Capabilities of the Australian steel industry to supply major projects in Australia

compiled by

the Australian Steel Institute

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Table of Contents

1. Introduction

Purpose

This document has been prepared by the Australian Steel Institute (ASI) on behalf of its members and the wider steel industry. It is a summary of the structure, capabilities and capacities of the Australian 'steel value chain' and provides a background into the business environment in which the industry operates. The main purpose of the document is to provide an overview of the industry and highlight the essential role Australian manufactured, fabricated and processed steel plays in delivering value to the Australian construction and manufacturing industries.

This document describes the structure, capability and value of the Australian steel industry and provides information on the capacity of the Australian steel manufacturers and the fabrication sector as a reference document for major project proponents and their Engineering, Procurement, Construction Management (EPCM) contractors.

Context

The intrinsic value of engaging and using the Australian steel industry are outlined and a summary of the main industry sectors is provided. The applicable compliance requirements and standards applicable to construction in Australia are also explained.

ASI is of the view that early engagement with project teams will maximise the potential benefits that will flow to each project and local industry. The Australian steel industry is keen to work with project proponents and their constructors, engineers, specifiers and procurers from the outset to achieve optimum project outcomes and help ensure that local industry is provided with full, fair and reasonable opportunity to supply major projects within Australia.

2. Background of the Australian steel sector

Industry Structure

The Australian steel industry consists of four primary steel producers, supported by over 300 steel distribution outlets throughout the country and numerous manufacturing, fabrication and engineering companies.

Production, Employment and End Use Statistics

According to the Australian Bureau of Statistics, the Australian steel supply chain, from basic iron and steel production though to downstream users such as fabricators, employed over 120,000 Australians in 2022-2023[1] and generates annual revenue in the order of $29 billion. Table 1 below shows Australian iron and steel production for the period 2017 to 2022.

Table1 – Australian Iron and Steel Production (million tonnes)

Production	2017	2018	2019	2020	2021	2022
Pig Iron	3.758	3.882	3.664	3.723	3.751	3.652
Crude Steel	5.328	5.689	5.493	5.490	5.780	5.621
Hot Rolled Products	4.606	5.146	4.961	4.915	4.848	4.800
Hot Rolled Long Products	1.603	2.069	1.978	1.964	1.733	1.720
Hot Rolled Flat Products	3.003	3.077	2.982	2.951	3.115	3.080
Railway Track Material	N/A	0.100	0.080	0.090	N/A	N/A
Hot Rolled Bars (excl. concrete reinforcing bars)	0.672	1.053	1.052	1.018	1.079	N/A
Wire Rod	0.931	0.650	0.615	0.578	0.654	N/A
Hot Rolled Coil, Sheet, and Strip (<3mm)	2.709	2.747	2.679	2.612	2.763	N/A
Other Metal Coated Sheet and Strip (excl. Tin Mill Products)	1.536	1.613	1.515	1.589	1.749	N/A
Non-metallic Coated Sheet and Strip	0.724	0.761	0.764	0.797	0.887	N/A
Tubular Products	N/A	N/A	N/A	N/A	N/A	N/A

Source: World Steel Statistical Yearbook 2023

Primary steel production occurs in New South Wales, Victoria and South Australia. Overall steel industry employment follows a similar pattern (see Figure 1). For more detail on steel manufacturing see Section 5A. The combined domestic crude steel production exceeds five million tonnes annually (see Table 1). This compares to domestic crude steel consumption of approximately six million tonnes per annum (see Table 2). Some specialised steel types, most notably stainless steel, and tinplate, are not manufactured in Australia. Markets for these products are serviced by imports. Specialised products produced locally include railway track and sleepers, pipe and tube, and plate. The majority of steel end use is in the building and construction sector (see Figure 2).

1 ABS 81550DO003_202223 Australian Industry, 2022-23 (Manufacturing Industry Data Cube)

Table 2 – Australian Apparent Steel Usage

Apparent Use	2017	2018	2019	2020	2021	2022
Apparent Crude Steel Use (million tonnes)	6.025	6.091	6.091	5.648	6.816	6.767
Apparent Crude Steel Use per Capita (kg)	245	244	240	220	263	259
Apparent Finished Steel Use (million tonnes)	5.441	5.500	5.500	5.100	6.154	6.111

Source: World Steel Statistical Yearbook 2023

The annual value of steel exports typically ranges between A$0.9 billion and A$1.3 billion (see Table 3). During the same period, export volumes have risen steadily to approximately 1.0 million tonnes per annum.

Table 3 – Australian Steel Exports

Exports	2017	2018	2019	2020	2021	2022
Semi-finished and Finished Products (M tonnes)	0.979	0.998	1.149	0.891	0.711	1.245
Ingots and Semis (million tonnes)	0.018	0.095	0.066	0.002	0.118	0.138
Long Products (million tonnes)	0.087	0.110	0.152	0.099	0.155	0.106
Flat Products (million tonnes)	0.809	0.724	0.886	0.721	0.375	0.943
Tubular Products (million tonnes)	0.039	0.042	0.044	0.067	0.063	0.058
Total Value (FOB) of Exports (A$ billion)	0.87	1.287	1.011	0.773	1.047	1.355

Source: World Steel Statistical Yearbook 2023, Office of the Chief Economist (Resources & Energy Quarterly December 2023)

Australian industry competes in a global market that has both significant capacity and widespread market access issues. The value of steel imports averages around A$3.2 billion for the period 2017 to 2022 (Table 4), with a notable drop-off from 2016 onwards associated with the closure of domestic automotive manufacturing.

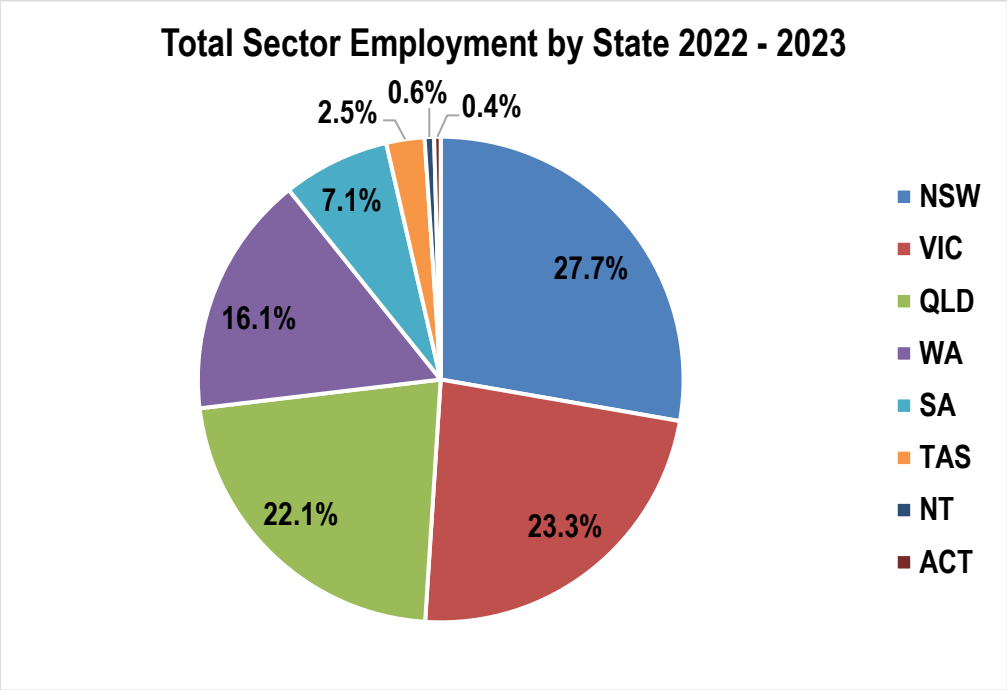
Table 4 – Australian Steel Imports

Imports	2017	2018	2019	2020	2021	2022
Pig Iron (million tonnes)	0.017	0.013	0.021	0.012	0.010	0.015
Semi-finished and Finished Products (M tonnes)	2.269	2.290	1.860	1.835	1.171	1.072
Ingots and Semis (million tonnes)	0.003	0.001	0.002	0.056	0.231	0.067
Long Products (million tonnes)	1.126	1.077	0.785	0.690	0.327	0.331
Flat Products (million tonnes)	0.671	0.661	0.569	0.540	0.299	0.356
Tubular Products (million tonnes)	0.465	0.549	0.503	0.496	0.313	0.317
Total Value of Imports (A$ billion)	2.45	2.992	2.634	2.599	4.504	4.010

Source: World Steel Statistical Yearbook 2023, Office of the Chief Economist (Resources & Energy Quarterly December 2023)

According to the World Steel Association, the top three steel producing countries in 2021 were China (1,018 million tonnes), India (125 million tonnes) and Japan (89 million tonnes). Both major domestic steel producers are multinational companies with international steelmaking operations. Liberty Steel Group was ranked as 55th largest producer in the world in 2022 with an estimated production of 6.38 million tonnes, whilst during the same period BlueScope was ranked the 59th largest with total production of 5.94 million tonnes.

Figure 1 – Total Steel Sector Employment by State

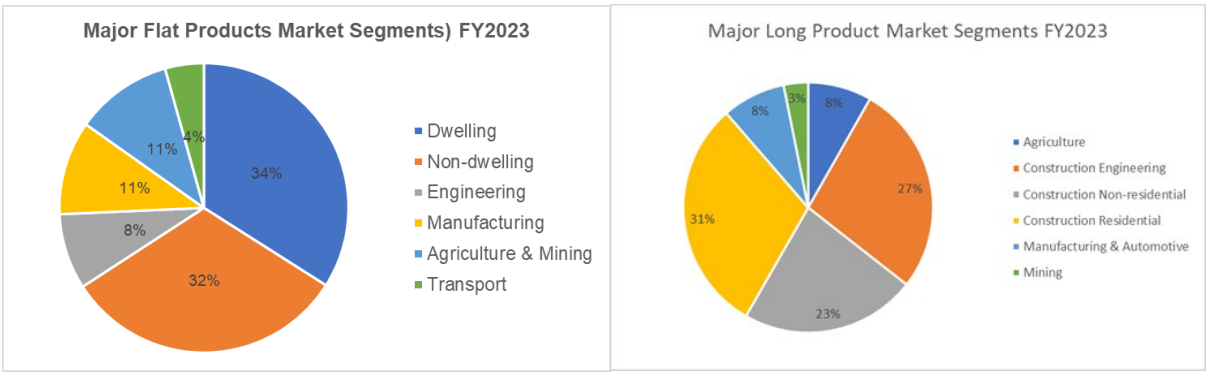


Source: ABS 81550DO003_202223 Australian Industry, 2022-23 (Manufacturing Industry Data Cube)

National employment in the steel industry is comprised as follows:

Segment	Employment
Primary steel production	22,865
Heavy fabrication	42,579
Medium fabrication and general manufacturing	55,203
Total	120,647

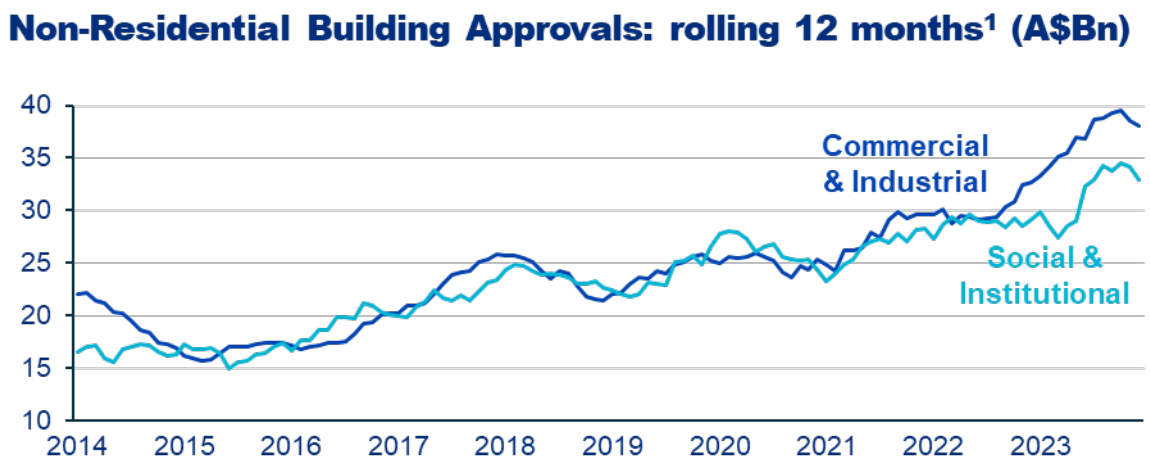
Figure 2: Steel Product Market Segments



Source: BlueScope Steel, InfraBuild Steel

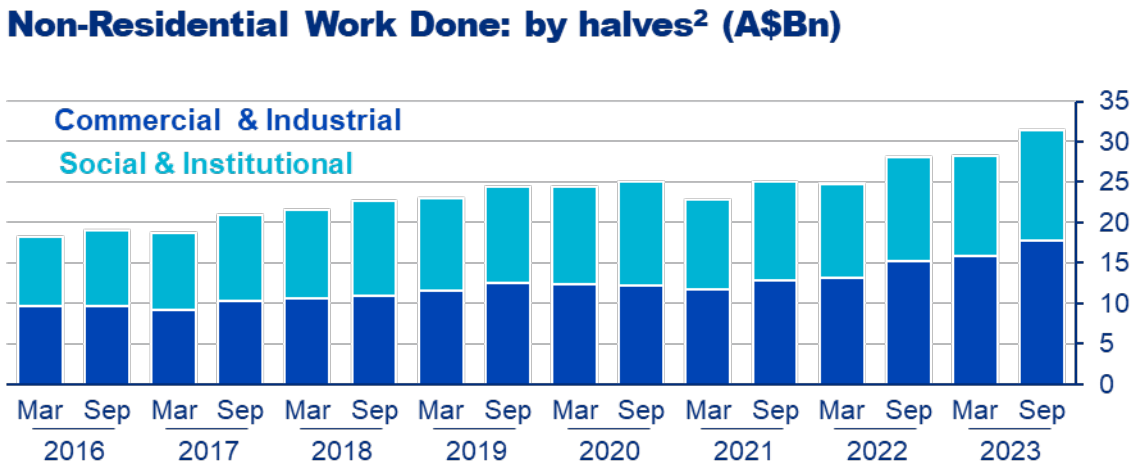
The underlying strength of the Australian steel market is shown in the figures 3 to 6 below.

Figure 3: Non-Residential Building Approvals 2014 to 2023



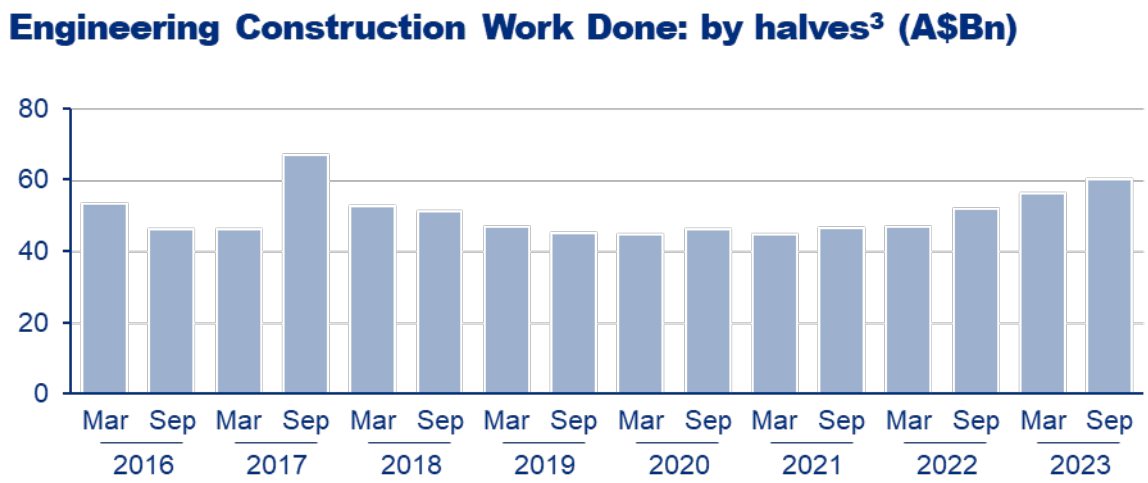
Source: 1. ABS series 8731, table 51; original data; current $; total sectors; data to Dec-23

Figure 4: Non-Residential Work Done 2016 to 2023



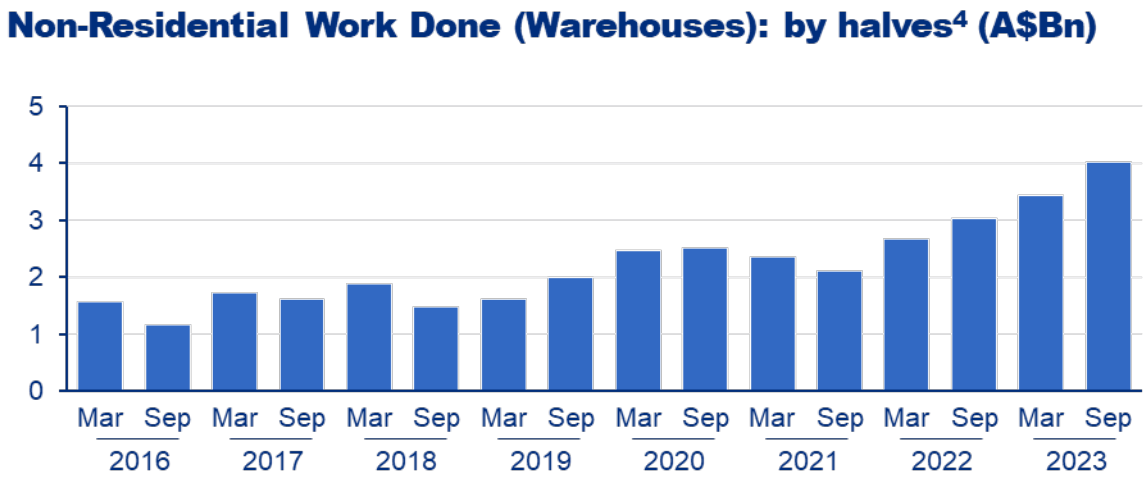
Source: 2. ABS series 8752, table 51; original data; current $; total sectors; data to Sep-23 half

Figure 5: Engineering Construction Work Done 2016 to 2023



Source: 3. ABS series 8762, table 1; seasonally adjusted data; real $; total sectors; data to Sep-23 half

Figure 6: Non-Residential Work Done (Warehouses) 2016 to 2023



Source: 4. ABS series 8752, table 51, original data; current $; data to Sep-23 half.

Australian steel supply chain

○ **Primary Steel Production**		
Sector	**Flat Products**	**Long Products**
Processes	- Cokemaking - Sintering - Ironmaking - Steelmaking (BOF) - Continuous Casting (Slab) - Hot Rolling (Plate / Strip) - Cold Rolling - Continuous Metal Coating - Continuous Coil Painting	- Cokemaking - Sintering - Ironmaking - Steelmaking (BOF/EAF) - Continuous Casting (Slab / Bloom / Billet) - Hot Rolling (Rod / Bar / Beam)
Common Products	• Hot Rolled Coil • Cold Rolled Coil • Plate • Metal Coated Strip • Painted Strip • Welded Beam	• Rail & Sleeper • Merchant Bar • Specialty Bar • Specialty Rod • Reinforcing Rod & Bar • Hot Rolled Structural
○ **Secondary Steel Production**		
Processes	- ERW Pipe and Tube Forming - Electro-galvanizing - Heat treatment	- Wire Drawing - Galvanized Coating - PVC Coating - Reinforcing Mesh Manufacture
Common Products	• Precision Tube • Structural Pipe • Galvanized Pipe • Quench & Tempered Plate	• Plain Wire • Barbed Wire • High Tensile Wire
○ **Distribution and Processing**		
Processes	- Slitting - Shearing - Cut to length - Machining - Pre-drilling - Pre-cutting - Profiling - De-burring	- Inventory Management - Warehousing / Stocking - Order Collation - Logistics - Temporary Storage Solutions - Bundling and Packaging - Pre-assembly - Installation Coordination
Common Products	• Mults / Slits • Sheets	• All Primary Products • All Secondary Products

Building and Construction Applications

○ **Construction Modelling**		
Outputs	• 3D models • Shop Detail Drawings	• Component Drawings • Machine Processing files
○ **Fabrication**		
Processes	- Coping - Boring / Drilling - Machining - Cutting	- Welding - Hot Dip Galvanizing - Painting - Assembly and Transport
Common Products	• Beams • Columns • Girders • Gantries • Platforms	• Towers • Supports • Staircases • Rolling stock • Truck Chassis and Trailers
○ **Steel Reinforcing**		
Processes	- Welding - Cutting	- Drawing - Bending - Fabrication
Common Products	• Mesh • Rock Bolts	• Prefabricated elements • Fitments
○ **Roll-forming**		
Processes	- Profiling	- Folding and Bending
Common Products	• Roof Sheeting • Cladding • Rainwater Goods • Structural Decking	• Purlins and Girts • Framing • Culvert Pipe • Ductwork

Manufacturing Applications

Processes	- Machining - Punching - Pressing - Drawing - Forging / Upsetting - Hot Dip Galvanizing	- Seaming - Welding - Heat Treatment - Soldering / Gluing - Powder Coating - Enamelling
Common Products	• Ovens and Stoves • Air Conditioners • Water Tanks • Hot Water Heaters • Insulated Panels • Componentry and Brackets • Caravans • Trailers • Toolboxes	• Fasteners • Coil and Leaf Springs • Nail Plate • Furniture and Cabinets • Racking and Shelving • Cable Trays and Ladders • Pipe Hangers • Struts • Meter Boxes

3. About the Australian Steel Institute

The Australian Steel Institute (ASI) is the nations peak body representing the entire steel supply chain, from the primary steel producers through to end users in the building and construction, structural design, architecture, detailing, frabrication, heavy engineering and manufacturing sectors. The ASI membership base includes approximately 6,000 individuals that are associated with more than 600 corporate memberships and over 350 individual memberships.

