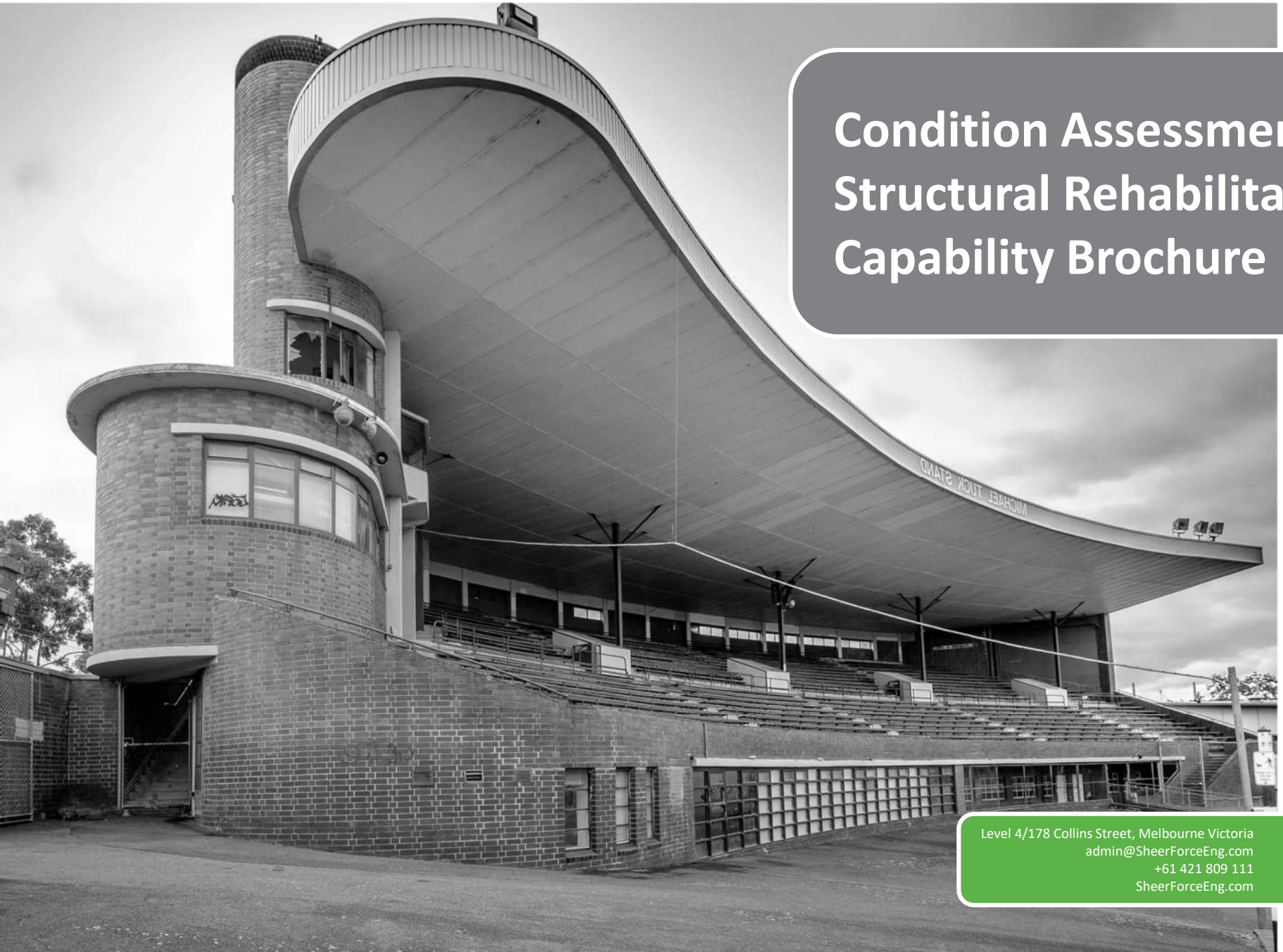
SHEERFORCE ENGINEERING

Engineering Better



Condition Assessment and Structural Rehabilitation Capability Brochure

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Engineering Better

We are an Australian business owned by the people who manage and deliver our projects.

