ARRB Australian Road Research Board

Capabilities Statement

Inspiring. Connecting. Delivering.

The Australian Road Research Board (ARRB) is the leading Australian provider of value added research and technical services addressing transport problems with over 55 years of experience.

At ARRB, we're helping to solve today's most pressing transport challenges. We're also firmly focused on building the knowledge to identify and overcome the challenges we'll face in future decades. These solutions will make our cities smarter, cleaner, greener, safer, more efficient and more productive.

We are the source of independent expert transport knowledge, advising key decision makers on our nation's most important challenges.

ARRB is a national organisation delivering a connected and adaptable future for Australia and New Zealand.

We have a strong heritage supporting and delivering high quality applied research for our members. Our team analyse and interpret global research and apply it to the Australian and New Zealand context.

We will continue to bring together the brightest transport minds to inform our policy makers, while exporting our cutting-edge research to influence transport solutions around the globe.

Our skills.

We have offices across Australia and representation around the globe. ARRB's member organisations include federal, state and local government bodies responsible for managing the nation's transport and road networks.

We're preparing Australia and New Zealand for a future of smart connected roads that have the ability to communicate with vehicles and drivers about safety hazards while generating clean power to fuel our cities.

A freight industry enabled by autonomous heavy vehicles platooning along our highways to increase efficiency and lower the cost of products for consumers.

A country with a public transport network that empowers those with limited mobility to make that last mile journey in a self-driving shuttle. It's our rigorous applied research and coordination with policy makers that is making it a reality.

We are here to deliver a connected and adaptable future for the community.

Our expertise.

Next Generation Asset Management

ARRB is constantly looking at how the next generation of pavements, surfacings and structures are to embrace a digitally connected and motivated world.

The opportunities which exist due to this volume of data – and other recent and emerging technologies – for road users, owners, designers, constructors, managers and public sector treasuries, lets us explore further solutions to not just routine maintenance planning and delivery, but also on building and retrofitting resilience into transport infrastructure.

Smart Roads & Infrastructure

At ARRB we explore how best to enable the physical and digital connectivity of our roads. Our research covers the incorporation of digital technology into pavements, roads which require only minimal closures for routine maintenance, innovative and sustainable road building materials, as well as into alternative applications for roads, such as power generation, stormwater capture and communications.

Human Technology Interface

Smart disruptive technologies and services are needed to help maintain connectivity between people, places and opportunities. These technologies, ideas or platforms can often be perceived as a threat, however ARRB explores the opportunities and risks available. Our research into these areas covers; Transformative technology; Taking advantage of disruption; Big data turning complex problems into simple solutions. Beyond the technologies, we also research what they offer and how they can be applied in delivering a 'smarter journey'.

