Safety Culture: Assessment Tools and Techniques

A review of the academic and applied literature

INSTITUTE FOR QUALITY OF LIFE
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Contents

Context

This report was produced following research conducted by the Sodexo Institute for Quality of Life for Sodexo Benefits and Rewards Services in January 2017. The Institute conducted a review of the academic and applied literature to determine the state of the art in relation to how safety culture is assessed across organisations. Three angles for approaching safety culture were identified and analysed: academic; analytical and pragmatic.

This report was drafted so as to be sufficiently accessible for a wide readership while maintaining sufficient attention to detail. Its aim is to contribute to raising awareness and steering behaviours to help sustain Sodexo's commitment towards safer environments for its people, clients and consumers.

Introduction

The first use of the term 'safety culture' appears to have been in a report by the International Atomic Energy Agency after the Chernobyl nuclear reactor disaster in 1986. Since then, the concept of safety culture has been studied internationally by many academics from different scientific backgrounds (e.g. psychology, anthropology, engineering), resulting in different but complementary approaches for exploring and assessing an organisation's safety culture.

It is important to note that the research has highlighted some confusion and inconsistency in the literature over the use of the terms 'safety culture' and 'safety climate'. This report will therefore begin by outlining the difference between *culture* and *climate* in relation to safety. We will then look into the impact of safety culture tools on safety performance. The three assessment approaches identified for safety culture will also be presented with their specific methods and instruments.

Understanding the difference between safety climate and safety culture

Safety climate is defined as "*the sum of employees' shared perceptions of policies, procedures and practices relating to safety in their work environment*" (Zohar, 1980; Huang et al., 2006). On the other hand, safety culture refers to "*the attitudes, beliefs, and perceptions shared by natural groups as defining norms and values, which determine how they react in relation to risks and risk control systems*" (Hale, 2000). The concept of safety culture, is therefore broader than safety climate as it incorporates a number of additional constructs, such as attitudes, values and behaviour. In other words, the term 'safety culture' can be used to refer to the behavioural aspects, i.e. what people do and situational aspects, i.e. *what the organisation has*. The term 'safety climate' should be used to refer to psychological characteristics, i.e. *how people feel*, corresponding to perceptions with regard to safety within an organisation (Cooper, 2000).

	SAFETY CLIMATE	SAFETY CULTURE
DEFINITION	The sum of employees' **shared perceptions** of policies, procedures and practices relating to safety (Zohar 1980; Huang et al. 2006)	The **attitudes, beliefs, and perceptions shared** by natural groups as **defining norms and values**, which **determine how they react** in relation to risks and risk control systems (Hale 2000)
FOCUS	**Psychological characteristics:** *how people feel*, corresponding to perceptions with regard to safety within an organisation (Cooper 2000)	(1) **Behaviour**: *what people do* (2) **Situation**: *what the organisation has* (Cooper 2000)

Table 1. The differences between safety climate and safety culture

Accidents are caused by an interacting system of social, cultural and technical forces (Brown, Willis and Prussia, 2000). The identification of safety culture and climate is therefore viewed as a major contribution to occupational accidents and the conceptualisation could have profound effects on the way risk and hazards are managed in the workplace. It is suggested that the occurrence of accidents at work can be predicted on the basis of certain factors that are indicative of an organisation's state of safety. These factors are thought to be group specific (e.g. different work groups experience different hazards and risks) and therefore analyses focusing towards more specific work groups should improve accident prevention in the organisation (Bjerkan, 2010).

What is the impact of safety climate and culture tools on safety performance?

