USER GUIDE

VIRTUAL INDUS Electrical Accreditation

Version V1.1

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1. Introduction

This document review in detail the different functionalities of the **VIRTUAL INDUS** simulator. This simulator works with the virtual-reality headset **HTC Vive.**

In the first part, we will review every functionality non-related to a sequence: headset adjustment, teleportation, controls etc.

The second part explains every instruction related to a sequence/exercise of the simulation.

1.1 Installation

For more information about the HTV VIVE system and the Virtual Indus software, please refer to "DTVI0600004__F-2.2_Installation.pdf" documentation.

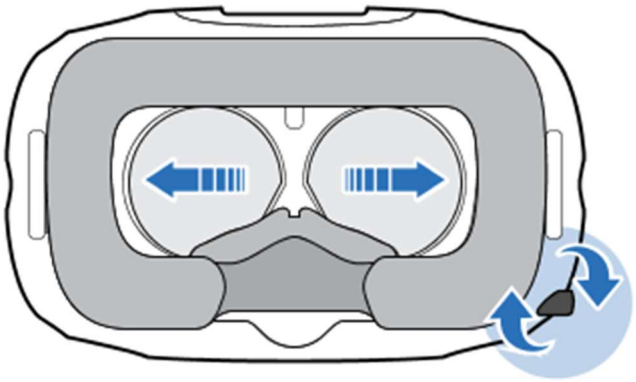
2. General Operation

2.1 HTC Vive

The **HTC Vive** is a virtual-reality headset with a refresh rate of 90Hz. It allows a view angle of 110° and have a screen of 1200 x 1080 pixels for each eye, or 2160 x 1200 pixels. This headset also has sensors as gyroscope, accelerometer and laser position sensors.

2.1.1 Interpupillary Distance

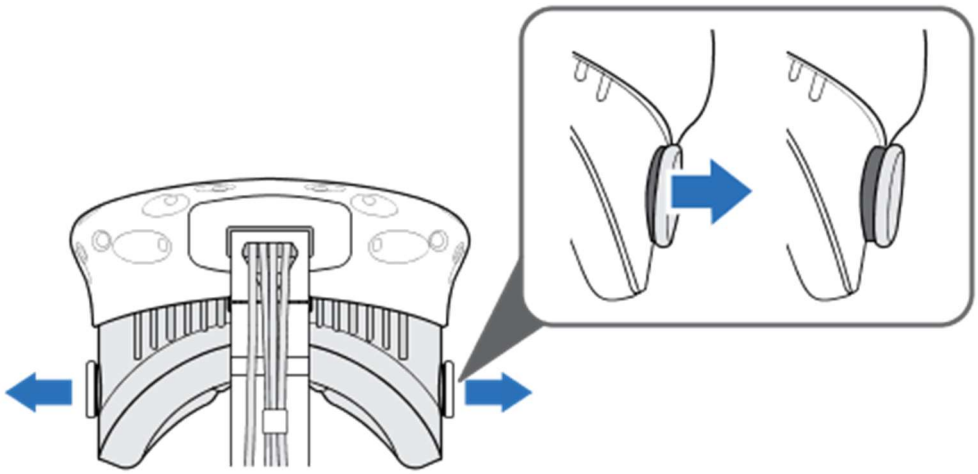
The **interpupillary distance** is the distance between the pupil center point of each eye. It can be adjusted manually with a wrench adjuster on the right side of the headset.



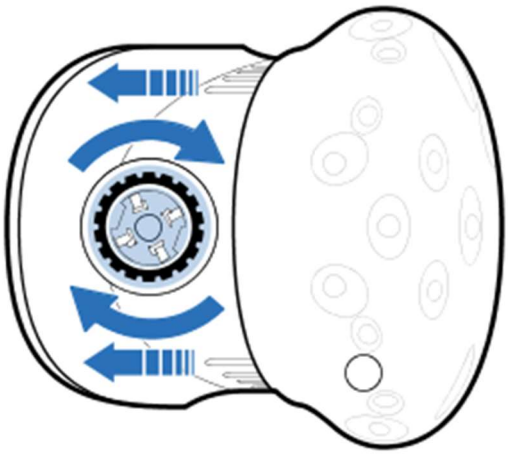
When adjusting the headset, a window pops up and displays the actual distance between the center of the glasses. It's important to adjust this interpupillary distance (IPD) to see correctly the different virtual elements in the headset.

2.1.2 Glasses Distance

If you wear corrective glasses, you can adjust the move away of the glasses by pulling the buttons located on both sides of the headset.



Once it is unlocked, turn the buttons for adjusting the glasses closer or further from your eyes.



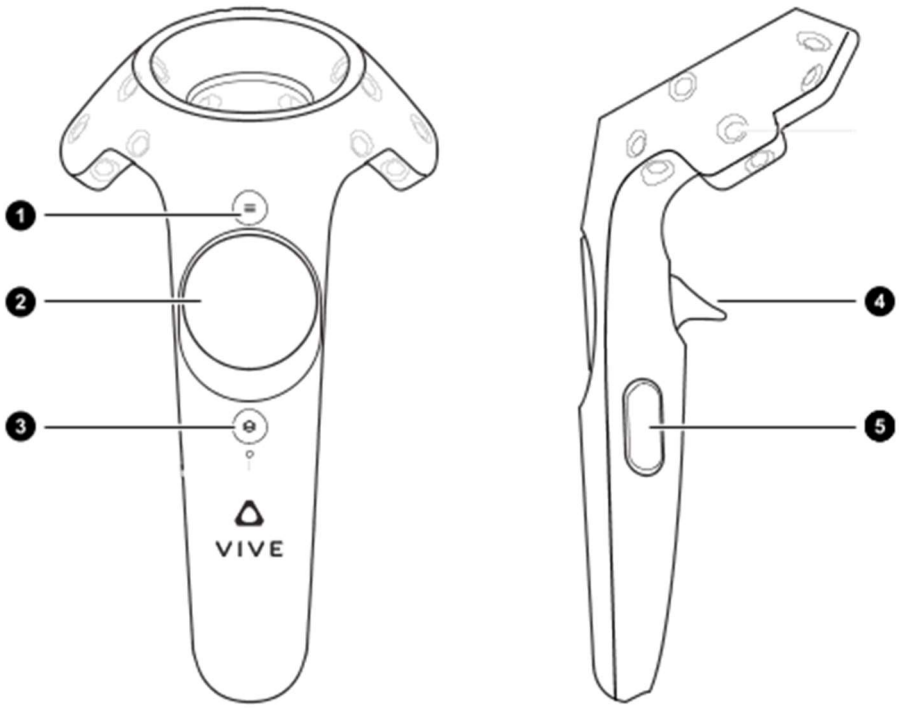
Note: increase the distance only if it's necessary. Indeed, closer are the glasses to your eyes, better will be your field of view when you use the headset.

2.2 Lighthouses

There are 2 lighthouses deliver with the **Vive**. Those are infrared lamps to estimate the headset and controllers position spatially.

2.3 Controllers

The **Vive** controllers are represented in the picture above. The main functionality is to interact with objects in the virtual space.



There are have 5 actuators:

1) Top button (menu button),
2) The trackpad (button and analog joystick),
3) Bottom button bas (bouton de system),
4) The trigger,
5) The input/grip button (located on each side of each controller)

For **VIRTUAL INDUS,** the right and left controllers represent the two virtual hands.

Figure 1 – Virtual hands in VIRTUAL INDUS

Each controller has its own functionalities concerning the menu **button (1).**
The left one is used to display the configuration screen named “Help”. You cannot modify this button.

Figure 2 – Controller keys configuration Interaction

To set off interactions with the key interface and some of the buttons in the virtual space, hands must move to point something out. A laser will appear, at the extremity a cylindrical target.

This target represents the impact point of the laser on a virtual object.

If the interaction with the target is allowed in the virtual space, you can interact with the tactile interface, pressing the buttons or remaining pressed on the **trigger button (4).**

When the object is interactive and can be catch, it becomes green with the contact of the hand.

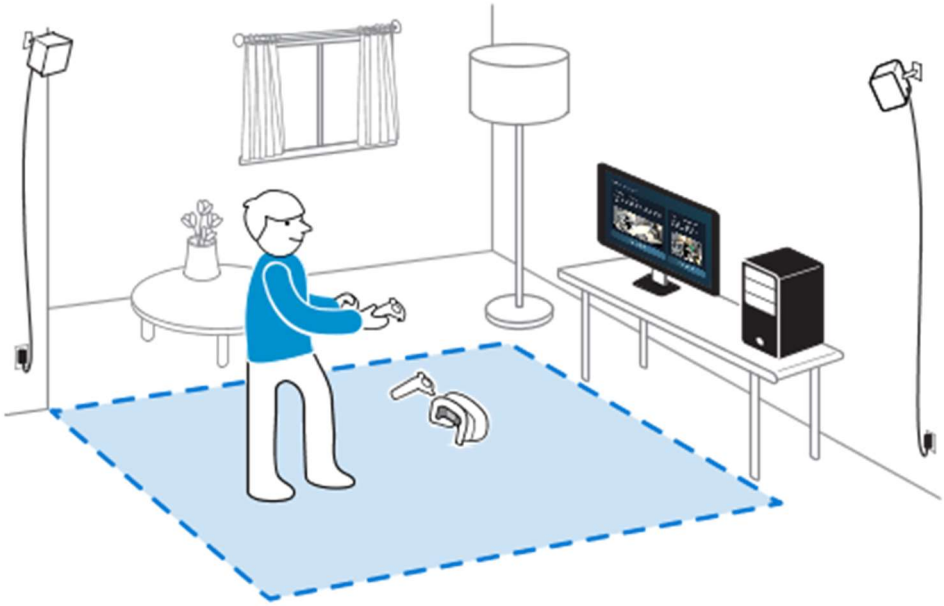
Figure 3 – Interactive basket

Some object can be grabbed and moved. Once those objects are on hand, you must stay pressed on the controller. The hand visual will disappear and only the object representation will remain. A blue ghost indicates where the object can be dropped.

Figure 4 – Basket interacting

2.3.1 Teleportation

Teleportation is a way to move in the virtual space of **VIRTUAL INDUS**, allowing the trainee to deal with physics constrains of virtual space called “room-scale”. When you get close to the room-scale border, a grate path appears to warn you.



By pressing the **touchpad (2)**, you can activate the teleportation option. As long as the button is pressed, you can choose to teleport yourself. When you release the button, the teleportation will be effective. You can cancel the teleportation if the touchpad is not release, by pressing the **grip button (5).**

Figure 5 – Visuals display during the teleportation

A parabolic and discontinuous pointer will be visible. It represents the path crossed during a teleportation. If the teleportation is accessible and possible; the pointer will appear in **blue**; otherwise, it will appear in **red.**

When the teleportation is possible, the exact landing place is represented in **orange** surrounded by a **green** square. The green lines will represent the room-scale limits.

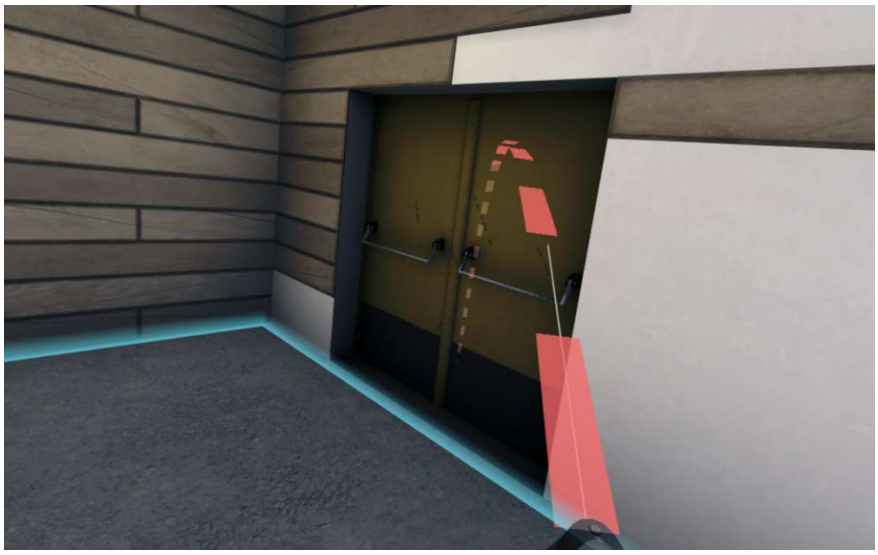


Figure 6 – Teleportation cannot be made across walls

The blue gleams that border the room represent the limited zone where you can move and teleport during the simulation.

Figure 7 – Possible moving zone

2.3.2 Zoom

Activate the zoom by pressing the **input button (5)** on the right controller. Disactivate it by releasing the button.

Figure 8 – Distant

Figure 9 - Zoom interface

2.3.3 Screenshot

When an exercise is ON, you can do screenshot by using the **menu button (1)** on the right controller. A sound indicates that the screenshot is done.

Those are save in a “Records” file. A shortcut is automatically created on the desktop when the simulator is installed. It is in the “Virtual Indus” file, Start menu.

2.4 Moving

2.4.1 Virtual Workshop

This is a 3D rectangular virtual space where the trainee will work on different industrial and electrical procedures.

Figure 10 – Virtual Workshop

The virtual workshop floor defined the moving space available for the trainee.

2.4.2 Walking

You can walk in the available Virtual Indus space by taking care not to tangled with the cable of the Vive and bumping in the different obstacle of the room-scale.

2.4.3 Teleportation

The other way to move is the teleportation. It works as explain in the **Teleportation chapter (2.3.2).**

2.5 Virtual Screen

Figure 11 – Main Virtual Screen

Virtual Indus virtual screen appears in the virtual workshop. The screen automatically adapts to the height of the trainee.

In this interface, the trainee can log in and launch exercises according to his/her pedagogical curriculum.

2.5.1 Connection to VULCAN

If the connection is not detection or Internet is OFF, the following message appears:

In that case, the trainee has 2 options:

- Try to reconnect if you are sure that the computer is connected to Internet
- Continue with the off line mode

Using the option #2, the system will use a local database of Vulcan including users. Their curriculum, results will not be register in the online database.

2.5.2 Parameters

The image below represents the setting bar of the virtual screen:

Figure 12 Setting Bar

The setting bar has the following icons:

Languages

Volume

User Log out

Disconnect

Before the exercise, the following icon appears

Recording

This is an option that allows recording the exercise.

Activating this option can deteriorate the performance of the system, depending on how powerful the computer is.

When the recording option is activated, a “REC” indicator appears in red on the tablet.

*Finally, videos are recorded with a poor resolution to reduce the storage corkacity of **Virtual Indus.** Videos*

are saved in the **"RECORDS"** file, as well as screenshots.

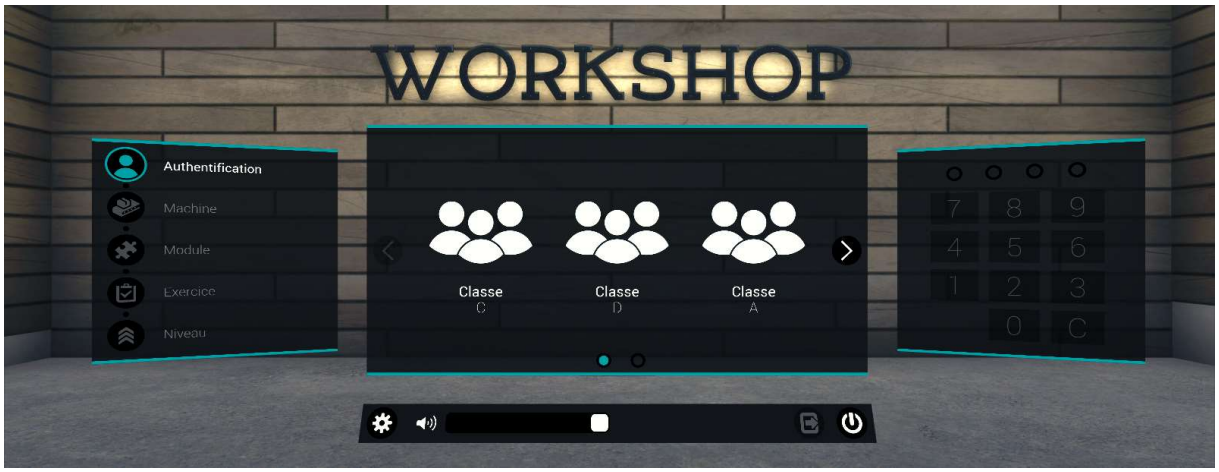
Figure 13 – Video Recording Activated

2.5.3 Authentication

The first step when using the virtual screen is login. Two steps: choosing the class then the trainee.

2.5.3.1 Choose a class

When choosing the class, you see the following interface:



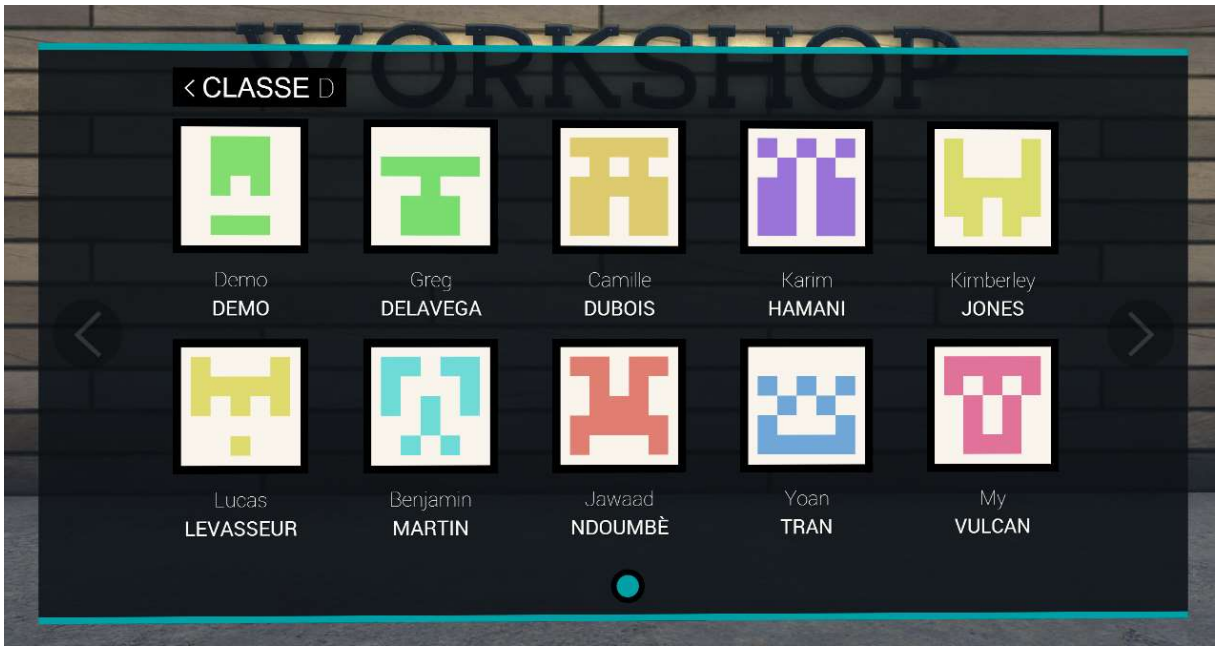
Class name appears under each class icon. This name is limited in terms of typeface and once the limit is reached, the class name will be cut and followed by "…".

At the bottom of the screen, the small dots represent the number of pages available. In the figure above, we notice two pages. To go on the second page, click on the right arrow. A maximum 3 classes are display per page.

Note: To navigate on the virtual screen use the trigger on one of the controllers.

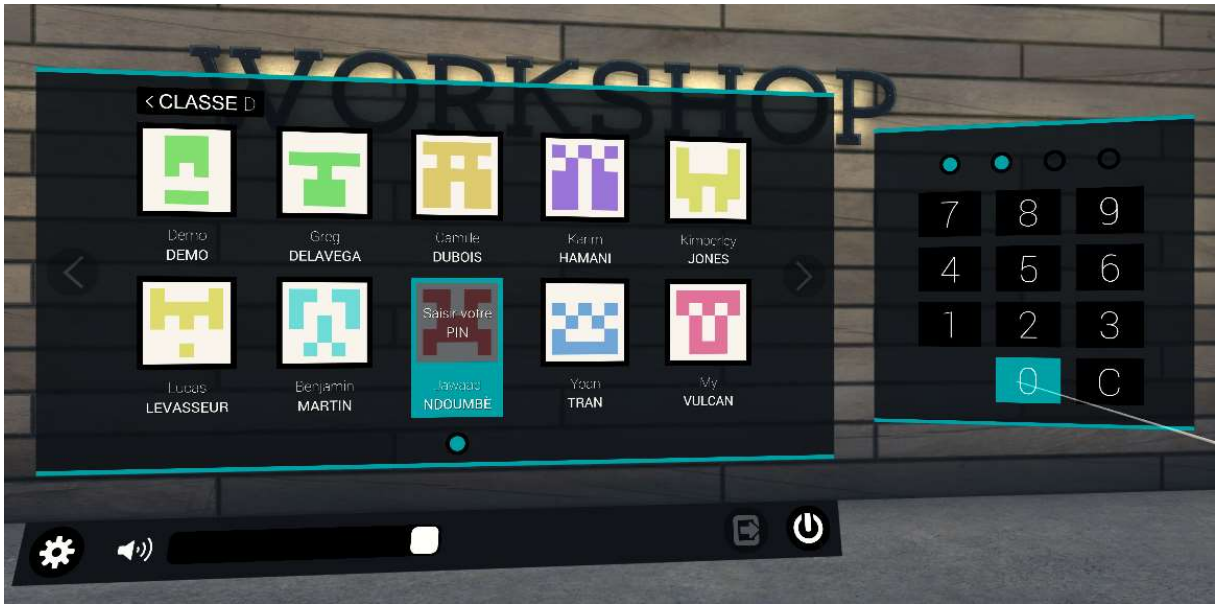
2.5.3.2 Choose the trainee

After selecting a class, the trainees registered are display as below:



To browse between the trainee's pages, select the right arrow. To go back on the class choice, you must select the button **"Class"** located on the top of the screen. Maximum 10 trainees are displayed on each page.

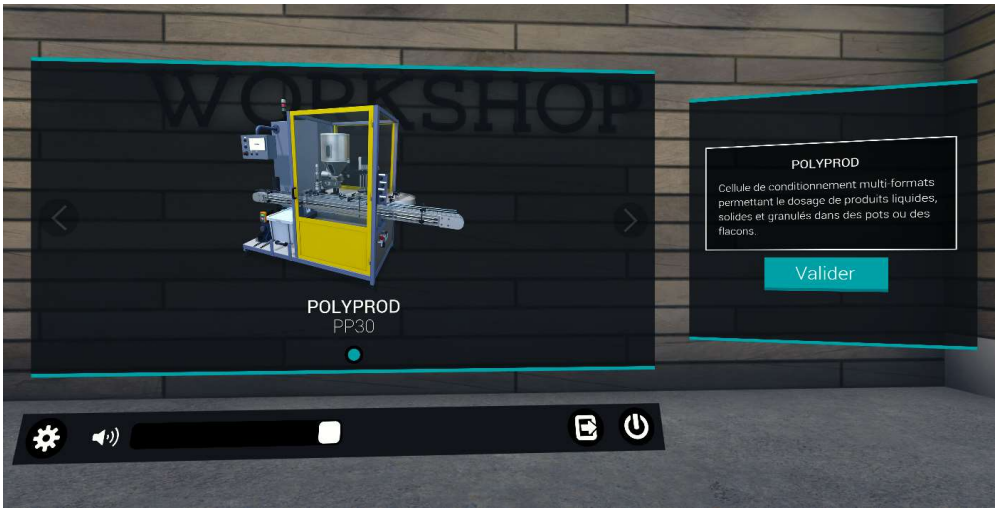
When selecting a trainee, the right keypad is activated, and you can enter the PIN code associated to finalize the authentication:



2.5.4 Selecting a Machine

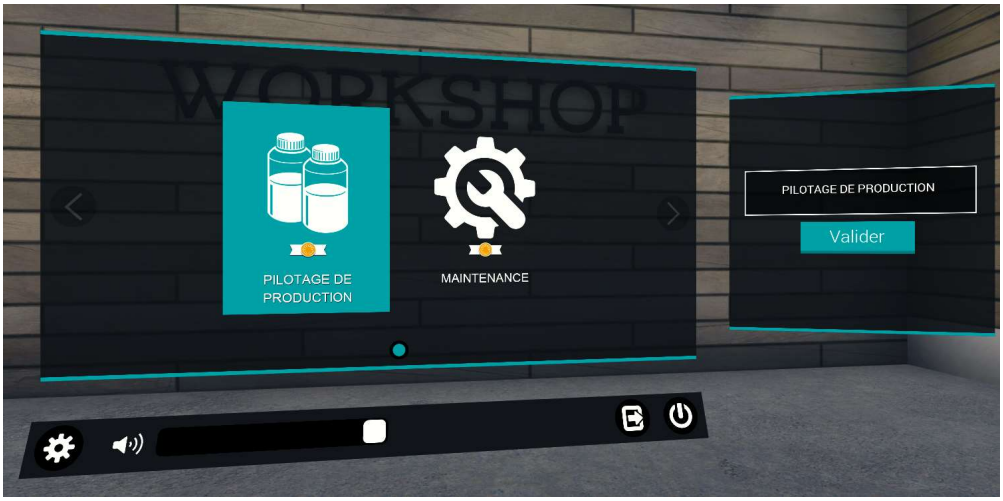
Choose the machine you want to use, works only with the **free curriculum mode**. A small description of the machine is displayed on the right side of the screen. Select the machine by pressing **Validate.**

One machine is display per page. Validate the section by clicking on the image. The process is the same for the following selection (exercises, levels, modules).



2.5.5 Selecting a Module

The available modules are displayed according to the chosen machine. Maximum 3 modules are displayed per page.



Under each module, 3 possibilities:

- No icon: the trainee never did the exercise of the module
- Yellow icon: module is in progress
- Green icon: the module is done

No Icon	the trainee never did the exercise of the module
	At least one level or sequence of the module has been launched or validated. In progress
	All sequences of the module are validated. The module is done.

2.5.6 Selecting an Exercise

The available exercises are displayed. A brief description of each exercise is available on the top right as well as evaluation criteria.

An icon indicates if at least one level of the sequence has been launched or all level validated.