Steel is the backbone of Australia's construction, resources, infrastructure and manufacturing sectors. It is a vital and sustainable source of innovation, employment and capability in our cities and our regional communities.

A not-for-profit organisation, the ASIs activities extend to, and promote, advocacy and support, steel excellence, standards and compliance, training, events and publications. The ASI provides marketing and technical leadership to promote Australian-made steel as the preferred material to the resources, construction, and manufacturing industries, as well as policy advocacy to government.

Our Vision:

- **To influence profitable growth for the complete Australian steel value chain.**

Our Mission:

- **To promote steel as the material of choice**
- **To promote the capability and capacity of the Australian steel supply chain**
- **To provide leadership in advocacy, compliance, safety, sustainability and technical education.**

Leadership and advocacy

The ASI provides marketing and technical leadership to promote Australian-made steel as the preferred material to the building, construction, resources, and manufacturing industries, as well as policy advocacy to government.

It exists to represent the Australian steel industry and to support its future growth, so that the industry can maintain and create jobs and income for Australia, and provide the highest-quality certified steel products for Australians.

The ASI achieves this by ensuring that political and policy decision makers, industry, consumers, allied industries and professions, and other key stakeholders continue to

recognise the strength, beauty and versatility of Australian steel, and the importance of maintaining and growing a strong steel industry sector.

Coordination

The ASI acts as the focal point for the steel industry, providing leadership on all major strategic issues affecting the industry. It focuses particularly on economic, environmental and social sustainability matters, and works with government, the media and other associations to provide an independent voice for industry. This includes promoting the advantages of local content procurement in the nation's interest, both to the client and to government.

Technical Support

The technical support arm of the ASI facilitates events and technical training at both shop floor vocational and degree qualified continuing professional development level, as well as case study seminars and awards. The ASI also publishes industry-leading journals based on the latest research.

The technical references provided through the ASI's electronic online resources and library are amongst the most comprehensive in the southern hemisphere. With longstanding links to global research capability and other steel industry associations such as the World Steel Association, the ASI can offer a truly international solution.

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4. Competitive advantages of the Australian Steel Industry

Australia has a highly skilled, well-equipped steel supply chain that has evolved over many years. Thousands of businesses throughout the country provide steel manufacture, design, detailing, fabrication, surface treatment and construction services. These industry players have a long history of successfully working together to deliver major projects, manufacture everyday consumer products, enable nation building initiatives, supply custom designed rural products, through to all types of residential construction, thereby providing clients with seamless, efficient, cost-effective steel solutions.

Choosing to partner with the Australian steel supply chain will ensure optimum mitigation of risks associated with the cost, quality, supply surety, compliance and safety of all steelwork used in a project.

Cost Containment

By engaging with the Australian steel supply chain in the early stages of a project, proponents and their partners may derive cost savings that can be built into a project at the initial concept design stage. Quick response and the capacity of the industry to get a project started can lead to significant cost reductions.

The fact that the steel supply chain is *local* can provide multiple, additional value adds:

- Through the implementation of a number of practices, contractors (and therefore the project owner) benefit through cash flows being 'protected'. For example, reducing handling of components, lower onsite inventory levels and pre-production work can free up cash for alternative activities.
- Onsite inspection costs can be significantly reduced where the personnel involved are resident in the region.
- Chances of misinformation and mistakes in interpreting site plans, local regulations and environmental matters can be minimised, providing a significant financial benefit by reducing the need for re-work.
- By meeting certified standards, exacting specifications and having a 'right first time' culture, Australian suppliers further eliminate the need for costly re-work.
- Inspection costs can be significantly reduced, compared to alternate supply of fabricated steel, which may require many overseas visits.

- There are savings to be made in various administration costs such as bank and other associated costs compared to the imported alternative.

- 'Whole of life' costs, including equipment maintenance and service costs are reduced when local subcontractors are part of the construction team and remain available on completion of the major works. Local companies have the ability to source replacement parts (or parts that may need to be re-engineered to certain specifications) and service a project's ongoing needs.

Supply Surety

Fabricated steelwork is often on the critical path of major projects, with supply and construction schedules usually tight. Delays or site rectification of the steelwork typically has serious ramifications for the project as a whole. Working together, the Australian steel supply chain can overcome many obstacles that negatively impact on-time delivery of steel components to a project:

- The likelihood of having to make design changes either at short-notice, or at a late stage in a complex project is high. The ability of locally-based companies to be innovative and respond to changing conditions or variations to the original planning and design work is easily accommodated. Regular face-to-face contact between the fabricator and detailer ensures that when design or site erection schedule changes arise, delays are minimised. Additionally, the industry is serviced by a network of steel distribution centres throughout Australia that stock a depth and range of all steel products thus enabling fabricators to quickly source material to respond quickly and cost-effectively to any changes. Australian steel distributors can also supply processed steel to fabricators to further speed production schedules.

- The high rate of productivity of Australian fabricators, coupled with high integrity quality of workmanship that underpins the industry's 'right first time' culture, ensures on-time, short lead-time, completion of all steelwork.

- Robust and flexible transportation strategies for fabricated steelwork are essential to ensure the overall project schedule is not at risk. Locally fabricated steelwork can take advantage of road, rail or local sea transportation, maximising flexibility and economy in meeting delivery schedules and ensuring that project schedules are met.

- The ability of the local steel supply chain to, if required, provide phased or 'just-in-time' deliveries that dovetail with a project's construction schedule is superior, when compared to alternative fabricated steel supply options.

Input Quality

Poor quality fabricated steelwork can create multiple risks, not only during construction but also for future plant operations. These risks may be heightened by the remoteness of a particular project's location.

From steel manufacture to coatings application, a broad range of independently developed, administered and audited Australian Standards exist, each tailored to regulate specific processes undertaken by each member of the Australian steel supply chain. Compliance to these Australian Standards is the foundation for building input quality for any project. Additionally, the systems rigour and traceability requirements that adherence to these quality standards demand, can facilitate seamless input to any QA requirements of a project. Specifically, the following practices contribute to input quality by the local steel supply chain:

- The size, scale and breadth of Australian steel manufacturers' capabilities contribute to their ability to successfully deliver quality steel solutions to their customers. The industry is able to produce special steel grades and control quality through the full production chain – from steelmaking to rolling. Regardless of the specific product or grade required, all steel is manufactured in accordance with Australian Standards. These standards address such matters as inherent attributes of the steel itself, product testing, certification procedures and dimensional tolerances. Australian steel manufacturers guarantee the quality of the steel products they manufacture by certifying compliance with these independently established Australian Standards. Additionally, local steel manufacturers hold ISO Quality Management System Accreditation (ISO 9001), third party quality accreditation.

- Domestic steel manufacturers have technical teams with significant experience and expertise in working with other members of the steel supply chain and their clients, to provide input to the design process or optimise existing designs by ensuring the most suitable quality grades of steel are chosen for particular applications, or offer advice on Best Practice for steel processing.

- A highly skilled workforce, trained in the latest steel fabrication techniques and welding processes characterises the Australian fabrication industry. This team, coupled with investment in the latest plant and equipment, such as plate roll forming equipment, CNC beam lines, angle lines and plasma cutting lines, provides a robust platform on which to fabricate steel of exacting quality. Design, fabrication and erection of fabricated steelwork is governed by various Australian Standards and welding specifically by AS1554 (read more about these in sections 6 and 7 of this document) which lead to reduced instances of onsite rectification due to poor quality, inaccurate or incomplete fabrication.

- Australian Construction Modellers are experienced in all manner of construction types and project sizes. The coordination of intricate architectural intent with engineering integrity to prepare the full suite of fabrication drawings and machine processing files in a timely and accurate manner is an integral step in the steel construction process. A comprehensive listing of quality Construction Modelling firms can be found on the ACMA website find-a-detailer page.

- The local steel industry has become accustomed to satisfying the demands of project proponents and their partners for quality records and traceability. Provision of documentation is not limited to that governing traceability and compliance of steelwork. It includes materials for cleats and fitments, bolts and welding consumables as well as welding records, NDT records, and fabrication inspection records. Without such traceability a project may not only be at risk of compromising quality and being unable to meet reporting requirements, but also risk schedule delays associated with achieving compliance.

Safety Secured

The Australian steel supply chain is invested in the social bond of caring for those who work in the industry and those markets that we serve. The industry demonstrates a strong commitment to work, health and safety (WH&S), believing that all injuries, occupational illnesses and incidents are preventable. Steel manufacturers take pride in global-industry-low, benchmark levels for Lost Time Injury Frequency Rates (LTIFR) and Medical Treatment Injury Frequency Rates (MTIFR). This safety performance is underpinned by wide-scale safety improvement plans, driven by executive leadership from the local steel manufacturers.

Proven Track Record for Large Projects

Australia's large mining and processing industries have over many decades spawned a competitive steel construction industry capable of servicing major projects and delivering quality. The track record of the industry is one of continual improvement in all facets of fabricated steel supply to large projects resulting in optimum risk mitigation for project proponents and their partners.

5.A. Steel manufacturing

Australian steel is recognised around the world for its quality and product consistency. The annual capacity of Australian steelmakers is 5.3 million tonnes of which nearly 70% is used for industrial, commercial and residential buildings, bridges, towers and masts, maritime structures, mining and materials handling projects[2].

The integrated Australian steel chain typically holds more than two million tonnes of inventory, made available through distributors located at over 300 sites across the country[2]. This means in practice that projects in any location, even remote areas can be flexibly supported with efficient logistics capability.

Australia is well served by three steel producers that operate an array of modern facilities across the country**,** **BlueScope Steel** (which mostly produces flat steel products), **Liberty Primary Steel** (making mostly hot rolled structural and rail long steel products), and **InfraBuild** (reinforcing products, merchant bar and pipe & tube).

BlueScope Steel

BlueScope Steel Limited is an international steel solutions company with a manufacturing and marketing footprint that spans Australia, New Zealand, Asia and North America. It employs more than 14,000 people and operates 91 manufacturing plants in 17 countries around the world.

Manufacturing Facilities

BlueScope Steel has vertically integrated operations for flat steel products in Australia and New Zealand including steel slab, hot rolled coil, cold rolled coil, steel plate and value-added metallic coated and painted products.

It is also a designer and manufacturer of pre-engineered steel buildings and building solutions products. The Australian Steel Products division employs around 6,000 employees at more than 50 facilities and over 50 distribution centres in Australia. It incorporates:

- Port Kembla Steelworks - an integrated steelmaking operation with an annual production capacity of approximately 3.2 million tonnes of crude steel. It is the largest manufacturer and supplier of flat steel in Australia by volume and manufactures slab, hot rolled coil and plate products.

2 https://www.steel.org.au/about-us/our-industry/

- Metallic coating facilities located in Springhill, NSW (three lines; 825kt/a capacity) and Western Port, VIC (three lines; 830kt/a capacity).
- Steel painting facilities located in Springhill, NSW (one line, 200kt/a), Western Sydney, NSW (one line;120kt/a), Western Port, VIC (two lines, 330kt/a) and Acacia Ridge, QLD (one line; 95ktpa).
- Export trading offices based in North America, Europe, the Middle East and Asia.

Through its focus on cost efficient manufacturing and strong brand recognition for products such as COLORBOND® steel and ZINCALUME® steel, the company enjoys a strong reputation in each of the Australian and New Zealand sectors in which it operates, serving customers in the building and construction, engineering construction, manufacturing, automotive and transport, agricultural and mining industries.

Its flat steel product range is produced to exacting standards with products being manufactured to Australian and International Standards providing a known level of quality with full traceability. All manufacturing facilities have quality management systems accredited to ISO 9001:2008. This accreditation is actively maintained and audited, ensuring a mature and fully functional system. BlueScope Steel is committed to the principles of quality assurance, thereby increasing customers' confidence of the project being delivered to the required quality standards.

BlueScope Steel Port Kembla Hot Strip Mill finishing stands control room.

Customer Service

BlueScope Steel also operates a national network of service centres and steel distribution sites throughout Australia. BlueScope Distribution can fill customers' material needs from its Australian network of more than 70 processing and distribution sites.

Products stocked include steel plate, sheet and coil, reinforcing fabric, bar and building products, merchant bar, structural steel, tubular, engineering steel and aluminium products. It offers quality processing services which range from simple length-based cutting of bar and tube products to complex multiple precision processing on world standard CNC controlled beam line and plate line installations. Providing customers with metal in the form they need helps reduce customers' costs, lead-times and waste.

For steel-intensive projects, BlueScope Steel collaborates with both BlueScope Distribution and other ASI-affiliated steel distributors as well as steel fabricator customers to provide 'flowed' deliveries of steel to meet project production schedules to reduce project costs by minimising sorting, handling and storage. The need to 'jump-start' projects is also easily accommodated given the ready availability of its standard product range from the Australia-wide steel distributor network or on short lead times from mills for non-standard products.

BlueScope Steel has an experienced technical team that supports projects by providing advice regarding the 'best-fit' steel grade for a particular application from its current product range, advice on international equivalent steel grades that BlueScope Steel can produce, or even working with project proponents to develop new, modified steel grades, tailored to provide optimum application performance.

To simplify the process of ordering steel and doing business with BlueScope Steel, its e-commerce trading hub www.bluescopesteelconnect.com provides online access 24 hours a day, seven days a week. Its *OrderIntegrator* system for single point data entry delivers time savings, productivity enhancements and reduced error potential while giving more control over orders

Safety and the Environment

BlueScope Steel's fundamental belief is that all injuries can be prevented. The company is committed to its goal of Zero Harm for all its employees and contractors, anywhere in the world. The company's injury levels are at World Best standards with its Lost Time Injury Frequency Rate (LTIFR) at 0.62 and Medically Treated Injury Frequency Rate (MTIFR) at 5.4 as of FY 2018[3].

3 FY2018 FINANCIAL RESULTS PRESENTATION

BlueScope Steel is committed to caring for the environment and choosing to do what is right. It takes action within its businesses and works with partners to continually improve its environmental footprint. The company has adopted comprehensive environmental governance arrangements and management systems to ensure it achieve those goals. In addition to its compliance obligations, BlueScope Steel has undertaken a range of initiatives to reduce the company's environmental footprint (refer *11-Environmental Sustainability*).

Liberty Primary Steel

Liberty Primary Steel's Whyalla Steelworks, located in Whyalla, South Australia is an integrated steelworks with current capacity of approximately 1.25Mt/a of cast steel and hot rolled products.

Liberty Primary Steel produces custom made hot rolled structural, rail and sleeper products for the construction and transport markets

Liberty Primary Steel sources its key raw materials in iron ore, coal and limestone from Australian mining operations owned by its parent company.

InfraBuild

InfraBuild has a rich history spanning more than 100 years, playing an integral role in the nation building of Australia.

The name reinforces InfraBuild's commitment to and investment in the innovation, manufacturing and supply of solutions and products to the rapidly developing construction of nation-building infrastructure in Australia, along with commercial and residential construction, and the fabrication, manufacturing, mining and rural sectors.

InfraBuild includes InfraBuild Construction Solutions, InfraBuild Steel Centre, InfraBuild Recycling, InfraBuild Wire (Manufacturing) and InfraBuild Steel (Manufacturing), ARC and ATM.

InfraBuild and Liberty Primary Steel together form Australia's largest integrated manufacturer and supplier of steel long products and solutions – including hot rolled structural steel, reinforcing bar and mesh, merchant bar, pipe and RHS, rod and wire and building products – enabling the construction of steel-framed buildings, buildings framed in concrete and nation-building infrastructure projects. InfraBuild is also a trusted supplier to the manufacturing, housing, mining and agricultural industries.

All of InfraBuild's outputs are manufactured to the highest level of Australian and New Zealand Standards and are independently accredited by the Australasian Certification Authority for Reinforcing and Structural Steels (ACRS).

InfraBuild Steel (Manufacturing)

At its manufacturing sites in Victoria and New South Wales, InfraBuild Steel operates two electric arc furnaces with steel production capacity of approximately 1.5Mt/a, and four rod and bar rolling mills. Steel billet is also sourced from Liberty Primary Steel.

InfraBuild Steel manufacturer of rod and reinforcing bar products for construction applications, merchant bar for general applications, and specialty bar and wire for manufacturing applications in Australia, principally supporting the resource sector.

InfraBuild Wire (Manufacturing)

InfraBuild Wire is Australia's leading manufacturer and supplier of wire products.

InfraBuild Wire operates three wire mills and is Australia's largest manufacturer of wire for construction, manufacturing and rural applications. InfraBuild Wire includes Waratah Fencing and Cyclone Products supplying agricultural products, including fencing, silos and hardware to the agricultural market, and manufacturers wire used to manufacture anything from nails to wire rope for massive draglines in mining.

Austube Mills

With a history dating back to the 1930s, Austube Mills has evolved

They have also developed a range of world-class DuraGal and DuraPrimed coatings designed to meet the needs and conditions of Australia. With manufacturing facilities in Acacia Ridge (QLD) and Newcastle (NSW), they are well equipped to service domestic steel pipe and tube markets in Australasia.

They are supported by more than 200 distribution networks across Australia and New Zealand.

For further information and complete product range information, visit www.austubemills.com.au/

InfraBuild Recycling

InfraBuild Recycling specialises in the safe handling, collection and processing of more than 1.4Mt/a of ferrous and non-ferrous scrap metal every year, distributing it to InfraBuild Steel's Australian steel mills and international customers. InfraBuild Recycling operates nationally from 22 locations in Australia as well as several in Asia and across the globe.

The recycling business is a significant contributor to the raw material requirements of Australia's steel industry and provides a sustainable alternative to landfill, capturing the full value-in-use of the materials recycled.

InfraBuild Steel Centre

Australia's only fully integrated supplier of metals and building products, with an extensive network of branches covering all major cities and regional areas.

InfraBuild Steel Centre supports customers in key industries including engineering, infrastructure, commercial and residential construction, fabrication, manufacturing, mining and rural. InfraBuild Steel Centre services over 10,000 customers and has extensive expertise in providing engineering and design optimisation to minimise risk while reducing waste and cost.

InfraBuild Construction Solutions

Australia's premier supplier of steel reinforcing construction solutions supported by a national network of branches.

InfraBuild Construction Solutions is a full-service reinforcing supplier to tier 1 builders and mega infrastructure projects across Australia. It is one of Australia's premier suppliers of steel reinforcing solutions for commercial, residential and civil construction and mining industries. InfraBuild Construction Solutions' national network of branches services customers Australia wide, supplying quality custom prefabricated reinforcing solutions, products and accessories to both Australia's largest construction companies and the home renovator.

Customer Service

The products supplied by InfraBuild include hot rolled structural steel, rod and bar, reinforcing, wire, tube, pipes and hollow sections, fittings, valves, and recycled metals. InfraBuild's products are used across industries including construction, manufacturing, housing, resource, mining and agriculture.

InfraBuild has standardised product identification and scanning processes to dramatically improve productivity and customer quality outcomes. Working with global leaders in supply chain tracking GS1, InfraBuild has developed and implemented GS1's DataMatrix barcode and product identification tagging technology across its manufacturing sites nationally to deliver globally unique identification of products at a bundle level.

By using this identification technology, InfraBuild can demonstrate the compliance certification and sustainability credentials of a large volume and wide variety of products, plus ensure certainties of cost and reliability of on-schedule delivery directly to site. It can also

reduce the impact of construction projects on communities by accurately scheduling and minimising truck movements to sites. It does all this with a scrupulous attention to safety for the workforce and the general public.

To assist industry, InfraBuild Steel has developed its EzyCommerce® solution. EzyCommerce® is a suite of internet-based solutions to provide transactional information to its customers in a simple and efficient manner. By working to industry standards, we want to make it as easy as possible to do business together – 'Electronic Commerce Made Ezy'.

InfraBuild Steel Centre's state-of-the-art processing equipment and expert teams ensure the accuracy, tolerance and repeatability of processing. The company's integrated supply chain enables the sourcing of an extensive range of complementary products and the scheduling of deliveries to meet customers' schedules.

InfraBuild Steel Centre has significant expertise in working with customers to provide engineering and design optimisation to minimise risk while reducing waste and cost. Optimising material use can also aid in the sustainability credentials needed for awarding Green Star steel credit points.

InfraBuild Construction Solutions distributes a comprehensive range of reinforcing product and accessories, and has extensive prefabrication and customisation capabilities, with innovative prefabricated products including PROPILE, PROCAGE, CUSTOMCAGE, BAMTEC® and BARMAT™. InfraBuild Construction Solution's prefabricated solutions comply with all relevant Australian Standards.

The company leverages its in-house product development, engineering support and project management capability to optimise engineering design and manage the sourcing, fabrication and logistics of solutions for its customers in resources, mining and construction industries.

InfraBuild has significant experience and expertise in working in partnership with its customers to provide input into the design process or to optimise an existing design for efficient manufacturing, reduced waste, reduced risk and ultimately reduced cost.

InfraBuild personnel contributed to a range of standardised steel connections published by the ASI. A significant focus of the company's involvement with these publications was to provide the industry with a range of practical and economical standard connections. As an objective in design is to utilise the available member strengths to a high degree, the connections were developed to achieve the maximum strengths possible (subject to bolt capabilities), while at the same time minimising component sizes for optimum economy. Having a range of connections designed in accordance with the current standards and the latest design models eliminates a great deal of detailed and time-consuming engineering work. These connections have been developed based on InfraBuild's hot rolled and welded

universal beams and cover many practical situations. With their involvement in this area, InfraBuild's engineers are able to assist customers to apply those connections and develop suitable solutions for alternative design situations, where they arise. This can provide significant efficiencies during design and fabrication.

Safety and Sustainability

InfraBuild's core values of Family, Sustainability and Change demonstrate the depth of commitment within the organisation to achieving the highest performance in occupational health and safety, with the aim of creating and maintaining a safe and healthy work environment throughout its businesses.

InfraBuild believes that the use of sustainable materials in modern Australian building construction is no longer a negotiable. Structurally efficient buildings that optimise resources and make the most of usable space now have an essential role to play in creating green cities that citizens can use now and into the future.

