

WELDTRAINER BROCHURE

WELDING SIMULATOR

WELDTRAINER



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SUMMARY

WeldTrainer is a welding simulator designed both for the training of new welders and for the improvement of experienced ones.

Based on virtual reality and created regarding precision and realism as fundamental pillars, WeldTrainer allows the user to immerse in a virtual welding room where the spatial detection of the welding mask and tools in the working place recreate a virtual scene in which the user can virtually weld in an interactive way in real time.

WeldTrainer is the ideal solution for the understanding, development and improvement of welding techniques as well as the muscle memory required in order to act in an efficient way in a wide range of different types of welding by SMAW/MMA, GMAW/MIG-MAG, GTAW/TIG, FCAW-G and FCAW-S.



HARDWARE FEATURES

WORK TABLE

Each unit of WeldTrainer includes a working table carefully designed which provides an optimum space for interacting with the system.

The work table allows having all the elements of the system always in its specific place, protected and ready to use.

At the same time, it permits the easy regulation of the height of the working area so that it is accessible to any user, no matter his/her height or whether he/she is sitting or standing.

It includes a custom-made reclining tray that, along with the other couplings present in the system, allows the robust positioning of all the welding parts in all the welding positions.

It also includes a custom-made side table for the placement of all the welding coupons.



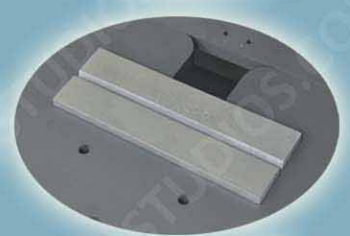
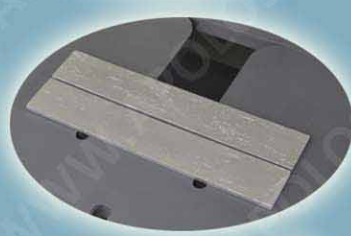
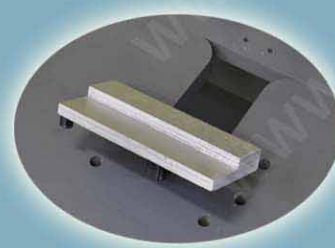
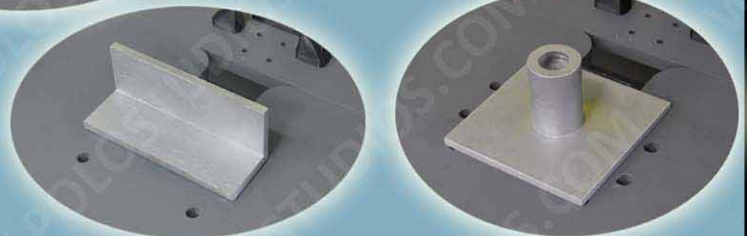
WELDING COUPONS

Each WeldTrainer unit includes 14 welding coupons that exactly represent the pieces within the work area that appear in the simulation.

All the pieces integrate custom-made couplings that allow their placement on the work table in a robust, precise, fast and simple way in all welding positions.

The included coupons are the following:

- Square plate for flat welding.
- Tee joint FW (x2).
- Lap joint FW (x2).
- Butt joint of flat plates in flat position.
- Butt joint of plates with V edge preparation (x2).
- Pipe to plate fillet joint FW (2 different pipe diameters) (x2).
- Pipe to pipe butt joint BW (2 different pipe diameters) (x4).