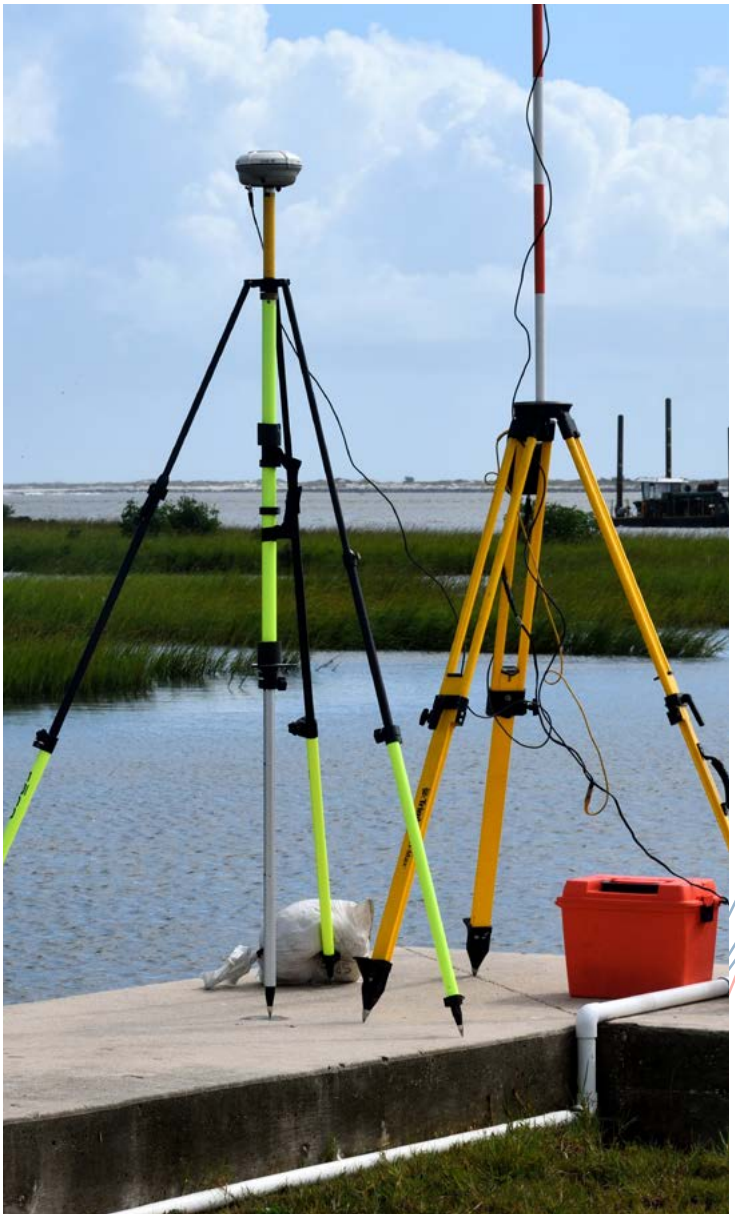
People, Movement & Place

Changes to the transport mix and travel preferences are happening continuously. ARRB can help prepare for these changes by providing expert input and research on informed and improved understanding of security challenges for the network; right infrastructure choices for the community at the right price; and utilising technology to meet growing community needs and aspirations.

Global Research Capabilities

ARRB's embedded knowledge from over 55 years of research and as a provider of world class research outcomes for its Members, allows the organisation to bring together diverse perspectives and expertise to both identify emerging issues and provide timely advice and options for ways forward.

While expertise in core technical areas is essential, ARRB's strength is in bringing together various project collaborators on a national and international scale to generate the multidisciplinary-based outcomes needed for implementation by member agencies.

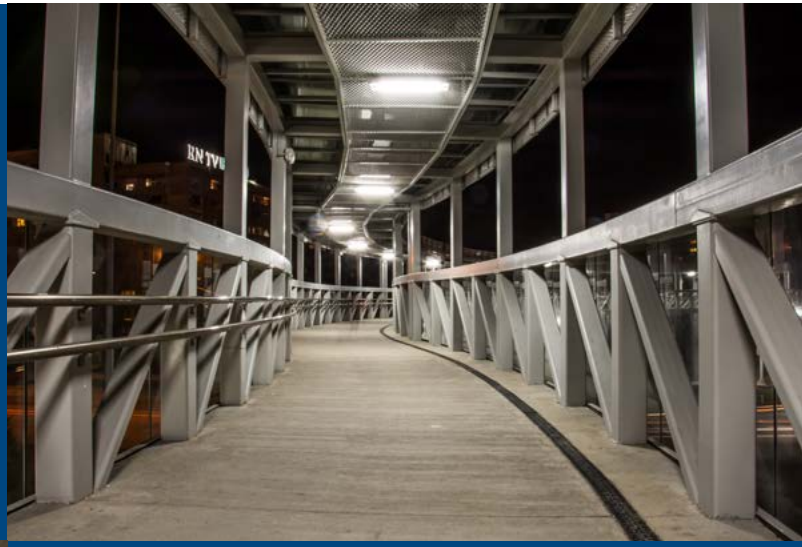


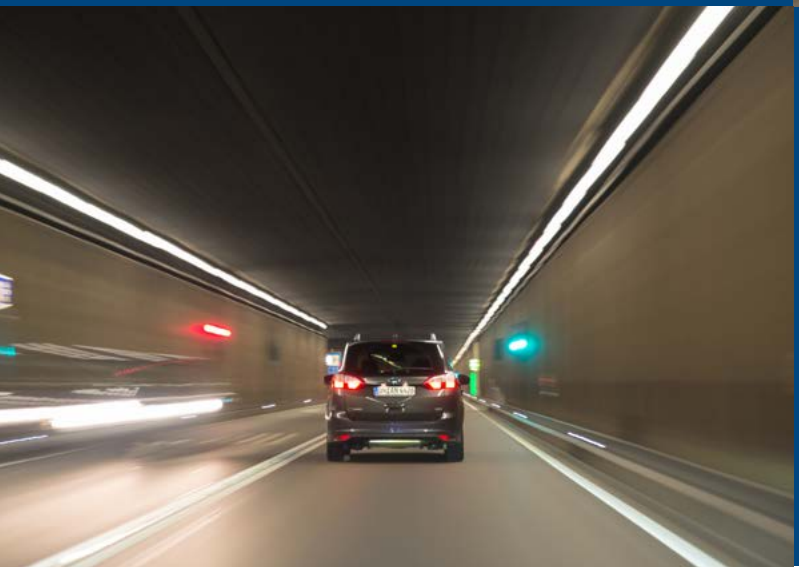
Our strategy.