InfraBuild is committed to the role played by steel in the circular economy, including the promotion of the recovery, reuse and recycling of steel and other products. The company is dedicated to conducting its business to global environmental, social and commercial standards.

Molycop

Molycop Australasia is part of the Molycop Group, which is the largest supplier of mining consumables in the world. Group installed manufacturing capacity is in excess of 1.8 million tonnes per annum from twelve locations. In Australia, Molycop produces forged grinding media and railway products. Production is carried out at Waratah, NSW. Grinding media production facilities are located at Waratah, and Bassendean, WA.

Production Facilities

The Waratah, NSW plant produces grinding media and railway products. Grinding media is produced using both roll-forming and upset forging processes. The Railway Products plant takes large ingots and converts them into finished wheel and axle sets using a fully integrated manufacturing process.

The Bassendean, WA plant produces forged grinding media and specialty fasteners for mineral processing applications such as SAG mill liner bolts.

Products and Brands

In the grinding media sector, SAG Balls are produced from 4 inch to 6.25 inch diameter, whilst Ball Mill Balls are available from 1 inch to 4 inch diameter. Rod Mill Rods are produced in a similar diameter range. After considerable in-house and in-field testing Molycop has recently developed a superior, high performance SAG ball – 'Molycop NG'. The ball is manufactured using an innovative, proprietary manufacturing process that has resulted in a tougher SAG Ball, with higher impact and spalling resistance.

Specialty fasteners are sold under the Donhad Fastener brand.

Railway products are sold under the Comsteel brand. Comsteel produces forged and rolled railway wheels to international standards for all classes of rolling stock. In particular the company is at the forefront in developing products for higher axle loading. New materials and designs for specific applications such as high hardness and wear resistant wheels have been developed by Comsteel. These wheels deliver improved performance in heavy haul, freight, passenger and locomotive applications.

Grade Capability

Molycop has the ability to produce almost any grade of steel including all grades covered by the following Australian Standards:
BS5892 – Part 3 British Standard Railway Wheels
AAR M1003 – Association of American Railways - Quality Assurance
AAR M107 / 208 – Association of American Railways - Railway Wheels
EN13262 – European Railways Accreditation

Quality Assurance

ISO 9001 – 2015 Quality Management System
NATA approved Chemical and Mechanical Laboratory

Orrcon Steel

Orrcon Steel is a manufacturer and distributor of steel tube and pipe in Australia owned by BlueScope and sourcing a majority of its coil supply from BlueScope Port Kembla and Western Port steel mills. Orrcon Steel's distribution centres are strategically located in Queensland, New South Wales, Victoria, South Australia and Western Australia, providing a national distribution network complimented by the regional Metalcorp branch network with a focus on rural products. There is also an extensive spread of distributors and stockists in metropolitan and rural Australia that carry the Orrcon Steel manufactured range of tubular products.

Manufacturing Locations and Scope

• **Brisbane** – Structural tube and pipe mills with inline painting, 30T coil slitter and electro-galvanizing plant. Providing ready-primed and zinc coated ERW product, manufactured for structural and low-pressure applications. This includes Orrcon Steel's own range of ALLGAL®, as well the ULTRASPEC-GAL® range of zinc coated Z275 (ZB135) products to meet the National Construction Code. A key supplier of tubular products for the renewable energy sector.

• **Adelaide** – Precision tube mill manufacturing cold rolled, hot rolled, zinc, and aluminium coated ERW steel tubing rolled to precise sizes and wall thicknesses. The MECSPEC-GAL® tube product range provides a local source of pre-galvanized mechanical tube and a viable alternative to imported HDG pipe in low through to moderate corrosive environments.

Wollongong- Unanderra- Large Structural tube and pipe mill located near the BlueScope Port Kembla Steel works, producing a range of tubular steel products including RHS 3-9 mm thickness up to 250x 100, SHS 3-9mm up to 200x200 and CHS 2.5 mml up to 10 mm 254mm diameter. Producing the StrucTube ® range, the mill provides steel tubular products for large scale infrastructure builds in sizes previously required to be imported. There is now a locally produced large tubular option in short lead times with delivery across Australia.

Additional Products available through Orrcon Steel & Metalcorp distribution

- Merchant bar (e.g. flats, rounds, squares and angles)
- Hot rolled structural (Columns, Beams, Channels)
- Hot Dip Galvanized Pipe
- Fencing, wire, welding products, mesh, sheet, gates and roofing.
- Metalcorp's Australian made Cattle Crushes, Ramps, Panels, Grids and Feeders.

Quality Management Systems and Product Standards

Orrcon Steel's Quality Management System is certified to ISO 9001, and the Brisbane site testing facility is NATA accredited to ISO 17025. Tubular products are manufactured, inspected and tested to comply with one or more of the following Standards or schemes:

- Structural – AS/NZS 1163 Cold-formed structural steel hollow sections.
    - Third party certified by ACRS
- Low pressure pipe - AS 1074 - Steel Tubes and tubulars for ordinary service.
- ALLGAL® standard AS4750 Electro-galvanized (zinc) coating on ferrous hollow and open sections.
    - Additional zinc coatings as per applicable Standards, AS4792, AS1397
- ORRFIRE® range of CSIRO ACTIVFIRE® certified sprinkler and hydrant pipe
- Precision – AS 1450 Steel tubes for mechanical purposes, made to meet the demands of industry in all aspects of the product.

As a business of BlueScope and sourcing a majority of its coil supply from BlueScope which is a ResponsibleSteel® member, there are multiple certifications and credentials available for reference purposes to incorporate in the Green Building Rating Scheme.

For further information and complete product range and certification information, visit www.orrcon.com.au.

Australian Pipe and Tube (APT)

Australian Pipe & Tube is a privately owned, Australian company, specialising in the manufacture of the highest quality (to Australian Standards) tubular steel products. APT's state-of-the-art tube mill in Victoria specialises in manufacturing RHS, CHS & SHS tubular steel products.

Australian Pipe and Tube hollow structural sections are manufactured in full compliance with Australian Standard AS1163 which is one of the world's most advanced standards. Used in industries ranging from mining to agricultural, APT Painted and APT Galv are certified to Australian standards and backed by local technical support.

For further information and complete product range information, visit auspipetube.com.au/

Bisalloy Steels

Bisalloy Steels is Australia's only manufacturer of high-tensile and abrasion-resistant quenched and tempered steel plate used for mining, armour, structural and wear-resistant steel applications. Bisalloy supply manufacturers and end-users in a vast array of industries including mining, construction, quarrying, general fabrication and buildings, pressure vessel and defence. Products which are marketed under the brand name BISALLOY® are supplied both direct to customers and through an extensive distribution network across Australasia, Indonesia, Thailand, Peoples Republic of China, South Africa and the Middle East.

Product Range

- BISALLOY® WEAR steel is the number one performance steel choice of countless industries because of its remarkable hardness and ability to withstand the toughest wear and tear.
- BISALLOY® STRUCTURAL steel can enable manufacturers, engineers, industrial designers and architects to deliver size, weight and cost savings while still achieving required levels of strength and performance.
- BISALLOY® ARMOUR steel has become the first choice in defence applications here and abroad and is specified for hulls in Armoured Personnel Carriers (APC), Light Armoured Vehicles (LAV) and the Bushmaster Infantry Mobility Vehicles in Australia, along with many APCs and LAVs worldwide.
- BISALLOY® PROTECTION steel range offers tested and certified, lighter weight plate products with superior ballistic performance to suit a wide range of applications for the protection of life, valuables and property.

Technical Assistance

Bisalloy has a range of technical and product data available to support its range of Australian made high performance steel products. With locally based technical experts and its own NATA accredited laboratory, Bisalloy can provide personalised, value-added technical support to all customers in every state. Bisalloy has the capacity to manufacture hard wearing and specialty steels to suit your applications and environment.

Sustainability

Bisalloy Steels is proud to know its performance steel grades are also delivering lighter, stronger and more sustainable steel options which, by their very nature, are increasing energy savings.

Bisalloy Steels also takes a tough approach to protecting the environment in all their steelmaking processes. They are passionate about the environment and continually measure the environmental performance of their plant. Energy consumption and carbon emissions have been regularly reported to the Clean Energy regulator since 2009. Rainwater is harvested for quenching processes, waste furnace gasses are utilized to preheat plates entering the heat treatment process, and they actively promote the limitless recycling opportunity of products throughout their lifecycle.

For further information and complete product range information, call 1300 BISALLOY or visit www.bisalloy.com.au

5.B. Roll-forming

Cold-formed light gauge steel members and profiled sheeting are produced from steel strip usually supplied in coil form from the steel mill. In Australia, BlueScope Steel Limited is the predominant manufacturer of steel strip. Cold-rolled coil is usually supplied in the range 0.3mm to 3.5mm in thickness and is generally metal coated, either galvanized or ZINCALUME® steel. Additional continuous coating processes, such as painting, may be applied after metal coating.

The coils of steel strip begin the process of being turned into cold-formed steel sections and profile sheet with being uncoiled, slit into appropriate widths and then cold-formed into the required final profile shape, usually by a continuous process passing through a number of roll stages to form the final product shape. These processes are undertaken by **roll formers**, who may work as contract businesses tooling up and producing a range of specialist section shapes for various clients, or at dedicated facilities working in-house with manufacturers of specific product lines for purlins, girts, structural framing, profiled sheeting or metal decking.

The final cold-formed light gauge steel products have any secondary finishing processes applied (e.g. cutting, punching) and then are packaged for delivery to either distribution centres, stockists or builders.

Roll forming machine operation. Image courtesy Enduroframe®.

For certain product types it is logistically easier and more economical to roll the product on site and then directly install onto the final structure. In this case, the roll forming machinery is usually truck mounted and brought to site.

ARAMAX wide span roofing is rolled on site. Image courtesy Bay & Coast Metal Roofing.

5.C. Distribution

A network of steel distribution facilities exists across Australia with state-of-the-art processing and stock control systems to support demanding project schedules. These businesses carry large stocks throughout the branch network giving excellent availability of the full range of steel products.

Leading distributors include InfraBuild Steel Centre, BlueScope Distribution (Sheet Metal Supplies), Orrcon Steel, Metalcorp, Southern Steel Group (Brice Metals, Southern Sheet & Coil, Surdex), Vulcan, United Steel, Mesh & Bar, GAM Steel, Calibre Steel, and Coil Steels. These all have a national footprint and provide the full range of steel products to resellers and end–users including merchant bar, pipe and tube, structural steel sections, steel plate, angles, channels, flat sheet, reinforcing steel, sheet steel and coil, roofing and rainwater goods, purlins, battens and studs. Some distributors also carry a range of stainless steel, aluminium products and pipe fittings and valves.

Reinforcing businesses process, fabricate and coordinate the distribution of reinforcing bar and mesh throughout Australia for the construction, mining and oil and gas industries (refer section 8 for more information).

The integrated Australian steel channel typically holds in excess of two million tonnes of inventory providing project proponents with confidence that the industry can promptly and effectively respond to a project's steel requirements when and where they need them. Local availability dramatically reduces the need for projects to maintain large inventories onsite and greatly reduces the schedule risk for a project.

Not only do Australian distributors offer large stocks, but they also offer steel processing on equipment which includes CNC beam lines, angle lines, band saws and cropping lines capable of processing the full range of structural steel, merchant bar, pipe and tube products.

Plate processing capabilities include laser, plasma and oxy-fuel cutting, drilling, counter-sinking, boring, bevelling and marking of the biggest available plate. By using these processing facilities customers are able to substantially increase their productivity allowing them to take on larger projects, finishing them faster and within budget. They also benefit from reduced handling, the elimination of mistakes and the reduction of waste.

Australian steel distributors are accustomed to working closely with project designers, steel fabricators and other contractors to ensure that the optimal steel product, compliant with all relevant standards and fully traceable, is available where and when it is required. Consequently, unnecessary and costly delays can be avoided.

Distributors add considerable value to the management of projects by:

- Maintaining significant stocks of steel.
- Advising on the best use of steel lengths and plate sizes for minimum yield loss, thereby maximising cost savings.
- Supplying quality processing as needed to customers' exact requirements.
- Providing timely deliveries, coordinated to projects' construction schedules and in cooperation with other suppliers.

Australian distributors are located at over 300 sites across the country and offer a depth and breadth of range, coupled with logistics, supply chain, processing capability and expertise to facilitate fast, flexible and reliable delivery of product to all Australian steel users.

For further information, visit:

BlueScope Distribution

Coil Steels

InfraBuild Steel Centre

Mesh and Bar

Orrcon Steel

Metalcorp

Southern Steel Supplies

United Steel

Vulcan

5.D. Fabrication

Fabrication Overview

The Australian structural fabrication industry is characterised by a very large number of fabricators with a total output capacity of approximately 1.6 million tonnes per annum, including some product used in repetition manufacturing, lintels, truck body and trailer fabrication[4]. One of the largest the steel industry sectors, Australian structural steel fabricators have committed heavily to new technology in recent times to meet the demands of new resources and infrastructure investments head on.

This investment takes in the latest technology in new overhead cranes, plate rolling equipment, CNC beam lines, angle lines and plasma cutting lines. The fabricators are increasing their capability and capacity and investing in Australia's future not only by installing new plant but also by keeping skills in Australia to build and maintain a sustainable steel manufacturing sector.

This investment has seen the fabrication steel processing capacity increase by close to 30 percent. The sector has ample capacity in reserve and is more cost competitive due to this recent investment in automation.

General Fabrication

The medium and larger fabricators (2,000 to 20,000 tonnes per annum capacity) process approximately 1.1 million tonnes annually with a large shift from labour-based fabrication to CNC, beam lining, angle lines and plasma and gas profile cutting. A trend is for fabricators to invest in detailing or to have close liaison with detailers to enable the benefits of computer files to drive their CNC equipment. Automotive style processing is progressively being applied to plate profiling, line marking, identification marking, drilling and tapping and where required, weld preparation.

A characteristic of steel fabrication in recent years has been the move to introduce technology throughout the steel value chain, including processing facilities at distribution level.

New and innovative business models are being developed with better interface in the technology areas between engineers and detailers, and the fabricator. Flowing from the UK experience, we are seeing an emergence of the Design and Construct Steel Contractor assuming an increased share of design and erection for the entire steel component.

4 https://www.steel.org.au/about-us/our-industry/

This market segment includes portal frame buildings such as factories and warehouses and commercial buildings such as offices, shops, schools, health and civic facilities. Steel brings advantages in speed of construction, lightweight and reduced foundation costs and a smaller manufacturing footprint to the construction site as most fabrication is off-site in more secure and safer manufacturing environments.

The Australian fabrication industry capacity is extended by the outsourcing of some functions to specialist processors and coaters. A community of specialist subcontractors augment the fabrication capacity in:

- Steel detailing
- Blast cleaning
- Painting
- Hot dip galvanizing
- Non-destructive testing
- Grating and handrail manufacture
- Bending
- Transportation

Fabricators will often specialise in structural steel, pipe fabrication, plate fabrication or mechanical fabrication. This has served the industry well, maintaining capability, cost effectiveness and flexibility. In fact, fabricators often specialise in certain market segments which makes them more competitive and profitable in these segments.

This paper assumes that reference to 'fabricators' covers all these disciplines. Refer to the Australian Fabricator Listing with approximate capacity tonnes indicated in the following pages.

The leading fabrication firms are equipped with state-of-the-art CNC automated fabrication equipment and are adept at utilising electronic information direct from the Engineer or Detailer to run fabrication machines. This improves cost and quality and enables 'just in time' processing and erection.

Fabricator Quality

The Australian steel industry is based around the integrated nature of Australian Standards. For example, the material specifications of Pipe and Tube (AS/NZS1163) and the structural sections Specification (AS/NZS3678, AS/NZS 3679.1, AS/NZS 3679.2) feed into the design requirements of AS4100 and AS3600 which are called up in the Building Code of Australia.

Significant to this structure is the welding code, AS1554. For special purpose welds, the welder needs to be qualified and tested and the equipment used calibrated and approved through the production of tested samples.

Australian fabricators maintain a system of apprenticeships to renew and update the skill levels in this country and to ensure training so that the skill sets to the relevant standards are maintained.

Similarly, the importance of a steel structure is dependent on the coating scheme which must be applied onsite or handled well to the site. These requirements defray significant on-costs from avoiding not getting the specification requirements right the first time.

Australian Steel Institute Fabricator Member Listing

New South Wales

Business name	Website	Capacity
CIVMEC Construction & Engineering	www.civmec.com.au	>10,000
Nepean Engineering & Innovation	www.nepean.com/building	>10,000
Precision Oxycut	www.steelcutting.com.au	>10,000
S&L Steel Fab Pty Ltd	www.slsteel.com.au	>10,000
Alfabs Engineering Group Pty Ltd	www.alfabs.com.au	2,000-10,000
Algon Steel	www.algonsteel.com.au	2,000-10,000
Apollo Fabrication Group Pty Ltd	https://apollofabrication.com.au	2,000-10,000
Belmore Engineering	www.belmoreengineering.com.au	2,000-10,000
Bhullar Engineering Pty Ltd	https://www.bhullargroup.com.au/	2,000-10,000
Chess Industries	www.chessindustries.com.au	2,000-10,000
Combell Steelfab Pty Ltd	www.combell.com.au	2,000-10,000
Crossmuller	https://www.crossmuller.com.au	2,000-10,000
Cullen Steel Fabrications	www.cullensteel.com.au	2,000-10,000
Engineering Fabricators Newcastle	www.efnewcastle.com.au	2,000-10,000
Ferrocom	www.ferrocom.com.au	2,000-10,000
Flame-Cut Pty Ltd	www.flame-cut.com.au	2,000-10,000
Gonzalez Steel	https://gonzalezsteel.com.au	2,000-10,000
Hard Bakka Pty Ltd	www.hardbakka.com.au	2,000-10,000
Icon Metal	https://www.iconmetal.com	2,000-10,000
Knox Engineering Pty Ltd	https://www.knoxeng.com	2,000-10,000
Kotzur Pty Ltd	https://kotzur.com	2,000-10,000
Macfab Engineering	https://macfab.com.au	2,000-10,000
Mascot Steel	https://www.mascotsteel.com.au	2,000-10,000
NWEC Pty Ltd	www.nwec.com.au	2,000-10,000
Universal Steel Construction Pty Ltd	www.universalsteel.com.au	2,000-10,000
Wexford Welding	www.wexfordwelding.com.au	2,000-10,000
WGE Pty Ltd	www.wgegroup.com	2,000-10,000
Aarti Fabrications Pty Ltd	https://www.aartifabrications.com.au/	<2,000
Ace Construction Australia	aceaustralian.com.au	<2,000
ACT Steelworks Pty Limited	www.actsteelworks.com.au	<2,000
Alfec Industrial Engineering Pty Ltd	https://www.alfec.com.au	<2,000
Align H	www.alignconstructions.com.au	<2,000
Amarcon Group	www.amarcon.com.au	<2,000
Asero Group		<2,000
Australian Structural Steel Pty Ltd	https://australianstructuralsteel.com.au	<2,000
AWI Steel Pty Ltd	www.awisteel.com.au	<2,000
B&G Welding NSW Pty Ltd	https://www.bgnsw.com.au/	<2,000
BJL Welding & Fabrication Pty Ltd	https://www.bjlwelding.com.au/	<2,000
C & V Engineering Services Pty Ltd	www.cvengineering.com.au	<2,000
Coastal Steel Fabrications	https://coastalsteel.com.au	<2,000
Cosme-Australia Stainless Steel Fab	www.cosme.com.au	<2,000
CTB Industries	https://www.ctb.net.au	<2,000

Business name	Website	Capacity
Designed Building Systems	www.designedbuildingsystems.com.au	<2,000
DMG Engineering	https://dmgengineering.com.au/	<2,000
Edcon Steel Pty Ltd	www.edconsteel.com.au	<2,000
F3 Industries Pty Ltd	http://f3industries.com.au	<2,000
Fabinox	www.fabinox.com.au	<2,000
Fabrekate		<2,000
Ficogi Engineering Pty Ltd	www.ficogi.com.au	<2,000
GK Blue		<2,000
Hayman Industries Pty Ltd	https://www.haymanindustries.com.au/	<2,000
HE Burns	https://www.heburnsandsonsptyltd.com/	<2,0000
HF Hand Constructors Pty Ltd	www.hfhand.com.au	<2,000
Hort Enterprises	www.hortenterprises.com.au	<2,000
Hutchins Bros	www.hutchinsbros.com.au	<2,000
Illawarra Steelworks	https://www.illawarrasteelworks.com.au/	<2,000
Industrial Maintenance and Fabrications	https://www.imfab.com.au	<2,000
Inverell Fabrication	https://inverellfab.com.au/	<2,000
JBK Engineering	www.jbkgroup.com.au	<2,000
Karuah Enterprises	https://www.karuah.net.au	<2,000
KS Metal Fabrications	https://www.ksmetalfab.com	<2,000
LA Services	https://www.la.services	<2,000
LSW Group	https://www.lswgroup.com.au/	<2,000
Mario & Sons Steel Fabrication Pty Ltd	https://www.marioandsons.com.au	<2,000
Marko Welding and Sons		<2,000
Metal Projects	https://metalprojects.com.au/	<2,000
Motion Group	https://www.motiongroup.net.au	<2,000
NWI Fabrication	https://nwifabrication.com.au	<2,000
Outdoor Fabrications	https://www.outdoorfabrications.com.au/	<2,000
Oz Metalwork	http://www.ozmetalwork.com.au/	<2,000
Pacific Steel Constructions Pty Ltd	www.pacificsteel.net	<2,000
Paragon Steel Fabrication	https://paragonsteel.com.au	<2,000
Piper & Harvey Steel Fabrications Pty Ltd	www.piperharveysteelfab.com.au	<2,000
PPW Services Pty Ltd	https://www.ppw.net.au	<2,000
Precise Way	https://preciseway.com.au	<2,000
Precision Metal Group Aust Pty Ltd	www.precisionmetalgroup.com	<2,000
Proline Steel	https://prolinesteel.com.au	<2,000
Rambler Welding Industries Pty Ltd	www.ramblerwelding.com.au	<2,000
ReelFab Pty Ltd	https://reelfab.com	<2,000
Riton Engineering Pty Ltd	www.riton.com.au	<2,000
Silo Dev		<2,000
Steel Power 7	https://www.steelpower7.com.au/	<2,000
Sydney Structural Steel	http://sydneystructuralsteel.com.au/	<2,000
Synergy Engineering Australia	https://synergyengineering.com.au/	<2,000
T. Sakkal Group Pty Ltd	www.sakkal.com.au	<2,000
TTM Engineering Pty Ltd	www.ttmengineering.com.au	<2,000
Tub Built Industries	https://www.facebook.com/tubbuiltindustries/	<2,000