SENSORS SYSTEM

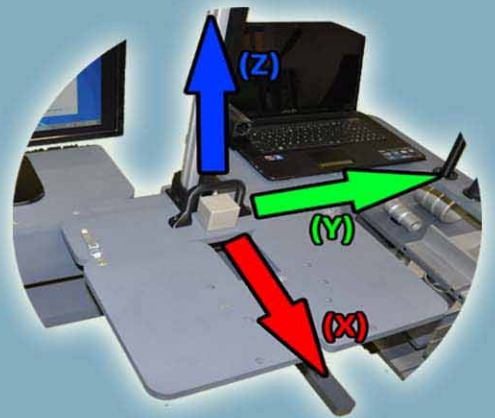
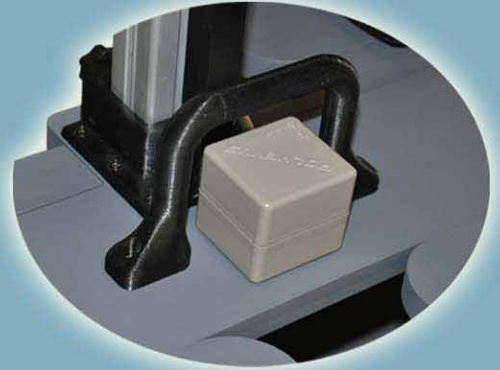
WeldTrainer is built and designed based on magnetic technology that allows the system to track at all times with millimetric precision the position and orientation of the sensors placed inside the welding tools and always relative to a coordinates origin, which allows the system to place them in the virtual world with an exact match of their physical placement in hands of the user.

Unlike other systems based on augmented reality where two-dimensional work is done from the image capture made by a camera with low precision, high latency, forced need of line of sight between camera and objects, forced restrictions of use and no origin of coordinates, the motion tracking system of WeldTrainer grants a total three-dimensional tracking of the welding tools providing at all times exact spatial data relative to a known origin of coordinates, without any possible interruption in the data flow and with non-existent latency.

As a consequence of this 3D tracking precision and unlike other systems, the correspondence in the WeldTrainer between the welding tools and the actual welding parts in the work area is always accurate .

Therefore the entire simulation in the WeldTrainer is always 100% driven by the user actions without any predetermined or makeup behaviors or results, without limitations, restrictions or dependencies on external factors that could frequently interrupt the accuracy and real usefulness of the simulation as is the case with other technologies.

As consequence of this, the development and improvement of muscle memory essential to correctly perform the welding work, is a fact in the users who are trained using WeldTrainer.



AUDIOVISUAL SYSTEM

WeldTrainer integrates an advanced custom display system with the following features:

- Integrated display system compatible with both Full HD and 4k native input video signals.
- Cristal clear display with no image or color distortion, 100% free of ghosting or image retention.
- Advanced internal optics that mimic the display of a 100" screen at 3 meters distance while allowing at the same time a 100% eye strain free visualization.
- Integrated audio with volume control.
- Usable for users wearing glasses.



INTERCHANGEABLE TORCHES AND TIG FILLER ROD

The welding torches for the different types of welding included in the simulator (SMAW, GMAW, GTAW, FCAW-G and FCAW-S) are interchangeable, with a USB 3.0 connection system integrated in the base of the welding hose.

The torch exchange is carried out in a few seconds and the torches that are not in use are always placed and protected on the work table thanks to their custom fittings.

Besides, each torch integrates a micro joystick that allows, through its different directions of pulsation, to interact with the system intuitively without the need to ever remove the welding mask if it is not desired.

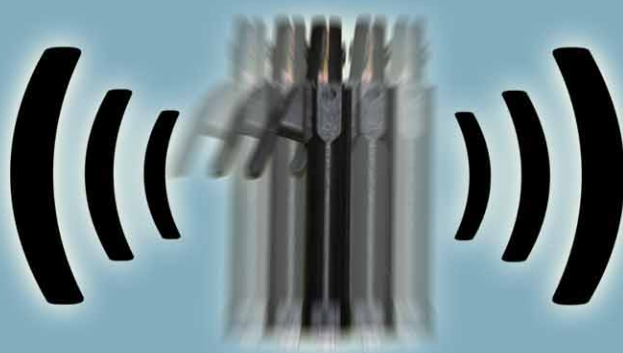
Furthermore, the system includes a custom piece that allows the user to handle the TIG filler rod in the simulation.



VIBRATION ENGINES/HAPTIC ERROR NOTIFICATION

WeldTrainer integrates vibration engines controlled by the electronics of the equipment that allow to report errors to the user through a haptic system based on different patterns of vibration and in real time during the execution of the welds.