Technology

Harnessing the value of transformative technology.

- Predict the advantages of disruptive technology
- Utilise technology to meet growing community needs and aspirations
- Use big data to simplify complex decision making





Infrastructure

Adaptive and affordable infrastructure for future generations.

- Improve resilience to deliver beneficial community outcomes
- Systems designed for people to improve access and journey experience
- Right infrastructure choices for the community at the right price

Collaboration and People

Building multi-disciplinary teams with highly evolved skills.

- Sourcing best practice solutions to address transport challenges to serve our members
- Efficient and timely delivery of cost-effective business solutions and communicating the complex in a simple and visual way
- Enshrining world's best practice in all that ARRB does

Resilience and Security

Derive a new understanding of the future transport challenges in a changing world.

- Optimising recovery and rehabilitation models for the transport system
- Deliver an improved and informed understanding of security challenges that face the network
- Embed a safe system approach to transport solutions

Capabilities.

Knowledge Transfer/Learning

With a wealth of knowledge at our fingertips, our Knowledge Transfer and Learning programs continue to share the research with the transport industry.

Our webinar program continues to offer cost-saving and convenient solutions to our members, reaching practitioners in more remote areas of Australia and around the world who cannot attend face-to-face events.

The use of a Learning Management System (LMS), such as Schoology, allows us to provide continuous support to delegates through online assessments and access to training videos as part of a learning package.

Inhouse and regional workshops, also allow us to bring the experts to you and provides Members with first-hand accounts of the research and outcomes received.

Research program

The research program continues to develop and sustain a national capability for technical research and knowledge, so that it can be available to meet the future requirements of the global road industry.

Results of research are used by our technical experts to update relevant parts of the Austroads Guides and are disseminated through reports, workshops and training courses, and the presentation of papers at local and international conferences.

Technical consulting services

We also apply the knowledge gained through its research activities to consulting projects, and in the delivery of workshops and publications. Our customers benefit by accessing this knowledge to develop complex and multi-disciplinary solutions to road and transport challenges.

ARRB supports the development of research programs, responds to public tenders and request for technical advice. We work closely with our customers and industry to produce useful, innovative and practical solutions.

National Interest Services (NIS)

The NIS program provides national land transport information services, and leadership in delivering information to all sectors of the Australian land transport community. It is jointly funded by the Australian Department of Infrastructure and Regional agencies and is coordinated by experienced land transport information and knowledge management professionals based at ARRB's MG Lay Library.

The program has two outputs: online knowledge resources and altering services to aid decision support coordination and collaboration nationally and internationally to assist information sharing and access.

NIS initiatives include:

The Australian Transport Index (ATRI) in the international TRID database

The Rail Knowledge Bank

The Road Research Register

News feeds and alerts.

ARRB also leads resource and expertise sharing for the Tranzinfo network across Australasian transport libraries.

Asset Management

Our unique road and bridge asset management services provide innovative customer focused solutions making it possible for your network manager to effectively manage the network to achieve best value.

Asset Management research involves development of decision tools to assist road agencies. Key areas include assessment of the effects of incremental increases in axle group loads on the road network in terms of road condition and road agency costs, predicting dynamic wheel loading and its effects on the network and long-term pavement performance monitoring to develop consistent performance needs.

Bridge Management and Evaluation

Through our intense research, ARRB is able to undertake bridge inspections and structural investigations and also offer bridge management services to address the management of structural infrastructure assets. Our team of bridge experts have been researching and imparting their knowledge to the industry for a number of years and are valued contributors to the ongoing improvement of bridge infrastructures and management.

Capabilities.

Heavy Vehicles

Our services to the heavy vehicles industry includes performance assessments by field testing and development of validated vehicle computer simulation models. Our on-site crash investigation, formal reconstruction and expert witnesses have formed part of many legal teams across the country. Our development of high productivity vehicle concepts, risk management strategies and detailed focused reports with practical outcomes is due to our invested research in heavy vehicles.

Pavements & Materials

Pavement management is focussed on the optimisation of expenditure on the road pavement to meet budgetary requirements and user expectations. This requires a detailed knowledge of pavement behaviour throughout the pavement life-cycle.

