

## Task 02/A1

### Defining key situations



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## INTRODUCTION

One of the main pillars of this project was the creation of an interactive multimedia learning tool available to all workers in the construction sector, with the main objective of creating safe working environments for the use of robotic machinery. A central factor is the accident due to being run over, as well as high noise levels or electric shocks, which are very frequent in this sector. To avoid such accidents, it is important to be aware of the risks involved in the use of such machinery.

For this reason, it was necessary to develop a tool to raise awareness of the existing risks derived from the application and use of these machines, and to make available to the educational and professional community all the necessary training materials, as well as to take advantage of the different possibilities offered by new technologies as a means of dissemination and visualisation of the materials produced.

This report is included in the task *"O2/A3. Production of the scripts of the virtual reality (VR) immersive safety training environment"*, corresponding to Intellectual Output 2 *"Procuction of Virtual Training Tool"* of the SafeCRobot project.

For the realisation of this task, he has had the support of all the partners in the production of the scripts (story board).

Each script includes the details: where the situation takes place, characters, full explanation of the background, action to be carried out, etc. The partners have reviewed the scenarios and made contributions and improvements.

The scenarios have been approached from an interactive point of view to make the training tool attractive to workers. In these scenarios, appropriate actions to achieve a safe and environmentally sustainable workplace are shown.

The report and all the information about the project are available in the following url:

- SafeCRobot project web: <https://safecrobot.pwr.edu.pl/en/>

## SITUATION 1

### Drones (Unmanned Aerial Vehicle) – Preparing for flights on construction sites in day light

#### ASOCIATED RISKS:

#### Safety risks:

- Operator falling from height
- Distraction of workers
- Collision
- Device failure
- Losing control of the device
- Falling or hitting a ground obstacle or a person
- Hazards resulting from the local terrain conditions and weather conditions
- Third parties / animals
- Fire hazard
- Electric shock
- Falls to the same level, tripping
- Blows, cuts

#### Chemical risks:

- Dust inhalation

#### Physical risks:

- Noise

## SITUATION 2

### Drones (Unmanned Aerial Vehicle) – Flight by unmanned aerial vehicle during favourable weather conditions.

#### ASOCIATED RISKS:

#### Safety risks:

- Operator falling from height
- Distraction of workers
- Collision
- Device failure
- Losing control of the device
- Falling or hitting a ground obstacle or a person
- Hazards resulting from the local terrain conditions and weather conditions
- Third parties / animals
- Fire hazard
- Electric shock
- Falls to the same level, tripping
- Blows, cuts

	<b>Chemical risks:</b> <ul style="list-style-type: none"> <li>- Dust inhalation</li> </ul> <b>Physical risks:</b> <ul style="list-style-type: none"> <li>- Noise</li> </ul>
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### SITUATION 3

Drones (Unmanned Aerial Vehicle) – Flight by unmanned aerial vehicle during adverse weather conditions.	
ASOCIATED RISKS:	<b>Safety risks:</b> <ul style="list-style-type: none"> <li>- Operator falling from height</li> <li>- Distraction of workers</li> <li>- Collision</li> <li>- Device failure</li> <li>- Losing control of the device</li> <li>- Falling or hitting a ground obstacle or a person</li> <li>- Hazards resulting from the local terrain conditions and weather conditions</li> <li>- Third parties / animals</li> <li>- Fire hazard</li> <li>- Electric shock</li> <li>- Falls to the same level, tripping</li> <li>- Blows, cuts</li> </ul> <b>Chemical risks:</b> <ul style="list-style-type: none"> <li>- Dust inhalation</li> </ul> <b>Physical risks:</b> <ul style="list-style-type: none"> <li>- Noise</li> </ul>

### SITUATION 4

Drones (Unmanned Aerial Vehicle) – Preparing to fly an unmanned aerial vehicle (drone) at night	
ASOCIATED RISKS:	<b>Safety risks:</b> <ul style="list-style-type: none"> <li>- Operator falling from height</li> <li>- Distraction of workers</li> <li>- Collision</li> <li>- Device failure</li> <li>- Losing control of the device</li> <li>- Falling or hitting a ground obstacle or a person</li> </ul>

	<ul style="list-style-type: none"> <li>- Hazards resulting from the local terrain conditions and weather conditions</li> <li>- Third parties / animals</li> <li>- Fire hazard</li> <li>- Electric shock</li> <li>- Falls to the same level, tripping</li> <li>- Blows, cuts</li> </ul> <p><b>Chemical risks:</b></p> <ul style="list-style-type: none"> <li>- Dust inhalation</li> </ul> <p><b>Physical risks:</b></p> <ul style="list-style-type: none"> <li>- Noise</li> </ul>
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## SITUATION 5

Autonomous Site Transport Vehicle – Indoor site conditions	
<b>ASOCIATED RISKS:</b>	<p><b>Safety risks:</b></p> <ul style="list-style-type: none"> <li>- Falls to the same level, tripping.</li> <li>- Falls to different levels.</li> <li>- Blows or crushing due to falls of transported cargo.</li> <li>- Collisions, crashes, blows or crushing by mobile machinery.</li> <li>- Entrapments, blows and cuts.</li> </ul> <p><b>Chemical risks:</b></p> <ul style="list-style-type: none"> <li>- Inhalation of fumes or gases from machinery.</li> </ul> <p><b>Physical risks:</b></p> <ul style="list-style-type: none"> <li>- Noise</li> </ul>