By means of this hardware functionality, the system is capable of correcting the user's errors instantaneously by not being performed in a visual or auditory way and therefore does not require a processing of the information by the brain.



INFRA RED SYSTEM

WeldTrainer integrates an infrared system which allows to position the welding mask in the space and thus to determine the point of view in the simulations by its position and orientation.

The welding mask integrates some pieces in its upper part that reflect the infrared light which allows the system, by analyzing the rebound of that light, to position and orient the virtual camera in the simulation in correspondence to the user.



MAIN UNIT

The WeldTrainer main unit contains all the computer hardware and all the electronics inside. It has the power button in the front panel.

It includes Ethernet network port, Wi-Fi adapter, external USB connections, ventilation system, speaker system and handle for transport.



INSTRUCTOR POSITION

Each WeldTrainer includes a portable computer that works as instructor position.

The connection of the portable computer to the Weldtrainer is performed by Ethernet, being possible that several units of Weldtrainer connect to the very same instructor position.



ADVANCED WELDING MASK DESIGN FOR HEALTH AND COMFORT

The Weldtrainer integrated welding mask has been designed to maximize the user comfort and guarantee a healthy use even for intensive sessions.

It features a floating design where the only contact points against the user head are two very soft and washable pads.

Its closed internal shape allow the complete air flow from the user breathing to circulate and always remain outside the welding mask, both for nose and mouth.

This allows a feasible use of the system while wearing a face mask avoiding any burden due to the feeling of lack of air, while at the same time keeping the welding mask internals isolated from any potential contamination.



SOFTWARE FEATURES

WELDING PROCEDURES TYPES AND CONFIGURATION

The system simulates welding with SMAW/MMA, GMAW/MIG-MAG, GTAW/TIG, FCAW-G and FCAW-S.

In the case of SMAW, the user can modify the intensity, polarity and orientation of the electrode with respect to the electrode holder.

In the case of GMAW and FCAW welding, the user can modify the voltage, the welding wire output speed, the gas type and flow rate, the wire diameter and the mode of operation (2T/4T).

In the case of TIG welding, the user can modify the intensity, the diameter of the non-consumable electrode, the gas type and flow rate, the diameter of the welding rod and the polarity.



DEVELOPMENT OF THE EXERCISES

Each exercise presents the user with a series of weld beads to be made in which the start point and completion point are indicated. According to the selected exercise, the order of realization of the welding beads can be free or pre-set in a particular order. In some exercises it will be necessary to apply several passes by making cords on top of each other until filling the joint.

In the case of GMAW welding, the user can select, in the middle of the execution, the realization of any pending welding bead with push technique or drag technique.

The whole simulation is always calculated in real time according to the welding procedure, selected workpiece, material properties, parameters configuration and user actions. There is a maximum time for the completion of each exercise.



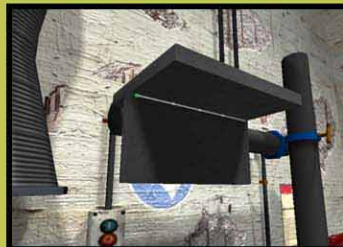
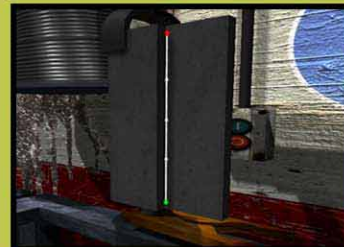
WORKPIECES, POSITIONS AND MATERIALS

WeldTrainer includes the following content related to workpieces for all welding procedures:

- Exercises featuring a square plate to perform flat welding in straight lines with different directions and also curved lines with different radius.
- Exercises featuring fillet joint in all positions (1F, 2F, 3F, 4F) / (PA, PB, PF, PD).
- Exercises featuring lap joint in all positions (1F, 2F, 3F, 4F) / (PA, PB, PF, PD).
- Exercise featuring butt joint without edge preparation.
- Exercises featuring butt joint with edge preparation in all positions (1G, 2G, 3G, 4G) / (PA, PC, PF, PE).
- Exercise featuring pipe to pipe butt joint in all positions (2G, 5G, 6G) / (PC, PH, PG, H-L045) with two different pipe diameters.
- Exercises featuring pipe to plate fillet joint in all positions (1F, 2F, 4F, 5F) / (PA, PB, PH, PG) with two different pipe diameters.