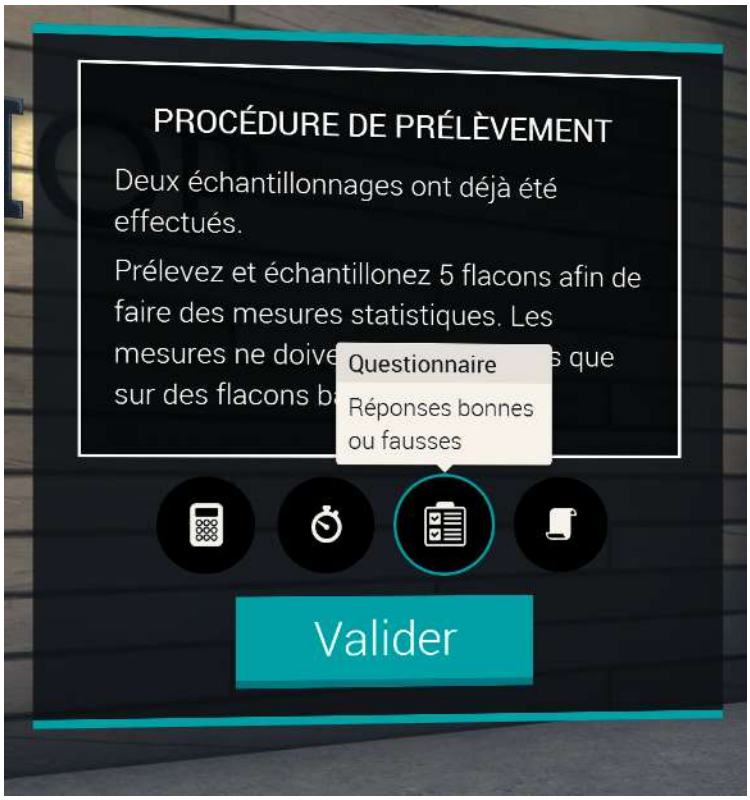
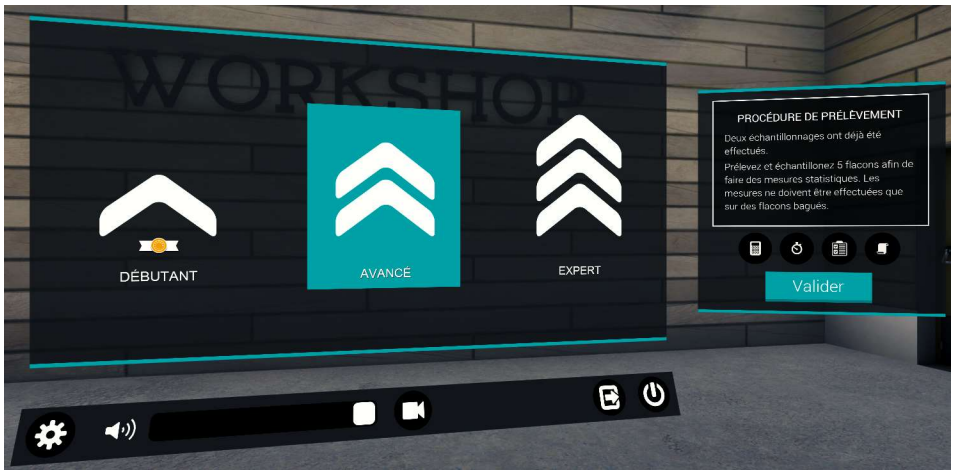


Figure 14 – Evaluation criteria of a sequence

By clicking on the icon of each criteria, you can see its detail.

2.5.7 Selecting a Level

Once you choose the exercise, you must select the level:



Each level of each sequence has several assessment criteria progressively harsher. Processes have less and less instructions.

At some **BEGINNER** level, only one part of the sequence must be completed to realize the first handling.

After launching the exercise, the main virtual screen disappears, the interface appears on the right or left harm of the trainee (you can define the position before).

The laterality of each trainee is modifiable through **VULCAN** or can be changed temporarily for an exercise.

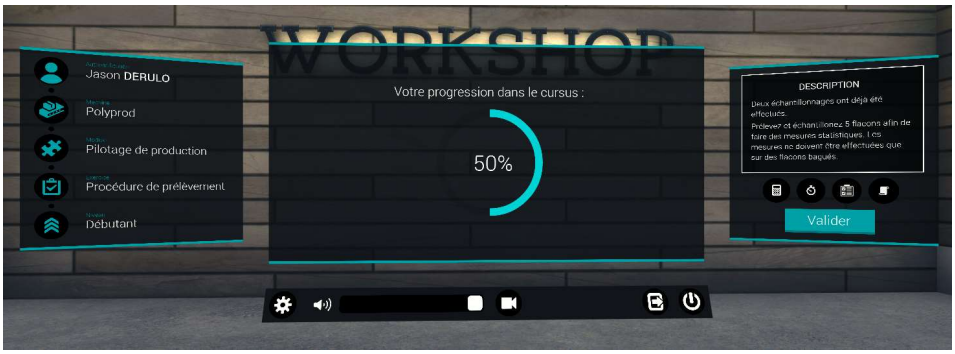
2.5.8 Table of Contents

The contents page appears on the left side of the main virtual screen. It sum up exercise steps before launching it.

You can use the contents table to come back to previous step. For instance, choosing a level or changing the machine.

2.5.9 Prescribed Curriculum

In a prescribed curriculum the trainee doesn't have the choice of the machine, module, sequence or exercise level.



The curriculum progression is displayed by a circular gauge. The next exercise description and the evaluation criteria are display on the right side of the screen. The table of content sum up the machine, module, exercise and level of the exercise that need to be done. When doing imposed curriculum, the trainee cannot do the second exercise if the first one is not realized successfully.

2.5.10 Results

When an exercise is done or exit before the end, results are display on the main virtual screen. The workshop is cleared from all information, and the virtual screen displays the results (possibility to find those results on VULCAN).

«SUCCESS» or **«FAIL»** will appear according to results.

According to the success percentage, 1 to 3 stars appear filled up on the left side of the screen. The execution time is also display. For some sequences, the time can be an evaluation criteria.

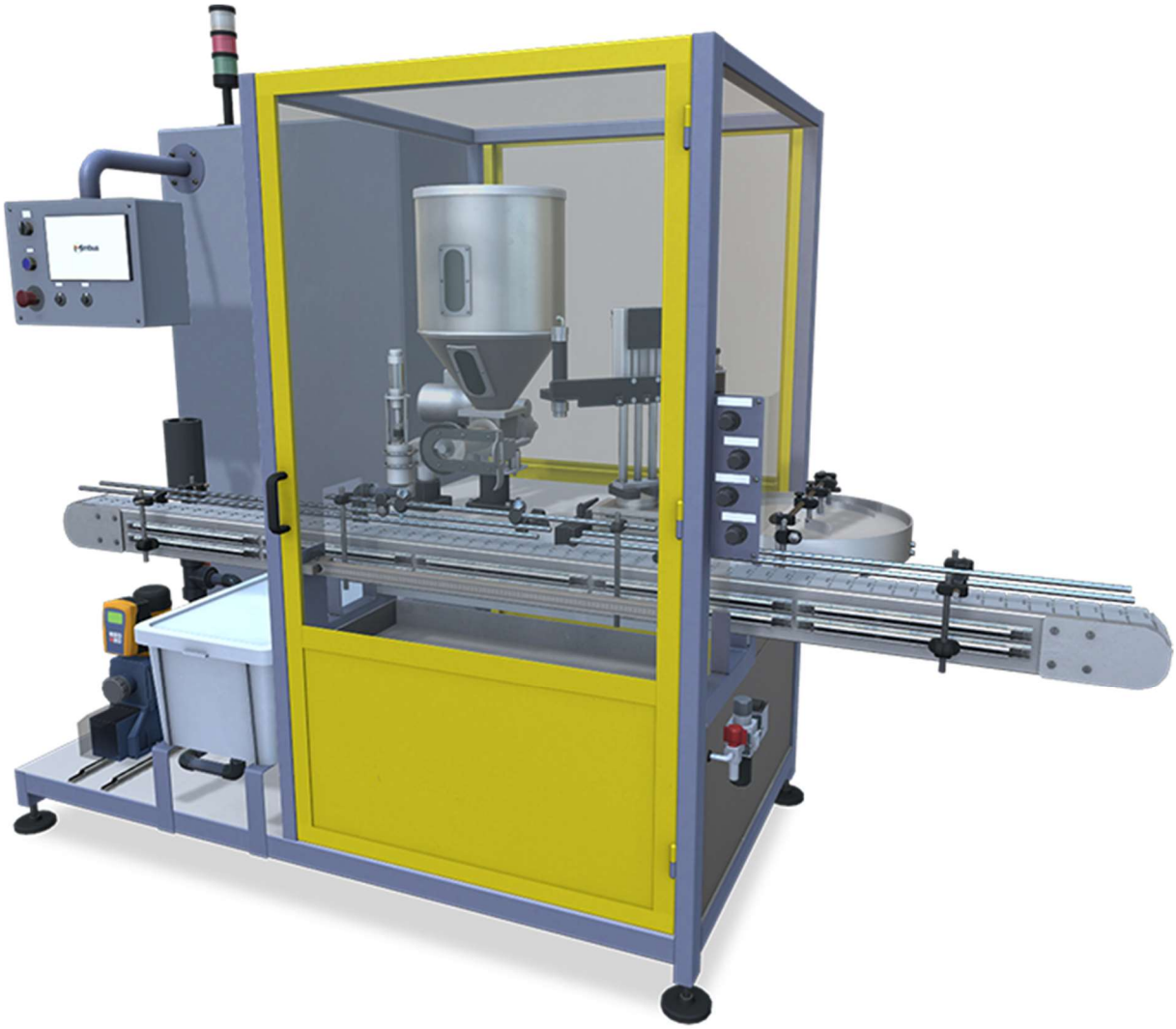
Figure 15 – Results after

stopping the sequence.

2.6 POLYPROD - PP30

Knowledge requirement: normality zone, enhance surveillance zone, out of control zone, drifting code

The PP30 is a multi-format processing cell that allows to dose liquid, solid or granulate products. The liquid can be packed in pots or flask with screwing cork.



2.6.1 Desk

Alike a real machine, a screen appears on the reading desk.

This screen allows to initialize the machine, switch it on and off and manage parameters.

Figure 16 - Reding desk screen of the PP30

2.6.2 Power Supply

To operate, the machine is supply by **electric and pneumatic energy.**

The main electric supply can be logged or unlogged with a 2-position rotary switch.

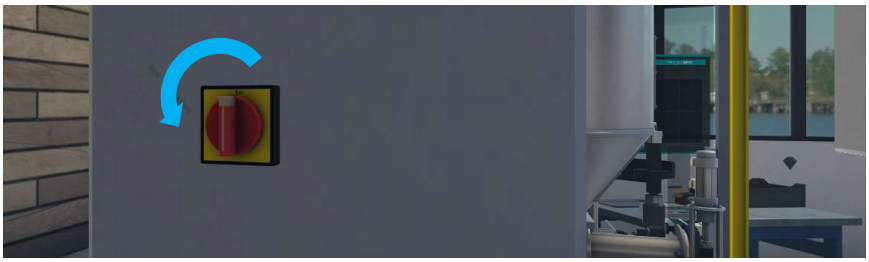


Figure 17 -Maine Electric switch

The switch is located on the left side of the machine, when facing the machine.

When log in the main power supply, the machine will stop working, the screen turns off and you must initialize the machine by turning it on.

2.6.3 Pneumatic Supply

The pneumatic supply may be logged or unlogged with a 2-position rotary switch.

The switch is located on the right side of the machine, when facing it.

When login the main pneumatic supply, the machine will stop working and engage an emergency stop that is notify on the desk screen.

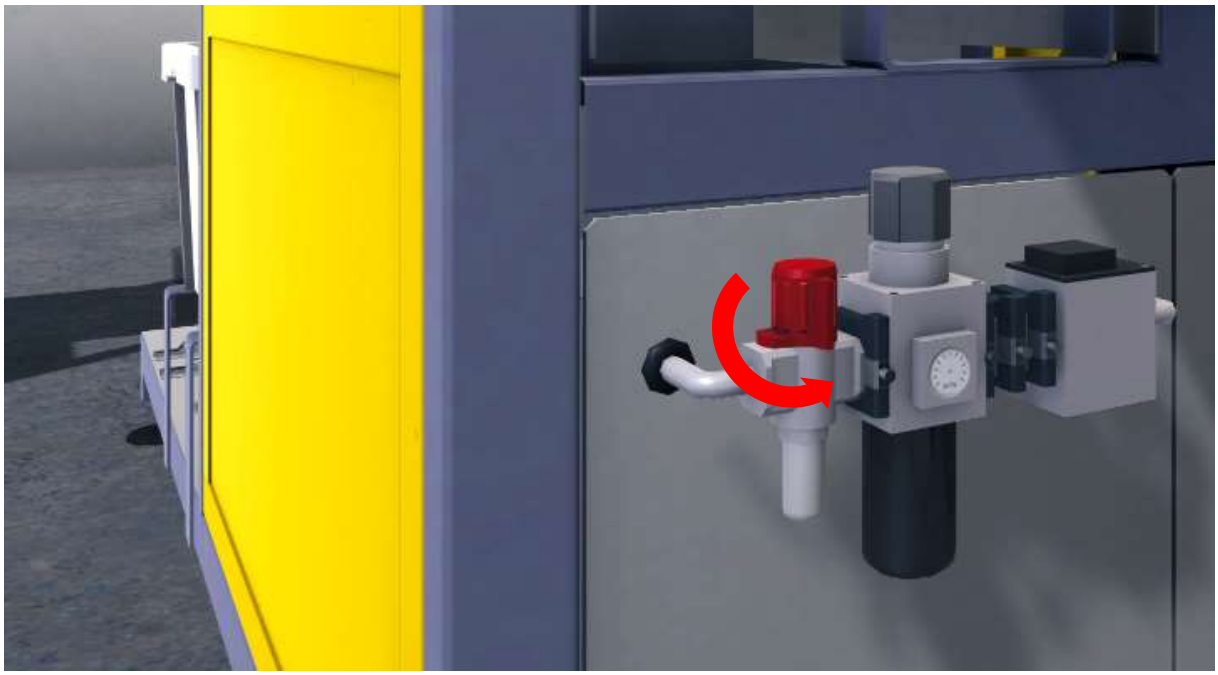


Figure 18 – Pneumatic supply switch

2.6.4 Dosing Pump

The dosing pump is located on the Polyprod frontage.

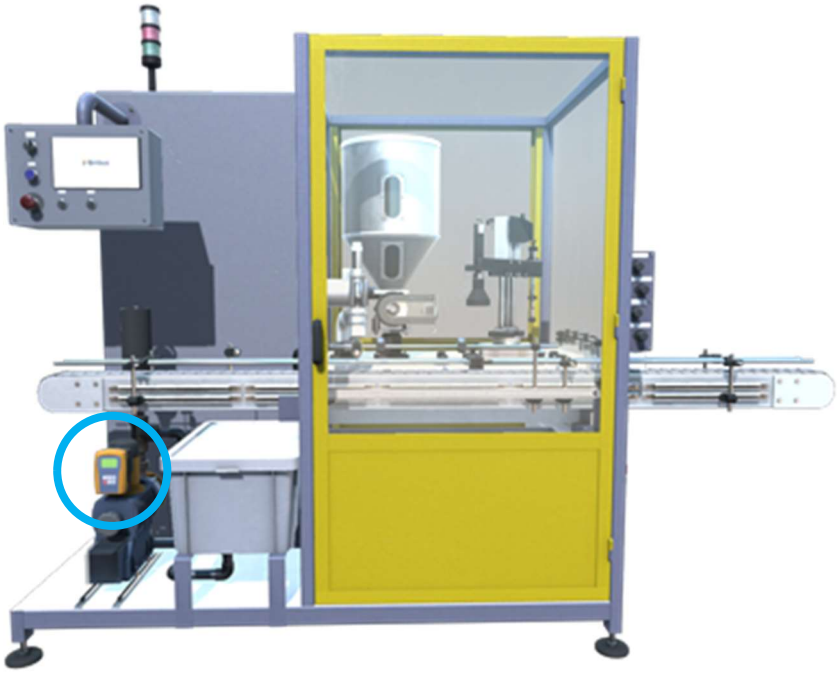


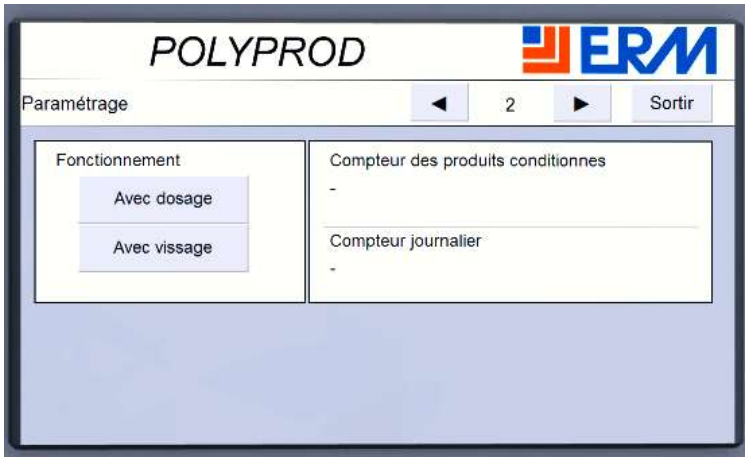
Figure 19 – Dosing pump

To adjust the dosing pump, turn the grey spanner adjuster.

2.6.5 Details of Desk Screen

On the desk screen, you can access the machine configuration parameters.

You can manage the recipe (number of pots, flask to produce), content, product, and the calculation.



The second page of parameters allows you to choose if the machine will work in **deteriorate** mode or not (**with or without dosing**, **with or without screwing**).

On the main page you can initialized the machine, it will turn on the conveyor during a certain amount of time.

We can also turn the machine on and off.

Starting the machine activate the dosing and screwing process.

When the machine is stopped, it will still finish the ongoing process/action before stopping the conveyor.

When an emergency stop is required by pressing the ***hardline*** red button, the machine stopped its ongoing activity and notify the emergency stop on the desk screen.

2.6.6 Indicator Lights

The indicator lights are located on top of the machine and indicate the operational status of the machine

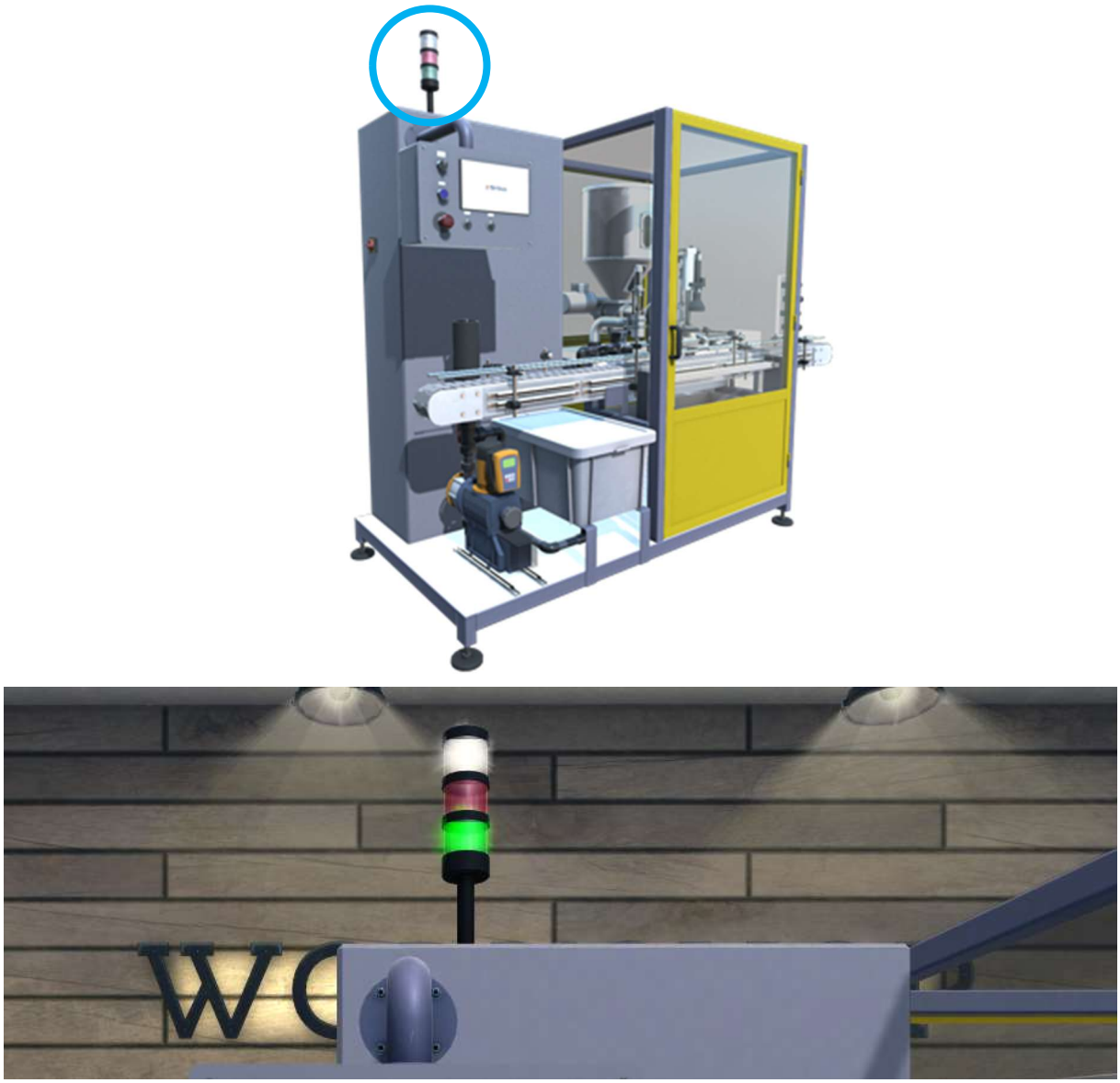


Figure 20 – Indicator lights when the machine works properly

When the machine is on the deteriorate mode, the green diode is blinking.

Figure 21 – Screwless mode

When the emergency button is pressed, the light turns red.

Figure 22 – emergency stop pressed

When the electric supply is logged, all diodes are off.

2.6.7 Conveyor belt, screwing and dosing.

When the machine is turn on, the conveyor brings the different flasks to the different station of the machine; dosing and screwing of corks.

Figure 23 – Flasks conveyance

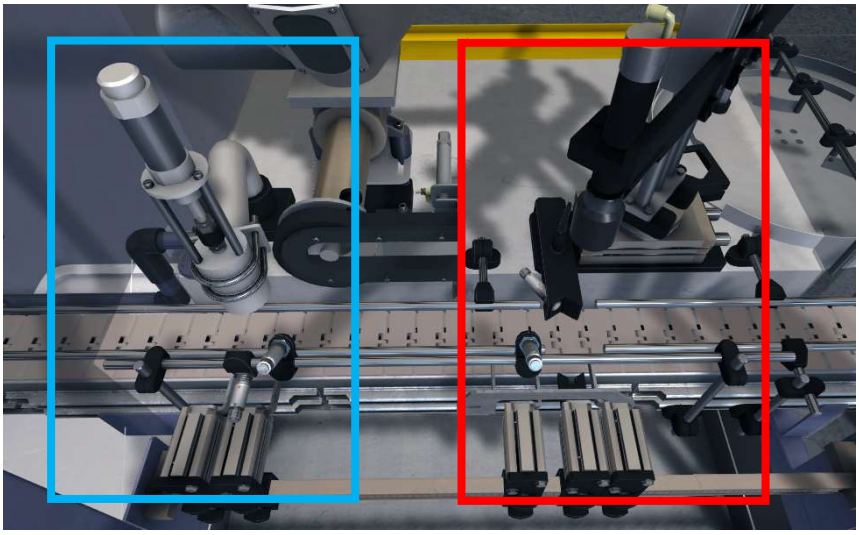


*Figure 24 – **Dosing** and **Screwing** of corks*

When 1 flask arrived at the dosing station, the others are stopped and stayed on the waiting line.

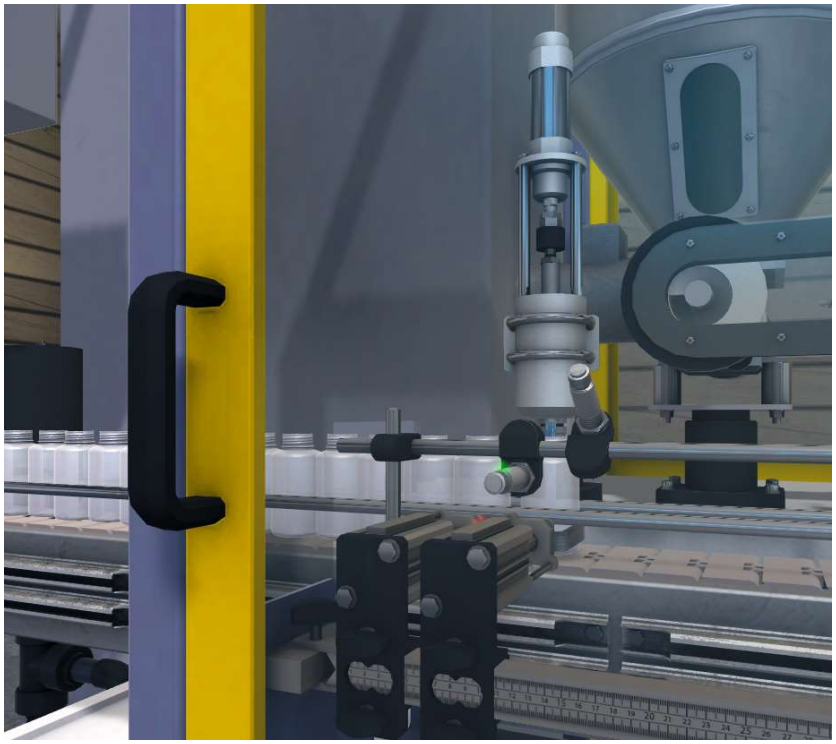


Figure 25 – Dosing a flask

When a flask is at the screwing station, other flaks are hold on the waiting line.

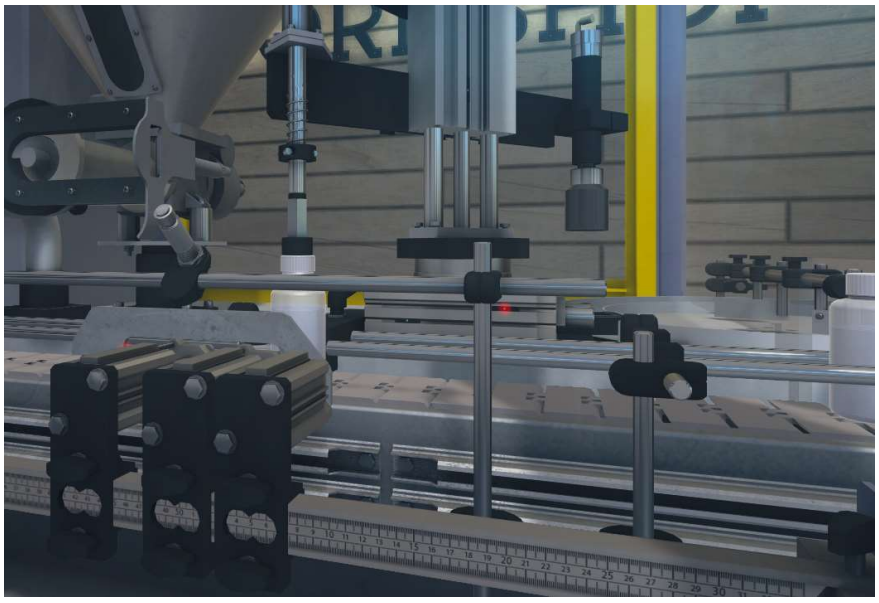


Figure 26 – Screwing a flask cork

Figure 27 – Overview of the machine

2.7 Tablet

Once the exercise is launched, the tablet appears on the non-dominant hand of the trainee. This laterality is defined in VULCAN and can be modified anytime.