SAFETY CLIMATE

To date, the safety climate literature has mainly focused on two major issues: (1) the factor structure of safety climate and (2) the relationship between safety climate and outcome variables. A number of different measures of safety climate have been developed by researchers (e.g. Cox & Cheyne, 2000; Hayes, Peranda, Smecko & Trask, 1998; Zohar, 1980) – unfortunately, these have produced a wide range of different factor structures and there is currently no consensus regarding the key dimensions of safety climate (Neal & Griffin, 2002). Regardless of the precise structure of safety climate, prior research has demonstrated that perceptions of safety climate are positively associated with safety compliance and negatively associated with accidents at the individual, group and organisational levels of analysis (Brown & Holmes, 1986; Hayes et al., 1998; Hofmann & Stetzer, 1996; Rundmo, 1994; Varonen & Mattila, 2000; Zohar, 2000). Indeed, a positive safety climate is associated with higher levels of safety through improvement of workers' safety motivation and participation (Neal & Griffin, 2006) and utilisation of protective equipment (Arcury et al., 2015). Furthermore, safety climate has been shown to predict workers' and management's safety commitment, and their compliance with safe working practice (Barbaranelli et al., 2015; Zohar, 2002). These studies also document a relation between positive safety climate and fewer accidents (Arcury et al., 2015; Barbaranelli et al., 2015; Neal and Griffin, 2006; Tholen et al., 2013; Zohar, 2000). Previous studies have shown that the employees' perception of the safety climate at work is a strong predictor for occupational accidents (Noblet, 2003). Stressors in the working environment, such as work pace and high work demands, have in previous studies been related to an increased frequency of occupational accidents (Clarke, 2006).

SAFETY CULTURE

Near Miss reporting programs are recognised as effective safety culture tools. Organisations that have achieved effective Near Miss reporting programs have reached outstanding safety performance (Borg, 2002). For example, in Western Canada a major petroleum producer reduced injury frequency by more than 90% within one year of achieving its goal in Near Miss Reporting. In another successful implementation of a Near Miss reporting program at a major South East Asian petroleum company, the injury frequency rate was reduced to zero and the direct cost of accidents was reduced by US$3,000,000.00 in 1996 alone. In addition to the reduction in injury and reduction of direct cost, a total of 10,000 barrels of oil was identified as the production loss related to accidents and accidental process shutdown. In 1996, 10,000 barrels of oil a day at US$25.00 was worth over US$90,000,000.00 a year. If that amount of accidental production shutdown could be reduced by just 10%, cash flow would still be increased by over US$9,000,000.00 a year.

Three angles for approaching safety in an organisation

Safety culture can be approached from three different angles: the academic (anthropological), analytical (psychological) and the pragmatic (experience-based) (Guldenmund, 2010). For each of the three approaches, Table 2 provides information on the period in the organisation's time it focuses on (past, present or future), the kind of information it aims to gather (qualitative versus quantitative information), its specific research characteristics (descriptive versus normative) and the related assessment strategy and methods (instruments).

Main approach	Time focus	Information to be gathered	Research characteristics	Assessment strategy and methods
Academic (anthropological)	Past	Qualitative information	Descriptive	Fieldwork, ethnographical-inspired methods (e.g. document analysis, observations, focus groups, interviews, etc.)
Analytical (psychological)	Present	Quantitative information, on the safety climate	Descriptive	Safety climate scales, questionnaires
Pragmatic (experience based)	Future	Safety culture maturity (level)	Normative, prescriptive	Behaviourally Anchored Rating Scales (BARS)

Table 2. Overview of three approaches for assessing safety culture

ACADEMIC ASSESSMENT APPROACH

This approach focuses on things from the past, e.g. accident statistics, policy statements (Guldenmund, 2010). It is a descriptive approach that seeks to describe and understand safety culture rather than judging it, to promote change and improvement (Antonsen, 2009). For this reason, specific data collection methods based on anthropological and sociological research are used. This implies that data and information are gathered through 'fieldwork' in the whole organisation, using techniques such as:

- **observation** to generate an overview of typical artefacts of an organisation;
- **document analysis** to reveal artefacts or values espoused in the organisation;
- **regular personal interviews** with company management, safety experts or workers in sensitive areas to learn more about management and safety practice in the company and provide a deeper insight into complex contexts;
- **open discussions in groups (focus group interviews, focus groups)** to discuss findings and observations and help to gather a more qualitative insight into an organisation.

The above techniques/instruments should preferably be applied by a person from outside the organisation, who has a rather neutral point of view and who should have the expertise needed in conducting the assessment.

