



Longest Tunnel Inspections Worldwide

Remotely Operated Vehicles (ROV's) and Submersible Excavators (ROSE)

Aquatic Sciences owns and operates a comprehensive fleet of Remotely Operated Vehicles (ROV) and Submersible Excavators (ROSE) designed for long range pipeline and tunnel inspections and dredging. The fleet includes the *ASI Mantaro*, *ASI Falcon* and *ASI LBV300XL* units along with crawler and excavation vehicles.

The *ASI Mantaro* was purpose built in 1989 to complete an internal video and sonar inspection of the 20 km headrace tunnel at the Mantaro hydroelectric facility, in Peru. The company has inspected

over 700 km of underwater pipelines and tunnels.

Aquatic Sciences ROV's are primarily used in civil engineering inspections of utilities to assess the structural integrity of aging pipeline systems. They can also be used to conduct open water surveys for structures such as bridge piers. Pipelines and tunnels ranging from 600 mm to 15 m (2ft. to 50 ft.) in diameter can be accessed, while lengths of up to 10 km can be achieved from a single access point.



40 Centre Drive
 Quaker Centre Business Park
 Orchard Park, NY, 14127
 Tel: (716) 667-3507 Fax: (716) 667-0350

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Aquatic Sciences ROV's utilize fibre optic telemetry that transmits clear video and sonar signals in real-time over long distances to the top-side navigation station. Vehicles are equipped with high resolution digital video for cracks, offsets, defects, marine growth, debris and sediment to provide continuous visual inspection. Profiling sonar is used simultaneously to supplement the visual inspection, scanning cross-sectional features and anomalies of the structure. Video, complete with audio commentary, and sonar scans are recorded top-side in digital format. Vehicle depth, heading, distance of travel and vehicle status info are displayed as an overlay on the camera video screen. This information lends itself to repeatable inspections to precise chainage locations and details of anomalies. A sheave counter measures penetration distance of the ROV and distance information is recorded in the audio commentary.

Aquatic Sciences employs a wide selection of applications and sensors/equipment to satisfy the following inspection requirements:

Requirement	Technique/Equipment
Accurately identify location of ROV and observations	Mechanical cable counter, marked cable, unique identifiers in tunnel (markers, construction features), acoustic tracking
Conduct visual observations and document findings	Video camera, still camera, video recorders and digital media
Measurement of large features	Profiling and navigation sonar (high and low frequency)
Measurement of small features (cracks, pitting of steel or concrete)	Direct measurement with scale, laser line or pointer system, stereo visualisation and other photogrammetric techniques
Leak detection and quantification	Physical indicators - dye, particle flow, mechanical flow meter Acoustic techniques - hydrophone, current profilers
Thickness measurement of steel liners	Ultrasonic probe
Sample collection	Suction carousel, sampling tray, manipulator
Concrete lining integrity	Sample collection by coring, ground penetrating radar (GPR), seismic techniques
Water quality parameters	Chemical cells, temperature probes
Correlate all observations into readily accessible report	Use of relational database so that all information is cross-referenced

With each inspection a comprehensive report is issued to clients including edited a video/audio DVD report and a written assessment. The final reports can be cross referenced with the video report. The reporting documents are cross referenced with the video/DVD records to provide the client with an essential tool for making critical decisions.

Aquatic Sciences was founded in 1987 as by a small team of technical professionals committed to provide industry and government worldwide with integrated underwater infrastructure inspections and water and wastewater engineering services.

Over 100 professionals and technical support staff are dedicated to providing municipal and private sector clients innovative, single source, industry leading solutions in the areas of water and wastewater engineering, biofouling control, underwater inspection, maintenance and repair services.

The company's head office facility (32,000 sq. ft.) is located in St. Catharines, ON. Branch offices are located in Sarnia, ON and Orchard Park, NY.

PROCESS/ PRODUCT APPLICATIONS:

- flooded pipelines and tunnels
- open water surveys
- civil engineering
- structural integrity inspections
- preventative maintenance
- non-destructive testing
- structural integrity inspections
- preventative maintenance
- non-destructive testing

