



INNOVATION EDGE™: UNDERGROUND ACCESS VEHICLE

Main Image: The Underground Access Vehicle in one of the tunnels to the south of the Haweswater Reservoir

Developed by Land & Marine, a subsidiary of Murphy, the Underground Access Vehicle provides a safe and productive working environment in confined spaces such as culverts and tunnels.

Description

The Underground Access Vehicle was developed by Land & Marine, a wholly-owned subsidiary of Murphy. The vehicle's origins lie in Canada, from where Land & Marine purchased battery-powered airport luggage transport buggies – push-me-pull-me units with steerable wheels at both ends.

Land & Marine made extensive modifications to these units to develop the Underground Access Vehicle with enhanced performance and increased safety for underground surveying. Tyres and wheels were modified to a standard UK specification and chamfered to enable operation in a tunnel or culvert. Adjustable and foldable working platforms were added to the side of the units, enabling movement around obstacles. Safety was increased by additional speed controls and master 'kill switches'.

Hydraulic pipes and hoses were re-rated to UK specification, ensuring minimal risk of bursts, whilst all fluids were changed to bio-degradable oils. Some vehicles include towing attachments for trailers carrying tools. The research & development team also added welfare facilities. Additional equipment such as fire blankets, extinguishers, brackets and LED lights were installed. Paintwork was non-toxic and fire resistant.

The Benefits

- Enables safe access and egress within enclosed underground spaces, e.g. culverts and tunnels.
- Increases productivity rates as crews can travel further and faster along pipes, tunnels or culverts.
- Ensures safer work environment for the crews due to welfare and emergency facilities being on board.
- Has environmental credentials as the unit is powered by batteries and all hydraulics are run on bio-degradable oils.
- Provides a facility for operatives to carry out a variety of tasks at the same time.

Application

The Underground Access Vehicle was specifically developed for the £9.6m Haweswater Aqueduct Condition Survey Project carried out by Land & Marine on behalf of client United Utilities in 2013.

Haweswater Aqueduct was constructed between 1933 and 1955 to transport water from the Lake District to Manchester, supplying 2m customers.

Only a two and a half week outage on the aqueduct was permitted by the client for the conditional survey of the six concrete-lined 2.6m diameter tunnels with a combined length of 50km.

Land & Marine developed the Underground Access Vehicle as a solution for safe and quick transportation of the workforce and equipment through the 2.6m diameter aqueduct in the short timeframe.

Twenty-two unique access points along the route were constructed to allow safe access and egress of the units and personnel. Over 240 people were involved in the survey with 16 Underground Access Vehicles utilised.

The Land & Marine team completed all contracted work within the programmed outage, including an additional unplanned tunnel alignment survey and 48 unplanned critical repairs to extend the serviceable life of the aqueduct. The project was also completed RIDDOR-free during the 50,000 man-hours worked.

End User Feedback

The Underground Access Vehicles performed without fault and received praise from client United Utilities, as well as, Land & Marine's engineers.

"The issue was how to transport the men and equipment. A rail-type system had to conform to Drinking Water Inspectorate (DWI) standards and also had to be assembled and removed quickly. The Underground Access Vehicle which we developed as a solution for that exceeded the client's expectations"
– **Martin Oakes, Land & Marine Head of Civil Engineering**



Land & Marine R&D team developing the Underground Access Vehicle

Market Potential

The Underground Access Vehicle can be modified to comply with specific requirements of other tunnel, culvert or pipeline projects.

Learn More

For more information, please contact Murphy Marketing & Communications Department at communications@murphygroup.co.uk

This is a brief description of the solution as we have applied it and should not be taken as exact. Its application must take into account the local environment and specific project requirements.

