# A Case Study on the Influence of Human Resource Management on Health and Safety Indicators

**Abstract.** Around 250 million work accidents and 160 million work-related illnesses occur annually in the world. Health and safety indicators are instruments that allow us to assess this scenario, as the prevention of work accidents is more effective and costs are lower when compared to the treatments and rehabilitation of an employee. Nowadays, the people management policy with a focus on no damage has proven to be effective in controlling occupational accidents and reducing costs in large corporations. It is noticed that the individual's behavior contributes to the reduction of accidents and occupational absences from work. The objective of this work is to analyze the management of people in safety and health indicators in the implementation of highly complex structural engineering works in a large company in Grande Vitoria/ES. We can conclude that technical leadership skills are fundamental attributes of an organization to achieve corporate results and goals. In short, safebehavior and no damage are directly linked to the leader's management capacity, as by influencingpeople, they will develop activities focused on achieving the company's financial and health and safetygoals.

**Keywords:** People management, project management, safety and health.

# 1 Introduction

According to the International Labour Organisation (ILO), about 250 million occupational accidents and 160 million work-related illnesses occur worldwide every year. Fatal accidents number about 1.1 million, more than traffic accidents (999 thousand), violence (563 thousand), wars (502 thousand) and AIDS (312 thousand). The International Labour Organisation also predicts that the number of work-related diseases will double by 2022 if no preventive measures are taken [1].

Safety indicators are tools that make it possible to assess safety at a given point in time, as well as its evolution over time, whether this safety relates to individual elements or to a totality of the organisation being assessed. However, prevention is more effective and less costly than treatment and rehabilitation. According to the International Labour Organisation, all countries can take concrete measures to improve their capacity to prevent occupational or work-related diseases [1-2].

The lack of adequate prevention and policies to control occupational accidents has profound negative effects not only on workers and their families, but also on society due to the enormous costs, particularly in terms of lost productivity and overburdened social security systems [1, 3].

Therefore, human resource management policies aimed at no damage have proven to be effective in controlling occupational accidents and reducing costs in large companies. All this because we know that the most important asset of a company is its people, who need to be motivated and know their rights and responsibilities [3-4].

One must know how to manage in order to carry out effective management, and above all, one must know that management means a series of efforts aimed at planning, organising, directing or guiding, coordinating and controlling the activities of a group of people who have common goals [1, 3-5].

When talking about human resource management, one cannot assume that this is a reality that has always existed, because people have not always been considered the most important asset of an organisation. It is worth noting that the behaviour of these people confirms the reduction of accidents and work-related absences from work, and currently human resource management and interpersonal motivation are the main pillars to achieve no damage in the industrial environment [2, 6].

From the moment an organisation adopts the systemic approach, it has some characteristics, such as the interdependence of the parts; the emphasis on processes, since an organisation always has continuity and cannot remain static in any case; probabilism, since one is never quite sure what must happen and what is best; multidisciplinarity, since in a systemic organisation one must try to collaborate with other fields of knowledge [4, 7].

Human resource management faced several challenges to clarify its necessity and importance within organisations, until it finally moved to perceive the employee as a partner, as the production process depends on a joint action [3, 8].

## 2 Type of incidents in safety and health

If the human resource management model chosen aims to increase the productivity and motivation of the team, it is easier to control health and safety indicators, making it possible to achieve no damage [7-9].

Given the need to review the risk situation in the Brazilian workplace, expressed in the number of occupational accidents verified each year, and considering the damage caused to the quality of life of Brazilian workers, as well as the costs incurred by public policies in the social sector, private companies, together with the Ministry of Labour, have prioritised the introduction of measures that allow the evaluation and control of the current situation [7-11].

