

Environment Agency Digital Asset Data and Information (DADI)

The Sharing Data Saving Lives Project (SDSL)

Case Study



Introduction

The Sharing Data Saving Lives project was inspired by the 2022 report by Discovering Safety in partnership with HSE, together with Atkins, the Open Data Institute and Metis Digital and funded by the UK Government through the Regulators' Pioneer Fund (RPF). This project concluded that there was a compelling financial, legal and moral case for better sharing of risk related data between the duty holders in a construction project, and then onwards between the project and the ongoing management of an asset. This has the potential to power a cycle of continuous improvement in health and safety management.

This case study describes work carried out by The Environment Agency (EA) supply chain. This work shows how EA has standardised terminology, established a common data schema for risk, and developed a workflow to support a distributed common data environment. Implementing these changes will make risk information available to all the duty holders in a project in order to improve design risk management, enhance the interface between the design and construction phases, and enable handover information and the 'Health and Safety File' to be managed more efficiently. Beyond these project wide benefits, EA as a client will be able to access all risk data across relevant projects operations and maintenance work and ensure that lessons are identified and learning actioned on a broad Nationwide basis.

You can find an explainer video on You Tube here:
<https://www.youtube.com/watch?v=KNDSak4H4vI>

Background

Before this work started EA were managing risk project-by-project in a document-based way. Risks were captured on spreadsheets, but there was a limited amount of work carried out to join up these data sets and learn from them. At the Client level it was very difficult to look at anything other than an individual project. The spreadsheet was the dominant tool used to capture, aggregate, visualise and analyse data on risks.

The biggest challenge was the fragmented and inconsistent nature of health and safety risk information between the various systems used by EA and their supply chain. This is a typical situation in UK Construction, common to many large Clients funding programmes of construction projects, The fragmentation affects the entire data journey for Risk information; from an initial asset appraisal, through a project design and construct lifecycle, and then to update the asset operations and maintenance. At a project level this creates barriers to easily understanding risks across the various work activities required. At the programme level both the EA and supply chain health and safety teams find it hard to use available data to draw wider lessons and insights. This in turn hinders EA's focus on continually improving how the work of contractors and their own staff is controlled through a project framework. Many of EA's own staff are often required to work under pressure in emergency situations.

Aims and Objectives

The aim of this work was to improve access to risk information across the whole lifecycle of an asset, including through capital projects and routine operations and maintenance.

Some key objectives were set for the project:

1. To record a reduction in number of RIDDOR both during project delivery and operation and maintenance of assets
2. To demonstrate that use of HEALTH AND SAFETY data is foundational to preventing accidents
3. To demonstrate best practice in health and safety working closely with the Health and Safety Executive
4. To embed practice where all HEALTH AND SAFETY Hazards are identified and treated in the design phase of projects, with no new risks being registered in the construction, commissioning or handover stages
5. To show how HEALTH AND SAFETY data is maintained and updated through the life of an asset with risk information being captured, used and shared by all parties through a common data structure

The Future State: What will success look like?

Success in this project will be demonstrated;

- 1) when all parties to project management are able to retrieve, use and share risk information held in the various EA Information systems
- 2) by the various EA Information systems working together as a distributed common data environment
- 3) When asset data is routinely updated as risk information is modified in response to work carried out by contractors

The Business Benefits to be Gained

Contractors, suppliers and EA staff will have the necessary access to risk information when it is needed, and therefore greater ability to prevent and manage incidents as they arise. Duplication of effort, time wasted in retrieval of documents, and needless repetition of site visits will be reduced. Looking to the future, a massive benefit will be the ability to leverage risk data to better predict, detect and prevent harms from occurring wherever EA operates. Consistent reporting on Health and Safety issues will link up work activities across the whole of England. This will lead to significant benefit to strategic and operational planning for both management and operational teams.

What has the Work Achieved to Date?

This case study reflects work carried out to August 2024, which includes developing the systems, data schema and data exchange tools which will enable the Risk Information to be shared. Implementation of these changes across the EA estate will begin in Autumn 2024 and continue into 2025.

A Standardised Data Schema

The work has established a consistent risk data schema. This will enable EA to record data in a consistent, known and understood format that will enable insights to be gained. The data schema allows for progressive addition of data as a project is developed from inception through design, and on into construction. The same data structure will be applied to managing health and safety risks in assets, so a seamless join is possible between project and asset information models.

A key feature of the new data structure is the ability to create a record of a risk, and link it to specific instances of that risk at a given location. In this way a 'fall from height' risk can be labelled by category, but also located at multiple locations, each one having a unique record, so variants can be readily captured. A location can be registered in a flexible format, as a point, a line or as a bounded box or polygon enabling risks to be made visible as a layer in the corporate GIS platform.