Brooks (2008) also describes the use of ethnographic research methods in safety in a study of organisational safety culture in a SME. He underlines the fact that such field studies can be very time consuming, which might encourage people to use quicker methods such as safety climate questionnaires. However, the deepest layers of an organisation's culture can only be uncovered and understood by applying a more academic approach.

ANALYTICAL ASSESSMENT APPROACH

This is the most popular and predominant approach in safety culture assessment and focuses specifically on organisational safety climate. Workers are asked to complete a specific, standardised questionnaire, i.e. giving their perception/opinion (or the perception that is shared among co-workers) on certain safety related dimensions. These survey questionnaires can be simple (one page) or more exhaustive (up to 100 and more items), using tick boxes or Likert scales for responses. Safety climate is typically assessed using standardised questionnaires[1] with numerical results to allow for comparisons to be made with past results and/or with results from other working groups or units. The measured safety climate appears to be a strong predictor for safety performance, which makes it a very appealing construct for researchers,

[1] See Appendix A for a non-exhaustive list of safety climate questionnaires and toolkits. Please note that some of the instruments mentioned in the Appendix A table (e.g. Loughborough Safety Climate Assessment Toolkit (LSCAT)) are better described as toolboxes or toolkits, providing several instruments for the assessment of safety culture, of which one is a safety climate questionnaire. Some of the other instruments in that table (e.g., HSL Safety climate Tool (SCT)) are commercial products and thus not cost free. Other instruments (e.g. Swiss Safety Awareness Questionnaire (SAQ)) are only mentioned in scientific publications, making it unclear whether these questionnaires are freely available and from where they can be obtained.

managers and OSH professionals (e.g. Clarke, 2006; Nahrgang et al., 2008; Christian et al., 2009; Kuenzi and Schminke, 2009). A review by Seo et al. (2004), in which 16 safety climate questionnaires were examined, identified the following five core constructs/dimensions of the safety climate concept:

- management commitment to safety
- supervisor safety support
- co-worker safety support
- employee participation in safety-related decision making and activities
- competence level of employees with regard to safety

PRAGMATIC ASSESSMENT APPROACH

This approach focuses on assessing an organisation's current state of *maturity* regarding safety culture, giving it a ranking on a predefined 'cultural maturity ladder' that shows different levels or stages of cultural maturity. The aim is to define and explore what should be done to develop the organisation's safety culture to a higher level of maturity. This approach is future-oriented and prescriptive as opposed to descriptive. The table below gives three examples of existing methods/tools that focus specifically on such a pragmatic, normative approach towards safety culture.

Title/Name	Developer/Author	Country of origin	Sector of origin	Characteristics
Hearts & Minds Programme/ Toolkit	Energy Institute – Shell (developed by Leiden and Manchester Universities) (Parker, Lawrie, Hudson)	UK	Offshore oil and gas	C (some parts are free), T
Safety Culture Maturity Model (SCMM)	The Keil Centre (Lardner, 2004; Lardner et al., 2001 ; Fleming, 2000)	UK	Offshore oil and gas	C
Safety Culture Indicator Scale Measurement System (SCISMS)	Federal Aviation Administration (FAA) (developed by University of Illinois) (Von Thaden, 2008)	US	Commercial aviation	M

Table 3. Examples of existing methods/tools for a pragmatic assessment of safety culture

The three assessment strategies each provide a different way of looking at and assessing an organisation's safety culture (using specific instruments). They should be regarded as complementary (Guldenmund, 2010). A questionnaire survey can, for example, result in some numerical outcomes, which can then be further checked and explored by means of interviews with staff (i.e. qualitative, academic, participatory approach) (Guldenmund, 2010).

Many authors put emphasis on the fact that no one single approach or technique is suitable for understanding and exploring safety culture. Rather, a multi-method and holistic approach should be taken towards safety culture (e.g. Antonsen, 2009; Grote, 2008; Haukelid, 2008; Guldenmund, 2007). The need for a triangulation approach is also justified by the fact that several safety culture assessment toolboxes exist, each containing and providing different tools and instruments.

