



Shaping the climate of construction work safety

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ABSTRACT

Purpose: The interest in the social aspects of work safety results because the human factor plays a key role in the causes of accidents at work in construction. Statistical data for Poland confirm that organisational and human causes, in particular those related to improper behaviour of employees, account for the highest share in the structure of causes of accidents at work according to the TOL classification.

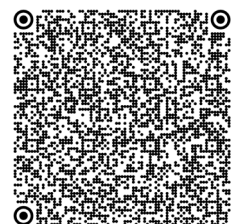
Findings: Human behaviour determines the current and future state of occupational safety and requires at least interest. The key factors of human error resulting in accidents include lack of knowledge about hazards in the working environment and appropriate qualifications or irregularities in the behaviour of a group of employees in relation to the adopted social standards, established rules, or inappropriate behaviour. On the one hand, human behaviour depends on the safety culture; on the other hand, it is human behaviour that shapes the climate of work safety by consolidating certain beliefs and attitudes.

Research limitations/implications: The measures outlined in work allow for the creation of a desirable safety climate and enable the smooth and compliant operation of the construction site, as well as the economic benefits of minimising losses due to eliminating occupational accidents and illnesses. Social benefits, in turn, can include increased awareness and motivation of construction site personnel, made possible by shaping the desired safety climate by informing and involving workers and their social representatives.

Practical implications: The practical application of shaping the safety climate is very important, which will also impact the quality and productivity of the work and the image of the construction workers.

Originality/value: The article attempts to systematise terms related to the concept of security climate, and tools for shaping the security climate on the example of construction.

Keywords: Complementary roles of developed and developing nations in promoting a global industrial and economical infrastructure and requirements on common international research and teaching development in the field of safety, construction, culture, and construction sites, Construction, Construction safety, Safety culture, Work safety climate



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EDUCATION AND RESEARCH TRENDS**1. Introduction**

When analysing the literature on construction safety, one notices the different approaches of the various participants in the construction project process to shaping safety issues.

On the one hand, the construction site, conceived as a space in which the resources necessary to complete a construction project are pooled, is where theory and practice meet and where confrontation takes place between the actual conditions on site and the adopted (assumed) safety policies and procedures. At the same time, each project may involve a number of participants representing the client, the designer or the works contractor at the level of preparation, planning, construction or operation of the works.

On the other hand, each construction site is carried out at a specific location by specific teams and the works are carried out by specialists at a specific time regardless of the season and weather conditions.

This results in a construction safety climate that is a product of the many safety climates of the various organisations involved in a construction project. Addressing these demands requires a proactive and anticipatory approach. This, in turn, requires an understanding of how occupational safety requirements are perceived at the construction site level and a comparison of the perceptions of the safety culture of the different employee groups (e.g., site managers, works managers or contractors or subcontractors) involved in the project. The proposed approach is important for the safe conduct of construction, as construction works are characterised by high levels of health and life hazards for on-site workers. These risks result from inadequate perceptions of occupational safety or inappropriate worker behaviour resulting from a failure to comply with applicable legal requirements, principles and culture of occupational safety or overlooking the broader safety issues associated with the work being carried out.

All participants in the construction project process have an important role to play in maintaining proper safety on site. A typical construction process includes the preparation and execution of construction work.

The relationship between the number of accidents and near-misses occurring during the construction and operation of buildings and the safety culture at work has been. It

continues to be the subject of much research and analysis [1]. The consequences of the most dramatic past disasters and accidents in the history of the world often relate to safety culture. In the investigation of events such as the Chernobyl nuclear power plant accident (1986), the explosion on the Piper Alpha North Sea mining platform (1988), the fire at Kings Cross tube station in London (1987) or the sinking of the passenger ferry Herald of Free Enterprise (1987), a low level of safety culture at these sites is identified as the main cause [2,3].

The concept of an organisational safety culture emerged in the early 1920s. At that time, it was noted that workplaces are social (subjective) organisations that generate their norms, values, and ways of behaviour. In contrast, in the 1980s, companies began to be considered organisations with their own subjective culture [4-9].

Construction site personnel play a key role in shaping a safe working environment on site [10-12]. These are the people (management and workers), particularly their attitudes towards legislation, their understanding of hazards and the strength of their mutual cooperation for safety and health during construction work. It is recommended that activities to foster a culture of occupational safety and health and to promote safe behaviour on construction sites be included in site management activities. At the same time, the guidelines for management activities must not be universal. Still, they should relate to specific conditions, considering both the cultural and environmental dimensions of the construction work being carried out [10-13].

