Simons, P. R. J. (2012). De canon van het leren: 50 concepten en hun grondleggers. Kluwer.

Rumsfeld, D. (2013). Rumsfeld's rules. Harpercollins.

Science Communication Unit of the University of Bristol. (2017). 'Future brief' by the Science Communication Unit of the University of Bristol *Science for Environmental Policy*(18).

Scott, J. (2015). A Dictionary of Sociology. Oxford University Press. https://doi.org/10.1093/acref/9780199683581.001.0001

Sekerka, L. E., Bagozzi, R. P., & Charnigo, R. (2009). Facing ethical challenges in the workplace: Conceptualizing and measuring professional moral courage. *Journal of business ethics*, 89(4), 565.

Slagmolen, B., Van Dalen, B., & Tolk, J. N. (2017). HRO Fieldbook. Apollo13 Consult.

Slocum, J. W., & Hellriegel, D. (2009). *Principles of organizational behavior*. South-Western Cengage Learning.

Slovic, P. (1987). Perception of risk. science, 236(4799), 280-285.

Slovic, P. (2001). The risk game. *Journal of hazardous materials*, 86(1).

Slovic, P., Finucane, M. L., Peters, E., & MacGregor, D. G. (2004). Risk as analysis and risk as feelings: Some thoughts about affect, reason, risk, and rationality. *Risk Analysis: An International Journal*, 24(2), 311–322.

Soliman, M., & Wilson, A. E. (2017). Seeing change and being change in the world: The relationship between lay theories about the world and environmental intentions. *Journal of Environmental Psychology*, 50, 104–111.

- Soree, F. (2007). Modelontwikkeling Risicomanagement Prorail.
- Spoorwegwet. (2005). Spoorwegwet.
- Sreenivasan, B., Benjamin, K., & Price, I. (2003). A Review of Safety Passport Training Schemes HSL/2003/10.
- Standards Association of Australia. (1999). Risk Management Standard AS/NZS 4360.
- Stichting Tripod Foundation. (2015). *Guidance on using Tripod Beta in the investigation and analysis of incidents, accidents and business losses*. Energy Institute.
- Stockholm, G. (2011). Insight from hindsight: A practitioner's perspective on a causal approach to performance improvement. *Safety Science*, *49*(1), 39–46.
- Stogdill, R. M. (1948, 1948/01/01). Personal Factors Associated with Leadership: A Survey of the Literature. *The Journal of psychology*, 25(1). https://doi.org/10.1080/00223980.1948.9917362
- Suokas, J., & Rouhiainen, V. (1989). Quality control in safety and risk analyses. *Journal of Loss Prevention in the Process Industries*, 2(2), 67–77.
- Sutton, F. X. (1954). Achievement norms and the motivation of entrepreneurs. *Entrepreneurs and Economic Growth. Cambridge: Social Science Research Council and Harvard University Research Center in Entrepreneurial History*.
- Swuste, P., Van Gulijk, C., & Groeneweg, J. (2017). Risico-en veiligheidsmanagement in high-techhigh-hazard sectoren, van Clapham Junction tot Macondo, Deepwater Horizon. *Tijdschrift voor toegepaste arbowetenschap*, 3(30), 78–120.
- Swuste, P., van Gulijk, C., & Zwaard, W. (2016). Veiligheidsmanagement en veiligheidssystemen voor arbeidsveiligheid. *Tijdschrift voor toegepaste arbowetenschap*, 4(29), 131–149.
- Swuste, P. G., J; Guldenmund, F; Gulik, C van; Lemkowitz, S; Oostendorp, Y; Zwaard, W. (2022). From Safety to Safety Science, The evolution of thinking and practice. Routledge.
- Taleb, N. N. (2010). The black swan: The impact of the highly improbable (2 ed.). Random house.
- Teubner, G. (1987). *Juridification of Social Spheres: A Comparative Analysis in the Areas ob Labor, Corporate, Antitrust and Social Welfare Law* (Vol. 6). Walter de Gruyter.
- Thomas, T. a. (1928). The child in America. Knopf.
- Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive psychology*, *5*(2).
- Van Asselt, M. B. (2000). Perspectives on uncertainty and risk. In *Perspectives on Uncertainty and Risk* (pp. 407–417). Springer.
- Van Asselt, M. B. (2012). Risk Governance: Over omgaan met onzekerheid en mogelijke toekomsten. In *Risico: Risico en risicomanagement in Nederland*. Kluwer.
- Van den Herik, H. J. (2016). *Intuïtie valt te programmeren*. Tilburg University.
- Van der Graaf, G. C., & Hudson, P. (2002). Hearts and Minds: the status after 15 years research. SPE International Conference on Health, Safety and Environment in Oil and Gas Exploration and Production,
- Van Dort, R. (2016). Leidt de LOPA methodiek tot de stand der techniek? *Tijdschrift voor toegepaste arbowetenschap*, 29(2).
- Van Kampen, J., Van der Beek, D., Steijn, W., Groeneweg, J., & Guldenmund, F. (2017). Assessing the statistical properties and underlying model structure of fifteen safety constructs. *Safety Science*, 94.

Van Velthoven, B. (2008). Over medische fouten en hun afhandeling. *Recht der Werkelijkheid*, 29, 7. Venart, J. E. S. (2004). Flixborough: the Explosion and its Aftermath. *Process Safety and Environmental Protection*, 82(2), 105–127. https://doi.org/10.1205/095758204322972753

- Venema, A., Den Besten, H., Klauw, M., & Ybema, J. (2013). Arbeidsongevallen in Nederland 2011.
- Verdonschot, N. J. (2008). Reizen van techniek naar kliniek.
- Wagenaar, W. A., & Groeneweg, J. (1987). Accidents at sea: Multiple causes and impossible consequences. *International Journal of Man-Machine Studies*, 27(5), 587–598.
- Walker, K., Throndsen, T. I., Reeves, G. D., Hudson, P. T., Croes, S., Dahl-Hansen, E., Stadler, R. L., & Winters, R. (2010). A Guide to Selecting Appropriate Tools to Improve HSE Culture. SPE International Conference on Health, Safety and Environment in Oil and Gas Exploration and Production,
- Weick, K., & Sutcliffe, K. (2007). *Managing the Unexpected: Resilient Performance in an Age of Uncertainty*. John Wiley & Sons.
- Weick, K. E. (1988). Enacted Sensemaking in Crisis Situations. *Journal of management studies*, 25(4), 305–317.
- Weick, K. E. (2005). Organizing and failures of imagination. *International public management journal*, 8(3), 425–438.
- Weick, K. E. (2011). Organizing for transient reliability: The production of dynamic non-events. *Journal of Contingencies and Crisis Management*, 19(1), 21–27.
- Westrum, R. (1988). Organizational and inter-organizational thought. World Bank Conference on Safety Control and Risk Management,
- Wet kwaliteit, klachten en geschillen in de zorg, (2016).
- Wetenschappelijke Raad voor het Regeringsbeleid. (2008). Onzekere veiligheid. A. U. Press.
- White, H. K., Hsing, P.-Y., Cho, W., Shank, T. M., Cordes, E. E., Quattrini, A. M., Nelson, R. K., Camilli, R., Demopoulos, A. W. J., German, C. R., Brooks, J. M., Roberts, H. H., Shedd, W., Reddy, C. M., & Fisher, C. R. (2012, December 11, 2012). Impact of the Deepwater Horizon oil spill on a deep-water coral community in the Gulf of Mexico. *Proceedings of the National Academy of Sciences*, 109(50), 20303–20308. https://doi.org/10.1073/pnas.1118029109
- Willett, A. H. (1901). The economic theory of risk and insurance. In B. J. M. Ale (Ed.), *Risk: an introduction* (pp. 4). Routledge.
- Winter, D. G. (1991). A motivational model of leadership: Predicting long-term management success from TAT measures of power motivation and responsibility. *The leadership quarterly*, 2(2), 67–80.
- Winter, D. G. (2005). Things I've Learned About Personality From Studying Political Leaders at a Distance 1. *Journal of personality*, 73(3), 557–584.
- Wong, J. H. K., Kelloway, E. K., & Makhan, D. W. (2016). Safety Leadership. In *The Wiley Blackwell handbook of the psychology of occupational safety and workplace health.* (pp. 83–110). Wiley Blackwell.
- Wu, T.-C., Chen, C.-H., & Li, C.-C. (2008, 5//). A correlation among safety leadership, safety climate and safety performance. *Journal of Loss Prevention in the Process Industries*, 21(3), 307–318. https://doi.org/http://dx.doi.org/10.1016/j.jlp.2007.11.001
- Yoe, C. (2012). Primer on risk analysis: decision making under uncertainty. CRC Press.

