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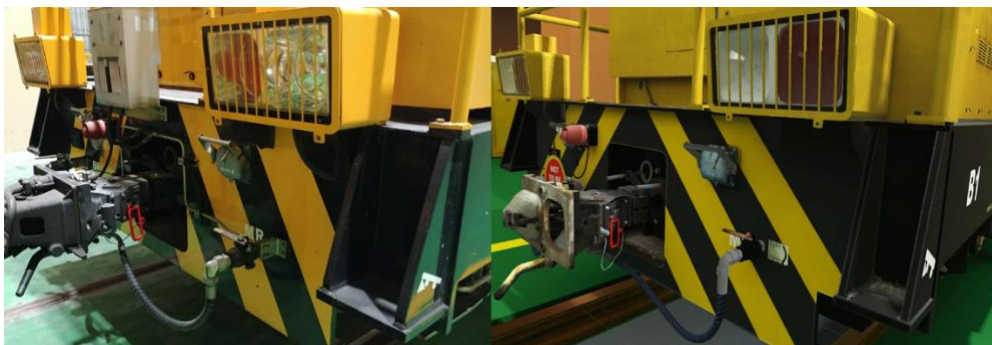
Overcoming Safe Distancing challenges with Fraunhofer Singapore's Next Gen VR Trainer

Are you able to distinguish between the virtual and real?

Digital twin of the cockpit

Digital twin of the locomotive

Fraunhofer Singapore's next-generation Virtual Reality Training Simulator for Shunting of Trains (VR-TSST) delivers new levels of realism in immersive training while ensuring safe distancing.

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Fraunhofer Singapore, the only Asian affiliate of Europe's largest applied research organisation, delivers a first-of-its-kind cutting-edge VR trainer for SMRT Institute, the workforce development arm of Singapore's pioneer and dominant rail operator.

Virtual reality training gives trainees the opportunity to work in immersive environments that are digital twins of the trains in real life. This virtual training resolves the challenges of how trainees could observe safe distancing while under training, as practice for each trainee may take place anytime, anywhere with the software downloaded on a laptop, accompanied by a virtual reality headset, controllers and internet.

Fraunhofer Singapore's Executive Director and Nanyang Technological University (NTU) professor, Dr Wolfgang Mueller-Wittig says, 'The impact of maneuvering equipment in this highly realistic virtual environment for trainees is almost indistinguishable from hands-on training on a real train. This digital twin is built to the exact scale of SMRT trains to provide an unparalleled immersive experience. Close collaboration and effective communication between the train operator and ground shunter is essential for ensuring safety. The VR-TSST allows multiple trainees and the instructor to interact virtually in a highly realistic environment, which nurtures teamwork while ensuring safe distancing. This level of interactivity in a virtual environment greatly enhances safety for rail workers in the real world."

Spearheaded by Fraunhofer Singapore, the VR-TSST will enhance team performance and training to prevent accidents from happening in real life. This project was funded by the SMRT-NTU Smart Urban Rail Corporate Laboratory, which was jointly set up by the National Research Foundation (NRF) Singapore, SMRT Corporation and Nanyang Technological University (NTU) in 2016 to develop global innovative transportation solutions.

Mr Lee Ling Wee, Chief Executive Officer, SMRT Trains, says: "Continual training of our staff and innovation are key as we strive to maintain our rail reliability. We are excited to partner Fraunhofer in this project, which leverages cutting-edge technology to improve employees' performance, collaboration and safety. The use of virtual reality solutions provides a safe virtual environment for trainees to practice tasks and prevent mistakes and human errors. It allows multiple trainees to interact and collaborate across various scenarios in a controlled setting."

The VR-TSST models highly realistic and complex scenarios for trainees to experience the shunting process as a team. In particular, two trainees – the train operator and ground shunter collaborate in the virtual environment to complete the shunting process. Each step of the shunting process will be executed by functionally performing the movements and characteristics of the task. All dynamic elements will behave realistically and use VR exclusive interactions such as "grab and move the lever" instead of "press a button to move

the lever". Simulation of inspection and shunting operations allows for training of inspectors and operators. Trainees will interact in the same virtual space but need not be in the same physical location.

Digital twin of the locomotive at the SMRT train depot

Digital twin from the VR-TSST training scenario

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