.

For instance, while simulating, you can change temporarily the laterality and the tablet position.

The exercise length appears on the tablet as well as:

One icon representing the chosen laterality. You can change it by clicking on the left or right hand.

One exit icon that allows quitting the ongoing exercise.

When recording the video, the **'REC'** notification appears on the tablet.
At the bottom part of the tablet, a gauge indicates the different steps validated.

3. SEGMENTED INTRODUCTIONS

3.1 Module 3: Electrical Accreditation

3.1.1 Sequence 2: Accreditation B1V

In sequence 2, the objective is to get use to B1V electrical accreditation processes:

- B: Low voltage installation
- 1: Electrical work
- V: Work adjacent to live pieces

At the **BIGINNER** level, each step is details and match with an action to do. Additionally, a sound + vibration of the controller happened when a step is complete.

At the **ADVANCE** level, steps are less detailed, and some actions are gather under one step. The vibration and sound only happen when the actions are validated, even if the step description doesn't vary.

At the **EXPERT** level, steps are not detailed, and no sounds guides.

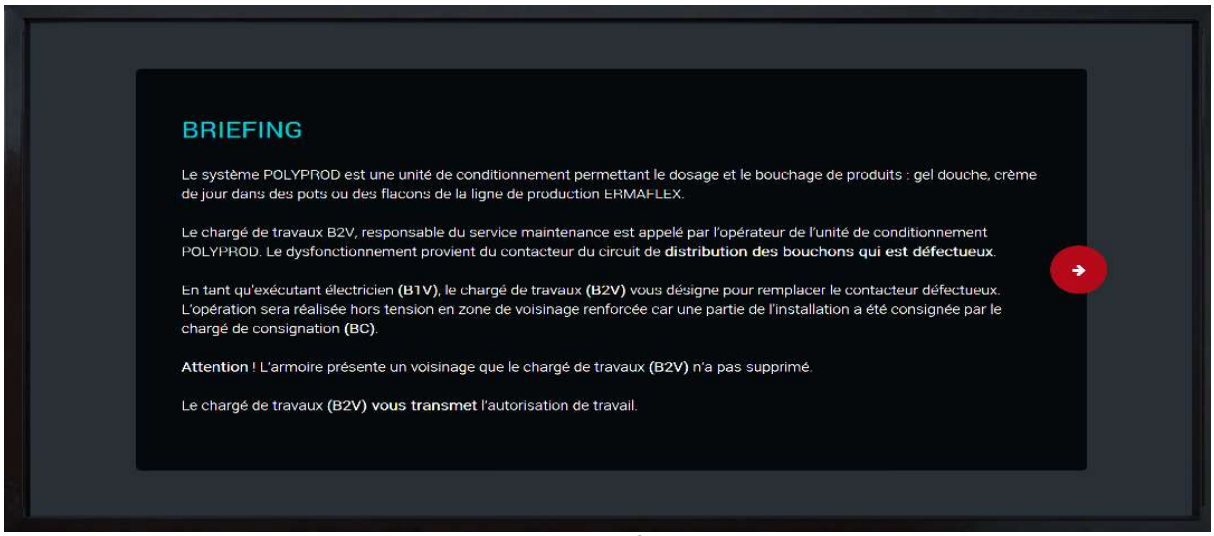


Figure 28 – Briefing screen

At the beginning of the sequence, the trainee is in the locker room. During the briefing, he/she will be notifying that the Q6 circuit breaker have been consigned by the B2V work supervisor. In this scenario, the machine continues the production without screwing the corks because the corks distribution circuit contactor is defective.

Figure 29 – The Q6 circuit breaker is hold

The B2V ask the trainee to replace the contactor. This operation is realized in off-power environment, because the installation has been blocked by the consignment supervisor.
The trainee is notified that the cabinet have a vicinity that the supervisor did not removed.

After the briefing, the trainee must complete an MCQ that varied according to the sequence and the level.

For all levels, 2 first questions are identical. The trainee has the machine electrical schema to answer correctly.

All level	
Questions	**Answers**
Identify the caps distribution circuit engine breaker concerned by the failure by looking at the POLYPROD electrical control cabinet diagram	Q6
Identify the corks distribution channel contactor, based on the electrical cabinet diagram of the POLYPROD.	KM2

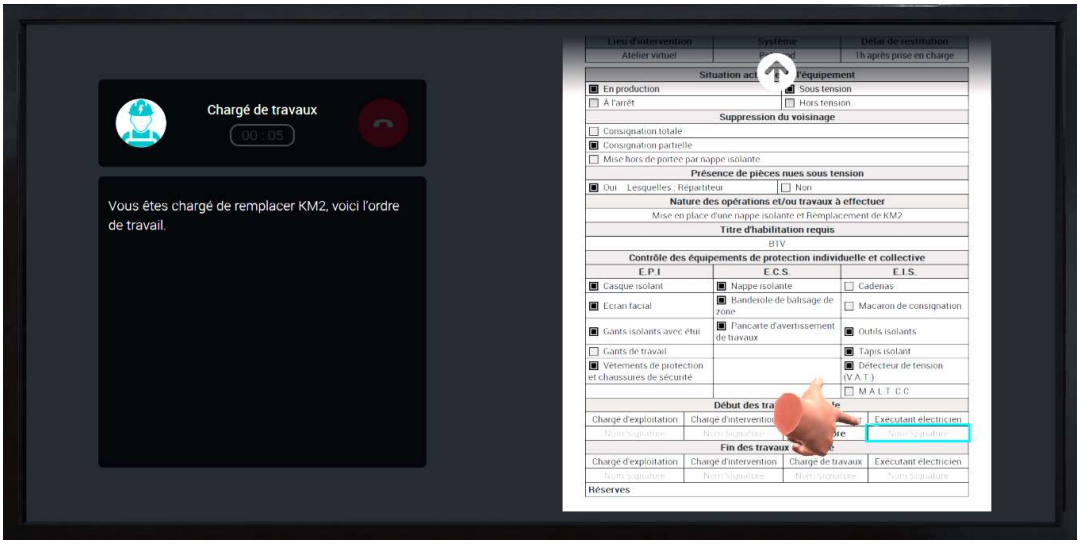
BEGINNER	
Questions	**Answers**
The marking of the intervention zone around the cabinet must be:	Temporary
Which device of the electrical cabinet represent a danger for the vicinity of voltage pieces?	Zone B
From what distance of the live part, do you need to be equipped of PPE?	0.3 m

Advanced	
Questions	**Answers**
The off-tension controller must be checked only before the off-tension verification.	FALSE
The markup banner is part of:	PPE - personal protective equipment
The insulative gloves must be tested	Before each utilization
During B1V accreditation and under the control of your work supervisor, you can do an operate in zone 4?	YES
From what distance of the live part, do you need to be equipped of PPE?	0.3 m

Expert	
Questions	**Answers**
During B1V Accreditation, in which area should you use the PPE?	Zone 4
The marking of the intervention zone around the cabinet must be:	Temporary
Once the isolating mat if in place, can you remove the PPE to change the contactor?	YES
Once the contactor has been changed, you must be equipped of the PPE to remove the isolate mat?	YES
Any work that does not require the power maintenance on an electrical installation must be turned off.	TRUE

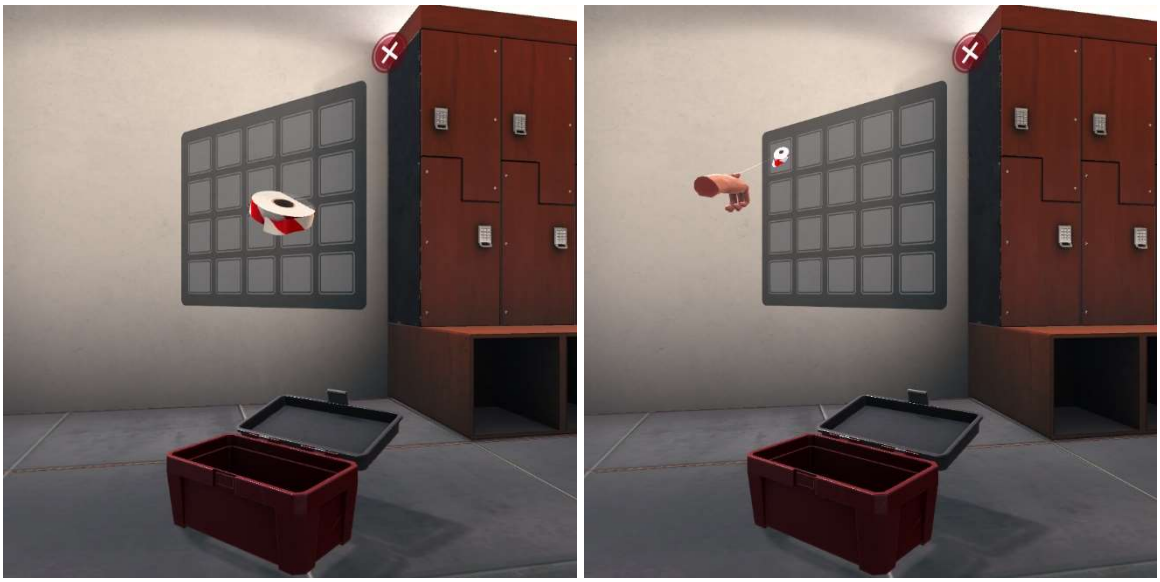
After a work supervisor call (appears on the screen). The work supervisor gives the work order to the trainee who must sign it to indicate the intervention beginning.

Once it's signed, the trainee must place in the toolbox, the required equipment for the intervention.



The toolbox looks like the image below. You can move it by taking the handle and open it by pressing the latch. Once you open the toolbox, an interface appears representing the inventory of the chosen tools.

To drop an object in the toolbox, you must put it in the virtual board/inventory or in the box. To remove an object, you must point out that object move it out of the box. To remove certain object like the Voltage detector VAT/DDT you need both hands.



The objects are display on shelves all around the room. The mandatory tools and equipment's are the following:

- **The Helmet**

Place it on the top of your head and fold down the visor.

Figure 30 - Helmet

The Gloves

To put the gloves on: drop the gloves on the hand's shapes that appear in yellow.
To remove the gloves, point each of those with the controller and put them back on the toolbox.

For the B1V scenario: yellow gloves are requested.

Gloves tester

The gloves tester must be drop on the glove. Once drop the glove will be tested automatically. To take it back you must point the tester and move it in the toolbox.

Insulated screwdriver

The insulated screwdriver allows to screw and unscrew screws located on the electric board and cabinet. To make it work, approach the screwdriver of the screw and press the trigger. Only one quarter rotation is required to unscrew or screw completely.

The VAT: Voltage detector

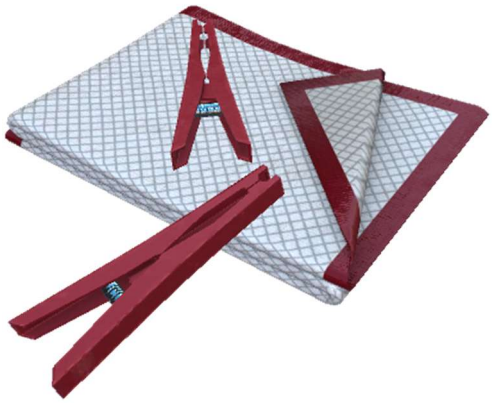
The voltage detector allows to check the tension status. You need to have two free controllers to grab that tool. The VAT is made up of two terminals. The main body of the latter indicates whether a voltage is detected.

You can auto test the voltage detector by joining its two terminals and pressing the interaction trigger.

To test the terminals of the electrical elements in the cabinet, you must approach each of the two terminals at the extremity of the cabinet element, until it's surrounded by a shape. To realize the test, you must press the interaction trigger of controllers.

The insulating mat

The insulating blanket allows the trainee to protect himself from the KM2 contactor. It should be place by the electric cabinet once the cabinet door is open.



The temporary banner

The temporary banner is red and white. You must fix it at the poles when you mark the intervention area and before replacing the contactor.

The insulatingblanket

The insulating blanket must be place on the work area in front of the electrical cabinet to protect from electrical dangers. You can put it anywhere on the floor.

The KM line contactor

The new KM2 contactor must be place where the actual defective KM2 is located. The defective KM2 will be represent differently.

Optional equipment:

Markups poles

The markers poles can be display anywhere on the floor, in the inventory and allows you to mark the intervention area.

Work warning sign

The work warning sign must be drop on the banner at the end of the intervention beacons.

The simple screwdriver

The classic screwdriver must not be use during this sequence but can be display in the inventory if the trainee doesn't know which one to take. If the trainee uses it, he/she will provoke a fatal error and stop the sequence.

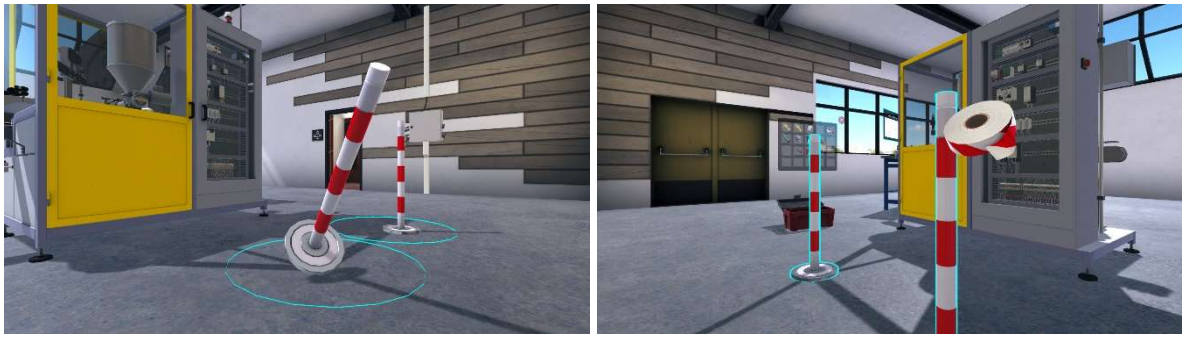
Figure 31 – Dropping objects in the inventory

Once the right tools are in the toolbox, the trainee can leave the locker room. At the Beginner and Advance level, the trainee is notified if the wrong tools have been picked up. At the EXPERT level, if the trainee takes the wrong tools, it causes a fatal error.

Figure 32 – Open the door

When the trainee is in the virtual workshop, he/she can observe the POLYPROD. He must install the safety zone in front of the electrical cabinet.

Once the poles are correctly positioned, the trainee must place the adapted banner.



At the **BIGGINNER** level, the trainee is guide when placing the poles and banner.
At the **ADVANCED** level, the trainee is not guide for the 30 first seconds, once this time is over visual guides appear.
EXPERT level, the trainee must place the poles and banner at the right place in less than 40 seconds, otherwise, a fatal error goes off that and leads to the end of the sequence.
To end the markup, the trainee must place the working warning sign on the banner.

Figure 33 – Intervention area marked up

After, the trainee must test the gloves impermeability.

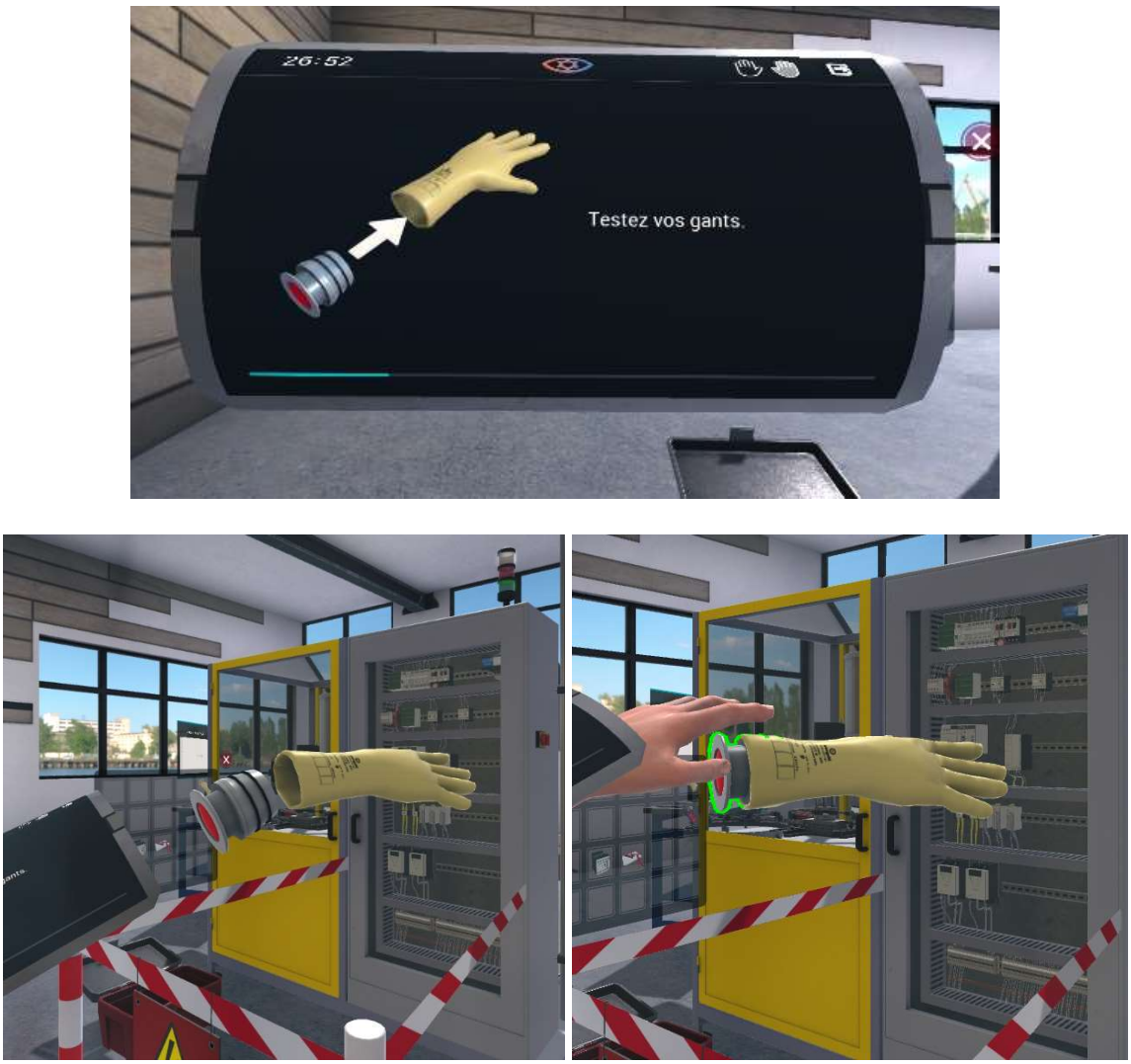
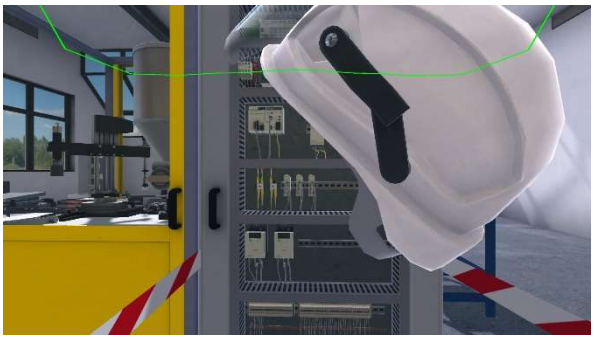


Figure 34 – Gloves tester

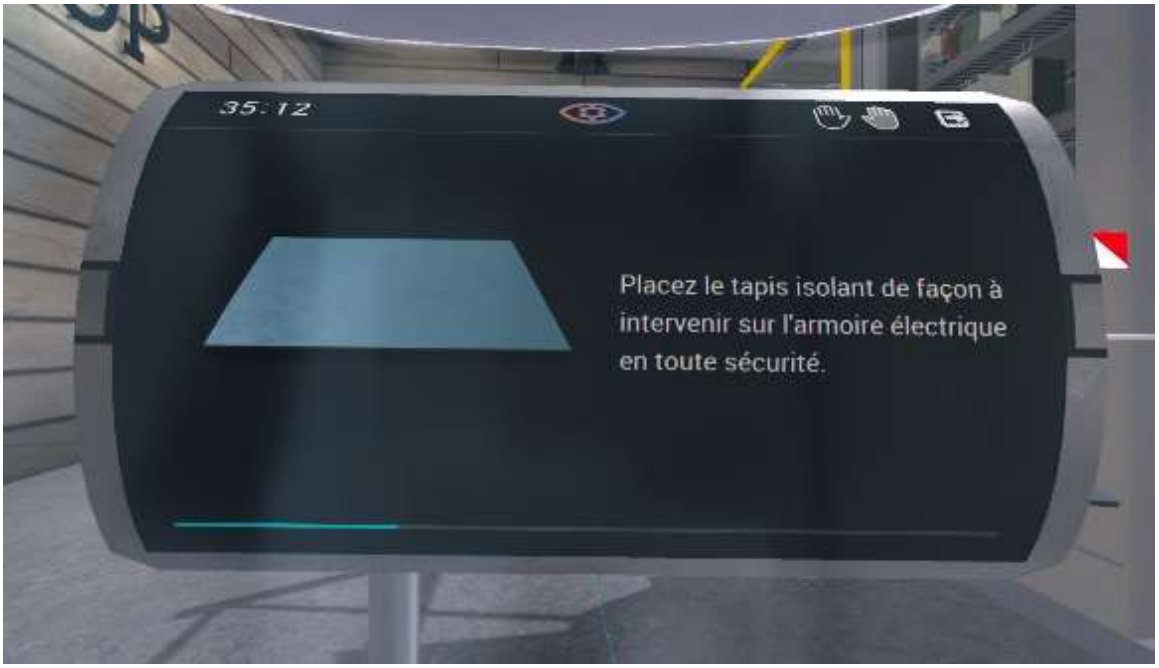
The glove tester must be taken by one hand and teste the gloves on the other hand. You need to release the tester on the glove to test it.

After testing the gloves, the trainee put his/her PPE: gloves and helmet

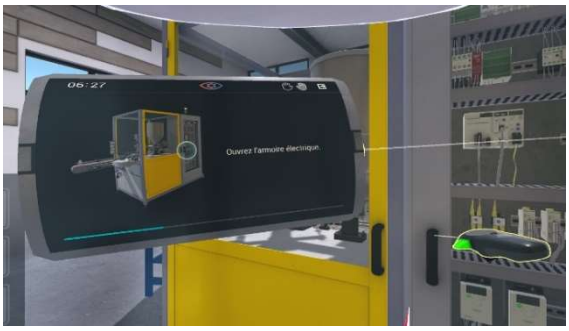
Note: Make sure to lower the visor to validate this step.

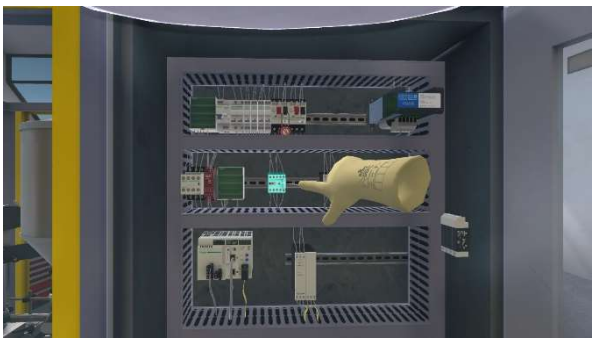
Once you wear the PPE, the trainee must place the insulating blanket to start the intervention.



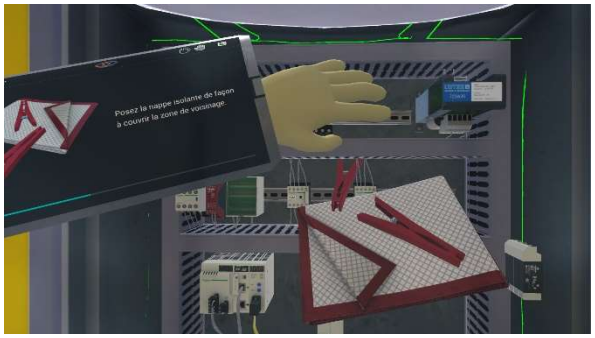

When the insulating blanket is placed, the trainee must open the cabinet door to start the operation.



At the **EXPERT** level, the different step detailed above, are gather in one step names “Prepare the intervention”.
After opening the cabinet door, the trainee must locate the KM2 contactor. You must use the interaction trigger to locate the contactor.
If the contactor is not located in 20 seconds, it start blinking (in blue) to help the trainee.

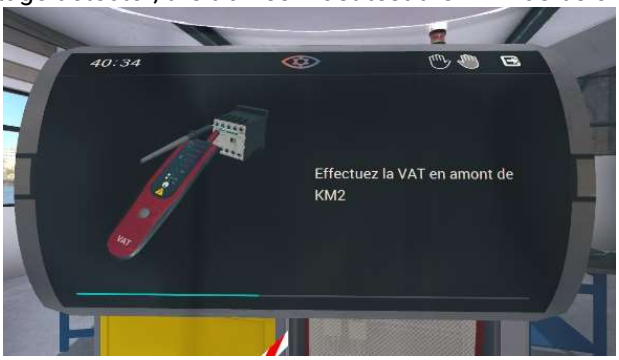


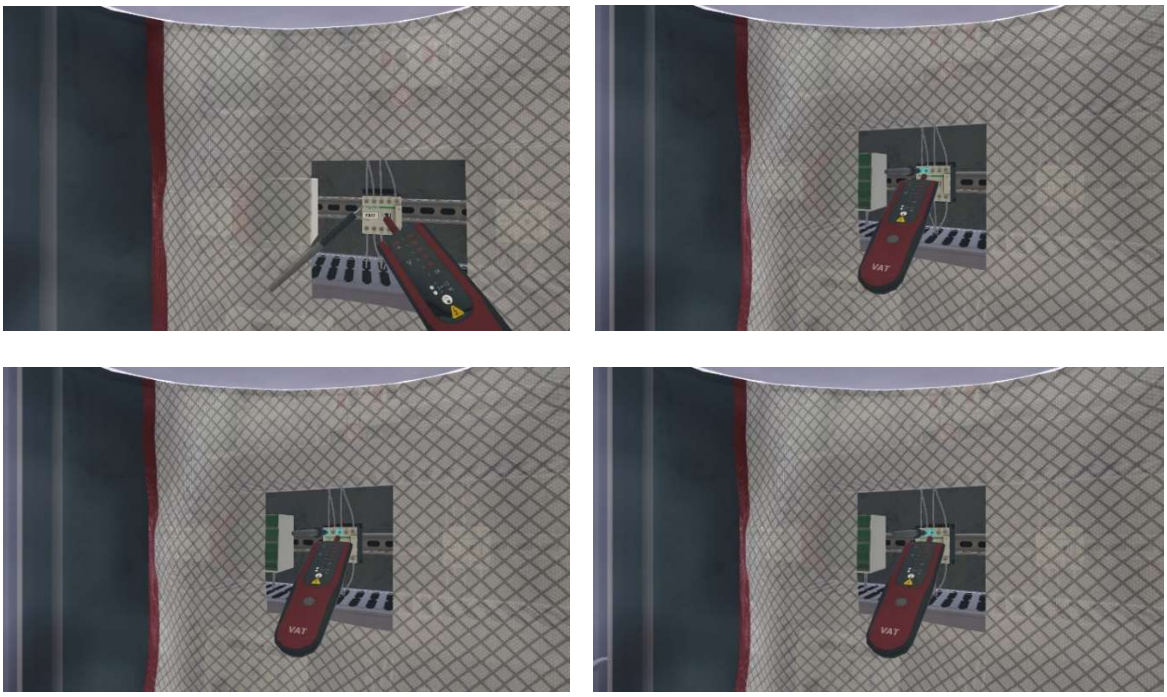
At the **ADVACNED** level, if the contactor is not located in 20 second this is considered as a fatal error and the sequence will stop.
When the KM2 contactor is located, you must cover the zone with the insulating blanket.



