



# Loading Rack Training

## Challenge

Downstream operations in the United States include the distribution of refined fuels from dozens of terminals across the country to thousands of retail gas stations. The gasoline is blended with special additives based on the specific requirements of each customer, location and applicable regulations and then loaded into a fleet of specialized tanker trucks for distribution. While the process itself is not highly complex, the equipment used is – and that means precision is required for safe and accurate fuel loads.

Depending on the price of a barrel of oil, each fuel tanker truck holds approximately tens of thousands of dollars of fuel, which if incorrectly mixed, results in a financial loss. More importantly, the flammable nature of the fuel and the volume stored at each terminal creates a hazard if proper precautions aren't taken to safely transfer the fuel to the tankers. Operator error could cause catastrophic consequences ranging

from a fuel leak to an explosion. Terminals can average approximately 400 refuelings per day lasting 35 minutes each, efficiency and safety are critical to meet operating goals.

A US-based, Fortune 500 petroleum refiner needed a more effective way to efficiently train its tanker drivers to correctly load fuels as well as equip them with scenario-based safety training to improve critical thinking skills in the event of an incident at the terminal. Their legacy training approach had been PDF documents combined with on-the-job training and wasn't very engaging. The challenge with OJT is the interruption to business operations as it requires a lane shutdown, trainer time, operator time, and lowers the delivery output of an entire terminal.

This large downstream refiner wanted to engage XALTER to develop a VR training program for drivers to safely and quickly load its tankers.



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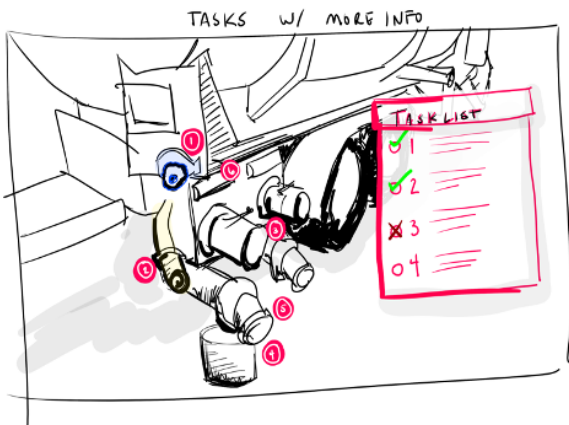
# Solution

We followed our proven **6-step process** to design VR learning experiences that aligned to key learning and safety objectives outlined by the petroleum refiner:



- Assigned a dedicated team led by our CTO
- Document downstream refinery training goals, HSE goals, and measures of success (cross-functional discussions with Safety, O&M, Finance, HR, etc. to find ROI)
- Initiated discovery calls with Training Managers
- Interviewed trainees, operators, etc. (user stakeholders)
- Engaged SMEs to understand proper processes and technical requirements.
- Engaged CIO to define data strategy and then meet with IT to document deployment strategy

## Training Design



- Reviewed current refinery operations training practices and materials (including the PDF documents)
- Visited field terminals to video record fuel loading and unloading processes to get a better understanding of how current operations work and potential HSE risks.
- Built storyboards and accompanying workflow diagrams to illustrate the recommended functionality of the proposed VR training solution. This also included mockups of the user interface (UI) design to ensure a high level of engagement
- Evaluated and recommended a VR headset solution for the training implementation (Oculus Quest based on mobility, long battery life, easy setup, no wires)

- Visited a live terminal to document the entire set of rack load processes to be recreated in virtual reality
- Photographed and digitally scanned every piece of equipment and fixturing for 3D model creation
- Recorded voiceover and sound effects for narration and audio cues. Now it was time for software development and that included building the desired training functionality inside Unity Engine to bring the training to life
- To replicate real-world interaction between coworkers in a terminal setting, we built multiplayer servers for communication and interaction
- Designed and built the backend of the system to capture user data and support analytics



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## Distribution

- Deploy software to VR headsets via MDM
- Distribute VR headsets throughout workforce and to required operators
- Build Training Facility to allow users to check out headsets for training use
- Deploy asymmetrical experience to PC for wider usage across different technical competencies

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## Adoption

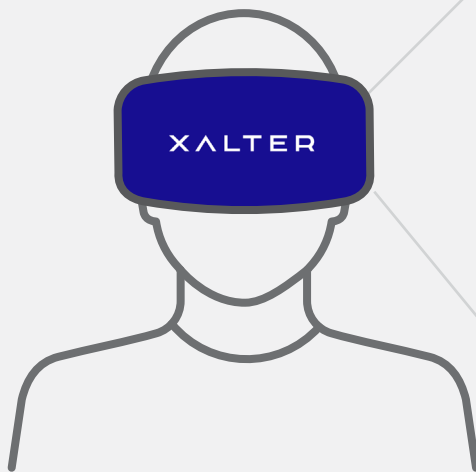
- Built in Tutorial System for key commands and functionality in headset
- Train the trainer experience to coach MPC through scenarios and common usage
- Notify users via LMS of usage & credentials
- Deploy trainers to assist in real time in the virtual environment
- Allow for a variety of input methods

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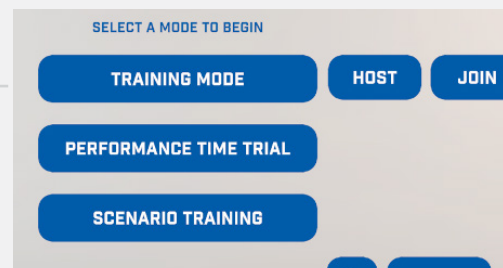
## Evaluation

- Gather results and apply against a control group to determine efficacy and ROI
- Apply data visualization to analyze the most important data and original measurement requirements
- Build an analytics dashboard that can be filtered by trainee or specific tasks

All of the various active learning scenarios are designed to not only simulate real-world situations for hard skills training, but also build critical-thinking, resiliency, reasoning and problem-solving skills.