Also available material selection between carbon steel, stainless steel, aluminum and copper plus thickness selection from 1mm min to 25mm max in intervals of 1mm.

(selectable thickness and material always adapted to each workpiece shape and procedure)

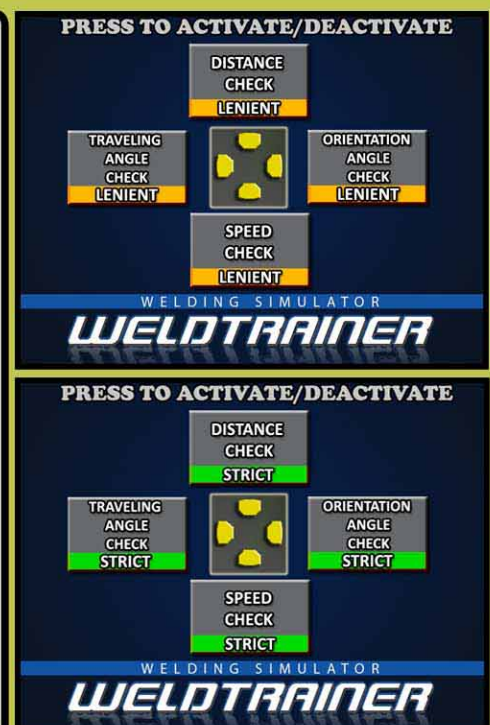


CONTROL OF WELDING PARAMETERS

For each exercise you can activate or deactivate the error control of the relevant welding parameters such as welding distance, working angle, angle of inclination and welding speed.

The activation of the control of each of the parameters can be selected in strict or tolerant mode, so that the error margins determined by the system are more or less strict depending on the selection of the user.

When a parameter is activated, the system displays the exact numerical measurement of its value at each moment during the execution of the pass, as well as displays correction indications and sends the user different vibration patterns that report errors in real time during the execution.

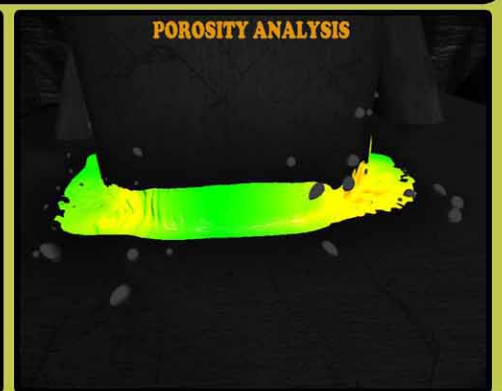
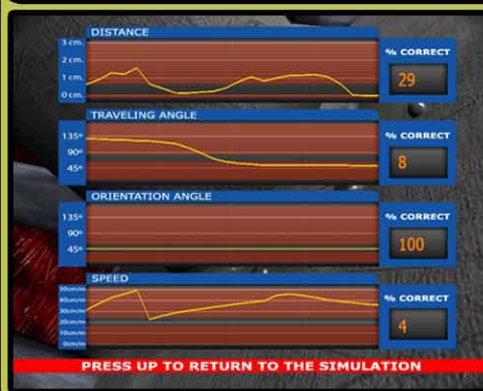


ANALYSIS AND RESULTS REPORT

When the user finishes every welding pass, the system shows a telemetric report with the numerical data of each parameter during the execution.

The virtual scene visualizing mode can be changed at any time in order to see it in special modes which show the analysis of porosity, penetration and splatter. In these special modes, the welding cords are shown in different color scales that determine the area of the cord where the result is correct and the ones in which the result is not correct.

Besides, for every welding pass, the system stores screenshots of the telemetric report as well as screenshots of the result of the welding cord from different angles for every visualizing mode. These screenshots are sent to the instructor position so that they can be visualized at any time in web format or else they are available in the simulator itself.