One the vicinity is covered, the trainee must check the absence of voltage in the KM2. Use the VAT and auto test it.

After auto testing the voltage detector, the trainee must test the KM2 as below:

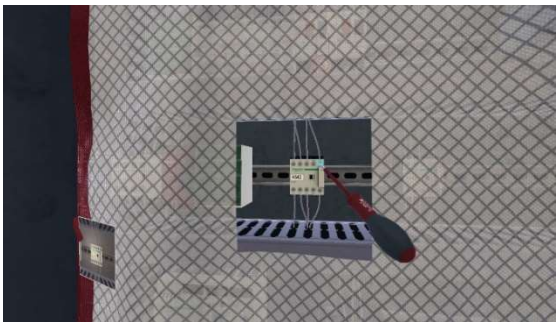


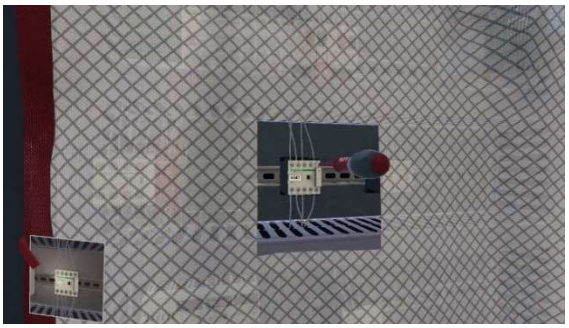


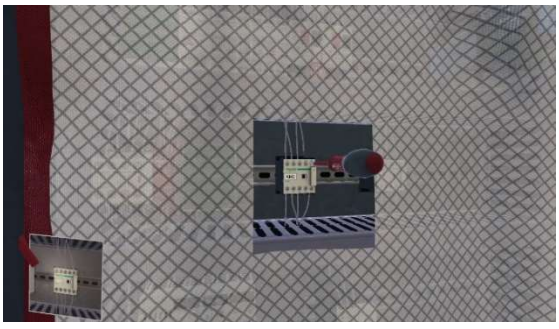
The trainee must test the first and second terminal together (L1 & L2), the 1st and 3rd together and finally the 2nd and 3rd together.
When this is done, the trainee must auto test the voltage detector to make sure it works well.
At the **EXPERT** level, those 3 steps are gather under a step named « Control the absence of electrical danger". Fatal error goes off if the 3 steps are not executed correctly (auto test, test, auto test).
Once the KM2 is tested the trainee must remove his/her PPE.

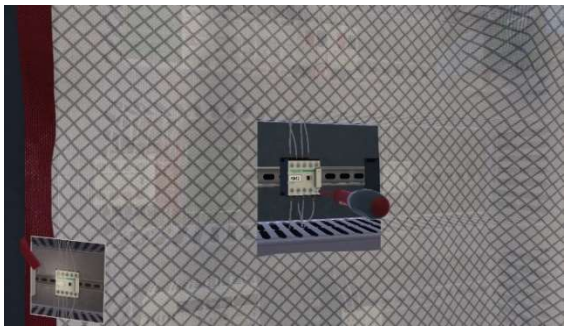
At **ADVANCED** level, the last auto test and PPE removal is gather under the step called "Prepare KM2 replacement".

Once the PPE are removed, the trainee must choose the right tool to replace the KM2 contactor. He/she must choose the insulated screwdriver to unscrew all the conductors linked to the KM2.

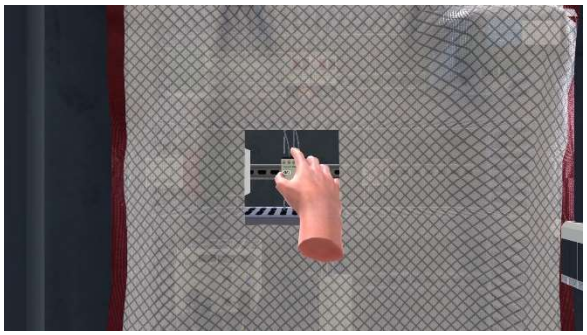








Once contactors have been unscrewed, the trainee must remove the defective KM2 and place the functional one.



Then, the trainee has to screw the conductors.

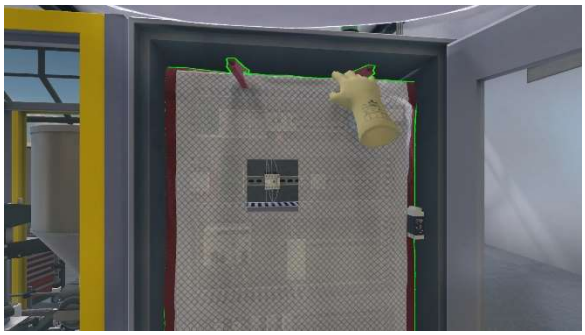
Figure 35 – Conductor screwing

In **ADVANCED**, unscrewing conductors replacing the KM2 and screwing the conductors are gather under the step “Proceed KM2 replacement”.

In **EXPERT**, from the PPE removal to replacing the KM2 all the actions are under the step “replacement of KM2 only with the necessary equipment ".

The trainee must put his/her PPE back for the next step. Step 2 remove the insulated blanket that protect the electrical cabinet.

To do so, the trainee must select one of the pliers of the insulated blanket. If one step above is is not done correctly, fatal error goes off and the sequence failed.



Once the insulated blanket is removed, close the door of the electric cabinet.

Figure 36 – Close the electrical cabinet

The next step consists in removing the insulating blanket, the markup banner, warning sign and poles.

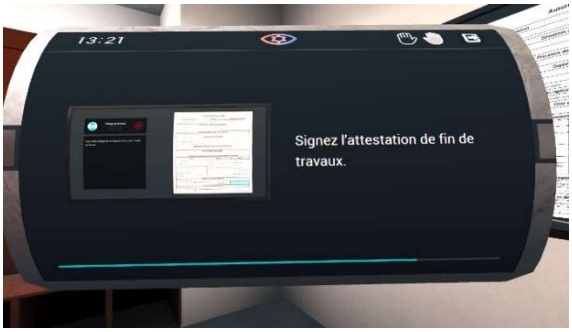
After removed his/her PPE for one last time, a temporal ellipse happened. The trainee is informed that the BC supervisor have reclaimed the system and the B2 supervisor ask him to test it.

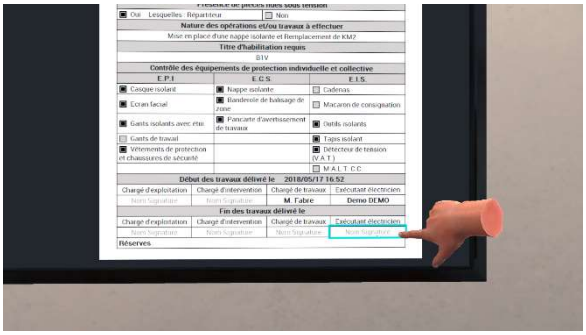
The trainee can see that the POLYPROD is no longer working and the Q6 circuit breaker have been reclaimed and rearmed. He/She must open the pneumatic sluice gate, rearmed the machine and launch the initialization to start it.




It is asked to test the corks distributor by located it as well as the KM2 contactor (using the interacting trigger).

Sign the work certificate to close the sequence.



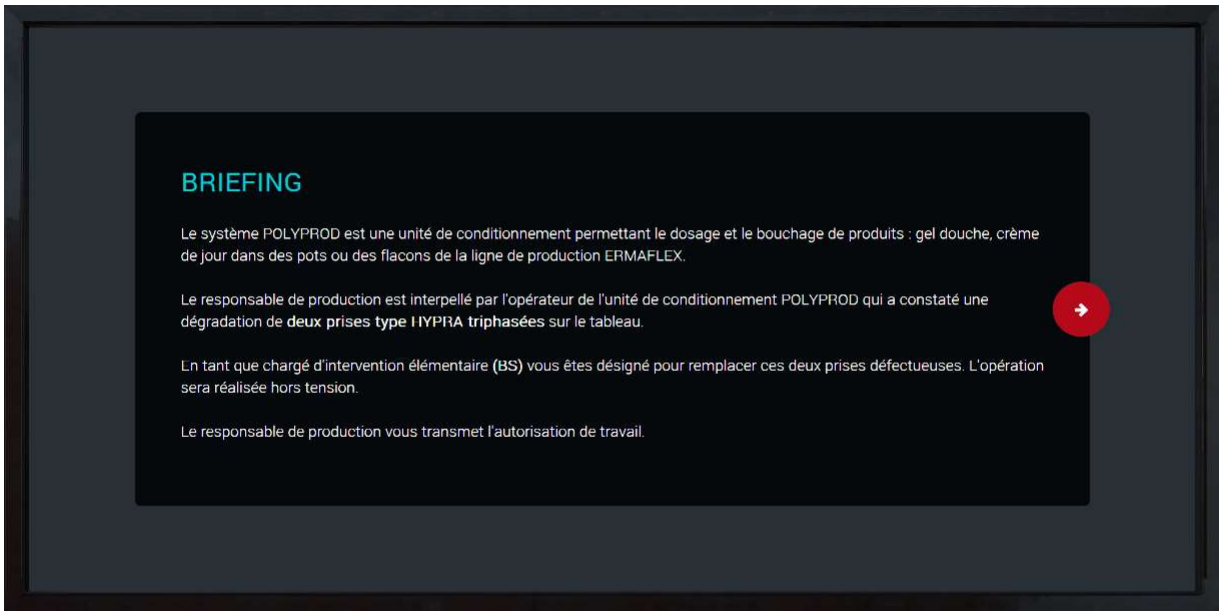


3.1.2 Sequence 3: Accreditation BS

In sequence 3, the objective is to get familiarized with the BS electric accreditation process.

- B: Low voltage installation
- S: Elementary intervention worker

At the beginning of the sequence, the trainee is in the locker room. During the briefing, he/she informed that as a BS elementary intervention worker, he/she needs to replace two defective HYPRA type plugs. The operation must be done off voltage.



After this brainstorming, the trainee must answer the following MCQ:

BEGINNER	
Questions	**Answers**
What are the symbol(s) that refer to the accreditation of an officer?	BR, BS
What are the symbol(s) that refer to the authorization of an elementary response officer?	BS

The BT elementary intervention are exclusively on magnetic circuit:	• Circuit breaker • Powered in 400 V maximum • Protected against short circuit as alternative by devices rated at not more than 32 A • Section less than 6mm2 • With switchgear for disconnecting and de-energizing function
The elementary BT intervention are limited to:	• Replacing the same fuse. • Replacing the same lamp • Replacing the control device • Replacing the power outlet • When connecting electrical equipment to a waiting circuit • Circuit breaker reset in an environment that guarantees the safety of the operator
Do you need to inform potential users about the power outage and its recovery?	YES
The HYPRA P3 and P4 are flawed, can you replace those two?	No, I can only replace the P3

Advanced	
Questions	**Answers**
If you must replace a bulb, as BS habilitated worker, you should:	Do a power down work
When the operation of the undervoltage detection should be verified:	Before and after
To reset a circuit breaker, what precautions must be taken?	• That there is no direct contact • It must be reset maximum on time

Is there a physical difference between an electrical conductor off and under tension?	NO
Can a circuit breaker be operated to open a heating circuit operating?	YES
AS a BS worker, can you operate on a 230V AC circuit protected by a 63A circuit breaker?	NO
What are the limits of the very low voltage?	From 0 to 50V
You are approaching a 400V alternative installation in a room preserved for electricians. At what distance from accessible and energized bare parts should you take special precautions?	30 centimeters / 11.8 inches
You are an interim worker and you work in a company. Who should give you issue an accreditation?	The Employer
On the nameplate of a projector, we can read: 230V ~ - 50 Hz - 2000W. what supply voltage range it belongs to?	Low Voltage BT

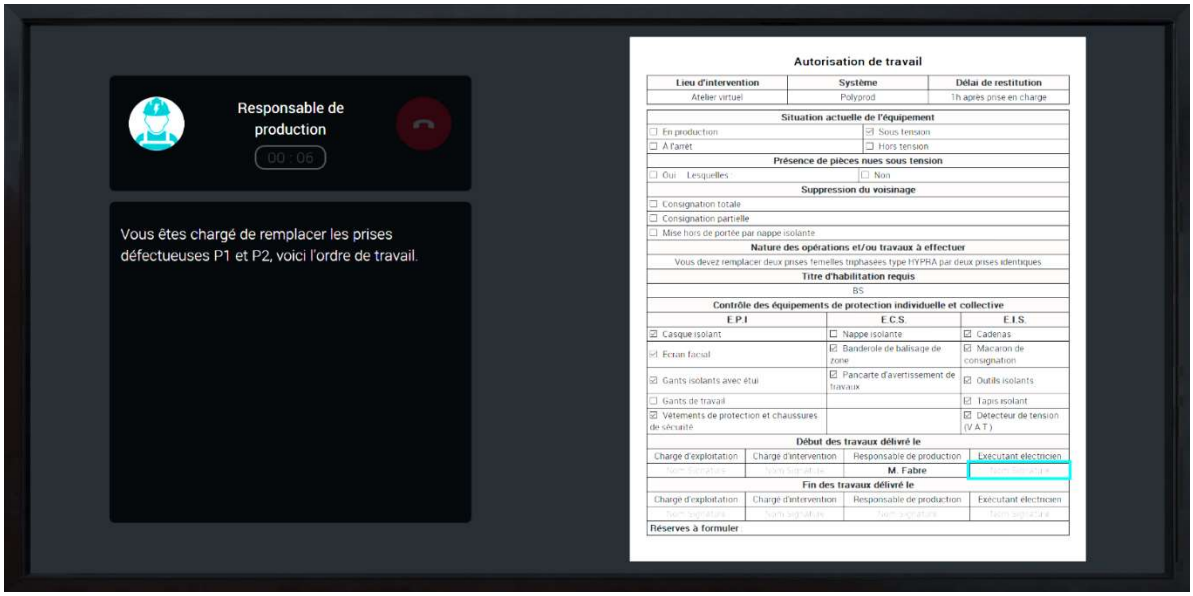
Expert	
Questions	**Answers**
BS accredited, can you reset a circuit breaker whose IP rating is IP1X?	NO

As a BS, you must replace a fuse located in zone 4. You must:	Ask for a DS accredited worker to do the replacement
Can you use a tester screwdriver to check the voltage absence on a circuit if you have no other standard devices	NO
A BS accredited worker can change a high-voltage neon tube identically?	NO
From what voltage does alternating electric current become dangerous in a classroom?	50V
In case of electrical accident, what is the first action to take?	Turn off or someone turn off the power
A residual current differential device with a high sensitivity of 30 mA protects:	People using those tools
What the following image represents? 	10A magneto thermic circuit breaker
What are the correct sentences for the following images? 	• The red wire is the phase of the circuit • The blue wire is the neutral conductor • • The green and yellow conductor is a protective wire
Which of the following statements are correct?	• The electric current can be measure in Ampere • The power is expressed in Watt

	• The kilowatt hours are a unit use to count the electrical energy • A voltmeter allows the measurement of voltage in Volt

After answering the question, a work supervisor call and appears on the screen. The work supervisor gives the work order to the trainee. He/She must sign it to indicate the intervention beginning.

Once the work order is signed, the trainee must place in the toolbox all the required equipment for the intervention.



Then, the trainee must place in the toolbox all the necessary tools for the operation. Refer to sequence 2 to understand toolbox operation.

Several tools are display in the locker room; to realize that sequence, the following tools are mandatory:

- Helmet *
- Insulated gloves (yellow)
- Gloves tester
- Insulated screwdriver
- Voltage tester
- Temporary banner
- The work warning sign
- Insulating blanket
- New P3 HYPRA32 plug
- Consignment grip

- Consignment lock

Following tools are optional:

- Markup poles
- Simple screwdriver

New P3 HYPRA32 plug

The new P3 HYPRA32 plug can be drop off where the actual defective P3 HYPRA32 plug is.
The new plug should appear in the inventory and the defective one is displayed differently.

Consignment grip

The consignment grip is used to seal off the circuit breaker head and avoid turning it of accidently during the intervention. It needs to be place on the differential circuit breaker handle.

Consignment lock

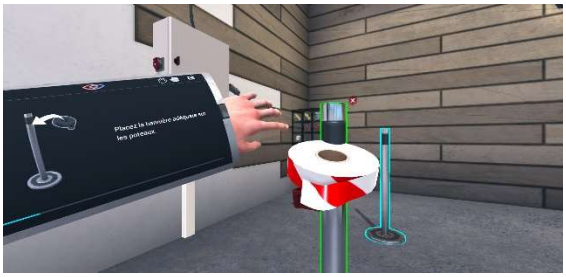
The consignment lock is used to lock the consignment grip on the circuit breaker. It needs to be place on the grip once its fastened to the circuit breaker.

Once the right tools are in the toolbox, the trainee can leave the locker room. The trainee will be informed if the tools are correct for the intervention.

In the virtual workshop, you must locate the defective HYPRA32 P3 plug. It is located on the top high shelve in the electric cabinet, where the POLYPROD is connected.

To locate it, the trainee must use the interactive trigger by pointing the plug. If it's not located in 20 sec, it starts blinking in blue.

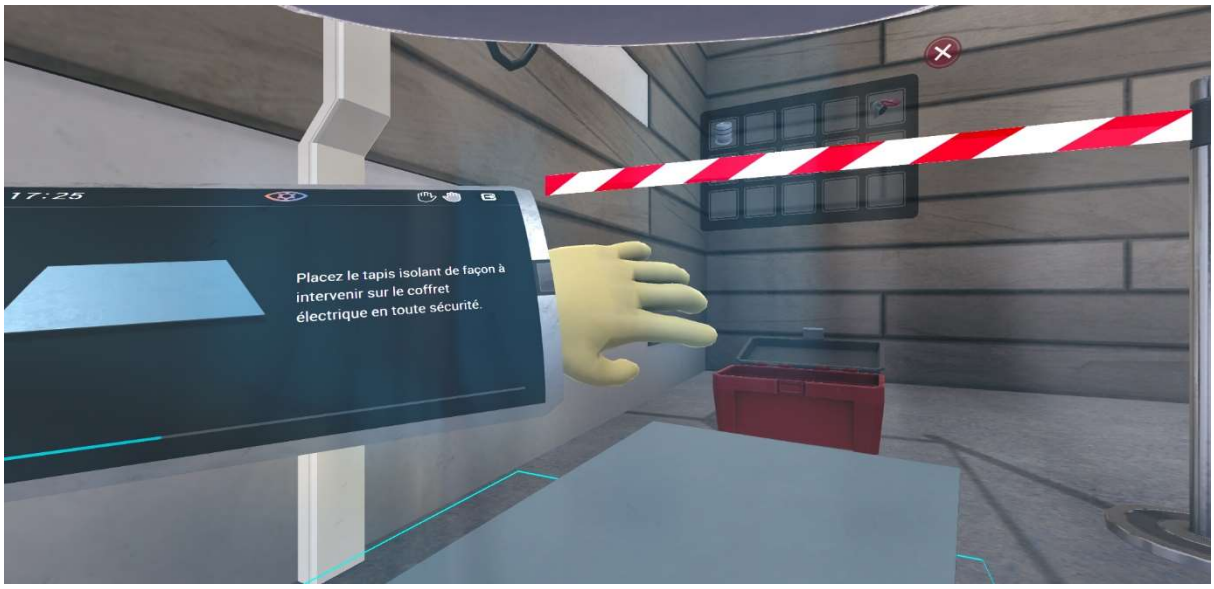
The trainee must place the markup zone. First place the pole guided by visual guides, then the temporary banner (stripped red and white) on the two poles.



The trainee must test the gloves impermeability. He must attach the gloves tester to the gloves extremity and fill them up with air.

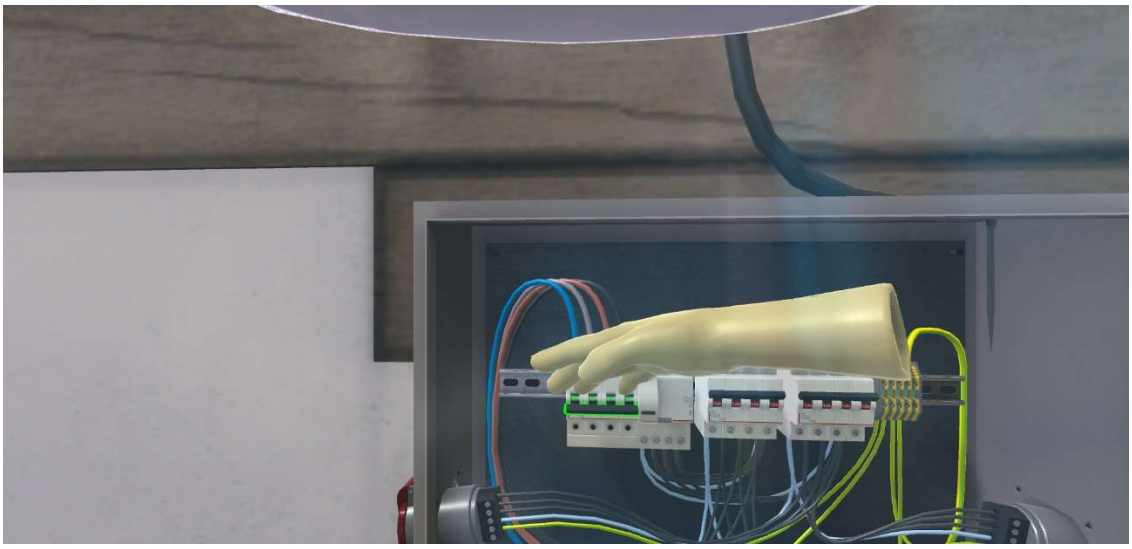
The trainee can then wear his/her PPE. To put the gloves on, you must grab the gloves with the free hand and so on. When placing the helmet, the trainee must put it on his/her head and lower the visor, represent by a yellow gosh.

Then, the trainee must place the insulating blanket to work in safety. A visual guide appears to indicate where the mat should go.

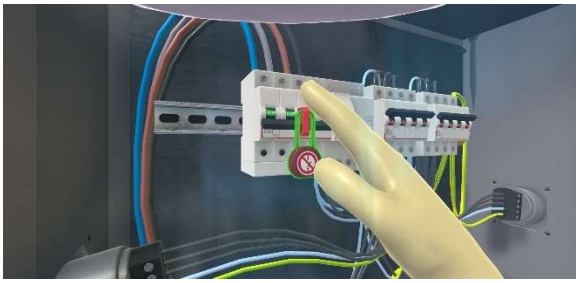


Once done, the trainee can open the cabinet door.

To switch off the electrical cabinet, the trainee must separate the circuit breaker head. Press the interaction trigger to select it, (the circuit breaker head is located on the left side of the cabinet).



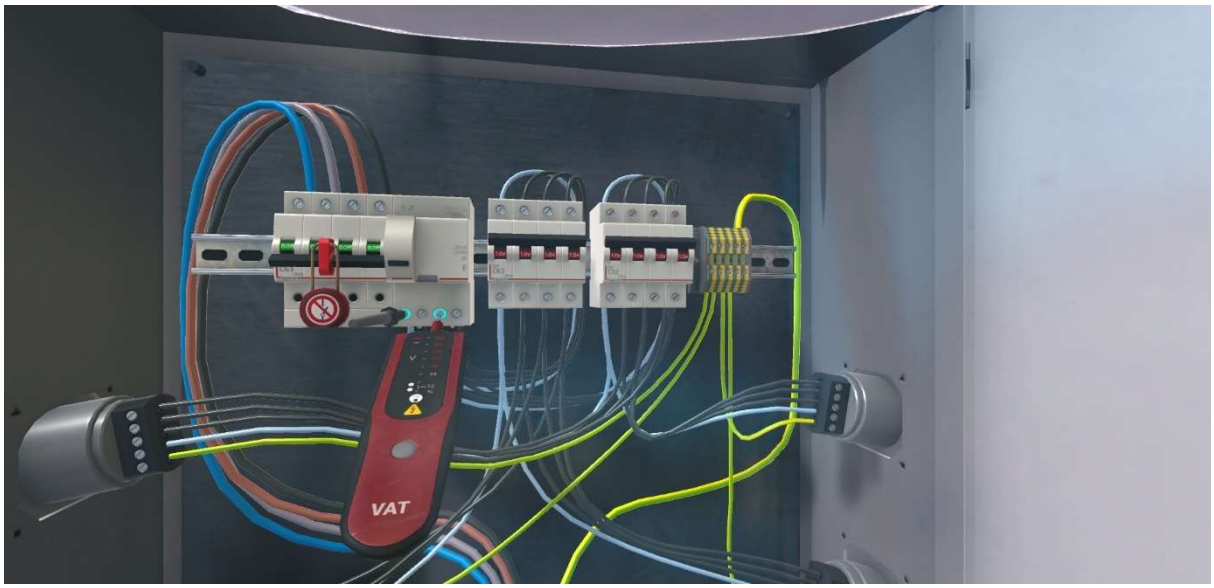
To avoid switching again the circuit breaker, the trainee must fix a consignment grip. To make sure the grip stays you must log the grip with the consignment lock.



The trainee must check for the presence of voltage upstream of the circuit breaker and its absence downstream. To do this he must first check the operation of the VAT by self-testing.

It can then check the presence of voltage upstream of the circuit breaker by testing two terminals among the phases and the neutral.

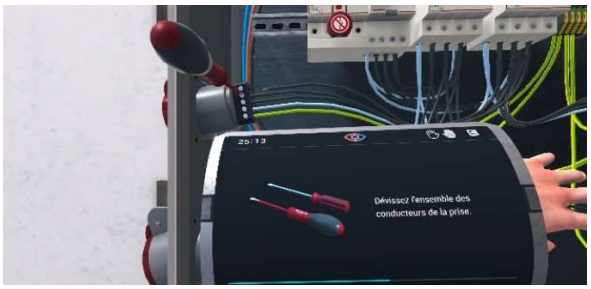
He can then check the absence of voltage downstream by testing between the neutral (blue wire) and each of the three phases (the other wires), and between phases 2 to 2.



