



MARSHALL DAY
Acoustics



CULTURAL BUILDINGS
COMPANY PROFILE

WHO IS MARSHALL DAY ACOUSTICS?

Marshall Day Acoustics is one of the world's leading firms of acoustic consultants, providing the highest standard of architectural and environmental acoustic consulting to our clients.

For over 30 years, we have been providing innovative acoustic designs on major projects in over 15 countries and employ over 85 professional staff in offices in Australia, New Zealand, China, Hong Kong, and France.

As one of the largest acoustic engineering firms worldwide, we are able to provide our clients with the greatest range and depth of experience and expertise available. Our strength in acoustic design comes from the diversity of our team members who have been drawn from engineering, architectural, musical and academic backgrounds, with one common focus; to provide innovative acoustic designs of the highest standard.

We have extensive experience in the acoustic design of complex mixed use and heritage sensitive projects. In fact, from concert halls to wind farms and everything in between, we have experts in every field of acoustics who have the specialist knowledge required to deliver quality project outcomes.



"I regard the acoustic designs of Marshall Day Acoustics to be amongst the finest and probably the most innovative in the world"

Dr Anders Gade, Associate Professor Technical University of Denmark

A COLLABORATIVE APPROACH

We have a collaborative approach to design and work as part of an integrated team with the client, architect and other consultants. We do not specify acoustic performance that “must” be achieved but instead we work with the project team to develop acoustic criteria and treatment that meets the desired project outcomes, whatever they may be. Recognising commercial realities and achieving an appropriate balance between quality and cost objectives is something we take very seriously.

SIR HAROLD MARSHALL KNZM

Sir Harold Marshall is an architect, engineer and physicist, internationally recognised for his contribution to concert hall design. He has over 45 years of experience in the acoustical design of auditoriums and concert halls.

Sir Harold remains Marshall Day Acoustics’ principal acoustic designer or peer reviewer of concert hall and theatre projects. Renowned as one of the world’s most creative and innovative concert hall designers, his ground-breaking studies into the importance of room cross-sections in concert halls in the late 1960s have had a profound effect upon modern day concert hall design.

In 1994, Sir Harold was elected a Fellow of the Royal Society of New Zealand. He also holds Fellowships in the Acoustical Society of America, the New Zealand Institute of Architects and the Royal Australian Institute of Architects. In 2009, Sir Harold was made a Knight Companion of The New Zealand Order of Merit for services to acoustical science, KNZM.

Today, Sir Harold is Group Consultant of Marshall Day Acoustics, leading the conceptual design of concert halls and similar commissions, as required, by any of the practice offices. This is a role for which his architectural and musical skills have uniquely equipped him to communicate with architects and their clients.

“Marshall Day Acoustics brought imagination and resourcefulness to the task... Their work has set a new standard.”

Donald L. Bates, Project Director,
Federation Square, Melbourne –
Lab Architecture Studio



TECHNICAL AND DESIGN CAPABILITIES

We are at the cutting edge of development in the acoustic industry. We are committed to being at the forefront of research and development in our field and have employed significant time, energy and resources into ongoing development of our in-house and commercially available tools across a range of sectors including concert halls, theatre design, building acoustics, environmental noise modelling, intelligent noise loggers, underwater acoustics and more.

Marshall Day Acoustics provides a unique combination of design skills, research knowledge and predictive techniques to ensure the client's requirements are achieved.

The firm has a range of acoustic design tools including the facility to carry out computer modelling and also scale model testing on physical models as small as 1:50. This allows the accurate prediction of the objective acoustic properties and simulation of subjective qualities before they are constructed.

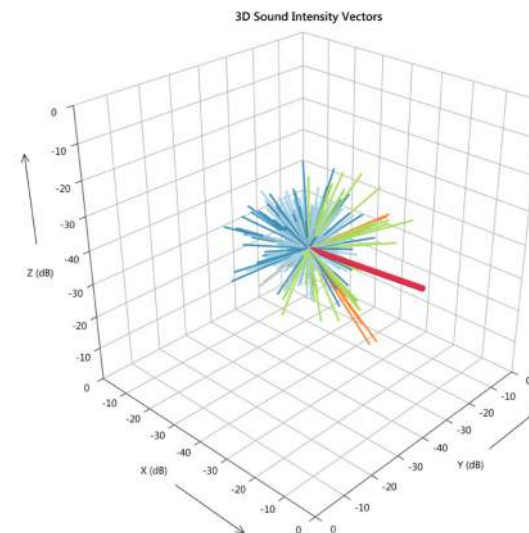
“MDA has developed a unique collaborative process involving 3-dimensional technologies to deliver proficient, yet original design accomplishments. The internationally recognised success in the acoustic designs of the Guangzhou Opera House is a reflection of this testament.”

