

SAFETY CULTURE AND ITS MEASUREMENT METHODS IN THE FIRE SERVICE

Małgorzata Zdzisława Wiśniewska

University of Gdańsk, Faculty of Management

Correspondence: malgorzata.wisniewska@ug.edu.pl

Abstract

The article considers safety culture and discusses its role with regard to risks associated with the fire service. Attention was drawn to the gap in research on this issue, especially in Poland. The following research problem was formulated: what is and what dimensions does a safety culture conducive to fire services consist of? The cognitive objective was to understand and present the essence of safety culture and its importance, and the utilitarian objective was to identify possible tools for measuring safety culture in fire services. A proprietary definition of safety culture in the fire service has been proposed. An analysis and comparison of different tools for assessing safety culture in the sector were carried out. Attention was drawn to the need to be systematic in conducting this assessment and the necessity of providing adequate training and experiences of other sectors.

Keywords: safety culture, dimensions, literature review, assessment questionnaire, fire service

1. Introduction

Security is a non-negotiable value. It is a fundamental prerequisite for the functioning of every human being and society. It is included in the catalogue of fundamental rights, both internationally and nationally, as evidenced by existing conventions and relevant provisions in the constitutions of individual countries. From the workplace point of view, it is most often regulated by relevant legislation, which guarantees decent and safe working conditions for employees. Workplace safety is essential in high-risk or high-reliability organizations (Glesner et al., 2022). They usually operate in a complex task environment and do their utmost to avoid major accidents and disasters caused by operational errors (Haslam et al., 2022). Becoming such an organization requires an appropriate organizational culture (OC) focused on anticipating adverse events that could lead to a dangerous situation, posing

DOI: [10.5604/01.3001.0053.7157](https://doi.org/10.5604/01.3001.0053.7157)

Received: 03.04.2023 Revised: 11.06.2023 Accepted: 11.06.2023

This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

a hazard to health, life and continuity of operations, to prevent them, e.g., through knowledge sharing, careful, open and fair analysis of the causes and their sources. In this type of organization, it is necessary to react immediately and to learn from past experiences to improve operations and processes. An organizational culture requiring such behaviour and attitudes is called a safety culture (SC). Its importance was recognised in many industrial and service sectors. Its absence was a cause of many tragic events, not least the Chernobyl nuclear reactor disaster in 1986 (Engen et al., 2023). SC, as one of the critical essential subcultures of the overall organizational culture, is a measurable phenomenon, and this makes it possible to assess it on an ongoing basis, monitor it, react early enough to correct it, and then improve it for the benefit of the organization as a whole. It is also necessary to recognise and realize its importance from the perspective of the individual employee and their well-being, especially as the safety culture issue is already relatively well recognised in many application areas. Unfortunately, the described phenomenon reaches the fire service area slowly and modestly. This is evidenced by the relatively poor results of the review of foreign and domestic literature included in the scientific databases available in the author's home repository of the Main Library of the home university (BazEkon, Wiley, Taylor & Francis, Science Direct, Web of Science, Springer, Scopus, Ebscohost, Emerald, World Scientific, Wiley, Nature, SAGE, Science). After entering phrases such as: 'safety culture' + 'firefighting'; 'safety culture' + 'fire service'; 'safety culture' + 'firefighters', eight records were obtained, in the form of foreign, English-language articles (McDonald and Shadow, 2003; Pessemier and England, 2012; Pessemier, 2013; Loveless and Hernandez, 2015; Maglio et al., 2016; Taylor et al., 2019; Davis et al., 2020; Özay et al., 2021). As far as Polish literature is concerned, by introducing phrases such as: 'kultura bezpieczeństwa' + 'straż pożarna'; 'kultura bezpieczeństwa' + 'strażak', 'kultura bezpieczeństwa' + 'służba pożarnicza', only one study was identified, dedicated to rescue culture in general (Gromek, 2019). Given the importance of the issue described in view of the hazards of the fire service and the perceived research gap, particularly in Poland, the following research problem was formulated: What is safety culture and what are the dimensions of a safety culture conducive to fire services? Addressing the problem in this way was determinant for the development of the following cognitive objective of the article: To understand and present the essence of safety culture, and its importance. The following utilitarian goal was also formulated: To identify possible tools for measuring safety culture in fire services.

2. Methodology

A literature review and an analysis method were adopted to achieve the research objectives. First and foremost, the literature identified by the assessment of the databases was used. Other scientific literature on the phenomenon and problem described was also taken into consideration. The study also used the method of

factual analysis contained in various source materials and legal acts, the process of synthesis (used to combine the characteristics of the object under study) and abstraction (allowing the essential features to be distinguished and separated from unimportant parts) (Hejduk, 2021). The method of conceptual work and logical reasoning was also used.