- Yukl, G. A. (2010). Leadership in organizations. Pearson Education India.
- Zaleznik, A. (1977). Managers and leaders: Are they different. *Harvard business*, 55(May–June), 67–78.
- Zohar, D. (2002). Modifying supervisory practices to improve subunit safety: A leadership-based intervention model. *Journal of Applied Psychology*, 87(1), 156–163. https://doi.org/10.1037/0021–9010.87.1.156
- Zohar, D., & Luria, G. (2003). The use of supervisory practices as leverage to improve safety behavior: A cross-level intervention model. *Journal of Safety Research*, 34(5), 567–577.
- Zwetsloot, G., Bezemer, R., & De Hoog, M. (2012). Quick Scan van de veiligheidscultuur bij 14 bedrijven in het Rijnmondgebied.
- Zwetsloot, G. I., Aaltonen, M., Wybo, J.-L., Saari, J., Kines, P., & De Beeck, R. O. J. S. S. (2013). The case for research into the zero accident vision. 58, 41–48.
- Zwetsloot, G. I., Hale, A., & Zwanikken, S. (2011). Regulatory risk control through mandatory occupational safety and health (OSH) certification and testing regimes (CTRs). *Safety Science*, 49(7), 995–1006.

# 15 Appendices

15.1 Qualification info of incident investigators

Retrospe	ective review of safet	y crises		Info concerning reviewers		
I.D. code	Years in safety	Years incident investigator	Number of incident investigations	Sectors of investigations	Tools	
1	11	11	30+	Hospitals, health care	Tripod Beta	
2	17	17	30+	All Sectors	Timeline, Tripod Beta, STEP, STAMP, HFACS, Prisma, Accimap	
3	26	26	30+	Oil&Gas, hospitals, process industry, general infra	Tripod Beta	
4	30	25	30+	Tank storage, process industry	Tripod Beta, RCA, many others	
5	16	16	30+	All sectors	Tripod Beta, RCA, TopSet Taproot, SIM, BSCAT, Sologic, 5W	
6	18	17	30+	All, except hospitals	Tripod Beta, RCA, TopSet SIM, BSCAT, Prisma, Sologic, 5W	
7	24	22	30+	Rail and general infra	Tripod Beta, Prisma, HRA, Cascade-model, FAM, 5W	
8	31	28	30+	Rail	SOAT, FAT, Tripod Beta, Bowtie	
9	6	7	30+	All sectors	Local Rationality, FRAM, Tripod Beta, SIM, STAMP Multi Actor Timeline	
10	12	12	30+	All sectors	Tripod Beta, RCA	
11	20	20	30+	All sectors	Tripod Beta, RCA, BSCAT	
12	10	10	30+	All sectors	Tripod Beta, sıм, кса	
13	31	31	30+	Oil&Gas, tank storage, process industry	Tripod Beta, FMEA, Deep Learning, TopSet, 5W	
14	12	12	30+	All, except hospitals	Tripod Beta, TRACK, TopSet, SIM	
15	14	8	30+	Oil&Gas	MSCAT, TopSet, Tripod Beta, Casual Learning	
16	13	10	30+	Genral infra, rail	Tripod Beta, 5w, soat	
17	14	10	>10<20	Rail	Tripod Beta	
18	16	10	30+	All sectors	Tripod Beta, TopSet, FRAM, BSCAT, SIM, GBV	

#### 15.2 Guideline for incident investigators

# Expert research into the role of leaders in incidents *Objective of this sub-study*

This sub-study is part of a research into the role of leaders in the occurrence of safety incidents. This sub-study looks for the way in which leaders (possibly in the background) have influenced the occurrence of security incidents.

#### Introduction

In my research I use two concepts: A Risk Reduction Process and Safety Leadership orientations.

In order to be able to conduct the review of existing incident analyses in a structured way, some understanding of these two concepts is required. In the section 'References' (on the next page) I explain these terms. If you think more explanation is needed, I will be happy to provide that.

#### My request

My request to you is to consider in more detail the role and behaviour of leaders who directly or indirectly influenced the origin of an incident you have investigated.

I have sent an example commentary for this purpose.

I am making this request to 15 experts/incident investigators. In order to be able to meaningfully analyse all reviews, as much uniformity as possible in the data is required. To this end I have also sent a template. In it you can post your commentary on the incident you selected. This makes it a fill-in-the-blank exercise, which also saves you time. In a pilot, conducted among three colleagues, it appeared that this fill-in exercise takes about an hour. I am very grateful to you for taking that time for me.

#### Criteria

You write your comment independently; I am not allowed to get involved in personal bias.

Select an incident with at least the following (potential) consequence: death or permanent disability, or major economic/production loss, or serious environmental or reputation damage.

This incident must have really happened and must have happened in the Netherlands after 2000.

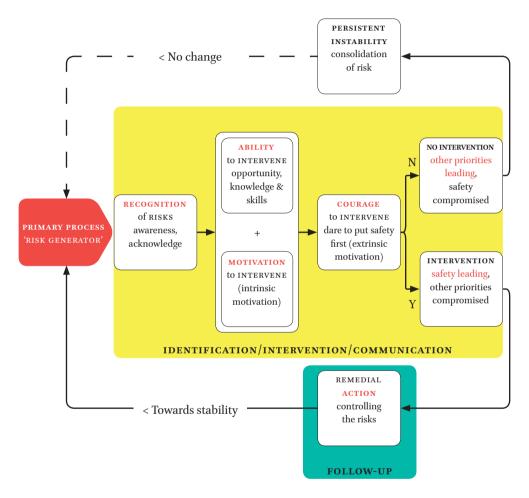
All information must be anonymised, so that the commentary cannot be traced back to people by outsiders.

As a guideline: The scenario of the incident does not have to be more than 1 A4 (half an A4 is even better).

#### References

#### The Risk Reduction Process

'Management of safety' means 'reducing risks.' The risk reduction process consists of 5 critical phases: Knowledge, Ability, Motivation, Courage and Doing. To illustrate that process. I use the model below.



If all 5 risk reduction phases are effective, the risks are optimally reduced.

- People recognize the risks (Recognition);
- People are able to intervene (Ability);
- People are motivated to intervene (Motivation);
- People dare to intervene by, for example, interrupting production (Courage);
- Risk-reducing measures are taken in time (Action).

If one or more risk reduction phase (s) does not function optimally, the following situations may arise:

- People do not recognize the risks;
- People are unable to intervene;
- They do not want to intervene;
- People do not dare to intervene;
- Measures are not taken on time.

If that is the case, the basis for incidents has been laid.

#### Safety Leadership orientations

Leaders (supervisors, managers, etc.) can, on the basis of their role/function in an organisation, have a positive or negative influence on the effectiveness of the above risk reduction phases.