The risks of typical accidents and occupational diseases are different for each sector of the economy and depend, among other things, on the technologies used, the working conditions, the characteristics of the workers employed, the safety measures taken and the human resources management model [9-11]. In the event of an occupational accident, the consequences can be divided into the following categories:

- **Simple medical assistance:** The insured person receives medical care and immediately returns to hisor her occupational activity;
- **Temporary incapacity:** The insured person is absent from work for a period of time until he is able to resume his occupational activity. For social security purposes, it is important to divide this period into less than 15 days and more than 15 days, as a cash benefit, sickness benefit, is paid in the second case;
- **Permanent incapacity:** the insured person is unfit for the occupational activity he was performing at the time of the accident. The permanent disability may be total or partial. In the first case, the insured person is no longer able to do any kind of work and receives a disability pension. In the second case, the insured receives compensation for the incapacity suffered (accident compensation paid monthly and credited against the future pension), although he or she is considered capable of performing another professional activity;
- **Death:** A pension is granted for the death of the insured person due to an accident at work if there are dependants.

Once accident risks are known, companies should try to eliminate or minimise them through preventive measures. An important step on the road to accident prevention is the production of reliable statistics that make it possible to calculate and monitor the development of indicators of occupational accidents and diseases and thus develop a more effective prevention policy [11-12].

## 3 Practical case

During one year, a study was carried out in a company in the steel sector in Vitoria (ES) in Brazil on a new management method focusing on no damage.

The Fundamentals of Zero Accident Human Resource Management is a proposed methodology based on the management of the "shop floor" within a zero accident human resource management model, with a team with professional experience and technical training to ensure safety indicators. In essence, the methodology consists of very close collaboration with the executing team, prior planning and immediate treatment of any non-conformities.

The methodology provides for careful planning of all activities and "full-time" control by the management team during execution to ensure full execution of the model. After the execution of the activity, possible future deviations were mapped to ensure that they do not occur in the future.

First of all, it is important to understand that every organisation functions on the basis of communication processes. Organisational dynamics are only possible when the different actors are connected and integrated. The connection and integration takes place through personal, functional or interpersonal communication networks.

The design of the organisation is important to ensure that the communication networks are effective and function well, allowing for the exchange of information and proper flow between the parts that make up the organisational whole. **Fig. 1** shows the proposed management model.


**Fig. 1.** Proposed management model.

According to the ILO study, Brazil is currently ranked 4th in the world with 2,503 deaths. The country is second only to China (14,924), the United States (5,764) and Russia (3,090). In the 1970s, Brazil recorded an average of 3,604 deaths out of 12,428,826 workers. In the 1980s, the number of workers increased to 21,077,804 and the number of deaths to 4,672. In the 1990s, there was a decrease: 3,925 deaths out of 23,648,341 workers [12-14].

The first to publicise the philosophy of property damage accidents was the engineer Herbert William Heinrich in his work entitled Industrial "accident preven-tion" in the 1930s [14].

Engineer Frank Bird Jr, author of Damage Control, improved on the statistics presented by Heinrich in the 1950s. Fig. 2 shows Bird's pyramid for the analysis of more than 1 million accidents.

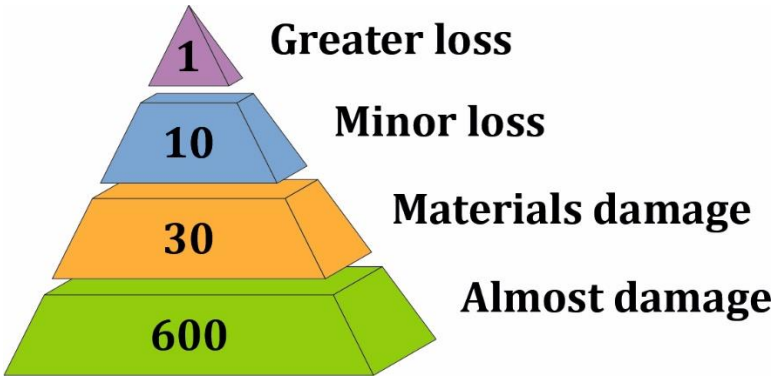


**Fig. 2.** Frank Bird Jr Pyramid.

The pyramid representation shows us the statistical magnitude of these studies and also the chain of events (causes and effects) leading to damage to people and the material resources of the organisation, as well as the great importance of collecting and dealing with the famous "near misses". Another important finding of Bird's pyramid is the levels over which we have no control, i.e. we can only act through the identification and control of hazards, as these are the hazards that can lead to near misses, damage and even death.

