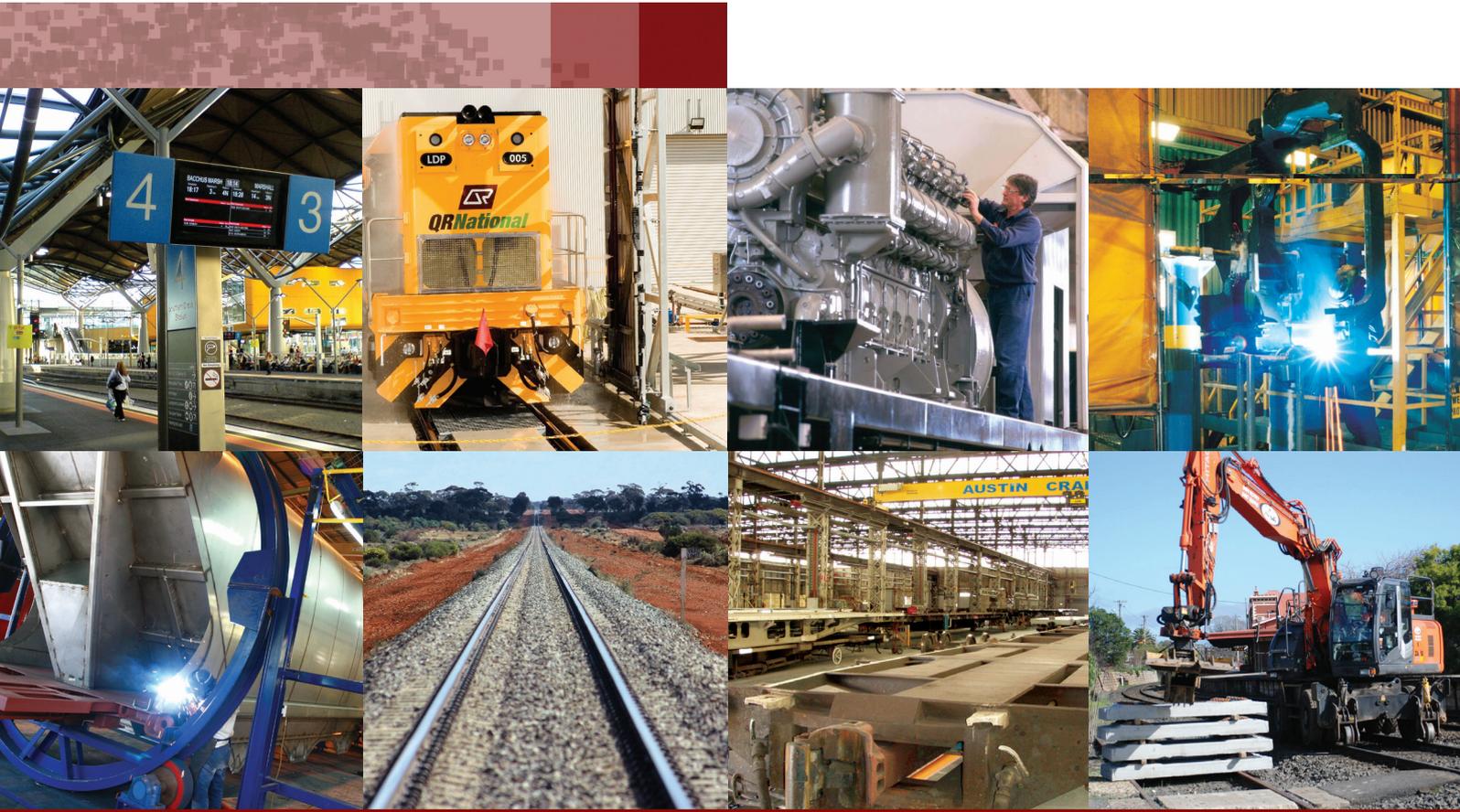




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Industry, Science and Research



RAILWAY MANUFACTURING INDUSTRY

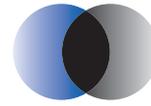
A PROFILE OF THE RAILWAY
MANUFACTURING INDUSTRY
IN AUSTRALIA

SUPPLIER
ADVOCATE | RAIL



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Industry, Science and Research



ACIL Tasman

Economics Policy Strategy



RAILWAY MANUFACTURING INDUSTRY

A PROFILE OF THE RAILWAY MANUFACTURING INDUSTRY IN AUSTRALIA

This report was prepared for the Department of Innovation,
Industry, Science and Research by ACIL Tasman.

RAIL SUPPLIER ADVOCATE'S FOREWORD



The Australian railway manufacturing industry has long been recognised for its contribution to the national economy.

