

# #GAMIFICATION IN OCCUPATIONAL HEALTH AND SAFETY (OHS) TRAININGS

## #GRYWALIZACJA W SZKOLENIACH BHP

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*The trainings in occupational health and safety matters have been considered as being deadly boring for many years; such opinion is dating back to the period of the implementation of the only one reasonable method of education: the teacher speaks and the pupils listen. A label of the most boring trainings which, alas, are obligatory, confirms only the existing stereotype. If the trainers were able to fill a room only with the volunteers, being really interested in a given matter, it would be possible to expect the improvement of the quality of training. Meanwhile, their compulsoriness and lack of control gives a luxury of a high frequency, often of a low quality, to many trainers, instructors and specialists in occupational health and safety (in Polish: BHP).*

What is the aim of OHS training? First of all, it serves creation of awareness of appropriate behavior and consequence of its absence. Therefore, apart from legal knowledge, we speak about the influence on people and on their behavior. And now, the first difficulty in BHP teaching appears: change management. The successive one includes their obligatory content. The preparation of attractive form of education in respect of legal rules or other, not very interesting elements of "framework programmes of education" requires creative approach and effort. As we know, the market does not like empty space and where it is necessary, a product appears. More and more companies which offer service in the field of OHS begin to suggest better prepared trainings. However, the educational offer in respect of soft skills, managerial training, IT training or, simply, cooking courses remains still more attractive in a form of knowledge transfer as compared to the training work health and safety. Therefore, it is important to make the discussed training more attractive by a change of their form. One of such elements is #gamification, which apart from dynamics in teaching, and effect on the rate of knowledge assimilation, introduces innovativeness in instruments and methods as well as competition as motivating and mobilizing factor.

Is it therefore possible to run interesting training in big companies? Can we make the subject of OHS training interesting for generation of millennials? Will the knowledge concerning the appropriate protecting rules be transmitted to the employees in an understandable way?

The answer is yes but under the condition of applying three

most important elements of effective training in respect of safety and implementation of changes in culture of organization safety. The description of the mentioned elements is given below.

### Innovative #simplification

Carl Friedrich Gauss, a genial German mathematician, physicist and astronomer lived at the turn of the 18<sup>th</sup> century. In spite of the fact that he is considered as one of the outstanding scholars in the field of science in history, he is not so recognized as Archimedes or Newton. However, most of us will remind him when looking at normal Gauss distribution. We should also remember him due to another reason. Let us move to Germany of 1784 when seven years' old Carl Friedrich attended school. A teacher of mathematics, being deprived a greater engagement in his profession, gave a mathematic task to his pupils which should

Fig. 1. Carl Friedrich Gauss (1777-1855) – German mathematician, physicist, astronomer and geodesist<sup>1</sup>



make the children busy and give him at least one hour of rest. The pupils were asked to give the sum of arithmetic progression from 1 to 100 what may be written, in the simplest way, as  $1 + 2 + 3 + \dots + 98 + 99 = 100 = \dots$ . After few minutes, contrary to expectations, a young Gauss gave the correct result of the discussed adding. Although being unaware of his operation, he based only upon his imagination and simplified a laborious counting owing to a simple rule which he had noticed. When combining into pairs the numbers 1 and 100, 2 and 99, 3 and 98 and so on, he obtained 50 pairs with sum of 101, therefore,  $(1+100) + (2+99) + \dots = 101 \times 50 = 5050$ . To-day it is contained in the programme for the fourth class of elementary school.

Let us come back to the question about effective training in health and safety of work. It is not seldom case that **the mentioned above trainings**, being instructed to the external companies, **are the tiring "talking shops" or confabs** (in Polish the so-called "nasiadówki") **for the participants** when the fragments of Work Code or other legal regulations are read aloud. The transmission of knowledge is implemented in professional language, being very well understandable for instructor who does not seek for the way of access to the trained listeners. Such methods are especially disliked by the persons, employed as blue-collar workers. They are treated quite often as a day which may be spent sitting or even sleeping and it is not necessary to stay at the machine or dig with spade.

Simplification of training in the field of safety, the mandatory and the additional ones, aiming at such shaping of our listeners and furnishing them with such knowledge and skills that they could protect their life, should be commenced from the contents of the transmission and the language of the transmission.

Carl Friedrich Gauss, as performing the mathematic operation in non-obvious way, should be the inspiration for all persons who develop the trainings in respect of safety. Similarly as Gauss, we have to seek for the methods of abbreviating the time period necessary for assimilation of the knowledge. The effectiveness of the method is measured by the level of knowledge which was acquired by a student!

