DYWIDAG

Manual Monitoring and Survey Services

One of our strongest divisions is our Survey teams who provide specialist surveying techniques for the asset protection industry

We work across many sectors of industry providing asset protection through geotechnical, structural and environmental methods of monitoring and survey. Our foundations started within the rail sector and have since developed to span across construction, highways and many others.

DYWIDAG's ability to call on a diverse portfolio of skills and techniques in order to deliver the best solution for every individual project is what enables us to be the UK's leader in asset protection monitoring. Our continued growth and innovation in this field has created a strong client base and excellent reputation for quality and reliability.

- **21 years of experience**
- **Emergency ready**
- **Network Rail PCL Licence**
- **Large SHEQ back office support**
- **PTS/COSS/SWL**
- **CSCS & SSSTS Qualified**
- **North & South offices with in-house Surveyors**
- **Rail & Construction ready subcontractors** *(de-veg/light civils/CRT)*
- **Network Rail agreed/approved report formats**
- **Additional automated Monitoring & Manual Geotechnical Services**

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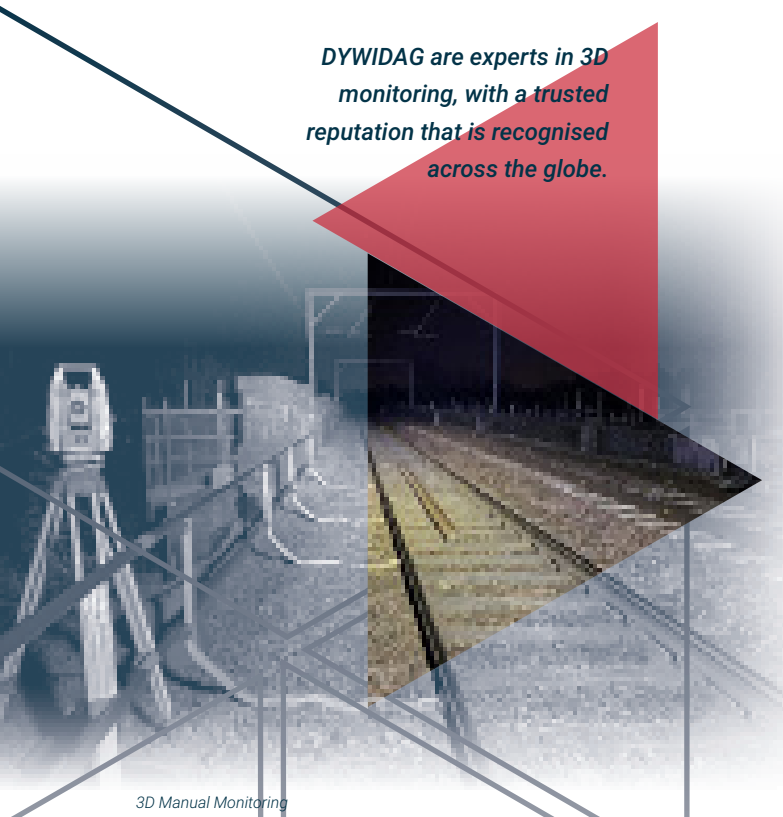
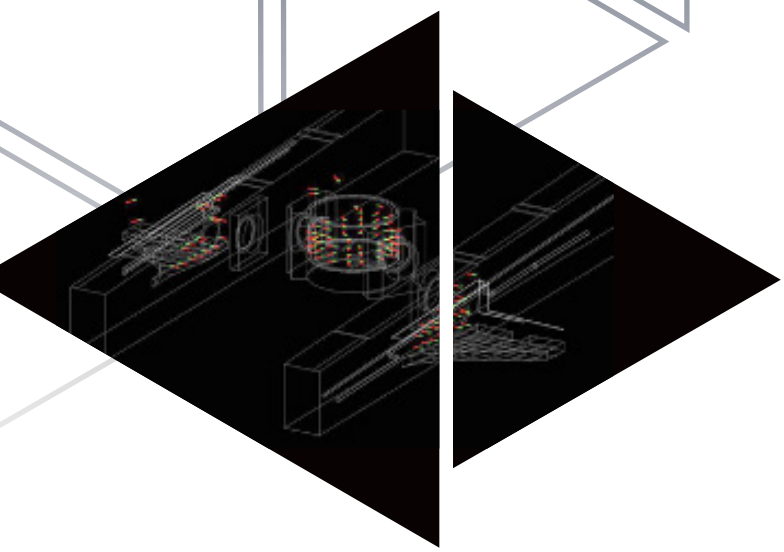
3D & 1D Monitoring

DYWIDAG are experts in 3D monitoring, with a trusted reputation that is recognised across the globe.



