Health and Safety Management in the Aspects of Singularity and Human Factor

Janusz K. Grabara^{1,*}

¹ Czestochowa University of Technology, Faculty of Management, 42-201 Częstochowa, Dabrowskiego 69, Poland

Abstract. Entering the era of sustainable development and artificial intelligence slowly but surely changes the way we understand the world around us. This state of affairs is met with a lack of acceptance, most often resulting from a lack of knowledge in the area of the latest organizational and technical solutions. In connection with these activities, a new concept of "technological personality" appeared, which is also known as "singularity", meaning a moment in future development (some say that this moment has already occurred) when technical progress becomes so rapid that it is unpredictable. This may happen at the time of the creation of artificial intelligence that surpasses the intellectual capabilities of man. Such a change also entails changes in the form of interdisciplinary science and creates completely new points of reference. Due to the fact that new organizational and management trends appear in the processes of risk and work safety assessment resulting from the implementation of tasks related to occupational safety and health management, including sustainable development and new areas of supporting these tasks by modern information technologies, research activities should be undertaken in the scope of identifying and identifying these trends and ranges.

1 Introduction

The qualitative change also entails changes in the work safety of people employed in the implementation of the aforementioned tasks, since every accident or almost accidental event as well as the threat has a significant impact not only on management processes, but also on the quality of security management and hygiene at work.

Introduction of very advanced information technologies It also carries a new type of threat in the form of solutions, whether they are of an "altruistic" or "selfish" type. This means that in such advanced systems, referred to as artificial intelligence, new dilemmas appear that have to be solved most often by choosing the "lesser evil".

The presented article attempts to demonstrate the nature of these changes and their positive and negative effects.

* Corresponding author: janusz@grabara.eu

2 Human factor

Supervising the human factor occurring in causal processes leading to accidents and accident events is a priority for all activities in this area. This is not only the result of caring for the employee and his health, both physical and mental, but most of all due to the strong emphasis on avoiding and preventing losses in the company [1].

The human work environment is shown in Figure 1. The human work environment is not the only set that affects a person, but factors outside the work environment are also very important.

Fig. 1. The human at work environment (Author's own work)

These factors are:

- broken family life,
- standing in court,
- irregular work,
- threat of removal from work,
- misunderstanding in marriage,
- contact with social welfare institutions.

As can be seen from the number of presented factors affecting occupational safety, it can be concluded that a man (employee) is susceptible to a large number of factors, including some that can not be determined by the employer or direct superiors. This

situation makes man the weakest link in production processes. Replacing the machine park in plants at ever shorter intervals requires constant acquisition of new knowledge and work philosophy. There are also many factors in the workplace, which are shown in Figure 1.

All these elements and factors related to a human being as an object and subject must be taken into account in the functioning of occupational safety and health management systems. Nevertheless, the present and future brings with it threats resulting from unbridled technological progress.

Man is naturally resistant to introducing new solutions, especially when he is aware of the uncertainty of further employment or the need to raise his qualifications to a very high level, which the employee seems unachievable to him. Others argue that the degree of automation causes a reduction in the role of man from an independent worker with individuality to the role of servant or slave to technological processes. This phenomenon is nothing new in the history of the economy and industry. The period of the technical revolution in the nineteenth century in many European countries had to do with a wave of protests against labor mechanization. Even in Russia factory workers were singing the song of the "Dubinoczka" proletariat, in which the words "Sly Englishman to crush industrious hands were hard - he invented various machines". And indeed, at the initial stage of labor mechanization, the employment of the lowest qualified workers (workers) was reduced [2]

However, the idea of this article concerns a completely different phenomenon, it is difficult to call it a threat, because it is scientifically documented, but also a phenomenon that also brings some threats. This phenomenon is the relationship of a man (employee) with artificial intelligence or so-called "technological personality"

3 Singularity

In the 1960s, Irving J. Good began discussing the consequences of making machines smarter than people. He defined the ultra-intelligent machine as a machine that intellectually exceeds every human being. Since machine design is one of the mental work, the ultra- intelligent machine could design even better machines. It would undoubtedly be an explosion of intelligence that would leave man far behind. The ultra-intelligent machine will be the last human invention [3].