Health and safety activities on the construction site are part of the responsibilities of the employer and employees under the Labour Code [14]. The site management needs to create safe workplaces for employees on the construction site. The employee then gains adequate working conditions and a sense of self-worth and dignity. Not having to constantly defend one's case and knowing that site management is interested in providing safe working conditions leads to interpersonal relationships on site becoming a dynamic web of intertwined personal and organisational goals centred around issues such as safe and healthy working conditions, conditions of employment, participation in decisions, opportunities for development and promotion and contributes to the smooth implementation of the construction process [15,16].

2. Defining the safety climate at work

Practically, the term 'occupational safety' is linked to people's behaviour and 'culture' is linked to understanding the importance of these behaviours in an organisation [1,2]. The relationship between employee behaviour and culture is consistent, as both are linked to each organisation's basic assumptions about safety issues. The rules of cultural perceptions and behaviour are shaped by workers' commitment to the physical working environment (tools, machinery, workstation organisation) and by workers' behaviour (compliance with OSH regulations, communication of information, cooperation, concern for safety beyond duties), resulting from their internal characteristics such as knowledge, skills, motivation [17].

In a general sense, *safety culture* is the sphere of accepted rules of conduct of the general public, i.e., all employees, both management and workers and a subset of the general culture of the organisation formed in a long-term, multidimensional and continuous process, covering the area of the entire company structure [2,18]. Any safety culture derives from the culture of the organisation. However, the interpretation of the two terms differs [7,8]. Organisational culture can be described as attributively avoiding valuing it. On the other hand, once identified, the work safety culture should be analysed, and its qualitative and quantitative characteristics should be sought, through which its evaluation is sought mainly in improving work safety [19-

23]. The evaluation of an organisation's occupational safety culture makes it possible to develop recommendations for that organisation and identify directions for change to improve or identify directions for improving safety management or cultural change [24].

The concept of 'work safety climate' has evolved historically and has been recognised in the literature as an element of work safety culture. In many cases, it has been included as a sub-system of organisational climate, which has simultaneously been identified with the atmosphere prevailing in the organisation and influencing the employees of the organisation [25].

An interesting procedure for defining safety climate was presented by the Construction Industry Council of the National Occupational Research Agenda (NORA), which, together with the Centre for Construction Research and Training (CPWR) and the National Institute of Occupational Safety and Health (NIOSH) and the National Institute of Environmental Health Sciences (NIEHS), held a workshop in 2008 for 72 construction industry stakeholders representing: contractors, employer associations, labour organisations (14%), researchers/academics, consultants and insurance companies [26,27]. The workshop considered ten selected definitions of safety climate (Tab. 1), drawn from a variety of areas both from the peer-reviewed academic literature and from interviews with contractors and safety practitioners, and selected those that were most relevant to construction (Fig. 1).

Table 1.

Preferred definitions of security climate selected from different areas (source: Authors' compilation based on [26,27])

No.	Definitions of the security climate
A	What happens on a day-to-day basis, a kind of snapshot of what actually happens and how employees perceive the way the company actually implements security in the field.
B	The way something is done, you know, how is it really done now and is it really practised? Is security a major concern for the company, do they really care about security, or do they just talk about it?
C	Encouragement, enabling and giving people the tools and education. It is largely about supporting people's ability to do their jobs safely.
D	Employees' shared perceptions at any given time about the extent to which hazard identification and injury prevention are important to the organisation, as perceived through their interactions with their immediate supervisors.
E	The environment in which the company implements its safety culture. For example, providing the necessary tools and equipment, perhaps resources in our workplaces to create an environment where people can work safely.
F	An indicator that reflects how well the declared safety programme is ultimately integrated into the organisation to support safe and effective workplace practices.
H	Objective measurement of attitudes and perceptions of health and safety issues.
H	A subset of organisational climate that measures through members' perceptions the degree of congruence between the organisation's professed values and policies and enacted practices.
I	Members' shared perceptions of their working environment and, more specifically, their organisational safety policies.
J	What this reflects is a shared perception of the relative priority of safety compared to other competing priorities of the organisation.