Business name	Website	Capacity
Veolia Fabrication		<2,000
Vulkan Advanced Engineering	http://vulkanengineering.com.au	<2,000
Walpett Engineering Pty Ltd		<2,000
Weldcraft Engineering (ACT) Pty Ltd	www.weldcraft.com.au	<2,000
Zac Pirie Welding & Fabrication Pty Ltd		<2,000

Queensland

Business name	Website	Capacity
Beenleigh Steel Fabrications Pty Ltd	beenleighsteel.com.au	>10,000
Sun Engineering (Qld) Pty Ltd	www.suneng.com.au	>10,000
Watkins Steel	www.watkinssteel.com.au	>10,000
ATW Group Pty Ltd	www.atwgroup.com.au	2,000-10,000
Brown Steel	www.brownsteel.com.au/	2,000-10,000
CSF Steel Fabricators	www.csfsteel.com.au	2,000-10,000
Caneland Enginering	www.caneland.com.au/	2,000-10,000
Casa Engineering Pty Ltd	www.casaeng.com.au	2,000-10,000
Central Engineering Pty Ltd	www.ceng.com.au	2,000-10,000
First-Line Engineering	www.firstlineengineering.com	2,000-10,000
HVAC Australia	www.hvac.com.au	2,000-10,000
Jag Welding & Fabrication	www.jagwelding.com.au	2,000-10,000
Livingstone Engineering	www.liveng.com.au	2,000-10,000
JS Welding Services	www.jsweldingservices.com	2,000-10,000
Livingstone Engineering	www.liveng.com.au	2,000-10,000
M2P Engineering	www.m2pengineering.com.au	2,000-10,000
NEACH	www.neach.com.au	2,000-10,000
Pierce Engineering	www.pierceengineering.com.au	2,000-10,000
R&F Steel Buildings	www.rfsteelbuildings.com.au	2,000-10,000
Range Steel Fabrications	www.rangesteel.com.au	2,000-10,000
Sencova Steel Fabricators	www.sencova.com	2,000-10,000
Stanfirst Steel	www.stanfirststeel.com.au	2,000-10,000
Steel Structures Australia	www.steelstructuresaustralia.com	2,000-10,000
Universal Welding Services	www.universalwelding.com.au	2,000-10,000
W D T Engineers Pty Ltd	wdtengineers.com.au	2,000-10,000
Walz Group	www.walzgroup.biz	2,000-10,000
AA Steelworks	www.aasteelworks.com	<2,000
Base Fab	www.basefab.com.au	<2,000
BME Australia	www.bmeaust.com.au	<2,000
Brezac Constructions	brezac.com.au	<2,000
BridgeFab	www.bridgefab.com.au/	<2,000
Coastal Engineering	www.coasteelengineering.com.au	<2,000
Compliant Steel	www.compliantsteel.com.au	<2,000
Cooroy Engineering	www.cooroyengineering.com.au	<2,000
Dawsons Engineering	www.dawsonseng.com.au	<2,000
Eastern States Engineering	www.esengineering.net.au	<2,000
Engineering Applications Pty Ltd	www.engapp.com.au	<2,000
English Engineering	www.englisheng.com.au	<2,000
GM Poles Pty Ltd	www.gmpoles.com.au	<2,000
GNH Engineering	www.gnhengineering.com.au	<2,000
Idec Solutions	www.idec.com.au	<2,000
IS FAB	www.isfab.com.au	<2,000
Kyst Engineering	www.kyst.com.au	<2,000
Lazco Fabrications	lazcofabrications.com.au/	<2,000

Business name	Website	Capacity
Logan Steel Pty Ltd	www.logansteel.com.au	<2,000
Mayfair Engineering & Aluminium	https://mayfairfab.com.au/	<2,000
Micad Industries		<2,000
Morton Steel Pty Ltd	www.mortonsteel.com.au	<2,000
NEM Group	www.nemgroup.net.au	<2,000
Norfab (QLD) Pty Ltd	www.norfab.com.au	<2,000
Pro Fab & Installations	www.profabinstallations.com.au	<2,000
PSF QLD Pty Ltd	www.psfsteel.com.au	<2,000
S.J.C Engineering	www.sjcengineering.com.au	<2,000
Steelman	www.steelman.com.au	<2,000
Strathdickie Smithy Steelworks	www.stratheng.com	<2,000
Studio Steel	www.studiosteel.com.au	<2,000
Taringa Steel P/L	www.taringasteel.com.au	<2,000
Vancisco Industries Unit Trust	www.vanciscoindustries.com.au	<2,000
Versatile Manufacturing	www.versatilestructures.com.au	<2,000
WFM Co Pty Ltd	www.winterfab.com.au	<2,000
Widgee Engineering	www.widgeeengineering.com.au/	<2,000

South Australia

Business name	Website	Capacity
Ahrens Group	www.ahrens.com.au	>10,000
Samaras Structural Engineers	www.samarasgroup.com	>10,000
Advanced Steel Fabrications	www.advancedsteel.com.au	2,000-10,000
Bowhill Engineering	www.boweng.com.au	2,000-10,000
Ferretti International	www.ferretti-international.com.au	2,000-10,000
Genis Steel (SA)	www.genissteel.com.au	2,000-10,000
Lai Group - Fabrication	www.laiswitchboards.com.au	2,000-10,000
MG Engineering S.A. Pty Ltd	www.mgengineering.com.au	2,000-10,000
Stevens Group	www.stevens-group.com.au	2,000-10,000
Tali Engineering	www.talieng.com.au	2,000-10,000
Adelaide Steel Fabrications Pty Ltd	www.asfabsa.com.au	<2,000
BGI Building Group	www.bgibg.com.au	<2,000
Teks Engineering	www.teksengineering.com.au	<2,000
Coded Contracting Pty Ltd	www.codedcontracting.com.au	<2,000
DMK Engineering Pty Ltd	www.dmkengineering.com.au	<2,000
Gadaleta Steel Fabrication Pty Ltd	https://www.gadaletasteel.com.au/	<2,000
Gant and Sons	www.gantandsons.com.au	<2,000
ID Fabrication	https://www.idfabrication.com.au/	<2,000
J.J.P & M Enterprises	www.jjpmenterprises.com.au	<2,000
JDM Steel Fabrication	https://www.jdmsteelfabrication.com/	<2,000
JD's Metal Fab Pty Ltd		<2,000
JMA Engineering	www.jmaeng.com.au	<2,000
Krueger Engineering Pty Ltd	www.krueng.com	<2,000
Lincoln Engineers Pty Ltd	www.lincolnengineers.com.au	<2,000
GE Hughes Construction Pty Ltd	www.gehughes.com.au	<2,000
Macweld Industries Pty Ltd	www.macweld.com.au	<2,000
Reimann	www.reimann.com.au	<2,000
SA Steelworks	www.sasteelworks.com.au	<2,000
Shakti Constructions Pty Ltd		<2,000
Spanlift Australia	www.spanlift.com.au	<2,000
Specialised Solutions Pty Ltd	www.specsolutions.com.au	<2,000
Quantum Steel Fabrications Pty Ltd		<2,000
Woods Constructional Engineers	www.woodscon.net.au	<2,000
Tonkin Schutz Design & Build Pty Ltd	www.tsdb.com.au	<2,000
Tri-metal Engineering Pty Ltd	www.trimetal.com.au	<2,000
Ultimate Engineering + Maintenance Services	www.uems.com.au	<2,000
Williams Metal Fabrication Pty Ltd	www.williamsmetalfabrications.com.au	<2,000
Wiltya Vari	www.wiltyavari.com.au	<2,000
Wingfield Structural Pty Ltd	https://www.wingfieldstructural.com.au/	<2,000

Victoria

Business name	Website	Capacity
Keppel Prince Engineering	www.keppelprince.com.au	>10,000
Genis Steel (Vic)	www.genissteel.com.au	>10,000
ABECK Group	www.abeckgroup.com.au	2,000-10,000
APS	www.apsystems.net.au	2,000-10,000
ArcStructural	www.arcstructural.com.au	2,000-10,000
Aus Iron Industries		2,000-10,000
Barra Steel (Vic)	www.barrasteel.com.au	2,000-10,000
Best Fab Pty Ltd	www.bestfab.com.au	2,000-10,000
Continental Steel Pty Ltd	www.continentalsteel.com.au	2,000-10,000
Dodd Structural Pty Ltd		2,000-10,000
Dynamic Welding Pty Ltd	https://www.dynamicwelding.com/	2,000-10,000
Entegra Trading Pty Ltd	www.entegra.com.au	2,000-10,000
GFC Industries Pty Ltd	www.gfcindustries.com	2,000-10,000
GVP Fabricators Pty Ltd	www.gvpfabricators.com.au	2,000-10,000
Hanlon Industries Pty Ltd	www.hanlonindustries.com.au	2,000-10,000
IJ Build	www.ijbuild.com	2,000-10,000
PacifiCO Structural Steel	www.pacificosteel.com.au	2,000-10,000
Page Steel Fabrications Pty Ltd	www.pagesteel.com.au	2,000-10,000
Randall Industries (Aust)	www.randallindustries.com.au	2,000-10,000
Stilcon Steel	www.stilcon.com.au	2,000-10,000
Structural Challenge Pty Ltd	www.structuralchallenge.com.au	2,000-10,000
Plinius Engineering and Wrought Iron Pty Ltd	www.plinius.com.au	2,000-10,000
Coslee Heavy Metal Fabricators Pty Ltd	www.coslee.com.au	2,000-10,000
Weldtek Pty Ltd	www.weldtek.com.au	2,000-10,000
3PE Engineering Pty Ltd	www.3pe.com.au	<2,000
Acciona M&E Pty Ltd	www.acciona.com	<2,000
Metarom Steel	www.metaromsteel.com.au	<2,000
A-Line Building Systems	www.alinebuildingsystems.com	<2,000
AM Metal Solutions		<2,000
Apex Welding & Steel Fabrication	www.apexwelding.com.au	<2,000
BB Truss & Timber Pty Ltd	www.bbtruss.com.au	<2,000
BridgeCon Pty Ltd	www.bridgecon.com.au	<2,000
Brunton Engineering & Construction	www.brunteng.com	<2,000
Calbah Industries Pty Ltd	www.calbah.com	<2,000
CIGFAB	https://www.civilinfrastructuregroup.com.au	<2,000
Dream Fabrication	www.dreamengineering.com.au	<2,000
Eltham Steel		<2,000
Fichera Engineering Pty Ltd		<2,000
CPE Construction	www.cpeconstruction.com.au	<2,000
Hangan Steel	https://hangansteel.com.au/	<2,000
Jaeger Group	www.jaegergroup.com.au	<2,000

Business name	Website	Capacity
Diamond Steel Engineering		<2,000
KMS Engineering	www.kmseng.com.au	<2,000
Minos Structural Engineering Pty Ltd	www.minosstructural.com	<2,000
NuForm Steel Fabrications Pty Ltd	www.nuformsteel.com.au	<2,000
PC Mobile Welding		<2,000
Profab Steel		<2,000
R&M Engineering		<2,000
SGA Engineering (Aust) PTY LTD	www.sgaengineering.com.au	<2,000
SJ & TA Structural Pty Ltd	www.sjta.com.au	<2,000
Skrobar Trojan Structural Steel Company	www.skrobar.com.au	<2,000
Steelcorp	www.steelcorp.com.au	<2,000
Steelwork Bendigo Pty Ltd	www.steelworkbendigo.com	<2,000
Sutcliffe Engineering Pty Ltd	https://sutcliffe.com.au/	<2,000
APR Structural Steel	www.aprsteel.com.au	<2,000
BWS Industries P/L	www.bwsind.com.au	<2,000
Third Angle Engineering Pty Ltd	www.thirdangle.com.au	<2,000
Atex Steel	https://atexsteel.com.au/	<2,000
Traralgon Industries Pty Ltd	https://www.tindustries.com.au/	<2,000
Truline Engineering (Aust) Pty Ltd	www.truline.net.au	<2,000
Variset Pty Ltd	www.variset.com.au	<2,000
Weldone Pty Ltd	www.weldone.com.au	<2,000
Westys Steel	www.westys.com.au	<2,000

Western Australia

Business name	Website	Capacity
Civmec Construction and Engineering Pty Ltd	www.civmec.com.au	>10,000
Fremantle Steel Fabrication Co.	www.fremantlesteel.com.au	>10,000
Pacific Industrial Company (PIC)	www.pacind.com.au	>10,000
Alltype Engineering Pty Ltd	www.alltypeengineering.com.au	2,000-10,000
Cays Engineering	www.cays.com.au	2,000-10,000
Chess (WA) Pty Ltd	www.chessindustries.com.au	2,000-10,000
Italsteel W.A.	www.italsteel.com.au	2,000-10,000
Metro Steel Fabrication	www.metrosteelwa.com.au	2,000-10,000
National Lintels	www.nationalsteel.com.au	2,000-10,000
WA Cutting Services	www.wacutting.com.au	2,000-10,000
West Australian Steel Sales	www.wasteel.com.au	2,000-10,000
Acute Fabrication Pty Ltd	www.acutefabrication.com.au	<2,000
AD Coote & Co. (Sheetmetal) Pty Ltd	https://adcoote.net.au	<2,000
Arch Engineering	www.archengineering.com.au	<2,000
Austline Fabrications	www.tfggroup.com.au	<2,000
Brian Fisher Fabrications	www.brianfisherfabrications.com.au	<2,000
Enviro Infrastructure Pty Ltd	https://evigroup.com.au	<2,000
Falcon Engineering 95 Pty Ltd	www.falconeng95.com.au	<2,000
Gen X Engineering Pty Ltd	http://genxengineering.com.au	<2,000
Hotweld Fabrication Pty Ltd	https://hotweld.com.au	<2,000
In-situ Construction and Maintenance	www.in-situ.com.au	<2,000
Jasmat Steel Fabrications	http://jasmat.com.au	<2,000
Kimberley Manufacturing Pty Ltd	www.kmpl.com.au	<2,000
Lighthouse Engineering	http://lighthouseengineering.com.au	<2,000
Meneghello Steel Pty Ltd	www.meneghello.com	<2,000
Metro Sheetmetal and Fabrication	www.metrosheetmetal.com.au	<2,000
Murray Engineering Group Pty Ltd	www.murrayengineering.com.au	<2,000
Rollwell Engineering Pty Ltd	www.rollwell.com.au	<2,000
Scenna Constructions	www.vectorlifting.com.au	<2,000
Steelweld Fabrication	www.steelfabricationperth.com.au	<2,000
Unique Metals Fabrication	www.uniquemetalworks.net	<2,000

Tasmania

Business name	Website	Capacity
Haywards Steel Fabrication & Construction	www.haywards-steel.com	>10,000
BridgePro Engineering Pty Ltd	www.bridgepro.com.au	< 2,000
Horizon Poles	https://horizonpoles.com.au/	< 2,000

Australian Capital Territory

Business name	Website	Capacity
Baxter Engineering Pty Ltd	www.baxterengineering.com.au	2,000-10,000
Renrow Steel and Fabrication Pty Ltd	https://renrow.com.au	<2,000

Northern Territory

Business name	Website	Capacity
Jakes Steel & Welding Pty Ltd	www.jakessteel.com.au	<2,000
PH Welding	www.phwelding.com.au	<2,000

5.E. Construction Modelling

Construction modelling or detailing is closely associated with Building Information Modelling (BIM). BIM uses three-dimensional, real-time, dynamic building modelling software to increase productivity in building design and construction, taking account of building geometry, spatial relationships, geography as well as quantities and properties of building materials.

Australian detailers are widely sought after and internationally recognised for application of advanced technologies and tight management with established relationships built from work in the US, Canada, East Asia, the UK and Africa. Benefits that have been realised from Australian detailers contributing to large resource infrastructure projects include:

Project schedule and cost savings

Australian-based detailers keep projects on-time and on-budget through:

- Parallel managing of design and modelling stages.
- Delay mitigation during modelling ahead of construction.
- Project efficiencies through use of advanced BIM systems.
- Construction efficiencies by developing designs that avoid extra rework.
- Applying powerful multidiscipline inspection and clash detection tools.
- Achieving efficiencies through optimising use of datacentric information.
- Maximising workloads offsite.
- Using BIM tools to mitigate construction issues like RFI management.

Improved safety

Australian detailers enhance safety during project developments by:

- Employing visualisations for training, inductions, construction sequencing and project scope to anticipate potential site hazards.
- Minimising onsite work commotion by maximising offsite preassembly.
- Deploying powerful intelligent multi-disciplined clash detection to ensure better design for more responsible construction and operating plant.

Environmental care

Steel detailers in Australia help to safeguard the environment through:

- Better planning that reduces site needs for lay-down areas.
- Facilitating improved site handling and less material wastage.

Experience and quality

Australian detailers are typically independent dedicated specialists who bring a higher level of expertise than a typical detailer associated with a fabricator. They generally have a higher level of industry experience due to the high portion of resource projects than commercial type work and this experience provides resource clients with risk mitigation by providing a more professional design verification process.

With close familiarity with advanced 3D systems, Australian detailers mitigate delays and site rectification costs.

With modularisation becoming more popular, steel supply and fabrication is typically falling on the critical path and owners are therefore engaging detailers that have high productivity rates, efficiencies and quality to mitigate typical engineering delays and maintain schedule.

Technology

One of the reasons why Australian detailers lead the implementation of BIM technologies is due to their advanced knowledge of various 3D modelling technologies as required to maintain a competitive edge against low-cost centres.

Many Australian Construction Modelling firms develop their own in-house software to augment proprietary 3D modelling software packages sold by global brands. Typically, this development aims to improve the performance of the base modelling package to deliver higher quality models and drawings in a shorter time frame, and in many cases it will also allow the drawing office to provide greater control over design revisions, schedule risk and the RFI/TQ process.

Industry Representative body

The Australian Construction Modellers Association (ACMA) has an experienced, professional and technologically sophisticated membership made up of firms ranging in size from sole traders to multi-national corporations.

The ACMA actively promotes best practice techniques for 3D modelling and detail drawings of structural steelwork, metalwork and precast concrete, and reviews the performance and professional conduct of its members.

This means that when you use an ACMA member, your project will have the full attention of a recognised industry participant with links to the latest industry standards and the best on-going professional development available to Australian construction modellers and detailers.