People, including leaders, have personal preferences when it comes to their behaviour. We call these 'orientations.' In this research I limit myself to the following three orientations:

- 1. Task (The leader mainly focuses on completing the work);
- 2. Relation (The leader mainly focuses on stimulating good mutual relationships);
- 3. Self (The leader is mainly self-centred; he thinks highly of himself).

Everyone has something (or more) of all three orientations. The degree to which these orientations are present in us affects how we behave.

In my research I try to determine to what extent the behaviour of leaders has a negative influence on the effectiveness of the risk reduction process. In other words: To what extent does the behaviour of leaders determine the risk of incidents?

```
Incident review template

Description of the incident

A. Scenario (What happened?)
...... (your text here)

B. What was the (potential) effect (damage/injury)?
...... (your text here)

C. What was the situational context of this incident?
...... (your text here)

D. What underlying causes were there?
```

..... (your text here)

Matrix for influence of leaders on the risk reduction process

Safety is risk reduction. Disruption of the risk reduction process increases the risk of incidents.

- A. Which leaders negatively impacted the risk reduction process that triggered the incident?
- B. Indicate for these leaders to what extent they had a negative influence on the effectiveness of the risk reduction phases (Know, Can, Want, Dare, Do).

Explanation: Several choices are possible for each person in terms of risk reduction phase AND degree of influence.

Possible scores per phase:  $\circ$  (no negative influence), 1 (very little), 2 (little), 3 (quite), 4 (much), 5 (very much)

N.B. A high score (e.g., 5) therefore means that that person had a very significant negative influence on the effectiveness of the specific risk reduction phase, which increased the chance of incidents. A low score (e.g., 1) means that that person had very little negative impact on that particular phase.

(The grey rows are examples)

Which leader?	RECOGNITION Recognition and understanding	ABILITY Knowledge, skills, and opportunities to intervene	MOTIVATION Internal motiva- tion to intervene	COURAGE Courageous enough to intervene(e.g. by interrupting production)	ACTION Implementation of risk reducing measures
Leader A. (position)	5				3
Leader B. (position)		3		1	5

- 1. ...
- 2. ...
- 3. ...
- 4. ...
- 5. ...

Matrix for personal orientations in the behaviour of the leader(s)

Indicate how the leaders, you mentioned in 2, generally behave:

- Task (The leader is focused on completing the work);
- Relation (The leader is aimed at stimulating good mutual relationships);
- Self (The leader is self-centred; he thinks highly of himself).

Explanation: Every person has some of all three orientations (Task, Relation, Self); this is about the degree to which the leaders show the different orientations in their behaviour.

Possible scores per leader: 0 (none), 1 (very little), 2 (little), 3 (quite), 4 (a great deal), 5 (very much)

(Grey lines are examples)

	TASK-oriented	RELATION-oriented	SELF-oriented
Leader A. (position)	3	1	2
Leader B. (position)	1	3	2
1.			
2.			
3			
4 5			

### 15.3 Survey questionnaire used in pilot survey

This questionnaire is processed anonymously and we cannot link the information you provide to your person.

Do you give permission to use the information you provide anonymously for scientific research?

O Yes

O N

No In case this is the answer, the session is aborted.

#### 1 To what extent do the following situations contribute to the occurrence of accidents?

	(Almost) never	Sometimes	Often	(Almost) always	Don't know
The risks are not known/seen in the workplace	0	0	0	0	0
People are unable to solve the risks in the workplace	0	0	0	0	0
There is a lack of motivation in the workplace to intervene	0	0	0	0	0
The risks are known, but nobody dares to intervene	0	0	0	0	0
Known risks are not always resolved or are resolved much too late	0	0	0	0	0

2 Who are in the best position to resolve these situations?

			Local	Operational	
	Board of directors	Management	supervision*	staff	Don't know
The risks are not known/seen in the workplace	0	0	0	0	0
People are unable to solve the risks in the workplace	0	0	0	0	0
There is a lack of motivation in the workplace to intervene	0	0	0	0	0
The risks are known, but nobody dares to intervene	0	0	0	0	0
Known risks are not always resolved or are resolved much too late	0	0	0	0	0

<sup>\*</sup> examples of local leadership are: team leader/foreman/workshop foreman/guard chief/trade manager/etc.

8 Have you ever experienced a serious accident

- 3 Your direct supervisor is:
  - The director
  - O A manager
  - O a local leader: e.g., team leader/foreman/workshop foreman/guard chief/trade manager/etc.
- 4 Your direct supervisor is:
  - O Man
  - O Woman

6 How long have you been working in this industry?

5 Consider the manager from the previous question and make your assessment below about his/her behavior

	(Almost) never	Sometimes	Often	(Almost) always
Listens well	0	0	0	0
Supports and encourages	0	0	0	0
Ensures (maintenance of) a good atmosphere	0	0	0	0
Let employees participate in the discussion and decision-making	0	0	0	0
Encourages active participation from all team members	0	0	0	0
Sometimes comes across as hostile	0	0	0	0
Avoids involvement	0	0	0	0
Is predominant	0	0	0	0
Abusing the good will of others	0	0	0	0
Makes good appearance with the work of others	0	0	0	0
Comes up with ideas and stimulates renewal/innovation	0	0	0	0
Is interested in ideas of employees and deals with them positively	0	0	0	0
Ensures that employees can perform their duties properly	0	0	0	0
Ensures that employees receive the correct information in a timely manner	0	0	0	0
Encourages employees to take joint decisions where possible	0	0	0	0
Is enthusiastic, can get people moving	0	0	0	0
Is honest and sincere	0	0	0	0
Is attentive and gives compliments where appropriate	0	0	0	0
Attaches to status, considers his/her own position in the organization important	0	0	0	0
Trying to give employees what they need	0	0	0	0
Is compassionate, helps where possible	0	0	0	0
Shows understanding if someone, out of prudence, has unnecessarily disrupted production	0	0	0	0
Sometimes overlooks something; is flexible with rules and procedures	0	0	0	0
Radiates confidence	0	0	0	0
Dares to make decisions based on his/her intuition	0	0	0	0
Is individualistic, goes his/her own way	0	0	0	0
has guts; does what he/she deems right, even if procedures prescribe otherwise	0	0	0	0
is patient	0	0	0	0
Is knowledgeable and understands what his/her employees are doing	0	0	0	0
Dares to make decisions	0	0	0	0
Is result-oriented; everything has to give way to meeting deadlines	0	0	0	0
Motivates employees to intervene themselves in case of safety risks	0	0	0	0
Stimulates knowledge development among employees	0	0	0	0
Ensures that necessary improvement measures are implemented	0	0	0	0
Does not compromise on safety; 'safety first!'	0	0	0	0

	0	Less than 5 years	Select one	of the following options:	at close qua	arters, at work or outside it?
	0	5-10 years	О	Operational staff	0	Yes
	0	10-15 years	О	Local supervisor	0	No
	0	Over 15 years	0	Support staff		
			О	Manager	11 Your age	e:
9 How long have you been working in your current position?		0	Director	0	Younger than 25	
	0	Less than 5 years			0	25-35
	О	5-10 years	10. You are	e a:	О	35-45
	0	10-15 years	О	Man	0	45- 55
	О	Over 15 years	О	Woman	О	Over 55

7 Your position:

### 15.4 Correlational effect size benchmarks (Bosco et al.)

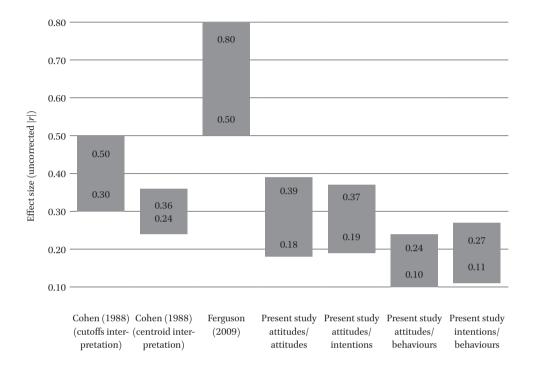


TABLE 21 Correlational effect size benchmarks

#### 15.5 Online prospective survey questionnaire

Welcome to this study of the relationship between leadership and security.