3. Results and discussion

3.1. Safety culture and reflections on its definition in the fire service area

SC should be considered in the broader context of organisational culture, seen as a kind of adhesive in the organisation that translates into staff behaviour, and attitudes (Wiśniewska, 2021). Organisational culture is a 'living' component, the 'soul' of the organisation (Kamińska and Janczewska, 2016). OC also determines whether employees are guided solely by compliance with various formal conditions or whether employee participation develops in the direction of creativity, responsibility and decisiveness (Czubasiewicz and Grajewski, 2018). As Gert G. Hofstede (2000) argues, OC is 'the collective programming of the human mind by which one group of people distinguishes itself from another group'. According to Edgar H. Schein (1986) OC is defined as "a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration". Polish researcher Malgorzata Czerska (2003) argues that OC is a philosophy of how a company is organised, including the division of labour, configuration, organisational ties, level of decentralization, formalization and course of procedures. The researchers add that OC is crucial in public organisations. For example, as Agata Bera (2020) demonstrates, OC enables these institutions to implement organisational change, survive legislative changes, adapt to new priorities, meet strategic objectives, improve organisational performance, enhance efficiency and effectiveness and define the quality of functioning and delivery. The same author points out that, despite its obvious importance, OC is still poorly recognised in public sector organisations, including, in particular, the fire service. Bera argues that in these organisations, due to their specificity and objectives aimed at ensuring and safeguarding the public good, a bureaucratic culture prevails, characterized by internal concentration, an authoritarian approach to management, and, in addition, a high level of control and compliance with orders. As far as the organisational culture in the fire service is concerned, it is also corporate culture based on a solid work ethic and teamwork ethic. In the culture of such organisations, a visible hero acts with a sense of urgency and honour (Bera, 2020). The OC is not a monolith, it has different and specific micro-cultures with specific and often shared characteristics that influence the overall culture. They are its components and, just like interconnected vessels, serve the general OC. Depending on their specificity, they translate into different values and shape

certain organisational attitudes (Wiśniewska, 2021). If these values are employee safety and health protection, an SC culture is essential in the organisation. The SC phenomenon has already been widely described in scientific literature. An extensive catalogue of works, including current positions, e.g. in the fields of energy, building/construction, aerospace marine/maritime, medical, and food (Wiśniewska, 2021; Low and Daba, 2022; Shirali et al., 2022; Moosa and Oriet, 2022; Altinpinar and Başar, 2022; Boutros and Roberts, 2023) confirms the prominence and importance of this issue. The concept of SC first appeared in 1988, in a report by a group of experts from the International Atomic Energy Agency, who explained the causes of the Chernobyl disaster (Choudhry et al., 2007). Subsequent tragic events, such as, for example, the London underground station fire (1987), sinking of the passenger ferry Herald of Free Enterprise (1987) and the accident on the Piper Alpha offshore oil platform in the North Sea (1988) have led to this phenomenon, receiving more and more attention and concern (Engen et al., 2023). The ‘fathers’ of safety culture are considered to be, among others, Nick F. Pidgeon and Frank W. Guldenmund (Obolowicz, 2014). For example, Pidgeon (1991) suggests a definition of SC as ‘(a) a system of meanings by which individuals, groups or communities understand hazard and risk and (b) a system of principles of behaviour in hazardous situations’. According to Polish researcher, Marian Cieślarczyk (2010), SC is ‘a pattern of basic assumptions, values, norms, rules, symbols, and beliefs that influence the way we perceive challenges, opportunities, and (or) threats’. The author adds, that SC is the way we experience security and thinking about it, and the associated mode of behaviour. Over the years, many other studies have been dedicated to reviewing the various definitions and opinions on SC (e.g. Wiegmann et al., 2007; Gembalska-Kwiecień, 2012; Siuta et al., 2022). It should be added that in some of the identified papers on SC in the fire service, as well as in rescue service, it is challenging to find a clear position on what SC is. The definitions and opinions cited in the articles are included in Table 1.

Table 1. Definitions of SC included in the collection of scientific articles analysed

Definition/opinion	Paper
‘The shared perceptions of individuals regarding critical behaviours, values and beliefs, and management control systems associated with safety’.	(Pessemier et al., 2012)
‘A construct that involves shared values among groups of organisational members. Establishing a safety culture involves developing a proper management and supervisory system for dealing with safety issues’.	(Pessemier, 2013)
‘[Safety] culture is a combination of artefacts (dress codes e.g., turnout gear, equipment e.g., Halligan, stories e.g., “eating smoke”), shared espoused values (leader-driven e.g., always wear your seatbelt), fundamental assumptions (it’s a dangerous job, you’re going to get hurt eventually, we want to be first in)’.	(Taylor et al., 2019)

Definition/opinion	Paper
‘A pattern of basic assumptions, values, norms, rules, symbols and beliefs characteristic of rescue actors and influencing the way they perceive the challenges, opportunities and threats present in their internal environments and surroundings, associated with ways of thinking about rescue and appropriate operational activities aimed at protecting people, as well as property and the environment to the extent necessary for their survival in biological and livelihood-cultural dimensions, under the circumstances or about circumstances of responding to threats in an immediate (immediate, urgent) manner’.	(Gromek, 2019)
‘Safety culture is a sub-dimension of organisational culture and reflects the behaviours and attitudes of the organisation’s members about the maintenance of health and safety performance. The safety culture structure of an organisation is examined as a pyramid consisting of four-step fundamental security values, organizational factors, attitudes, and ideas, as well as safe behaviours’.	(Özay et al., 2021)

The definitions cited above all draw attention to apparent analogies with the work of Edgar Schein (1986), in that they feature elements and terms such as ‘shared’, ‘artefacts’, ‘values’, ‘norms’, ‘beliefs’, ‘behaviour’, ‘assumptions’. However, none of these definitions or opinions, except the two (Taylor et al., 2019; Gromek, 2019) are sector-specific.