Existing methods/tools

Score Your Safety Culture Checklist

The 'Checklist for Assessing Institutional Resilience' (also known as the 'Score Your Safety Culture Checklist') was developed by James Reason and John Wreathall and published in the January-February 2001 edition of Flight Safety Australia[2]. The tool is comprised of 20 statements describing various aspects of an organisation's safety culture, e.g., the way safety is regarded by senior management. Respondents are required to read the statements and rate each as either 'Yes', 'No' or 'Don't Know'. After completion, a single digit score is generated that summarises the state of an organisation's safety culture/ institutional resilience. Scores are interpreted according to the following criteria:

- 16-20: So healthy as to be barely credible!
- 11-15: You're in good shape, but don't forget to be uneasy.
- 6-10: Not at all bad, but there is still a long way to go.
- 1-5: The organisation is very vulnerable.
- 0: Jurassic Park!

The advantages of this tool include its ease of use, particularly for first time and inexperienced users thanks to its relatively uncomplicated structure and scoring system. On the other hand, there is currently a lack of benchmarking data and limited potential for collecting it while the language used in the items is considered complex in some parts.

Hearts & Minds programme – Understanding Your Culture Checklist

The 'Hearts & Minds' Safety Programme/Toolkit was developed by Shell Exploration & Production, based on 20 years of university research, and is being applied in both Shell and non-Shell companies around the world. The toolkit is intended to help organisations achieve a world-class health, safety and environment (HSE) performance by more than mechanically applying a management system. Indeed, it requires the involvement of all in the organisation, from top to bottom, in a change process described by the five stages of the 'HSE Culture Step Ladder':

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[2] This publication is free to download at: **https://www.casa.gov.au/sites/g/files/net351/f/_assets/main/fsa/2001/jan/28-41.pdf these questionnaires are freely available and from where they can be obtained**.

- Pathological: "*Who cares as long as we're not caught*"
- Reactive: "*Safety is important, we do a lot every time we have an accident*"
- Calculative: "*We have systems in place to manage all hazards*"
- Proactive: "*Safety leadership and values drive continuous improvement*"
- Generative (High Reliability Organisations): "HSE is how we do business round here"

One of the practical tools in the Hearts & Minds Toolkit is the 'Understanding Your Culture Checklist', which is available on the internet and can be used without the need for consultants. This tool consists of 18 dimensions, based on eight themes:

- Leadership and commitment
- Policy and strategic issues
- Hazards and effect management
- Organisations/responsibilities/resources/standards/documents
- Planning and procedures
- Implementation and monitoring
- Audit
- Review

Safety Climate Assessment Toolkit and User Guide (LSCAT)

The Loughborough Safety Climate Assessment Toolkit is a 'free at the point of use' tool designed to help organisations measure safety culture using a combination of quantitative and qualitative methodologies. Initially developed for use in the offshore oil and gas industry, it has been successfully 'transported' for use in the UK health sector. The toolkit employs the principle of triangulation, combining data from a survey questionnaire with the following additional sources of data:

- In-depth, informal discussion with individuals
- Focus groups
- Document analysis
- Examination of records and databases

The triangulation approach allows users to exploit a multi-method approach to data collection that brings greater robustness to the assessment of safety climate. Using a multi-method approach to assessing safety culture allows different aspects of safety culture to be assessed, as outlined in Table 4 below.

Safety culture viewed as:	Assessment methods
Objective organisational attribute	Observation, audit
Perceptions of the organisation	Interviews, questionnaires, etc.
Individual perceptions	Questionnaires, observation, etc.

Table 4. Assessment methods for different aspects of safety culture

The survey questionnaire comprises 47 items that examine the following organisational factors:

- Organisational content
- Social environment
- Individual appreciation
- Work environment
- Organisation specific factors

Given its relative ease of deployment, the survey questionnaire is potentially the most useful component of the toolkit for assessing OSH. Potential users may also be attracted to the toolkit because of the benchmarking data available from Loughborough University.