By answering the questions below, you make an important contribution to this research.

Your answers are processed ANONYMOUSLY, so no one can see who gave which answers. It takes about 8 minutes to answer the questions.

We thank you in advance for your participation.

NOTE: This survey is also part of a research at Leiden University.

Do you give permission to use the results of this survey for scientific research?

- 1 YES, I give permission to use my answers anonymously for scientific research.
- 2 NO, I do not consent to my answers being used for scientific research. (This choice will automatically end the survey.)
- Q3 Thank you for your willingness to participate in this study! Click on 'Next' for the first questions.

Q4	In which sector do you work?
	Tank storage
	Hospitals
	Railway sector
	Mineral extraction (Oil and gas, salt)
	Process industry/chemistry
	Transport
	Maintenance/maintenance
	Construction industry
	Industry in general
	Other, namely (Please fill in your sector below.)
Q5	What is your age?
Q6	6 How many years have you been working in this industry/sector? (if less than 1 year
ple	ease enter o)
Q <sub>7</sub>	What is your current position in this organisation?
	Executive/production employee
	Manager (team leader/foreman/chief/head/supervisor/supervisor/specialist/etc.)
	Advisory staff member
	Manager
	Director

Q8 How many years have you worked in your current position? (if less than 1 year, please enter  $\circ$ )

Q9 Have you ever experienced a serious accident up close, at work or elsewhere?
(Note: the term 'serious' is not further defined here: If you considered an accident to be
'serious', this is sufficient reason to answer this question with YES.)
□ YES, as a victim
□ YES, indirectly (e.g., as a witness, helper, friend, family, etc.)
□ NO
Q10 Have you ever interrupted or delayed production for safety reasons?
☐ Yes, I have interrupted production once
☐ Yes, I have slowed down production sometimes
□ No, I have never done this

 $Q_{11}$  A few situations are described below. Indicate whether these situations are actually the case for you:

	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly disagree	Don't Know
In the workplace, people are aware of the local safety risks	0	0	0	0	0	0	0	0
In the workplace, people are able to solve those safety risks	0	0	0	0	0	0	0	0
In the workplace, people are motivated to solve safety risks	0	0	0	0	0	0	0	0
On the work floor, people dare to intervene themselves to solve safety risks	0	0	0	0	0	0	0	0
Known safety risks are resolved in a timely manner	0	0	0	0	0	0	0	0

Q12 A few situations are described below. Indicate for each situation who do you think can best solve that situation? (several people possible)

	Board	Management	Supervisors	Operational staff	Don't know
In the workplace people are insufficiently aware / aware of the safety risks	0	0	0	0	0
People in the workplace are insufficiently able to solve safety risks	0	0	0	0	0
People in the work- place are insufficiently motivated to solve safety risks	0	0	0	0	0
The safety risks are known, but people do not dare to intervene themselves in the workplace	0	0	0	0	0
Known safety risks are not resolved or are resolved too late.	0	0	0	0	0

Q13 Your immediate supervisor is:
□ The director
□ A manager
☐ A supervisor (team leader/foreman/chief/head/supervisor/supervisor/manager/etc
□ I do not have a supervisor
Q14 Your immediate supervisor is:
□ Man
□ Momen

 $\rm Q15$  Take your immediate supervisor (from the previous question) in mind and give an impression of his/her behaviour below.

Your immediate supervisor...

	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly disagree	Don't Know
is a good listener	0	0	0	0	0	0	0	0
supports and encourages	0	0	0	0	0	0	0	0
ensures (maintenance of) a good atmosphere	. 0	0	0	0	0	0	0	0
let employees partic- ipate in the discussion and decision- making process	0	0	0	0	0	0	0	0
encourages active participation of all team members	0	0	0	0	0	0	0	0
sometimes comes across as hostile	0	0	0	0	0	0	0	0
avoids involvement	0	0	0	0	0	0	0	0
is predominant	0	0	0	0	0	0	0	0
takes advantage of the goodwill of others	. 0	0	0	0	0	0	0	0
makes a good impression with the work of others	0	0	0	0	0	0	0	0
comes up with ideas and stimulates renewal and innovation	0	0	0	0	0	0	0	0
is interested in ideas from employees and deals with them posi- tively	0	0	0	0	0	0	0	0

## Q16 Your immediate supervisor...

	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly disagree	Don't Know
ensures that employ- ees can perform their tasks properly	0	0	0	0	0	0	0	0
arranges that employ- ees receive information on time	0	0	0	0	0	0	0	0
encourages employ- ees to make joint deci- sions where possible	Ο	0	0	0	0	0	0	0
is enthusiastic and can get people moving	0	0	0	0	0	0	0	0
is honest and sincere	0	0	0	0	0	0	0	0
is considerate and gives compliments where appropriate	0	0	0	0	0	0	0	0
values status, considers his / her organisational position important	0	0	0	0	0	0	0	0
tries to give employ- ees what they need	0	0	0	0	0	0	0	0
is compassionate, helps where possible	0	0	0	0	0	0	0	0
shows understanding when, out of caution, someone has unnec- essarily disrupted production	0	0	0	0	0	0	0	0
sometimes overlooks something; handles rules and procedures flexibly	0	0	0	0	0	0	0	0
radiates confidence	0	0	0	0	0	0	0	0

# Q17 Your immediate supervisor...

	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly disagree	Don't Know
dares to make decisions based on intuition	0	0	0	0	0	0	0	0
is individualistic, goes his/her own way	0	0	0	0	0	0	0	0
has guts, does what he / she considers right, even when procedures prescribe otherwise	0	0	0	0	0	0	0	0
is patient	0	0	0	0	0	0	0	0
is knowledgeable, understands what em- ployees are doing	0	0	0	0	0	0	0	0
dares to make decisions	0	0	0	0	0	0	0	0
is result oriented; everything has to make way for meeting dead- lines	0	0	0	0	0	0	0	0
motivates employees to intervene in case of safety risks	0	0	0	0	0	0	0	0
stimulates knowledge development among employees	0	0	0	0	0	0	0	0
ensures that necessary improvements are made	0	0	0	0	0	0	0	0
gives safety priority: 'Safety First!'	0	0	0	0	0	0	0	0

Q18 Disruptions in the primary/production process of your I can in the worst-case lead to:
 □ an accident with several fatalities, serious material or environmental damage and reputation damage.
 □ an accident with a fatal outcome or serious material or environmental damage.
 □ an accident resulting in hospitalization.
 □ an accident that leads to an employee's absence.
 □ an accident with minor injury or little material or environmental damage
 □ an incident without injury or material or environmental damage.
 □ I have no idea.
 Q19 Have you been taught in any education/training to recognize safety risks?
 □ Yes
 □ No.
 Q20 In which training did you learn to recognize safety risks?

Q21 In which department/business unit/division/etc. do you work?