Woody K.T. Yao, Associate Director, Zaha Hadid Architects

Marshall Day Acoustics is a world leader in the development of commercially available sound insulation predictive tools for consultants and engineers. Our proprietary software has sold more than 1900 licences in 22 countries.

All of the Marshall Day Acoustics offices are linked via a company intranet which indexes the collective experience of our consultants, providing access to solutions developed over many years of consulting projects.

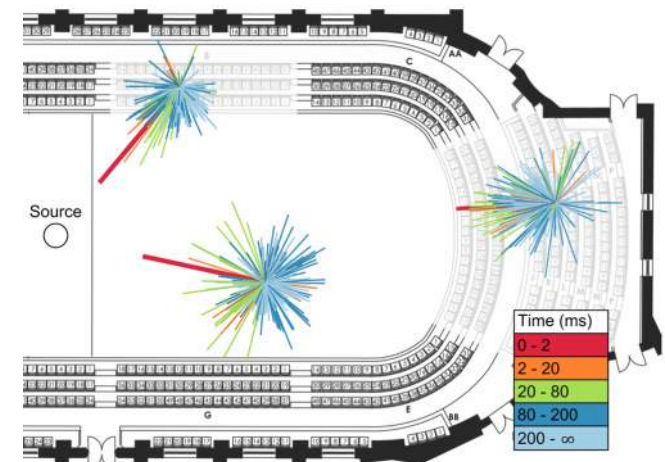
Marshall Day Acoustics is committed to improving our delivery of quality and to enhancing our reputation as suppliers of quality acoustic consulting services, in all of our markets.



QUALITY ASSURANCE

Marshall Day Acoustics is a professional organisation with a quality management system certified in accordance with ISO 9001:2015. We have a number of quality assurance procedures in place to ensure that:

- All reports are checked and then countersigned by a senior member of staff prior to issue
- Measurement procedures are standardised
- Calculations are performed using standard data and validated methods defined in our technical binder system. Standard calculation checklists will be used on this project
- We have a range of software that has been developed in-house. Together with our master technical binder system, this allows us to adopt a uniform approach to calculations, which can then be more readily checked
- Use of the online intranet design advice and document register system



CONSULTANCY SERVICES - WHAT WE DO

ARCHITECTURAL ACOUSTICS

Design or corrective work to make the acoustical environment effective and comfortable. Sound insulation, acoustic quality, speech privacy and the total acoustic design of projects such as music teaching facilities, offices, hotels, reception centres, broadcast facilities and apartments.

AUDITORIUM ACOUSTICS

Complete acoustic consultancy for all communication and performing arts spaces, including theatres, churches, conference rooms, multi-purpose halls and concert halls. Design techniques include state-of-the-art computer and scale modelling.

ELECTRO-ACOUSTIC SYSTEMS

Specialist consulting services for the design and commissioning of sound reinforcement and communication systems for performing arts applications, churches and convention facilities.

ENVIRONMENTAL NOISE AND VIBRATION

Assessment of noise and vibration impact of development proposals, including new roads, railways, air transportation developments and industrial projects. Site noise and vibration surveys, sound and vibration propagation predictions. Recommendations for the enforcement of environmental standards. Presentation of expert evidence for prosecutions or planning hearings. Assistance with development of noise and vibration control policy.

“Marshall Day Acoustics participated fully in the development of insightful, responsive and appropriate designs for the acoustic and vibration issues across the entire project”

Donald L. Bates, Project Director, Federation Square, Melbourne – Lab Architecture Studio Denmark

MECHANICAL SERVICES NOISE AND VIBRATION CONTROL

Design, specification, supervision and commissioning of noise and vibration control systems for mechanical plant. Control of all duct, pipe and structure-borne noise.

INDUSTRIAL NOISE CONTROL

Occupational noise surveys, noise abatement, factory planning, design of specialist silencers, screening and industrial enclosures.

Building vibration and structural dynamics estimation of vibration propagation factors in buildings and other structures. Estimate of re-radiated structure-borne noise. Recommendations for vibration control measures. Empirical, theoretical and numerical modelling.

SOFTWARE DEVELOPMENT

Development of acoustics and vibration software, including software for the estimation of sound insulation properties, sound absorption coefficients and environmental noise propagation. Developer of INSUL, Zorba, dBSea and IRIS, and agent for SoundPLAN.

