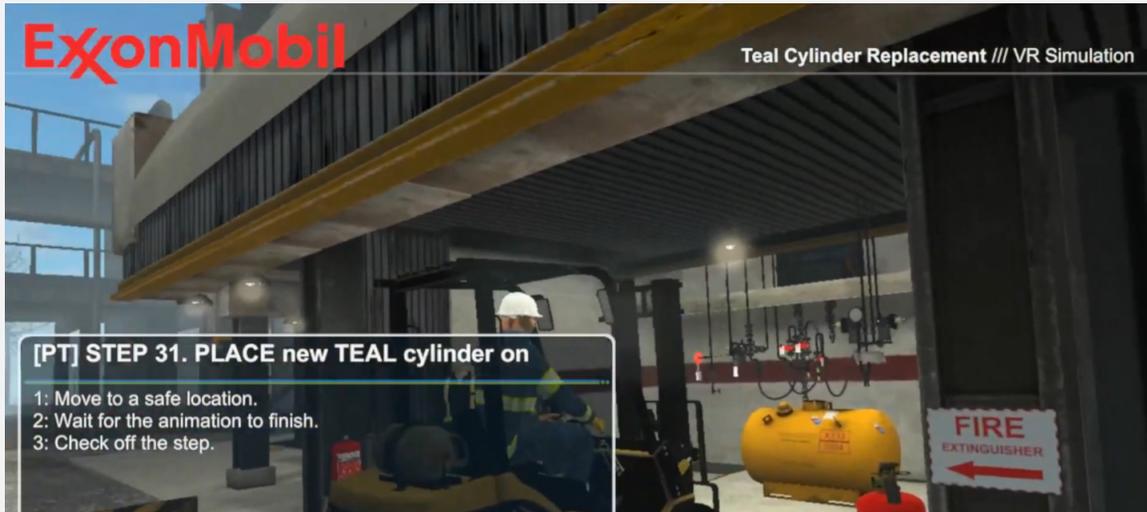


ExxonMobil – Triethylaluminium (TEAL) Cylinder Replacement



TEAL is an extremely flammable substance igniting immediately upon exposure to air that requires extreme precision in cylinder replacement at Oil and Gas Plants. This VR simulation teaches staff at Exxon how to properly replace a cylinder safely. View video: <https://youtu.be/tPbBnpFXTtA>

About the Team

TEAL was a 70- step simulator (40 minutes) in collaboration with [3D Media](#) for ExxonMobil. The team consisted of:

- Project Owners: Red Iron Labs
- Architecture: Lloyd Summers, Red Iron Labs
- VR Development: Sean Brown, Mike Oakes & Ian Johnstone, Red Iron Labs
- Graphic Design: Shane Berezowski, Red Iron Labs

About the Project

Red Iron Labs created a clean training VR application, showcasing the traditional HR training video as an interactive VR medium with the intent of showing trainees how to properly secure a TEAL cylinder. This was a stand-alone manually installed VR experience on Windows catered to the HTC Vive, Oculus Rift, and Oculus Quest.

The experience concludes with an overview of the user's performance/score. However, progression throughout the experience is monitored so that a user cannot progress to the next step without fixing errors and will completely end if too many major errors within the same step are conducted.



User Interface

The control schema utilized a VR component only, meaning the experience automatically began as soon as the user put on the headset. The experience included various interactionable features including:

- The seven valve handles (A, B, C, D, E, F, G)
- The manual air valves
- The petcock drains
- The TEAL cylinder caps
- The cylinder's grounding clamp
- The proximity suits

The experience followed the Process Technicians PT role, which entailed 70 steps (40 minutes from start to finish) that cover:

1. Preparing the pipes
2. Exchanging TEAL cylinders
3. Installing new TEAL cylinder (Nitrogen side)
4. Installing new TEAL cylinder (TEAL outlet)
5. TEAL transfer

The scene layout is based outdoors, non-distracting and based on realistic representation of the real site. All the valves are accessible around the TEAL cylinder and fire extinguishers are placed behind the player. The oil flow meter is in a separate area beside the user.

Audio

- Audio focused on the areas of importance at the moment of execution to maximize the value of the tutorial.
- Voice overs were included as a tutorial element to help walk the user through interactions. The radio communications will have a voice over to act as the PC portion of the process.
- Sound effects were used to deliver information, increase the production value, and evoke emotional responses. Sound effects were associated to the valves, transfers, and physics objects.

Outcomes

Following a series of critical human performance errors that resulted in near-misses, injuries, and significant damage to plant assets, Exxon Mobil commissioned the TEAL training Module to mitigate future incidents and share lessons learned. TEAL will be used as a training tool for both Process and Mechanical Maintenance technicians. The desired and expected outcome is that retention of training material, and recognition of work environments and practices, will be increased by up to 87% when compared to traditional method baselines.



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