The value of simulation in training

The use of simulators for training, education and research has been around for many years. In aviation, cockpit simulators have been the norm for a long time. Depending on the airline, commercial pilots may be required to have a simulator assessment every six months. Simulator training is also widespread in many other industries, ship handling and the operation of wharf machinery are common. In the transport industry along with driver training and education simulators can be used for training on machinery such as forklifts and emergency preparedness.

In the trucking industry driver training simulators are widespread overseas with some advocates suggesting they could help to reduce the shortage of truck drivers by introducing learners to basic truck driving skills with minimal risk. Driving simulators are not so common in New Zealand, however.

Positives

In a simulator, drivers can practice driving in a safe environment with minimal wear and tear on equipment and with no direct interaction with other road users. Simulator training can start with the basic skills that need to be mastered then progressively working up to more complex tasks such as reversing a multi combination vehicle.

The performance of a driver in a simulator can be recorded and the data analysed over time to confirm the driver's knowledge and skills are improving. If the driver makes a mistake the circumstances leading up to the mistake can be repeatedly replayed so the root cause of the mistake can be addressed.

Simulators can be used to good effect by exposing a driver to situations that would not normally be encountered on the road such as vehicle coming in the opposite direction and crossing over the centre line. Drivers can be taught how to manage these situations. Driving a familiar road but in different conditions such as in a cross wind and adverse weather can also be practiced so if a driver comes across these conditions, they will not be all new to them. This is one of the main features of aviation simulators, teaching people to react to situations in safety that they would not normally encounter in their daily work but still could happen.

With the increasing sophistication of simulator software drivers can practice driving on unfamiliar roads before they go there.

Simulators can also be used to demonstrate what happens if a vehicle is operated outside its design windows, example, what happens to the handling of a truck if it is has excessive axle loads, or the SRT is exceeded. The effects of driving whilst fatigued or with an impairment can also be demonstrated with no risk to other road users.

As new equipment is bought into the fleet drivers can be familiarised with it and taught how to maximise its features before they take the truck out onto the road. Thus, the many benefits of purchasing a truck with the many options available can be realised from day one. Drivers can also be taught what to do if a feature fails.

In the aviation industry simulators are widely used to recreate the events leading up to a crash by recreating the events recorded in the aircraft black boxes, the flight data and cockpit voice recorder. As black box technology makes inroads into the trucking industry post event simulation of serious events are likely to become common.

_____

Negatives

Too much time spent in a simulator can reduce both the physical and physiological attachment to the real world.

The learner may become lulled into the perception of a driving environment where their actions can be simply reset with little or no consequences.

The use of low-quality software adds to the negative aspects of using a driving simulator as it does may not replicate the real driving situation. Because of this, and the detachment from reality, some overseas researchers are questioning the value of research that is based solely upon the outcomes derived from driving simulations.

The rapid advances in in-vehicle technology can result in some simulator software becoming out of date quite quickly.

Despite this the use simulators to teach basic driving skills, improve skill and to train drivers without exposing people to high risk situations is a developing aspect of modern driving training and education.

Cost evaluation

There appears to be little qualitative research into the cost benefits of the use of driving simulators in New Zealand. However, research completed overseas does provide some insights into the benefits of this type of training. In 2007 Heinrich and Wieland reported drivers with simulator training had 22% fewer accidents than the control group using ordinary vehicles. HEC Montreal, in collaboration with the Centre de Formation en Transport de Charlesbourg, a professional truck driving school in Quebec Canada found that simulator trained drivers reach a level of competence in less than half the time of those who only receive on-road training, 1 hour of simulator training being approximately equal to 2.4 hours of in-truck training.

A 2007 report published by TRL (UK), previously the Transport Research Laboratory[1], suggests that the benefits of simulator training could be more than $4,000.00 annually depending on the type of operation. In the TRL project much of the cost benefit came from a projected reduction in fuel use.

_____

[1] https://trl.co.uk/reports/PPR214