Safety Health of Maintenance Engineering (SHoMe) Tool

The Safety Health of Maintenance Engineering (SHoMe) tool was developed on behalf of the UK Civil Aviation Authority by Health and Safety Engineering Consultants Limited to identify indicators of 'safety health' in aviation engineering maintenance organisations. The tool is relevant to both larger and smaller organisations. In this context, 'safety health' is conceived as a property of the organisation and does not relate to the health and safety behaviours of individual employees. The SHoMe tool consists of three questionnaires, each one aimed at one of the worker groups listed in Table 5 on the next page.

Worker group	Generic questionnaire	Job difficulty questionnaire	Organisational questionnaire
Technical certifying staff	Version 1	Standard	Standard
Technical and non-certifying staff	Version 2	Standard	Standard
Management and technical support staff	Version 3	Not applicable	Not applicable

Table 5. Questionnaires aimed at different worker groups

The 'Generic questionnaire' consists of 83 questions that are answered using a five point Likert scale where 1 = Strongly disagree and 5 = Strongly agree. The 'Job difficulty questionnaire' consists of 32 statements requiring an initial 'Yes' or 'No' response to indicate if a task forms part of the respondent's job. If the response is 'Yes', the respondent is asked to indicate the level of difficulty experienced from the following three options: (1) 'No problems', (2) 'Some problems' or (3) 'Major problems'. The 'Organisational questionnaire' is comprised of 92 statement about various circumstances that may arise in the respondent's organisation, e.g., 'Noisy working environments' or 'The general space in and around the aircraft'. Respondents are required to indicate if any of these statements have:

- caused them, or a colleague to make a mistake or,
- caused them or a colleague confusion or uncertainty over a job or,
- otherwise affected airworthiness.

Results are presented in the form of scores on 19 separate human factors or root issues that may potentially impact on safe and reliable maintenance performance, including provision of resources, training, fatigue, complacency, job pressure. A key limitation of SHoMe is its focus on the aviation maintenance industry. However, this does not rule out further development in order to make the Tool relevant to other industries/sectors.

Nordic Occupational Safety Climate Questionnaire (NOSACQ-50)

The Nordic Occupational Safety Climate Questionnaire (NOSACQ-50) was developed by a team of Nordic occupational safety researchers from respectively Denmark (NRCWE), Finland (FIOH), Iceland (Administration for

Occupational Safety and Health), Norway (University of Stavanger) and Sweden (University of Gothenburg). The tool is based on organisational and safety climate theory, psychological theory, previous empirical research and empirical results acquired through international studies and a continuous development process.

Figure 1. NOSACQ-50 Safety climate dimensions (scale 1-4)

NOSACQ-50 has been pilot tested in various industries in all the Nordic countries and is available in numerous languages. It consists of 50 items across seven dimensions, i.e. shared perceptions of:

- management safety priority, commitment and competence
- management safety empowerment
- management safety justice
- workers' safety commitment
- workers' safety priority and risk non-acceptance
- safety communication, learning and trust in co-workers' safety competence
- workers' trust in the efficacy of safety systems

NOSACQ-50 can be used in full or be tailored for specific studies using individual dimensions.

IAEA Guidance for Use in the Enhancement of Safety Culture

The International Atomic Energy Agency's 'Guidance for Use in the Enhancement of Safety Culture' (IAEA, 2002) was originally developed for the organisation's own safety culture services for the use in training sessions. Its development is based on the experiences gathered by the Safety Culture Service when assisting the national stakeholders in developing and improving the safety culture in nuclear installations. The guidance explains in a very comprehensible and comprehensive way the concepts of culture as a general term, safety culture and safety climate, based on the fundamental work of Edgar Schein (2004). Based on these concepts, the guidance considers safety culture in organisations as always bi-dimensional and affecting structural aspects of the whole organisation as well as attitudes, practices and commitment of the individual. The guidance transposes the culture explanations into a model of 'three development stages of safety culture':

- in the first stage, safety is only based on rules and regulations. A **rule-based safety culture** is described as short term oriented, where management enforces rules and fines workers for non-fulfilment;
- in the second, more advanced stage, safety has become an organisational goal. An **organisational-based safety culture** operates with short term goals (or numerical targets) and reward systems for workers who fulfil such goals;
- finally, in the third stage, safety awareness has been mainstreamed in the organisation and the awareness that safety can always be improved has become a mindset. An **awareness or improvement-based safety culture** rewards long term values for example the anticipation of consequences and can be characterised by communication and collaboration between management and workers.