COURSES AND SEMINARS

Provision of courses and seminars in the areas of building acoustics, mechanical services noise control, sound system design, town planning acoustics and SoundPLAN training.



BUILDING ACOUSTICS

The design of industrial, commercial and residential buildings encompasses many fields of acoustics, which must be designed and co-ordinated to comply with a myriad of regulations and to accomplish the client's needs.

Factors such as controlling sound and vibration transmission between rooms, reverberation control within spaces, control of intrusive noise from external sources, HVAC and services noise and compliance with relevant boundary noise criteria may be necessary considerations.

Marshall Day Acoustics specialises in all aspects of acoustic prediction, development, assessment and mitigation advice. Since 1981 we have become the largest acoustic consultancy firm in Australasia, with project experience around the globe.

Our building acoustics services include:

- Acoustic design and assessment for healthcare facilities, stadia, apartments, concert halls, theatres, offices, art galleries, museums, libraries, recording studios, swimming pools, education facilities, mechanical plants airport terminals, factories, mixed-use developments, churches and many other building types
- Expert monitoring and measurement of noise and vibration
- Acoustic assessment of building elements (e.g. Building Code Compliance testing, Reverberation Time, etc.)
- Detailed acoustic analysis using proprietary modelling software such as IRIS, dBSea, Insul, Odeon, EASE and Zorba
- Assessment and specification of noise control measures
- Research and assistance with preparation for of policy government and private sector
- Acoustically designed office fitouts, including speech privacy system design for open plan offices
- Presentation of evidence as Expert Witness
- Acoustically designed office fitouts, including speech privacy system design for open plan offices
- Presentation of evidence as Expert Witness

“We have no hesitation in recommending Marshall Day Acoustics for their services in both acoustic and vibration consulting”

David Waldren,
GROCON Constructors Pty Ltd



PERFORMING ARTS - ROOM ACOUSTICS

The ideal acoustic environment in performing arts auditoria is the one in which both performers and audience participate in a shared experience; where the artistic expression is conveyed with warmth and intimacy.

The most challenging and rewarding aspect of our role as acousticians is providing a balanced interface between architectural function and aesthetics whilst achieving the exacting acoustic requirements of symphony, recital, opera and theatre performance.

Since our foundation we have been at the forefront of innovative acoustic solutions for performance arts venues around the world. We pioneered the design concepts that result in envelopment and spatial impression for the audience, a concept which is now considered to be a property of the best concert halls around the world. Our ongoing research in room acoustics is borne out of our desire to provide a transcendent experience for performers and audience alike.

Use of the latest computer software and scale modelling techniques assist with the design process and provide auralisation of the room. This allows the project stakeholders to “hear” how the space will sound before a single brick has been laid.



‘I’m very happy to report that this is a big success acoustically.’

Paavo Jarvi, Orchestre de Paris Music Director,
Philharmonie de Paris

SELECTED PROJECTS - MUSEUMS & GALLERIES

SHRINE GALLERIES OF REMEMBRANCE, MELBOURNE

Client: ARM Architecture

Marshall Day provided design input into all acoustic aspects of the \$45 m project, from the acoustic design of the theatrette, to building services noise control and a 5.1 professional surround system, foyer and courtyard sound reinforcement system. The development includes facilities for exhibitions, community research, and the delivery of school and community education programs.



MONA, TASMANIA

Client: Museum Old and New Art

New Moorilla Museum of Old and New Art, Berriedale, Tasmania. Acoustic design for new museum including finishes, construction and mechanical services.



AUCKLAND ART GALLERY

Client: Auckland Council

The redeveloped Auckland Art Gallery incorporates contemporary and heritage buildings, new entry forecourt, flexible atrium/function space, auditorium and new and refurbished gallery areas. The goal of the acoustic design was to create suitable internal acoustic environments, and limit noise disturbance, whilst remaining sensitive to the architectural vision.



WESTERN AUSTRALIAN NEW MUSEUM, PERTH

Client: Aurecon/Department of Treasury Strategic Projects

The Western Australian Government has committed \$428 m to redevelop its Museum, making it one of the most significant museum redevelopments in the world. Marshall Day prepared the Project Brief for acoustics and specialist AV, and will be assisting the State as a key advisor during the project.