When you work with us, you get the key leaders who are owners of the business, on your project from start to finish. The success of our clients' projects is directly linked to the success of our business; our approach is to embark on a collaborative journey with our clients on each and every project we deliver.

At Sheer Force Engineering, we recognize the unique challenges faced by large organizations with extensive portfolios of assets. Our approach to condition assessment and rehabilitation of existing structures is tailored to meet your specific needs and goals, ensuring the longevity and performance of your assets.

By choosing us, you gain a trusted partner dedicated to the health and longevity of your structures. Our approach ensures that your assets remain safe, compliant, and an enduring source of pride for your organization. Together, we build a legacy of resilience and success.

- General Condition Assessments, building Health Reports and Forensic Engineering
- Differential Settlement and out-of-plumb structures
- Damage Caused by moisture, ground water, drainage and pipe leaks
- Structural rehabilitation, repair and strengthening
- Building capacity check including floor load rating and seismic rating.
- Heritage structures of significant age and current contemporary structures

Our Approach

> Preserving the past, securing the future. Empowering structures to stand the test of time.

1. **Customized Solutions:** We understand that no two structures are the same, and we tailor our solutions to the individual characteristics of your assets. Our team conducts thorough site assessments and evaluations to create customized rehabilitation plans that align with your strategic objectives.
2. **Holistic Assessment:** We go beyond surface-level inspections. Our experts employ cutting-edge technologies and methodologies to conduct in-depth structural assessments, including non-destructive testing, material analysis, and load capacity simulations. This comprehensive approach enables us to identify underlying issues and their root causes.
3. **Data-Driven Insights:** Leveraging data analytics and modeling, we provide you with valuable insights into the health of your structures. Our reports include actionable recommendations that prioritize safety, compliance, and cost-effectiveness.
4. **Seamless Execution**: Our experienced team ensures that rehabilitation projects are executed smoothly, adhering to industry standards and safety protocols. We manage every aspect of the project, from obtaining reports to overseeing construction, minimizing disruptions to your operations.
5. **Sustainable Solutions:** We are committed to environmentally responsible practices. Our rehabilitation strategies often incorporate sustainable materials and techniques, aligning with your organization's commitment to sustainability and corporate social responsibility.
6. **Long-Term Partnerships:** We view our relationships with clients as long-term partnerships. Beyond the initial assessment and rehabilitation, we provide ongoing monitoring and maintenance plans to extend the life of your assets and reduce the need for major interventions in the future.

Sports and Entertainment

> Reviving the heartbeat of entertainment. Ensuring the stage is set for memorable experiences, one structural encore at a time.

CASE STUDY

Jack Dyer Grandstand, Punt Road Oval

Project undertaken directly for Richmond Football club to assist them in better understanding their precincts development potential.

The engagement began with a detailed assessment on the existing condition of the as-built structure followed by a prescriptive report on strengthening and remedial measures that were required in order to bring the grandstand up to current BCA standards (including a full seismic and wind assessment). The grandstand possesses a heritage overlay which further complicates the aspirations for Richmond FC developing their site.

Richmond Football Club required a good level of understanding regarding what load the existing grandstand structure could support as well as its compliance with current design standards in order to help them finalise their training facilities master planning. This was made complex without the aid of existing structural documentation

The solution was a meticulous data collection process to the existing building which included inspecting the tiered seating structure, collecting structural member data and timber grading.

Sports and Entertainment

CASE STUDY

Festival Hall, Melbourne

Due diligence study, with Cox Architecture, for a potential purchaser of the historic Festival Hall Structure.

Originally constructed in circa 1913, the venue hosted Gymnastics and Wrestling during the Melbourne 1956 Olympic games and world class music acts such as the Beatles and AC/DC.