Australian Detailer listing

Company name	State	Website
EDC Consultants	NSW	http://www.edcgroup.com.au/
WAI Engineering	NSW	http://www.wai.com.au/
CCD Drafting Group	NSW	http://www.ccddrafting.com.au/
Elmasry	NSW	http://www.elmasry.com.au/
Jem Drafting	NSW	http://www.jembuildingdesigns.com.au/
PEA	NSW	http://www.ellsmore.com.au/
Demcox	NSW	http://www.demcox.com.au/
Australian Steel Detailers	SA	http://www.asdetailers.com.au/
ICM Integrated Construction Modelling	SA	https://integratedcm.com.au/
Horncastle Drafting	SA	https://www.horncastle.com.au/
Iron Ink Drafting	SA	http://www.ironinkdrafting.com.au/
SASTEEL	SA	http://www.sasteel.com.au/
Austruct	WA	http://www.austruct.com/

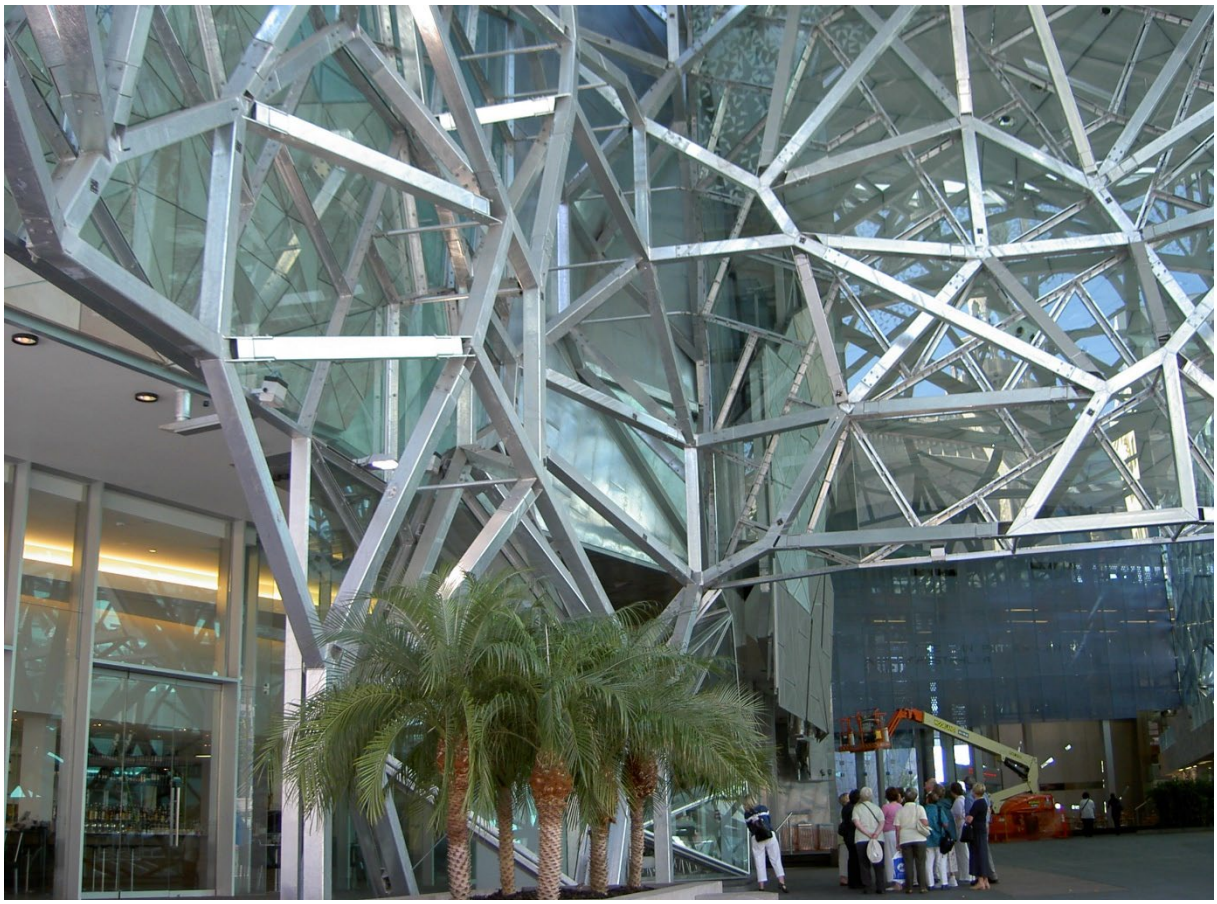
BIM Drafting	WA	https://www.bimdrafting.com.au/
CDS Structural Steel Detailing	WA	http://www.structuraldetailing.com.au/
Cadds Group	WA	https://www.cadds.com.au/
Minstruct	WA	http://www.minstruct.com.au/
Multiplan	WA	http://www.mddwa.com.au/
PDC Group	WA	http://www.pdcwa.com.au/
Universal Drafting	WA	http://www.universaldrafting.com.au/
Company name	**State**	**Website**
Westplan Drafting	WA	http://www.westplan.com.au/
Abel Drafting Services	TAS	http://www.abeldesign.com.au/
Applied	VIC	http://www.appliedsteeldesign.com.au/
Atex	VIC	http://www.atexsteel.com.au/
Baigents	VIC	http://www.baigents.com.au/
Coadata	VIC	https://coadata.com.au/
Ingen	VIC	http://www.ingen3d.com.au/
NV	VIC	http://www.nvdrafting.com.au/
Planit	VIC	http://www.planitdesign.com.au/
Steelforce	VIC	http://www.sfis.com.au/
Van der meer	VIC	http://www.vandermeer.com.au/
Xtech	VIC, WA	http://www.xtechdrafting.com.au/
Barra Steel	VIC	https://www.barrasteel.com/
Newsteel Pty Ltd	VIC	http://www.newsteel.net.au/
3D STRUCT	QLD	http://www.3dstruct.net/
BDS VirCon	QLD	http://www.bdsvircon.com/
BIMTek	QLD	http://bimtek.com.au/
Cadtech	QLD	http://www.cadtech.com.au/
Coutts Drafting	QLD	https://www.couttsdrafting.com/
Draftech Designs Pty Ltd	QLD	http://www.draftechdesigns.com.au/
Draftology P/L	QLD	http://www.draftology.com.au/
Idetail 3D	QLD	https://www.idetail3d.com.au/
Industrial Design Solutions	QLD	http://www.industrialdesignsolutions.com/
Jackson Roxborough Pty Ltd	QLD	http://jrdetailers.com.au/
JBD Steel Detailing Pty Ltd	QLD	http://www.jbdsteeldetailing.com.au/
Roberts Engineering and Drafting	QLD	http://www.robertsengineering.com.au/
Steelcad Pty Ltd	QLD	http://steelcad.com.au/
TD Drafting Services	QLD	http://www.tddrafting.com.au/
Tekcon Services Pty Ltd	QLD	https://www.tekconservices.com.au/

5.F. Hot Dip Galvanizing

With a history of over 180 years, batch hot dip galvanizing (HDG) commands an unrivalled reputation as a cost effective, sustainable, and efficient system of corrosion protection for steel assets. Batch HDG coatings will protect structural steel against corrosion for over 50 years in most locations of Australia and there are local examples where batch HDG coatings have protected steel against corrosion for over 130 years. Articles to be galvanized are prepared off-site in controlled conditions to reduce labour costs, minimise maintenance, ensure environmental cleanliness, and lead times are often significantly less than other protective coating systems.

Galvanized coatings usually provide a cheaper first cost and life cycle cost in comparison to other high-performance corrosion protection systems and the additional carbon footprint is very small (typically about 4%) relative to the initial structural steel footprint, meaning the benefits of structural steel can often be realised during the design life of an asset with reduced or no maintenance over the design life when compared to other protective coatings. All HDG coatings can be painted or powder coated to Australian Standards for additional durability or decorative reasons.

HDG provides a robust protective finish and minimises site work and ongoing maintenance. Its robustness and ability to withstand 'rough' handling also provides security during transport that reduces or eliminates the requirement for final dressing and touch up on site to maintain corrosion protection integrity prior to erection and installation – a significant factor when dealing with the remoteness of many Australian locations. HDG coatings and steel combine to produce a cost-effective sustainable building material that supports the circular economy, with many items able to be reused without additional costs. All galvanized steel is 100% recyclable without loss of properties.



The HDG coating industry in Australia is experienced in the delivery of large infrastructure and resources projects and galvanizers have invested in large facilities and state-of-the-art processes by global standards.

The industry is active in innovation and technology exchange with the global industry through the Galvanizers Association of Australia (GAA). Specifiers, designers, engineers, fabricators, and detailers can directly access the technical expertise of the GAA staff for assistance with design, durability, and sustainability of structures. The GAA also provides estimates on durability of coatings through their on-line and free durability estimator and a major update to the durability estimator will be available in the second half of 2024 (check the GAA website for details). Members of the GAA have also developed an independently accredited industry-wide Environmental Product Declaration (EPD) for hot dip galvanized steel. For general assistance, the GAA's Design Manual is now available online and can be accessed free of charge and without registration.

Members of the GAA provide the HDG coating service to AS/NZS 4680 (batch dip and spin) and AS/NZS 1214 for structural fasteners, while the critical aspects of design and durability of HDG coatings are dealt with by AS/NZS 2312.2. This group of Standards are referenced by various Australian design codes, including AS/NZS 5131 and the Building Code of Australia. Alternatively, GAA members can provide HDG coatings to all the major international Standards.

Capability of Australian Galvanizing Industry

The Australian hot dip galvanizing industry processes around 500,000 tonnes of steel per annum, with all cities and major regional areas well serviced by batch dip and spin coating services. Listed below are the galvanizing members of the Galvanizers Association of Australia along with their location and bath sizes (length x width x depth). More details are available here.

Business	Location	Bath Size (L x W x D)
Adelaide Galvanising Industries	Cavan, SA	9.5 x 1.3 x 2.8m (dip)
Albury Galvanizing	Albury, NSW	9.5 x 1.5 x 2.6m (dip)
Australian Professional Galvanizing	Stuart, QLD	12.5 x 1.6 x 2.8m (dip)
	Cairns, QLD	Depot for drop off and pick up
	Mackay, QLD	Depot for drop off and pick up
DSI Underground (Fero Group)	Narangba, QLD	13.0 x 1.8 x 3.0m (dip) 3.0 x 1.2 x 1.5m (spin)
	Kewdale, WA	15.0 x 2.2 x 3.6m (dip) 4.0 x 1.5 x 2.4m (spin)
Furphy Galvanizing	Shepparton, VIC	8.5 x 1.45 x 2.2m (dip)
Galserv (NEPEAN Building & Infrastructure)	Yagoona, NSW	10.3 x 1.85 x 2.3m (dip)
Galvatech	Padstow, NSW	9.5 x 1.6 x 2.6m (dip)
GB Galvanizing Service	Bayswater, VIC	9.5 x 1.8 x 2.6m (dip)
	Dandenong South, VIC	13.7 x 1.8 x 2.95m (dip)
Geelong Galvanizing	Corio, VIC	9.5 x 1.5 x 2.6m (dip)
Hartway Galvanizers	Canning Vale, WA	12.6 x 1.4 x 2.7m (dip)
	Naval Base, WA	12.6 x 1.4 x 3.0m (dip)
Korvest Galvanisers	Kilburn, SA	14.0 x 1.6 x 2.2m (dip) 4.0 x 1.25 x 1.6m (spin)
Mgalv	Landsdale, WA	9.2 x 1.6 x 2.7m (dip)
Sydney Galvanizing	Prestons, NSW	8.3 x 1.65 x 2.6m (dip and spin)
Valmont Coatings (Industrial Galvanizers)	Girraween, NSW	12.5 x 1.7 x 2.4m (dip) 6.7 x 1.24 x 1.64m (spin)
	Hexham, NSW	14.2 x 1.8 x 2.6m (dip)
	Port Kembla, NSW	Depot for drop off and pick up
	Carole Park, QLD	12.2 x 1.8 x 2.2m (dip) 4.5 x 1.2 x 1.6m (spin)
	Pinkenba, QLD	10.2 x 1.8 x 2.2m (dip)
	Prospect Vale, TAS	6.5 x 1.05 x 1.4m (dip) 12.5 x 2.0 x 2.95m (dip) 6.0 x 1.2 x 1.8m (spin)
-	Campbellfield, VIC	

5.G. Protective Coatings

Coatings are essential to protect steel substrates from the natural process of corrosion and to ensure the design life of structures is reached with minimum maintenance, cost and risk.

Annual corrosion costs in Australia are generally accepted to be between two to five percent of Australia's GDP. According to the Australasian Corrosion Association (ACA), that cost was estimated to be around $45 billion in 2018.

What is Corrosion?

There are many definitions of corrosion, however, two common ones are:

Corrosion is the deterioration of a material, (usually steel), because of a reaction with its environment.

and

The destruction of steel by an electrochemical process that is recognised by the formation of rust or pits.

These two definitions bring together the idea of an *environment* and the *electrochemical process* which are fundamental in understanding corrosion in terms of why it occurs and how it can be prevented.

Consequences of corrosion

As steel corrodes, it deteriorates as more iron oxide is produced. This causes a reduction in the steel's structural integrity in terms of its fundamental properties which make it such an ideal cost effective and reliable construction material (i.e. tensile strength, toughness and flexibility).

A good way to look at the consequence of corrosion is:

Corrosion = **Steel Metal Loss** = Reduced Steel Structure Design Life

Steel Metal Loss = Maintenance Costs

Reduced Steel Structure Design Life = **Potential for lost Revenue**

Consider steel constructions such as offshore structures, stadiums and bridges that must support the weight of extreme loadings and provide a safe working environment and the catastrophe of potential structural failure due to corrosion. What price has the loss of life?

This simple, very natural, electrochemical process can be very costly! The latest figures (2017) for the USA suggest that corrosion costs approx. $590 Billion per year!

Specifications for Major Projects

The onset of corrosion can be effectively controlled by a protective coating specification which outlines a paint system being a product or combination of products as well as appropriate surface preparation methodologies.

Consideration of the specifications at the early stages of a major project will assist in determining the most cost-effective coatings solutions for the life of the asset.

In selecting a coating system, it is important to understand the:

- Construction of a structure.
- Environment and location.
- Profile of the project and aesthetic requirements.
- Expected lifetime of the structure prior to first major maintenance.

To ensure correct specification and advice is received, certain Australian paint manufacturers can offer ACA and NACE International qualified personnel to minimise risk and costs associated with the potential onset of corrosion.

Credentials

A credible Australian paint manufacturer should hold the following accreditations:

- Quality Management System Standard: AS/NZS 9001:2000.
- APAS Recognised Manufacturer.

- NATA Accredited Laboratory ISO/IEC 17025.
- Environmental Management System Standard: AS/NZS 14001:2004.
- Health, Safety and Environment.
- Product Stewardship.

Product

Protective coating products should be tested to industry standards including NACE, ISO, NORSOK, NSF and more. Australian manufacturers should have products which follow these standards:

ISO 12944 Paints & Varnishes – Corrosion Protection of Steel Structures by protective paint systems (parts 1-8). ISO 12944 is intended to assist engineers and corrosion experts in adopting best practice in corrosion protection of structural steel at new construction.

AS 2312.1 - Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings – Part 1: Paint coatings.

Products unique for major steel projects are passive fire protection, ultra-high build epoxies, antifouling coatings, high temperature resistant systems (including under insulation), abrasive resistant coatings, tank linings, aesthetics, zinc rich coatings and maintenance coatings.

Paint products in Australia are free from lead due to local legislation.

Maintenance and Repair

Essential maintenance painting can be a costly and disruptive process. In the oil and gas industry, structures must be adequately maintained to extend life and reduce the hazards that can result from corrosion.

A comprehensive, proactive maintenance plan which identifies priority areas and specifies maintenance systems tailored individually for the asset should be in place to minimise downtime and reduce spend over the life of a project.

Regulatory Bodies

In Australia, there are recognised regulatory bodies that manage and assist the protective coatings industry, including:

Australian Paint Manufacturers' Federation (APMF)

The APMF was established in 1947 to represent the interests of Australian paint manufacturers. It was incorporated in New South Wales in 1986. Its objectives are to:

- Advance the theory and practice of paint technology in Australia.
- Promote efficiency and safe work practices.
- Foster international cooperation and standards.
- Advance, encourage and protect the interests of its members.

Australian Corrosion Association Incorporated (ACA)

The ACA is a not-for-profit, membership Association which disseminates information on corrosion and its prevention or control by providing training, seminars, conferences, publications and other activities. Ultimately to ensure corrosion is managed sustainably and cost effectively to ensure the health and safety of the community and protection of the environment and assist society to manage the impact of corrosion on asset durability.

5.H. Grating and Handrails

ASI members Webforge, Nepean Building and Infrastructure (Weldlok), and Mentis manufacture grating in numerous combinations of load bar depth and thickness, load bar pitch and cross rod pitch.

Load bearing bars incorporated in grating are produced from steel which conforms to the equivalent standards: AS3679, BS4360 Grade 43A and ASTM A36.

Steel grating is suited to many applications, from light-duty applications (maintenance floors, occasion usage), though light/medium duty applications (residential, light industrial occasional public usage), medium duty applications (mining and commercial, regular or medium industrial usage), heavy duty applications (heavy industrial, mining and trolleys and industrial equipment), and extra heavy-duty applications (frequent impact from trolleys).

Both companies supply a complete range of mild steel grates in compliance with the load and permanent set requirements specified in AS3996. Conformance certificates can be supplied upon request. They are also capable of custom manufacturing Mild Steel Grates and Frames to suit specific client applications and load test according to AS3996 if required.

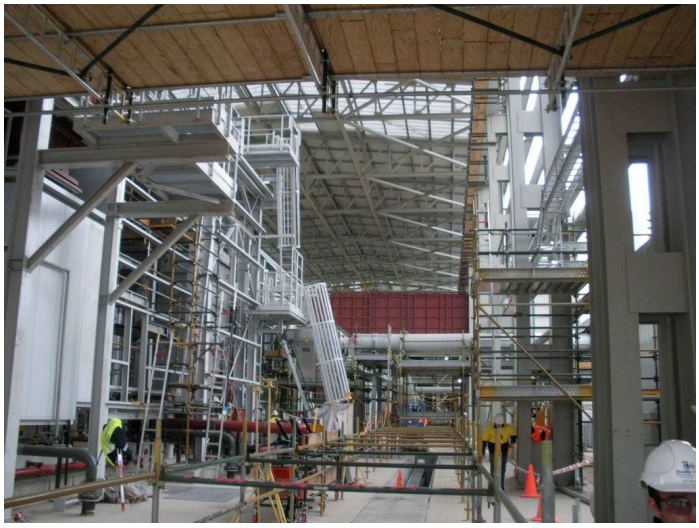
They also have an extensive range of handrail products in compliance with Australian Standards AS1657. These handrail systems can be transported and erected economically in all applications and locations. Complete systems can be supplied, including stanchions, rails, bends, kick-plates, grating and stair treads as required.

For further information on these companies, visit:

www.webforge.com.au

https://www.weldlok.com.au/

https://www.mentis.com.au/



6. Quality and Standards

Australia's larger steel manufacturers Liberty Primary Steel, InfraBuild and BlueScope Steel have a long and proud history of manufacturing structural steel in Australia. All three steel companies manufacture product to Australian and International Standards, providing a known level of quality with full traceability.

Over the years, the Australian Standards used for structural steel design have developed, reflecting improved understanding of material performance, structural behaviour and design processes.

Sites producing steel in Australia have a quality policy to guide process control to ensure product quality. All manufacturing facilities have quality management systems accredited to ISO 9001:2008. This accreditation is actively maintained and audited, ensuring a mature and fully functional system. Manufacturers are committed to the principles of quality assurance, thereby increasing the customers' confidence of the project being delivered to the required quality standards. Steel manufacturers are active in the development of improved product, fabrication and steel design standards. AS 4100 Steel Structures, Australia's main structural steel design, fabrication and erection standard, has been developed in conjunction with the steel manufacturers.

Australian manufactured products produced to the material standards AS 1163, AS/NZS 3678, AS/NZS 3679.1 and AS/NZS 3679.2 provided the statistical data used to calibrate the capacity factors and notch toughness defined in these standards. The quality and consistency of Australian manufactured products was recognised with prequalification of these materials to allow their use in structures without additional procedures. Therefore, Australian produced structural steel is inextricably linked to the structural and materials standards used in steel design.

In welded fabrication, statistical data associated with Australian manufactured steels was used in the calibration of standard AS/NZS 1554 Structural Steel Welding (specifically Parts 1 and 5). Control and consistency of chemistry in the Australian manufactured materials allows a large range of joint configurations to be prequalified for use without or with minimal additional weld testing necessary. Both AS4100 and AS/NZS1554.1 require the verification of steels produced to other standards or sourced from other suppliers, prior to use in design and fabrication. This may require a review of statistical data provided by the manufacturer or additional testing by the fabricator.

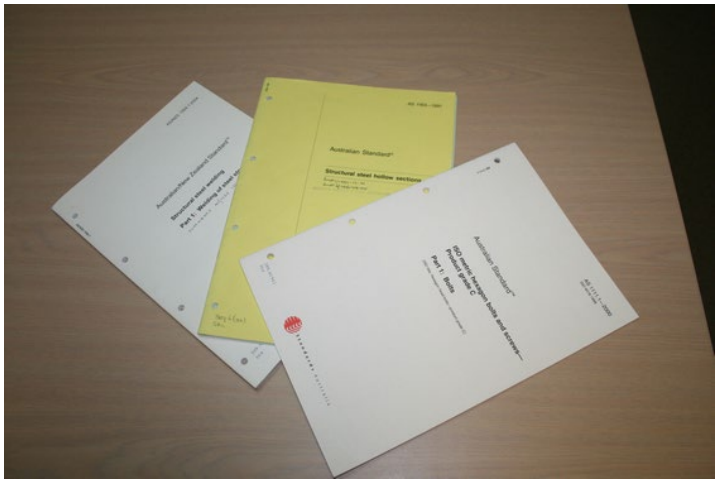
Technical expertise in standards, material, structural design and fabrication is provided by all Australian steel manufacturers. The ASI also has an extensive Library for reference and

many technical publications available from its bookshop. Assistance with specification, design and fabrication of steel products is available to members on request. Should any quality incidents arise, full technical backup of the products is provided.

All products manufactured are provided with documentary evidence of the inspection and testing performed. Laboratories used for performing these procedures have internationally recognised accreditation with the National Association of Testing Authorities (NATA) and the International Laboratory Accreditation Cooperation (ILAC). Prior to ordering, the customer can request additional testing and inspection procedures and documentation. The inspection and test documents will be supplied to the customer with the product order. In addition, the steel manufacturer archives this documentation. Products are branded with unique identification allowing traceability to the production facility linked to the manufacturing conditions for each item. All relevant product processing information is reviewed by the steel manufacturer to ensure conformance to its governing Australian Standard (as appropriate) and the results are archived for future reference.

If requested, third party product certification is available at various mills. This can incorporate factory production control (FPC) certification to ensure technical competence to produce the product and ensure continuing compliance with the provisions of the technical specification throughout the order production. FPC is a permanent internal control of production exercised by the manufacturer requiring the elements, requirements and provisions adapted by the manufacturer be documented in a systematic manner in the form of written policies and procedures. The FPC takes into account the process of the related production line from the raw material to finished product and storage of the product.

Assurance of total commitment to quality is backed up by ensuring that the manufacture of steel products is carried out in facilities with certified environmental (ISO 14001 compliance) and world-leading OH&S performance.



National Structural Steelwork Compliance Scheme

The supply of an unacceptable degree of non-conforming, unsuitable and often-faulty building products is increasingly being seen in building, infrastructure and resources projects in Australia, ranging from small local developments to major projects involving international teams.

Image courtesy Structural Challenge.

A 2013 Australian Industry Group (AiG) survey reported that **95% of respondents surveyed in the steel product sector reported non-conforming product in their supply chain**.

While our Standards suite in general, and AS/NZS 5131 in particular, provide a technically sound foundation, and the National Structural Steelwork Specification (NSSS) provides a robust implementation of AS/NZS 5131 in project process, the checking and auditing of deliverables is vitally important to achieve the quality and risk-minimised outcomes our community expects and our regulatory system requires.

Unfortunately, it is not straightforward to properly check the deliverables from the steel fabrication or erection process. Documentation requirements are substantial (as would be expected) and many processes such as welding are considered ‘special processes’,

meaning the outputs cannot be readily checked without destroying the component. Hence, the inputs must be controlled and managed to ensure fit-for-purpose outcomes.

The ASI developed the **National Structural Steelwork Compliance Scheme (NSSCS)** to help manage and control the fabrication and erection process, hence ensuring fit-for-purpose deliverables. Industry association-led compliance schemes are commonplace in the UK, US, Canada and Europe. In Europe there is, in addition, a legislated mandatory construction products regulation. New Zealand has joined Australia in developing an industry-led compliance scheme based on AS/NZS 5131.