IAN POTTER MUSEUM OF ART, MELBOURNE

Client: The University of Melbourne

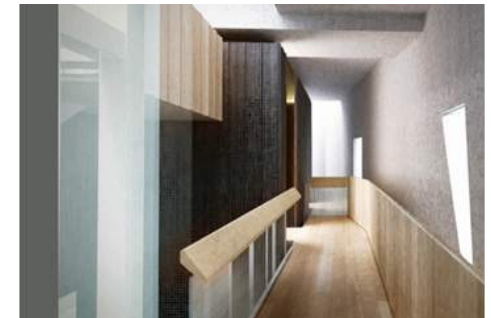
The Ian Potter Centre of NGV Australia is the world's first major gallery dedicated exclusively to Australian art. It is a showcase comprising over 20 galleries housed within a landmark architectural complex. The acoustic challenges of the gallery spaces were many and varied.



PHOENIX PERFORMING ARTS SPACE AND GALLERY, SYDNEY, NSW

Client: Aver

Full acoustic design services for a premium private gallery with an integrated theatre performance space and associated support areas, vitrine, gallery, garden, apartments and underground carpark.



SELECTED PROJECTS - AUDITORIA

PHILHARMONIE DE PARIS

Client: Jean Nouvel

This innovative 2,400 seat venue is a new typology of concert hall. The hall wraps around the audience and stage and features balconies suspended inside a larger volume, allowing sound to circulate completely around them to create an immersive experience. The 20,000 m² facility includes one major concert hall space, two medium sized rehearsal rooms, several smaller practice rooms, foyer, café and library.



JIANGSU GRAND THEATRE, CHINA

Architect: ECADI

The Jiangsu Grand Theatre is one of the largest performing arts projects in China with a budget of RMB 2 billion on a site of 200,000 m². It includes a large 2,300 seat opera house, a 1,500 seat concert hall and a 1,000 seat drama theatre. Our brief includes room acoustics design, sound insulation and noise & vibration control.



GUANGZHOU OPERA HOUSE

Client: Zaha Hadid

The 1800 seat, US \$120 m development is one of the biggest cultural projects in this city and is expected to become the biggest performing arts centre in South China.



HAMER HALL REFURBISHMENT

Architect: ARM Architects

Landmark renovation to Melbourne's iconic Hamer Hall. MDA provided full acoustic design services.

"New Hamer Hall restores clarity and vitality to the symphonic sound. New acoustic reveals colours that astonish" - Eamonn Kelly - The Australian



FEDERATION SQUARE - BMW EDGE

Client: LAB Bates Smart

Marshall Day Acoustics was challenged to turn the southern atrium into a performance space that could be used for classical music, theatre, comedy, talks and presentations, launches and cabaret. The Atrium is a striking structure made of glass, steel and zinc that is covered from above but open to outside, including bars, cafés and shops.



PERTH CONCERT HALL, WESTERN AUSTRALIA

Client: Lend Lease Project Management

The design of the Perth Concert Hall was initiated in 1968 by the City of Perth. The architects with acoustic consultant, Harold Marshall, produced a rectangular shoebox design with two balconies that opened on Australia Day 1973. It quickly established itself as one of Australia's most cherished performance venues.



SELECTED PROJECTS - LIBRARY & CIVIC

FEDERATION SQUARE, MELBOURNE

Client: Lab+Bates Smart

Federation Square is a major commercial and cultural development in the centre of Melbourne and houses Australia's multi-cultural broadcaster SBS, which includes a number of television and radio studios, and also houses the Australian Centre for the Moving Image (ACMI), which includes the national film archive.



GOLD COAST CULTURAL CENTRE STAGE 1, QLD

Architect: ARM Architecture

Provision of acoustic design advice and sound system design for Stage 1 (\$37 m), which includes a versatile outdoor space – catering for audiences of up to 5,000, a riverside hub – adapting the existing riverside building to provide a transitional, enhanced city gallery exhibition space.



CITY OF PERTH LIBRARY, WA

Architect: Kerry Hill Architects

Full acoustic design services for the new \$60 m library covering 3,500 m² over seven storeys. State-of-the-art facilities include digital media wall & green wall, exhibition space, video conferencing, outdoor terrace, café and dedicated young adult, children's and history centre levels.



BENDIGO LIBRARY, VIC

Client: City of Greater Bendigo

The \$7.5 m Bendigo Library Redevelopment is a remarkable regeneration of the 1984 City Library, resulting in a transformative outcome that readdresses the very nature of the library as a community amenity and facility, civic building and workplace. Marshall Day Acoustics provided advice on the refurbishment, including appropriate finishes to suit the different zones within the space.