The Heritage Council of Victoria listed Festival Hall as a place of cultural heritage significance in 2018. This heritage overlay restricts potential development as the heritage fabric of the structure largely needs to be retained

The client required answers fast. During the short due diligence process to purchase the site, the client required a detailed understanding of the existing structure and its ability to support their proposed live event rigging loads.

The solution was rapid prototyping of structural options and a detailed assessment of the existing building to allow the client to make an informed commercial decision regarding its future development potential during their due diligence process.

Sports and Entertainment

CASE STUDY

Michael Tuck Stand, Glenferrie Oval

The historic home of the Hawthorn Football club saw VFL/AFL matches played at Glenferrie Oval from 1903 to 1973.

The Michael Tuck Stand was built in 1938 as the flagship facility for the Hawthorn Football Club.

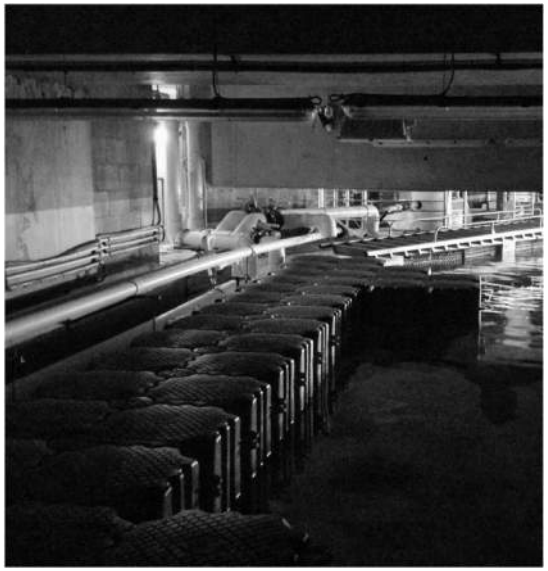
SFE were directly engaged by the City of Boroondara to assess the condition of the deteriorated structure and review the proposed remediation and repair works.

The structure comprises concrete framing and masonry walls.

Damage observed included deterioration due to the effects of water ingress which caused concrete spalling and reinforcement corrosion. There was also evidence of settlement and cracking to the Masonry elements.

The condition assessment appraisal is the second phase of a multi-phased process which will ultimately allow the City of Boroondara to re-use the stand for community purposes which include; community spaces, community sports facility and shared community multi-purpose space.

Water Retaining Structures



CASE STUDY

Melbourne Aquarium

The building was constructed in late nineties and is approx. 20 years of age, further alternations/additions have been undertaken over the years. It is a multistory building totaling five levels, two of which are basements which are level with and below the Yarra river water level. The structure is predominantly reinforced concrete, typically being of a banded beam floor type construction, combination of insitu and precast vertical elements and secant piles for basement site retention, the roof is generally light weight structural steel.

The engagement involved undertaking a thorough assessment of the conditions of the existing primary structure.

The assessment covered front and back of house areas. From roof down to lowest basement. Tanks were inspected from outside only (no scuba diving permitted.)

Included was a criticality assessment such that the client understood what order was required to approach the recommended remedial works.

Heritage Structures

CASE STUDY

Sale Magistrates Court

A direct engagement by Court Services Victoria (CSV), a client with multiple aged assets spanning across the state of Victoria.

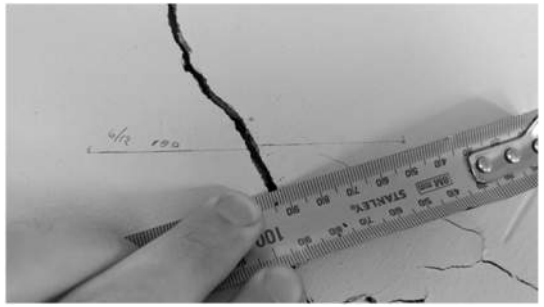
The magistrate court was originally constructed in 1863 and had received multiple extensions, renovations and services upgrades throughout its 160+ year life-span.

