

# Making innovative products and digital solutions a reality

As a diverse delivery partner specialising in bespoke solutions for infrastructure projects, D2 brings a blend of technological innovation and seasoned industry expertise to complex rail projects. Here we focus on two pioneering pieces of technology to visualise possession data and calculate track access compensation

The company was formed in 2011 by founder David Diesbergen, who continuously found himself facing the same challenges on projects – a lack of early ‘real planning’ engagement, where realistic and achievable programmes are developed by individuals who can relate to both the building and sequencing of works.

Over the past decade, D2 has now expanded its service offering to include planning, constructability, project controls, utilities management, digital technology, information management, capacity planning, collaboration and project management.

Throughout this growth, D2 has always remained committed to its core mission of ‘creating the highest possible value for its clients by viewing actions from their perspective’.

Key to this has been D2 consistently investing in developing elegant digital solutions and innovative products that help solve common industry issues and frustrations – the ultimate goal being to help improve the success of complex infrastructure projects and make delivery more efficient for everyone.

This approach has led to a portfolio of high-profile schemes which D2 has supported delivery of, including The Northern Hub’s Ordsall Chord, and the Transpennine Route Upgrade.

The development of two pioneering pieces of technology – Swiftview and a compensation management tool Schedule 4 Calculator – have helped D2 shine a light on how innovation and development of digital solutions can transform efficiencies on rail infrastructure projects.

## Swiftview: Revolutionising visualisation of possessions

Producing weekly possession diagrams is resource-heavy, repetitive work which carries a high risk of human error.

To make access planning easier, quicker, and more efficient, D2 has developed Swiftview, an online resource that enables real-time upload and visualisation of possession data.



Developed by D2’s industry experts and software engineers, Swiftview completely transforms the way project managers interpret and apply possession data.

## Designed by experts

This bespoke system has been meticulously designed by D2’s specialist system engineers to operate specifically for the rail and freight industry, providing a safer and more efficient way of working.

Swiftview takes possession data in various formats and seamlessly overlays it. This means users can see any possessions, conflicts or areas of concern in seconds, leaving them free to focus on other important aspects of their work.

The system makes long-term possession planning more auditable, scalable and efficient, reducing the errors caused by manual data entry using Excel spreadsheets. This means processes that could take weeks to be completed manually can be completed in minutes.

Swiftview is cloud-based for maximum efficiency, enabling large volumes of users at any given time. Through many years of testing and development, the software is now in use on live rail projects. Matt Sykes, D2’s Head of Digital

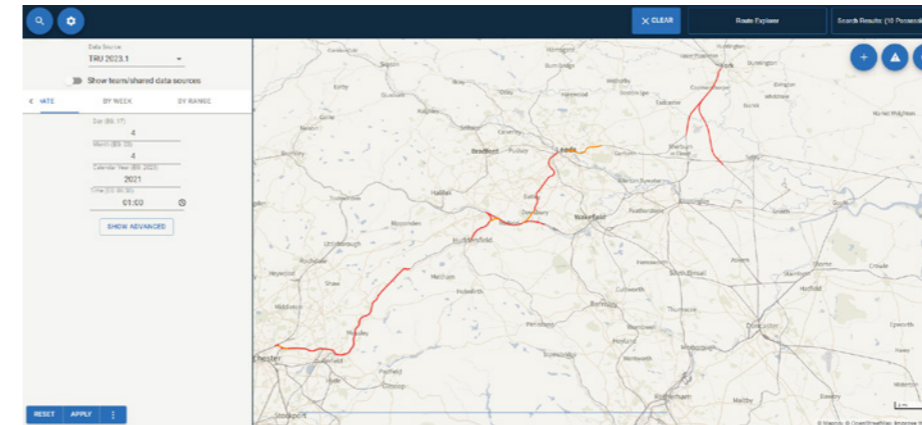
Technology, described the software’s formation: “The idea for Swiftview was born from a request that we kept receiving for visualised possession data. Clients were taking basic text-based possessions from location to location, and they wanted a visual solution. They were asking for this on a weekly basis, and it was a manual job of overlaying that footprint on a map.

“So, our digital team developed a solution that can read in possession data that is text-based and then visualise it as a geographical map.”

## Joining up the network data

During the development of Swiftview, the D2 software team faced the challenge of a lack of one complete set of geographic data relating to the rail network. While the network data existed individually, it just wasn’t joined up. D2’s digital technology team collected and checked this disparate data, starting with the geographical line data that make up the network.

Each line was checked and tagged with information such as line of route code, direction, and location. Next, the team aligned each location on the network with PPS location data, at the same time building in the route information for each line.