On this foundation of introducing a common understanding of the basic terms, the guidance builds up a practical approach which is focused on employee surveys as the method of choice for assessing safety culture in the company. For the stage analysis of safety culture a matrix for analysis is introduced: five characteristics are attributed to each stage of safety culture (rule – goal – improvement) and the expert can decide which of them best describes the situation in the organisation (see Appendix for Matrix). The guidance does not offer 'ready to apply' tools for the user, but defines categories and characteristics which can be attributed to the three stages concept of safety culture. It also explains how leadership and managerial approaches can foster safety culture in the company and how to use a learning culture to gain sustainability in improving the safety performance. In this context, the guidance presents the 'simple model of transformational change', which consists of a three-stage process for changing organisational safety culture:

1. unfreezing the status quo / creating the motivation to change;
2. mainstreaming / learning new concepts and new meanings for old concepts;
3. internalising new concepts and meanings.

Summary

The concept of 'safety culture' has drawn much attention from researchers across a variety of disciplines since the emergence of the term in the late 1980s following the Chernobyl nuclear reactor disaster. This report set out to present a review of the academic and applied literature on existing tools and methods for assessing safety culture across organisations. It aims to contribute to raising awareness and steering behaviours to help sustain Sodexo's commitment towards safer environments for its people, clients and consumers.

The report began by addressing the apparent confusion from the literature around the use of the terms 'safety climate' and 'safety culture' by concisely outlining the difference between climate and culture. The following section looked at the impact of safety climate and culture measures on safety performance with examples of Near Miss reporting programs as effective safety culture tools. A detailed analysis of the three approaches for assessing culture (academic, analytical and pragmatic) provided information on the period in the organisation's time it focuses on (past, present or future), the kind of information it aims to gather (qualitative versus quantitative information), its specific research characteristics (descriptive versus normative) and the related assessment strategy and methods (instruments). The last section provided a description of a selection of existing methods and tools for assessing safety in various types of organisations.

In summary, many safety researchers put the emphasis on the complementarity of the three approaches described in Chapter 3 as they each provide a different way of looking at and assessing an organisation's safety culture. They therefore recommend adopting a multi-method and holistic approach towards safety culture.

APPENDIX

APPENDIX A: NON-EXHAUSTIVE LIST OF SAFETY CLIMATE QUESTIONNAIRES AND TOOLKITS

Title/Name (LSCAT)	Developer/Author	Country of origin	Sector of origin	Characteristics
Loughborough Safety Climate Assessment Toolkit (LSCAT)	Loughborough University, Health & Safety Executive (HSE), and a number of offshore organisations (Cox & Cheyne, 2000)	UK	Offshore oil and gas installations (but adaptable for broader use)	T
Safety Health of Maintenance Engineering (ShoMe) Tool	UK civil Aviation Authority (CAA) (Developed by Health and Safety Engineering Consultants (HSEC) Ltd.)	UK	Aviation maintenance	(T)
Safety Culture Toolbox	Eurocontrol (developed with the help of Aberdeen University)	EU	Air Navigation Services Providers (ANSP)	T, M
HRMI Safety Culture Inspection Toolkit	Her Majesty's Railway Inspectorate (HMRI) (developed by Human Engineering Ltd. (HSE, 2005a/b))	UK	Railway	T, M, R
RSSB Safety Culture Improvement Toolkit	Rail Safety and Standards Board (RSSB)	UK	Railway	T, M
Multilevel Safety Climate (MSC) Scale (Organisational and Group-level Safety Climate)	Zohar (1980), Zohar and Luria (2005)	Israel	Manufacturing	R
Offshore Safety Questionnaire (OSQ) Offshore Safety Climate Questionnaire (OSQ99)	Robert Gordon University / Aberdeen University (Mearns et al., 1998, 2003)	UK	Offshore oil and gas installations	C?, R
Commercial Aviation Safety survey (CASS)	Federal Aviation Administration (FAA)	US	Commercial aviation, aviation maintenance	M