 $\hfill\Box$  To be completed later, e.g., Location A, Terminal B, Factory C, Department D

□ Other, namely \_\_\_\_\_

□ Other, namely \_\_\_\_\_

□ Professional training

 $\square$  VCA

Q22 To what extent do you agree with the following statements:

	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly disagree	Don't Know
I feel safe in my organisation.	0	0	0	0	0	0	0	0
There is a real risk of an accident within my organisation.	0	0	0	0	0	0	0	0
In the field of safety, a great deal has gone wrong within my organi- sation in the past year.	. 0	0	0	0	0	0	0	0

#### 15.6 General mean scores

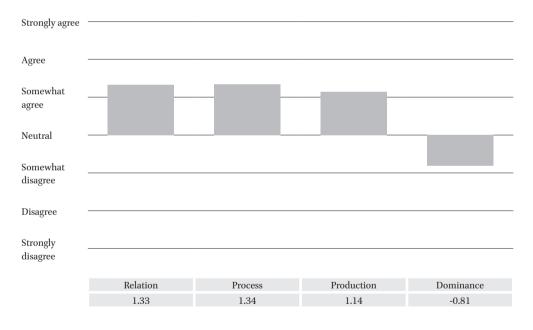
In Chapter 8 we presented the outcomes of the online prospective survey in terms of mean scores. This appendix shows the statistical information underlying the presented outcomes.

 $15.6.1 \qquad \textit{Safety Leadership orientations}$ 

15.6.1.1 General means for Safety Leadership orientations

SAFETY LEADERSHIP	Relation	Process	Production	Dominance
Valid	3332	3319	3316	3332
Missing	0	13	16	0
Mean	1.3276	1.3437	1.1370	-0.8121
Std. Deviation	1.19064	1.07288	1.22041	1.13131

TABLE 22 Safety Leadership orientations as reported by general employees



BAR CHART 12 General Safety Leadership profile of all employees

15.6.1.2 Safety Leadership orientations per business sector

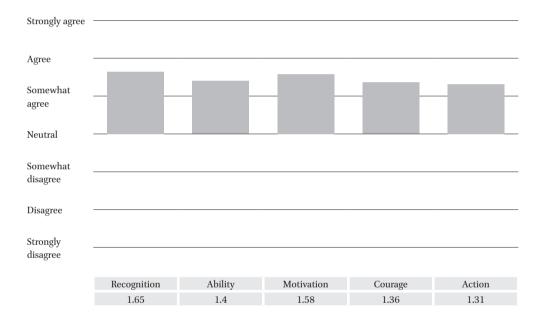
Strongly agree								
Agree								
Somewhat agree		lle:	111	th:	ılı.	11-	lin	ile.
Neutral		- 1	- 1			-71	- 1	-1
Somewhat disagree			-	•	_	_		
Disagree								
Strongly disagree								
		Tank storage (n=185)	Hospitals (n=767)	Process industry (n=128)	Oil & gas (n=414)	Infra general (n=454)	Rail infra (n=1010)	Other (n=374)
	Relation	1.1547	1.2145	1.3169	1.0633	1.4464	1.5910	1.0852
	Process	1.3689	1.2523	1.6087	1.3533	1.5155	1.3360	1.2286
	Production	0.9189	1.1724	1.2031	0.7962	1.3511	1.2350	1.0032
	Dominance	-0.4824	-0.7198	-0.7470	-0.7877	-0.7264	-1.0857	-0.5786

BAR CHART 13 Safety Leadership per business sector

15.6.2 Risk Reduction Capacity15.6.2.1 General means for Risk Reduction Capacity

RISK REDUCTION CAPACITY	Recognition	Ability	Motivation	Courage	Action
Valid	3322	3320	3310	3297	3291
Missing	10	12	22	35	41
Mean	1.6508	1.4000	1.5782	1.3588	1.3102
St. Deviation	1.28842	1.27988	1.31422	1.41341	1.45053

TABLE 23 Risk Reduction Capacity as reported by general employees



BAR CHART 14 Risk Reduction Capacity as reported by all employees

## 15.6.2.2 Risk Reduction Capacity per business sector

Strongly agree	
Agree	The second second
Somewhat agree	
Neutral	
Somewhat disagree	
Disagree	
Strongly disagree	

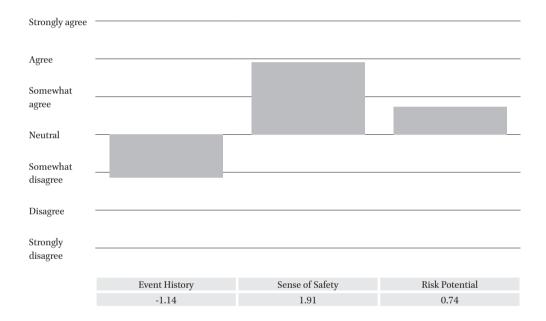
		Tank storage (n=185)	Hospitals (n=766)	Process industry (n=127)	Oil & gas (n=414)	Infra general (n=453)	Rail infra (n=1005)	Other (n=373)
	Recognition	1.70	1.66	1.54	1.86	1.58	1.65	1.50
	Ability	1.45	1.43	1.13	1.36	1.42	1.49	1.19
	Motivation	1.81	1.68	1.27	1.67	1.33	1.71	1.22
	Courage	1.61	1.53	1.13	1.38	1.03	1.43	1.16
	Action	1.14	1.28	1.14	1.46	1.36	1.42	1.00

BAR CHART 15 Risk Reduction Capacity per business sector

15.6.3 Safety15.6.3.1 General means for Safety

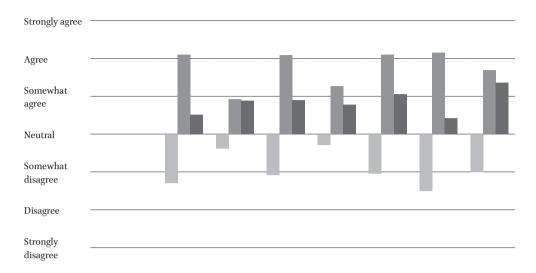
Result	Event History	Sense of Safety	Risk Potential
Valid	1906	2005	1991
Missing	1426	1327	1341
Mean	-1.1443	1.9102	0.7373
Std. Deviation	1.50995	1.24732	1.75591

TABLE 24 Safety as reported by general employees



BAR CHART 16 General safety as reported by general employees

## 15.6.3.2 Safety per business sector



	Tank	Hospitals	Process	Oil & gas	Infra	Rail infra	Other
	storage	(n=211)	industry	(n=96)	general	(n=901)	(n=215)
	(n=98)		(n=48)		(n=436)		
Event History	-1.29	-0.38	-1.08	-0.29	-1.04	-1.50	-1.00
Sense of Safety	2.10	0.92	2.08	1.26	2.09	2.15	1.68
Risk Potential	0.51	0.88	0.89	0.78	1.06	0.42	1.35

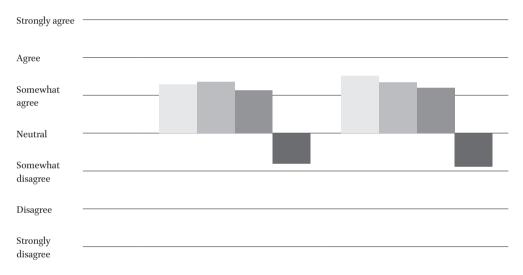
BAR CHART 17 Safety per business sector

15.7 Mean scores for additional moderator variables
 15.7.1 Mean scores by direct supervisors' genders

	Frequency	Percent
Male	2578	77,4
Female	720	21.6
Total	3298	99.0
Missing	34	1.0
Total	3332	100.0

TABLE 25 Genders of respondents' direct supervisors

15.7.1.1 Safety Leadership orientations by gender of direct supervisors



	Men (n=	2578) Women (n	=720)
Relat	ion 1.29	9 1.51	
Proce	ess 1.30	6 1.34	
Produ	action 1.13	3 1.20	
Domi	inance -0.8	0 -0.88	