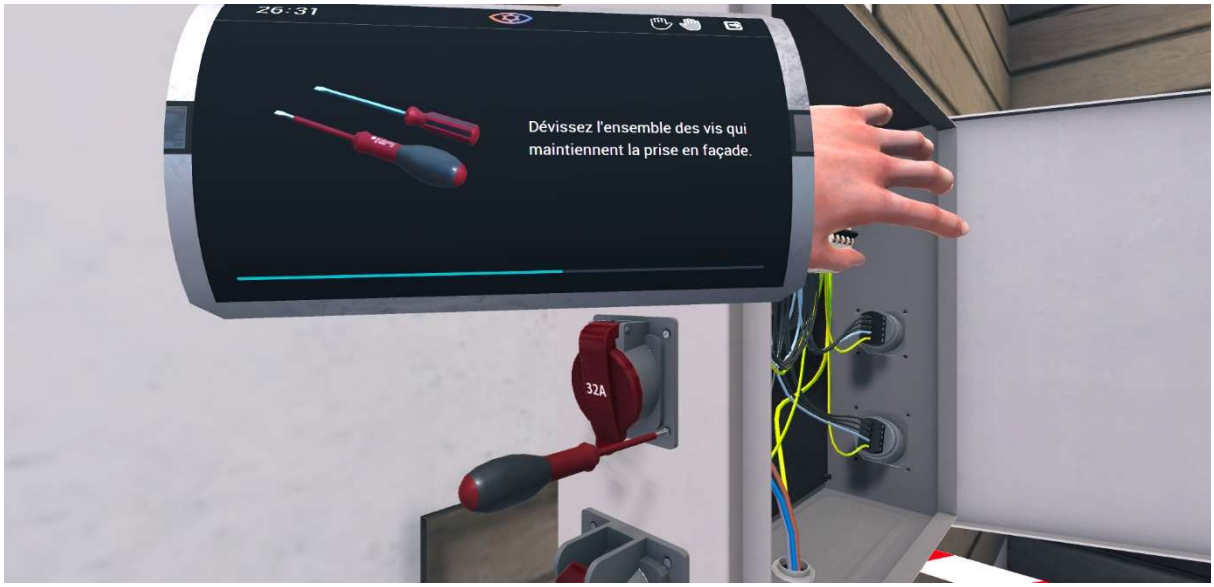
He/She must finally check the proper functioning of the VAT by self-testing.

After being sure that everything is off power, the trainee can remove its PPE.

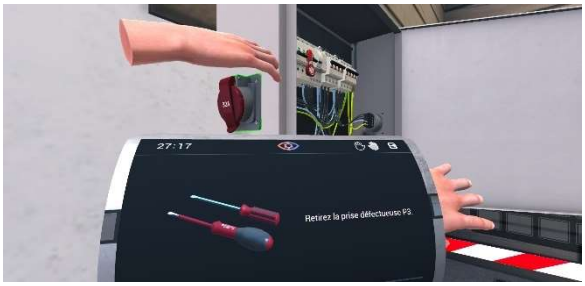
When the PPE are removed. The trainee must choose the right tool (insulated screwdriver) to replace the plug. He/She must unscrew all the conductors linked to the plug, inside the electric cabinet.

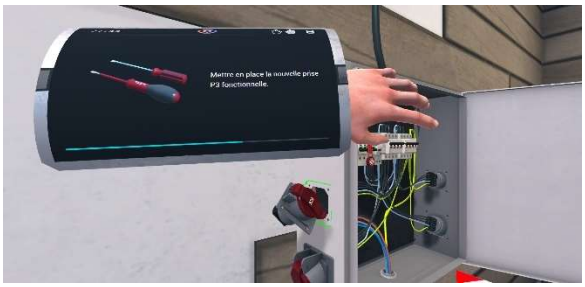


The trainee must then unscrew the 4 screws on the front hat hold the plug to the cabinet.

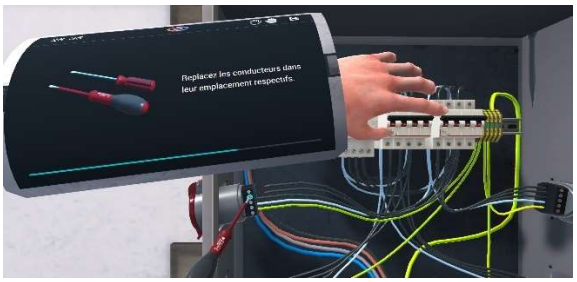


Since the conductors and screws of the socket are unscrewed, it is now possible for the traniee to remove the defective plug and replace it with the new one.

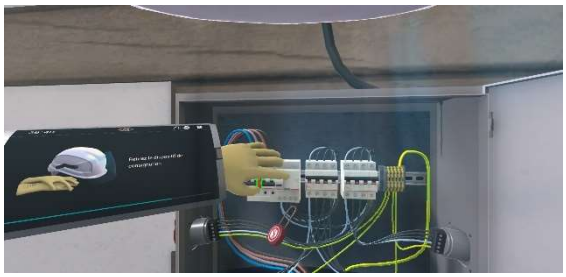


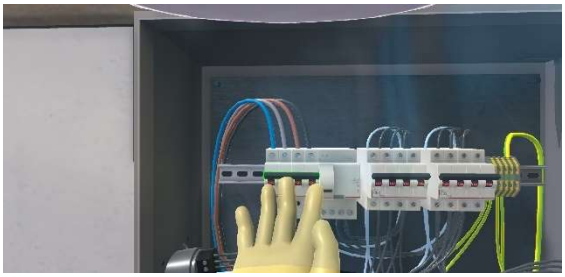


Then screw back the facade screw and the conductors.



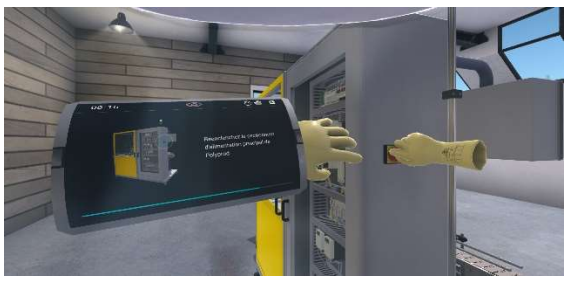
The replacement operation is now done. The trainee must tagout the electrical box. The trainee must put its PPE back to remove the lock device (grip + padlock). Finally, the trainee can turn the device on by reactivating the differential head circuit breaker. Then close the cabinet door.





Reconnect the plug to the HYPRA32 socket on the left edge of the electrical box. This socket is used to power the POLYPROD system.

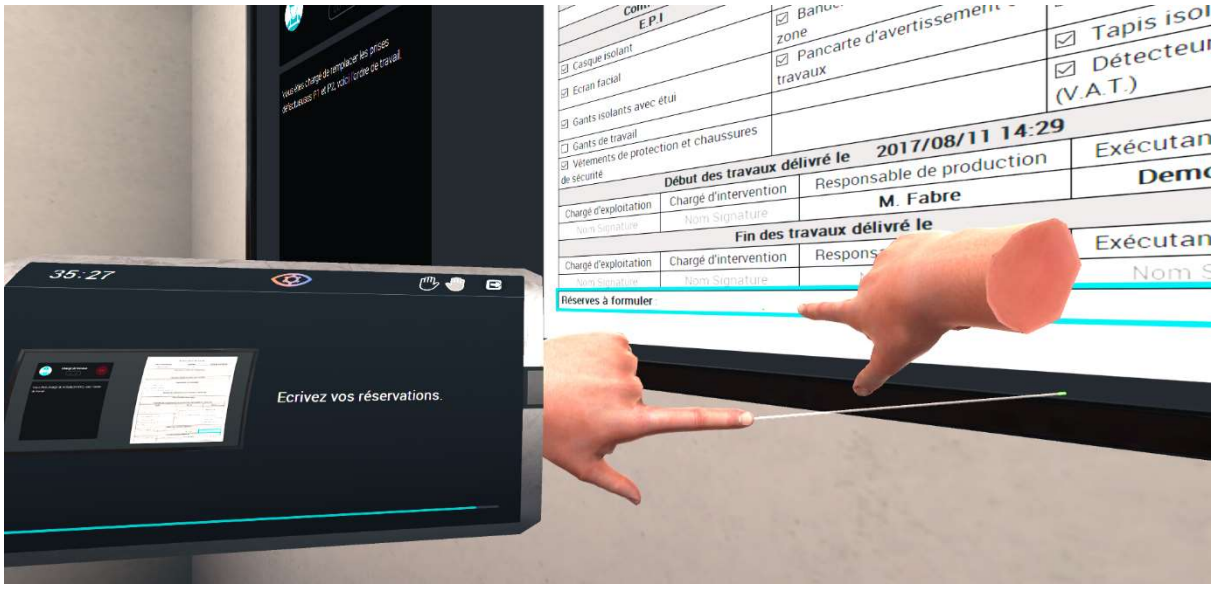
Once the plug is plugged in, the learner must check that is works properly. To do so, she/he must first put the cabinet back under tension by switching on the disconnector Q1, then point and click on the white jack of the POLYPROD.



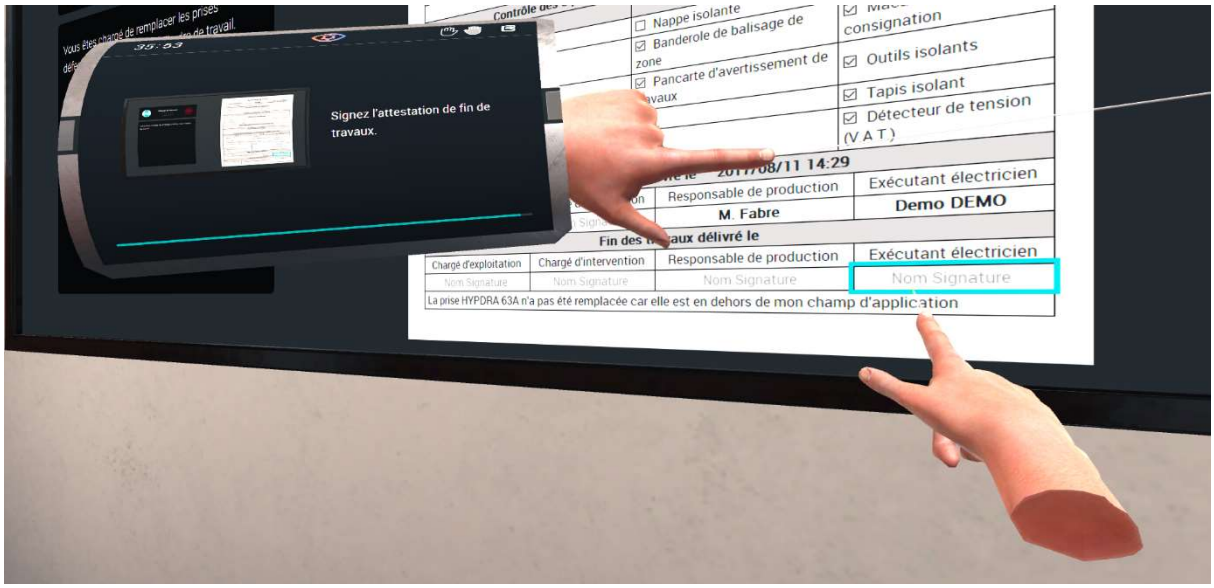
The trainee can finally remove the insulation blanket and markups. When all markup elements are moved he/she can removed the PPE.

Then the trainee must bring back the toolbox in the locker room. To do so, the trainee must drop the toolbox on the locker room floor.

The trainee was unable to replace the P4 plug, because it was located outside the scope of a BS accredited worker. The trainee must write his/her comments on the appropriate box (blue).



Sign the certificate of work completion on the work order.

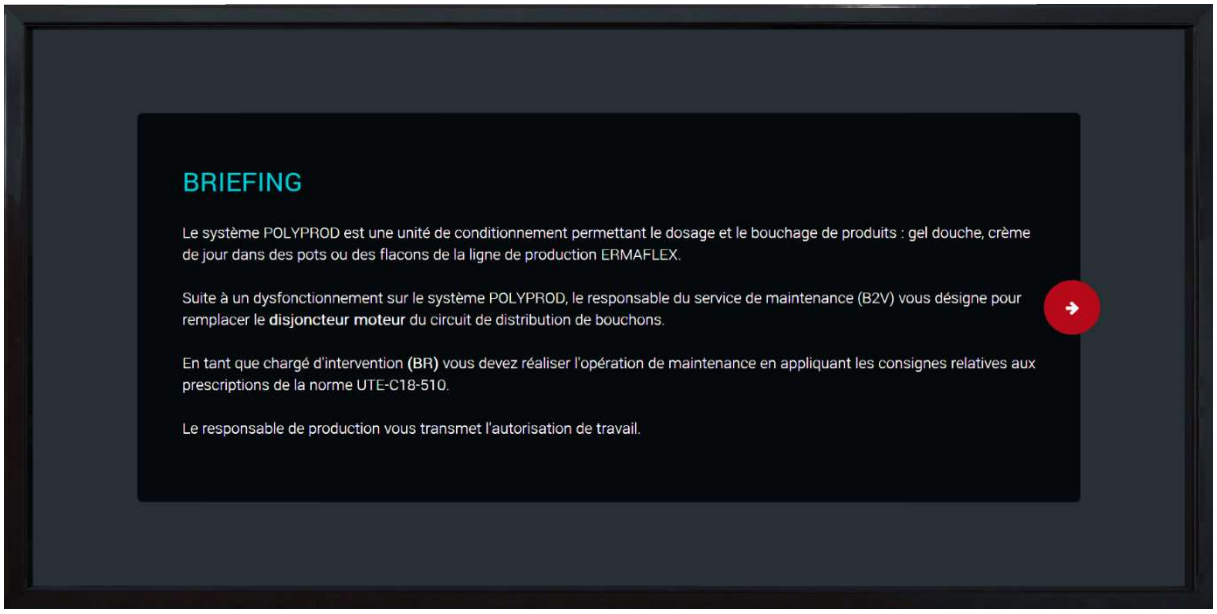

Signez l'attestation de fin de travaux.
Nappe isolante
Banderole de balisage de zone
Pancarte d'avertissement de travaux
consignation
Outils isolants
Tapis isolant
Détecteur de tension (V A T)
Responsable de production
Exécutant électricien
M. Fabre
Demo DEMO
Chargé d'exploitation
Chargé d'intervention
Responsable de production
Exécutant électricien
Nom Signature
Nom Signature
Nom Signature
Nom Signature
La prise HYPDRA 63A n'a pas été remplacée car elle est en dehors de mon champ d'application

3.1.3 Sequence 4: Accreditation BR

In sequence 4, the objective is to get familiarized with the BR electrical accreditation:

- B: Low voltage installation
- R: Responsible for general BT interventions

At the beginning of the sequence, the trainee is in the locker room. During the briefing, he/she is informed that as a BR intervention worker, he/she needs to do a maintenance operation: replacement of the circuit breaker motor of the cork distributor.



The trainee must answer the following MCQ:

BEGINNER	
Questions	**Answer**
Identify, from the wiring diagram of the POLYPROD control cabinet, the electrical element to be maneuvered to switch off the system:	Q1
Identify the defective circuit breaker motor in the corks distribution process. Base your answer on the electrical schema of the POLYPROD cabinet:	Q6

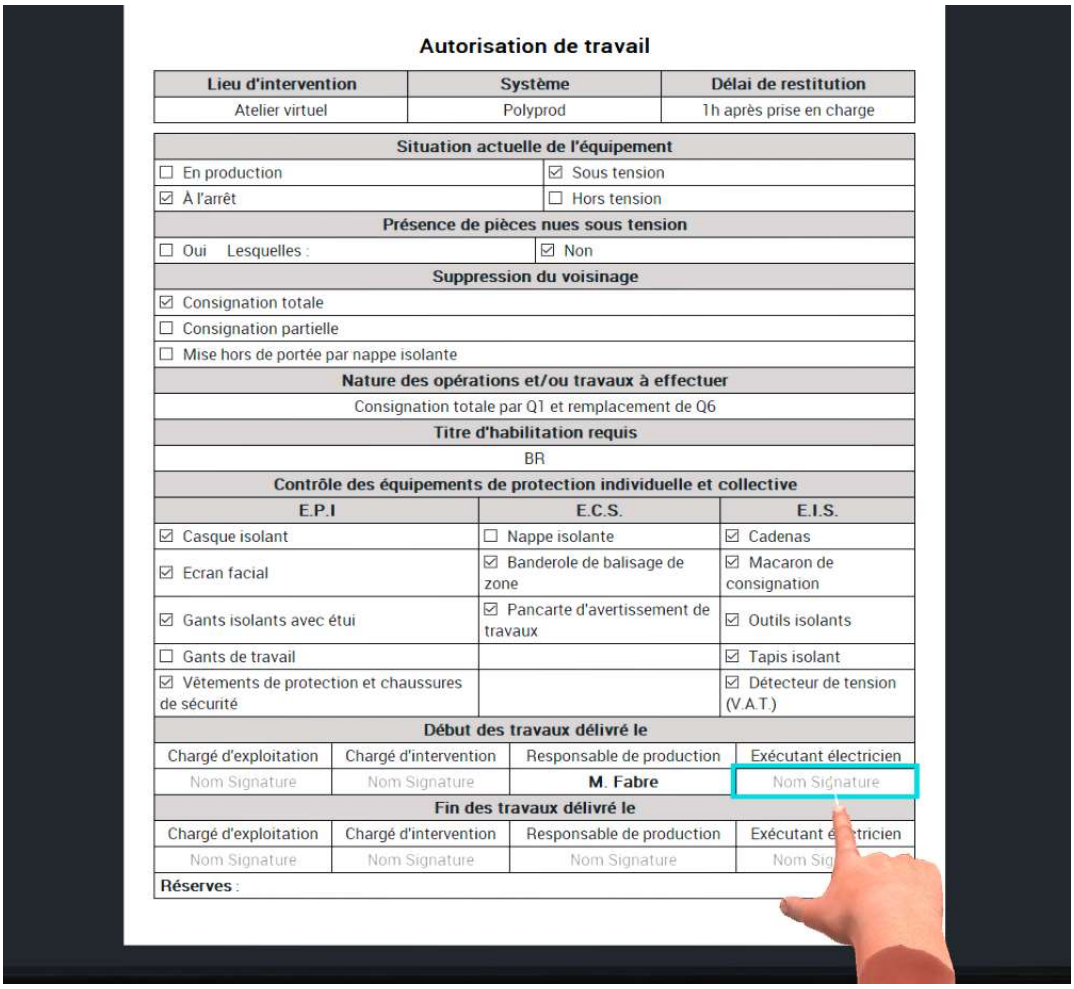
Give the value of the rated motor current of the plug distribution circuit, from the wiring diagram of the POLYPROD control cabinet :	0.4A
Intervention officer BR must always carry out the VAT during a consignment?	TRUE
What are the different steps of a consignment (Choose the right order)	Separation - Conviction - Identification - VAT

ADVANCED	
Questions	**Answers**
When doing an intervention in zone 4, the office BR must:	• Must eliminate risk by isolation or logging if possible. • Can lay insulating blankets or screens
At the end of the intervention, the officer must:	• Put back on service the installation • Notify the person in charge of the electrical installation. • Turn off the installation he himself recorded
The standard NF C 18-510 defines an operation of electrical order as being an operation which concerns	• Active parts • The measuring
The BR authorization as defined by standard NF C 18-510 no longer entails the authorization B1:	TRUE
The maintenance operation that you are going to perform is considered as	A BT general intervention

Expert	
Questions	**Answers**
Give the value of the useful power of the plug distribution motor	60W
At the end of the troubleshooting, the functional test must only be carried out by the BE	FALSE
The electrical environment is defined in standard NF C 18-510 as the geographical volume around a live bare part or an isolated pipe limited to	50m around the live bar part
Among the limit distances conventionally fixed, which one does not exist	DMLA
Reinforced neighborhood zone (zone 4): In this zone, only electrical order and non-electrical work can be done	FALSE

After answering this MQC, a call appears on the screen.

The production supervisor gives the work order to the trainee who must sign it to start the intervention (to sign click on the blue box).



Autorisation de travail

Lieu d'intervention	Système	Délai de restitution
Atelier virtuel	Polyprod	1h après prise en charge

Situation actuelle de l'équipement	
☐ En production	☑ Sous tension
☑ À l'arrêt	☐ Hors tension
Présence de pièces nues sous tension	
☐ Oui Lesquelles :	☑ Non
Suppression du voisinage	
☑ Consignation totale	
☐ Consignation partielle	
☐ Mise hors de portée par nappe isolante	
Nature des opérations et/ou travaux à effectuer	
Consignation totale par Q1 et remplacement de Q6	
Titre d'habilitation requis	
BR	

Contrôle des équipements de protection individuelle et collective		
E.P.I	E.C.S.	E.I.S.
☑ Casque isolant	☐ Nappe isolante	☑ Cadenas
☑ Ecran facial	☑ Banderole de balisage de zone	☑ Macaron de consignation
☑ Gants isolants avec étui	☑ Pancarte d'avertissement de travaux	☑ Outils isolants
☐ Gants de travail		☑ Tapis isolant
☑ Vêtements de protection et chaussures de sécurité		☑ Détecteur de tension (V.A.T.)

Début des travaux délivré le			
Chargé d'exploitation	Chargé d'intervention	Responsable de production	Exécutant électricien
Nom Signature	Nom Signature	**M. Fabre**	Nom Signature
Fin des travaux délivré le			
Chargé d'exploitation	Chargé d'intervention	Responsable de production	Exécutant électricien
Nom Signature	Nom Signature	Nom Signature	Nom Signature
Réserves :			

Once the work order is signed, the trainee must choose the right tool and place them in the toolbox.

The following object are displays in the locker room shelves. The mandatory tools are the following:

- The Helmet
- The insulating gloves (yellow)
- Gloves tester
- Insulated screwdriver
- The voltage detector
- The temporary banner
- Warning sign
- Insulating blanket
- New Q6 circuit breaker
- Consignment locker

The trainee can also add the following tools

- Markup poles

- Simple screwdriver
- Tablet

Detailed information can be found on the sequence 2 (B1H accreditation).

Once the right tools have been placed in the toolbox, the trainee can leave the locker room.

At the beginning level, the trainee is warn if the goof object are in the tooolbox. Then, he needs to mark of the intervention area. To do so, the trainee must take the poles, the temporary banner and the warning sign. Finally, the trainee must place the insulating blanket on the markup zone. Visual guides appear at the BEGINNER level.

The second step consists in splitting the Q1circuit breaker. To turn off the machine, and cut the electrical supply of the POLYPROD, the trainee must turn the red spanner adjuster to the left by 90°.

The trainee must seall off the circuit breaker with the consigment lock.

In the next step, the trainee must identify, based on the visible diagram (tablet) the electrical trip that has been recorded. The tablet must be grab with one hand. Then the trainee must click on the aera where the circuit breaker Q is represented.

The trainee must check the absence of voltage downstream of disconnector Q1. To do so, the trainee must test the gloves with the glove tester and put his/her PPE – the insulating gloves and the helmet.

Now, the door of the electrical cabinet can be open safely. The trainee can check that there is voltage detector and auto check it.

The trainee can check the no voltage of the downstream Q by testing the neutral (first terminal bottom of Q1) and each of the 3 terminals (on the right side), then between the terminal of phase 2 and 2.

The trainee must check the voltage detector by auto testing it agin.

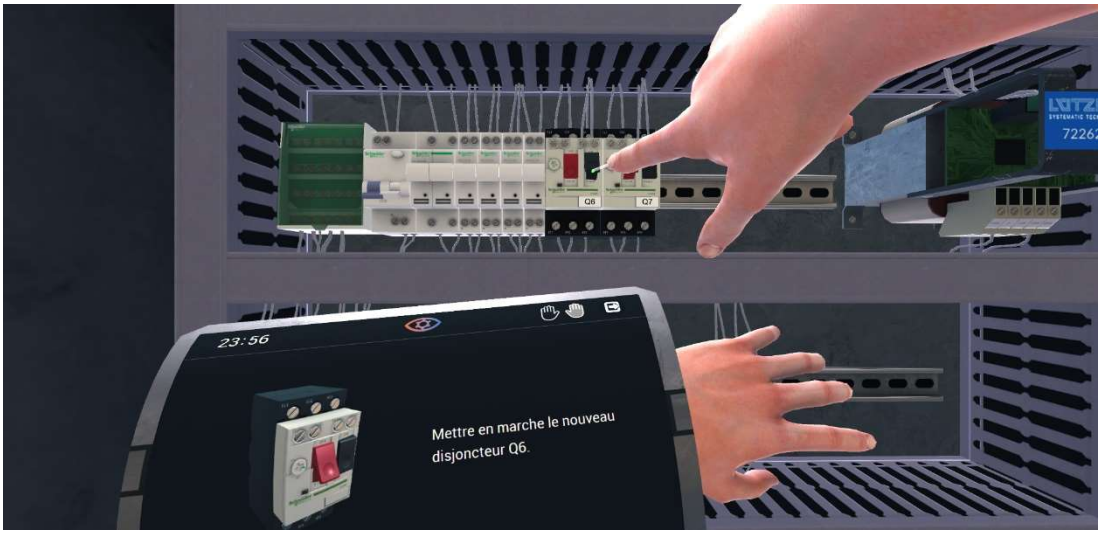
Since the POLYPROD is off, the trainee can remove his/her PPE and grab the insulated screwdriver in the toolbox.

Then, unscrew the 8 screws that hold the conductors to the circuit breaker Q6.

Once the conductor are disconnected, the trainee can replace the Q6. To do so, grab the circuit breaker, and place it in the toolbox. Place the new Q6 at the same place than the old one and screw the conductors.

Once the new Q6 is placed, adjust its size with the plastic screw on the front. Using the insulated screwdriver, it is possible to adjust its value by attaching it to this screw by clicking on the trigger and rotating the hand holding the screwdriver. A visual guide appears and displays the current calibration value. The Q6 breaker must be set to 0.4A gauge.

The Q6 can be turn on by cliking on the black button ON (right side of the resseting)



When the interventon is done, the trainee must close the door of the POLYPROD and turn on the machine by setting off the Q1, after removing the consigment lock.

The trainee can now remove the insulating blanket and the markup intervenion zone.

The trainee must check that the machine works well especialy the cork supply system. To do so, open the pneumatic sluice gate, rearmed the machine, launch the machine initialization then turn off the machine once the initilization is done.

The machine works. Click on the corks supplier, attesting of the proper operation of the plug distribution circuit.