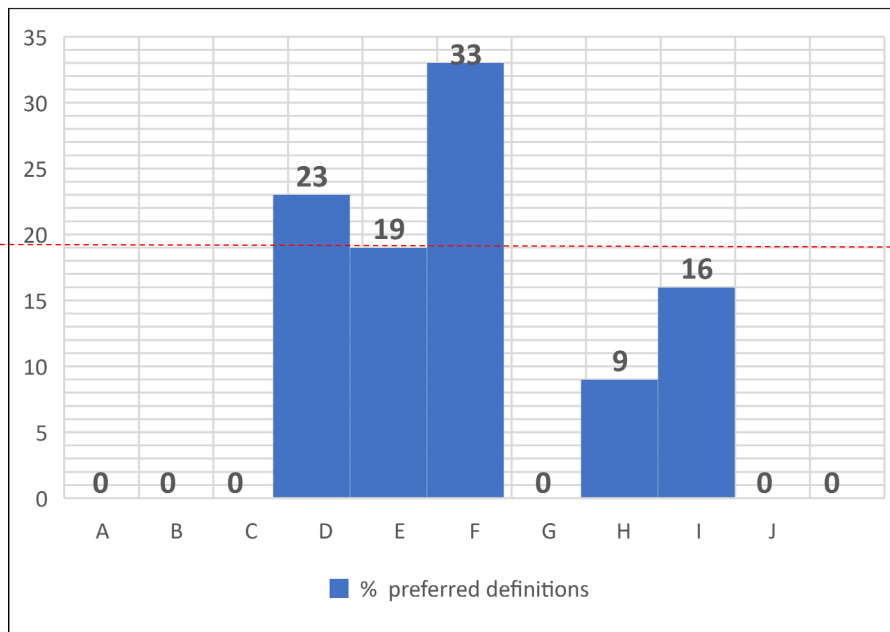


Fig. 1. Preferred definitions of safety climate for construction

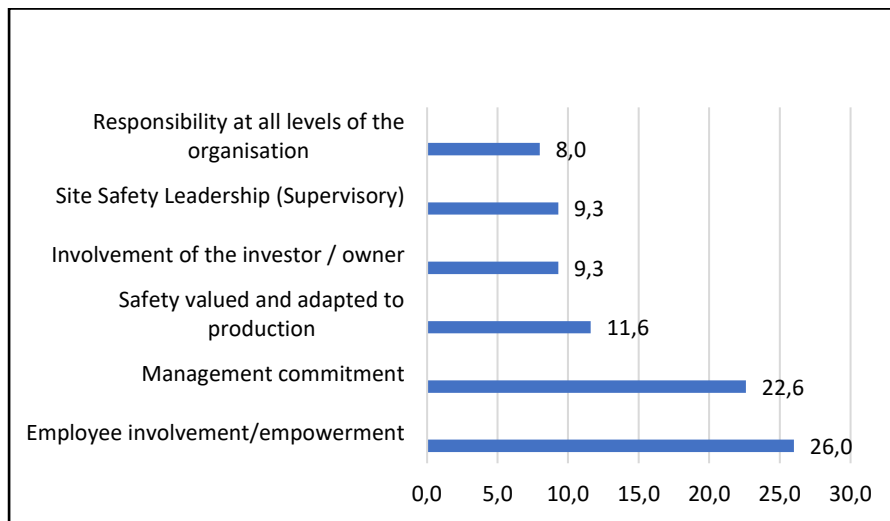


Fig. 2. Factors having the greatest impact on the safety climate in construction

The factors that influence the safety climate in the construction industry were then formulated:

- Communication;
- Accountability at all levels of the organisation;
- Safety valued and adapted to production;
- Employee engagement/empowerment;
- Training/education at all levels;
- Mutual trust;
- Leadership commitment;

- Management commitment;
- Programmes, policies, procedures, practices;
- Work planning;
- Safety and health programme/system operations;
- Investor engagement;
- Involvement of general contractor/site manager/works manager.

These factors were discussed and ranked from least to most influential on the construction safety climate (Fig. 2).

The biggest influence on the safety climate in construction is the commitment of the workers and the organisation's management [26-28].

This is particularly important on a specific construction site, treated as a shared space for the conduct of construction work at any given time. It is a product of the multiple safety climates of the various organisations involved in the construction site, including the developer, site manager/general contractor and subcontractors. The safety climate on the construction site is also strongly influenced by the technology used and the organisation of the construction work.

The accumulation of multiple cultures of occupational safety and the variety of technologies used induce a heterogeneous perception of occupational safety issues among site personnel.

According to the Construction Law [29], the construction manager is responsible for health and safety of the construction site. According to the aforementioned law, the construction manager prepares or ensures that a health and safety plan is prepared before construction begins. Such a plan must take into account the specifics of the site and the conditions of the construction work. The tasks of the site manager also include coordinating measures to ensure compliance with health and safety rules, through which he can shape the safety climate at work [29]. The site manager can stop work if he/she determines that there is a potential for danger [30]. The direct supervision of health and safety at workplaces is exercised by the works manager and the master builder, respectively, according to their responsibilities.