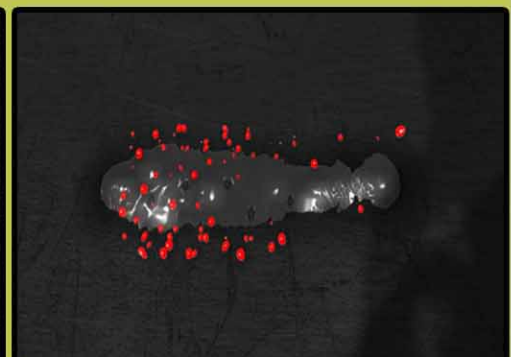
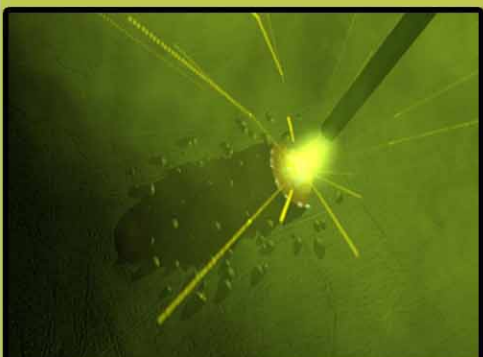


REPLAY SYSTEM

For every exercise, the system saves an interactive repetition of the execution that allows the user to visualize it.

It is an interactive replay because it is not a video but the user finds himself in the very same virtual scene as in the exercise being able to move around the scene with the same freedom as in the execution itself. You can also pause and rewind the replay forward or backward to the desired point.

In this way the system offers the user the possibility to review in the same virtual scene his own execution and to be able to observe and assimilate the mistakes made in an impossible way to replicate in the real welding.



SUPPORT FOR LEFT-HANDED USERS

Before launching any exercise, the system lets the user choose if he is right handed or left handed in order to adapt the direction of the welding beads accordingly.

KIND OF USER SELECTION



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MULTI-LANGUAGE SUPPORT

The software allows to have installed simultaneously in the same simulator as many language packs as necessary and change the active language from the simulator menu itself in a matter of seconds and as many times as the user desires.

This functionality allows a group of users of potentially several different languages, to use the system in their preferred language and to easily change it without having to restart the computer at any time.

LANGUAGE SELECTION



LANGUAGE SELECTION



THEORY TEST MODE

The system includes a mode where the user can have theory tests. The questions have three possible answers but only one of them is correct.

The content of the questionnaires is organized into several modules with a dozen questions per module. The system allows you to add as many new modules and new questions as you like by using a built-in editor integrated in the instructor position.

The results of every questionnaire are sent to the instructor position in order to visualize them in web format at any time.

MAIN MODE SELECTION



SELECT THE TYPE OF TEST



QUESTION

To make sure that the protective lens is in correct conditions:



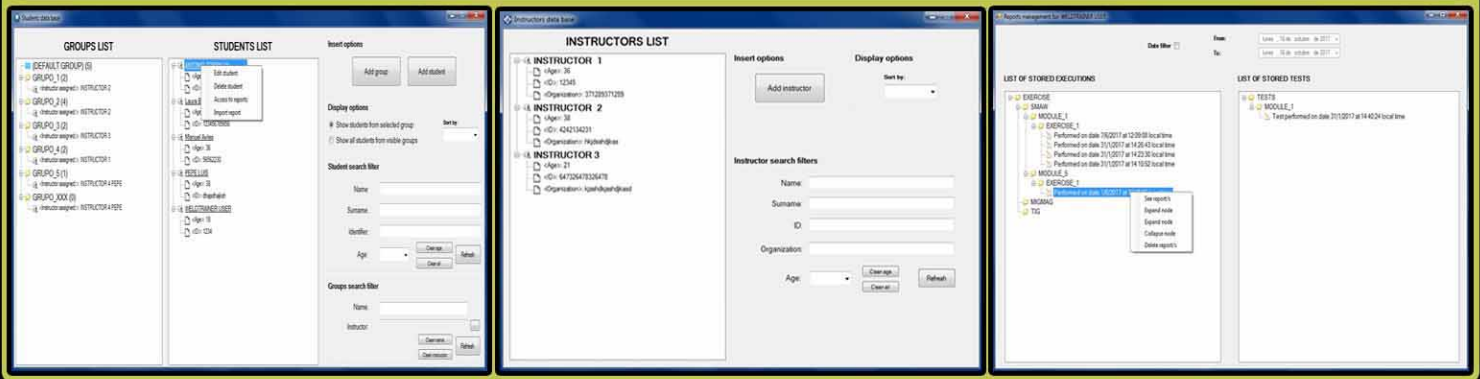
- 1 It is recommended to perform a small testing weld before the real job starts.
- 2 It is recommended to blend it slightly with the hands to make sure it is in good conditions.
- 3 As long as there are no deep cracks on it, it is ok for use.

