

# BASIC HEALTH AND SAFETY SKILLS ON WORKS AT HEIGHT THROUGH SERIOUS GAMES

IO1. Set of learning outcomes on prevention  
of hazards

*FOCUS GROUPS REPORT*



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# UPP GAMES

## BASIC HEALTH AND SAFETY SKILLS ON WORKS AT HEIGHT THROUGH SERIOUS GAMES

### 1. INTRODUCTION

This document shows information about the development and results from the groups carried out in Upp\_games project. The pursued aim with these meetings was to get first-hand information from health&safety experts on what are the main hazards in works at height. Besides, they were asked about what are the main preventive measures that should be implemented to avoid that these hazards become an accident or to minimize its gravity if it occurs.

Five focus groups were carried out, each one organized by one participant partner in the project. All meetings were held between April and June, 2018. These meetings are part of the programmed work in IO1 (Set of learning outcomes on prevention of hazards) in the project.

Common agenda for the meetings:

- Presentation of Upp\_games project, aims and pursued results.
- Presentation of the group framework. A different perspective was used in each group depending on the participants' profile.
- Discussion about the different proposed subjects.
- Conclusions and closure of the meeting.

In the kick-off meeting of the project the partners agreed to include a differentiated perspective to add value to the project: how the psychological elements work in construction industry workers' behavior change when they work at height.

This new perspective has been the start point for the focus groups aimed to get the experts' information on what are the most important hazards in works at height, and what characteristics should be taken into account to design the serious games for the App. The main objective is to get durable changes in workers' behaviour from prevention's point of view.



## 2. THE FOCUS GROUPS - DEVELOPMENT

Depending on the participants' profile the obtained information was different. Their expertise covered several fields, mainly: psychology, pedagogics and sociology; health and safety; prevention of labor hazards; VET; engineering; design and implementation of training actions in construction industry; design and development of gaming on health&safety...

### 2.1. FOCUS GROUP IN THE NEEDERLANDS



When → April, 2018

Participants → Four + moderator

Profile → Psychology and gaming experts

The goal of the Focus group was to establish priorities regarding the most determinant elements on the behavior, the most effective methods to achieve a safety behavior in work at height, and the possible games scenarios.

Different articles were used as inputs for the discussion:

- "How can safety in construction be influenced? A literature review of determinants of accidents and examples of interventions since 1980" by P. Swuste and F. Guldenmund.
- "A practical guide to effective behavior change: How to identify what to change in the first place" by G.J. Peters.

3 main questions were launched:

1. What is a good approach and what should be pay attention to?
2. What do you think would be suitable game designs?
3. Could you think of some possible scenarios for the serious game for working at height?

Suggested by the experts, two areas should be examined regarding question 1:

- Workers' views on and knowledge of safety from the social environment on safety behavior. It would be interesting to know the workers' opinion about who is the responsible for the safety climate that is lived in the site.



- Workers' reasons (determinants) for unsafe behavior, taking social environment and working environment factors into account and focusing on personal and environmental determinants.

Regarding question 2 and 3, experts concluded that only after knowing the workers' views and reasons, a suitable game design can be created → once the determinants for unsafe behavior are clear, a good intervention method can be selected.

The participants pointed out that the number of possible scenarios could be reduced to a few dozen generic scenarios. Furthermore, the game (learning) effect could be boosted by explaining the desired behavior to the player.

Regarding measuring the success of the game (or behavior change of the player), the suggestion was that it could be done "in-game", measuring the response to various dangerous situations and including a level of skill.

## 2.2. FOCUS GROUP IN GERMANY



When → May, 2018

Participants → Four + moderator

Profile → Bridge constructor engineer; APP designer; expert in works at height; expert in the theoretical field of VET

After presenting the project goals, the participants answered the proposed questions, within a dynamic discussion on a round table. The ideas to be debated and participants' answers were the following:

### 1. The greatest risks concerning the works at height

The biggest risk concerning this kind of work is a lack of preparation. Most of the accidents happen due to a bad preparation. Very often these accidents happen when working at lower heights of 2 to 6 meters above the ground, because workers underestimate the dangers. Experience is a key factor with the appropriate use of the PPE, so, a lot of training and work with experts is needed.

### 2. Methods used by the organization to face these risks properly

All the experts said that their organizations offer training about work at height. Nevertheless still accidents happen, rarely though.

### 3. Specialized trainings concerning work at height

Specialized trainings are offered by climbers with licenses, who can upskill even experienced workers concerning, for example, the use of safety harnesses and the scaffolds.

### 4. Focus on workers' training or focus on conditions of works at height

The organizations offer enough opportunities even for lower skilled workers to gain sufficient knowledge and skills for these tasks. But the experts also indicated that especially unexperienced workers still lack these skills often. More regular trainings could help to face these challenges properly.

### 5. Level of usability of learning material developed as an App to improve the training

The experts indicated that additional training material may help targeting the group of young unexperienced workers. One expert highlighted that it would be useful to offer a full package of written learning material, with an attractive application and in connection practical work.