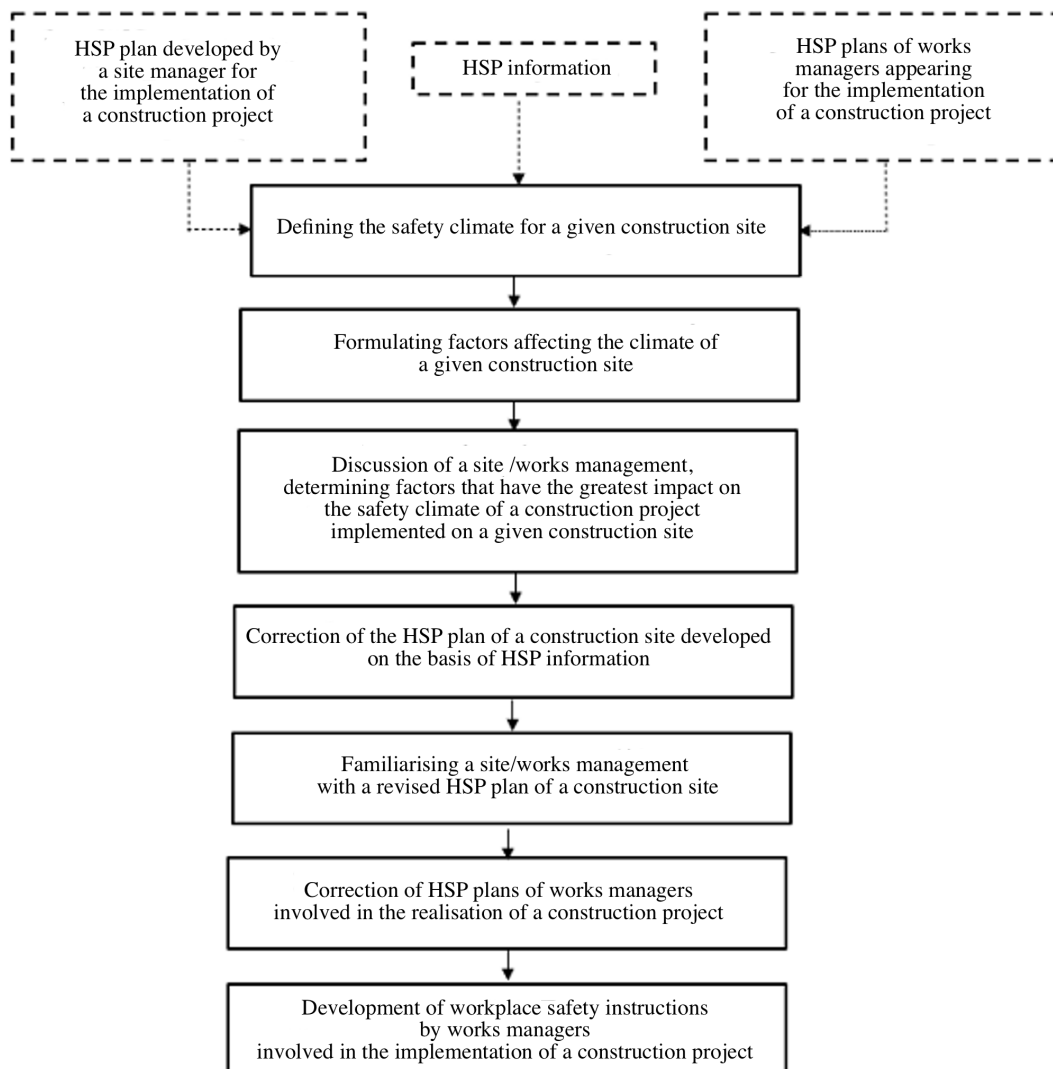


Fig. 3. Construction climate procedure

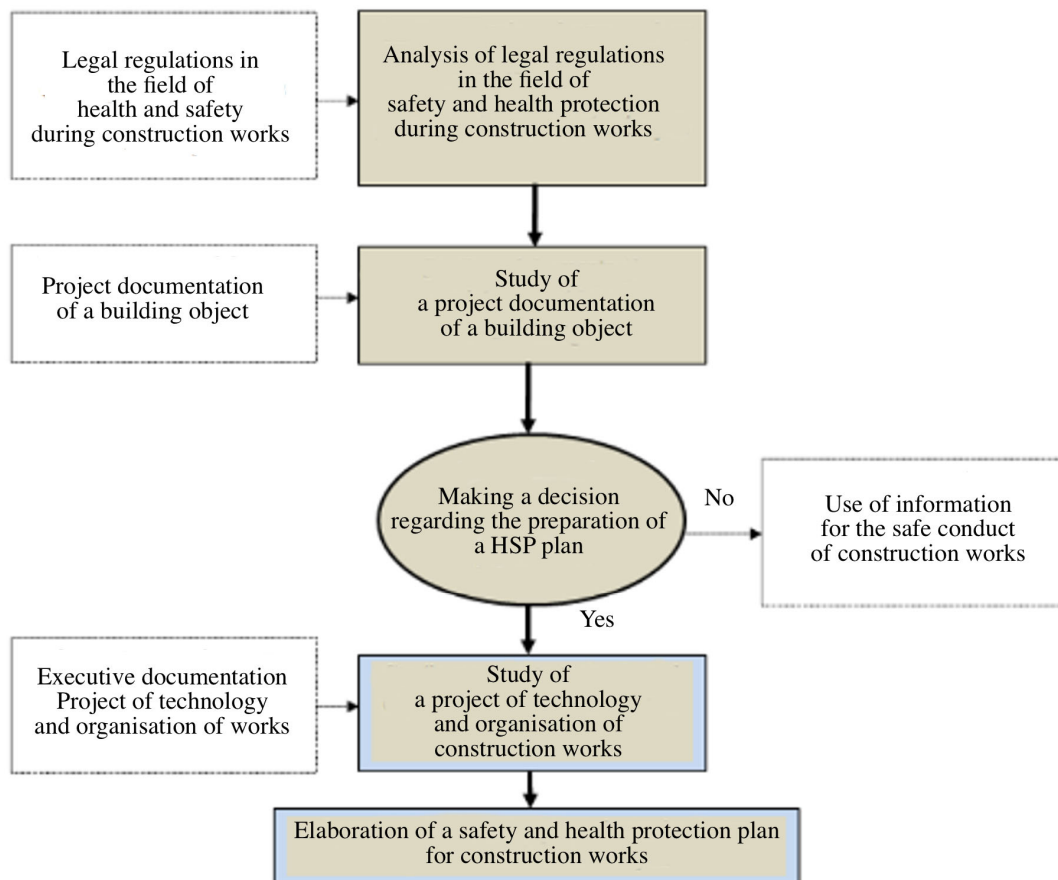


Fig. 4. Schematic of the development of the Health and Safety Plan [33]

According to the Central Statistical Office (CSO), employee misconduct is responsible for more than 60 per cent of accidents at work due to a lack of adequate H&S competence in employees and ignorance of H&S regulations [31]. This is a particularly important topic during construction projects where the developer does not use or have in-house forces. From the works manager level onwards, they are employed by another subcontracting organisation with quite different safety standards and culture. This is where a barrier of sorts arises – communication, execution and awareness. The influence of site management on individual employees is also significantly limited. This is due, among other things, to the lack of direct subordination of employees. There are often situations in practice where workers on the part of subcontractors are not treated as equal participants in the construction process [12,29, 32-34].

In such cases, the site manager should focus primarily on 'levelling up' in terms of knowledge, awareness, commitment, preparation for work, safe equipment, but also effective supervision and enforcement in the area of site

safety issues. The proposed procedure for shaping the construction safety climate (Fig. 3) developed using the SDS (Fig. 4) can be helpful.

3. Completion

Shaping the desired construction safety climate requires a constant focus on the behaviour of all construction participants in particular.

Selective application of measures, for example targeting only one group of employees, such as general staff, does not yield satisfactory results.

The desired level of construction safety climate must characterise all participants in a construction project.

The safety climate at a construction site cannot be separated from the workers' personal culture and behaviour.

Maintaining the desired safety climate on the construction site requires a constant simultaneous focus on the general contractor's and subcontractors' employees of the different types of work. Thus, there is a need for greater

emphasis on joint safety education involving all construction participants during health and safety training, as this is the last moment to instil the right safety attitudes in employees.

The measures mentioned above make it possible to build a desirable safety climate, allow smooth and compliant construction site operation, and bring economic benefits from minimising losses due to eliminating occupational accidents and illnesses.

On the other hand, social benefits can include increased awareness and motivation of site personnel, made possible by shaping the desired safety climate by informing and involving workers and their social representatives.

Shaping the occupational safety climate also influences the quality and productivity of work and the image of the site personnel among the other participants in the investment process and the public, and raising the safety culture will ultimately lead to improved health and safety decision-making.

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