

UK West Coast Main Line Asset Mapping

Cyrax® and Cyclone™ speed feature coding and dimensioning of overhead rail gantries

Scope As-built and code 1500 gantries over 300 miles of track; ASCII data file output

Owner RailTrack, UK

Date February – July 2001



“Without the Cyrax system enabling us to extract data under controlled office conditions we would not have been able to provide results to the timetable required. Also, collecting and labeling data in the field on a discrete point basis is very prone to error and increases time spent in a dangerous environment. Errors in discrete points are difficult to trap and will inevitably mean a revisit to site. With the Cyrax system all data could be fully QAd by over sampling without time penalties and all processing was done off-site.”

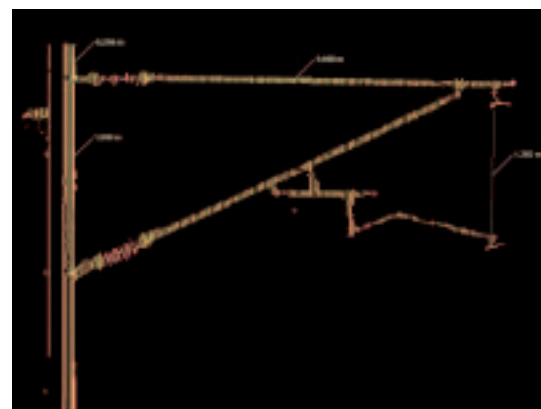
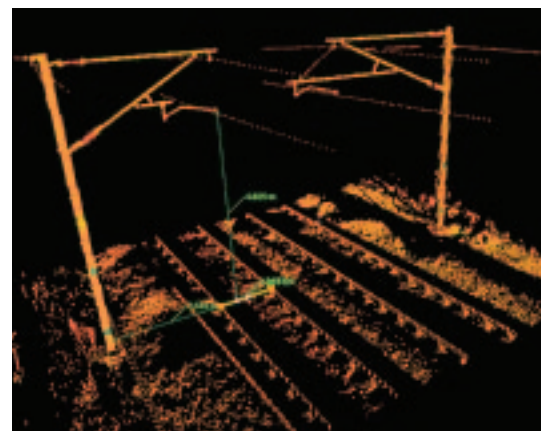
Alan Barrow, Managing Director, ABA Surveying, London, UK

Background: The UK rail system is split into a number of mainlines. As part of a strategic campaign, all rail assets are being systematically located, identified, and stored in an asset register. For electrified overhead line gantries, asset data is supplemented by accurate dimensional and coordinate data that enables overhead line engineers to plan maintenance and design new systems. RailTrack commissioned ABA Surveying (UK) to carry out a nine-month dimensional and asset survey (with accuracies of 10-15mm) for 1500 gantry structures on the West Coast mainline.

ABA started the project Sept. 2000 with total stations using a two-person survey crew, as well as a two-person safety crew, but found the overall process too slow to meet the project schedule. Survey completeness and proper survey QA (missed points or incorrect feature code assignment) were major problems, as field conditions with passing trains, etc. were very difficult in which to work. Returns were routinely made to specific gantries for resurvey - a major undertaking. It requires organizing permission to access the track, employing safety personnel, driving to a distant site, carrying the equipment for up to a mile and then trying to sort out what went wrong. One mistake could take as much as 4 hours to find and rectify. Attempts to survey with a standard reflectorless EDM were also unsuccessful due to material and weather conditions, and due to difficulty in establishing exactly where a measurement was being taken. To overcome these problems, ABA switched to 3D laser scanning in February 2001, electing to use a Cyrax 2500 and Cyclone software.

Project Workflow: Each structure was captured by a single, dense scan that included pre-surveyed targets. With a scan density of 5-10mm and the high accuracy and small spot size of a Cyrax 2500, dimensional measurements could be extracted directly from point clouds in Cyclone without doing any modeling. Scan targets were coordinated using a reflectorless total station and related to fixed survey stations along the route. These target positions were used to register scans to RailTrack's Project Design Grid.

Key locations (ends and corners) on each gantry were selected within a scan cloud, labeled according to a pre-defined coding system, and stored in an ASCII file. These digital files were sent to RailTrack for inclusion in their asset database. Office work was carried out concurrently with fieldwork. With Cyrax, crew size and initial field time were the same as those using conventional methods, but there were no site revisits. The overall result: a project that was completed on schedule with a 50% man-hour savings.



Project Facts

Field: 100 days; 2-person Cyrax crew, plus 2-person safety crew; 1,500 scans

Office: 100 days; 2 operators

Deliverable: ASCII output file of coordinates and feature codes

Customer Benefits

- Completeness of each scan eliminated frequent, time-consuming site revisits and provided strong QA
- 50% overall labor savings vs. traditional methods
- On-time project completion
- Improved safety via less field time in hazardous location

CYRA

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© Cyra Technologies, Inc
4550 Norris Canyon Road
San Ramon, CA 94583
Tel. 1.925.790.2300

► www.cyra.com

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