BAR CHART 18 Safety Leadership by gender of direct supervisors

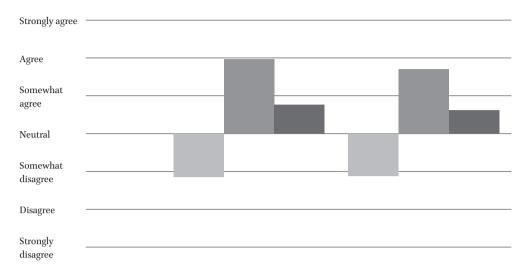
## 15.7.1.2 Risk Reduction Capacity by gender of direct supervisors

Strongly agree			
Agree			
Somewhat agree			
Neutral			
Somewhat disagree			
Disagree			
Strongly disagree			
		Men (n=2578)	Women (n=719)
	Recognition	1.68	1.58

	Men (n=2578)	Women (n=719)
Recognition	1.68	1.58
Ability	1.39	1.41
Motivation	1.57	1.64
Courage	1.35	1.40
Action	1.35	1.24

BAR CHART 19 Risk Reduction Capacity by gender of direct supervisors

## 15.7.1.3 Safety by gender of direct supervisors



	Men (n=1640)	Women (n=364)
Event History	-1.15	-1.12
Sense of Safety	1.96	1.70
Risk Potential	0.76	0.62

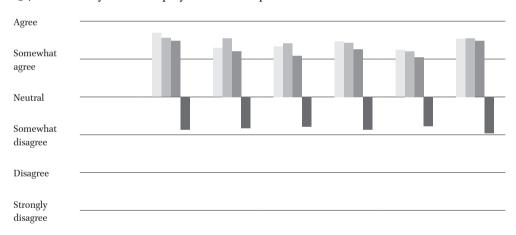
BAR CHART 20 Safety by gender of direct supervisors

15.7.2 *Mean scores by hierarchical position*Distribution of hierarchical positions

	Frequency	Percent
Director/Board	41	1.2
Management	340	10.2
Supervisor	657	19.7
Support staff	559	16.8
Operational staff	1539	46.2
Senior staff	181	5.4
Subtotal	3317	99.5
Missing	15	0.5
Total	3332	100.0

TABLE 26 Hierarchical positions of respondents

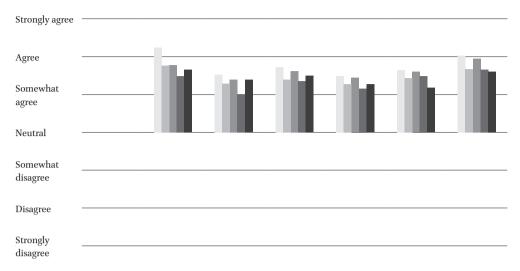
15.7.2.1 Safety Leadership by hierarchical positions



	Director (n=41)	Manage- ment (n=340)	Supervisors (n=657)	Support staff (n=559)	Operational staff (n=1539)	Senior staff (n=181)
Relation	1.69	1.29	1.34	1.47	1.24	1.54
Process	1.56	1.55	1.42	1.43	1.21	1.55
Production	1.48	1.21	1.09	1.26	1.05	1.48
Dominance	-0.87	-0.82	-0.79	-0.87	-0.78	-0.96

BAR CHART 21 Safety Leadership by hierarchical positions

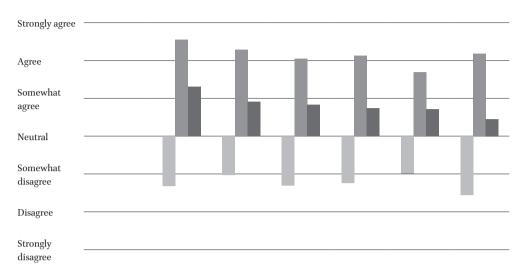
15.7.2.2 Risk Reduction Capacity by hierarchical positions



	Director (n=41)	Manage- ment (n=340)	Supervisors (n=657)	Support staff (n=557)	Operational staff (n=1535)	Senior staff (n=181)
Recognition	2.24	1.53	1.72	1.49	1.64	2.03
Ability	1.76	1.29	1.39	1.28	1.43	1.67
Motivation	1.78	1.39	1.62	1.44	1.60	1.95
Courage	1.49	1.01	1.35	1.15	1.48	1.66
Action	1.66	1.39	1.50	1.27	1.18	1.60

BAR CHART 22 Risk Reduction Capacity by hierarchical positions

## 15.7.2.3 Safety by hierarchical positions



	Director (n=20)	Manage- ment (n=148)	Supervisors (n=366)	Support staff (n=325)	Operational staff (n=962)	Senior staff (n=179)
Event History	-1.32	-1.02	-1.30	-1.23	-0.99	-1.55
Sense of Safety	2.55	2.28	2.04	2.12	1.68	2.17
Risk Potential	1.30	0.91	0.83	0.73	0.71	0.45

BAR CHART 23 Safety by hierarchical positions

# 15.7.3 Mean scores by age

# 15.7.3.1 Safety Leadership by age

Strongly agree					
Agree					
Somewhat agree		100	lle:	The contract of	The s
Neutral		- 20	- 7	- "	-76
Somewhat disagree			_	_	
Disagree					
Strongly disagree					
		Age < 31 (n=352)	Age 31–40 (n=737)	Age 41–50 (n=1001)	Age 51–67 (n=1229)
	Relation	1.29	1.33	1.30	1.36
	Process	1.31	1.33	1.33	1.38
	Production	1.32	1.13	1.11	1.11
	Dominance	-0.62	-0.74	-0.85	-0.88

BAR CHART 24 Safety Leadership by age

15.7.3.2 Risk Reduction Capacity by age

Strongly agree				
Agree				
Somewhat agree	100		-Illin-	-100-
Neutral				
Somewhat disagree				
Disagree				
Strongly disagree				
	Age < 31 (n=352)	Age 31–40 (n=735)	Age 41–50 (n=999)	Age 51–67

	Age < 31 (n=352)	Age 31–40 (n=735)	Age 41–50 (n=999)	Age 51–67
				(n=1226)
Recognition	1.45	1.53	1.68	1.77
Ability	1.40	1.30	1.41	1.46
Motivation	1.27	1.44	1.61	1.73
Courage	1.25	1.17	1.36	1.51
Action	1.16	1.16	1.26	1.49

BAR CHART 25 Risk Reduction Capacity by age

## 15.7.3.3 Safety by age

Strongly agree	
Agree	
Somewhat agree	
Neutral	
Somewhat disagree	
Disagree	
Strongly disagree	

	Age < 31 (n=209)	Age 31–40 (n=439)	Age 41–50 (n=592)	Age 51–67 (n=756)
Event History	-0.79	-0.92	-1.16	-1.36
Sense of Safety	1.72	1.90	1.93	1.96
Risk Potential	0.67	0.82	0.79	0.66

BAR CHART 26 Safety by age

## 15.7.4 Mean scores by vocational experience

## 15.7.4.1 Safety Leadership by vocational experience

Strongly agree						
Agree						
Somewhat agree		ш	ш	lle:	lin.	ш
Neutral					~	
Somewhat disagree			_	•	•	
Disagree						
Strongly disagree						
		0–5 years (n=546)	5–10 years (n=668)	11–20 years (n=883)	21–30 years (n=674)	31–50 years (n=548)
	Relation	1.47	1.36	1.25	1.25	1.39
	Process	1.39	1.34	1.31	1.32	1.39
	Production	1.27	1.16	1.11	1.11	1.05
	Dominance	-0.80	-0.85	-0.79	-0.78	-0.88

BAR CHART 27 Safety Leadership by vocational experience

15.7.4.2 Risk Reduction Capacity by vocational experience

Strongly agree	 				
Agree	 				1.0
Somewhat agree	-De	libr.	-Mile	-lile	-10-
Neutral				•	
Somewhat disagree					
Disagree	 				
Strongly disagree					
	0–5 years	5–10 years	11–20 years	21–30 years	31–50 years