The planning, evaluation and administration of the OSH management system must include adequate skills, necessary procedures, risk assessments, task planning, management and health programmes, and collective and individual controls to protect employees. The management of hazards and risks: sub-standard practises, unsafe acts and conditions in equipment and infrastructure [15-16].

**Fig. 3** shows the pyramid with the additional levels of prevention and illustrates the pyramid after the study was conducted. According to this, prevention of accidents and losses is achieved through careful planning, management of the necessary control measures and efficient investigations of incidents.

In this new pyramid, it can be observed that by adding the new bases, we have reduced the other areas of the pyramid. This also shows that the more comprehensive the planning, the smaller the hazards (in terms of quantity and severity) and minimises situations over which we have no control (accidents, damage to property and damage to persons).


**Fig. 3.** Pyramid with additional levels of prevention

## 4 Final considerations

In order to bring about change in the company, create a pleasant working environment or achieve a certain behaviour, bosses and managers use various forms of communication with which they pass on their ideas and receive suggestions from their employees. By practising communication, people can make great strides in improving their performance or their own professional development.

Technical leadership skills are fundamental qualities for an organisation to achieve business results and goals. Therefore, leaders and managers must behave properly to ensure that results are achieved in the execution of their tasks.

The terminology "technical competence" varies considerably, i.e. different models use different expressions to describe essentially the same concepts, such as: "taking control", with "decision-making ability" or "courage to lead".

In order to bring all leadership models together, it was necessary to create a common language that translates the competences of the different models into a structure that can be analysed. So the first step was to distinguish two types of competences: practical and technical.

Practical competences refer to what people do in performing their tasks to achieve results, such as a project manager's ability to "lead a team", "manage a company", "put the customer first" or "make a decision".

Technical skills are qualities that people bring to the role that enable them to perform leadership tasks. For example, a project manager may have "strategic thinking", "initiative" and "enthusiasm" as personal qualities. These qualities are the raw material for performance. These are the skills required to perform the role. Practical competencies are the attitudes that result from the attributes associated with the technical competencies: Without a high level of 'confidence' (technical), it is not possible to 'make tough decisions' (practical).

The technical skills required to perform a function do not necessarily guarantee the behaviours required to perform it. However, they do greatly increase the likelihood

that the required behaviours will be repeated over time. In this context, in relation to safe behaviour in the context of occupational accidents, we can mention that the objectives related to the prevention of accidents can be more easily achieved if the individual engages in behaviour that is consistent with the company's policy.

To ensure that occupational safety objectives are achieved, the company must adopt a human resource management model that has skills and attributes that together promote team synergy.

There are universal leadership traits that must be considered when achieving safety and health objectives. These qualities are: mental capacity, emotional intelligence, technical knowledge, personal development and a healthy ego. In addition, the leader must be able to lead the team, influence people, build relationships and make a difference. All of these universal qualities depend on proper and effective communication to be effective in an organisation.

Effective leadership requires a high level of intelligence to manage the inherent complexity of the role and the leader. Therefore, high intelligence or intellectual capacity is essential. However, effective leaders are also able to interpret people and their unspoken feelings. They are able to predict the reactions of others to what they say or do, have a sense of morale and the work environment, and are aware of the interpersonal and political dynamics within the organisation.

To achieve no damage, technical knowledge is a basic requirement for the effective implementation of this safety and health policy. This category also includes the ability to make informed decisions and use the knowledge gained from experience.

In this context, it can be said that effective leaders are curious and inquisitive, they want to face new situations and learn by doing. They are flexible and always willing to consider other points of view. Furthermore, they see bad decisions as a valuable opportunity to learn and encourage others to do the same.

Leaders also need to be efficient, confident and decisive. However, your ego must be healthy enough to admit when you have made a mistake, because this will allow you to correct mistakes before disaster strikes.