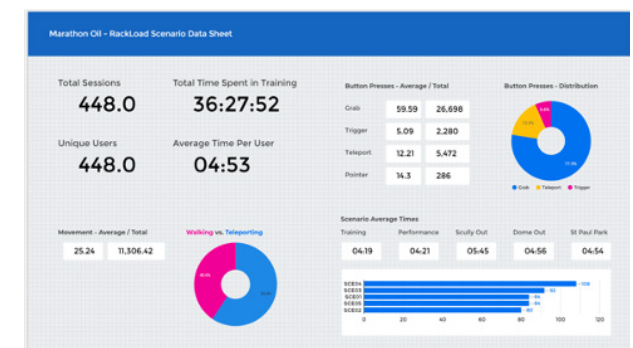
### Multiple Learner Modes



### VR Immersive Learning



### Example of Analytics Dashboard



# Results

The downstream petroleum company was able to dramatically enhance their rack load training by supplementing PDF documents and OJT with a collection of VR training experiences that take workers through all of the refueling steps with special emphasis on safety procedures.

## Operations Benefits:

The downstream petroleum company was able to reduce fueling time and increase truck throughput with less accidents and misfuels.

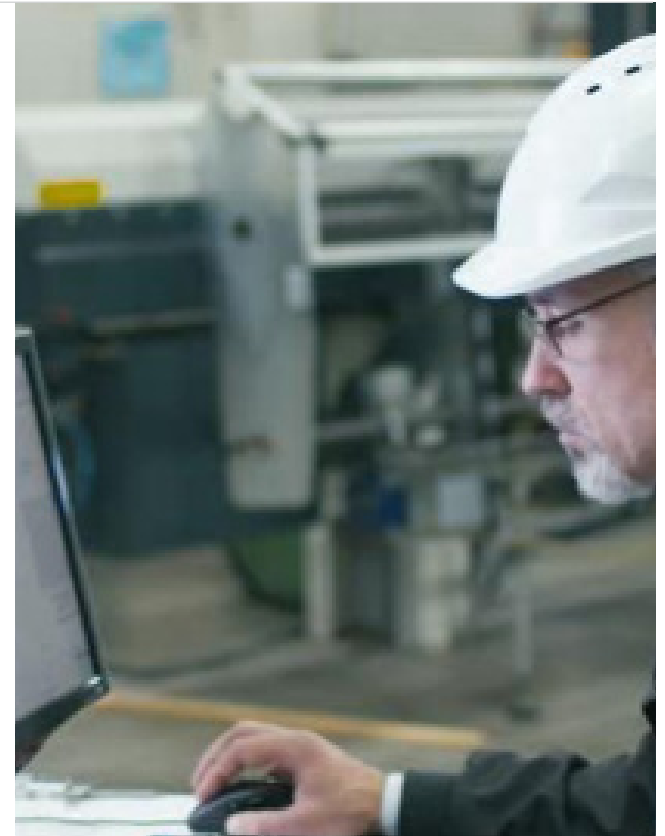


*XALTER's Rack Load Scenario training makes the process safer for employees.*

## Safety Benefits:

Trainees were able to experience different scenarios and explore the correct responses to explosions, fuel leaks, vapor capture as well as correct mixing the additives for each fuel type. Importantly, workers' actions in each scenario are recorded, aggregated, and evaluated to improve each safety process. Data insights from the VR training resulted in process improvements -- including the modification of a control panel to improve worker safety.

XALTER's Rack Load Scenario makes the process safer for employees, enables faster and more efficient fueling, and mitigates harmful environmental impact -- all while reducing costs and waste. As a result, executives at the downstream petroleum company are extending the successful VR training across the company.



XALTER develops virtual, augmented and mixed reality solutions that are delivered through the proprietary XALTER platform. The company has revolutionized the use of 3D modeling and simulation in training and operations support and offers measurable ROI, enhanced safety, content retention and environmental impact metrics.

Now customers can deploy multi-user and multi-platform programs anywhere in the world, gather data and derive valuable insights about their business. Scenario planning, user tracking and subsequent analytics facilitates data

visualization on sophisticated dashboards that showcase business intelligence. The program benefits learners, trainers and the client company.

XALTER engineers and training professionals harness the latest research and training technology to provide clients highly individualized solutions. The platform engages learners in immersive VR/AR/MR custom training environments tailored to specific industry sectors and ensures effective knowledge acquisition and skills mastery.

## XALTER

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