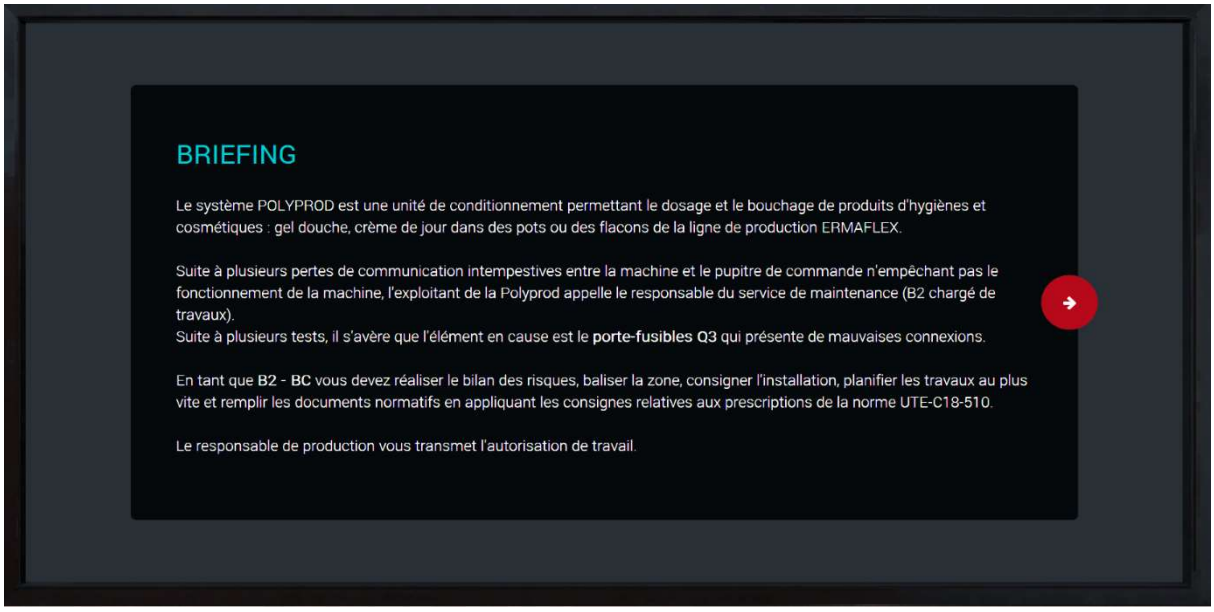
The trainee must bring the toolbox back to the locker room and sign the work certificate at the bottom of the work order.

3.1.4 Sequence 5: Accreditation B2/BC

In sequence 5, the trainee learns the process for electrical accreditation B2 and C2:

- B: low voltage installation
- B2: Electric work officer
- BC: Consignment officer

At the beginning of the sequence, the trainee is in the locker room. During the briefing, he/she is informed that as B2 work officer and BC consignment officer, he/she carry out the risk assessment, markup the intervention zone, record the installation, plan the work as soon as possible and fill in the normative documents.



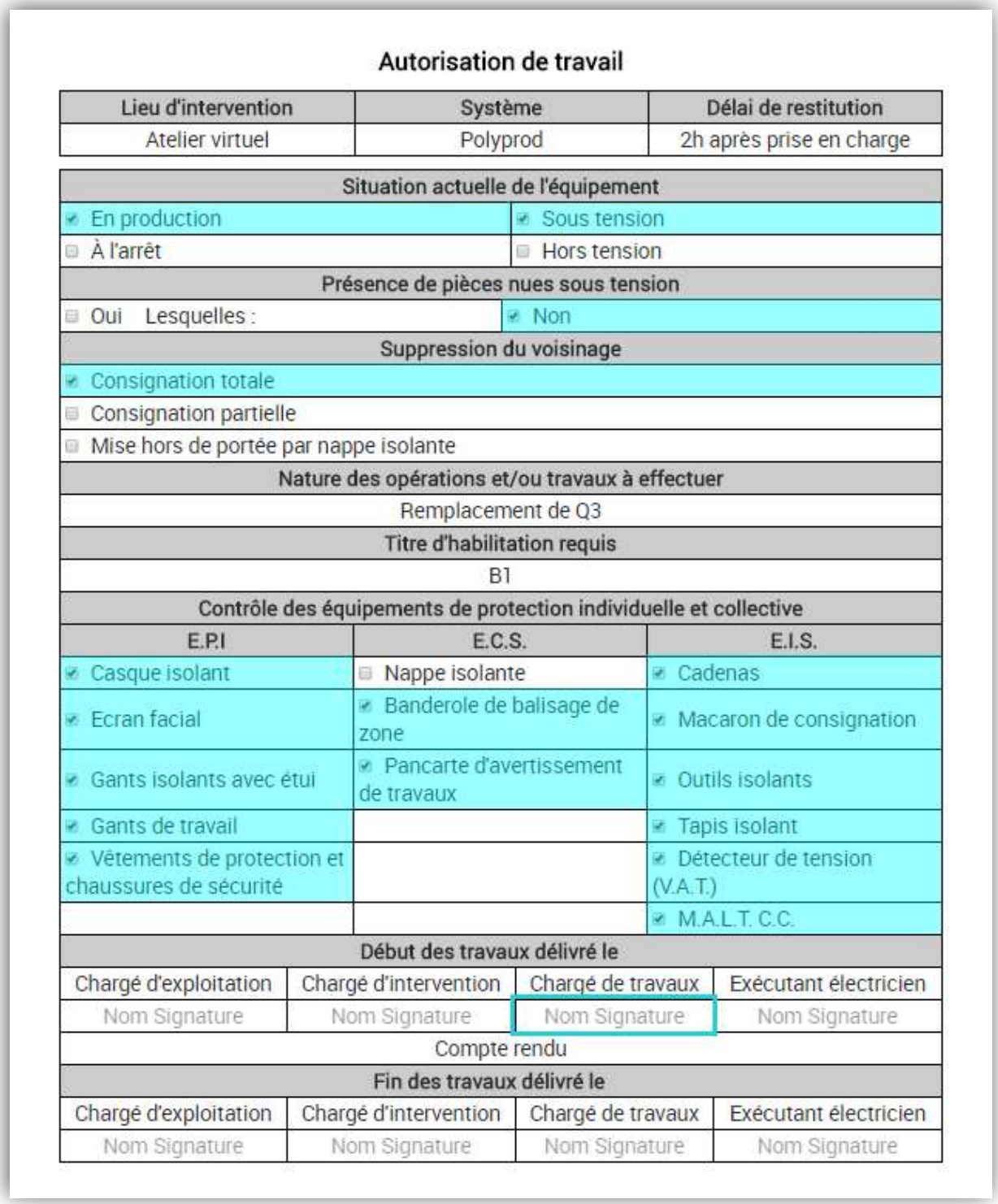
The trainee must answer the following MCQ:

BEGGINER – ADVANCED – EXPERT	
Questions	**Answers**
Identify from the electric Scheme of the POLYPROD, the electrical element to be maneuvered to switch off the system:	Q1
Identify the protective element from communicative element of the system	Q3
For electrical work, can the same person be responsible for consignment and works officer?	TRUE
The grounding system and the short circuit is mandatory for BT?	NO
The work area is delimited by:	The work officer
The electric work must be:	Plan
The MALT procedure begins with the connection of the device	To the ground

After answering those questions, a call will appear on the main screen.

The production supervisor gives the work order to the trainee.

The work order must be complete by clicking on the box below. If the work order is not complete correctly, the correct answers appear.



Autorisation de travail

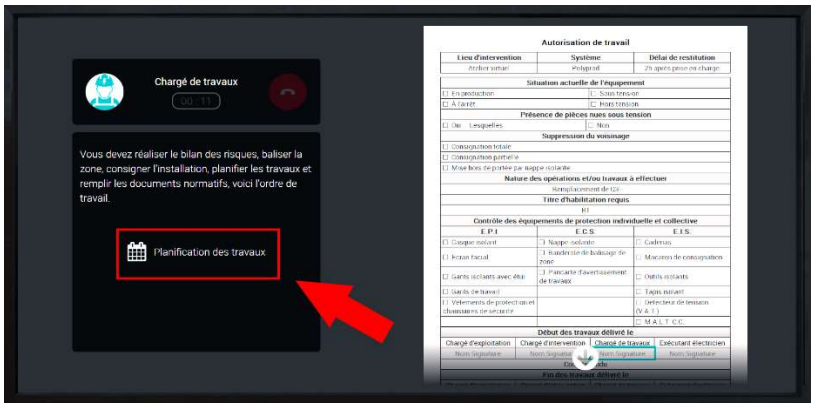
Lieu d'intervention	Système	Délai de restitution
Atelier virtuel	Polyprod	2h après prise en charge

Situation actuelle de l'équipement	
☑ En production	☑ Sous tension
☐ À l'arrêt	☐ Hors tension
Présence de pièces nues sous tension	
☐ Oui Lesquelles :	☑ Non
Suppression du voisinage	
☑ Consignation totale	
☐ Consignation partielle	
☐ Mise hors de portée par nappe isolante	
Nature des opérations et/ou travaux à effectuer	
Remplacement de Q3	
Titre d'habilitation requis	
B1	

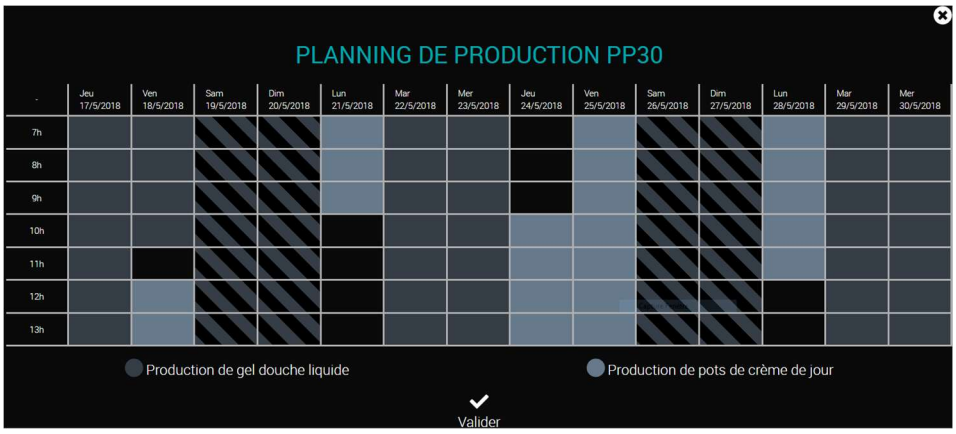
Contrôle des équipements de protection individuelle et collective		
E.P.I	E.C.S.	E.I.S.
☑ Casque isolant	☐ Nappe isolante	☑ Cadenas
☑ Ecran facial	☑ Banderole de balisage de zone	☑ Macaron de consignation
☑ Gants isolants avec étui	☑ Pancarte d'avertissement de travaux	☑ Outils isolants
☑ Gants de travail		☑ Tapis isolant
☑ Vêtements de protection et chaussures de sécurité		☑ Détecteur de tension (V.A.T.)
		☑ M.A.L.T. C.C.

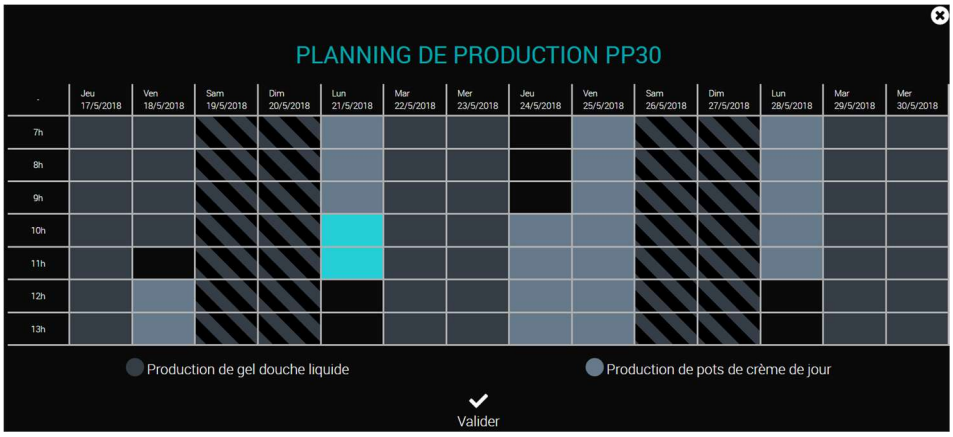
Début des travaux délivré le			
Chargé d'exploitation	Chargé d'intervention	Chargé de travaux	Exécutant électricien
Nom Signature	Nom Signature	Nom Signature	Nom Signature
Compte rendu			
Fin des travaux délivré le			
Chargé d'exploitation	Chargé d'intervention	Chargé de travaux	Exécutant électricien
Nom Signature	Nom Signature	Nom Signature	Nom Signature

The trainee must plan the intervention during that step. The planning is available when clicking on the **work planinificaiton button** (left side of the work order).

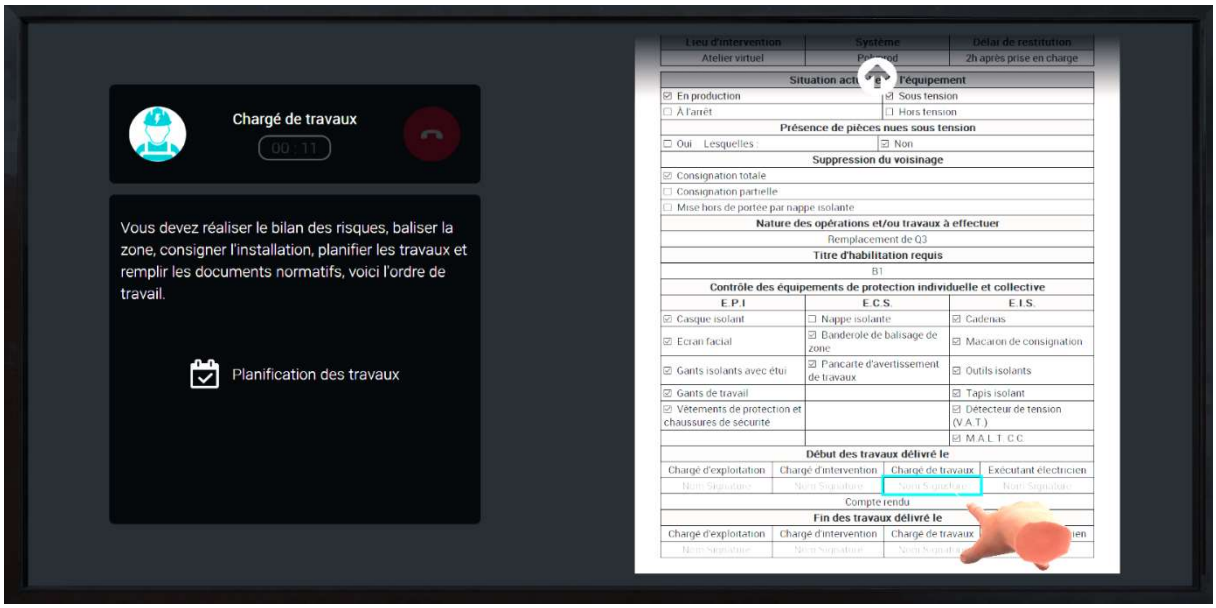


This intervention will last 2 hours, select the two boxes corresponding to the two hours available at the earliest in the production schedule, then validate. If the selection is not correct, a message appears on the tablet to inform the trainee.





The trainee must check some element of the work order and sign the work officer box (end of the W.O) to validate the planning.



After signing the work order, a time ellipse takes place, with a black fade effect. The following sound message can be heard and read on the tablet:

"As a BC consignment worker, you must tag and log the installation to prepare the maintenance operation. "

The trainee must place the right tools ans equipment in the toolbox. The following tools should be placed in the box, located on the shelves of the locker room:

- Insulated helmet
- Insulated mechanic gloves (r ed gloves) *
- Glove tester
- The voltage detector
- Temporary markup banner
- Work warning sign *
- Insulating blanket
- Consignment lock
- Grounding device (***MALT)***

The following tools are optional:

- Markup poles
- The tablet showing the wiring diagram
- Insulated or simple screwdrivers

Once done, the trainee can leave the locker room, he/she will be informed if the inventory is complete.

Then, markup the intervention area. To do so, place the poles and the temporary banner and work warning sign. Then, place the insulating blanket on the markup zone. Visual guides will appear to place the poles correctly – only for the beginner level.

When the markup is placed, the tainee must locat the Q1 ***inter sectionner.*** To consign it, point the Q1 and press the trigger of the controler.

It will start blinking if not located in 20 second – BEGINNER mode exclusively.

Next step aims to separate the circuit breakre Q1. To turn it off, the trainee must cut the electric supply of the POLYPROD, to do so, rotate the red spanner adjuster, 90 degre on the left.

Seal off the inter circuit breaker with the consigment lock.

Identify on the scheme (tablet) the electric start that has been consigned. The tablet can be grab by one hand and the trainee must click on the box representing the Q1 circuit breaker.

Th trainee must check that there is no voltage mainstream of the Q1 circuit breaker. First, the trainee must test the gloves with the gloves tester. He/She must wear the PPE (red gloves, helmet).

Open the door of the electrical cabinet.

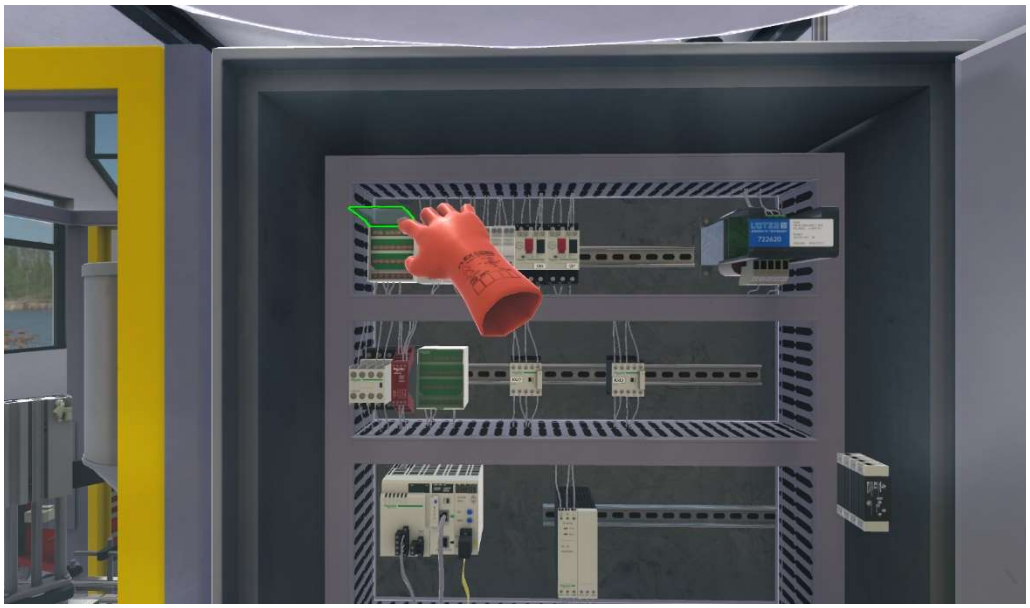
The trainee must grab the voltage detector and auto test it.

Then check the absence of voltage downstream of Q1 by testing between the neutral (first terminal at the bottom of Q1) and each of the three phases (the other terminals on its right), then between the terminals of phases 2 to 2. All the combinations of the four terminals of the bottom two by two.

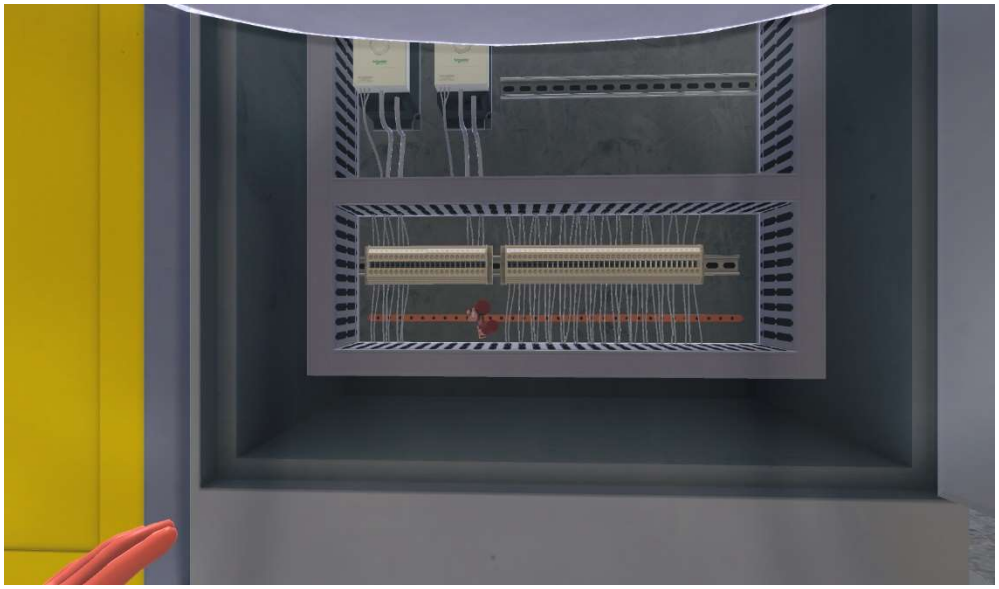
Finally, test the ascence of tension at the voltage detector (autotesting).

The electric supply of the installation is off and the trainee must now ground the installation thanks to the grounded device.

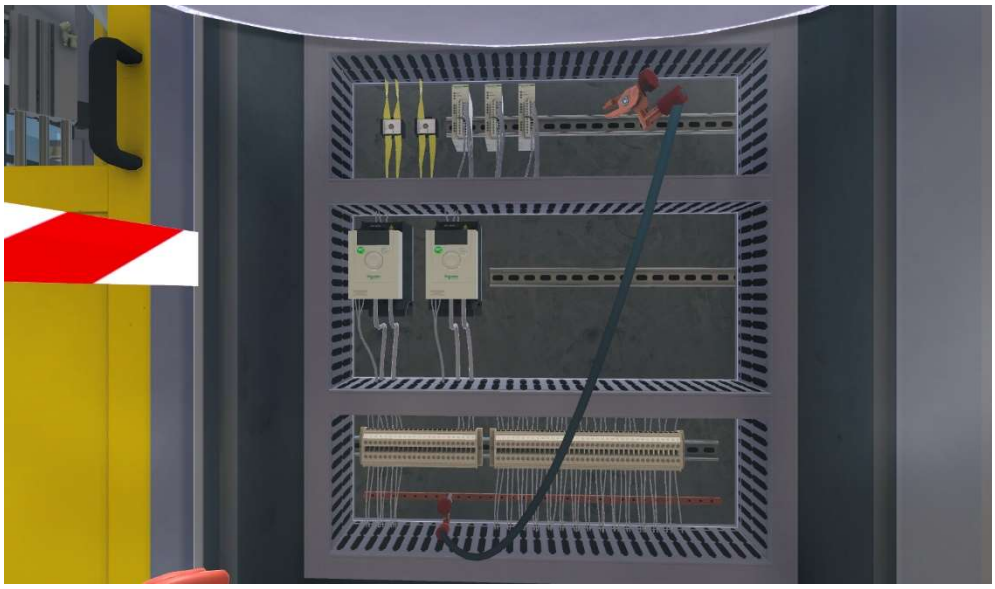
Open the terminal block, top left side of the cabinet.



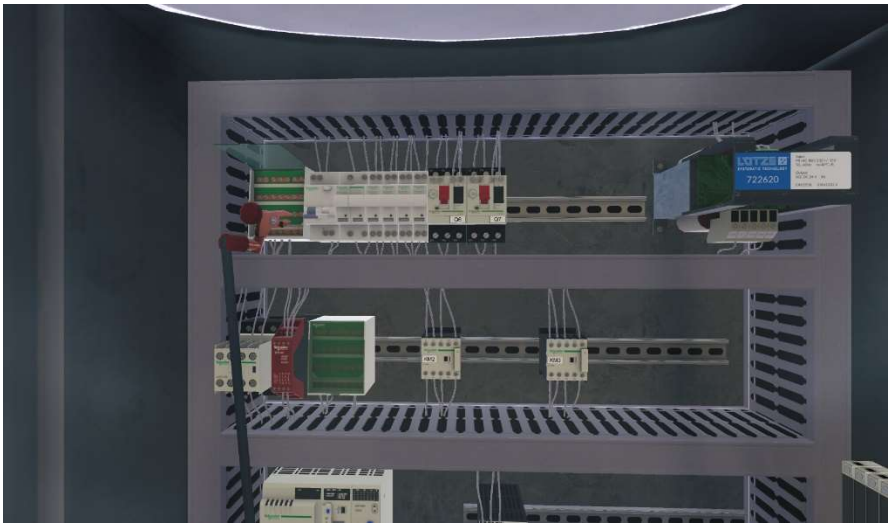
After grabbing the grounding device, click on the pliers (appear in your hand) on the bottom of the cabinet.

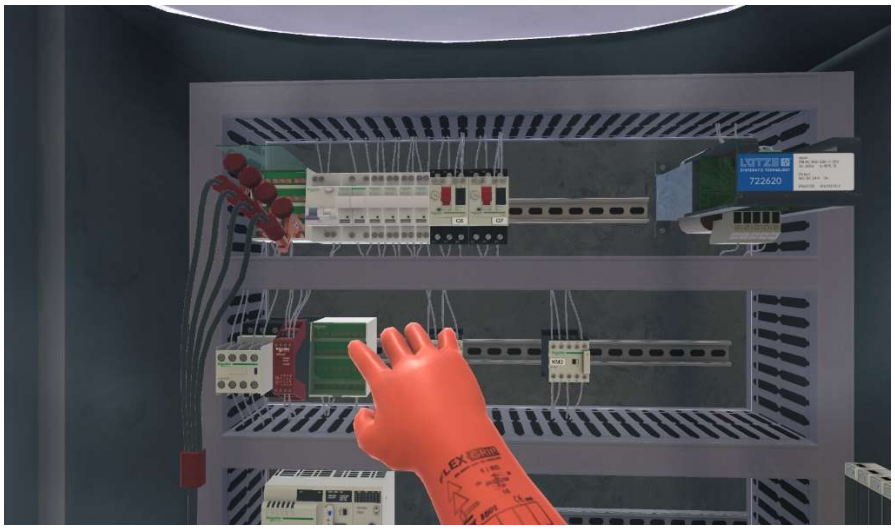


The trainee must tie the first pliers on the earth bar level and the second one at the terminal block level. If those steps are not respected a fatal error will be triggered and end the exercise



Then, fix one by one 4 clamps on the 3 phases and the neutral of the previously opened terminal block.

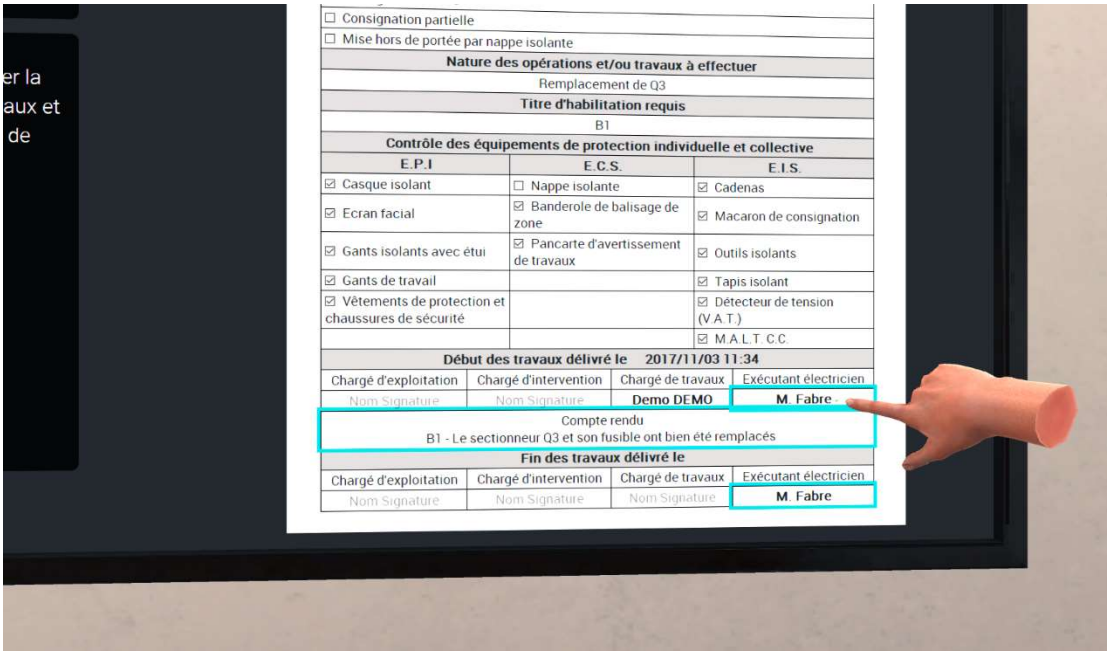




When the grounding is done, the trainee can close the electrical door of the cabinet and remove the PPE. Bring back the toolbox to the locker room.