The knowledge does not mean, however, everything. We must also answer the question whether the educated persons would change the possessed knowledge into appropriate behavior? It is affected by the successive factor of correct training, that is, #leadership.

### The engaged and reliable # leadership

Thyssen Krupp Gerlach (TKG) from Homburg near Frankfurt is one of the known magnates of manufacture of components for the companies of automotive sector. In 2010, the number of accidents at work in the mentioned company was equal to 20 per million of the hours worked and the work environment was faced with the problems of noise, vibrations, high temperature and dusting. The management of the company began to perceive the negative effects of low culture of safety and in February 2011, they invited the consultants of DuPont company for cooperation, asking them to help to analyze the existing situation and improve

the state of occupational health and safety. After the performed analysis, it was revealed that on the Bradley's diagram (Fig. 2) the highest management of TKG placed the status of its organizational culture by one degree higher than it was in a real situation.

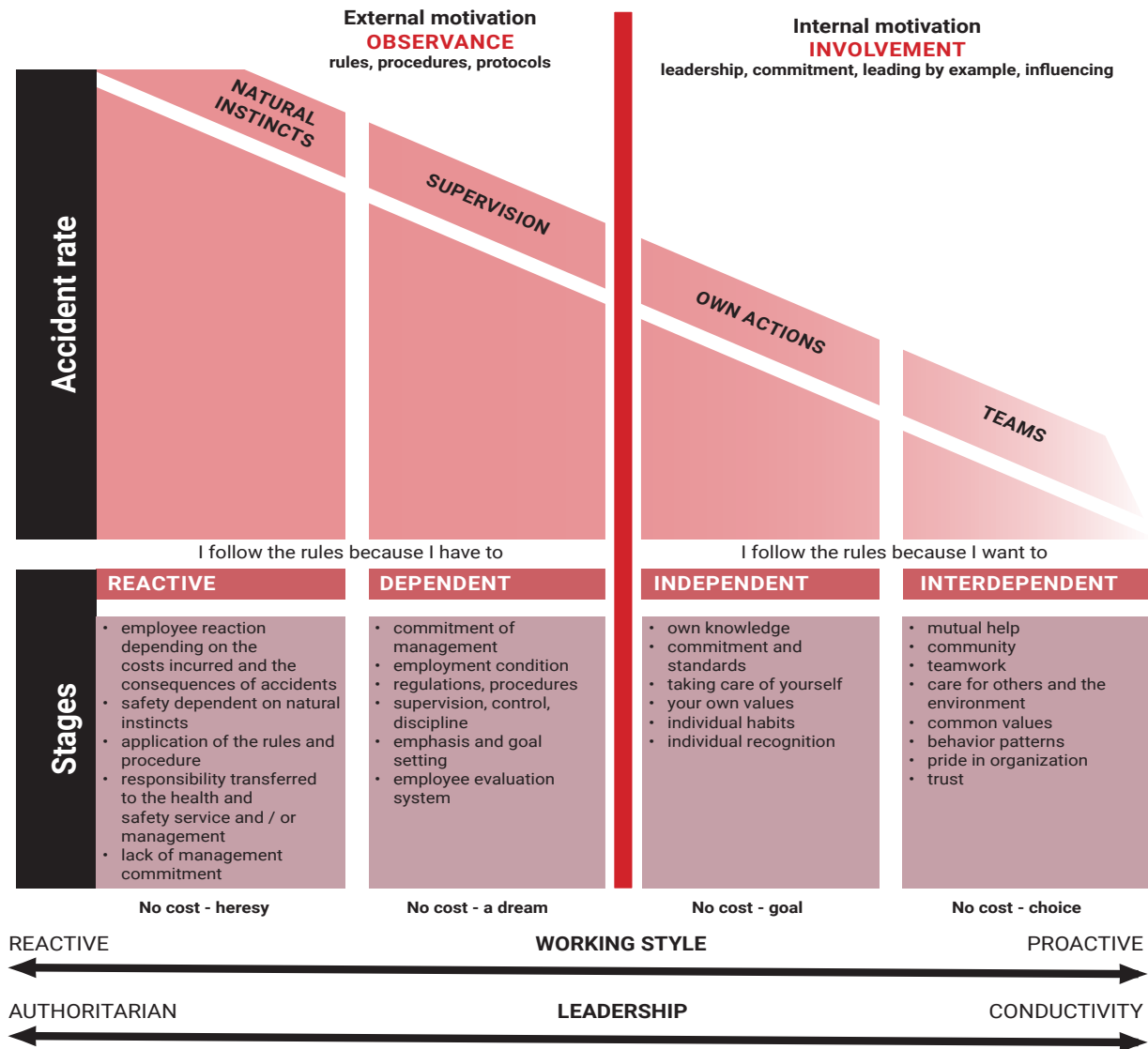
When analyzing more deeply the data, it was observed that there are also encountered good behaviours of the employees which may be strengthened and also such ones which lead to dangerous situations and damages. The management of TKG undertook immediately the corrective action. They utilized the suggestion that they should at first focus on "quick win". One of such actions included declaration of safety rules for the management the members of which signed as a proof of their engagement. The mentioned principles were widespread and gave a distinct signal to the staff: the engagement of the highest level of the management is the first and most important step towards the improvement of safety at the workplace. Although TKG on the Bradley's curve was still found on the side "I observe it because I have to", the involvement of the management caused their passage from reactive stage into dependent one.