Early in my role as Rail Supplier Advocate, industry identified the need to accurately measure the value of their sector. I undertook this project to gain a more comprehensive overview and fill data gaps. By surveying rail firms across Australia, I believe we have made a significant step towards better understanding the significance of the sector. This report provides an important basis for ongoing data collection and for informing decision making.

We now know that in 2008/09, the sector comprised over 350 firms, with annual revenue of \$4.2 billion, employing more than 15,000 people and adding \$1.6 billion to the Australian economy each year. These are significant results that have not been captured in this detail before.

The report highlights some key characteristics, regarding types of workers, ownership of firms and size and location of operations. It is noteworthy that over 90 per cent are small and medium sized firms, but notwithstanding this, a small number of large firms dominate the industry. Further insights regarding exports, capabilities and production capacity provided in the report, will be valuable for industry and government in the development of rail initiatives and policies to maximise benefit to the sector.

Thank you to the many firms who took the time to complete the survey. This report would not have been possible without your contribution. I also want to acknowledge the support of the Australasian Railway Association and the Industry Capability Network throughout the project.

A handwritten signature in black ink, appearing to read 'Bruce A Griffiths'.

Bruce A Griffiths
Rail Supplier Advocate

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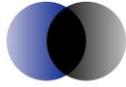


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Executive summary

Key Highlights about the MMER sector –

- One percent of the Australian manufacturing sector
- \$4.26 billion in revenues
- \$1.6 billion in value adding
- Over 15,000 employees
- Average wage of \$70,000
- Over 50% employees are technical and trade workers
- Small and medium sized firms make up 90% of the number of firms in the industry
- Small number of large firms dominate industry, with 87.5% of overall revenues
- Large MMER firms have a greater presence in capital intensive areas of production and smaller firms focus more on components
- Imports and exports tend to play a relatively small role in the industry, being worth 18 and 4 % of industry revenues respectively.
- Imports worth \$771 million
- Exports worth \$173 million

This report presents an overview of the Manufacturing and Maintenance of Equipment for Railways (MMER) industry,¹ undertaken by ACIL Tasman for the Department of Innovation, Industry, Science and Research (DIISR). The report is the first time that this industry has been comprehensively surveyed. It covers industry activity in 2008/09.

The report is the culmination of more than six months of data collection from firms across the industry, who took part in an email-based survey of their operations. In total, ACIL Tasman surveyed more than 500 firms and generated 142 usable responses.

Some of the key industry attributes revealed in the survey are summarised in Table ES1. The figures for revenue, value-adding, employment, exports and imports are “grossed up” following the process outlined in Appendix A2 and thus represent estimates of industry aggregate figures.

Table ES 1 **Key industry attributes***

Attribute	All firms	Small firms	Medium firms	Large firms
Revenue	\$4.26 billion	\$79.9 million	\$453.7 million	\$3.72 billion
Value adding	\$1.60 billion	\$102.81 million	\$244.05 million	\$1.25 billion
Employment	15,373	1,783	2,436	11,154
Average wage	\$69,093	\$55,946	\$66,565	\$85,545
Australian ownership	86.13%	92.31%	85.18%	66.67%
Value of exports	\$173.96 million	\$11.43 million	\$59.76 million	\$74.01 million
Value of imports	\$771.03 million	\$19.51 million	\$74.86 million	\$676.66 million
Profitability (pre-tax)	15.11%	19.95%	15.83%	9.55%

* Figures for revenue, value-adding, employment, exports and imports are grossed up, representing estimates of industry aggregated figures.

The MMER sector represents approximately one percent of the manufacturing sector in Australia (in terms of revenues, value-adding and employment), generating around \$4.26 billion in revenues, and adding \$1.6 billion in value to the Australian economy each year. It employs more than 15,000 workers who earn more than a billion dollars in wages. The industry is dominated by a small

¹ MMER represents businesses engaged primarily in the manufacture and maintenance of equipment to be used for: railway and/or tramway track infrastructure; railway and/or tramway rolling stock (such as locomotives, wagons and passenger carriages); and signalling and communication.

number of large firms, with the top six firms contributing around 70 percent of total industry revenues, and the top 22 firms contributing 87 percent of industry revenues. This is typical in the manufacturing sector, particularly in a relatively small economy such as Australia's.

Around half of the workers in the industry are technical and trade workers, with only small numbers of scientists and researchers (less than one percent), and around 20 percent of the workforce being categorised as managers or professionals. Wages are relatively high compared to the wider manufacturing industry, with workers earning, on average, approximately \$70,000 per annum.

The industry is largely Australian-owned and privately held. This was not a function of the size of the firm; most large firms were also owned by Australians. Within Australia, firms are concentrated around Sydney, Melbourne and Brisbane. However, there are important operations in regional areas, and in Perth and Adelaide.