A black fade appears, and an audio message warns the trainee of a time jump after the intervention of the B1V.

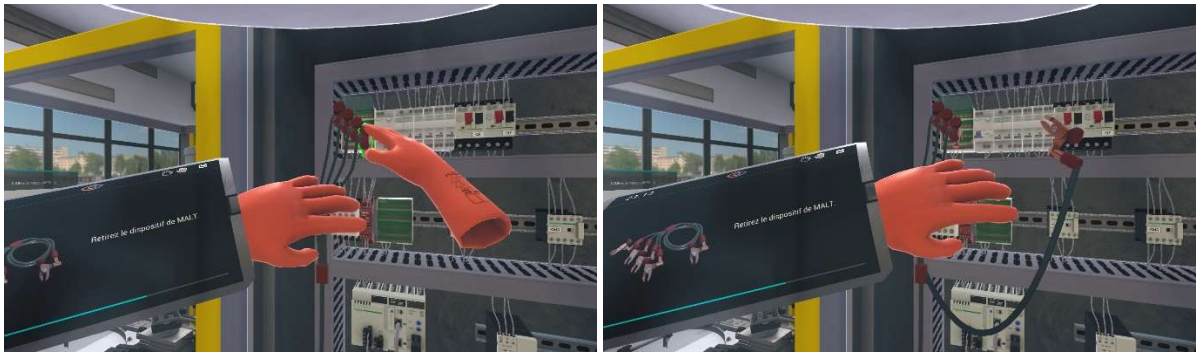
During this step, the learner must check that the electrician officer has completed the work order by clicking in the 3 highlighted areas (briefing screen).



Grab the toolbox and bring it near the POLYPROD. Test gloves and equip the PPE before opening the door of the electrical cabinet.

Then, remove the Grounding Device. First, grasp one of the terminals of the terminal block and release it outside of the same terminal block. This operation must be repeated for each of the terminal block

clamps. At the end only, the trainee can remove the clip attached to the ground bar before storing it in the inventory. If the withdrawal order (terminal block clamps then earth clamp) is not respected, a fatal error is trigged and ends the exercise.



Once the intervention is done, close the POLYPROD door and remove his/her PPE. The trainee must then remove the markup poles, insulating blanket and work warning sign. Finally, he/she must switch on the cabinet by reconnecting the disconnector Q1 after removing the locking padlock.

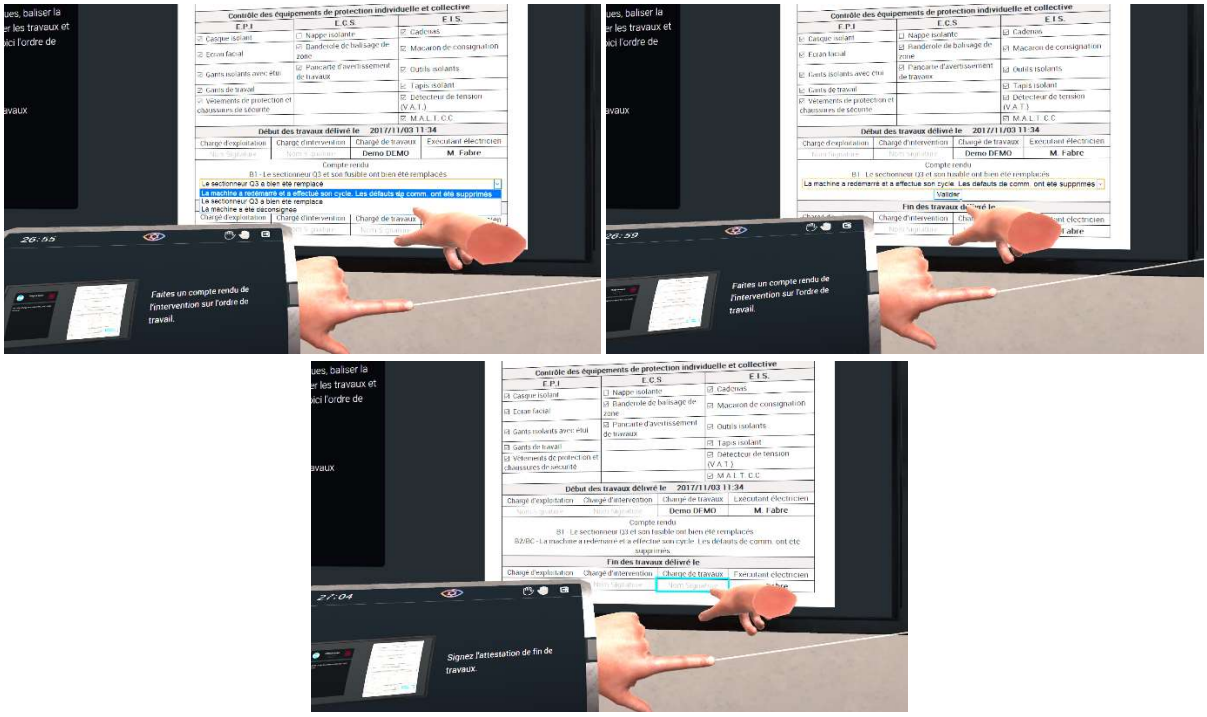
The trainee must now check that the communication between the desk and the machine is working properly. To do so, restart the machine. It is necessary to reset it, then start the initialization before turning it on.

The trainee must bring back the toolbox in the locker room. Make sure to close the toolbox.

For the last step, write a report on the work order. Several choices are available. The correct answer is the following.

« The machine started again and cycle. The communicating default have been resolved».

Validate the answer by clicking on « validate » and sign the work order on the work officer box.



The trainee must pass the work order to operation manager by clicking on « Pass the work order to the operation manager», on the top left of the work order.

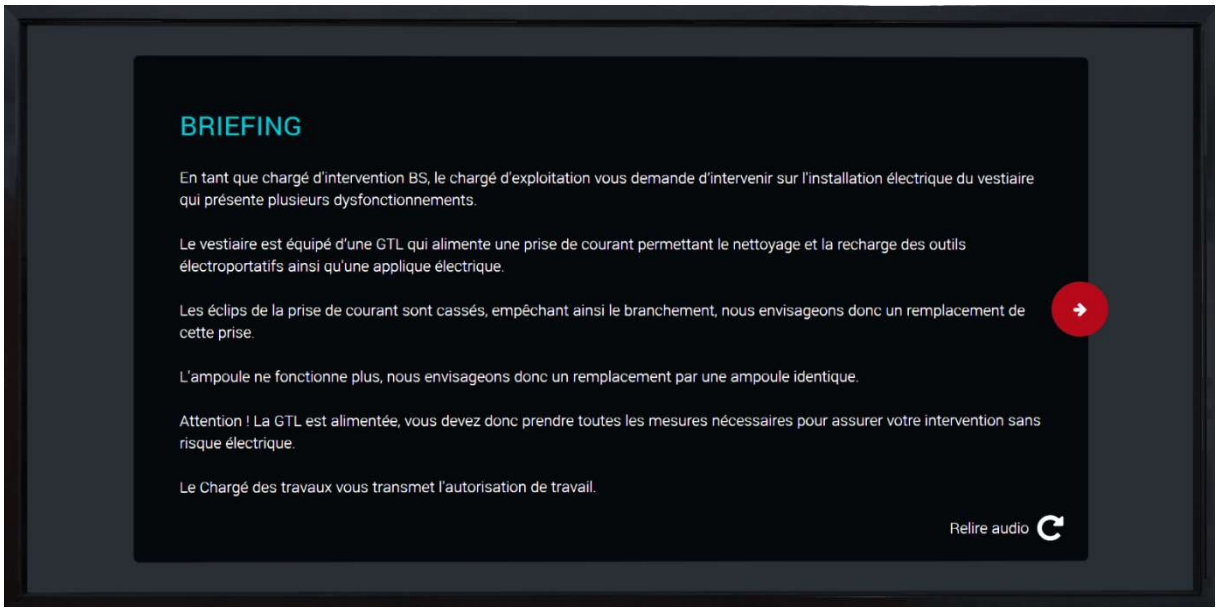

Chargé de travaux
00:11
Vous devez réaliser le bilan des risques, baliser la zone, consigner l'installation, planifier les travaux et remplir les documents normatifs, voici l'ordre de travail.
Planification des travaux
Transmettre l'OT au chargé d'exploitation

3.1.5 Sequence 6: Accreditation BS Construction

In sequence 6, the trainee learns the procedure of electrical accreditation BS, specific to construction.

- B: Low voltage installation
- S: Elementary operation supervisor

At the beginning of the sequence, the trainee is in the locker room. As a work officer BS, the trainee must replace an outlet and the bulb of a wall unit. The installation is done under tension. The trainee must take the appropriate measure to step in with no electric danger.



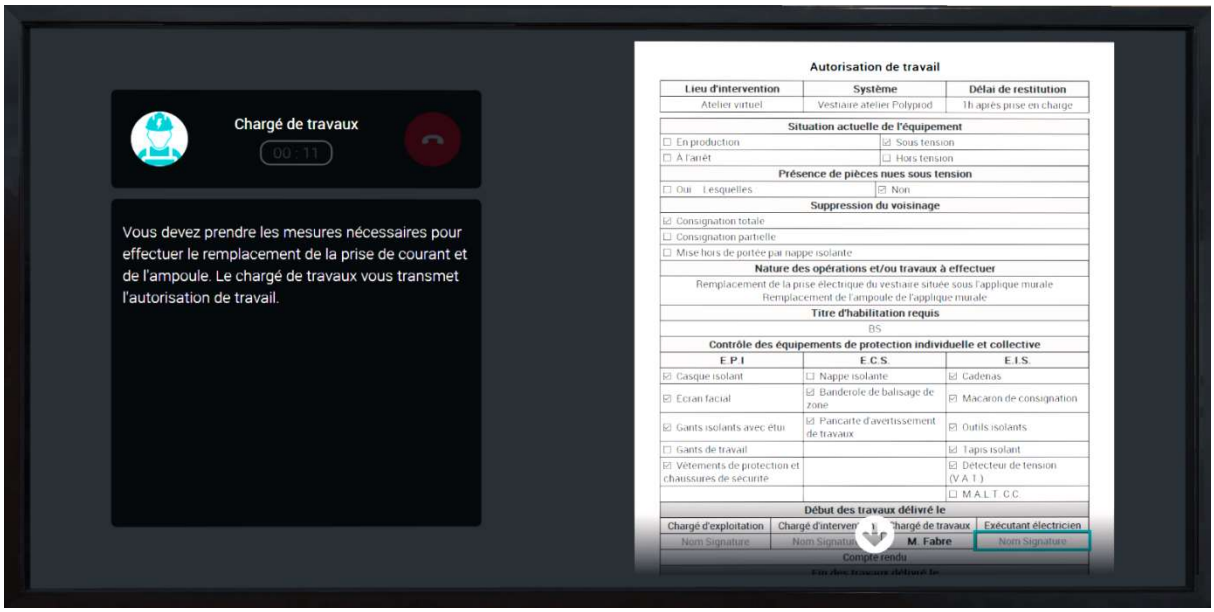
The trainee must answer the following MCQ:

BEGGINER – ADVANCED – EXPERT	
Questions	**Answers**
To replace a broken bulb, as a accredited officer BR, you must:	Perform a power off mission
Le fonctionnement du dispositif de détection d'absence de tension doit-il être vérifié :	Avant et après la V.A.T (vérification d'absence de tension)

To reset a circuit breaker, what precautions must be taken?	That there is no direct contact • It must be reset once only
Is there an apparent difference between an electrical conductor turned off and on?	NO
Can a circuit breaker be operated to open a heating circuit in operation? ?	YES
If you have a BS accreditation, can you work on an alternative electrical circuit of 230V protected by a 63 A circuit breaker?	NO
What are the limit of very high voltage?	0 to 50V
Vous vous approchez d'une installation en 400V alternatif dans un local réservé aux électriciens. A partir de quelle distance des pièces nues accessibles et sous tension devez-vous prendre des précautions particulières ?	30 centimeters
You are an interim worker and you work in a company. Who should give you the accreditation?	The employer
Sur la plaque signalétique d'un projecteur, on peut lire : 230V~ - 50 Hz - 2000W. A quel domaine de tension appartient-il ?	Low voltage BT

After answering the MCQ, a call appears on the screen

The work supervisor gives the work order to the trainee who must sign it to start the intervention. To sign, click on the blue box.



The trainee must place the right tools in the tool box as well as the necessary equipment's.

The following object are displays in the locker room shelves. The mandatory tools are the following:

- Helmet
- Insulating gloves (yellow gloves) *
- Glove tester
- Insulated screwdriver
- The voltage detector
- Temporary markup banner
- The work signs
- Th insulating blanket
- Consignment grip
- Consignment lock
- The tablet showing the wiring diagram
- Outlet tester
- New bulb
- The new outlet

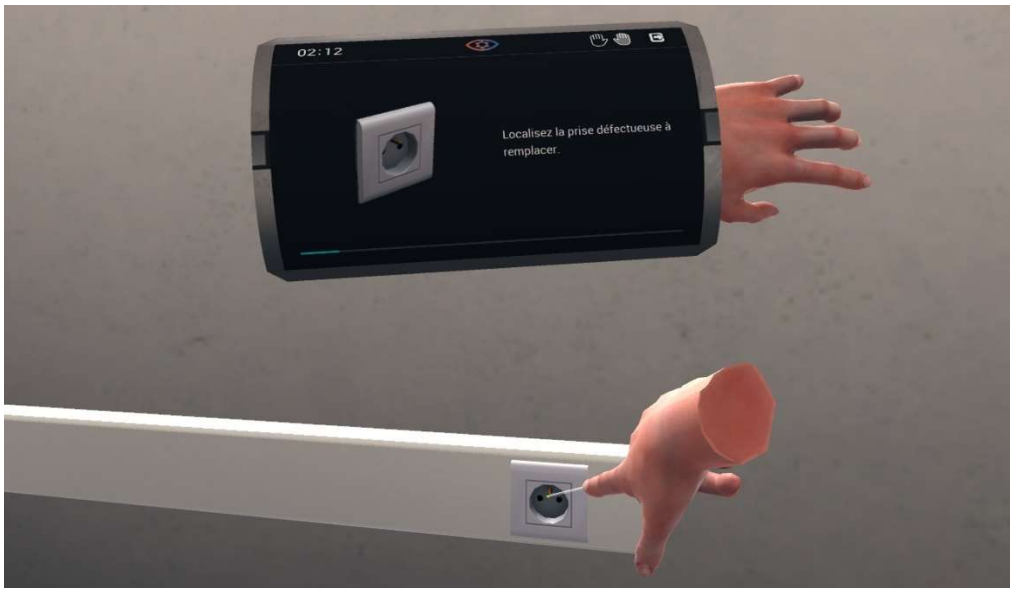
You can add the following tools (optional):

- Markup poles
- Simple screwdriver

The step is automatically validated when the right tools are in the toolbox.

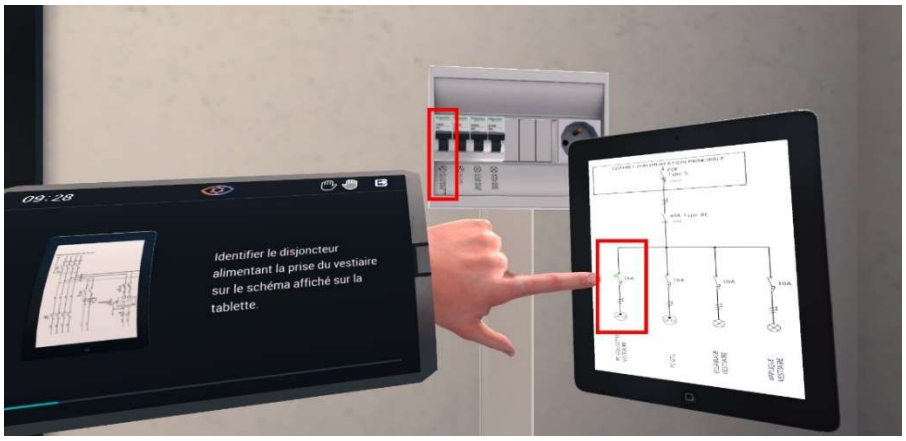
The trainee must locate the defective outlet and replace it. To do so, the trainee can use the outlet tester. « no voltage » message will appear on the screen if the circuit breaker is defective.

The trainee must then select the outlet by approaching the hand and selecting it by clicking on the interaction trigger and pointing the outlet.



The trainee must then markup the intervention area. Place the poles, the temporary banners on the poles and the warning signs. Finally, place the insulating blanket on the markup zone. Visual guides are available for BEGINNER level.

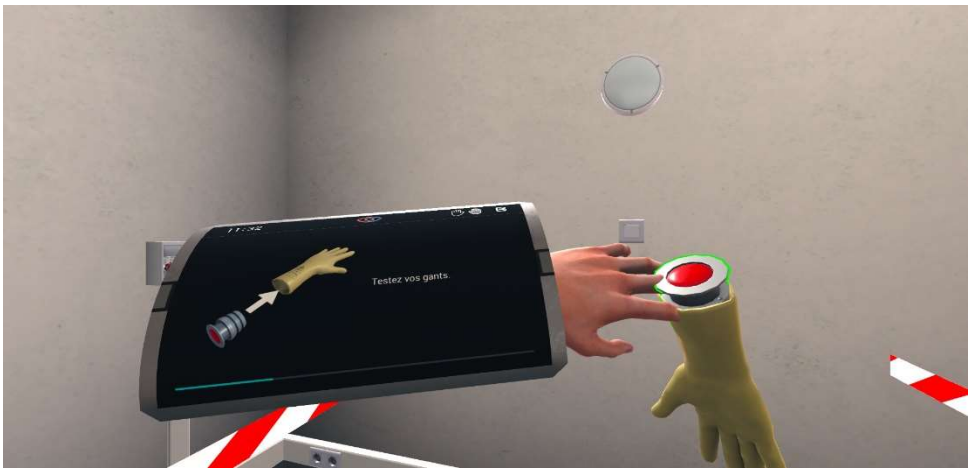
The trainee must now identify the circuit breaker that supply the locker room outlet on the electrical scheme. The scheme is visible on the tablet. This step is validated when the trainee click on the circuit breaker.



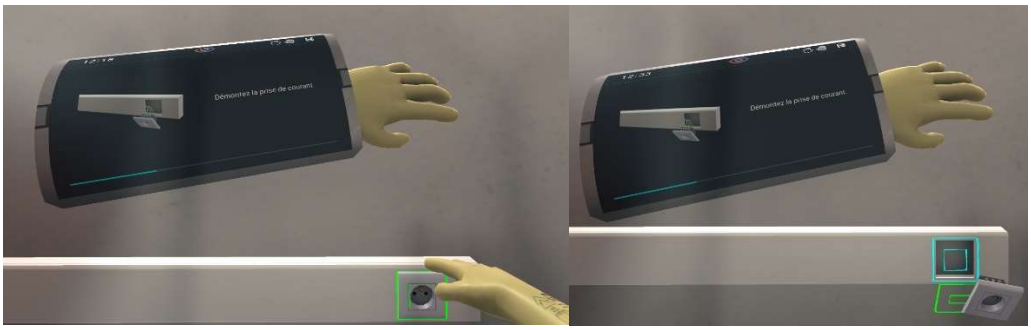
When the circuit breaker has been located on the diagram, the trainee must separate it by clicking on it on the electrical board (located on the right side of the locker room door)

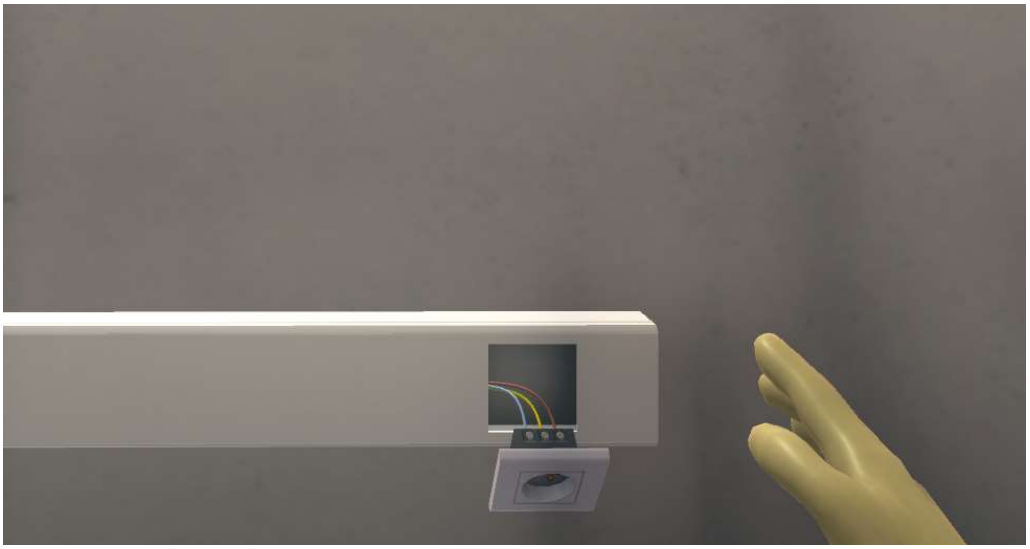
To avoid the circuit breaker to be accidentally turn on, the trainee must seal it off with the consignment grip and consignment lock. Grab the two objects from the toolbox and drop those one after the other on the circuit breaker. The trainee cannot place the grip of the circuit breaker is not cut before.

To replace the outlet, the trainee must test the gloves with the glove tester and put his/her PPE (insulating gloves and helmet).



Grab the outlet on the wall and drop it on a ghost.



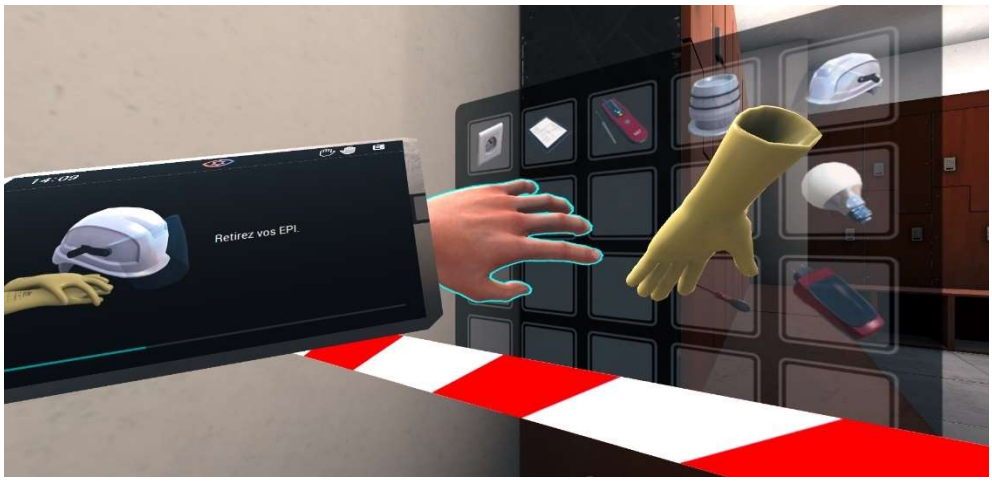


The trainee must now check the absence of voltage on the outlet terminal. Grab the voltage detector and auto test it.

The LEDs turn on with a sound, it shows that the tool is working properly.

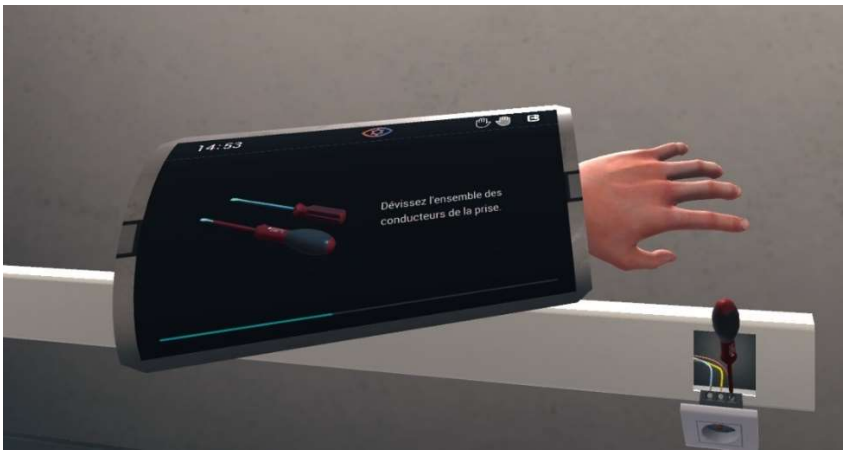
He/She can then check the absence of voltage across the outlet terminals (2 to 2). All combinations of three terminals two by two must be tested (three different tests), by plugging a portion of the VAT to a terminal and the other at another terminal. Press on the triggers of the controllers in contact between a tip of the VAT and an electrical terminal.
A new self-test must be performed to validate this step.

The trainee can now remove his/her PPE and place it in the inventory.

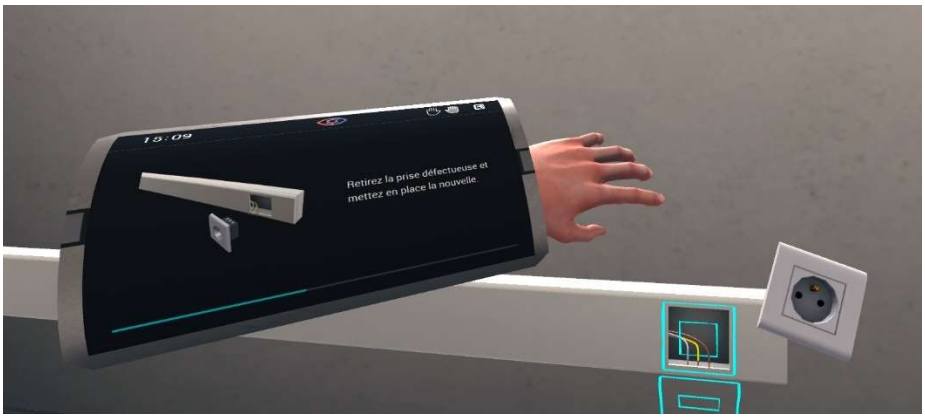


He must now grab the tools needed for the operation. The insulated screwdriver is needed to unscrew the screws.

