

Specialists on Mine and Marine Structures

RESPECTED EXPERTS

SIE has specialised in structural engineering for Mine Fixed Plant and Marine Structures since 2000.

Building on the existing expertise of its founding Structural Engineers, SIE has accumulated a wealth of design, inspection and risk assessment experience. We assist clients with structures ranging from transfer towers, conveyors, tunnels, ROM walls, crushing and screening buildings, train loadout systems, industrial buildings, cranes, jetties, wharves, mooring hardware, and navigation towers.

SPECIFIC KNOWLEDGE FOR MINE AND MARINE STRUCTURES

Mine and marine structures have different design and maintenance challenges to regular buildings. They are not typically static structures but rather have dynamic loading and moving and mobile loads that require rigidity as well as strength.

Mine structures are typically exposed to heavy loading, corrosive product and buildup, and highly restricted shutdown opportunities impacting the ability for maintenance.

Marine structures are under constant attack from the highly corrosive marine environment, have the potential for damage when large vessels are berthed, and downtime often is a significant impact on business.

SIE assists clients with a broad range of projects involving mine structures. This includes design, remedial maintenance prescription, repairs, remedial designs, loading reviews, conveyor upgrades, wharf expansions and loading maps. Using a depth of knowledge in Australian and International standards to get the best outcome for clients, we provide:

- b) Load maps for materials handling wharfs to accommodate large mobile cranes and delivery trucks.
 - c) Concrete and steel integrity assessments and remediation for aged mine and marine structures.
 - d) Rope snapback guarding for mooring winches and bollards.
 - e) Lighting Tower Structures.
 - f) Structural design and reviews for product sheds, with risk assessment of key structural components.
 - g) Maintenance equipment design, design verification, and documentation for jacking, pulling, and temporary support equipment.
 - h) Assessment of the dynamic behaviour of structures' supporting vibrating equipment.
 - i) Modifications to structures for additional loading, access, or temporary support.
 - j) Assessment of deflection and deformation behaviour at mechanical interfaces, such as couplings and bearings.
- a) Structural design of mine and marine infrastructure, including investigation of modifications and upgrades.

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DESIGN REVIEW

SIE conducts a broad range of design reviews for new and existing structures. Technical correctness of a provided design is essential for technical, legal, and commercial reasons. An independent structural design review or audit can assist owners with complying with their internal requirements and statutory duties, including due diligence.

Our structured approach to design review and auditing allows clients to understand the status of a provided design by others and what corrective actions are necessary to achieve compliance to the contract, specification, standard, or statute. SIE provides:

- Assistance with establishing the project design criteria.
- Quick identification of issues and problems that may arise in design, fabrication, erection, or remedial works.
- Independent design verification methods.
- Clear identification of risks and strategies to avoid them.

CONDITION AND RISK ASSESSMENT

Competent structural condition and risk assessment requires detailed knowledge of the design basis of structures, including loading and resistance parameters.

SIE uses internally developed and customised risk assessment processes, which include:

- Visual inspection techniques.
- In-house drone inspection of difficult to access areas.
- Use of testing techniques such as non-destructive testing, strain, vibration, and dynamic measurement.
- Rapid initial risk assessments by Structural Engineers.
- Concise inspection reports with recommendations for remedial work actions, considering risk.

REMEDIAL DESIGN

SIE provides customised remedial designs with specifications, drawings, and scopes of work for the construction and maintenance of mine and marine structures. Our well-honed design processes and clear documentation achieve:

- Coherent and consistent design criteria from the start of a project.
- Workable solutions for complex challenges.
- Justifying calculations to assess the compliance status of structural elements.
- Drawings and specifications for correct fabrication and construction.
- User-friendly reports.
- Site supervision of remedial works or major maintenance.

ADVANCED ANALYSIS

SIE use a variety of structural analysis software tools for geometric modelling, frame analysis, and advanced finite element analysis. Effective use of these tools achieves:

- A better understanding of structural behaviour in complex structures through simulation.
- Determination of dynamic behaviour.
- Accurate methods of assessment for the strength and safety of structures.
- Optimized design of structures, remediation or strengthening via use of parametric investigations or what-if scenarios.
- Accurate re-creation of failure conditions of structures, enabling identification of root causes.

UPGRADES

Upgrades of structures require the consideration of applied design criteria and loads, impact on the structural integrity status, and reinforcement requirements.

SIE provides upgrade engineering designs and reviews for conveyors, transfer stations, wharves, and bulk material handling facilities.

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