3D Manual Monitoring



3D Manual Monitoring

Our 3D monitoring principles are applied and adapted to any situation, as part of one of the most challenging industries for monitoring solutions. Difficult locations can include tunnels, the railway network, bridge monitoring.

Railway network monitoring, for example, includes live monitoring of the rail infrastructure. This vital service keeps trains running, while essential repair or installation can be carried out, resulting in minimal disruption. All our rail monitoring is carried out to the Network Rail required standards NR/L2/CIV/177.

All monitoring starts with a stringent safe work planning system, that again meets all NR requirements. Once on-site, installation of the monitoring targets is required. DYWIDAG can provide a wide range of options, when providing a solution to which target and method is most suitable for a project. Once the reflective targets are installed, the points are determined through an optical trigonometric measurement. This process is repeated to establish an absolute reference system i.e control network. This is realised by a number of reference points that are recorded and their positions checked continually in an effort to keep the monitoring process consistent.

The location of the measuring instrument is selected according to the best possible visibility, access restrictions, conditions of the targets and reference points according to the principle of a free station (Resection). Known points can also be installed and accurately traversed/levelled, providing precise control for duration of the works.

Once the targets have been measured we can process the data on-site, providing the client with results instantly. This is achieved through an industry leading monitoring report system, developed and improved on for over 15 years. These reports are fully customisable to process and present the data quickly, while presenting precise data clearly. The data is checked against previous readings and baseline results. While at the same time, error checking with background formulae that ensures quality results.

DYWIDAG are known for providing a 24 hour 365 days a year service. We regularly operate at evenings and weekends and our staff are committed to meeting client demand for monitoring at any time of the day/night. We are also renowned for reacting quickly to emergency situations. Embankment slips/rail faults/ flooding can occur instantly and we are always on hand to mobilise quickly to provide the most suitable monitoring solution.

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Precise Levelling

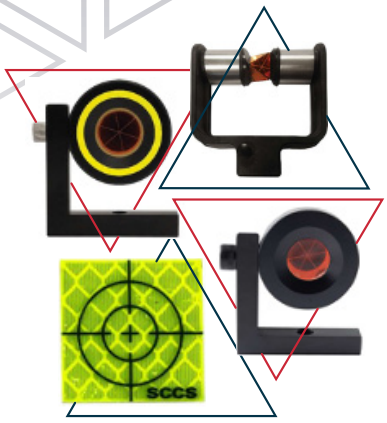
Precise Level Monitoring at Manchester Viaduct

Complicated infrastructure demands the uppermost accuracy when monitoring and setting out reference heights. With dedication to striving forward, DYWIDAG use only the latest products to achieve accurate and consistent results.

The Leica Precision 5000 range with DNA03 and LS15 Digital Level are used in the field for their accuracy, versatility and speed. Benchmarks are installed as a point of reference throughout the works. Our staffs and method of measurement is essential to accuracy. The 2m staff has a lower thermal expansion coefficient, thereby improving accuracy. Accuracies with this equipment achieve sub 1mm.

Excel monitoring spreadsheets are issued to the client from site, giving the client the results the very same day of survey. We also specialise in live monitoring such as drilling and load testing.