In addition to our skills in pavement construction and design, and knowledge of pavement materials you can benefit from our extensive research and understanding of pavement deterioration processes and our road asset data collection services.

Our expertise includes not only traditional asphalt pavements in urban environments but also low-cost unbound and spray seal pavements.

Parking

At ARRB, we are experienced in all facets of car park management and operations, including parking strategy, policy, planning, pedestrian and road safety, audits, feasibility studies, technology, signage systems and car park safety assessments.

We provide independent and unbiased advice to the parking industry as we do not operate parking facilities, or supply equipment.

Road Design & Traffic Engineering

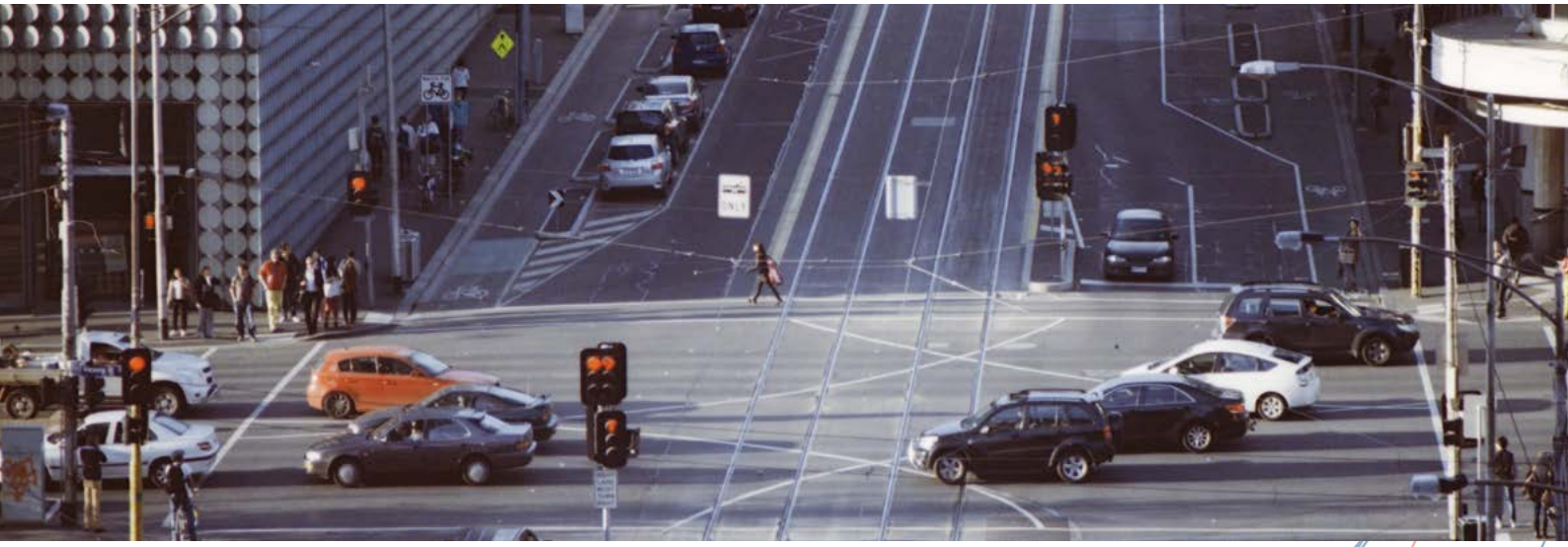
Road safety engineering research focuses on ways to improve the road environment in order to reduce road safety risk, as part of the Safe System approach.

Well-researched design guidelines, monitoring of road crashes, timely problem identification, and implementation of remedial treatments and evaluation of countermeasures are all critical to the safety of the road network.

Intelligent Transport Systems

There is a need to deliver more from existing transport infrastructure to meet the growing demands of the transport function.

The aims may include to: improve safety, increase efficiency, minimise environmental impacts, improve security or increase accessibility and convenience for more transport users.
ARRB have assisted many transport authorities and organisations to meet these aims. Intelligent transport systems (ITS) and innovative transport management allows the creation of better transport futures.



Capabilities.

Automated Vehicles

Automated vehicles are becoming an integral part of the future transport landscape.

The Australian Road Research Board (ARRB) plays a significant research role in the higher level design, research methodology, human and safety factors, working in collaboration with other industry partners to deliver next generation mobility solutions in Australia and New Zealand.

