

VIRTUAL REALITY (VR) FOR INDUSTRIAL TRAINING

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360° virtual reality (VR) training solutions use commercially available VR headsets to re-create an immersive virtual reality environment which can replicate or mimic the actual environment.

Combined with custom high-fidelity visual content, effective sound and environmental audio design and (where necessary), physical props, such VR environments can be an effective replacement for real-life experience, except in a much safer, controlled environment.

In effect, such **solutions 'transport' the learner to the actual site.** Therefore, they are ideal for training individuals working in high-risk or hazard-rich environments and for on-boarding and training in roles or locations with a low tolerance for user error.

The value VR can offer for training is based on three key features:

1. Complete immersion
2. Ability to digitally re-create specific environments
3. Ability to interact with virtual objects, each with their own properties and attributes

Each of these attributes, together or in combination, can be leveraged for effective, impactful training solutions in safety, incident response and Standard Operating Procedures (SOPs).

While no digital / technology-based training solution can ever replace in-real, hands-on training, VR training can be a very effective tool for ensuring that foundational knowledge is quickly imparted, at scale, and reliably.

VR in Safety Training

Safety training, with a focus on consistent use of personal protective equipment (PPE) and adhering to the correct personal safety protocols, is a subset of industrial training and adult learning. Since effective, consistent use of PPE and following the correct personal safety protocols fundamentally requires the workers to adopt a safety-first mindset, any training solution focused on PPE and personal safety needs to be focused on enabling a mindset shift.



A shift in a mindset requires behavioural and cultural change, in contrast to developing proficiency in specific skills. Safety training, especially in the use of personal protective equipment, requires a slightly different approach from training where the goal is acquisition of a new technical skill (for instance, a new way of welding a joint, or learning how to use new tools) or learning a new workflow. Successful safety practices on the shopfloor and organization demand a culture of safety, which is inherently a team effort – therefore, effective VR safety training solutions must acknowledge and address this need as part of the solution design and development.

VR can be very effective in making safety ‘personal’. The sense of immersion and the ‘1st person experience’ that VR can provide, when combined with visual special effects and effective film-making, can recreate the experience of an accident - say, falling from height or getting injured by falling materials - without being exposed to the actual hazard. When integrated with classroom sessions, gamification and on-the-job hand training, VR can be a very powerful addition to the training arsenal for onboarding and periodic re-training of staff and workers involved in potentially hazardous activities.



VR for SOP and incident response training

The ability to create high-quality virtual environments based on real-world facilities, when combined with the ability to interact with objects in the virtual environment, also makes VR a powerful tool for SOP training, operations training and incident response at different scales and degrees of resolution.

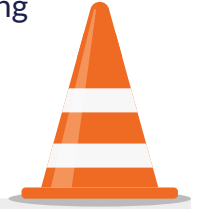
For instance, we can use VR to re-create an entire petrochemical facility, or a production plant, complete with equipment that respond to user-inputs. Users can interact with key systems, learning and rehearsing procedures before executing them on-site in the real-world.

Consider a high-risk, mission-critical process such as shut-down and tie-in activity required for integrating a new refining unit in an existing, active refinery. A VR simulation of key aspects of the facility, including all the critical steps and processes, along with simulation of accidents that may occur if procedures are bypassed or performed incorrectly, allows users to both learn the SOPs and offers an evaluation and assessment tool that can be used to certify staff and engineers before they are authorized to work on site.



At a different scale, interactive VR-based training modules allow us to create detailed models of equipment and allow users to familiarize themselves with new equipment and its operations, maintenance and overhaul procedures. When combined with gamified, interactive assessments that track the user's progress, it is possible to create integrated training solutions that offer measurable metrics to track progress towards specific learning outcomes.

This is reflected in the adoption of VR for training in complex, often high-risk, mission-critical roles such as refineries, petrochemical facilities, energy and power generation facilities, and infrastructure projects. Further, industry and academic reports suggest that such training interventions can reduce safety incidents, enhance safety, and improve operational efficiency.



References

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