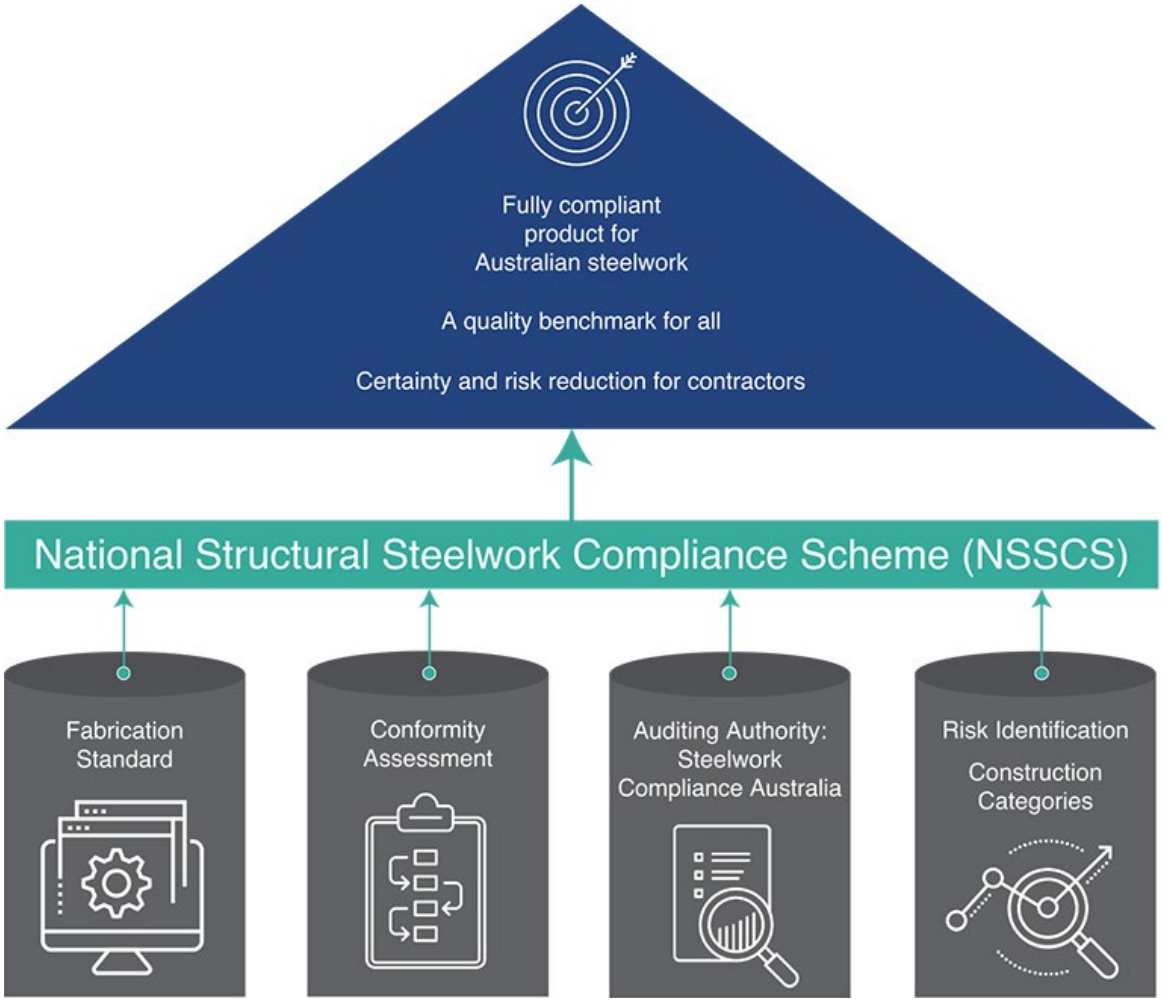
Scope of the NSSCS

The ASI NSSCS is an independent third-party quality compliance and certification system for supply, fabrication and erection of structural steelwork in Australia. The technical basis for the NSSCS is founded on AS/NZS 5131 Structural steelwork – Fabrication and erection and is applicable to structures designed to AS 4100 (structural steelwork), AS 5100.6 (bridges) and supporting Australian Standards, including those for welding, bolting and corrosion protection.

Structure of the Scheme

The NSSCS comprises four supporting pillars:

- AS/NZS 5131 as the technical foundation;
- Risk assessment and engineer selection of the Construction Category for the particular project;
- Conformity assessment to the requirements of AS/NZS 5131;
- Auditing and certification of fabricators to one of the Construction Categories through the separate body Steelwork Compliance Australia (SCA).



The NSSCS in project process

For engineers:

- Engineer designs the structure and creates the specification, ideally using the NSSS as template;
- Specification calls up AS/NZS 5131, Construction Category and project-specific selections.

For fabricators and erectors:

- Undertake a web-based audit with Steelwork Compliance Australia (SCA) to establish current level of conformity;
- Apply for SCA certification via a workshop site audit and final audit review process;

- Maintain certification with annual surveillance audits.
- Obtain SCA certification via an audit;
- Maintain certification with annual audits.

For builders:

- Client/builder selects fabricator, who works to requirements in AS/NZS 5131;
- Best outcomes with a fabricator independently certified by Steelwork Compliance Australia (SCA) under the NSSCS.

For building certifiers:

- Requires engineer to provide confirmation of review against full requirements of Australian Standards;
- Independently audits and approves basis of documentation from engineer;
- Confirms fabricator certified under NSSCS, or;
- Performs detailed review of supply chain documentation.

NSSCS and JAS ANZ accreditation

Responding to market demands particularly in the Government sector, for independent accreditation of the Scheme, ASI achieved having the Scheme accredited under JAS ANZ in March 2019.

Steelwork Compliance Australia has also achieved accreditation under JAS ANZ in August 2022.

ShedSafe

ShedSafe® promotes Australian-manufactured steel products used in construction of cold-formed shed structures, such as sheds and garages and promotes steel shed industry compliance in the design, supply and construction principally of those types of structures.

This is achieved by pursuing portable building compliance with Australian Standards (Building Code of Australia) and developing documentation formats that conform to local government and certifier requirements. Achieving industry compliance is linked to improving the credibility and sustainability of the industry.

The ShedSafe was formed as a representative group for the shed industry to:

- ensure that buildings comply with all relevant Australian standards;
- improve credibility and sustainability for the steel shed industry;
- have shed designs / documentation that conform to local government requirements.

ShedSafe works towards the promotion of Australian-manufactured steel products and Australian capability in the efficient design, supply and construction of cold-formed shed structures. It provides an independent industry forum for awareness, code position representation, government lobbying, industry education and technical representation, presentations and seminars. Membership consists of a broad range of shed manufacturers, roll-forming companies and industry suppliers. ShedSafe also guarantees that members have undergone ShedSafe training and submit to regular reviews of the manufacturer's design principles and processes. More information is available at the **ShedSafe** website.

7. Welding and Testing

Welding is an economical method of joining materials, enabling transmission of large critical loads which may be static and/or dynamic under various conditions (high/low temperature, etc). The welding and related testing industry in Australia is highly sophisticated and is on par, if not exceeds the service requirements and outputs of many similar industries around the world. Industrial applications in Australia are well serviced by specialist and general welding and testing contractors including experienced and qualified structural steel fabricators, boilermakers, pressure piping and mechanical contractors. Such contractors have been successfully engaged in many and various complex and high-profile welding applications both in Australia and abroad.

Complex and economical welded fabrication has been readily achieved with Australian welding contractors. Such positive outcomes have been due to rigorous welding, certification, testing and inspection as embraced by the local industry via Standards Australia, International Institute of Welding (IIW), International Standards Organisation (ISO) and other national standards (ASME, etc). The development and utilisation of such standards has taken place for many years.

Australian welding and related testing contractors generally have third-party certification to ISO 9001 and other relative certification for their specialist areas.

The evolution of much of the welding and testing standards used in Australia are based on many years of ongoing calibration with welding and inspection processes, personnel, equipment, consumables and materials with the correlation to design assumptions. Such has been the success that should welding contractors use such standards, their testing and compliance requirements are significantly minimised.

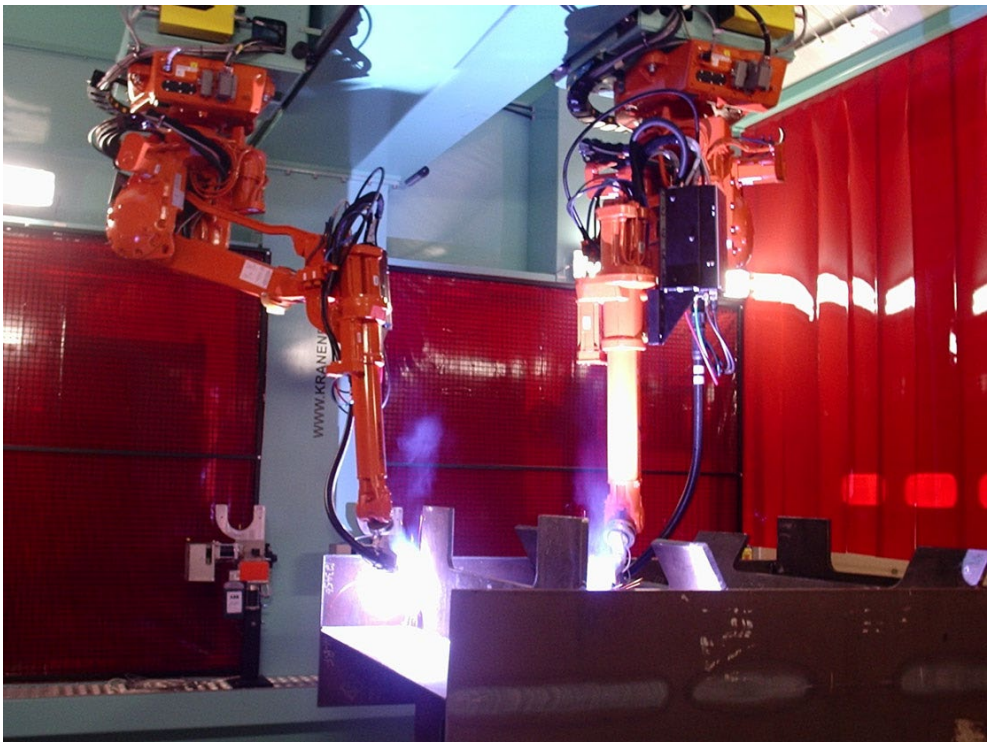
In welded fabrication, statistical data associated with Australian manufactured steels are used in the calibration of standard AS/NZS 1554 Structural Steel Welding (specifically Parts 1 and 5). Control and consistency of chemistry in the Australian manufactured materials allows a large range of joint configurations to be deemed pre-prequalified for end-use without or with minimal additional weld testing necessary. Both AS 4100 (design) and AS/NZS 1554 (welding) require the verification of steels produced to other standards or sourced from other suppliers, prior to use in design and fabrication. This may require a review of statistical data provided by the manufacturer or additional testing by the fabricator. Hence, the use of Australian welding contractors and their sophisticated welding standards helps to reduce the risk of non-compliance in this area.

Further support for addressing Australian welding, testing and inspection issues can be readily obtained from the:

- Weld Australia (WTIA).
- Australian Steel Institute (ASI).
- Australian steelmaking and finished steel manufacturing companies, BlueScope Steel and InfraBuild.

This backup includes assistance in standards, materials, structural design and fabrication. Should any quality incidents arise, full technical support of the products is provided.

Coupled with cost effectiveness, embracing Australian welding and related testing contractors increases confidence in such critical areas as welding and testing. The success of the industry in such areas over many years further validates this situation.



8. Steel reinforcing

About Steel Reinforcement Institute of Australia

The Steel Reinforcement Institute of Australia (SRIA) is a national non-profit organisation providing a high-quality technical support and information service to the Australian building industry on the use of reinforcing steel in concrete, primarily reinforcing bar (Rebar) and reinforcing mesh (Reomesh). SRIA is funded and supported by the vast majority of the manufacturers and suppliers of steel reinforcing used in Australian construction. The SRIA offers practical solutions to meet the diverse and ever-changing needs of the Australian building industry. The organisation actively supports and encourages the use of Australian capability and quality in the processing and use of reinforcing steel in concrete in an increasingly competitive global market.

SRIA Processor Members

SRIA Processor Members are established Australian companies responsible for subsequent processing of reinforcing steel supplied by a steel producer in Australia or from overseas which significantly changes the shape and properties of the steel. They are processors of steel reinforcement in Australia, meet recognised technical standards and keep production and financial records. Processors provide the market with a one-stop processing shop or fabrication of steel reinforcement to AS 3600, AS 5100 and AS 2870 in compliance with the relevant Australian Standard AS/NZS 4671:2001 *Steel reinforcing materials*. Steel reinforcing is often packaged with a range of complementary products supplied by SRIA Associate members.

SRIA Associate Members

SRIA Associate members (Accessories Suppliers, Machinery Suppliers and Steel Mills) are established Australian and International companies who have aims and objectives similar to those of SRIA. They strive for quality and compliance with the relevant standards, maintain quality assurance and implement workplace health and safety. They service Processor Members through supply of ancillary products providing the end user with a complete solution, supply of steel reinforcing feed materials to processors or processing equipment. SRIA Processor members commonly package in-house a range of Associate Member complementary products for delivery of a complete steel reinforcing solution.

Quality Assurance and Traceability

SRIA Processor members strive for compliance with the relevant standards that apply to the reinforcement industry and this professionalism is demonstrated in one of two ways:

a *Third-Party Product Quality Certification to AS/NZS 4671 and AS 3600*

ACRS certification will satisfy this criterion but this is not exclusive.

b *Documented Quality Management System plus Authority Product Approvals*

The ISO 9000 family of standards for quality management systems plus multiple product approvals from State and/or Federal Government Construction Authorities.

Mill Feed Materials

SRIA processors purchase their feed materials from quality Australian and overseas mills. A list of third-party accredited mills can be found at www.acrs.net.au.

Capability – Tonnage and Footprint

The combined industry capacity of all SRIA Processor members is in excess of 1.5 million tonnes per annum of steel reinforcing supplied into resource, engineering construction, commercial and residential projects. This comprises both cut and bent reinforcing bar or manufactured reinforcing mesh. SRIA Member companies source, schedule, process and distribute packaged solutions to meet clients' procurement strategies and project plans.

The SRIA Processor footprint spreads across all states of Australia providing a reliable and efficient just-in-time supply chain. Steel reinforcing traditionally has very short lead times measured in hours to days. Members understand the customer needs and the importance of service and delivery performance on the project plan. SRIA Members efficiently control and manage risk in reinforcement supply. Engaging the professional members of the supply chain will turn potential risk into opportunity. With early SRIA processor member involvement on major and often the more remote projects, customers can confidently build in these shorter lead times after the issuing of final construction documentation.

Sustainability

The SRIA promotes a program of steel stewardship, seeking to engage the whole steel reinforcement supply chain in adopting more environmentally sustainable practices. SRIA Processor Members have an Environmental Sustainability Policy (ESP) encompassing the industry's environmental, social and economic performance. This is a continual process of benchmarking, monitoring and measuring progress. The SRIA has established and

maintains global networks to deliver improvement programs in responsible Best Practice to the local steel reinforcing sector.

Workplace Health and Safety

The SRIA promotes industry wellbeing and a safe and healthy working environment. The SRIA records trend data and monitors national industry statistics on lost time injuries (LTIs) and medically treated injuries (MTIs), from participating Processor members. This data enables each company to compare and benchmark their safety record against the national industry values for continuous improvement of their Safety Policy or Safety Management System. Consistent improvement and performance are a reflection of the safety conscious companies the SRIA represents. The ultimate aim is to achieve an accident free workplace with zero harm to all steel reinforcing industry employees and contractors.

The SRIA National Safety Group meets quarterly around the country at member's manufacturing premises. This group comprises the Safety Managers from each member Processor company and is chaired by SRIA's Executive Director. Members work together to share their collective knowledge to ensure the member companies have a consistent approach toward a safer work environment and awareness of safety issues within the reinforcement processing industry.

Standards

SRIA Processors benchmark both locally and internationally to sustain world's Best Practice across design, specification, production and supply. The SRIA Membership strives to achieve quality and continuous improvement and is actively involved in Standards Australia, with representation on the following Committees:

BD-002 Concrete structures (AS 3600)
WD-003 Welding of structures (AS 2214)
BD-006 Structural design actions (AS 1170)
BD-025 Residential slabs and footings (AS 2870)
BD-066 Tilt-up concrete construction (AS 3850)
BD-084 Steel reinforcing materials (AS/NZS 4671)
BD-090 Bridge design (AS 5100)
BD-098 Pavements

Leaders in Reinforcing Steel Processing

Processor	Capability Details
Active Steel	www.activesteel.com.au/
AKZ Reinforcing	http://www.akz.com.au/
ARC - The Australian Reinforcing Company	www.arcreo.com.au
Ausreo	www.ausreo.com.au
Best Bar Reinforcements	https://www.bestbar.com.au/
Bianco Reinforcing	https://www.bianco.com.au/
Mesh & Bar	www.meshbar.com.au/
Neumann Steel	www.neumannsteel.com.au
InfraBuild Construction Solutions	www.infrabuild.com
VicMesh	www.vicmesh.com.au
Wire Industries	http://www.wireind.com.au/contact

Leaders in Reinforcing Steel Accessories Supply

Accessories Supplier Member	Capability Details
Ancon	https://www.ancon.com.au/
aSa Australia - Applied Systems Associates	https://www.asahq.com/
Connolly Key Joint	https://www.connollykeyjoint.com/
Danley Construction Products	https://www.danley.com.au/
Erico Products Australia	https://www.erico.com/default.asp
Modfix	http://www.modfix.com.au/
Reid Construction Systems	https://reid.com.au/

For further information visit the SRIA website at www.sria.com.au

9. Whole of industry cooperation

Working together

The steel value chain has a long and successful history of cooperation and banding together to get the job done in the most efficient way. The value chain is strongly linked from manufacturer to distributor to fabricator as customers and suppliers, each of whom works seamlessly with the various other associated links including, engineers, architects, design detailers, painters, galvanizers, erectors and others to ensure that a solution is delivered to the satisfaction of the end-user.

The ASI has long established links with a number of key industry bodies that support the steel industry including; Engineers Australia, the Architects Institute of Australia, the Australian Industry Group, the Building Products Industry Council, and other key associations who interact with the steel industry.

The ASI and the industry in general also work closely with the trade unions that work within the steel sector including the Australian Workers Union, Australian Metal Workers Union, National Union of Workers and the Construction Forestry Mining and Energy Union.

Building Products Industry Council

The Building Products Industry Council (**BPIC**) is the national body representing Australia's building product associations who support Australia's building product manufacturers and suppliers. BPIC's members and associated member companies directly employ over 200,000 Australians with more than 470,000 employed indirectly. Their collective industries are worth over $54 billion annually to the Australian economy.

The Council's prime objective is to provide unified and coordinated representation of the building products industry to Government and regulators while providing a forum for discussion and information sharing between manufacturers.

BPIC's mission is to promote the most efficient and innovative use of building products within a nationally consistent regulatory environment and regards the Building Code of Australia as the pre-eminent national regulatory framework for building.

The Council works to fulfil this aim by sourcing and delivering practical and current industry information to regulators on behalf of its members. This industry-wide approach to responding to codes and standards helps to ensure all levels of government hear a unified voice when changes are proposed that will affect Australia’s building product manufacturing and supply industries.

BPIC works to ensure the regulatory framework supports a viable and efficient building products industry in Australia, recognising that this extends beyond Australia to the global market for building materials. BPIC also encourages investment in skills formation, product development and industry research by helping to identify and remove regulatory impediments to innovation. They participate in research into technical codes, standards and regulations as well as matters of mutual interest to the building products industry. The Council is governed by a Board of Directors comprising representatives from the member organisations.

10. Industry Participation Plans and Local Content Procurement

Australia has a range of Federal, State and Territory Government legislative frameworks in place designed to encourage the creation of local jobs in association with major project investment. These frameworks apply principally to large government funded one-off projects such as transport infrastructure or recurrent spending on items such as public buildings e.g. hospitals, gaols, schools.

Federal Government

Australian industry participation

Australian Industry Participation (AIP) requirements ensure full, fair and reasonable opportunity for Australian industry to compete for work. This includes work in major public and private projects in Australia, and procurements or projects receiving Australian Government funding of $20 million or more.

The Australian Industry Participation National Framework commits the Australian Government and state and territory governments to adopting a consistent national approach to maximise Australian industry participation in major projects in Australia and overseas. Each jurisdiction also has its own industry participation policies aimed at increasing Australian industry participation.

Legislation

The Australian Jobs Act 2013 (the Jobs Act) requires proponents of major projects with capital expenditure of $500 million or more to provide opportunity for Australian industry to bid to supply key goods and services.

Australian Industry Participation Authority

The AIP Authority:

- provides guidance on the obligations under the Jobs Act, including if and when an AIP plan is required;
- can assist with development of an AIP plan;
- approves AIP plans;
- publishes AIP plan summaries;

- provides guidance on how to report against your implemented AIP plan;
- monitors and enforces compliance with the Jobs Act.

The Guidelines for Jobs Act Compliance Monitoring and Enforcement detail the compliance process.

Australian Industry Participation plans

AIP plan requirements are applied to:

- major public and private projects with capital expenditure of $500 million or more;
- Australian Government procurements of $20 million or more;
- Australian Government grants of $20 million or more;
- Australian Government payments of $20 million or more to state and territory governments for large infrastructure projects;
- investments from the Clean Energy Finance Corporation and Northern Australia Infrastructure Facility of $20 million or more.

State and Territory Governments

Australian Capital Territory

Canberra Regional Local Industry Participation Policy

The Canberra Region Local Industry Participation Policy (LIPP) applies to all approaches to market by Territory entities as implemented from 1 January 2017. Territory entities must consider local capability and economic benefits for the Canberra Region when determining the best available procurement outcome.