ARRB is a lead partner in the **Australian and New Zealand Driverless Vehicle Initiative (ADVI)**, which aims to accelerate safe and successful introduction of driverless vehicles onto Australian and New Zealand roads.

Network Operations

The Australian Road Research Board provides services relating to the operation of transport networks including roads, freeways, car parks and related technologies.

We investigate the strategies and technologies for efficient and safe movement of people and freight.

The network operations team collaborates closely with ARRB's transport safety and traffic, transport economics, transport planning and management and heavy vehicles areas to develop tailored solutions that meet client needs.

Safe Systems Approach

This involves a holistic view of the road transport system and the interactions among roads and roadsides, travel speeds, vehicles and road users. It is an inclusive approach that caters for all groups using the road system, including drivers, motorcyclists, passengers, pedestrians, cyclists, and commercial and heavy vehicle drivers. The Safe Systems approach recognises that people will always make mistakes and may have road crashes—but the system should be forgiving and those crashes should not result in death or serious injury.

The Australian Road Research Board (ARRB) is a recognised leader in developing the Safe System vision for road transport. ARRB works together with road agencies to implement the vision's aim of no death and serious injury on Australian and New Zealand road networks.

Transport Policy

Our customers benefit from access to state-of-the-art information, and our established contacts within the international transport profession.

The Australian Road Research Board (ARRB) can offer clients a unique level of skill and understanding with regards to transport policy and strategy development. Through our extensive involvement in the setting and delivery of strategic research projects through Austroads, we can provide experience from high-level decision making and policy through to project level analysis and consulting. This distinctive capability provides clients with access to professionals who understand the full range of transport planning issues, the opportunities to improve transport function and a hands-on appreciation of the impacts and effects of various strategic options. This experience can be shared with customers through a peer review of policies and plans or with a cooperative approach to development from the ground up

Capabilities.

Sustainable Transport Planning

The Australian Road Research Board (ARRB) can provide comprehensive and integrated planning for and management of travel by people and goods.

ARRB considers all travel modes: walking, cycling, bus, rail, motor vehicles (including parking), and freight. We deliver plans, strategies, policies and guidelines that are sustainable, safe, efficient, equitable and practical.

Human Factors in Transportation

User-centred design of the road transport system is critical to ensure that it delivers all the services and benefits that customers expect, now and in the future.

These include safety, comfort, efficiency, ease of use, and pleasure. Human Factors and Ergonomics have made important contributions to the research, design, development, operation and evaluation of road transport systems to optimise customer experience and safety. However, as the road transport system evolves, so too will the role of humans within the system. This topic will focus on human issues critical in the design and operation of the road transport system and how these are likely to change as the road transport system becomes increasingly automated, connected and service oriented.

Road User Behaviour

The way transport systems are used is changing. Monitoring these changes, understanding the factors that drive them, and determining their implications for safety and efficiency is a growing component of the work undertaken by the Australian Road Research Board's behavioural scientists. We research and offer solutions to transport safety or efficiency problems involving human behaviour; contribution to better project outcomes through identification of best practice and well-designed evaluations; and contribute the road user perspective to fields such as transport safety, transport efficiency, transport integration, road user education and driver and rider licensing.

Transport Economics

The transport economics team works with engineers, scientists and other transport professionals to undertake both research and consulting projects focusing on transport demand modelling and forecasting; project evaluation and risk assessment; road pricing and the cost of congestion; freight and logistics analysis; transport policy analysis and integrated planning; and transport externalities analysis related to environmental, social and safety aspects.