SFE undertook a full condition assessment appraisal to both the Magistrates and County court structures which exhibited extensive cracking to the unreinforced masonry wall elements.

Movement, settlement and out-of-plumb were also features of both structures.

Our on-site assessment was also supplemented with a full historical documentation review of the buildings. This included a review of all past upgrades and renovation works. It was found that some of the past renovation works had an adverse effect on the structure compounded over several decades. This allowed us to specify remediation measures which rectified movement to the building which had apparently not been addressed through previous underpinning works.

> Unlocking the potential of aging structures, one transformation at a time. Building a legacy of strength and resilience for generations to come



Heritage Structures

CASE STUDY

330 King Street

Originally constructed in 1850 when the city of Melbourne was just 15 years old, 330 King Street is often referred to as the oldest home in the city.

The original structure had undergone previous repair, underpinning and extensions throughout its service life spanning more than 170 years.

Following its change in ownership in 2017, it was apparent that the previous underpinning and remediation works had not resolved the ongoing movement and cracking observed within he building.

After full strip out of the internals of the building, SFE undertook a full condition assessment evaluation and health report on the structure. Serious defects were discovered which had previously been unnoticed by previous Structural Engineers over multiple assessment reports.

Our remediation recommendations aimed to achieve full preservation of the original heritage fabric of the building. This was especially triumphant for the dwellings northern wall which exhibited a significant lean towards the public footpath and La Trobe street. While a full knock down and re-build of this wall would have been the “easy” solution, our approach allowed the character and story of the building to be preserved for years to come while ensuring safety and code compliance for its occupants both current and future.

Heritage Structures

CASE STUDY

South Melbourne town Hall

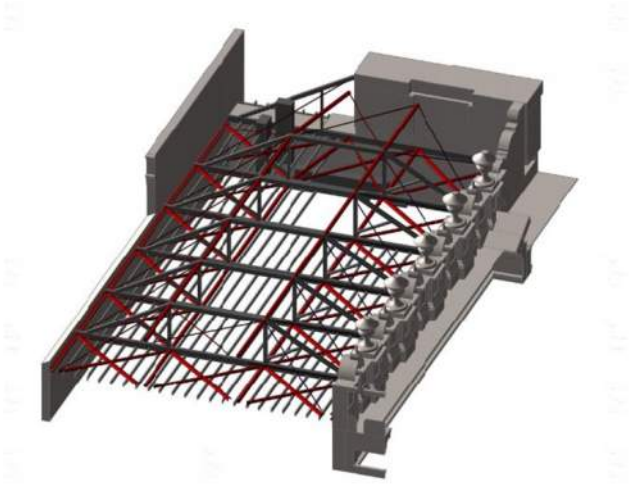
The South Melbourne Town Hall (SMTH) is a building of substantial heritage significance and importance. Being circa 140 years of age the original building designers had not considered seismic loading and the building performance or ability to resist this loading.

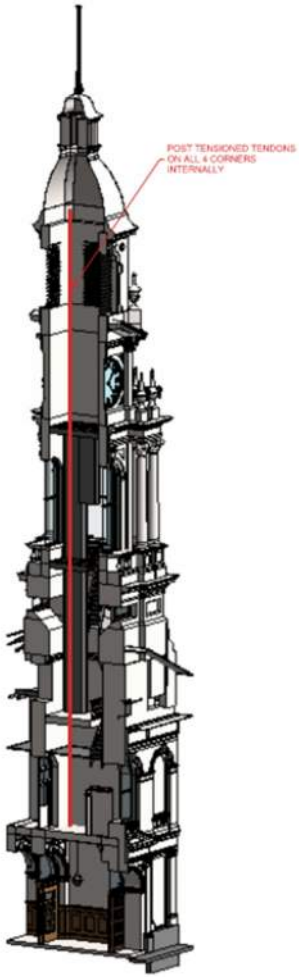
The SMTH is primarily unreinforced load bearing clay masonry. Unreinforced masonry construction is a non-ductile type of construction and is highly susceptible to damage or collapse during a seismic event.