Norwegian Offshore Risk and Safety Climate Inventory (NORSCI)	(Developed by University of Illinois)	Norway	Offshore	C
Nordic Occupational Safety Climate Questionnaire (NOSACQ)	(Wiegmann, 2003, 2004)	Nordic countries	Construction (now in high-risk industries)	
HSL Safety Climate Tool	International Research Institute of Stavanger (IRIS)	**UK**		C
Safety Awareness Questionnaire (SAQ) (Arbeitstätigkeit und Umgang mit Sicherheit)	(Tharaldsen et al., 2008)		Petrochemical (now in all high-risk industries)	C?, R
Organisational and Safety Climate Inventory	Consortium of Scandinavian organisations (Kines et al., in press)	Portugal		R

APPENDIX B: IAEA GUIDANCE FOR USE IN THE ENHANCEMENT OF SAFETY CULTURE: MATRIX WITH THE THREE STAGES OF SAFETY CULTURE AND FIVE CHARACTERISTICS

	Stage 1 – Rule based	Stage 2 – Goal based	Stage 3 – Improvement based
View of mistakes	People are blamed for non-compliance with rules. Organisations react defensively to criticism rather than listening and learning.	Mistakes result in more controls and training.	Mistakes are an opportunity to understand and improve.
Time focus	Short-term is all important.	People are rewarded for exceeding goals, regardless of long term consequences. Numerical targets are specified for safety.	Short term performance is analysed to improve longer team performance. Longer term focus with anticipation of consequences.
Roles of management	Managers enforce rules and pressure employees for results.	Managers use techniques such as management by objectives.	Managers coach people to improve performance. Managers support collaborative work.
Conflict handling	Conflicts are rarely resolved and groups continue to compete with one another.	Conflict is discouraged in the name of teamwork.	Conflict is resolved by means of mutually beneficial solutions.
View of people	People are components in a system.	Growing awareness that people's attitudes influence their performance.	People are respected and valued for their contribution.

APPENDIX C: OVERVIEW TABLE OF SELECTED TOOLS

Title of tool (kit)	Developed/owner (author)	Country (origin)	Sector (origin)
Score Your Safety Culture Checklist	Transport Canada (James Reason)	Canada	Transport (and healthcare)
Hearts & Minds programme – Understanding Your Culture Checklist	Energy Institute (Shell in collaboration with Leiden and Manchester Universities)	UK - Netherlands	Offshore
Safety Climate Assessment Toolkit and User Guide (LSCAT)	Loughborough University, Health & Safety Executive (HSE), and a number of offshore organisations	UK	Offshore
Safety Health of Maintenance Engineering (SHoMe) Tool	UK Civil Aviation Authority (developed by Health and Safety Engineering Consultants (HSEC))	UK	Aviation maintenance
Nordic Occupational Safety Climate Questionnaire (NOSACQ)	Consortium of some Scandinavian institutes	Scandinavia	Construction
IAEA Guidance for Use in the Enhancement of Safety Culture	International Atomic Energy Agency (IAEA)	International	Nuclear

Language(s)	Pragmatic	Analytic	Academic
English, French, Dutch	Simple Checklist		
Arabic, Chinese, Dutch, English, French, German, Italian, Korean, Norwegian, Portuguese, Russian, Spanish	Safety culture maturity ladder with 5 stages – assessment of 8 factors (18 questions) in workshop		
English		Employee attitude survey	Face-to-face interviews and focus discussion groups; structured observation
English			Questionnaires (with software and guide)
Czech, Belgium (Dutch and French), Danish, English, Finnish, German, Icelandic, Italian, Norwegian, Persian, Slovene, Spanish and Swedish		Safety climate questionnaire (50 questions)	
English	3 stages of development of safety culture – assessment of 5 factors by individuals or group	Contains information	Contains information

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