

## From Data Capture to 3D Reality Models

### 3D PHOTOGRAMMETRY & MODELLING

SIE has the capability to capture and process high-resolution aerial and handheld imagery into 3D reality models.

Our in-house CASA approved pilots and UAV/drone equipment allow us to capture data of the required standard to produce high quality reality models. Integration with Bentley iTwin provides the capability to create 3D models of items for insertion into a digital twin.

SIE leverages its expertise in structural engineering, drafting, drone technology, and modelling to provide tailored 3D visualisation solutions.

### SIE 3D VISUALISATION CAPABILITY

Key capabilities that form the basis of SIE's 3D visualisation capability include:

- UAV inspections of assets.
- UAV and handheld photography and video capture of assets.
- UAV and handheld imagery are processed to create 3D reality models of assets.
- Engineering 3D modelling.
- Visualisation of proposed modifications to existing structures in 3D reality models.

Our 3D capability supports asset inspections, enables the insertion of defect data for graphical reporting, and assists with the planning and design of remedial works or structural modifications.

### DATA CAPTURE HARDWARE

Our hardware equipment for the capture of data includes:

- An enterprise-grade drone/platform designed for highly detailed aerial capture with RTK positioning for improved accuracy.
- A drone with cutting-edge automation and AI-driven obstacle avoidance with RTK precision for safe and accurate data collection.
- Specialised cameras for terrestrial / handheld photography (with gimbals) when drone operations are not possible.

- Integration with targets, either ground or structure mounted, to further improve accuracy.

### 3D MODELLING AND DRAFTING SOFTWARE

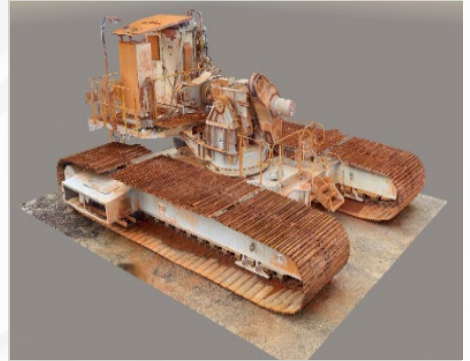
SIE prepare reality models in a range of industry software, including Bentley's iTwin package and Pix 4D Cloud. Teamed with the latest drafting and 3D modelling software, SIE provides high quality 3D modelling and drafting services to support the design, assessment, and fabrication of structural components across a broad range of industrial and mining assets.

### BASIC APPLICATIONS

Reality modelling can be used as a basic 3D 'map' to quickly understand site layout, access constraints, and the spatial relationship between key assets. It can serve as a simple, shared visual tool that helps align stakeholders and eliminates ambiguity in discussions about site conditions.

### ASSEMBLY INTO PORTFOLIOS

Bentley iTwin supports assembly of reality models of various items of plant and equipment into a portfolio of assets. This makes large, complex sites far easier to manage. Structures can be grouped by facility, location, or asset type, so users can quickly move from a high-level overview to individual components. This allows for clearer comparison of asset condition, more consistent inspection workflows, and faster identification of emerging risk.



“SIE has the technology, equipment, licensed people, expertise and software to meet our clients’ 3D modelling and visualisation needs.”

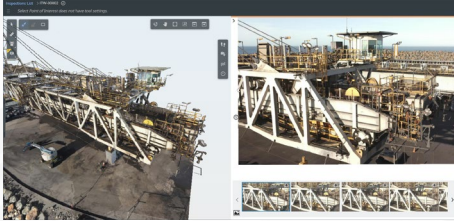


## STRUCTURAL INSPECTIONS

Our reality-modelling capability streamlines structural inspections. Instead of reviewing thousands of photos or hours of video footage, high-fidelity 3D models allow users to visually navigate the asset, quickly locate areas of concern, and understand context that traditional media often fails to capture.

Platforms such as Bentley iTwin Experience enhance this process by allowing users to open the original source images for any point of interest directly within the model environment, providing both spatial context and detailed visual evidence in one place.

This significantly accelerates inspection workflows, particularly for difficult to access areas, and improves the accuracy and consistency of engineering assessments.



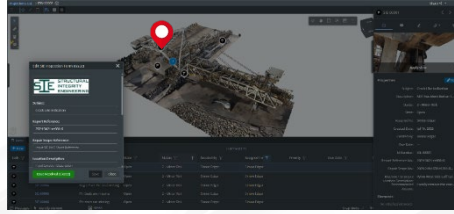
## VISUAL REPORTING & DEFECT TRACKING

Reality models provide a powerful platform for visual reporting, enabling defects to be identified, annotated, and tracked directly within a 3D environment. Annotations can be added to the spatial location of a defect, creating a clear record of condition issues across the asset.

Additional information, such as engineering sketches, repair scopes, photographs, or inspection notes can be attached to annotations. This consolidates all relevant data into a single accessible source.

Not only can the overall condition of an asset be understood at a glance, because density of annotations highlights areas of concern, but defects can also be sorted, filtered, and categorised by type, severity, risk rating, or required action. This enables targeted reviews and efficient prioritisation of maintenance activities.

The result is a structured, traceable defect-management process that enhances communication between stakeholders with higher quality of reporting.



## REPAIR SCOPING & DESIGN

Reality models provide a highly effective platform for scoping and designing repairs via an accurate, spatially-rich view of defects and surrounding structural context. The model can be used to determine defect dimensions, access constraints, connection details, and interactions with adjacent components. This enables definition of repair extents and quantities.

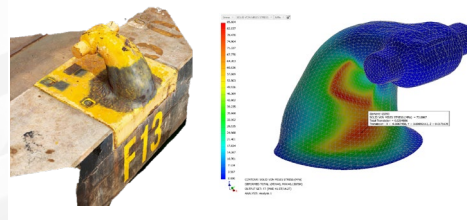
The 3D environment supports clearer communication between inspection teams, designers, and maintenance crews. Proposed repair locations can be tagged directly within the model, allowing all stakeholders to visualise what needs to be addressed.

A model can provide sufficient information for preliminary design development, such as confirming member sizes, measuring clearances, or assessing geometry required for temporary works or access systems.



## STRUCTURAL ANALYSIS

The geometric mesh underlying reality models can be applied as direct input into detailed finite element modelling, providing a practical solution for analysing structures with complex or irregular geometry. By importing the mesh generated from a high-quality reality model an FEA model representing the geometry of the asset can be rapidly built.



## About SIE

SIE is a leading Australian consulting firm with structural engineers in Perth, Brisbane, and Newcastle. We specialise in structural engineering; it is what sets us apart. Our senior engineers are highly experienced, state registered and Chartered in the structural field.

Since 2000, we have managed critical, complex, and challenging structural projects in Australia and overseas.

We are proud of our technical team. Their expertise and experience mean we are well equipped to manage and advise on your structural project or business critical asset.

Place your next enquiry with a Specialist Structural Engineer at SIE at [info@siepl.com.au](mailto:info@siepl.com.au)