It should be emphasized that an essential element of any culture, including SC, is climate, which refers to the subjective feelings of employees or other stakeholders about the atmosphere, such as the safety atmosphere, in the workplace. It shapes employee motivation, influences productivity and reflects the level of satisfaction as well as the successes achieved (Wiśniewska, 2021). As Jennifer A. Taylor et al. (2019) point out, a safety climate demonstrates a shared perception of safety policies, procedures and practices. It should be added that climate is the most visible element of culture, encompassing its various artefacts. Among these are linguistic artefacts, i.e., the manner, form and language of communication between firefighters during an action; behavioural artefacts, i.e. typical behaviour following established procedures, e.g., during a firefighting operation, and physical artefacts, which can include the firefighter’s characteristic clothing, equipment, vehicle markings, etc. The climate is also sometimes called the ‘personality, the ‘spirit of an organisation,’ or the ‘spiritual dimension of its functioning.’ Researchers also use weather metaphors, stating that the climate is a kind of ‘barometer’ of the organisation (Nawrat, 2014). The right (good) climate contributes to staff morale and well-being, enables an organisation’s staff to cope with various challenges, and unleashes the innovative and creative potential of an organisation (Berberoglu, 2018). An inappropriate (bad) climate is characterized, among other things, by distrust, suspicion, unfair appraisal, turning a blind eye to

mistakes, failure to recognise and reward employees, jealousy, intrigue, constant tension and conflictual social relations or bitterness (Wударzewski, 2016). Indeed, this type of climate is not conducive to teamwork, especially in case of in complex, life- and health-threatening conditions.

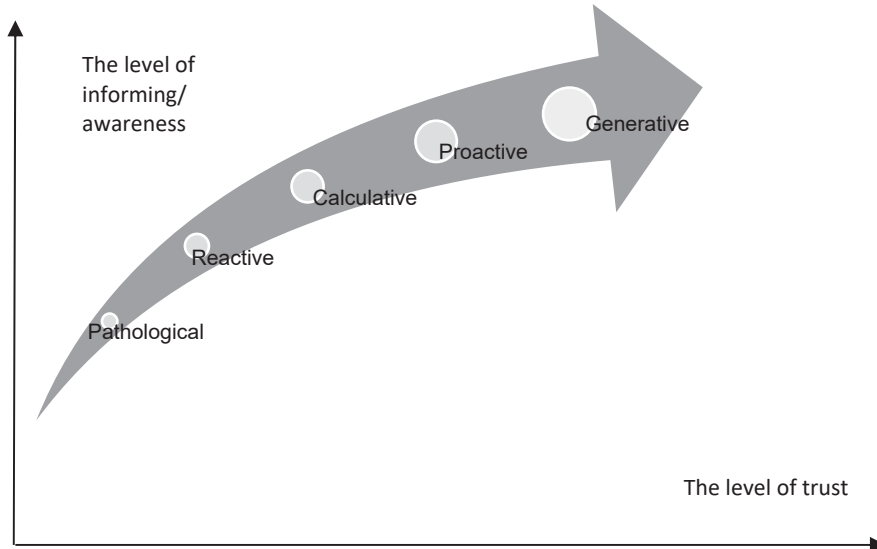


Figure 1. Maturity levels of safety culture

Source: own study based on (Hudson, 2003)

Given the climate created within SC, it is interesting to note the typology of SC proposed by Peter Hudson, who distinguishes (see Figure 1) (Hudson, 2003):

- Pathological culture: Employees are solely responsible for workplace safety problems. The only thing that matters in the organisation is task completion and work efficiency. No importance is attached to mistakes at work. There is a deficiency or insufficiency of safety information and a low level of trust in accepted practices and management.
- Reactive culture: The interest in safety issues is action-based. The importance of safety is only noticed when dangerous incidents have occurred. Management pays attention to maintaining safety procedures and practices for a short period. A return to bad habits and behaviours, such as ignoring existing rules by employees and management, can be observed.
- Calculative culture: A systemic approach to safety management is in place (e.g. granted certification of ISO 45001:2018 - Occupational Health and Safety Management System). Leadership is committed, and employees follow the requirements of the standard and procedures. There is an awareness of consequences of failure to comply with safety rules.
- Proactive culture: There is a significant increase in trust towards accepted practices. Employees understand and follow safety rules. They have

support and understanding from management, which is more vital than in a calculating culture.

- Generative culture: There is a very high and genuine awareness of workplace risks and safety among employees, and safety is managed in an active and participatory manner. Safety is a priority, and all employees have constant access to the necessary information on safety rules and procedures. There is a high level of trust in the superiors and existing operating systems.