The data schema requires severity, likelihood and risk level to be recorded, and each risk should be matched to a treatment. The term risk treatment is preferred to the term

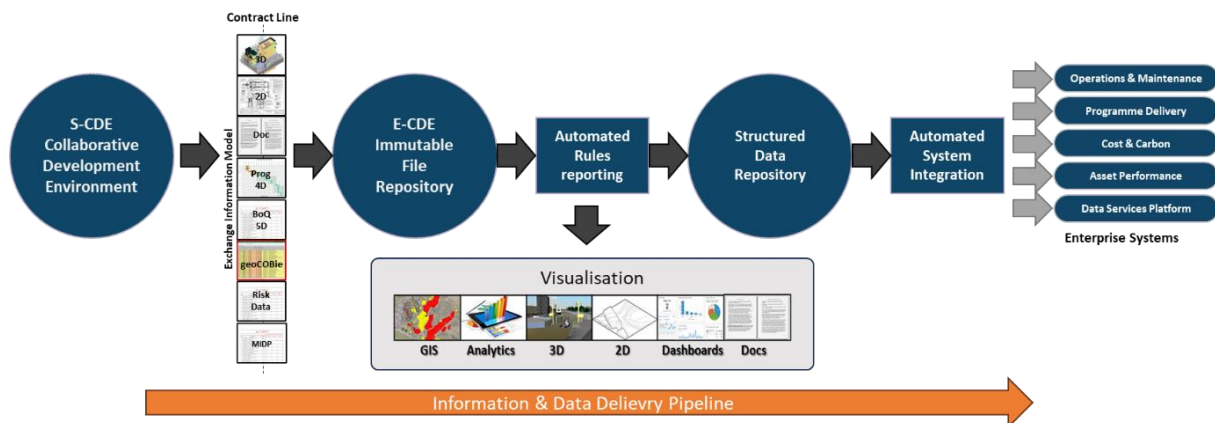
‘mitigation’, because it includes the options of elimination or of choosing to take no action. A free text field is included to describe the selected treatment, and designers also have an option to access the [Construction Risk Library](#), which is a Discovering Safety library of risk scenarios and treatment prompts held in a separate data file.

The data schema hinges around the consistent classification of risk, and by adding in start and end dates at a planning stage, a risk loaded project programme can be prepared before the construction phase, to help monitor risk accumulations and concentrations in the programme.

Data Flows

Having established a data schema, the challenge is to exchange that data across the necessary systems. A new open standard document type, has been created from which data can be extracted, analysed and used to inform all parties. Data will be progressively added as a project progresses and as risks are identified and treated. The data will ultimately be available to any party, at any stage in an asset or project lifecycle.

EA requires all appointed parties to maintain their own collaborative Common Data Exchange (CDE) which is aggregated as it passes across the contract line into the EA CDE. This means that all parties are responsible for managing their own information, and EA, as the client can aggregate information at a project and asset level.



Common Data Exchange

Individual files containing risk information arrive in the EA CDE and data is extracted into a common risk database, on the Client Cloud environment. The SDSL project has developed three options for data interaction.

Option 1- Using standard tools. Data analytics insight and business intelligence is generated and made available using standard tools such as Excel and Power BI.

Option 2 - Geospatial database. Adding spatially located risk instances to the corporate GIS Tools such as ArcGIS - Easimap.

Option 3 - Model Database. This option maintains data in a database such as Master Data Management (MDM) where data can be extracted to visualise in a 3D model environment where any 3D model authoring tool can be used. A viewer such as 3D Repo SafetiBase is used to provide a visual output.

As a key operating principle this project exploits a distributed CDE which has the benefit of data providers being able to manage any commercially sensitive data on their own terms, and only share the information that EA requires.

Inputs

The input of risk information is very flexible. It can be through export of a spreadsheet, making the generation of data by micro and SME suppliers, easily accessible to EA. Alternatively design teams can use Geographic Information System (GIS) Tools or Building information modeling (BIM) Models to generate risk information and share this seamlessly with EA.

To achieve a validation process in accordance with data standards, risk files will be scheduled as part of an Information Delivery Plan (IDP) which will track that files arrive on time and are automatically checked to meet data quality standards.

Outputs

The project outputs will match the three levels of inputs, to ensure that any size or complexity of project can be managed efficiently in a resource proportionate way.

- 1) Standard data exchange format. Outputs may be in the form of a spreadsheet or standard tables of data
- 2) Outputs may be provided as risks linked to 3D or 4D models, or to a GIS platform such as ArcGIS or Easimap. Traditional drawings will be generated from these platforms.
- 3) For more complex projects or asset management scenarios, dashboards and automated reporting may be most appropriate. The standardised risk data schema opens up the possibility of reporting using a standard 'Risk Burden' report which could track and compare levels and loads of risks between projects and assets.