## 2.3. FOCUS GROUP IN SLOVENIA



When → April, 2018

Participants → 12 + moderator

Profile → Headmaster of VET school; company representative; H&R engineer; faculty teacher; public authority (VET regulatory body)

Two questions were launched to the participants in order to encourage the discussion.

1. *What are the risks of OSH in VET schools identified and tried to address (related to work at heights)?*

- There is not a real practice about OSH in VET schools, only theory. Pupils in general have basic knowledge about this issue before going to construction site. In the first week of practical lesson in school workshops, every teacher informs students about OSH, but only for the part that relates to work in the training workshop.
- Employers warn the pupils that they should not go at a height to work (as a law from 1967 says, a young pupil should not be involved in this kind of works). So, it's the sole responsibility of the employer to educate employees on the OSH specifics





for the work and the employer is the responsible for anything that could happen in the case of accident/incident.

- Training on OSH in work at height should be introduced in the school curriculum in Slovenia much earlier. There is training on this issue in the internal training in companies, but it is limited in contents and time. First, the worker is sent to a medical examination and then, he/she is involved in series of training so that everyone is aware about the work process at a height.

## *2. Are there also any tools of self-evaluation to check your ability for working at height?*

- The medical certificate is renewed, but usually, construction workers tell spontaneously that they have a problem working at a height (such as fear, phobia, etc.).
- In practice, training and testing is all on the employer, even the quality of the training. Work at height should be controlled, but for some workers (especially young people) would not be profitable to get training in a VET school and pay 250€ for a medical examination. So, it is not easy to solve this situation in Slovenia.

## **Final conclusions and proposals**

Participants were asked about their ideas and thoughts about how the training should be, what would they do and how (wishes and recommendations), if the cost is not a problem.

- An App for work at height will certainly help to raise awareness among young people about work at height, and it could change behavioural patterns. The App should show examples of what can happen on the construction site or at work at heights and what should be done to avoid accidents/incidents.
- Starting to raise awareness about works at height should be done as soon as possible.
- Simulators and simulations are interesting solutions for changing behaviour patterns.
- VET schools can only raise awareness, but verifying practical skills should not only be the domain of these schools.
- Employers think that it would be logical to include theoretical and practical OSH training regarding work at height into students' education, always under appropriate supervision.



## 2.4. FOCUS GROUP IN ITALY



When → June, 2018

Participants → Seven + moderator

Profile → Health&Safety experts in the construction industry

The goal of the Focus group was to establish the major risk factors when working at height and all the related factors.

The opening question for the group was: what does working at height mean? → Experts agreed that as it is stated by law, it is a work activity that exposes the work to a risk of falling from a height of more than 2 meters compared to a stable plan. It includes working on roofs, cranes, mobile elevator work platforms, and smaller maintenance works.

The participants analyzed the most common hazardous scenarios and the most important aspects to take into consideration during the risk assessment:

- Working on scaffoldings → one of the most dangerous situation is that not all elements are correctly or fully installed (rails, toeboards, cross braces, etc.), or not to check if the ladder access gap in planks are protected with guardrails or trapdoors.
- Working on roofs → the biggest safety mistakes are related to the access to work area which not always is provided by proper roof ladders, crawling boards or scaffolding. In smaller construction sites (like the roof for maintaining of a private house) essential PPE like safety harnesses or lifeline are not used in many cases. This is a minor problem in bigger or more organized construction sites.
- Working on lifting platforms → the major safety mistakes is that operators overextend outside of the basket to better reach the working area, and they don't wear the appropriate harness.
- Working on ladders → the risk is often underestimated. It happens that ladders are not properly secured at the top and bottom, or workers carry materials up ladders or steps causing the fall of materials and tools, or even the ladder itself falls with persons on it.

Other additional dangers:

- Suspension risk → when a worker falls and remains suspended because the safety harness avoids the impact on the ground. The risk is to compromise the blood





circulation or a rapid deterioration of the vital functions. So, the rescue must be very rapid.

- Environmental risks → meteorological conditions, falling objects from above, slippery surfaces, structural failures, exposure to environmental electrical discharges, bites of dangerous animals, etc.
- Related risks → conditions or events that can favor a fall from above (vertigo, poor adherence of footwear, dazzle or reduction of sight, heat or sunburn).

The involvement in prevention should make the workers the protagonists which make them feel more responsible.

The participants agreed that it is important to focus the training on workers from these perspectives:

- Analyzing the possible obstacles to safety:
  - Personal → age, experience, convictions, perception of the risk, etc.
  - Social, group dynamics → need of membership, approval, leadership formal and informal, etc.
  - Organizational culture → principles, values, myths, communications, etc.
- Changing an attitude evaluating three aspects:
  - Cognitive → inform, train, demonstrate, with references to data, statistics, standards, etc.
  - Emotional → explore pre-existent emotions, consider group dynamics, send messages of emotional content.
  - Behavioral → establish habits, acting on the consequences of behavior.



