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Avansim

Driver Simulator Training: Gimmick or Game Changer for Driver Competence Development?

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**The only simulator system
designed specifically for the
Light Rail Industry**



Agenda

- History
- Technology development
- Why simulation?
- History of Tram-Pro
- Benefits realisation – Edinburgh Trams case study

History - Railway Simulators

- Traditionally large, full size, mounted on motion platform
- Designed for 1:1 teaching + option for Observers
- Not designed for Line-of-Sight training – Geo-specific not required, no interaction with other traffic or pedestrians.
- Expensive to purchase and maintain



Technology Breakthrough

- Graphical and processing capability of PCs improving due to gaming market
 - Estimated at capability increase of between 2 and 3 times in every two years.
- Costs of equipment are reducing
- Can now drive more monitors and higher resolution from a single GPU

History of Tram-Pro

- Began in 2010
- Initial requirement from Manchester Metrolink
 - Trafford Depot Gate 3: Total of 6 moves
 - Requirement to train 220 Drivers on new Depot/main line moves
 - Need to complete training for ALL Drivers within 4 weeks (retention period)
- Traditional 'in-cab' training would take 55 days (based on 4 per day)
- Proof of concept project instigated to test simulation as a solution
- 6 desktop simulator Workstations installed
- Able to train 12 drivers per day. All Drivers trained in 19 days.



History of Tram-Pro (2)

- Satisfaction survey conducted on all Drivers following simulator training
Result: 98.7% positive satisfaction rating
- Training quality increased as degraded conditions could now be trained.
- Number of incidents decreased
- Metrolink committed to simulation for all new extensions and existing track
- Training results consistent as Driver numbers grew to 450 with 120Km of total track.



History of Tram-Pro (3)

- To address differing customer requirements, a range of Workstations are created that enable flexible solutions for driver training:

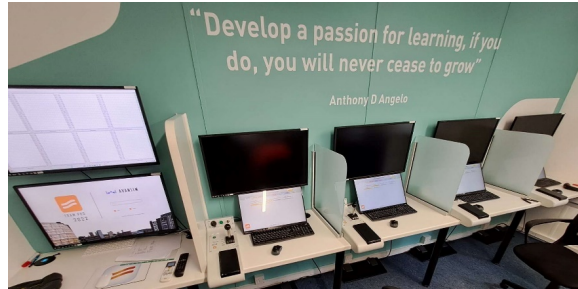


History of Tram-Pro (4)

- Manchester Metrolink now have 17 simulator Workstations
 - 1 x Compact Cab
 - 8 x T3 Desk-top Workstations
 - 8 x (original)T4 Laptop Workstations



T4 - Laptop



T3 - Desktop



T1 – Compact Cab

History of Tram-Pro (5)

- Tram-Pro now has 61 simulators throughout the UK, Europe and East Asia
- All report significant improvements in quality and efficiency

Application Areas

- Route learning
- New Driver training
- Refresher training
- Incident review and analysis
- Development and testing of new technologies
- Recruitment filtering
- Stakeholder engagement



A Gimmick or a Game Changer?



A real story
from
Edinburgh Trams



Background

- Edinburgh Trams recorded training and performance data prior to installing a simulation system
- Simulation system installed in March 2021 (1x T0 Full Cab Simulator, 4 x T2 Compact Simulator, 1 x Instructor Workstation)
- Training and recruitment programme reviewed and re-structured following Simulator implementation.
- Performance results recorded after re-structure
- Pre and post Simulator statistics compared.

Edinburgh Trams Simulation System Results

Area	Change	Note
Recruitment costs	Reduction of direct costs by replacing psychometric testing with simulator exercises	59,690 Euro saved in year – Also noted improvement in candidate quality
Training time (new recruits)	13 weeks course reduced to 8 weeks	124,950 Euro saved in year
Refresher training	Simulator used extensively	Trainers better able to observe behaviours and create more effective correction plans
Incidents (Total)	0.68 per driver to 0.14 per driver	
Incidents (first 6 months after qualification)	0.32 to 0.05	Cost of incidents include investigation manpower, loss of driving resource, repair of vehicle/infrastructure

New Extension Benefits

- Stakeholder engagement during construction
 - Engagement video
 - Digital twin
- Route learning/familiarisation for over 100 staff in advance of construction completion
- On-track time for Driver training reduced by more than 50%
- New extension opened on time



Conclusions

- Simulation for Light Rail is now financially affordable
 - Does not need to be full size
 - Multiple workstations provide training capacity benefit
 - One size does not fit all/tailored for each client and their individual requirements
 - Dedicated training space not always necessary
- When properly planned and implemented, simulation can be a ‘game changer’ for driver training and competency development.