A New Approach to the Health and Safety File

With the adoption of a more standardised data schema to create consistency in the digital exchange and management of the health and safety management information, it now becomes possible to update the traditional EA Health and Safety File template. Instead of

being a static pdf template which in effect becomes a curation of document sources in one place, the 'Health and Safety File' is created as a dynamic index (dashboard) of sources of information, which bridge the gap between the project, and the asset. This information becomes available through the CDE and uses the ability of the data schema to retrieve summaries of residual risks which are identified for an asset. These are risks identified prior to project completion, and should include risks associated with the project and asset which could lead to harm in the use, operation cleaning or maintenance of an asset, as well as including foreseeable risks which might arise from demolition, dismantling or repurposing.

Making a Difference to Risk Management

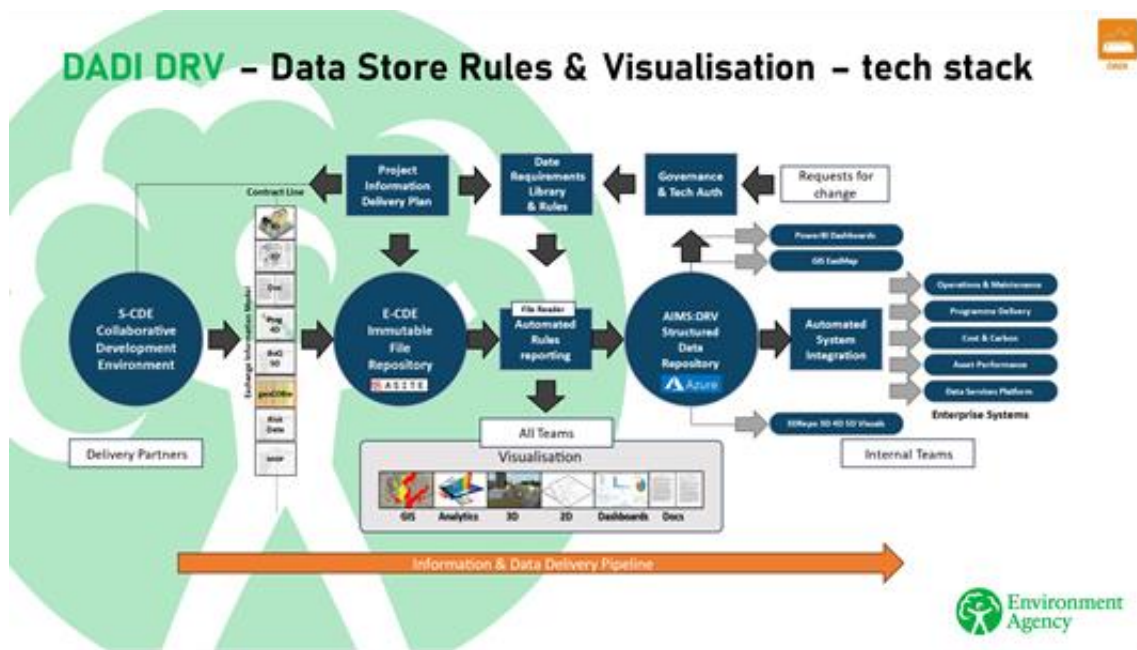
These three scenarios illustrate the difference this project is intending to achieve:

1. Access to risk information.

A sub contractor required to carry out work on a particular asset will be able to look up that unique asset record in a central database. It will immediately be apparent that there are risks recorded against that asset. One of the risks is associated with Uniclass Category RK_40_15 Electrical injury risk. This risk is sub classified as relating to underground power cables. This alerts the sub contractor to the need to check the drawings available to ensure that the area they need to dig in is safe.

2. An EA staff member is called out in an out-of-hours emergency scenario to help with flooding.
3. Making a difference – Health and Safety File Information.

All too often Health and Safety File information is referenced in a pdf document – sometimes in hard copy. It is often difficult for a sub contractor asked to carry out work on an asset to find the Health and Safety File which contains risk information recorded in the last project carried out on that asset. For this reason it is possible for work to go ahead without the contractor knowing critical information about safety risks. With the new system fully implemented it will increasingly be possible for a contractor to open a GIS record of an Asset and click straight onto a Health and Safety File tab. The risk information will be presented in the standard format which the contractor will be asked to use, and ultimately to feed back into the CDE as an update to the Health and Safety File.



Conclusion

In conclusion, the ‘Sharing Data Saving Lives’ project represents a critical step forward in the management of health and safety risks in construction and asset management. By creating a more integrated, accessible, and data-driven approach to risk management, the EA and their supply chain are poised to realise significant benefits in terms of safety, efficiency, and overall project performance. As the project moves from development to implementation, its success will be measured not just by the systems it creates but by the tangible improvements it brings to the safety and wellbeing of workers and the public alike.



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The main focus of our work is on understanding and reducing health and safety risks. We provide health and safety consultancy, research, specialist training and products to our customers worldwide.

Our long history developing health and safety solutions means that we're well placed to understand the changing industrial, regulatory and societal landscape, and to anticipate future issues.

We employ over 360 scientific, medical and technical specialists, drawing on their wealth of knowledge and experience to deliver evidence-based solutions to our clients. Our work is supported by accredited management systems.

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