

Wellington Cut – Retaining wall monitoring

Scope: registered 3d point cloud of Wellington Cut Retaining Wall at 6 month intervals, 2d sections at 1m spacing along entire wall.

Client: Translink, QUB Civil Engineering Dept.

Date: March 2005

Background: Translink in partnership with Queen’s University Civil Engineering Department approached Gridpoint Solutions Ltd to monitor a retaining wall at Wellington Cut on the main Belfast to Dublin railway line using 3d laser scanning. Scanning is to be carried out at six month intervals to highlight any areas of deformation along the wall.

Cyclone™ software was used to register the 6 scans together and reorientate the X, Y and Z axis to the local grid system. The resulting complete 3d point-cloud of the retaining wall was then sectioned at 1m intervals.

Project Facts

Field: 2 person scanner crew, 1 field day

Office: 1 Day

Deliverable: registered 3d point cloud, 2d sections at 1m spacing along wall, highlighting areas of movement (if any) during six month interval.

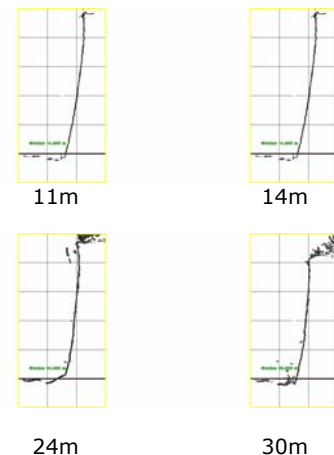
Benefits

- Increased safety
- Volume of information
- Quick turnaround
- Survey quality and accuracy
- Scan completed without affecting timetabling.
- Collection of additional track data.



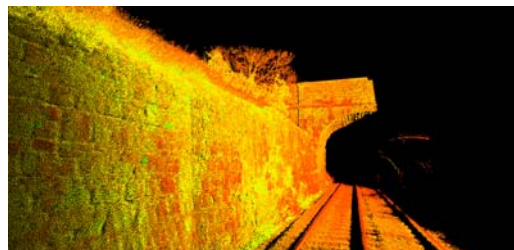
Wellington Cut retaining wall

Workflow: Multiple 3d scans were collected detailing the entire retaining wall. Local control was attached to the 6 individual scans via dGPS and a reflectorless EDM survey of in-scene targets. Scan data was viewed in real-time allowing areas of significance to be quickly identified and rescanned at a greater resolution.



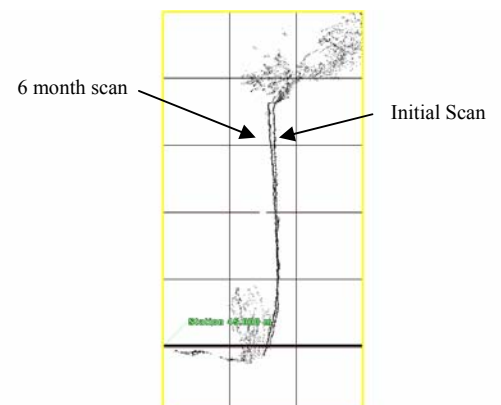
Cross sections along the wall at 11, 14, 24, and 30 meters (1m grid).

The next 3d laser scanning survey of the wall in 6 months time will be combined with this scan data. Cyclone software will be used to map and measure any areas of movement greater than 5mm. Cross sections of this combined point cloud should also highlight any areas of deformation.



Retaining wall 3d laser scan

Previous investigations using traditional survey techniques analysed only 90 points along the wall. Gridpoint solutions initial scan produced over 7 million coordinates.



Simulated movement of the wall in cross section (1m grid).