	0–5 years	5–10 years	11–20 years	21–30 years	31–50 years
	(n=545)	(n=667)	(n=880)	(n=672)	(n=547)
Recognition	1.56	1.53	1.66	1.69	1.85
Ability	1.52	1.28	1.40	1.33	1.54
Motivation	1.46	1.46	1.57	1.61	1.84
Courage	1.26	1.26	1.32	1.37	1.66
Action	1.31	1.19	1.28	1.35	1.49

BAR CHART 28 Risk Reduction Capacity by vocational experience

## 15.7.4.3 Safety by vocational experience

Strongly agree	
Agree	
Somewhat agree	
Neutral	
Somewhat disagree	
Disagree	
Strongly disagree	

	0–5 years	5–10 years	11-20 years	21-30 years	31–50 years
	(n=324)	(n=439)	(n=492)	(n=396)	(n=348)
Event History	-1.11	-1.04	-1.11	-1.13	-1.39
Sense of Safety	2.02	1.88	1.92	1.87	1.90
Risk Potential	0.68	0.62	0.87	0.81	0.68

BAR CHART 29 Safety by vocational experience

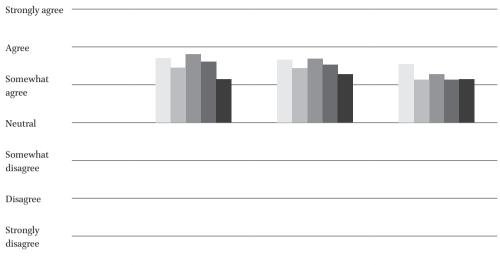
## 15.7.5 Mean scores by safety incident history

## 15.7.5.1 Safety Leadership by safety incident history

Strongly agree				
Agree				
Somewhat agree		100	The second	-10-
Neutral				
Somewhat disagree		_		
Disagree				
Strongly disagree				
		Victim (n=233)	Witness (n=1293)	Neither (n=1772)
	Relation	1.35	1.29	1.37
	Process	1.25	1.34	1.37
	Production	1.12	1.11	1.17
	Dominance	-0.78	-0.75	-0.87

BAR CHART 30 Safety Leadership by safety incident history

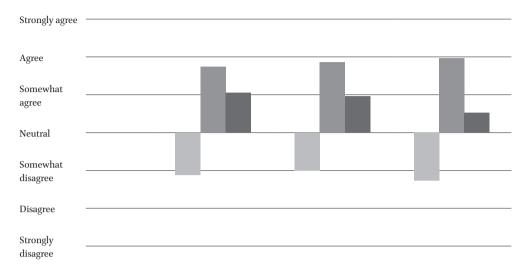
15.7.5.2 Risk Reduction Capacity by safety incident history



	Victim (n=232)	Witness (n=1292)	Neither (n=1767)
Recognition	1.70	1.66	1.54
Ability	1.45	1.43	1.13
Motivation	1.81	1.68	1.27
Courage	1.61	1.53	1.13
Action	1.14	1.28	1.14

BAR CHART 31 Risk Reduction Capacity by safety incident history

## 15.7.5.3 Safety by safety incident history



	Victim (n=140)	Witness (n=821)	Neither (n=1043)
Event History	-1.12	-1.00	-1.27
Sense of Safety	1.74	1.86	1.97
Risk Potential	1.05	0.96	0.52

BAR CHART 32 Safety by incident history

# 15.8 Conversation guide for reflection by senior leaders Objective and method

Interviews with CEO/managing director, operational manager and safety manager.

To obtain the reflection by the interviewee about the results of questionnaire in terms of the Risk Reduction Cycle and Safety Leadership orientations as collected in his/her organisation.

Duration: Approx. 1 hour Location: Office of the interviewee

#### References

What is the response to the results of the survey with regard to the Risk Reduction Cycle and behavioural orientations of leaders?

### Risk Reduction Cycle

- Understanding / Kennen
- Ability /Kunnen
- Motivation /Willen
- Courage / Durven
- Action /Doen

### Safety Leadership orientations

- Task
- Relation
- Self

### **Results**

Striking results?

What results are expected and what are unexpected?

Comments?

### Follow up

What can/do you want with the results?

Own experience: Have you ever been directly/indirectly involved in a "calamity"?

Organisation code		Date/tim	e of inte	rview:			
Position of interviewee Number of years in sector Number of years in office Age M/F	35–40	40-45	45–50	50-55	55-60	>60	

## 15.9 Effects of Safety Leadership on risk reduction phases

By application of Structural Equation Modelling (SEM), we identified the standardised regression coefficients of the effect of the four Safety Leadership orientations on risk reduction. The results of this analysis are shown in below Table 27.

The shaded cells indicate that there is no effect for these specific coordinates.

		Effects	on Risk Reductio	n Phases	
	Recognition	Ability	Motivation	Courage	Action
Relation	-0.25				-0.26
Process	0.72	0.59	0.42	0.61	0.79
Production	-0.18	-0.17			-0.19
Dominance					

TABLE 27 Standardised regression coefficients of effects of Safety Leadership on Risk Reduction

## 15.10 Mediating effects of risk reduction phases on Safety.

By application of Structural Equation Modelling (SEM), we identified the standardised regression coefficients (or standardised loadings) of the effects of each individual risk reduction phase on the three characteristics of the Safety node of the Safety Leadership Model (Event History, Sense of Safety and Risk Potential). The referred results are presented in the table below (Table 28). All effects less than 0.10 are considered too weak to be considered and are ignored. The shaded cells contain the ignored effects.

	Event History	Sense of Safety	Risk Potential
Recognition	-0.16	0.14	-0.06
Ability	-0.16	0.14	-0.05
Motivation	-0.12	0.08	-0.05
Courage	-0.16	0.07	-0.07
Action	-0.18	0.16	-0.09

TABLE 28 Standardised regression coefficients of effects of risk reduction phases on Safety

Direct and indirect influences of Safety Leadership on Safety

15.11

						Indire	Indirect (mediated) effect	iated)	effect								Direct effect	
	Re	Recognition	on		Ability		Mc	Motivation	п		Courage		7	Action		Event History Sense of Risk Potential Safety	Sense of Safety	Risk Potential
	ম	s	R	Э	S	R	Ħ	S R	m R	Э	S	æ	ы	s	æ	Ξ	s	R
Relation	.04	.04004											.05	.0504		.33 – .38		
Process	12	.10		60	80.		05 .03	.03		60	.04	.04	14	09 .04 .0414 .1207	07	4352	.3544	
Production	.03	03		.03	02								.0303	03		.17 – .19		
Dominance																.37 – .38		.2224

TABLE 29 Standardised regression coefficients of influences of Safety Leadership on Safety

LEGEND: E=Event History S=Sense of Safety R=Risk Potential Green =noticeable effect

Grey =no significant effect

Blank =negligible effect

### 15.12 Sources versus Process-oriented Safety Leadership Principles

In this appendix we explain how the different sources (the behavioural characteristics of Process-oriented leaders, the Academic Safety Leadership Practices and the findings by Flin and Hale et al.) have been applied to develop the Process-oriented Safety Leadership Principles as presented in paragraph 11.2.2.3.

Below we show a numbered list of all Academic Safety Leadership Practices plus the findings by Flin and Hale et al. We used this list to develop a table showing which item served as source for each Process-oriented Safety Leadership Principle. This table is presented after the numbered list.

### 15.12.1 List of source items (numbered)

LEGEND OF CODES after text:

G=Growth Mindset
PS=Psychological Safety
HRO=High Reliable Organizing
TL=Transformational Leadership
Flin=Item mentioned by Flin
Hale=Item mentioned by Hale et al.