Effective leaders are very forward thinking, drive change, take risks, shake things up, look for improvement even in the best managed organisations and act decisively rather than being led by circumstances and events. Many of these professionals are also restless and impatient, always looking for new ways to act, always striving to achieve financial goals and encouraging their employees to work safely because they will certainly have no damage under control.

In short, safe behaviour and no damage are directly related to the manager's management skills, because by influencing people, they will develop activities aimed at achieving the company's financial, safety and health objectives.

## References

1. Dallasega, P., Rauch, E., Linder, C. Industry 4.0 as an enabler of proximity for construction supply chains: A systematic literature review. Computers in Industry, 99(1), 205-225, 2018.

2. M. Hermann, T. Pentek and B. Otto, Design Principles for Industrie 4.0 Scenarios. In: 49th Hawaii International Conference on System Sciences (HICSS), 3928-3937, 2016.
3. Kim, D., Kumar, V., Kumar, U. Relationship between quality management practices and innovation. Journal of Operations Management, 30(4), 295-315, 2012.
4. Derlyke, P., Marín, L., Zreiqat, M. Discrepancies Between Implementation and Perceived Effectiveness of Leading Safety Indicators in the US Dairy Product Manufacturing Industry, Safety and Health at Work, 2022.
5. Iraj Mohammad, I., Kamalinia, M., Momeni, M., Golmoh, R., Hamidi, Y., Soltanian, A. Evaluation of the Quality of Occupational Health and Safety Management Systems Based on Key Performance Indicators in Certified Organizations, Safety and Health at Work, 8(2), 156-161, 2017.
6. Dodsworth, M., Connelly, K., Ellett, C., Sharratt, P. Organizational Climate Metrics as Safety, Health and Environment Performance Indicators and an Aid to Relative Risk Ranking within Industry, Process Safety and Environmental Protection, 85(1), 59-69, 2007.
7. Acheam, T., Kemp, A. Health, safety and environmental (HSE) regulation and outcomes in the offshore oil and gas industry: Performance review of trends in the United Kingdom Continental Shelf, Safety Science, 148(1), 105634, 2022.
8. Zwetsloot, G., Leka, S., Kines, P., Jain, A. Vision zero: Developing proactive leading indicators for safety, health and wellbeing at work, Safety Science, 130(1), 104890, 2020.
9. Poghosyan, A., Manu, P., Mahamadu, A., Akinade, O., Mahdjoubi, L., Gibb, A., Behm, M. A web-based design for occupational safety and health capability maturity indicator, Safety Science, 122(1), 104516, 2020.
10. Cardoso, W, Di Felice, R.: A Novel Committee Machine to Predict the Quantity of Impurities in Hot Metal Produced in Blast Furnace. Computers & chemical engineering 163(1), 107814, 2022.
11. Antão, P., Calderón, M., Puig, M., Michail, A., Wooldridge, C., Darbra, R. Identification of Occupational Health, Safety, Security (OHSS) and Environmental Performance Indicators in port areas, Safety Science, 85(1), 266-275, 2016.
12. Shea, T., Cieri, H., Donohue, R., Cooper, B., Sheehan, C. Leading indicators of occupational health and safety: An employee and workplace level validation study, Safety Science, 85(1), 293-304, 2016.
13. Sinelnikov, S., Inouye, J., Kerper, S. Using leading indicators to measure occupational health and safety performance, Safety Science, 72(1), 240-248, 2015.
14. Sheehan, C., Donohue, R., Shea, T., Cooper, B., De Cieri, H. Leading and lagging indicators of occupational health and safety: The moderating role of safety leadership, Accident Analysis & Prevention, 92(1), 130-138, 2016.
15. Mapar, M., Mo Jafari, M., Mansouri, N., Arjmandi, R., Azizinejad, R., Ramos, T. Sustainability indicators for municipalities of megacities: Integrating health, safety and environmental performance, Ecological Indicators, 83(1), 271-291, 2017.
16. Bouaziz, M., Marangé, P., Voisin, A., Pétin, J. Health checkup indicators-based safety criteria for operating sequences ranking of critical systems, IFAC-PapersOnLine, 808-813, 48(21), 2015.