CORRECT

INSTRUCTOR POSITION FUNCTIONALITY

The software of the instructor position has the following functionalities:

- Manage the connection and status display of each connected WeldTrainer unit, with no limit on the number of machines that can be connected to a single instructor position.
- Manage a database of students which can be assigned to connected WeldTrainer positions.
- Manage the creation of groups for the grouping of students.
- Manage a database of instructors which can be assigned to groups.
- Receive, organize and manage the performance reports and results of each student's exercise, including the telemetric report of each pass and all the results captured in the simulator.
- Receive, organize and manage the result reports of the theory test questionnaires done.
- Be able to view any report in .html format from the web browser.
- Allow access to all reports of any student at any time even with the simulators turned off.
- Provide access to the editor of theoretical questions.

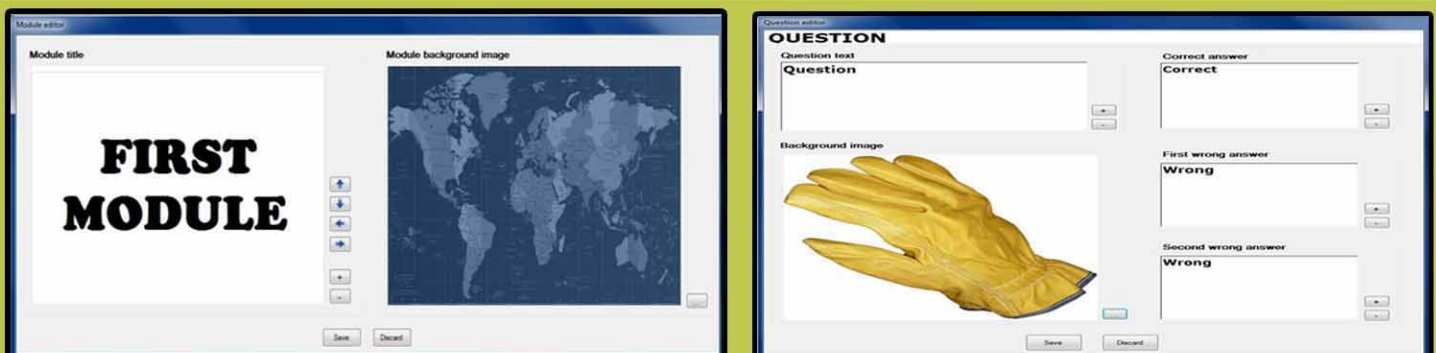


THEORY QUESTIONS EDITOR

The system allows the user to create content tailored to the theoretical questionnaires, with no limit on the number of new modules and questions.

From a simple editor integrated into the instructor position, the creation of the new content is managed and exported to the simulator, adding it to the existing one.

The editor allows you to manage as many databases of new modules and questions as you like allowing you to export all together or separately.



INTEGRATION OF CUSTOM PIECES

WeldTrainer integrates a unique functionality that allows to import to the virtual scene any piece any size or shape and weld on it. This feature makes it possible to add custom exercises for very specialized alternative uses of the simulator.