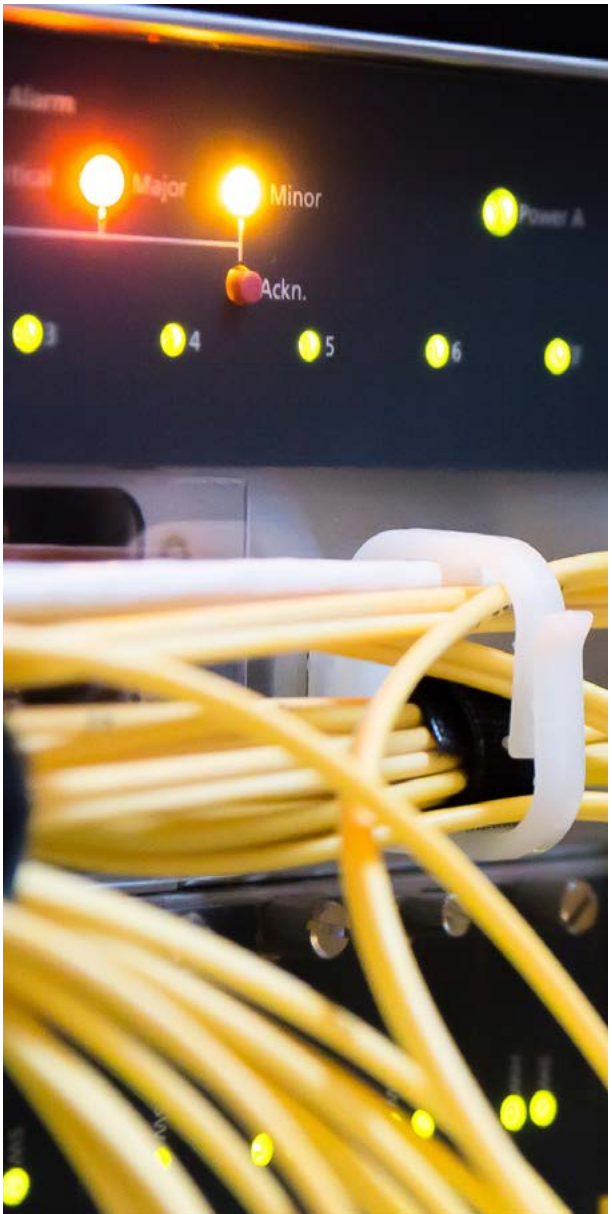
Research Laboratory

Our research laboratory has NATA accredited laboratories and equipment for testing. It is a world-class research facility employing staff with over 150 years combined experience in bituminous materials research.

We have been carrying out research in the following areas: bitumen, cement, treated materials, polymer modified binders, sprayed seals, asphalt, and skid resistance.

Our current clients include Austroads, all State and Territory road authorities, urban and rural councils, consultants and contractors. We have also successfully delivered projects in several countries including Malaysia, New Zealand, Pakistan, Hong Kong and Ethiopia.

Capabilities.



Data Collection Services

Whether your need is for a large-scale network survey, a local road system survey or ride quality test, the Australian Road Research Board's (ARRB) offers quality data collection, using ARRB's own Hawkeye platform. ARRB has built up extensive network survey experience over its many years of operation. This experience translates into the provision of accurate, reliable and time data, in accordance with national and international standards. ARRB maintains a fleet of over 10 dedicated survey vehicles, with various configurations to meet our clients' requirements, that can be driven anywhere in Australia for various types of data collection. With trained survey operators located in Victoria, New South Wales, Queensland and Western Australia, ARRB has people on hand to provide quality data collection assistance for your next project.

Case studies.

EME2

Jump-starting innovation – using successful programs from France

Our international networks and ability to evaluate overseas innovations identified a viable technology developed in France over two decades – high modulus asphalt (EME2).

Enrobés à Module Elevé Class 2 (EME2) technology was developed in the early 1990s, where it is now used on main routes and airports. Compared to conventional asphalt bases with unmodified binders, EME2 is characterised by a high stiffness, high durability, superior resistance to permanent deformation and good fatigue resistance.

Over the past two years we have been involved in an effort to transfer EME2 asphalt technology to Australasia. Two research projects were commissioned to facilitate the technology transfer.

Austroads invested in developing mix design guidelines setting appropriate performance criteria, using Australian test methods. Queensland Department of Transport and Main Roads has invested in the development of guidelines for the structural design of pavements containing EME2. A key characteristic of this effort is the involvement of, and in-kind contributions from, various industry partners including the Brisbane City Council – the use of one of its roads allowed for the evaluation of pavement design concepts and in situ performance of EME2. We carried out the pavement design and the site setup and is also performing the ongoing performance monitoring.

Australasia is now preparing for implementation of this technology on its road network. It is expected that the reduction in pavement thickness that can be achieved with this technology will lead to more cost-effective pavement designs and more sustainable use of scarce pavement materials.

IRSM

ARRB's Indian joint venture company, Indian Road Survey & Management (IRSM), has established itself as a professional provider of road data assessment, continuing to grow and expand their operations in India.