Numbers shown after source items refer to related Process-oriented Safety Leadership Principle.

- In selection and hiring processes, looking for people who are filled with passion and a desire to get things done. G2
- 2. Welcoming change and new ideas regardless of their source. G7
- 3. Being understanding and supportive when things have gone different as envisaged and helping employees through, acting as a guide, not as a judge. **G6**
- 4. Shutting down elitism and getting rid of brutal 'bosses'; fostering productivity by mentoring. Talking journey, instead of royalty, limiting the use of the words 'I' and 'me'; using 'we' and 'us' instead. Rewarding teamwork rather than individual genius. G6
- 5. Managers visiting operational sites to chat with front-line employees frequently. G6
- 6. Opening up dialogue and channels for honest feedback; asking team members what they like and dislike about the company and what they think needing change, e.g., by setting up structures, processes and forums for input and providing guidelines for discussion. G6 + PS6
- Showing that the analyzed values and stimulates personal development and growth of employees. PS2 + PS3
- 8. Emphasizing purpose by identifying what is at stake, why it matters and for whom. **PS1**

9. Clear framing of work by setting expectations about failure, uncertainty and interdependence to clarify the need for voice. PS4 + PS3

- 10. Inclusion of all team members, through direct invitation, in discussions and decisions in which their voices and perspectives might otherwise be absent. PS6
- Supporting collaboration across organisational boundaries by inviting input from relevant operational competence and experience in all meetings and consultations, ignoring hierarchy and departmental barriers. PS6 + PS3
- 12. Demonstrating situational humility by acknowledging gaps in own performance. PS4
- Fostering a just culture by focusing on system flaws, not on individuals, but sanction clear violations. PS7
- 14. Destigmatizing failure by looking forward, offering help, discussion, consideration and brainstorming next steps. PS6 + PS3
- 15. Stimulating reporting of safety risks and operational disturbances and express appreciation by listening, acknowledging and thanking for communicating. PS7
- 16. Practicing inquiry by asking good questions and listening intensively. PS6
- 17. Considering that changes taking place at any hierarchical level, these must be supported by concomitant change at other levels. TL8
- 18. Intervention models must assume a multi-level perspective, because processes take place at any organisational level influence and are influenced by, adjacent levels, i.e., processes at different levels are interconnected. TL8
- 19. Deliver incentives as part of their daily routine. Weekly feedback to line-supervisors concerning the frequency of safety-oriented interactions with subordinates, accompanied by communication of (high) safety-priority from direct superiors (i.e., section managers). TL6
- 20. Feedback concerned randomly timed episodic interviews with subordinates. During interviews, workers described their most recent interaction with their supervisor. TL6  $\pm$  TL3
- 21. Emphasize that incentives delivered by superiors (e.g., personal attention and recognition) have consistently been shown to provide the strongest reinforcement value in the organisational context, surpassing material and social incentives. TL6
- 22. leaders dare to discuss identified normalized deviant behaviour with their followers. HRO6
- 23. leaders should not avoid debates about the (ignorance of) seemingly unimportant deviations from normal, also known as 'weak signals.' **HRO7**
- 24. Identify whether there are variances in operation procedures between departments, sites or time periods (e.g., days/nights, weekends, holidays). **HRO7** + **HRO3**
- 25. an open dialogue between all relevant operating and supervisory staff is easily facilitated in order to find the reasons why the identified differences exist. **HRO6**
- 26. leaders should be alert concerning team members who are often absent when it comes to evaluating, reflecting and learning. **HRO7**

27. Leaders be aware and respect that unknown risks (blind spots) may exist and also motivate their team members to take this into account during their operations. **HRO7** + **HRO3** 

- 28. Leaders should respond positively, should verify the message and be prepared to take timely all remedial actions needed to prevent escalation. **HRO8**
- 29. "Expect the unexpected and always assume that during operations something can go wrong!" **HRO**7
- 30. As in any other facet of management, what is critical is the behaviours that are demonstrated in relation to safety. Flin7
- 31. Especially time is a crucial factor as it is the strongest signal of commitment by busy managers with little time to spare. Flin6
- 32. Show the importance of the safety professional and top management support as 'motor' for the successful implementation of safety interventions. Flin5
- 33. The importance of dialogue between the workforce and line-management as the most essential factor in ensuring that analyzed learn and change. Central to this dialogue was the reporting of dangerous situations (Recognition!). Hale6 + Hale3
- 34. most successful companies in the study, were the companies where the workforce and managers were more actively encouraged to look for safety risks; these companies showed spectacular increases in numbers. Hale<sub>7</sub> + Hale<sub>3</sub>
- 35. Rewarding reporters of (perceived) safety risks by ensuring that all reports are analyzed and decisions on remedial actions taken on them and that the reporters would receive feedback on actions taken (even if that feedback was to explain the reasons for lack of action). Hale8
- 36. The workforce was empowered to refuse to work under unsafe conditions. **Hale4** + **Hale3**
- 37. Top and line-managers were offered safety leadership training. Hale5

Reference table: Sources of Process-oriented Safety Leadership Principles 15.12.2

P.B.	PROCESS-ORIENTED SAFETY LEADERSHIP PRINCIPLE Process-oriented characteristic	rocess-oriented characteristic	Flin	Hale	нко	Psychological safety	Growth	Transforma- tional leadership
;	1. Don't skimp on safety	A				∞		
2.	2. Assure a sufficient number of competent staffing	A				2	1, 4	
33	Enable all employees to perform their duties in a safe way	A		33, 34, 36	24, 27	7, 9, 11, 14		20
4.	4. Empower employees to refuse to work under unsafe conditions	C, D		36		9,12		
5.	<ol><li>Arrange professional safety leadership training for all leaders at all levels</li></ol>	A	32	37				
9.	Allocate sufficient time for dialogues with workforce at their workplaces	А, С	31	33	22, 25	6, 10, 11, 14, 16	3, 4, 5,6	19, 20, 21
7.	7. Actively encourage identification and communication of safety hazards	O	30	34	23, 24, 26, 27, 29	13,15	2	
∞ <b>i</b>	Monitor implementation and achieved effects of risk reducing measures	В		35	28			17,18

TABLE 30 Sources of Process-oriented Safety Leadership Principles

LEGEND: Process-oriented characteristics

A. Sincerely care for safety

B. Ensure that necessary improvements are implemented timely

3. Motivate team members to intervene to prevent safety incidents

). Forgive people who intervene by mistake

Numbers refer to source items (listed under previous paragraph 15.12.1)

## Curriculum vitae



Victor Roggeveen (Amsterdam, 1949) joined the Royal Netherlands Navy in 1965 and was trained as a ship's engineer. He resigned after 8 years of service to accept an offshore technical position in an oil company operating a gas exploration activity in the southern North Sea (1973). Two years later, after the company obtained a gas production license, he was assigned as the first company's 'safety man' offshore. After 9 years of experience in the safety profession, he resigned in order to found his own independent safety consultancy firm Advi-Safe Consultants (1984). This

company rendered safety consultancy services to high-risk organisations in the oil and gas, tank storage, railways and other industries on a global scale. Under his supervision, the company developed safety management systems, safety incident investigations and conducted safety related training courses. In the year 2000 he retired from Advi-Safe Consultants. Since then, Victor operates as an independent risk management consultant, Tripod trainer and incident investigator, with a focus on the health care sector (hospitals) and other high-risk industries.

Since 1995 he holds a professional master degree in Occupational Health, Safety and Welfare from Amsterdam University (UvA). From 2006 until 2012 he chaired the Dutch Society of Safety Practitioners (NVVK). In 2013 he enrolled the Dual PhD Centre of Leiden University to do PhD research into the influence of leaders on the prevention of safety incidents.