Monitoring targets installed on arch of Rosegyhll Bridge



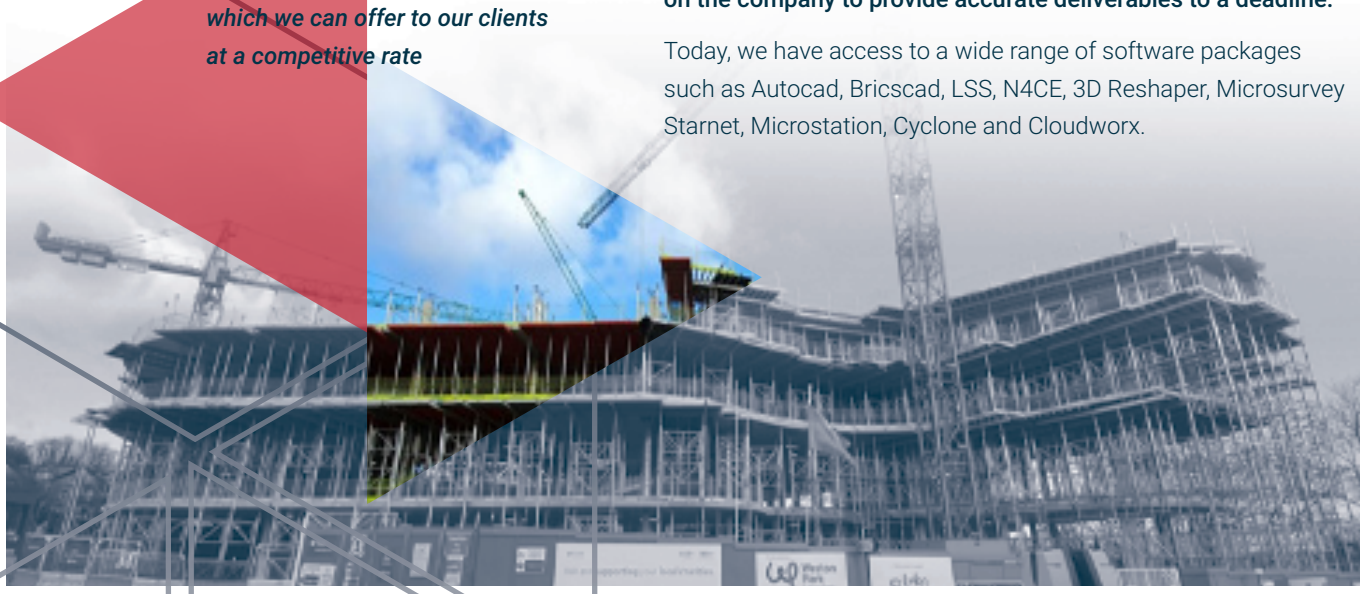
Monitoring Targets

Monitoring platform – to provide sufficient line of sight

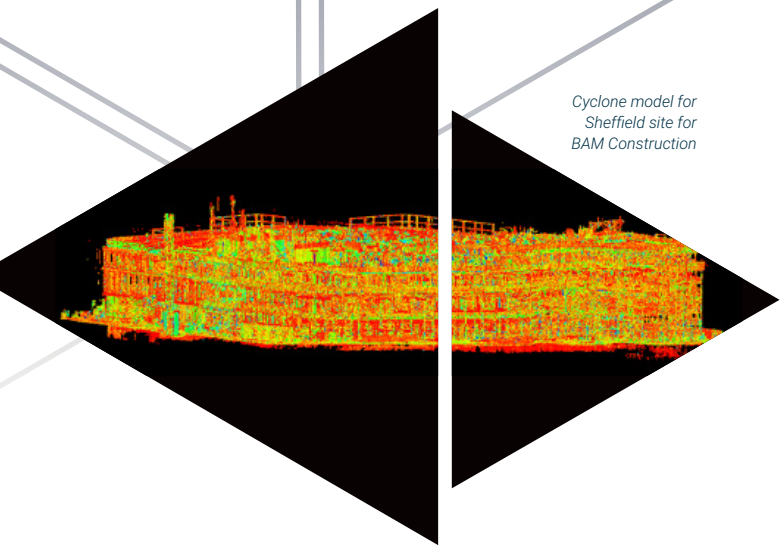
Manual Monitoring & Survey Services

Supplementary Services

Our experienced CAD team offers a wide range of deliverables, which we can offer to our clients at a competitive rate



Scanning on-site in Sheffield for BAM Construction



Cyclone model for Sheffield site for BAM Construction

3D Laser Scanning

DYWIDAG has formed a loyal and trusting client base, that count on the company to provide accurate deliverables to a deadline.

Today, we have access to a wide range of software packages such as Autocad, Bricscad, LSS, N4CE, 3D Reshaper, Microsurvey Starnet, Microstation, Cyclone and Cloudworx.

DYWIDAG has continually invested in Leica HDS laser scanning equipment. Our Scanner of choice currently is the Leica P50 scanner, which is recognised throughout the industry for excellent results and capture capability. This equipment allows us to achieve accuracy, speed and quality whilst working on numerous projects throughout the UK and Europe. Using our laser scanners results in fast collection of site data of up to a million points of detail per second. Point cloud compare and inspect, 3D modeling, 3D CAD wireframe, deformation surveys, cross sectional outputs, just to name a few deliverables.

Gauging and Clearance

DYWIDAG has a full capability to plan and execute a range of surveying and guaging services. An in-house expert team ensure all aspects of Gauging assessment are covered on our projects and recommendations made accordingly.

Using the most advanced method of measurement, we can capture the necessary data quickly, saving time in the field. Laser sweeps and scanning equipment are used on-site, combined with SSE processing software. This allows a comprehensive on-site assessment of survey content and quality. Data can be integrated with other measurements, such as cant and curvature. Measurement data can be edited to correct spurious points caused by lighting, foliage and areas of poor reflectivity.