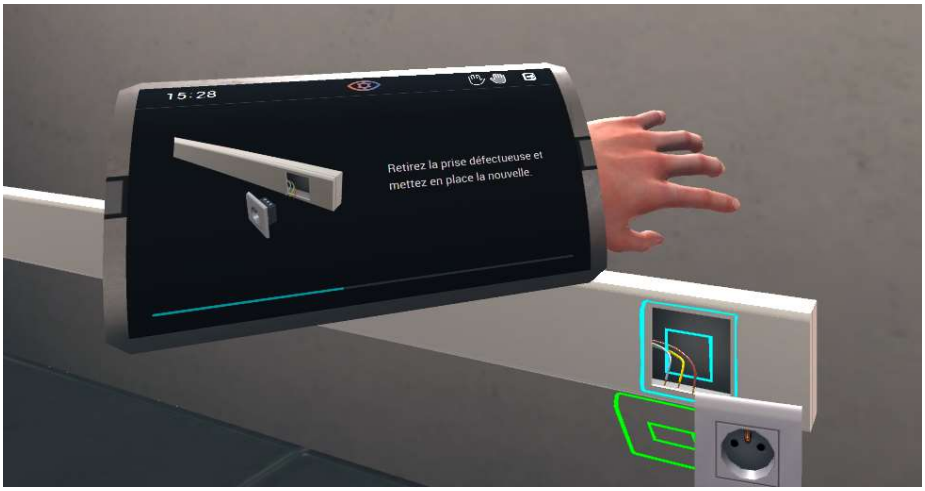
The three wires can be detached by unscrewing the three screws of the terminal blocks visible on the top of the socket.



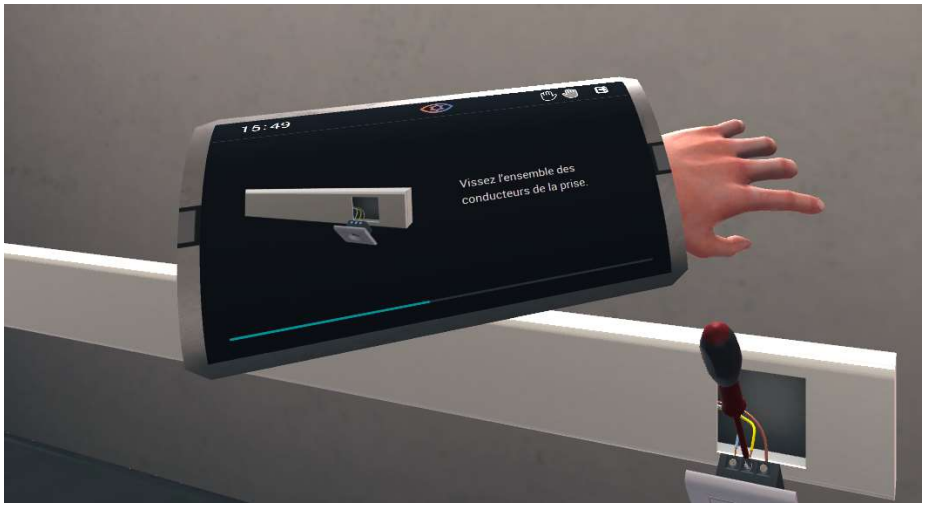
Once wires are loose, the defective outlet must be placed in the toolbox.



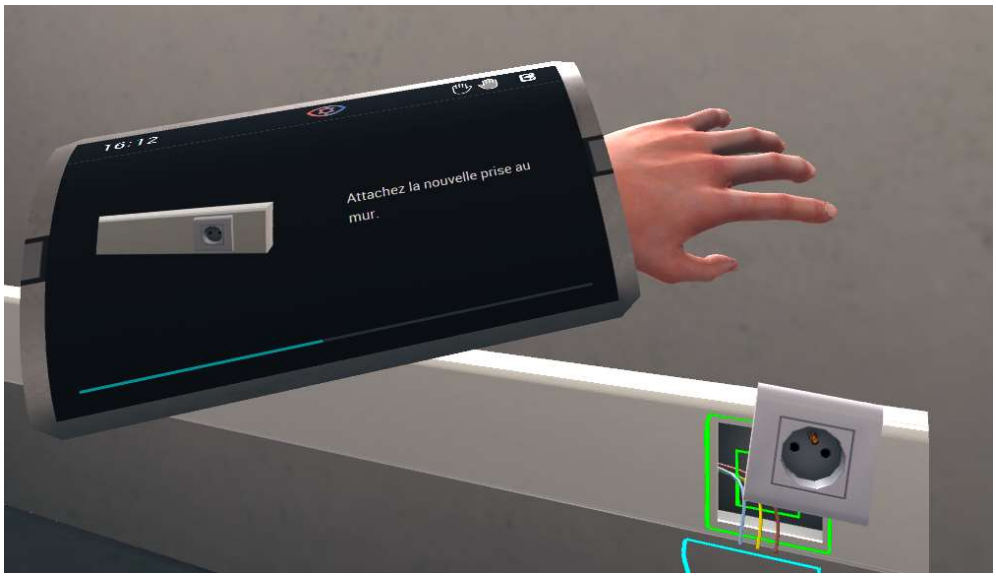
The trainee can now grab the new outlet from the inventory and drop it on the blue gosh.



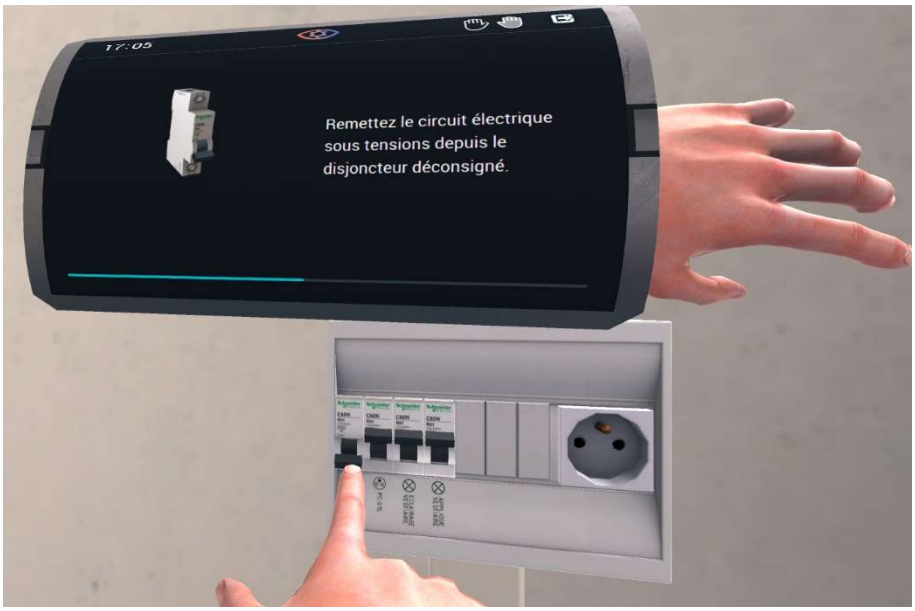
The 3 new screws of the outlet can be screwed to hold the wires with the insulated screwdriver.



Once the wires are plugged, the trainee must grab the outlet and fix it on the wall.

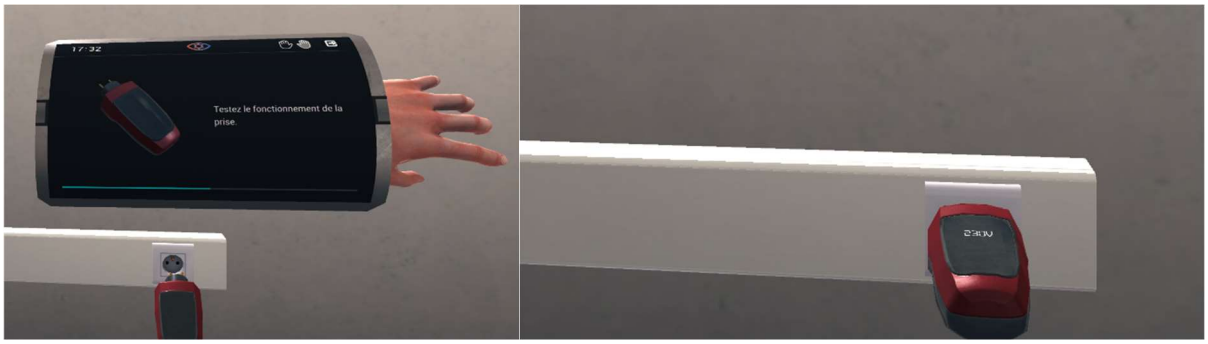


The consignment padlock and grip can be remove and place in the box. The circuit breaker can be turn on.

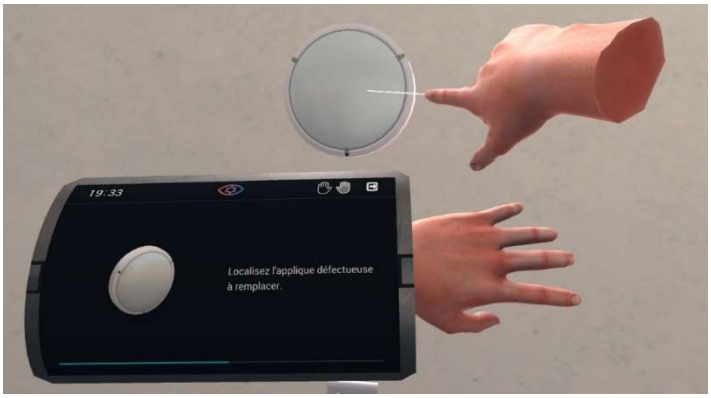


After turning ON the circuit breaker, the outlet must be tested with the plug tester.

The plug tester must indicate « 230V » on the screen once attached to the new plug.



In the next step, the trainee must locate the defective wall light. Point in the direction of the defective bulb and press the trigger to locate it.



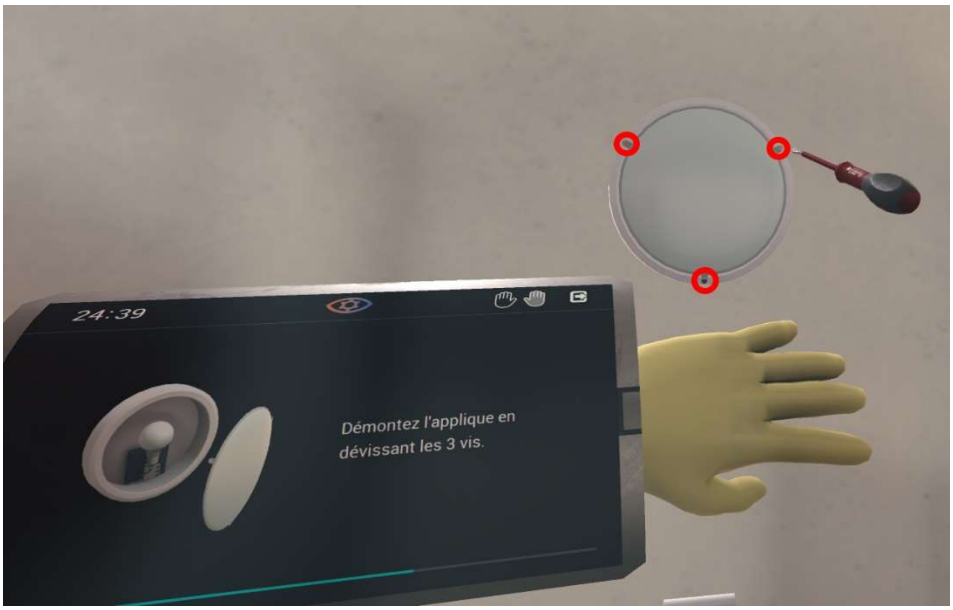
Then identify, by pointing and selecting, the circuit breaker that feeds the wall light on the diagram displayed on the screen tablet. Then, separate the same circuit breaker by approaching the hand of the

electrical panel and pressing the trigger of the controller; once the finge ris in contact with the circuit breaker in question.

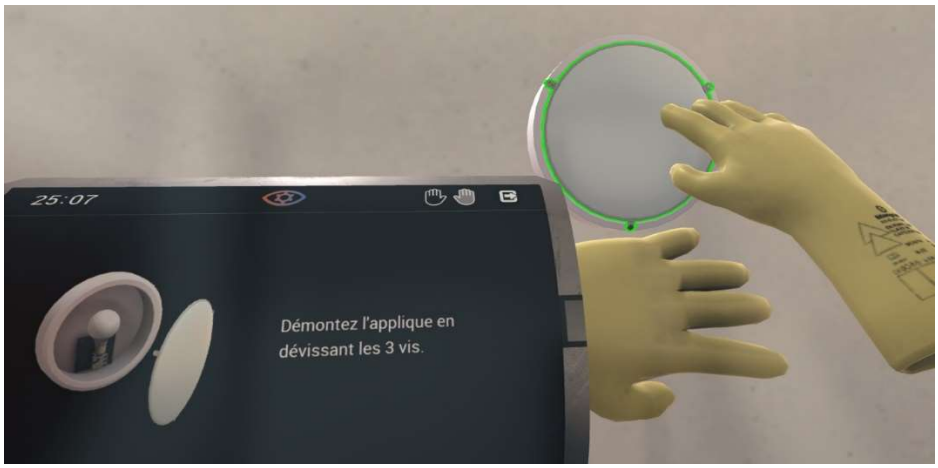
To avoid the circuit breaker to be turn on accidentally, the trainee must place a consignment grip then the lock. The grip cannot be placed on the circuit breaker if it has not been previously cut.

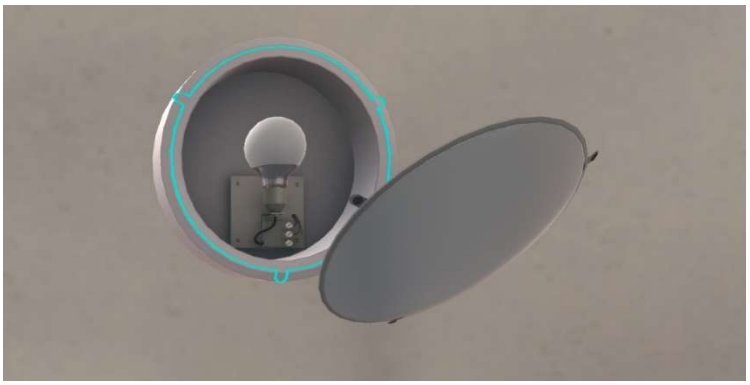
The gloves must be test again, and the PPE must be put on.

Grab the screwdriver and unscrew the three screws that hold the wall light structure, outside the wall light.



When the screws are unscrewed, it is possible to disassemble the wall lamp. The disassembled outer part of the wall lamp must be stored in the toolbox.



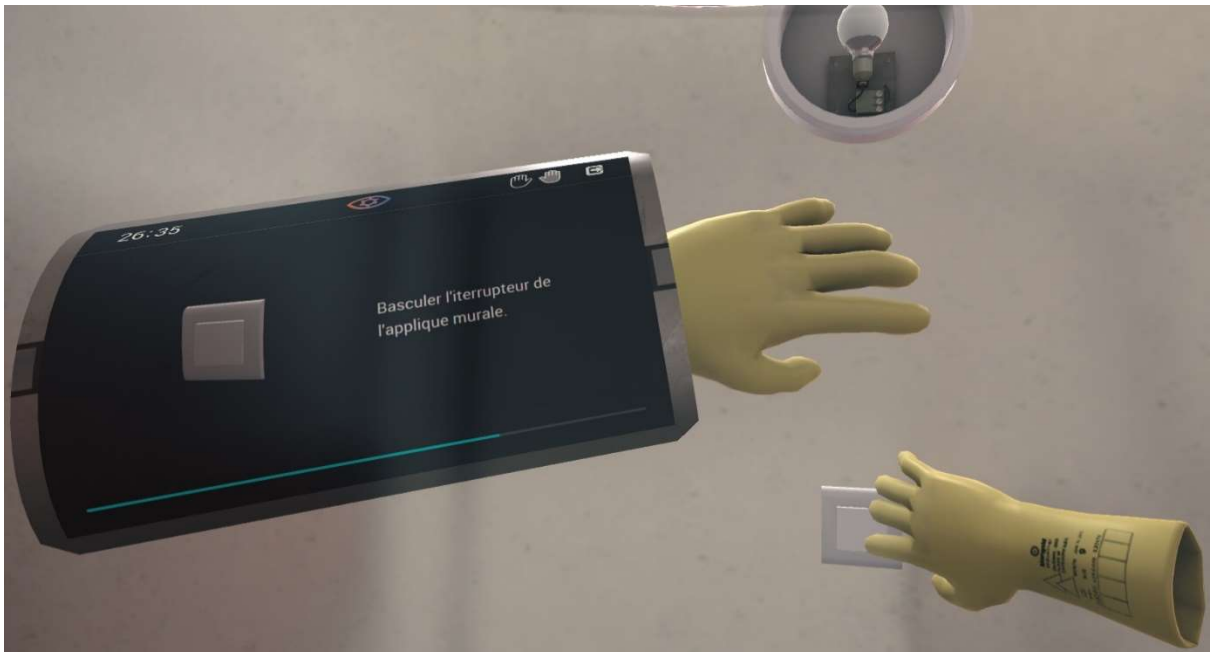


Before replacing the bulb check there is no voltage at the terminal.

Auto testing the VAT must be done before checking the absence voltage at the three terminals (2 to 2).

Auto test the VAT one last time to validate this intervention.

To make sure of the absence of voltage, we toggle the switch and repeat the procedure of verification of absence of voltage (self-test of the VAT, test of the three terminals, then self-test)



If the risk no more electric risks, the PPE can be remove.
The trainee can now remove the defective bulb, store it in the toolbox and replace it with the new one.

He must then reassemble the wall by grabbing its outer part from the inventory and releasing it on the light wall.

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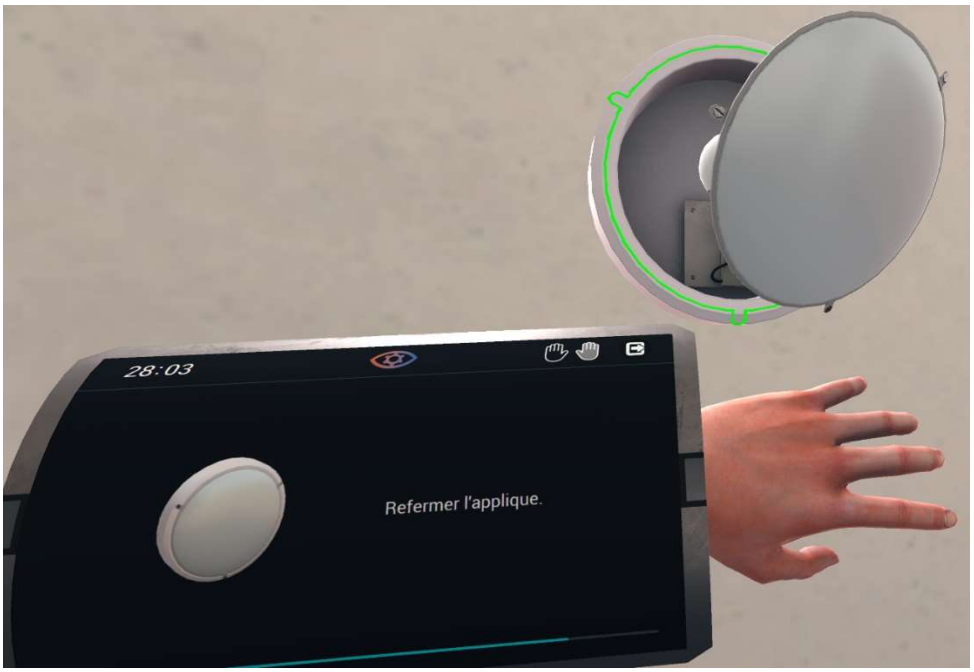
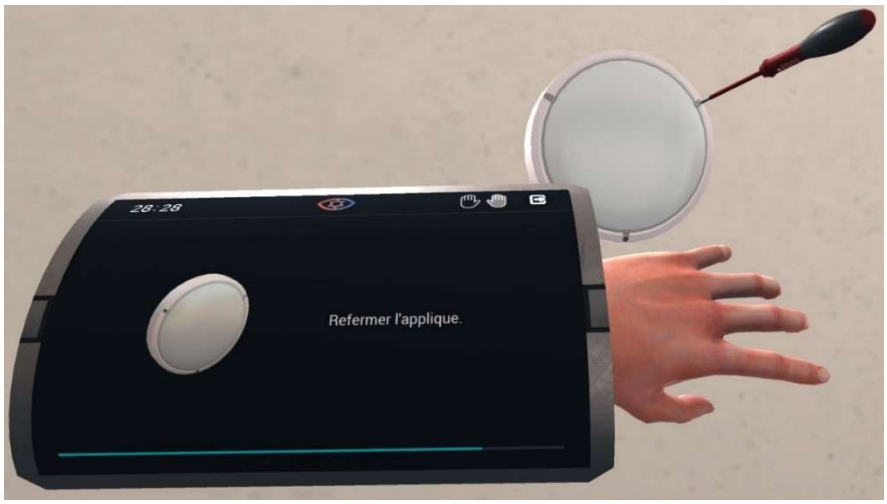
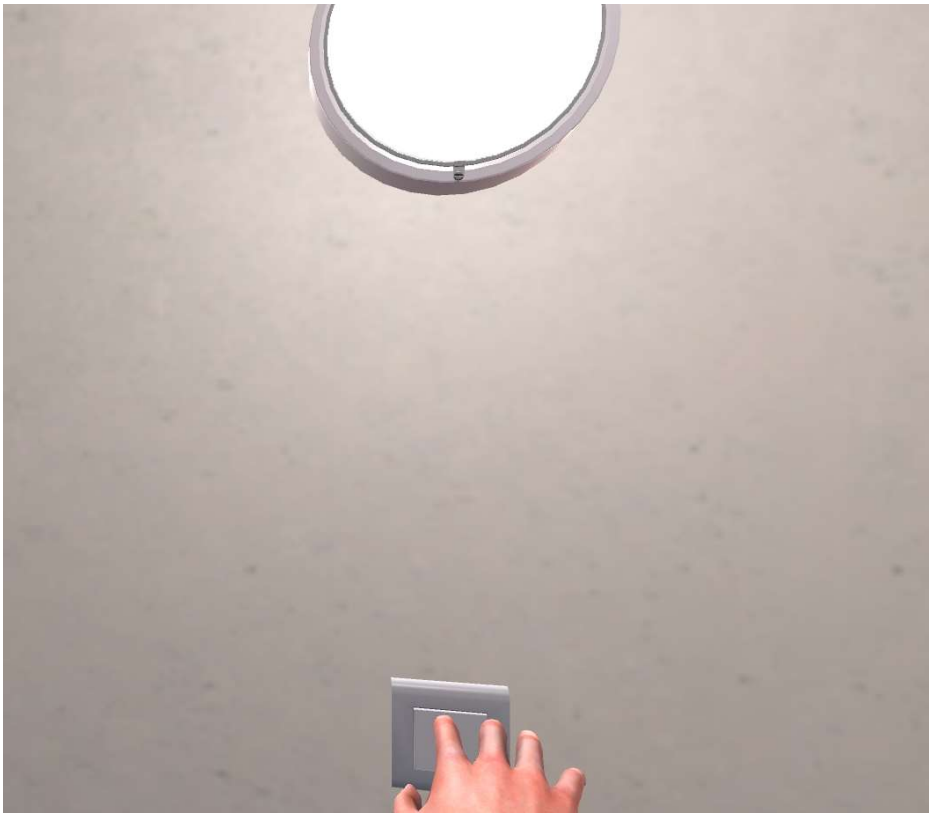


To achieve the operation, screw the 3 screws of the outer part with the insulted screwdriver.

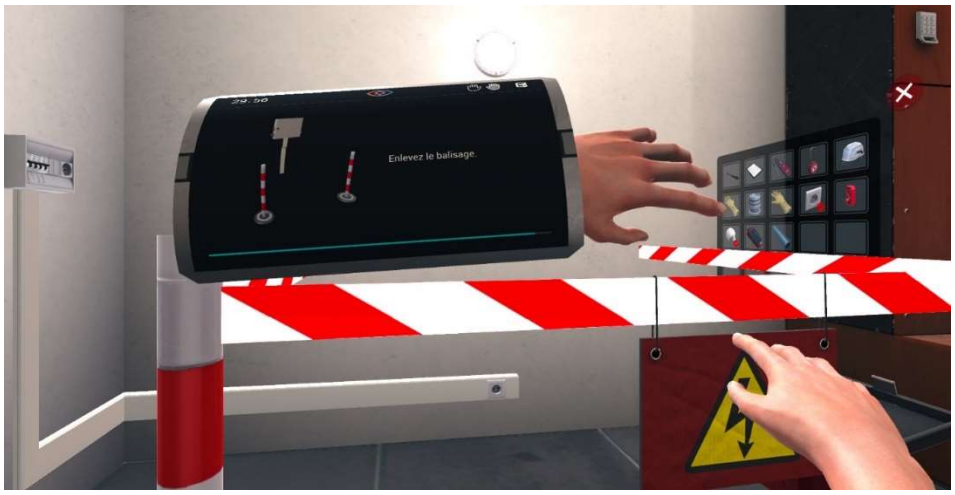


The trainee must reset the circuit breaker by first removing the lock and the lock grip.

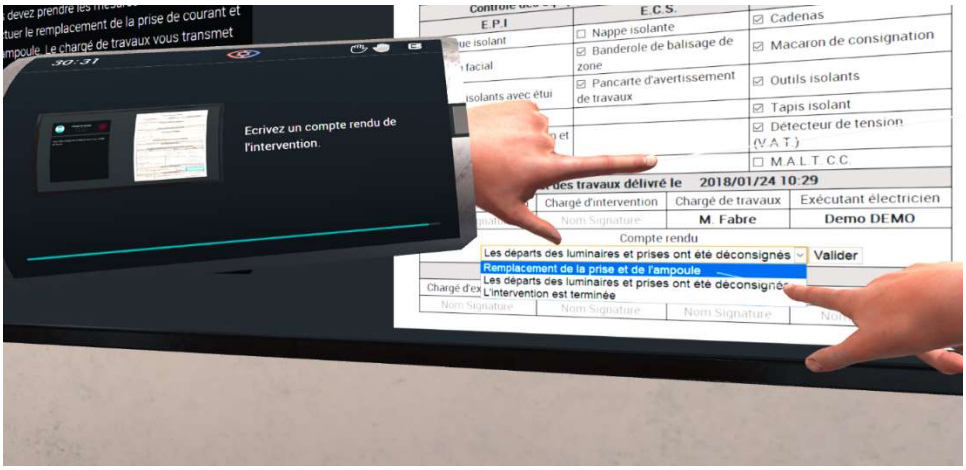
To check if it works well, toggle the switch and check if the light turns on.



The intervention is done, the markup zone can be removed and place in the inventory.



The last step of the sequence consists in writing a report. The trainee must choose the right answer on the briefing screen. The answer is « replacing the outlet and the light bulb" then click on validate.



Finally, sign the work order on the blue box at the end of the BS construction sequence.