## 2.5. FOCUS GROUP IN LUXEMBOURG



When → April, 2018

Participants → Five + moderator

Profile → Head of Health&Safety Department; Head of Construction Department; trainers in technical construction, H&S, scaffolding, and wood construction.

Two questions were launched to the participants. This is the information given by the attendees to each one:

1. *What are most frequent accidents or risks when working at height in the building sector? Why?*

- Use of scaffoldings produce a lot of accidents.
- Lacks of knowledge on: using the harness, checking the scaffold.
- Wrong use / no use of PPE for working at height in the building and for using boom lift.
- Wrong use or wrong control of rolling scaffolding or façade scaffolding. All user should have the knowledge to recognize if a scaffolding is appropriate or improper before using it.
- No railing or improper construction.
- Risk behavior of workers, endangering.
- The management of the building site is very important in the safety perception. For example, if there is a big pressure on planning and cost exist, workers' can't work correctly with safety rules.

2. *What are your expectation for an App on safety? Will you use it?*

- Trainers noticed that the App should integrate only situations which cannot be reproduced in reality, such as an accident, a fall, etc.
- Trainers wait a plug and play system: the system shall be easy to use, without technical problems or hard calibration.
- The App should be adapted to the target public: easy language, a lot of picture or/and videos.
- The trainers should be convinced by the efficiency of the App. If not, motivating them to use it with their trainees will be difficult.
- The solution should be integrated in the pedagogical schedule of trainings.
- Experts (age between 35 and 50) could image using the App in their trainings, but must be trained to use it correctly.



## 2.6. FOCUS GROUP IN SPAIN



When → May, 2018

Participants → 10 + moderators

Profile → Experts in: pedagogics, prevention of labor hazards, gaming and development of serious games in H&S; and trainers in the construction industry.

A participative dynamic divided into three phases was used:

1. First phase. It was based on the evaluation of eight factors already identified influencing unsafe behavior in works at height: individual factors – working conditions – work group – characteristics of the contractor – on-site supervision – project management – organization – society. The participants pointed out the four factors considered most relevant.
2. Second phase. Most focused in a detailed assessment of these four factors, focusing on those sub-factors, conditions and characteristics that are decisive.
3. Third phase. Focused on the application of the conclusions obtained to possible scenarios and proposals for the development of the games.

### Conclusions and comments for first and second phases

**First phase.** The four factors that prevailed were, in this order: individual factors; on-site supervision; project management; society.

It is essential not to lose sight of the final recipient of the “serious game”, because the point of view and approach is completely different.

The participants agreed that some of the eight factors have an important degree of interrelation and influence each other (such as organization and management of the project).

Within the individual factors, risk perception seemed important. Sometimes, workers have the feeling that nothing dangerous could happen to them, even if prevention is internalized in the organization and PPE are available.

Some difficulties inherent in the development of a project on this subject in a European scope were perceived differently, depending on each society, risk and security.

It was said that individual determinants are enhanced or lowered by the society / climate of the organization.

It was highlighted that previous personal experience influences the reception of the game. The perception of the risk is directly linked to emotion.

Prevention is everyone's business. The participants indicated that the game shows the interaction between profiles and how they all influence an accident may be interesting.

**Second phase.** The highlighted sub-factors were:

- In individual factors area: attitude-perception and competence.
- In work supervision area: the commitment to safety of the organization, and the communication style.
- In project management area: management style, competences and capabilities.
- In society area: education, training, social support.

The risks perception is linked to habits: the risk is internalized by repetition, and at one point is not perceived any more.

For successful "serious game" it is important to have a story, not a simple test of knowledge.

For risk perception, education is very important, since there is a clear relation between social perception and individual perception.

### **Proposals for scenarios and games**

- Real scenarios based on cause-effect where the player makes a decision and can observe the results of his choice. It could combine tests to identify risks and tests to check his theoretical knowledge on safety.
- Unite perception and competence through a game based on causal trees. This causal tree also has the advantage that, depending of the choice, the experience changes every time you play.
- The more interaction, the greater acquisition of skills. For each screen completed, a competence is acquired.
- Positive reinforcement and visibility of the social impact can be two very interesting strategies to address the game.
- Focusing on the different communications styles and the results they produce can be other interesting possibility.
- The games can also serve to reinforce the knowledge of security duties and rights in the different participating profiles.





- It can be interesting as reinforcement to show the social impact of the accident/incident and the costs that they have.



### **3. CONCLUSIONS**

\*Safety should not be seen as a burden of the Prevention Service Inspections but as a personal interest that leads advantages to the individual and the work group.

\*It should be established a system which prize the correct behaviors rather than sanctioning incorrect behavior to motive the safe behaviors at work

\*The App could be interesting to put in situation trainees to correct their habits when working at height.

\*The tool must impact the managers too and that it must be easy to use with a lot of pictures and/or films.

\*Trainers must be trained to use the tool.

\*Not forgetting the emotional aspects of the behavior is essential to get stable changes of workers' behavior.





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