During three years, the number of accidents at work in TKG dropped to the level of 0.1 accidents per one million of the hours worked. Ten principles of safety were published and introduced into life. Every month, sixty five managers of the highest level conducts the talks with the employees aiming at identification of the threats, increase of awareness, improvement of standards of safety and motivation of the staff to work in the way consistent with the mentioned standards. The discussed meeting are also aimed at recognizing the correct behaviours and positive changes, and strengthening the safety of work as everyday element of running the business<sup>2</sup>. **And, also, in the discussed case it has been revealed to be true that owing to good advices the road is long and owing to examples – short and effective.**

Coming back to the question whether the principles of safety, as being effectively assimilated during the training, will be immediately employed in practice by our workers, we may decisively answer that self-discipline will be proved in a certain degree but only a reliable and engaged leadership will guarantee a full success.

Let us remind once again the initial question: what purpose the trainings in occupational health and safety serve for? If their task is to generate the awareness of appropriate behaviour and of the consequence of their absence and the protection of the employee alone, and if we already know what a role of the involved superior is, we are faced against a new challenge, i.e. change management. We all know it from our experience. We seldom react with enthusiasm when someone expects we will change our behaviour. Especially, in the case when it requires a big concentration and change of our habits. The change in behaviour is never a quick process. Different people pass through it in a different rate what causes that the superiors have to tackle with a given situation when a part of organization has already approved and introduced the change, a part is just doing it and the last group still seeks the reason, sense and justification of it as those people discard any change as a rule.

Fig. 2. Bradley's diagram, as developed by DuPont company (Source: DuPont)



The reliable and engaged leadership may help in change of behaviours. The training plays also a significant role. However, the expectation of the results to come after training based exclusively upon the lectures is condemned on defeat, critics and discarding. #gamification seems to be helpful in this problem.

## The adapted #gamification

What does the word "#gamification" mean? It is, *inter alia*, the method of teaching which introduces activation of the participants by game and competition simultaneously. Although love of competition cannot be a factor, motivating all participants in the same degree, many persons participate in the game for a pleasure of competing, without the mindset to gain a necessary victory. In the case of training, conducted by the method of #gamification, the win is an effectiveness of assimilating the required knowledge in reality and not taking the place on the podium.

If we speak about effectiveness, it is worthy to mention the rewarding. Construction of good association with the subjects of training by consequent appraisal of the participants during the training as well as by the end of it should be a good guideline for the instructors. Even the examination may occur to be nice if well prepared team feels the fun during its passing, owing to the previous multiple checking of the knowledge of the participants by the instructor; it guarantees the easiness of obtaining the credit.

Frightening with the examination in order to obtain the attention of the listeners is ineffective as compared to rewarding their professional success after each finished problem module. The reward may be an appraisal or may have a substantial form, depending on the available resources.

Although a triangle of effectiveness, as developed by Edgar Dale (referred to in article in version of 1969) has as many followers as opponents (due to certain inaccuracies and utilization of highly estimated percentage data), it may be

Fig. 3. Triangle of effectiveness of memorization by E. Dale

THE TRIANGLE OF REMEMBERING EFFICIENCY		
after two weeks we usually remember		way of involvement
90% of what we say and do	by doing the actual action	active
	simulating real activities	
	performing a drama	
70% of what we say	giving a lecture	
	taking part in the discussion	
50% of what we hear and see	watching the actual action	passive
	watching the show	
	looking at the exhibit and its presentation	
	watching a movie	
30% of what we see	watching pictures, photos	
20% of what we hear	listening to speech	
10% of what we read	reading	

trusted on the intuition on the background, when filtrating the data from the diagram through our own experiences when we learn by various methods. If we could absolutely believe Dale, it could be – with regret – stated that only 10% of the readers of the present paper would remember it after 2 weeks and perhaps would utilize the contained herein suggestions.