The above levels confirm the opinion expressed by Cieślarczyk emphasising that SC requires continuous improvement. This is a long-term process that begins in the family environment and continues at all educational levels, i.e. in kindergarten, school and university, as well as in institutions and workplaces (Cieślarczyk, 2015).

As a result, given the number of existing works on SC in the fire service, there is undoubtedly a sense of malaise, especially given the dynamic output in other sectors. It is also disappointing that only some articles identified an attempt to define SC or cite other definitions proposed by different researchers. It seems fitting that any work on specific issues or approaches, including such important ones as safety including such important ones as safety, should be clearly explained and defined. Indeed, making a reflection on a given phenomenon should allow one to fully understand its essence. As pointed out by Philip Podsakoff et al. (2016) clear conceptual definitions are essential for scientific progress. This fact confirms the need of proposing an adequate description of SC in the field of firefighting.

Taking into account the tasks of the fire brigade included in the Act on Fire Protection of 24 August 1991 (2022, 2023) as well as the general understanding of organisational culture, it can be assumed that safety culture in the fire service is a set of assumptions, norms and values, as well as a climate conducive to the fact that the crew, directly and indirectly involved in fighting fires, natural disasters and other local threats, is constantly focused on minimising the potential impairment to their health and life that may result from the various risks associated with those activities.

It is undeniable that the shaping of SC in the field of fire service activity is related to numerous conditions stemming from the nature of the action, the need to apply safe work practices, the development and effectiveness of the safety programme, a reduction in the number of accidents, near misses and other events that threaten safety (Tetzlaff et al., 2021). It is nevertheless primarily associated with unique risk factors. This is confirmed, e.g., by Michał Pałęga and Dariusz Rydz (2018), in a work devoted to the identification of hazards and an analysis of the accident rate at the firefighter's workplace. The profession of a firefighter is characterized by separate exposure to various types of risk factors, such as collapsing structures, falling debris, air pollution of different types (e.g. toxic clouds of dust and gases), cold or hot microclimate, atmosphere poor in oxygen, excessive noise, physical stress, etc. The psychological strain resulting from traumatic events is no small factor. This is related to the firefighter's awareness of the existence of a threat or loss of life and health to themselves and other people. Another very important issue involves factors such as social expectations and the prestige associated with the

firefighting profession. The accident rate in this profession is high, as evidenced by official statistics published annually by Komenda Główna Państwowej Straży Pożarnej (National Headquarters of the State Fire Service) (2021). This is important because, according to research, the introduction of SC in the workplace, as well as its favourable climate, contributes to the enhancing safety management, productivity, employees' awareness of safety rules, and above all, reduction of accidents (Ismail et al., 2021).

3.2. Dimensions of safety culture and examples of tools to measure it

In the works devoted to SC in general, one can notice the authors' reference to the dimensions of this culture, also known as attributes. A 'dimension' can be understood as the essential element of a culture, without which it would not exist. In other words, the dimensions of safety culture can be considered as a set of conditions that allow the practical implementation, maintenance and development of safety culture in an organisation. Knowledge of the dimensions of SC would enable the development of tools to measure it. Table 2 presents the results of an analysis of works in which such tools, as well as the dimensions of safety culture, have been given.

Table 2. Dimensions and measurement of SC included in the collection of scientific articles analysed

Paper	Dimensions	Measuring method
(McDonald and Shadow, 2003)	No indication of dimensions; 40 statements relating to safety culture	The Crewmember Attitude Questionnaire (CAQ) was used; 5-point Likert scale: 1 – strongly disagree; 2 – disagree; 3 – both yes and no; 4 – agree; 5 – strongly agree.
	Additional explanation: 756 US firefighters involved in fighting fires caused by natural causes participated in the study	
(Pessemier and England, 2012)	Tool I: 95 statements subordinated to dimensions and sub-dimensions: 1) Policy; 2) Organising, including: structure; collaboration; communication; competencies. 3) Planning and implementation, including: performance standards; risk assessment and control; risk identification; planning. 4) Performance measurement and review, including: proactive monitoring; reactive monitoring; remedial action; performance review.	Three different measurement tools with different numbers of statements were used; 5-point Likert scale: 1 – strongly disagree; 2 – disagree; 3 – both yes and no; 4 – agree; 5 – strongly agree