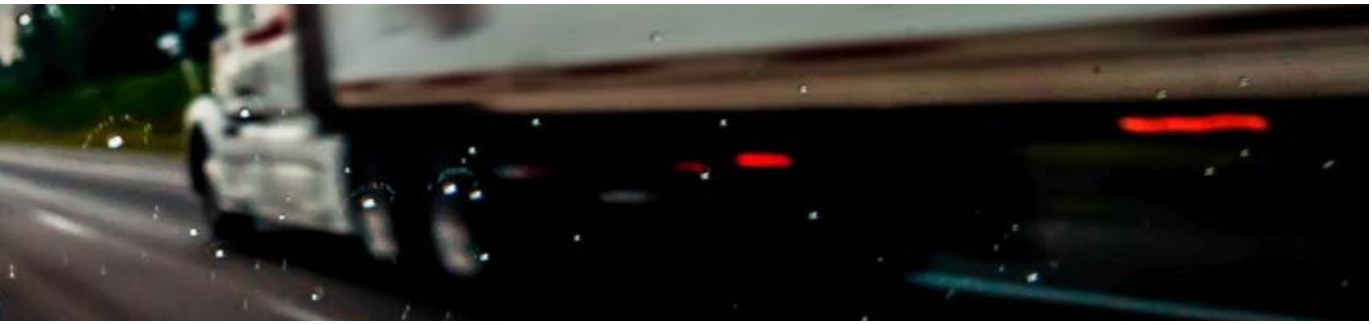
In operation since 2009, ARRB's Indian joint venture company, Indian Road Survey & Management (IRSM) was established to provide efficient and cost effective data rating services via ARRB, to our customers.

In just six years, IRSM has established itself as a professional provider of road data assessment, continuing to grow and expand their operations. Its primary business is road surface condition surveys, along with pavement strength testing (via Falling Weight Deflectometer). IRSM have successfully grown their work capacity by winning a number of significant data collection projects in their own right in India.

The partnership has grown beyond the initial low-cost service provider concept though. In a collaborative effort with ARRB, IRSM was awarded the road network condition surveys for the Government of Andhra Pradesh, within both the Andhra and Rayalaseema regions, totalling 43,000 km.

Additionally, IRSM undertake data collection projects for the International Road Assessment Program (iRAP) and many ARRB projects.

For further information, please refer to their website: irsm.in



Asset Management Systems

One of the challenges for Local Government in today's asset management systems supply world is that, arguably, there are too many choices available. There is a constant battle to ensure that best use is being made in terms of the choice of the most appropriate systems to ensure that value for money is delivered to the community, the client both from an asset service delivery perspective, and as the funders of the agency through their annual rate contribution.

In 2015, ARRB undertook a review of asset management systems to assist our members to make informed decisions regarding the management of their road assets.

The main purposes of the review were to assist local government to better identify which system, or systems, may be capable of meeting their requirements in circumstances where a systems-related solution is sought assist industry in understanding market needs and how they might target or develop their products provide evidence of the level of asset management system functionality and support sought in the Australian marketplace.

Austroads & ARRB

ARRB works with Austroads to help it achieve its strategic outcome areas that have been established to support its members, including sustainability, knowledge sharing and value.

During 2015, we commenced work on 54 projects for Austroads, spread across the Assets, Freight, Network, Registration & Licensing, Safety and Technology programs. The majority of these projects involved applied research in the core disciplines of asset management, bituminous surfacings, pavement technology, network operations and road safety infrastructure.

In 2015, Austroads published over 60 research and technical reports, 12 updated parts of Austroads guides and a new edition of the Glossary of Terms. At least one ARRB author contributed to about 60% of all reports and ARRB delivered all the guide updates, including the Glossary of Terms.

A focal point for the sharing of this published research and guidance is the Austroads online publications website (onlinepublications.austroads.com.au).

Importantly, outcomes of this research are also realised by Austroads member agencies. One example is the series of related projects we have undertaken in collaboration with Austroads on pavement materials performance, resulting in new design software and improved testing.

This in turn has led to improved quarry utilisation, haulage cost savings and more sustainable construction.

During 2015, ARRB and Austroads also collaborated to make the archival output of Austroads and its predecessor NAASRA (National Association of Australian State Road Authorities) freely available online in our ARRB Knowledge Base. Our initiative to digitise and upload over 1,300 reports, guides and papers, now provides an historical data source that complements the current knowledge available through the Austroads online publications website.

Austroads and ARRB work closely to disseminate the research outcomes in the industry through the growing knowledge transfer webinar program.

Flagship projects.

NRSPP

The National Road Safety Partnership Program (NRSPP) brings together industry, government and researchers to help develop and share evidence-based solutions and promote road safety in the community where they operate.

The NRSPP was launched by Prince Michael of Kent at the UN Decade for Action Road Safety Forum, Melbourne 2014. We were selected by the industry-led steering committee as the manager and deliverer of the program.