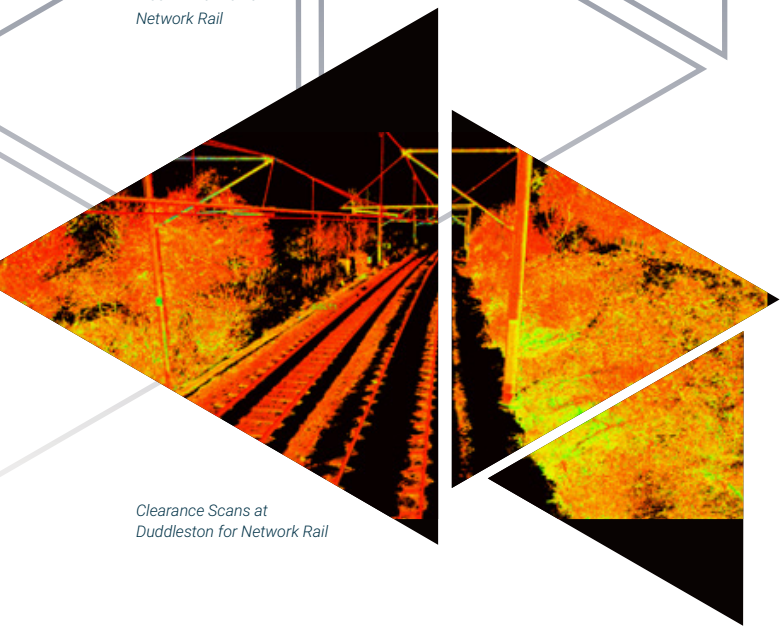
Manual Monitoring & Survey Services

Supplementary Services

Setting Out

With over 20 years of site experience DYWIDAG specialises in setting out at any stage of a project. Working alongside specialist contractors has given us in-depth knowledge of the construction process which enables us to deliver a superior setting out service. We understand the importance of accuracy in setting out and pride ourselves on using the latest industry technology which allows us to deliver projects accurately and efficiently.

3D Monitoring at Rise Hill Tunnel for Network Rail



Clearance Scans at Duddleston for Network Rail

As Built Surveys

As part of the quality control procedure, As Built Surveys verify the sub-contractor has carried out their work to specified tolerances. Often a request by main contractors as an independent check before subsequent trades commence without delay. DYWIDAG uses a combination of Leica total stations and Leica 3D laser scanning technology to carry out as built surveys giving speed and absolute accuracy of data resulting in a more cost-effective solution without the need for return site visits. Measurements are translated into agreed drawings that allow us to compare the as built structure to proposed drawings. Discrepancies are identified and reported to the client in a timely manner.

Control Installation & Maintenance

Every project needs tight, accurate dimensional control and the larger the project, the more important that control becomes. Equally important, and often overlooked by many project managers, is the fact that during the construction phase, control stations can be lost, and the accuracy of the overall system degraded to become sub-standard and unfit for purpose. With years of experience on some of the largest and most complex projects in the UK, DYWIDAG can confidently install and maintain your project's control system and liaise with all relevant project stakeholders to ensure the correct project control system is used by all throughout the entire project, thus mitigating potentially timely and costly project errors.

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Supplementary Services

Our in-house drafting technicians are able to carry out any modelling requirements using data captured internally, or supplied, in a range of applications such as:

- AutoCAD
- Revit
- Rhino 3D
- 3D Reshaper
- Leica Cyclone
- N4CE
- LSS
- Microstation

Permanent Way – Topographical Survey

DYWIDAG has a very good reputation with Pway Topographical Surveys. Combining traditional survey methods with new innovative scanning solutions. This saves time on-site and in turn, cost to the client. Working in a rail environment has various implications regarding safe planning and execution of tasks, all of which we are well rehearsed.

Surveys can include all on and off track detail such as rails, furniture, electric elements, buildings, drainage etc. Deliverables can include 2D and 3D CAD wireframes, full survey reports, rails overlap, point cloud outputs - to help verify the data. The purpose of this is to provide accurate and precise information, complying with NR/L2TRK/3100 specification. Many surveys allowing for band 1 and 2 track design to be carried out, for all relevant GRIP stages of a project.

The surveys are all orientated and transformed to the relevant control network provided, such as TPEN16 on Snakegrid. The control will also be double level run and a full survey report will be issued. This will include a description of the task, personnel and equipment, relevant certification and calibration history, control information with adjustment and final coordinates, registration reports and witness diagrams.

The End Product!

We offer a full range of services from project conception through to deliverables - data capture (laser scanners, Total Stations) to drawing issue. The exact deliverables will be discussed and agreed with the client before commencing any work - such as level of detail, survey extents, accuracy, software and so on. We aim to consult with the client at the conception stage of a project and to advise of the required works in order to successfully deliver (handover stage) any project in the most timely and cost-efficient manner whilst ensuring the deliverable is fit for purpose.

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