Using pathfinding algorithms, the team built a system that can analyse the ‘from’ and ‘to’ location for any given possession and determine the geographical lines that make the route up.

There are many different formats that possession data can take and D2 wanted to make the process as easy as possible. The team uploaded possession data using an import system that supports both CSV, PPS and box plan import. This allows the user to import data seamlessly with any validation errors automatically fed back to the user.

## Testing and development

The system naturally developed from its original concept, adding automatic import, possessions editing and creation tools directly in the system. This meant it functioned as a possession management tool with geographical visualisation as a feature, rather than the main element.

Through rigorous testing and development with an industry expert product champion, Swiftview is now a fully working possession management tool with a range of features. The product is currently being rolled out on TRU West Alliance.

Matt explained: “Once we have visualised the possession we can integrate different resources, for example, if the possession is running over the weekend, we can ask: ‘what manpower do you need?’ ‘What wagons do you need?’ What materials?’ Then we can start tagging this information onto the possession.”

## Entering new markets

With support from Innovate UK, D2 was recently awarded a contract to investigate how it could provide digital innovation to the Canadian rail system. For this project, D2 aimed to investigate how Swiftview could be developed in Canada to provide a safer, more efficient way to gain visibility of works with improved access planning and analysis. The focus was to investigate what geographical rail data is available and how it can be used in conjunction with maintenance planning data.

The D2 digital team is now working in Canada supporting the GO Expansion project and the development of its own possession management and access tools, using their experience and lessons learned to shape the direction of the system. The team plans to integrate the visualisation tools developed through Swiftview to bring the same benefits to the project that they have in the UK.

## Schedule 4 Calculator: Determining operator compensation

The current rail possessions regime in the UK is known as Schedule 4. This schedule is the portion of track access contracts that sets out the level of compensation Network Rail is required to pay train operators for delays, service changes or cancellations as the result of planned disruption on the network.

There are five different types of disruptions for which operators can be compensated\*:

- ▀ Possessions which are shorter than 60 (continuous) hours, known as type 1 possessions;
- ▀ Possessions which are longer than 60 hours but shorter than 120 (continuous) hours, known as type 2 possessions;
- ▀ Possessions which are longer than 120 (continuous) hours, known as type 3 possessions;
- ▀ Periods of sustained planned disruption (SPD), which are identified when the disruption caused by a possession exceeds specific revenue and cost thresholds;
- ▀ Late notice (within 12 weeks of delivery of the possession) cancellation of a type 1 possession.

Compensation to operators is a complex calculation and includes factors such as the size and location of the station, the number of passengers using the service, whether a bus replacement is required, and many more. D2 has developed a Schedule 4 tool that allows users to calculate the compensation owed to operators whenever a Network Rail possession affects their services.

The development of the Schedule 4 forecasting tool followed D2’s work on the Transpennine Route Upgrade (TRU) Alliance, where initial estimates for possession compensation made up a significant portion of the budget. The project team wanted to test the robustness of these figures, so they automated and simplified the method used by Network Rail.

John Johnson, Rail Operation Director explains some of the benefits: Using Schedule 4 Calculator on TRU has helped us calculate the forecasted costs to within 10% tolerance of the actual outturn figures.

“Some of these calculations were up to 50 per cent lower than original predictions. This is useful because it means that budget can be spent elsewhere on the project. Once we can harness the ability to understand these forecasts it provides projects with a really good optioneering tool.

“It also means we can optioneer different access strategies to identify the most efficient ‘industry’ solutions.”

D2 is currently supporting the TRU West Alliance with access planning and possession cost forecasting. As the software continues to develop, the aim is to bring it to other infrastructure projects spanning the wider UK network.

## Making data manageable and meaningful

D2’s digital technology team offers unparalleled experience in data analysis, web design and desktop software development, combined with the company’s wider knowledge of the day-to-day operations of the rail sector. It is this skill set that makes the company ideally placed to deliver these innovations to infrastructure projects and to help project teams better understand how they can use their data. To be able to calculate Schedule 4 costs, an understanding of all of the different attributes of the calculation is required. You also need to understand the process of train planning, which is where D2’s data analysts are used. D2 is working at the moment to bring that knowledge and its experience of working with operators to automate the tool so that it can be used by anyone.

Ultimately, D2 believes it can provide a tool that can help users make more efficient calculations. At the moment, there’s a lot of reliance on people’s knowledge in the rail industry, but the D2 digital technology team is keen to automate things so that users can benefit from the firm’s tools by making processes and calculations easier and more accurate. ▀

**If you would like further details of any of these products, please contact [info@d2rail.co.uk](mailto:info@d2rail.co.uk)**

\*Source: Office of Road and Rail