THE CONCOURSE, SYDNEY

Principal Architect: Francis-Jones Morehen Thorp

The project comprises a 1000 seat concert hall, 500 seat proscenium theatre, 700 seat community civic hall, library, rehearsal and multi-purpose function spaces. Marshall Day designed and specified the acoustics and all event, theatre and presentation technical facilities for the entire project.



WEST KOWLOON CULTURAL DISTRICT, HONG KONG

Client: Architect: AD+RG and UN Studio (JV)

The Lyric Theatre Complex will be the largest performing arts centre development in the West Kowloon Cultural District. Marshall Day Acoustics is responsible for the full acoustic design of all spaces, including the theatre. We are also engaged for full noise and vibration control for the development.



SELECTED PROJECTS - HERITAGE

THE OLD TREASURY BUILDING, PERTH

Client: FJM Equities

Full acoustic design services for a spectacular \$105 m refurbishment of Perth's heritage listed State buildings, which date from the 1800s. The project was subject to the utmost attention to detail, and features Perth's first 6 star hotel, a rooftop glass-box restaurant, dining, lounge, library and bar areas boutique retail accommodation and a day spa.



PARLIAMENT OF VICTORIA LEGISLATIVE ASSEMBLY

Client: Parliament of Victoria

Extensive site investigations and speech intelligibility tests associated with the refurbishment of the sound reinforcement system in the Legislative Assembly and Legislative Council Chambers.



OLD CUSTOMS HOUSE MUSEUM

Client: Allom Lovell & Associates Pty Ltd

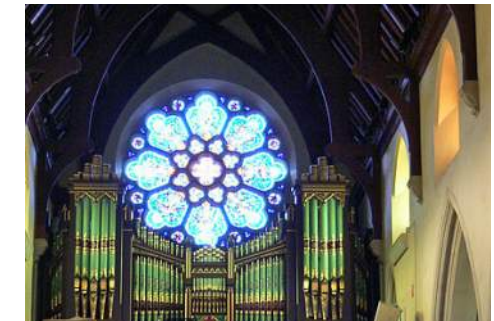
Restoration of the Old Customs House as a museum of immigration.



ST MARY'S CATHEDRAL HOBART NARTHEX

Client: St Mary's Cathedral Restoration Commission

Acoustic design and room acoustic modelling to the Narthex within existing heritage church



SUPREME COURT OF VICTORIA HERITAGE UPGRADE

Client: Billard Leece Partnership Pty Ltd

Extensive restoration and heritage upgrade of Melbourne's 130 year old historic and heritage listed Supreme Courts Victoria.



MANSION HOTEL, WERRIBEE, VIC

Client: Robertson Projects Victoria Pty Ltd

Acoustic design duties associated with the conversion of the historic Werribee Mansion to a 5 star hotel and conference suite.



SELECTED PROJECTS - SPORTS VENUES

MARGARET COURT ARENA, MELBOURNE

Client: Major Projects Victoria

Melbourne Park is the home of the Australian Tennis Open. Marshall Day Acoustics designed the room acoustics of the arena, concourse and back-of-house areas. We also designed the arena's new in-house sound system, sound insulation of the arena for music concerts, and the building services noise/vibration control.



NEW PERTH STADIUM

Client: Department of Treasury's Strategic Projects

Marshall Day Acoustics is working collaboratively with the WESTADIUM consortium to provide advice on bowl acoustics, environmental noise, room acoustics and mechanical and services noise. Marshall Day Entertech is providing design services for the broadcast services, AV and sound systems.



VODAPHONE ARENA, MELBOURNE

Client: Peddle Thorp

15,000 seat indoor stadium for cycling, tennis, basketball, concerts and other events, with retractable roof. Located in Melbourne's inner eastern sporting precinct.



RECTANGULAR PITCH, MELBOURNE

Client: COX Architecture

The AAMI Park has a capacity of over 30,000 and features a 'bio-frame' roof design providing extensive seat coverage and excellent spectator sight lines. Marshall Day Acoustics provided a full range of acoustic consulting design advice to the project including sound system design and the provision of appropriate sound insulation for all back of house facilities.



MCG, MELBOURNE

Client: MCG5 Architects

New stands at 100,000 seat MCG to replace MCG Northern, Ponsford and Members stands. Marshall Day Acoustics was involved in all aspects of the room acoustics, sound insulation and noise control for the new Northern Stand and designed the new distributed sound system for the complete ground.



PERTH STADIUM, PERTH

Client: Cox Bailey & Bailey Woodland Architects

Major upgrade to Perth's specialist rectangular football stadium. Marshall Day was engaged to provide a full range of acoustic design services including noise control, sound system design and broadcast facilities design.





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