Paper	Dimensions	Measuring method
	<p>Tool II: 85 statements mapped to dimensions and sub-dimensions: 1) Fitness and medical area, including: fitness programme; medical assessment. 2) Structural firefighting, including: command and control; communications; accountability; operational risk management. 3) Vehicle safety, including: seatbelt use; response policies and procedures; training; supervision. 4) Training, including: instructors; planning; facilities; safety requirements.</p> <p>Tool III: 43 statements subordinated to dimensions and sub-dimensions: 1) Organisational context, including management commitment; communication; safety priorities. 2) Social environment, including supportive environment; engagement. 3) Individual recognition, including personal priorities and need for safety; personal recognition of risk. 4) Work environment, including the physical work environment.</p>	
	Additional explanation: 1,043 US firefighters participated in the survey	
(Pessmier, 2013)	<p>5 dimensions: 1) Organisational commitment 2) Management commitment 3) Employee empowerment 4) Reward systems 5) Reporting systems Statements not indicated</p>	Article of a theoretical nature; Tool not indicated.
(Maglio et al., 2016)	<p>6 dimensions: 1) Management commitment 2) Support from superiors 3) Safety systems 4) Occupational risks 5) Pressure at work 6) Internal group processes Statements not indicated</p>	Article of a theoretical nature; Tool not indicated.
(Taylor et al., 2019)	<p>Two dimensions: 1) Management commitment 2) Supervisor support with 14 statements assigned</p>	Elements of the FOCUS tool – the Fire Service Organisational Culture of Safety Survey – were used as the basis for measuring safety climate;

table 2 cont.

Paper	Dimensions	Measuring method
		5-point Likert scale: 1 – strongly disagree; 2 – disagree; 3 – yes and no; 4 – agree; 5 – strongly agree.
	Additional explanation: 8,575 firefighters from 615 fire stations took part in the survey	
(Davis et al., 2020)	Three main dimensions: 1) Management commitment, 2) Supervisor support 3) Organisational performance (including job satisfaction, job burnout, and commitment). Statements not indicated.	The benefits of using a tool called FOCUS - the Fire Service Organisational Culture of Safety Survey - are described; 5-point Likert scale: 1 – strongly disagree; 2 – disagree; 3 – yes and no; 4 – agree; 5 – strongly agree.
(Özay et al., 2021)	No indication of dimensions; 40 statements relating to safety culture	Assessment questionnaire by Allen S. Williams, created for the Anne Arundel County Fire Department, in Maryland, USA. 5-point Likert scale: 1 – strongly disagree; 2 – disagree; 3 – both yes and no; 4 – agree; 5 – strongly agree; Four open-ended questions on safety attitudes and knowledge.
	Additional explanation: The questionnaire was completed by 209 firefighters from the Istanbul Metropolitan Municipality Fire Department.	

An analysis of the works, including the dimensions and instruments used to measure SC in the fire service, allows us to recognise that they are characterized by a diversity of approaches; nevertheless, certain regularities can be observed. First of all, in most works, tools of a quantitative nature are used. They are equipped with a symmetrical Likert rating scale, the use of which allows the level of SC to be determined, both overall and within a given dimension. In some cases, a qualitative approach was also used, in the form of interviews with employees (McDonald and Shadow, 2003; Pessemier and England, 2012; Maglio et al., 2016; Taylor et al., 2019). It is essential that the picture of the assessed reality is complete and reflects its various aspects and perspectives. Indeed, a full thorough knowledge of a phenomenon is obtained by additionally adopting methods that facilitate answering the questions: “How?”, “What?”, “Why?”. Hence, conversations and interviews with employees - individual, group, document analysis, workplace observation, or audits would undoubtedly be valuable. Indeed, the type and number of dimensions are important issues. Few dimensions limit the scope of the evaluation, while too many take time and effort to complete the questionnaire. When developing assessment questionnaires, existing approaches can be applied,

e.g. as those described in Table 2, or one can implement one's own proprietary tools relevant to the organisation's specific operation. They should also be statistically verified for reliability and validity.

The universal questionnaire for measuring SC in the workplace developed by the Centralny Instytut Ochrony Pracy (The Central Institute for Labour Protection) in Poland can also be used as a starting point for developing an assessment questionnaire, which includes 49 statements rated on a 5-point Likert scale and assigned to the following dimensions (<https://www.ciop.pl>): (1) Management attitudes towards safety; (2) Workers' participation; (3) Health and safety training and accident analysis; (4) Value placed on health and safety in the company; (4) Relationships between workers; (5) Responsibility and awareness of health and safety; (6) Safe behaviours. As indicated by the specialists of this institution, the questionnaire prepared there is characterized by good psychometric properties (validity and reliability), and the questionnaire items can be taken together as a single safety culture scale or as separate empirical scales, which emerged during factor analysis. Simplicity and the ability to obtain an assessment without discouraging the respondent should also be essential features of this type of tool. Such a disincentive could be, for example, the lack of anonymisation. Hence, the recommended conditions should be as follows:

- evaluation principles that are well-defined and understandable to employees;
- statements that are sufficient in number to not discourage people from completing the questionnaire;
- statements that are unambiguous and do not create doubt or suspicion;
- the opportunity of confronting and discussing the content of the questionnaire and the evaluation principles with the employees;
- possibility of having the questionnaire evaluated by relevant experts;
- straightforward interpretation of results and the need to present them to all employees;
- parallel use of qualitative tools;
- systematic use.