## SITUATION 6

Autonomous Site Transport Vehicle – External and outdoor site conditions	
<b>ASOCIATED RISKS:</b>	<p><b>Safety risks:</b></p> <ul style="list-style-type: none"> <li>- Falls to the same level, tripping.</li> <li>- Falls to different levels.</li> <li>- Blows or crushing due to falls of transported cargo.</li> <li>- Collisions, crashes, blows or crushing by mobile machinery.</li> <li>- Entrapments, blows and cuts.</li> </ul> <p><b>Chemical risks:</b></p> <ul style="list-style-type: none"> <li>- Inhalation of fumes or gases from machinery.</li> </ul> <p><b>Physical risks:</b></p> <ul style="list-style-type: none"> <li>- Noise</li> </ul>

## SITUATION 7

Action scenario for remote-controlled robots using the example of a demolition robot (General Handling)	
ASOCIATED RISKS:	<p><b>Manipulation of safety devices (sensors):</b></p> <ul style="list-style-type: none"> <li>- Consciously within the context of set-up and maintenance</li> <li>- Unknowingly due to operating errors</li> </ul> <p><b>Overturning:</b></p> <ul style="list-style-type: none"> <li>- Unevenness of the surface</li> <li>- Too much inclination</li> <li>- Loads too great</li> <li>- Incorrect assessment of the demolition materials (too firm, too hard, too massive)</li> </ul> <p><b>Incorrectly estimated or unforeseen robot movements:</b></p> <ul style="list-style-type: none"> <li>- Knocking people over,</li> <li>- Bruises</li> <li>- Contusions</li> <li>- Pinching</li> <li>- Running over the feet</li> </ul> <p><b>Uncontrolled flying around of demolition material:</b></p> <ul style="list-style-type: none"> <li>- Severe injuries to the entire body</li> </ul> <p><b>Improper maintenance (tool change, lubrication).</b></p>

## SITUATION 8

Remote-controlled robots using the example of a demolition robot (Handling of demolition robots <b>inside</b> of the building)	
ASOCIATED RISKS:	<p><b>Manipulation of safety devices (sensors):</b></p> <ul style="list-style-type: none"> <li>- Consciously within the context of set-up and maintenance</li> <li>- Unknowingly due to operating errors</li> </ul> <p><b>Overturning:</b></p> <ul style="list-style-type: none"> <li>- Unevenness of the surface</li> <li>- Too much inclination</li> <li>- Loads too great</li> <li>- Incorrect assessment of the demolition materials (too firm, too hard, too massive)</li> </ul> <p><b>Incorrectly estimated or unforeseen robot movements:</b></p> <ul style="list-style-type: none"> <li>- Knocking people over,</li> <li>- Bruises</li> <li>- Contusions</li> <li>- Pinching</li> </ul>

	<ul style="list-style-type: none"> <li>- Running over the feet</li> </ul> <p><b>Uncontrolled flying around of demolition material:</b></p> <ul style="list-style-type: none"> <li>- Severe injuries to the entire body</li> </ul> <p><b>Improper maintenance (tool change, lubrication).</b></p>
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## SITUATION 9

Action scenario for remote-controlled robots using the example of a demolition robot (Handling of demolition robots <b>outside</b> of the building)	
ASOCIATED RISKS:	<p><b>Manipulation of safety devices (sensors):</b></p> <ul style="list-style-type: none"> <li>- Consciously within the context of set-up and maintenance</li> <li>- Unknowingly due to operating errors</li> </ul> <p><b>Overturning:</b></p> <ul style="list-style-type: none"> <li>- Unevenness of the surface</li> <li>- Too much inclination</li> <li>- Loads too great</li> <li>- Incorrect assessment of the demolition materials (too firm, too hard, too massive)</li> </ul> <p><b>Incorrectly estimated or unforeseen robot movements:</b></p> <ul style="list-style-type: none"> <li>- Knocking people over,</li> <li>- Bruises</li> <li>- Contusions</li> <li>- Pinching</li> <li>- Running over the feet</li> </ul> <p><b>Uncontrolled flying around of demolition material:</b></p> <ul style="list-style-type: none"> <li>- Severe injuries to the entire body</li> </ul> <p><b>Improper maintenance (tool change, lubrication).</b></p>

## SITUATION 10

Remote Controlled Equipment (Diggers/excavators) - External and outdoor site conditions	
ASOCIATED RISKS:	<p><b>Manipulation of safety devices (sensors):</b></p> <ul style="list-style-type: none"> <li>- Consciously within the context of set-up and maintenance</li> <li>- Unknowingly due to operating errors</li> </ul> <p><b>Overturning:</b></p> <ul style="list-style-type: none"> <li>- Unevenness of the surface</li> </ul>



	<ul style="list-style-type: none"> <li>- Too much inclination</li> <li>- Loads too great</li> <li>- Incorrect assessment of the demolition materials (too firm, too hard, too massive)</li> </ul> <p><b>Incorrectly estimated or unforeseen robot movements:</b></p> <ul style="list-style-type: none"> <li>- Knocking people over,</li> <li>- Bruises</li> <li>- Contusions</li> <li>- Pinching</li> <li>- Running over the feet</li> </ul> <p><b>Uncontrolled flying around of demolition material:</b></p> <ul style="list-style-type: none"> <li>- Severe injuries to the entire body</li> </ul> <p><b>Improper maintenance (tool change, lubrication).</b></p>
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