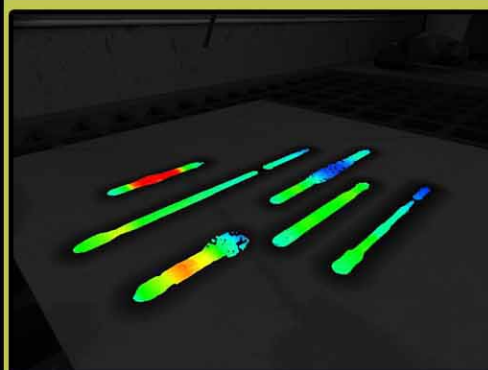
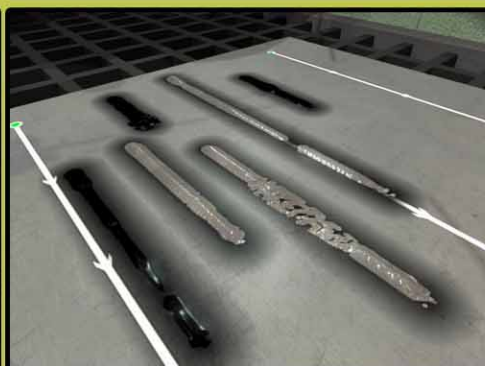
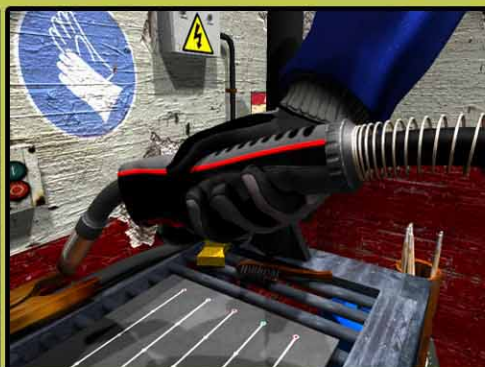
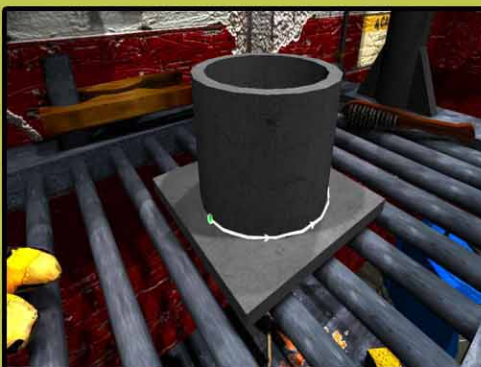
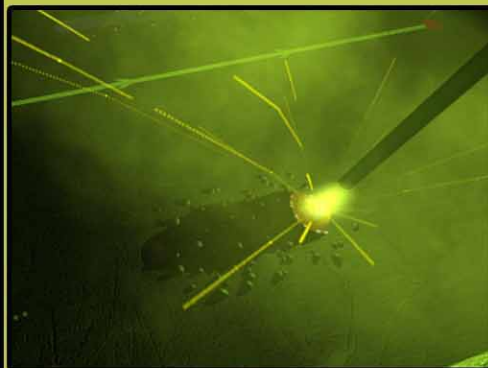
This functionality is found in units being used in factories of parts destined to automobiles or ships for example to enable in a practical and manageable way the power to train each operator on how to act before the potential need to manually retouch any welding bead in which the robot would have failed in the automated execution.



CUSTOM AND PROPRIETARY SOFTWARE

The software of all the elements that compose the simulator has been designed and developed by the engineers of Apollo Studios without external dependence, which allows a total control of the whole system and the continuous evolution and optimization of the same, as well as being able to manage a quick response to requests and feedback from users.

IMAGES



OTHER FEATURES

ADVANTAGES OF THE SIMULATOR

- Massive cost savings.
- Safe working environment.
- Much higher productivity compared to welding in a real workshop.
- Very attractive to new welders.
- Proven effectiveness.
- Learning techniques not possible in real welding in a workshop.
- Monitoring of user evolution.
- Eco friendly.

REMOTE SUPPORT

Each unit has a TeamViewer license installed. This permits the remote access to the simulator by Apolo Studios staff in order to give immediate support.

SOFTWARE UPDATES

Software updates have no cost for life.

WARRANTY

Two years for the hardware and life warranty for the software.

CONTACT

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