In the 1991s, Vernor Vinge popularized Good's theory of an explosion of intelligence and used the name "singularity" in its context. „Soon we will create intelligences greater than our own. When this happens, human history will reach a certain peculiarity, an intellectual transition point as impenetrable as a curved space-time in the middle of a black hole, and the world will cease to be understandable to us”. he predicted that it would happen between 2005 and 2030. Currently, nobody knows exactly how to create artificial intelligence that can match people. The human brain contains 15-33 billion neurons, each of which can have up to 10,000 synaptic connections [4]. The amount of data necessary to accomplish this task is enormous, estimated to amount to hundreds of petabytes. Eliezer Yudkowsky is the author of a different concept of thought predicting the effects of creating equivalent machines in the process of processing information to human capabilities [5].

This concept assumes that the introduction of learning machines will cause rapid acceleration of work, so that the machine versions will be created faster and work faster. According to the assumptions of this case, after 4 years the speed of computers would reach infinity. Contemporary guru of artificial intelligence Ray Kurzweil, on the basis of historical phenomena, suggests that the law of Moor can be generalized and predicts that the most important scientific discoveries will be made more and more quickly until "the fabric of the history of civilization breaks" [6].

Figure 2 shows the graph of the reachin to the singularity point.

Fig. 2. Shows the graph of reaching the singularity point (Kurzweil Singularity, www.picswe.com)

4 Threats of the relation human to singularity

The implementation of tasks related to the management of occupational safety and health in the context requires a completely new approach to analysis and prevention in this area. We will have a situation in extreme cases such as when the role of a man comes down only to supervision, or rather to check if the system works, because it is a system that can respond to threats on an ongoing basis. In this arrangement, the human relationship with the system on the principle "push the red button if the system has stopped working" will be even less engaging than the work of the railway trainer, which closes the passage when the train arrives, after passing the train may return to reading your favorite book or other activities of this type.

Such lack of impact on the system and ever smaller liability will be a more stressful factor than if the employee is more responsible.

The transfer of total responsibility to more efficient machines from the human brain can give rise to new types of situations in the work environment. Especially in situations of threat to human life and health or in the management of the prevention of great material damage. Man will at some point feel like an unnecessary element of the system because he will not understand the principles and mechanisms of the system. Such a situation may give rise to extreme reactions from completely positive praise-free to aggravation to the entire existing system. As historically it happened in Great Britain and other European countries at the end of the 19th century. In this situation human capital is important until the emergence of an advanced thinking and learning machine[7].

Unfortunately for machines, and fortunately for a man especially in security management, there are situations where decisions are made will be ambiguous, and thus there will always be someone injured [9]. There are certain traditions in making difficult decisions in some branches of the economy, the most-known area is underground mining [8]. The problem of ambiguity also applies to newer inventions such as, for example, autonomous cars in which the role of a human being is limited to the role of a passenger. And here we also deal with the possibility of making machine safety decisions. And here again there are situations of danger to the safety of road users and this applies not only to passengers but also to other people using roadways and sidewalks. The most frequently quoted example is the situation when people, an elderly person and a child before a moving car suddenly appear. The autonomy of the control system must decide whether to bypass

these people by changing the direction of travel and hitting the concrete wall. Such a choice threatens the health or life of passengers. The system may choose a solution consisting of deduction, pedestrian crossing and passenger protection. He can also choose to ride one pedestrian while saving another. Here again is born the dilemma of who should pass the older person or child. And who makes the choice, the machine and who will he choose. there is also an aspect of tradition that the autonomy of the car will include in the choice. Because in European countries the child is in the first place for health and life protection, while in Asian countries it is an adult.

5 Conclusion

The issues presented in the article are related to the nearest future. Lack of knowledge on this subject in many people causes fears, and since there are fears or anxiety, it is safer to negate new solutions and postpone their application to some uncertain future.

Both sustainable development and technological personality are already with us, they are present in a form imperceptible to people. We want or do not want this future is coming. Our task is to bring ordinary people knowledge of technological personality and sustainable development, which is very much in line with these changes in the world [10]. The author of the cycle and Hary Potter J.K. Rowling said that: "Understanding is the first step for acceptance and recovery".

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