As the case with other similar buildings of heritage significance such as the Flinders street station administration building, the local government had identified the building's heritage significance and risk associated should a seismic event occur.

The engagement involved undertaking a structural assessment of the existing building. It involved carrying out global high-level assessment of the building performance and provide general recommendations for possible retrofit structural strengthening solutions.

The assessment identified possible risk and vulnerability of the existing building and elements, as well as what potential measures that can be undertaken to improve the building performance and reduce the associated risk.





Heritage Structures

CASE STUDY

Flinders street Station
Administration building

Flinders street administration building is of substantial heritage significance and Importance. It's a public accessible building and over 100 years of age, the original building designers had not considered seismic loading and the building performance or ability to resist this loading. Furthermore parts were reaching the end of their design life and cracking was prevalent throughout.

The Victorian government set aside $100 million for the refurbishment of the city transport critical building in 2015.

The engagement involved an initial building assessment and reporting that was undertaken to inform the critical requirements to upgrade the building. This was used as the basis to inform the detailed documentation in preparation of the $100 million upgrade undertaken by Built.

Forensic Engineering

CASE STUDY

Christchurch, Post 2011 Earthquake Seismic Assessment and Strengthening

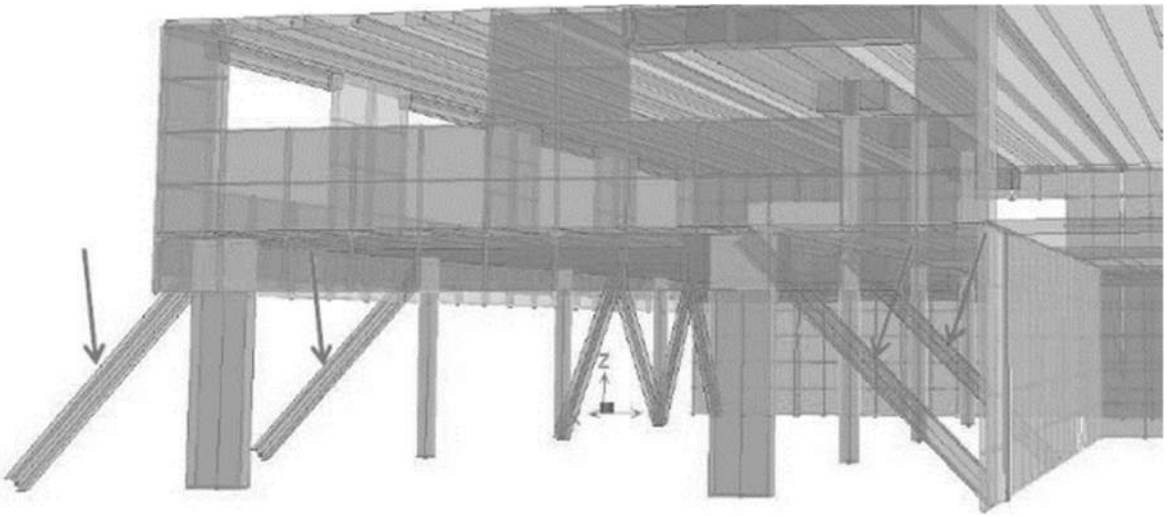
The engagement involved a 12-month secondment to the broken town of Christchurch New Zealand following the devastating 2011 earthquakes.

The principal task was to rapidly assess earthquake damaged buildings and specify strengthening, repair and make-safe measures to ensure public life-safety.

Over 50 individual structures were assessed which spanned across multiple construction types including domestic homes, industrial warehouses, commercial office towers and apartment buildings.

Detailed analysis and assessment was later performed on a number of structures which included:

- Re-levelling of uneven floors and structures due to the effects of liquefaction
- Crack assessment, appraisal and repair
- Introduction of supplementary framing systems to strengthen buildings against future earthquake events.
- Risk assessment on damaged buildings to assess feasibility of repair, remediation or knock-down



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