4. Conclusions

As has been shown, safety culture, as an essential part of the overall organisational culture, plays a critical role in providing conditions to protect the health and lives of employees. Its importance has been recognised not only in high-risk organisations. It seems that the cognitive goal of the article was achieved, as the content contained in it has provided an understanding of what safety culture is and the importance of this phenomenon. A utilitarian aim was to identify possible tools for measuring safety culture in fire services. In the civilized world, human well-being and safety are values in every institution, both private and public, regardless of its size and the specifics of its operation. Given the research problem

and objectives adopted, it should be emphasized that global literature could be more impressive in this respect. Similarly, it is difficult to find in the Polish scientific literature a description of the experiences of fire stations concerning an analysis and assessment of safety culture, which may confirm that such incidents still need to be improved in practice. This is because, as a rule, studies appearing in science follow existing activities carried out in reality by various entities, observations made, measurements and experiments. As Ernest Nagel points out, 'science is born out of the pursuit of explanations that are systematic and at the same time subject to data-driven scrutiny' (Nagel, 1961). Nevertheless, the direction of such research has been set, which can be considered as the author's contribution to science, as can the proposed original definition of safety culture in the fire service, and the recommendations for the preparation of an appropriate assessment tool. This may provide a starting point for further discussion in terms of what safety culture in the fire service is and what it means. The identification of the dimensions and their analysis, together with the description of the existing SC measurement tools, demonstrate the fulfilment of the research problem, the cognitive objective, but also the utilitarian objective, as the instruments identified can be used to develop own assessment approach, tailored to the needs of the individual organisation. However, it is necessary to emphasize that the effectiveness of the adopted tool for measuring SC depends on the systematic nature of its application. Regularity of application and an atmosphere of objectivity and trust will certainly foster research into the phenomenon, creating a climate of safety in the entity. What is more, it is essential to constantly spread awareness of what safety culture is and what it means in the fire service. Here, not only training will play an important role, but also the discussion of existing problems and internal or external constraints. It is also crucial to open up to the experiences of other sectors.

A limitation of the research conducted was that the author needed to analyse sources such as doctoral theses or monographs. Their inclusion in the future may give a broader picture of this critical phenomenon. Nevertheless, as observed during the study, this is also not an impressive collection. Further research on safety culture in the fire service should consist of recognising the state of knowledge and awareness regarding the described issue.

References

1. Act of 24 August 1991 on Fire Protection (Polish Journal of Laws/Dz.U. from 2022 item 1969, from 2023 items 240, 347).
2. Altinpınar, İ., Başar, E., (2022). Investigation of the effect of vessel type on seafarers' safety culture. *International Journal of Occupational Safety and Ergonomics*, vol. 28, issue 3, pp. 1618–1623.
3. Bera, A., (2020). Znaczenie kultury organizacyjnej dla motywacji pracowników Państwowej Straży Pożarnej. *Przedsiębiorczość i Zarządzanie*, vol. 21, issue 1, pp. 31–46.

4. Berberoglu, A., (2018). Impact of organizational climate on organizational commitment and perceived organizational performance: empirical evidence from public hospitals. *BMC Health Services Research*, vol. 18, no. 399, pp. 1–9. <https://doi.org/10.1186/s12913-018-3149-z>.
5. Cieślarczyk, M., (2010). *Kultura bezpieczeństwa i obronności*. Siedlce: Wydawnictwo AP, p. 210.
6. Cieślarczyk, M., (2015). Kultura informacyjna jako element kultury bezpieczeństwa. In: *Kultura informacyjna w ujęciu interdyscyplinarnym. Teoria i praktyka. Vol. I*, H., Batorowska (ed.). Kraków: Uniwersytet Pedagogiczny im. Komisji Edukacji Narodowej w Krakowie. Instytut Bezpieczeństwa i Edukacji Obywatelskiej. Katedra Kultury Informacyjnej i Zarządzania Informacją, p. 26.
7. Boutros, B.A., Roberts, K.R., (2023). Assessing Food Safety Culture: A Comparative Study between Independent and Chain Mexican and Chinese Restaurants. *Food Protection Trends*, vol. 43, no. 1, pp. 61–80. <https://doi.org/10.4315/FPT-22-021>.
8. Choudhry, R.M., Fang, D., Mohamed, S., (2007). The nature of safety culture: A survey of the state-of-the-art. *Safety Science*, vol. 45, issue 10, pp. 993–1012. <https://doi.org/10.1016/j.ssci.2006.09.003>.
9. Czerska, M., (2003). *Zmiana kulturowa w organizacji. Wyzwanie dla współczesnego menedżera*. Warsaw: Difin, p. 13.
10. Czubasiewicz, H., Grajewski, P., (2018). Koncepcja systemowych rozwiązań ZZL w realiach działania organizacji procesowej. *Zarządzanie i Finanse. Journal of Management and Finance*, vol. 16, no. 3/2, pp. 65–77.
11. Davis, A.L., Allen, J., Shepler, L., Resick, C., Lee, J., Marinucci, R., Taylor, J.A., (2020). Moving FOCUS – The Fire Service Organizational Culture of Safety survey – From research to practice. *Journal of Safety Research*, vol. 74, pp. 233–247.
12. Engen, O.A., Lindøe, P.H., Braut, G.S., (2023). They are coping with different system logics of standardization in regulatory regimes. Norwegian offshore experience. *Safety Science*, vol. 161. <https://doi.org/10.1016/j.ssci.2023.106079>.
13. Gembalska-Kwiecień, A., (2012). Kształtowanie kultury bezpieczeństwa w przedsiębiorstwie. *Zeszyty Naukowe Politechniki Śląskiej, Seria Organizacja i Zarządzanie*, no. 63a, pp. 189–198.
14. Glesner, C., Geysmans, R., Turcanu, C., (2022). Two sides of the same coin? Exploring the relation between safety and security in high-risk organizations. *Journal of Safety Research*, vol. 82, pp. 184–193. <https://doi.org/10.1016/j.jsr.2022.05.010>.
15. Gromek, P., (2019). Prolegomena do badań kultury ratownictwa. *De Securitate et Defensione. O Bezpieczeństwie i Obronności*, no. 2(5), pp. 181–192.
16. Haslam, A.S., Jetten, J., Maskor, M., McMillan, B., Bentley, S.V., Steffens, N.K., Johnston, S., (2022). Developing high-reliability organisations: A social identity model. *Safety Science*, vol. 153. <https://doi.org/10.1016/j.ssci.2022.105814>.
17. Hejduk, M., (2021). System bezpieczeństwa publicznego – próba identyfikacji i opisu. *Zeszyty Naukowe SGPS*, no. 77, pp. 117–131. <https://doi.org/10.5604/01.3001.0014.8416>.
18. Hofstede, G.G., (2000). *Kultury i organizacje*. Warsaw: Polskie Wydawnictwo Ekonomiczne, pp. 38–41.