In #gamification, the activation of the participants and encouraging them to, de facto, self-education is the most important factor. "Give a fish to a hungry man – you will feed him for one day; give him a fishing rod – you will feed him for the whole life", the known sentence says. In the questions of training in respect of safety, the mentioned above saying is most adequate.

Teaching the adults on safety seems to be senseless. All know that electric current "kicks" and you may fall down the stairs after losing equilibrium if we do not keep the trail. So really, all-knowing and (pseudo) aware adults twist their ankles

on the stairs or are subjected to electric shock. Therefore, their familiarization with the rules, principles and good practices must have an empiric form.

There are many possibilities of changing the training conducted in a form of lecture into #gamification, being limited probably more by imagination of the instructors than by the indispensable sources for its conducting.

The trainers who do not have the experience with #gamification, may begin from the application of the methods, employed in other domains of training such as work on "post-it" and then, discussion and classification of answers. Another easy method consists in distribution of the divided material among the participants and encouraging each of them to teach "his" part of material to the remaining persons. It is also possible to describe some exemplified situations, specific of a given profession, of case study type and encourage the discussion in groups what was mistakenly performed, where to seek the correction and



Fot. 1. Board game "Leadership in respect of safety" for managers and leaders in Philip Morris Polska SA.



how to remedy the repeated occurrence of the problems.

Where can we find the inspirations for more attractive teaching? At the beginning, I suggest the simplest and universally available games. The board games which are very popular now not only among the children and young people *may be* – with a good will and even small imagination – **utilized in running the OHS trainings**. Let us take the simplest examples: "Mushroom picking" or "Ladders and snakes". The participants, as divided into particular teams, move on the board and stop only at the specially marked fields, and implement the professional tasks. They may include the tasks connected with the initial as well as periodical training. Being equipped with the appropriate materials, they implement the "task" in order to go on. When teaching the remaining teams, they learn in the most effective way. Another excellent and a very cheap solution includes traditional and known "Play on words" (in Polish: Kalambr) or game "Tabu". The task of the trainer is to adapt the entries to a profile and profession of the participants.

If the employee has more financial means, he may buy ready-to-use board games, teaching the selected aspects in the field of safety such as "Memory", "Wheel of Fortune", or puzzles, being available e.g. in offer of the Malopolska company "TAMgram"<sup>4</sup>.

In #gamification, we may utilize computer games, e.g. applications in mobile phones and also, the excellent instrument, teaching the correct observation within the frames of risk

evaluation, that is, goggles 3D (VR). The built-in scene in the goggles present the image in the dimension of 360 degrees which transfers the trained person to virtual warehouse, manufacturing area or office where there are programmed inconsistencies to be discovered by a player. The level of difficulty should depend on the level of the knowledge of the participants. Simulation allows full focusing on a given subject, its "experiencing" and in effect, rising emotions; the players keep up the memorized elements of knowledge in the field of safety. It is worthy to mention e.g. the interesting training in VR technology by VR Premium company in cooperation with BHP Życie<sup>5</sup>.

Gabe Zichermann<sup>6</sup> is known as one of the greatest followers of gamification (that is, inter alia, utilization of video games in teaching). In his addresses during the TED conferences, he argues that #gamification (game-competition) may be utilized not only by the companies but also in teaching those persons, who are not able to engage in traditional teaching (by lecture method) in classes. Zichermann discards the argument that the addictive environment of video games does not teach the appropriate type of attention. He argues with the thesis that gamification is, as a rule, harmful, or that it is simply a fashion; he indicates the positive results of #gamification, employed outside the entertainment sector although he admits that it is not a technology without defects. He tries to convince that #gamification may be transmitted to internet banking system,

Fot. 2. The example of mailing concerning the principles of safety, as prepared by Time4 company for Philip Morris Polska Distribution



charity organizations or another sector. System of rewarding (known from video games) may encourage even the holders of gym room tickets to participate regularly in the discussed meetings. All depends on the way of designing # gamification so as to make it addictive and to affect the change of attitude, e.g. encourage to frequent participation in the sports' club classes.

The games which employ web applications are best tested among the office population. They are especially effective when an enterprise increases safety culture and wants to remind the mentioned problems to the employees, affecting the permanent changes in awareness and behaviour. Such example may be found in trainings in the field of introducing golden principles among the administration workers, implemented in a form of quiz which comes to the receivers by e-mail at internal mailing

system and is systematically implemented according to the plan, for instance every two weeks for each principle.