The program aims to help businesses and organisations create a positive road safety culture both internally and externally.

NRSPP
NATIONAL ROAD SAFETY
PARTNERSHIP
PROGRAM

ADVI

Self-driving vehicles will make driving easier, allow people to be more productive and offer greater mobility to a wider range of people than ever before. They will also help improve road safety, reduce emissions, and ease congestion. As a result, self-driving vehicles will provide significant economic, environmental and social benefits, including improving social inclusion.

The key thrust of the Australia & New Zealand Driverless Vehicle Initiative is to build momentum by rapidly exploring the impacts and requirements of this new technology in a truly Australian context and making recommendations on ways to safely and successfully bring self-driving vehicles to Australian roads.

To do this we will raise public awareness through live demonstrations involving government, industry, research entities and the media. The intention is to provide an avenue to showcase the involvement and contributions of collaborating partners involved in this important initiative.

ADVI
Australia & New Zealand Driverless Vehicle Initiative

NACOE

Driving innovation and cost saving:
National Asset Management Centre of Excellence

Queensland's Department Of Transport and Main Roads (TMR) has long recognised that innovation, and the supporting research, development and implementation activities are a means of saving money and improving transport outcomes for all Queenslanders. To capitalise on this, they established the National Asset Management Centre of Excellence (NACOE) in partnership with us.

The benefits realised in just the first year validate this approach; it has been found that the first year return on investments made is of the order of A$1.60 for every A$1.00 invested. It is therefore possible that over a widely accepted 10 year benefits accrual timeframe, this investment could conceivably have a return on investment exceeding 15:1.

NACOE focuses on driving innovation to achieve savings through best practice. While undertaking research in all disciplines of the roads engineering, a primary focus of the centre is pavements, structures and asset management.

NACOE
NATIONAL ASSET CENTRE OF EXCELLENCE

Flagship projects.

WARRIP

WA Road Research and Innovation Program - is an agreement between MRWA and ARRB which includes the establishment of a Western Australia Road Research and Innovation Program (WARRIP) in pavements, asset management, structures and bituminous surfacing, investment in the technology and systems necessary to gain a better knowledge of the condition and capacity in our current and proposed assets, a close association of ARRB's Pavements, Materials and Geotechnical resources with our Materials Engineering branch, increased collaboration with similar research centres in other states, including Austroads and the Queensland Department of Transport and Main Roads' National Asset Centre of Excellence (NACOE).

TIPES

The Transport Infrastructure Product Evaluation Scheme (TIPES) is a process aimed at providing an independent fit-for-purpose assessment of innovative road construction products. TIPES is intended for the evaluation products that fall outside the scope of established standards and specifications.

TIPES is a national scheme endorsed by all Australian State and Territory road agencies as well as IPWEA (QLD), the Queensland Local Roads Alliance and WALGA.

Our history.

The Australian Road Research Board (ARRB) is the source of independent expert transport knowledge, advising key decision makers on our nation's most important challenges.

ARRB has a strong heritage supporting and delivering high quality applied research for Australian and New Zealand state road agencies (our Members) and for the community. ARRB's team analyse and interpret global research and apply it to the Australian and New Zealand context.

In 2017, we are moving boldly into the future with a new vision and mission statement leading the way. We do this on behalf of our Members and the community. This mission is about creating knowledge for tomorrow's transport challenges, and solutions for today.

Reminiscent of its primary purpose and application in 1960 when founded, ARRB's core business is once again enlivened: it exists to serve the research needs of its Members, and maintain its reputation as a national interest, applied research organisation. Hence, our vision is born: to deliver an 'adaptable connected future' for every road user.

One such step to accomplishing this, is through the unification of all ARRB's businesses and services under the one ARRB brand, and through the formation of multi-disciplinary teams with highly evolved skills. In doing so, valued clients will have access to expanded specialist resources company-wide, and will benefit from the complete ARRB experience.

Our future.

Inspiring. Connecting. Delivering.

Mission

Creating knowledge for tomorrow's transport challenges and solutions for today.

Vision

Australian Road Research Board, driving innovation to deliver an adaptable connected future.

Our members.

Australian Government
Department of Infrastructure and Regional Development

ACT Government

NZ TRANSPORT AGENCY
WAKA KOTAHI

Government of South Australia
Department of Planning, Transport and Infrastructure

mainroads WESTERN AUSTRALIA

Queensland Government

NSW GOVERNMENT Transport Roads & Maritime Services

Tasmanian Government

Australian Local Government Association

vicroads

Northern Territory Government

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