19. https://www.ciop.pl/CIOPPortalWAR/appmanager/ciop/pl?_nfpb=true&_pageLabel=P12000173911342605544018&html_tresc_root_id=1413006&html_tresc_id=1413004&html_klucz=1413006&html_klucz_spis=1413006 [24.03.2023].
20. Hudson, P., (2003). Applying the lessons of high risks industries to healthcare. *BMJ Quality&Safety*, vol. 12, suppl. 1, pp. i7-i12. http://dx.doi.org/10.1136/qhc.12.suppl_1.i7.
21. Ismail, S.N., Ramli, A., Aziz, H.A., (2021). Influencing factors on safety culture in mining industry: A systematic literature review approach. *Resources Policy*, vol. 74, no. 102250. <https://doi.org/10.1016/j.resourpol.2021.102250>.
22. Kamińska, B., Janczewska, D., (2016). Zarządzanie kapitałem ludzkim w środowisku wielokulturowym. *Przedsiębiorczość i Zarządzanie*, vol. 17, issue 3/2, pp. 77–90.
23. Komenda Główna Państwowej Straży Pożarnej (2021). *Biuletyn Informacyjny Państwowej Straży Pożarnej za rok 2021*.
24. Loveless, B., Hernandez, A., (2015). *Measuring the Wildland Firefighting Safety Culture Change—An Analysis of Entrapment Rates from 1994 to 2013*. Proceedings of the Large Wildland Fires Conference (May 19–23, 2014). Missoula: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, pp. 150–155.
25. Low, S.R., Daba, E.F., (2022). Safety management and service quality in the civil aviation industry of Caraga region, Philippines. *Central European Management Journal*, vol. 30, no. 3, pp. 3512–3516.
26. Maglio, M.A., Scott, C., Davis, A.L., Allen, J., Taylor, J.A., (2016). Situational Pressures that Influence Firefighters' Decision Making about Personal Protective Equipment: A Qualitative Analysis. *American Journal of Health Behavior*, vol. 40, no. 5, pp. 555–467. <https://doi.org/10.5993/AJHB.40.5.2>.
27. McDonald, L.S., Shadow, L., (2003). *Precursor for Error: An Analysis of Wildland Fire Crew Leaders' Attitudes about Organizational Culture and Safety*. Third International Wildland Fire Conference/AFAC Conference Sydney. <https://gfmcc.org/wp-content/uploads/3-IWFC-038-McDonald-1.pdf> [24.03.2023].
28. Moosa, M.H., Oriet, L.P., (2022). Factors affecting safety performance in the construction industry: an empirical study using structural equation modelling. *International Journal of Occupational Safety and Ergonomics*, vol. 28, issue 2, pp. 779–789. <https://doi.org/10.1080/10803548.2021.1985302>.
29. Nagel, E., (1961). *Struktura nauki*. Warsaw: PWN, p. 13.
30. Nawrat, D., (2014). Wpływ klimatu organizacyjnego na psychologiczne koszty pracy. *Problemy Profesjologii*, no. 2, pp. 145–159.
31. Obolewicz, J., (2014). Kultura bezpieczeństwa pracy i ochrony zdrowia. *Praca i Zdrowie*, no. 6–7, pp. 9–14.
32. Özay, M.E., Yazici, A., Uçan, R., (2021). A Survey on Safety Culture: Firefighters. *International Journal of Advances in Engineering Pure Sciences*, vol. 33, issue 1, pp. 83–89. <https://doi.org/10.7240/jeps.741261>.
33. Pałęga, M., Rydz, D., (2018). Identyfikacja zagrożeń i analiza poziomu wypadkowości na stanowisku pracy strażaka. *Prace Naukowe Akademii im. Jana Długosza w Częstochowie, Technika, Informatyka, Inżynieria Bezpieczeństwa*, vol. VI, pp. 609–621. <https://doi.org/10.16926/tiib.2018.06.43>.