LIPP requirements will be stated at the initial invitation stage of a procurement process for procurements $200,000 or above (GST inclusive). Businesses responding to a Territory entity procurement of $200,000 or more and less than $5 million (GST inclusive) will be required to complete an Economic Contribution Test (ECT).

For procurements $5 million and above (GST inclusive) respondents will be required to submit a Local Industry Participation (LIP) plan. The successful bidder will also be required to report on their IP plan outcomes as part of the contract terms.

New South Wales

NSW Small and Medium Enterprise & Regional Procurement Policy

SME and Regional Supplier Exemption. NSW Government agencies may negotiate directly with and engage an SME or regional supplier, for goods and services up to $150,000, including where there is a whole-of government arrangement in place.

SME First. NSW Government agencies must first consider purchasing from an SME, for procurements up to $3 million, where the agency is permitted to directly purchase goods and/or services from a supplier, including from prequalification schemes and panels.

SME and Sustainability Criteria. For goods and services contracts valued at $3 million or more, a NSW Government agency must include in the non-price evaluation criteria as a minimum:

- 10 percent allocated to SME participation; and
- 10 percent allocated to support for the NSW Government's economic, ethical, environmental and social priorities.

Where no weightings are used, SME participation and support for the NSW Government's economic, ethical, environmental and social priorities should be given appropriate qualitative consideration.

SME and Local Participation Plan and Reporting. For contracts valued at $3 million or more, suppliers are required to submit a SME and Local Participation Plan, referencing SME and NSW specific content, consistent with International Procurement Agreement (IPA) obligations, and report on these commitments quarterly. We ensure that major procurements consider their impact on SMEs and the NSW industry in their activities.

Northern Territory

Buy Local Plan

The NT Buy Local Plan gives local businesses greater opportunity to tender for and win government work. It takes a broad view in addressing local benefits end-to-end across the procurement and contract management lifecycle - beginning with business and procurement planning, then progressing into tendering, contract formation, and lastly contract management.

The NT Buy Local Industry Advocate is an independent link between local businesses and the NT Government.

The advocate's role is to ensure that:

- Territory local businesses have full, fair and reasonable opportunities to compete for government contracts
- Value for Territory is considered in all aspects of government contracting
- promotes buy local principles by industry

Queensland

Buy Queensland 2023

Buy Queensland 2023 is the latest evolution in the Buy Queensland approach to government procurement. It has a focus on building on the achievements of Buy Queensland and the procurement investment opportunity for the Brisbane 2032 Olympic and Paralympic Games.

Buy Queensland 2023 commenced on 1 June 2023 and is made up of the Queensland Procurement Strategy 2023 – Jobs, Economy, Legacy, Confidence (QPS 2023) and the Queensland Procurement Policy 2023 (QPP 2023). The QPS 2023 and QPP 2023 work as one: the strategy sets the context and direction, and the policy details the 'how' to get there.

Queensland Government Charter for Local Content

This charter aims to provide all businesses with full, fair and reasonable opportunities to tender for Queensland Government procurements. The Queensland Charter for Local Content and Agency Guidelines are designed to support government agencies to incorporate the principles of the charter into their procurement processes and procedures. Additionally, the Queensland Charter for Local Content Tenderers Guidelines has been designed to assist managing contractors delivering projects for the Queensland Government that fall within the charter.

Local Benefits Test

This forms part of the Queensland Government Procurement Policy and is administered by the Queensland Department of Housing, Local Government, Planning and Public Works.
A data sheet on the Local Benefits Test is available at Local Benefits Test.

South Australia

Industry Participation Policy

State Government Agencies and private parties contracting to the Government of South Australia are required to comply with the South Australian Industry Participation Policy (SAIPP) and the supporting Procedural and Reporting Guidelines which have been updated in January 2023. The Policy is the high-level framework for delivery of the requirements of section 4 of the Industry Advocate Act 2017 including promoting:

- government expenditure that results in economic development for South Australia;
- value for money in public expenditure;
- the economic development of the steel industry and other strategically important industries for South Australia; and
- capable businesses based in South Australia being given full, fair and reasonable opportunity to tender and participate in government contracts.

The Policy has effect on the following Government of South Australia expenditure:

- Procurement of goods and services including infrastructure and construction.
- Public Private Partnership projects to which the SA Government is a party.
- Federally-funded infrastructure and construction projects managed by the Government of South Australia.
- Private sector projects receiving significant Government of South Australia monetary support or value-in-kind.
- Grants to the private sector.

Steel Industry Plan

The SA Steel Industry Plan was created in 2017. The key elements of the SA Steel Plan under the SAIPP are:

- All steel content must meet Australian Standards under ACRS (Australian Certification Authority for Reinforcing Structural steel);
- The OIA stipulate they have a steel surveillance program for Government projects;
- All steelwork fabricators must be certified to the relevant Construction Category in accord with NSSCS (SCA Compliance program);
- SA Government has mandated the use of certified Australian Standard steel in all tax payer funded projects.

The guidelines for the purchase of structural and reinforcing steel, and the fabrication of structural steelwork is covered under Section 5 of the SAIPP.

Industry Advocate Act

The Industry Advocate Act provides the Industry Advocate with the ability to recommend reforms to State Government procurement practices and ensure commitments made by contractors through Industry Participation Plans are acted upon. The Office of Industry Advocate (OIA) monitors compliance of the SA Steel Procurement Policy on steel purchases for State Government projects.

The Act sets out the objectives of the South Australian Industry Participation Policy and confirms the South Australian Government's commitment to the establishment and maintenance of the policy. It also establishes the Industry Advocate as a statutory position with specific functions and powers to further the objectives of the South Australian Industry Participation Policy.

Tasmania

Industry Participation Plans

Tasmanian Industry Participation Plans (TIPP) are strategic documents aimed at improving opportunities for local SME businesses in Government funded or resourced projects.

Agencies request suppliers to provide a TIPP when a procurement process for the purchase of goods, services or construction is valued over predetermined thresholds or where the Head of an Agency, at their discretion, has determined one is required. The threshold values apply to:

- procurements valued at over $5 million; or
- procurements valued at over $2 million up to, and including, $5 million, where the Head of Agency, at their discretion, has determined that a TIPP is required.

A TIPP is also required from proponents of private sector projects valued at over $5 million that receive support, including in-kind support, valued at or greater than $500 000 from the Government. The Plan must be approved before the project proponent enters into relevant procurement arrangements.

Information on when a TIPP is required and approved TIPPs (or executive summaries) for all agencies, including Treasury, are located on the Purchasing website at Tasmanian Industry Participation Plans (TIPP).

Victoria

Local Jobs First Policy

The Local Jobs First Policy under the Local Jobs First Act 2003 ensures that local small and medium-sized enterprises are given the opportunity to compete for government contracts. The Minister for Industry Support and Recovery sets minimum local content requirements for Local Jobs First Strategic Projects (valued at $50 million or above). The Minister may also set other requirements such as maximising or using a specified amount of steel products produced by local industry to deliver the project.

Bidders for Local Jobs First projects must include a Local Industry Development Plan (LIDP) to demonstrate the ability to deliver local content commitments, including any requirements set by the Minister. Compliance with the final LIDP is a requirement under the project contract. Victorian Government agencies are responsible for ongoing monitoring of LIDP commitments and associated compliance by suppliers (contractors responsible for delivering the project).

A new process is being embedded into Local Jobs First to maximise local steel industry opportunities. Where a supplier for a new or existing Strategic Project proposes changing the sourcing of local steel compared to what was listed in the LIDP, they must notify the project delivery agency before committing to the change. This may be considered a 'significant diversion'. The agency will work with the supplier to understand what is driving the change and look for solutions to maximise local steel outcomes.

For all new construction Strategic Projects, suppliers will be required to list steel packages and local steel commitments on the Industry Capability Network (ICN) Gateway, to provide the local steel industry with visibility of project opportunities. Select projects will have a requirement for suppliers to prepare a Steel Engagement Plan or Steel Sourcing Plan that will form an attachment to the LIDP, to advise the steel industry of project opportunities. For smaller projects, suppliers will be required to engage with the local steel industry.

Supplier and agency requirements to maintain use of local steel:

Suppliers for all new and existing Strategic Projects must inform agencies when they propose significant changes from locally sourced goods, materials or labour in their Local Industry Development Plan, including steel items.

Agencies delivering new and existing Strategic Projects must work with suppliers to understand the reason for any proposed changes to local sourcing. For significant changes that may impact on the achievement of local content commitments, agencies must notify the Department of Jobs, Skills, Industry and Regions (DJSIR) and the Industry Capability Network (ICN) when the changes are proposed.

Local Steel - policy enhancement factsheet June 2022

Steel work packages for Strategic Projects are listed on ICN Gateway to provide visibility of project opportunities.

The Victorian Steel Industry Supply Chain Directory lists businesses that have a significant presence in Victoria and manufacture their goods locally

Victorian Industry Participation Policy (VIPP)

VIPP improves opportunities for local suppliers to compete for work on all types of government contracts, helping to create and sustain opportunities for Victorian businesses and workers. This policy is about local industry development. More information on how VIPP works for suppliers can be found at www.localjobsfirst.vic.gov.au/industry-guidance/supplier-guidelines

Major Projects Skills Guarantee (MPSG)

MPSG gives focus to providing opportunities to Victorian apprentices, trainees and cadets to work on high value government construction projects. This policy is about growing the next generation of skilled workers in Victoria.

Western Australia

The WA State Government's Plan for Jobs outlined a number of strategies to create a more vibrant and diversified economy during a time of transition in resource investment and slowing in the residential building sector. One of the priority strategies was to ensure the $27

billion spent annually on State Government procurement supported local industry and retained or created new jobs for Western Australians.

To support this strategy, the *Western Australian Jobs Act 2017* (WA Jobs Act) was passed on 7 December 2017. Following this, the Western Australian Industry Participation Strategy (WAIPS) was developed to give effect to the objectives within the WA Jobs Act.

Legislation which encourages the use of local industry participation, is being progressed on another of the Plan for Jobs priority initiatives in the Local Jobs Bill. The intention of this Bill is to ensure benefits from major projects within the Mining, Construction and Oil and Gas industry sectors flow through to local business, essentially creating more jobs and business opportunities for West Australians. The Bill aims to maximise local content across private sector infrastructure and resources projects within the State and will be developed in line with the principles of providing a full, fair and reasonable opportunity to WA based businesses.

A central feature of this approach will be the inclusion of Skilled Work Agreements which will outline a project's potential employment, skilling and contractual opportunities. The ASI has an MOU with the WA Government Department of Jobs, Tourism, Skills and Innovation, and is well placed to assist in understanding state requirements for industry participation and local content.

WA Industry Participation plans

https://industrylink.wa.gov.au/about/western-australian-industry-participation-strategy

There is financial support available to assist with meeting certification to the National Structural Steelwork Compliance Scheme.

11. Logistics

Steel Industry Logistics Safety

Australian Steel Industry Logistics Safety Code

The Australian Steel Industry Logistics Safety Code (ASI LSC) is designed to ensure that all participants are aware of their responsibilities in the supply chain when they control or influence the safe and legal carriage of freight.

The purpose of the Code is to provide guidance to the Australian Steel Industry in relation to:

- controlling, managing, operating and auditing of Heavy Vehicle road transport freight movements;
- minimising the risk along the steel supply chain associated with freight movements;
- complying with the Chain of Responsibility legislation, which imposes liability for Heavy Vehicle offences on all people and/or businesses whose actions, inactions or demands influence conduct on the road as well as on-road parties such as drivers and carriers.

Chain of Responsibility (CoR)

The Heavy Vehicle National Law (HVNL) prescribes certain requirements and obligations to ensure compliance and safety for all parties in the transport supply chain. The Chain of Responsibility (CoR) laws within the HVNL also outline a requirement to have safety systems and controls in your operations to identify, assess and manage risks as they relate to your business and activities within the supply chain. Through a series of practical questions, the CoR Gap Assessment Tool enables you to examine your business practices and systems controls against known risks and recognised best practice.

Australian Logistics Council

This website provides guidance tools and links including load restraint, time slot and queueing principles and other logistics-related information.

Off-site Fabrication

Fabrication is the process used to manufacture steelwork components that will, when assembled and joined, form a complete frame or structure. The frame generally uses readily available standard sections that are purchased from the steel manufacturer or steel distributor, together with such items as protective coatings and bolts from other specialist suppliers.

Although a wide range of section shapes and sizes are produced, the designer may find that the required section size is not available. In this case, built-up plate girders may be fabricated from steel plate. Sections and plate girders may also be strengthened by stiffening the web or flanges depending upon the load to be carried.

Most modern steelwork fabrication shops have computer-aided design and detailing (CAD), which is linked directly to factory floor computer numerically controlled (CNC) machinery, creating a genuine seamless CAD/CAM environment. The accuracy of the computer-generated details being transmitted directly to the CNC machinery increases the quality standards of production. Fabrication is an important component of the evolving innovative digital construction process that is currently underway, improving speed, accuracy and safety for the complete supply chain.

Erection

Planning for erection should start at the very beginning of the design process. Such planning should consider the construction sequence, the design factors that affect buildability and site practice in terms of typical erection plant.

In the broader design and planning context, there are three planning factors that affect the buildability of steel structures:

1. **Practical erection sequence**: the location of both temporary and permanent bracing systems or other means of maintaining structural equilibrium are crucial here;
2. **Simplicity of assembly**: simply assembled connections are the main factor here;
3. **Logical trade sequences**: which will affect the development of the master contract programme as the pre-tender plan metamorphoses into the construction plan.

Steelwork erection must also focus on workplace health and safety. The ASI has worked closely with Brookfield Multiplex to produce the Practical Guide to Planning the Safe Erection of Steel Structures. This Guide sets out practical guidance for the erection of multi-element steel structures.

12. Work Health and Safety

Overview

Heavy industrial processes, such as many of those involved in the steel supply chain, carry with them some level of inherent risk. However, those risks are manageable and with proper process and attention to detail, the industry can move 'towards zero harm'.

The ASI believes that all injuries can be prevented and it is the responsibility of every single person in the supply chain, from those on the shop floor to those in upper management and boardrooms to exercise their duty of care to ensure that every single worker comes home safely to their families at the end of their work day.

The ASI is committed to working with our members in the steel supply chain and the industries that we serve to continually and unrelentingly improve safety performance through a range of initiatives, including the following:

- Awareness of best practice safety performance
- Promotion and reward for demonstrable improved safety outcomes
- Education and training
- Issue specific direct engagement utilising targeted safety groups
- Workplace Health and Safety alignment
- Safety alerts.

The ASI welcomes participation from industry through joining groups and providing feedback and information that will assist the supply chain to work safely together.

Workplace health and safety principles

The principles we apply, and we expect the industry to apply, mirror the Worldsteel Association health and safety principles. These principles are as follows:

1. All injuries and work-related illness can and must be prevented
2. Managers are responsible and accountable for safety and health performance
3. Employee engagement and training is essential
4. Working safely is a condition of employment
5. Excellence in safety and health drives excellent business results
6. Safety and health are integrated into all business management processes.

Solutions and tools

The ASI provides support to industry with a number of specific safety-related initiatives, including:

Steel industry logistics safety

Loading, transport and unloading of steel and fabricated steelwork components presents challenging logistical and safety issues. The ASI has been actively involved with a range of initiatives in this area, including:

- Chain of Responsibility (CoR) legislation
- ASI Logistics Safety Guides
- Loading, unloading exclusion zones
- Australian steel industry Logistics Safety Code and Master Code
- Australian Logistics Council
- Steel transport safety network
- Logistics Safety & Environment awards.

National Health & Safety Committee

The National Health & Safety Committee consists of ASI member company professionals and aims to cultivate a healthier and safer steel industry through promotion and education support. The National H&S Committee engages the State Safety groups to comment and assist with health and safety programs and activities.

Health and Safety Excellence Awards

The Health and Safety Excellence Awards are an initiative of the ASI National Safety Committee to recognise steel industry companies and individuals for high achievements in health and safety, innovation in equipment and process improvements.

Workplace Health and Safety (WHS) Regulation

We engage regularly with State WHS regulators and have a range of information and support material available to help you understand your ‘duty of care’ and the shared responsibility the steel supply chain has for safe compliant outcomes.

13. Environment and Sustainability

Sustainable development is a worldwide priority. Through efficient use of resources, intelligent design of products and their uses, and reduction of greenhouse emissions and water use, the Australian steel industry seeks to lower the impact of climate change.

Steel is the world's most important engineering and construction material that underpins almost every aspect of our lives – buildings, transport, infrastructure, home appliances and lifestyle goods. It can be recycled again and again.

The steel industry has made immense efforts to limit environmental pollution in the last decades. Producing one tonne of steel today requires just 40% of the energy it did in 1960 (worldsteel, 2018).

Sustainable futures are predicated on innovation. Flexibility, innovation, collaboration and communication are fundamental to an environmentally sustainable future for steel manufacturing specifically and the steel supply chain in general. Australian industry understands that it must invest in more productive and efficient practices and embrace innovation.

There are three primary focus areas that can help us move towards a true circular economy:

Responsible steelmaking

Environmentally aware steelwork fabrication and processing

Steel as environmentally responsible design solution

Opportunities for sustainability

We have a clear mandate from our community and the opportunity to promote a cleaner and healthier environment by working together towards improving the environmental sustainability of the entire steel supply chain, from steelmaking and construction to recycling and reuse, implementing innovative technology and best practice sustainable design.

We have the responsibility to our and future generations to set in place the solutions and tools that enable improved performance and reduced environmental impact, moving towards a life cycle perspective and what we think of as a circular economy.

Solutions and Tools

Our industry and the ASI have taken responsibility to create and provide the solutions and tools to help action the circular economy for steel and the fundamental principles of reduce, reuse, remanufacture and recycle.

Steel's natural characteristics make it a great sustainable choice in terms of its almost endless recyclability, the ability to futureproof structures to be modified or extended later, the reuse of steel sections and the option to design in high-strength steel to reduce mass, to name a few.

The ASI believes that innovation is of key importance and that we must learn and share ideas with our peers both locally and internationally. To enable sharing and cooperation among all sectors of the industry and with universities and research hubs, the ASI has underwritten the development of the new ASI Steel Innovation Portal. Head to the portal and explore the many innovative steel solutions under current development that will help us move towards a more sustainable future.

Steel Sustainability Australia (SSA)

In January 2023, the ASI released a new sustainability certification program for the steel industry, *Steel Sustainability Australia (SSA)* which is open for online applications. Superseding the ASI Environmental Sustainability Charter (ESC), the SSA certification program assesses environmental and social impact across the steel value chain in the manufacturing, fabrication and processing of steel. The independently audited program certifies downstream steel businesses such as fabricators, roll formers, and reinforcing processors, and verifies upstream steel producers against best practice environmental, social and governance (ESG) indicators.

The SSA program was developed by consultants thinkstep-anz in consultation with the steel industry and the Green Building Council of Australia (GBCA) and is a recognised initiative under the GBCA Responsible Products Framework, gaining 'Good or Best practice' product recognition in the Green Star Buildings rating tool.

A tiered certification model allows steel businesses to progress their sustainability journey across best practice operations in environmental management, health and safety in manufacturing, carbon emissions and waste reduction and responsible and ethical sourcing practices.

To review the benefits of SSA accreditation, or to find out more information, visit the SSA website: www.steelsustainability.com.au.

STEEL SUSTAINABILITY AUSTRALIA

Resources

Infrastructure Sustainability Council (formerly AGIC)

Australian Life Cycle Assessment Society (ALCAS)

BlueScope Steel – Sustainability

BPIC – Building Products Innovation Council

Green Building Council of Australia

InfraBuild Steel – Sustainable development

Responsible Steel™

Steel Construction Institute (UK)

Steel Recycling Institute

World Steel Association (worldsteel) – Sustainability

BlueScope's sustainability approach

BlueScope's commitment to sustainability is expressed in its Purpose and Bond, which reflect its belief in the responsible management of its business, transparency and doing what is right.

BlueScope's vision in Australia is to be a vibrant, modern manufacturer, embodying progress, innovation and sustainability.

Climate Action

Climate action is a core element of BlueScope's Corporate Strategy and building a pathway to low emission-intensity iron and steelmaking in Australia is a key priority for the business. The following goal and targets apply to BlueScope's global operations, including steelmaking and non-steelmaking operations in Australia.

Goal: net zero greenhouse gas emissions across our operations by 2050[5]

Mid-term targets[6]:

- 12% GHG emission intensity reduction by 2030 for steelmaking activities (based on 2018 levels)
- 30% GHG emissions intensity reduction by 2030 for non-steelmaking activities (based on 2018 levels)

Further information can be found at bluescope.com/climate-action

BlueScope transparently reports the environmental impact of a number of its products, including greenhouse gas emissions, via Environmental Product Declarations which are published in line with European Standard EN15804 and registered with EPD Australasia.

ResponsibleSteel™

BlueScope has proudly played an active role in the development, collaborative engagement and promotion of the ResponsibleSteel™ Standard, and is committed to pursuing ResponsibleSteel™ Site Certification at sites within its business. BlueScope's Port Kembla Steelworks, NSW and Western Port works, VIC are certified to the ResponsibleSteel™ Standard.

[5] This goal applies to all of BlueScope's global operational Scope 1 and 2 GHG emissions, and is dependent on several enablers, including the commerciality of emerging and breakthrough technologies, the availability of affordable and reliable renewable energy and hydrogen, the availability of quality raw materials and appropriate policy settings.
[6] These targets apply to our Scope 1 and 2 emissions, relative to a 2018 baseline

ResponsibleSteel™ is the steel industry's first global multi-stakeholder standard and certification program. ResponsibleSteel™ certification can give organisations in the steel value chain confidence in the environmental, social and governance performance of steelmaking and non-steelmaking facilities, and may help them to meet their climate objectives and manage supply chain risks.

Credentials and certifications

A number of BlueScope's products, product disclosures, and operations are recognised by third-party programs and credentials.