Additionally, the trainings being developed as mobile applications may be uploaded into any number of mobile devices such as tablets. When having a sufficient number of the devices, we may carry out the trainings and quizzes in groups, with the support of trainer in the sites, being most comfortable for the participants, what is especially significant in training of blue-collar working groups. Free-of-charge, generally available mobile applications for conducting the knowledge tests may perfectly supplement the attractive training in the field of safety, transforming the exam into quiz and, owing to it, creating a positive association with OHS.

Fot. 3. The example, showing how the training may be combined with quiz and the knowledge may be transferred in the interesting way.





**If training is interesting,  
it means undoubtedly BHP training.....**

In many big companies, visible positive effects of modern training are already visible. For instance, good results are obtained owing to consolidated approach in all affiliates (plants) of the same company. It facilitates generation of a high culture of safety. In the companies with the appropriate approach to BHP problems (treating them as the elements of management and improvement of the company and not as the unwanted necessity), we may observe a lower number of accidents, including especially those heavy ones. Of course, it cannot be achieved without engagement of people and financial means.

**The changes in occupational health and safety trainings are unavoidable.** The discussed sector must follow the changes in the contemporary education and teaching shall never stop to be the most important element of building the responsibility for safety. It is wonderful if we have successes in this domain when saving human life and health. And it is not true that we have to employ external companies in order to improve the standard of training; we may (even we have to!) try our own efforts and imagination.

All this indicates that we approach the exciting future of trainings which will become so interesting that the employees themselves will wish to participate in them!

## Sources

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## Gamification with hashtag and other important terms

**# (read: hashtag)** – as given by blog [widzialni.pl](http://widzialni.pl), according to official definition in Vocabulary of Polish Language, it is "word or phrase, preceded by sign # facilitating finding and grouping of elements". Commonly speaking, hashtags are internet road signs owing to which we are able to localise easily discussions, posts and contents connected with a given subject. Owing to symbol # situated at the beginning of a word, the phrase adopts a form of active link and aggregates all threads concerning a specified subject. It is enough to click a desired hashtag and we will see the entries in which a given entry has appeared<sup>1</sup>. Searching covers only one internet service, therefore hashtag cannot be connected with the news from another service<sup>2</sup>.

**#Gamification** (English word – the definition was invented by the founder of Bunchball company, Rajat Paharii). At present business, it is recognised as the easiest and most effective method for employment of the workers. Gamification is based upon the techniques, utilized by designers of games, used for engagement of players in order to motivate them to the expected behaviour or activity. # Gamification does not create anything new, it consists in strengthening of the existing experience via application of motivating techniques which make that the games are so addictive. Especially in on-line versions, the immediate return information encourages the players to react to the challenges, undertaking action, generally speaking to further activity and involvement in the successive stages of the game. From among the major techniques of gamification, the most known are as follows: definition of goals, passing the levels up, gaining the scores, gaining the trophies, cooperation in teams, construction of community or individual competition. # Gamification motivates via promise of being the best one in virtual dimension or via substantial rewarding<sup>3</sup>.

**Bradley's curve** – it is a diagram which refers to the state of advancement of safety culture of a given organization with the utilization of the number of cases to illustrate the maturity of the company. The discussed state of advancement is described by four stages of development on which there are the employees and the management of the company found. The first one is the most primitive in understanding of importance of the safety aspects of the company; it is REACTIVE stage, where the rate of accidents in the highest and safety is not managed practically by anybody. Avoidance of injuries is rather more a problem of luck than of the existing system for health and life protection. The procedures, if any, are only on paper and the management thinks that safety is a duty of OHS (Occupational Health and Safety) service. The second stage, being called DEPENDENT one, apart from natural instincts protecting the employees, includes the supervision to the process. The company still remains on the side: "I observe the principles because I must" but we may already refer to practising the procedures or written safety principles which are introduced under the force, however the superiors begin to pay attention to their observing. INDEPENDENT stage of safety culture development moves the employees above the most difficult threshold of the will to behave in consistency with the principles which protect us because it is good for us. The employees represent own good habits, irrespectively of their supervision, they have their own systems of values which motivate them to safe work. The stage Co-DEPENDENT is a dream of every specialist in OHS. "I observe the rules because I want to" means that the aware and motivated personnel take mutual care and creates a thoughtful community. Good practices of giving a friend's advice are implemented and the accidents do not almost appear.

<sup>1)</sup> <https://www.widzialni.pl/blog/hashtag-co-to-jest-i-gdzie-jest-uzywany/>

<sup>2)</sup> <https://pl.wikipedia.org/wiki/Hashtag>

<sup>3)</sup> <https://www.bunchball.com/gamification>