34. Pessemier, W., (2013). Developing a Safety Culture in the Fire Service. *International Fire Service Journal of Leadership and Management*, vol. 2, no. 1, pp. 7–17.
35. Pessemier, W.L., England, R.E., (2012). Safety culture in the US fire service: an empirical definition. *International Journal of Emergency Services*, vol. 1, no. 1, pp. 10–28. <https://doi.org/10.1108/20470891211239290>.
36. Pidgeon, N.F., (1991). Safety culture and risk management in organizations. *Journal of Cross-Cultural Psychology*, vol. 22, issue 1, pp. 129–140. <https://doi.org/10.1177/0022022191221009>.
37. Podsakoff, P.M., MacKenzie, S B., Podsakoff, N.P., (2016). Recommendations for Creating Better Concept Definitions in the Organizational, Behavioral, and Social Sciences. *Organizational Research Methods*, vol. 19, iss. 2, pp. 159–203. <https://doi.org/10.1177/1094428115624965>.
38. Schein, E.H., (1986). *Organizational Culture and Leadership. A Dynamic View*. Francisco-London: Jossey-Bass, San p. 12.
39. Shirali, G.A., Afshin, D.K., Angali, K.A., Kalhori, S.R.N., (2022). Modelling and assessing the influence of organizational culture norms on safety culture using Bayesian networks approach: the case of the oil industry. *International Journal of Systems Assurance Engineering and Management*, vol. 13, pp. 304–317. <https://doi.org/10.1007/s13198-021-01233-5>.
40. Siuta, D., Kukfisz, B., Kuczyńska, A., Mitkowski P.T., (2022). Methodology for Determining a Process Safety Culture Index and Safety Culture Maturity Level in Industries. *International Journal of Environmental Research and Public Health*, vol. 19, Issue 5, no. 2668. <https://doi.org/10.3390/ijerph19052668>.
41. Taylor, J.A., Davis, A.L., Shepler, L.J., Lee, J., Cannuscio, C., Zohar, D., Resick, C., (2019). Development and validation of the fire service safety climate scale. *Safety Science*, vol. 118, pp. 126–144. <https://doi.org/10.1016/j.ssci.2019.05.007>.
42. Tetzlaff, E.J., Goggins, K.A., Pegoraro, A.L., Dorman, S.C., Pakalnis, V., Eger, T.R., (2021). Safety Culture: A Retrospective Analysis of Occupational Health and Safety Mining Reports. *Safety and Health at Work*, vol. 21, issue 2, pp. 201–208. <https://doi.org/10.1016/j.shaw.2020.12.001>.
43. Weigmann, D.A., Zang, H., von Thaden, T., (2007). *A Review of Safety Culture and its Potential Application of Traffic Safety*. Illinois: AAA Foundation for Traffic Safety, pp. 1–12.
44. Wiśniewska, M.Z., (2021). *Kultura organizacyjna oraz kultury wzmacniające doskonalenie podmiotów opieki zdrowotnej*. Radom: Instytut Wydawniczy “Spatium”, pp. 9–55.
45. Wudarszewski, G., (2016). Początki zainteresowań problematyką klimatu organizacyjnego w polskiej literaturze naukowej. *Zeszyty Naukowe Wyższej Szkoły Bankowej we Wrocławiu*, vol. 16, no. 1, pp. 55–71.

KULTURA BEZPIECZEŃSTWA W SŁUŻBIE POŻARNICZEJ I METODY JEJ POMIARU

Abstrakt

W artykule zaprezentowano rozważania nad kulturą bezpieczeństwa, a także omówiono jej rolę w świetle zagrożeń łączących się ze służbą pożarniczą. Zwrócono uwagę na lukę w badaniach nad tym zagadnieniem, szczególnie w Polsce. Sformułowano następujący problem badawczy: Czym jest i z jakich wymiarów się składa kultura bezpieczeństwa sprzyjająca służbom pożarniczym? Jako cel poznawczy przyjęto zrozumienie oraz przedstawienie istoty kultury bezpieczeństwa i jej znaczenia, a za cel użyteczny zidentyfikowanie możliwych narzędzi pomiaru kultury bezpieczeństwa w służbach pożarniczych. Zaproponowano autorską definicję kultury bezpieczeństwa w służbie pożarniczej. Dokonano analizy i porównania różnych narzędzi służących ocenie kultury bezpieczeństwa w tym sektorze. Zwrócono uwagę na konieczność systematyczności w prowadzeniu tej oceny, a także na potrzebę szkoleń i uczenia się na podstawie doświadczeń innych branż.

Słowa kluczowe: kultura bezpieczeństwa, wymiary, przegląd literatury, kwestionariusz oceny, służba pożarnicza