- Environmental Product Declarations, published by EPD Australasia
- Global GreenTag GreenRate™
- ResponsibleSteel™
- Worldsteel Association Climate Action data collection program
- ISO14001
- Steel Sustainability Australia (SSA) – Verified Steel Manufacturing Supplier

Some of BlueScope's products and certifications can assist in gaining credits under green building rating schemes including:

- Green Star™
- Living Building Challenge
- Infrastructure Sustainability (IS) Rating Scheme

BlueScope's sustainability credentials are supported by its company-wide sustainability initiatives including those relating to responsible sourcing and supply chain sustainability and climate action. BlueScope publicly reports its sustainability performance, including greenhouse gas emissions, in its Annual Sustainability Report and Climate Action Report.

Further information can be found at steel.com.au/sustainability

InfraBuild's and Liberty Primary Steel's environmental advances

Sustainability at the forefront

InfraBuild and Liberty Primary Steel are committed to creating a more sustainable future for industry and society. Our innovative practices are underpinned by parent company GFG Alliances' GREENSTEEL strategy. The strategy is about promoting greater use of recycled materials, increasing the use of renewable energy and operating facilities close to key markets.

GFG Alliance has also established the CN30 programme, which builds on existing GREENSTEEL (and GREENALUMINIUM) strategies, aiming to become the first carbon neutral industrial group in the world by 2030. The programme involves implementing investments in new infrastructure, renewable energy and new technologies. Australian initiatives include the Liberty Primary Steel Whyalla transformation plan utilising state of the art hydrogen steel making technology, InfraBuild higher strength steels, group investment in renewable energy assets and investments in off-site fabrication capability.

InfraBuild and Liberty Primary Steels commitment to the environment includes optimising the eco-efficiency of our products through the product life-cycle. InfraBuild is taking action by increasing resource and energy efficiencies and the use of sustainably generated energy from GFG Alliance's SIMEC Energy in the production and distribution of its products, and during the use of steel products

InfraBuild and Liberty Primary Steel's Environmental Product Declarations (EPDs) are independently verified and recognise customers' need and the increasing demand for standardisation and greater transparency around environmental performance.

InfraBuild and Liberty Steel have six EPDs:

- Hot Rolled Structural and Rail (Liberty Primary Steel)
- Hot Rolled Structural and Merchant Bar (InfraBuild Steel)
- Reinforcing Rod, Bar and Wire (InfraBuild Steel)
- Reinforcing Bar and Mesh (InfraBuild Construction Solutions)
- Reinforcing Bar and Mesh (ARC)
- Hot Rolled Structural and Merchant Bar (InfraBuild Steel Centre)

InfraBuild and Liberty Primary Steel's EPDs comply with the requirements of a valid EPD recognised in the Green Star Design Rating Tool (Green Building Council of Australia) and the IS® Rating Tool (Infrastructure Sustainability Council of Australia).

14. Case Studies

ALLIANZ STADIUM

The new Allianz Stadium is a modern, world-class venue that will provide Sydney with a sporting and entertainment precinct of an international standard for decades to come. The New South Wales Government invested over $830 million in the development of the new 42,500 seat stadium on the site of the now-demolished original stadium, which was completed in 1988 as one of Sydney's major bicentennial projects.

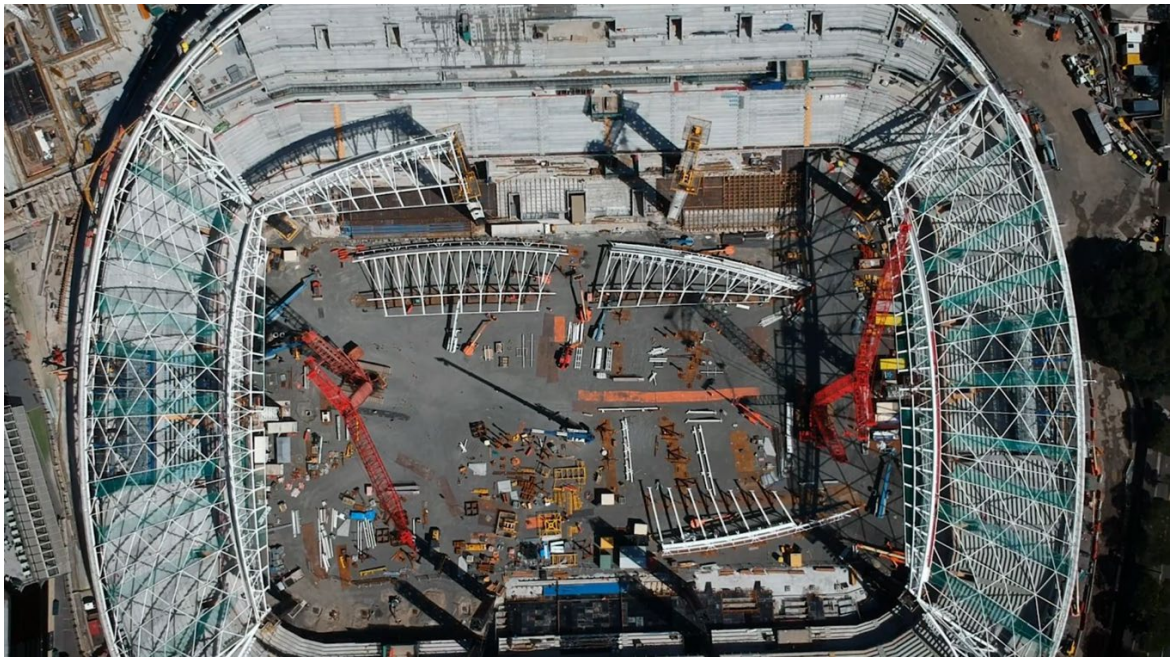
Allianz Stadium is an iconic and state of-the-art sports destination located in Moore Park, Sydney. The vision for Allianz Stadium was to blend engineering and art through a 'sculpture' and celebration of steel. The project is a legacy for the community that will be enjoyed by generations.

Early and collaborative involvement between the engineer, architect, contractor, fabricator and steel detailer were instrumental in the delivery of this iconic project.

The design of the new Allianz Stadium builds on the legacy of the original. Its sweeping roof floats over the seating bowl and will cover all patrons with 100% drip line roof coverage. To achieve this result, the 2,000 tonne roof structure is shaped as a synclastic diagrid shell.

The ‘Pringle’ shaped roof sits atop the coliseum like ‘bowl’ steel structure, which simultaneously supports the pre-cast tiered seating for 42,500 enthusiastic cheering fans.

The choice of fabrication methodology enabled the same section profiles, welding setup, and additional flexibility in the fabrication and installation sequence. Collaboration between Aurecon, COX Architecture and DBM Vircon enabled computational engineering techniques to be adopted for the design and detailing of the connections, which simplified the 528 connections into only five connection types for the entire roof diagrid.



S&L Steel, both SCA and ESC certified, was awarded the contract to fabricate the complex roof structure, which consisted of a tension ring located on the outside perimeter of the roof, four derricks which support the roof in the four corners and four trusses broken into ten liftable sections which are complemented by the diagrid structure being a combination of RHS, CHS and plated node connections.

The new Allianz Stadium strengthens Sydney as a destination for major sporting and entertainment events while enhancing the surrounding precinct with public places and spaces year-round. The project was delivered on time and on budget by more than 7,000 personnel, despite disruptions to procurement and construction due to COVID-19, a proud achievement for the entire design and construction team.

PROJECT TEAM

- Architect: COX Architecture
- Structural Engineer: Aurecon SBP
- Head Building Contractor: John Holland Group
- Distributor or Manufacturer: BlueScope Steel
- Fabricators: S&L Steel, Samaras Group
- Steel Detailers: DBM Vircon, van der Meer
- Coatings Suppliers: International Paint, Dulux
- Metal Building Contractor: Permasteelisa

MEMORIAL DRIVE TENNIS CENTRE, SUNKEN SHOW COURT ROOF

The redevelopment of the Memorial Drive Tennis Centre in Adelaide involved the addition of a diagrid roof steel canopy supported on four feature corner columns. The roof radius and diagrid member layout were optimised, by harnessing the capability of a dome shape, to span a large distance.

The members that form the roof structure were welded into 16 transportable segments, and bolted onsite. All 82 member splices are concealed with a cover plate, to make the diagrid appear seamless. The three-piece feature ‘tree’ columns are separated to allow light to pass through, resulting in a delightful, elegant piece of architecture.

The second stage of the Memorial Drive Tennis Centre redevelopment in 2021 involved the addition of a steel canopy over the sunken show court. Situated behind the centre court, the sunken court is a boutique offering. It can be used for special events, and also allows two tennis matches to occur concurrently during the Adelaide open—a bonus in inclement weather and during the hot South Australian summer.

With effective use of multi-platform model sharing technology WGA (structural engineers) was able to collaboratively develop and refine the shape of the roof to improve the structural efficiency while Cox (architect) reviewed and detailed the architectural elements.

The roof structure consists of 95 tonnes of locally acquired and fabricated steel. The members forming the roof diagrid structure were welded together into 16 transportable segments that were driven from the SCA-certified, Steven Group's (steel fabricator) workshop to site and bolted for assembly. All 82 member splices are concealed by a cover plate to make the diagrid appear seamless right across the span.

The project embraced environmental sustainability by minimising demolition requirements and thereby preserving the existing court and pavilion. As the roof is made from steel with

high quality corrosion protection it has a minimum serviceable life of 50 years. At the end of its life, it can be unbolted and recycled.

The project presented several complex architectural and engineering challenges which could not have been achieved within the compressed time frame without the high level of collaboration between the architect, engineers, steel fabricators, and construction team.

The construction of the roof was completed in 26 weeks to enable practical completion in time for the Adelaide International tennis tournament scheduled for January 2022. This timeline could not have been completed without the intensive collaboration effort of the design and construction team.

PROJECT TEAM

- Architect: COX Architecture
- Structural Engineer: WGA
- Head Building Contractor: Kennett Builders
- Steel Fabricators: Stevens Group
- Steel Detailers: Trident Detailing

CSIRO CLEAN LAB

This project involved the finalisation of the design and construction of a new laboratory for the CSIRO's Myall Vale Cotton Breeding Research Facilities, which is part of the Australian Cotton Research Institute. The CSIRO specified that the laboratory comply with several industry standards, including Physical Containment (PC2) barrier requirements for the main building. In addition, a separate area within the building had both PC2 and Office of Gene Technology Regulator (OGTR) Invertebrates Performance requirements.

The laboratory was constructed using a non-traditional modular building solution. This solution involved off-site fabrication, with the remaining works undertaken onsite in a similar fashion to traditional construction methodology—all within an operational environment.

The Australian Cotton Research Institute was established to develop new varieties to support a valuable crop to benefit export and the rural economy, and create a farming system that was efficient, sustainable and productive.

Some of the specific complexities of the project included:

- Laboratory conditions required the building to be air tight
- Laboratory conditions required that the floor have extremely low vibration tolerance
- Wall panels that were up to 6m high required a custom solution for transport and delivery
- The building needed to be easily removed from leased site at the end of lease

Working as sub-contractors to FKG Group, Austruss' scope of work included:

- Pre-fabricated floor system
- Pre-fabricated light gauge steel wall frames
- Pre-fabricated facade panels clad with Australian steel
- Pre-fabricated roof panels

These elements were all pre-fabricated in the Austruss facility in Braemar, New South Wales and then transported to site for installation. Given the 6m heights of some of the wall panels, Austruss designed specialised systems to facilitate transportation of the prefabricated kit of parts.

Austruss has been a leader in prefabricated light gauge steel building solutions since 2003. They provide a customised kit of parts, including wall and roof framing systems, floor cassettes, wall and facade panels, modular construction, skids for data centres and bespoke solutions.

Key benefits offered by Austruss for the CSIRO clean lab included:

- Limited preliminary site costs, truck movements, disruption, waste and numbers of trades onsite due to most of the prefabrication work happening offsite
- Accelerated project timeline due to parallel procurement

- Prefabrication allowed certainty and control of build quality

Experts in designing for compliance with the National Construction Code (NCC), Austruss kit of parts offers competitive advantages, whether by reducing steel tonnage, construction time, trades onsite, truck movements and waste, or impacts of wet weather and site closures.

PROJECT TEAM

- Architect: L2D Architects
- Structural Engineer: Barnson
- Head Building Contractor: FKG Group
- Steel Fabricators: Austruss Steel
- Detailers: Austruss
- Metal Building Contractor: Austruss

GRATTAN STREET FAÇADE

Located on Grattan Street in Prahran, Melbourne, this project delivered an enticing multi-residential experience that includes 43 dwellings that are now highly sought after. The new-age ‘Viridi’ apartment building is a new visual landmark characterised by a wide-pitched, ‘hill-like’ roof.

To reflect and complement the adjacent Grattan Gardens, the facade is clad in a mosaic-like tessellation of over 15,000 terracotta roof tiles, glazed in shades of lush green. The building's impressive façade consists of approximately 11,000 lineal meters of BlueScope's TRUECORE® steel and over 800 structural brackets.

The brief for the Grattan Street Façade called for a custom design that would suit the oddly-shaped 1,566m^2, without overshadowing Grattan Gardens or the surrounding pedestrian ways, while leveraging as much daylight as possible throughout the year. This complex brief prompted early collaboration to ensure that the novelty of the build would still produce a viable outcome for the client.

In a process akin to painting by numbers, Plus Architecture designed the placement and sequencing of the coloured tiles using a 3D model. The model helped to predict how the colours would appear in changing light conditions and produced an accurate map that was expertly realised by tilers, TLG Roofing Melbourne.

An innovative project beyond its aesthetic, Plus Architecture further designed a facade system in partnership with Cobild and expert façade engineers Inhabit, with the complex roof shape requiring the development of new technology and waterproofing approaches specifically for the project.

The project's custom-built blue steel truss system, developed by Bolt Blue Constructions and Dynamic Steel Frame, ensured adequate stability for both the thousands of tiles and large windows – some weighing over 500kg – while allowing for immersive views of the skyline. The truss system is fixed to posttensioned slabs, which allowed greater flexibility in achieving the unique design whilst also ensuring rigidity.

Developed during the COVID-19 era, the project and collective teams involved were subject to the ever-changing onsite conditions of the pandemic. Additionally, supply chains were heavily impacted. Despite this, the team was able to deliver the project to budget within the desired timeframe. From client through to contractor, every party worked cohesively, striving for the best outcome.

Viridi exemplifies design that paradoxically succeeds in both uniting with its surroundings while also distinctly enhancing them. The captivating façade, with its dynamic, tactile and reflective surface, shifts and shimmers responsively to transitions from day to night.

Reaching beyond standard multi-residential design, this unique outcome is a catalyst for life, contributing vibrant character to place.

PROJECT TEAM

- Architect: Plus Architecture
- Structural Engineer: Structerre Consulting
- Head Building Contractor: Cobild
- Distributor or Manufacturer: BlueScope
- Steel Fabricators: Dynamic Steel Frame
- Steel Detailers: Dynamic Steel Frame

308 EXHIBITION ST SKYBRIDGE

Designed by Cox Architects and Fender Katsalidis, 308 Exhibition Street is set to be one of Melbourne's most iconic projects, with the two luxury towers connected by an innovative skybridge on level 46. The level 46 skybridge forms the rigid link between both towers, synchronising the movement generated from both wind and seismic forces. Tower one will be comprised predominantly of residential apartments, and tower two will be a five star hotel.

The main works for the project commenced with one of the largest concrete pours in Melbourne's history—a day long concrete raft pour covering an area of 1,000m^2. This monumental 3m deep raft foundation is located on top of an existing railway tunnel and supports the new landmark mixed-use precinct.

ArcStructural engaged IR Drafting to assist with detailed consultant, builder and trade coordination, as well as complete modelling and provision of shop drawings for each structural steel element within the 308 Exhibition Street Skybridge. The design underwent several iterations, with multiple tradespecific consultants and subcontractors' information being meticulously integrated. A significant portion of the structural framing was developed into modular components to ensure installation efficiency and reduce dependence on the tower crane.

A safety-first approach was adopted for all components of the skybridge, including 2.1m high screened and braced handrail systems attached to the temporary access deck and bridge floor framing.

The skybridge floor framing was constructed with seven fully-welded modular frames. Due to the unique design and build-up of each frame, the steelwork was first assembled in the ArcStructural factory. Existing structures were as-built and then set out on the workshop floor to replicate site conditions.

This allowed for a safe, seamless installation process onsite by addressing any rectifications prior to installation. 600 set-out points were used to either set-up working trestles or fix each frame into position. Given the +/-350mm differential movement between the towers, one side of the floor structure was positioned on a movement joint along the slab edge. Four structural steel pin connections were engineered to temporarily lock the two towers together prior to the final concrete pour and stressing.

Removal of the protection decks was a significant task once the skybridge structure was in place. Careful planning was undertaken to remove the 24m and 27m long trusses and protection decks from beneath the permanent structure. Trusses were winched across the trestles using an engineered trolley system to pull the 12 tonne frames along the opposing side to allow clear access for the tower crane.

PROJECT TEAM

- Architect: Cox Architecture, Fender Katsalidis
- Structural Engineer: WSP Australia, Engineering Elements, Robert Bird Group
- Head Building Contractor: Multiplex
- Distributor or Manufacturer: Steelforce
- Steel Fabricators: ArcStructural
- Steel Detailers: IR Drafting
- Coatings Suppliers: Action Alliance

SYDNEY MODERN PROJECT AT THE ART GALLERY OF NSW

Japanese architectural firm SANAA designed the Art Gallery's new building to respond to the site's topography and integrate with existing infrastructure. The project site is on a steep escarpment in The Domain, north of the original art gallery building. The new and original buildings are separated by a 'land bridge' over a multi-lane motorway, the Eastern Distributor.

Adding complexity was a pair of decommissioned Navy fuel tanks below the site, built during WWII in a former sandstone quarry. The new building is formed from interlocking art pavilions nestled into the landscape over five levels, resting lightly on the land bridge and the fuel tanks. Each pavilion connects with the outdoors, via roof terraces, walkways, and landscaped gardens.

A particular feature is a new prominent destination for Aboriginal and Torres Strait Islander art and culture, both inside the new building and across the campus including a major commission in the art garden that links the new and original buildings.

The building's structure consists of a series of linked steel-framed structures, built over a reinforced and post-tensioned concrete podium structure, set in a deep excavation into the steep hillside.

Much of the new building is founded on existing structure. This includes the fuel tanks, constructed of reinforced concrete in 1941, and the land bridge, constructed in 2000 from in-situ and precast reinforced and pretensioned concrete elements.

The design transforms the southern of the two fuel tanks into a unique art space of 2,200m^2. The intent of the art gallery was for this space to be left ‘raw’, with the only spatial interventions being a new floor and drainage, new openings cut into the walls for egress, and a spiral stair inserted through a circular penetration in the roof.

Designed by SANAA, the new building was realised through a collaboration between the art gallery and Infrastructure NSW. The project’s executive architect is Architectus, with Arup providing multi-disciplinary engineering including structural, civil, acoustic, fire, hydraulics and services, lighting, security and traffic.

It was delivered by lead contractor Richard Crookes Constructions (RCC), with the building’s structural steel fabricated and erected by Samaras Structural Engineers.

Secondary steel elements formed part of the façades and the landscaping, which were delivered by subcontractors Kingston Group and Landscape Solutions respectively.

Structural steel was even present in the artworks commissioned for the project. Francis Upritchard's sculptures in the welcome plaza were engineered by Arup and fabricated by Italian contractor Lanaro Steel technology. The majority of the structural steel on the project was produced in Australia.

PROJECT TEAM

- Entering Organisation: Arup
- Architect: Architectus, SANAA
- Engineer: Arup
- Head Contractor: Richard Crookes Constructions
- Steel Fabricator: Samaras Structural Engineers

UMBAGONG DISTRICT PARK PEDESTRIAN BRIDGES

The Umbagong district park pedestrian bridges saw the replacement of existing timber walking bridges in favour of more secure steel alternatives. The original timber walkway was constructed in 1986. Since then, it has become one of the ACT's most serene spaces for recreational activity and wildlife. However, a safety audit found the existing timber bridges were not fit for purpose.

ACT Steelworks—the only fabricator servicing the ACT to be SSA certified—led the project alongside architect TCL; engineer Sellick Consultants; and head contractor Complex Co.

The team worked harmoniously to navigate some of the project's constructability challenges. This was crucial to ensure minimal environmental impact and develop a safe method of work.

The bridges were designed to have a minimal impact on the local environment, both during the construction process and for the lifetime of the structures. Designers used the existing bridges as a guide for the location of their steel replacements. Meanwhile, engineers capitalised on the natural rock outcrops as structural foundations. This saved on the number of new materials entering the environment.

The three bridges were designed to be wider than their original counterparts to improve access for pedestrians, cyclists, and increase accessibility for mobility scooters and wheelchairs. In addition, the larger bridge incorporates a new lookout area and seating. An efficient design was paramount to ensure the safety and wellbeing of the community could be maintained.

The design team developed smaller steel member sizes into typical and recurring modules, which allowed manual handling of all components. This eliminated the need for haul roads, crane pads and heavy machinery.

All steel used in this project was procured through InfraBuild, who optimised efficiencies in the materials while ordering. The team also reused the existing timber bridge components to create new seating throughout the park.

Meanwhile, the offcuts of steel plates were used as a plaque for each of the seats. All other wastage was separated into appropriate material types for offsite recycling. Corrosion protection for the bracing included hot dip galvanizing, while the support columns were painted in a PUR7 system offsite at an industrial coatings specialist, Dean Industrial. This protection is durable for 25 years to first maintenance.

The rusted finish of the bridges was designed to complement the natural setting and colours of the Umbagong grasslands. The rusted finish was achieved offsite by lightly abrasive blasting the fabricated assemblies prior to the application of three even mist coats of a 1:10 Ferric Chloride to water mix. Shortly after, the assemblies were rinsed with water to neutralise the coating.

PROJECT TEAM

- Architect: TCL
- Engineer: Sellick Consultants
- Head Contractor: Complex Co.
- Steel Fabricator: ACT Steelworks

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- World Steel Association (worldsteel)
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- Australasian Certification Authority for Reinforcing and Structural Steels (ACRS)
- Australian Industry Group (ai Group)