When examining industry output by firm size, there is a clear split between the larger firms (known as Tier One firms in the industry) and smaller (or Tier Two and Three) firms. The end customers, mostly Australian railways, will often contract out large projects to the Tier One firms, who will then, in turn, subcontract out work to the Tier Two and Tier Three firms. This can be seen by examining output, with larger firms having a greater presence in more capital intensive areas of production such as the manufacture of track and the construction of rolling stock, and smaller firms focussing more on components.

Imports and exports tend to play a relatively small role in the industry, being worth 18 and four percent of industry revenues respectively. Import shares across small, medium and large firms are approximately the same as the share of each size of firm in overall production. The picture for exports, however, is different; medium firms play a more dominant role in exports than their share of revenues might suggest.

This is the first time the MMER industry has been surveyed to the extent undertaken in this project. There are many lessons learned which might be applied to future surveys (see Appendix C), but the data gathered provide a useful initial step towards the better understanding of an industry which has been poorly understood in the past.

1 Introduction

This report presents an overview of the characteristics of the Manufacturing and Maintenance of Equipment for Railways (MMER) industry, undertaken by ACIL Tasman for the Department of Innovation, Industry, Science and Research (DIISR). The report is the first time that this industry has been comprehensively quantified. The Australian Bureau of Statistics (ABS) collects manufacturing statistics on the basis of the prime activity of the relevant business (an issue in respect of this industry), and one of the categories it reports on is “Railway, Rolling Stock Manufacturing and Repair Services” (ABS Cat no 8165.0). However, this only covers rolling stock, not track and signalling, which is a crucial part of the railway industry. This report is the first attempt to cover rolling stock, track and signalling and to provide much more detail on industry characteristics than has been the case with prior surveys. It covers the industry for the financial year 2008/09.

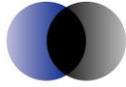
This report is the culmination of more than six months of data collection from firms across the industry, who took part in an email-based survey of their operations. ACIL Tasman would like to take this opportunity to thank all those participants in the survey, and would most especially like to thank the six firms who took part in the pilot survey, and provided feedback which allowed us to improve the full survey instrument.

Section Two of this report calculates the overall size of the industry in terms of its revenue, value adding and employment. Section Three highlights some key industry characteristics, and Section Four compares the MMER industry with the wider manufacturing industry. Section Five concludes with some observations about the industry. Technical details are included as appendices.

1.1 Process of analysis

In this section, a brief overview is provided of the process by which data was collected, analysed and verified to produce the results highlighted in this report. Further details on this process are contained in appendices for readers interested in greater detail.

In October and November 2010, a survey instrument was emailed to 513 firms which had been identified by DIISR, through analysis of various industry sources, as potentially being part of the industry. From this survey process, 202 responses were received. 119 of these responses were “positive” in that the survey was completed. A further 79 responses were “negative” in that firms indicated in an email response that they were not part of the industry,



and were hence out of scope.² After the main survey period, a number of firms that had not responded to the survey were approached again, and the final set of usable responses (not including those indicating they were out of scope) is 142 firms. Not all firms responded to all questions, but in general, the response rate was very good. Response rates to individual questions are shown in Appendix A.

In order to estimate industry size, in terms of revenues, employment, value added exports and imports, an approach of “grossing up” the sample was followed to ascertain relevant values for the industry as a whole. Details on this grossing up process are also provided in Appendix A.

² ACIL Tasman received numerous detailed responses from firms who indicated that the survey was not relevant to them, and this information was useful in understanding the industry in more depth. In each case, where a firm indicated that the survey was not relevant to its operations, this firm was recorded as being out of scope. Note that a very small number of firms simply stated that they would not be filling in the survey without giving a reason. These are not included in the 79 out of scope firms.

2 Overall Industry Size

This section provides an overview of the size of the industry, calculated on the basis of the “grossing-up” procedure outlined in Appendix A. Three key measures - revenues, value adding and employment - are examined which encapsulate industry size.

2.1 Revenue

Overall industry revenues from MMER in 2008/09, as indicated by the survey results were \$4.26 billion.³ The revenue of firms by size is shown in Table 1.

- **MMER sector generates \$4.26 billion in revenue**
- **Small and medium sized firms make up over 90% of firms in the industry**
- **A small number of large firms dominate the industry, with 87.5% of overall revenues**

Table 1 **Industry revenues***

	Gross revenues (\$m)	Share (%)	Average per firm (\$m)	Standard deviation (\$m)
Large firms	3,724.1	87.5	196.0	343.4
Medium firms	453.7	10.7	3.2	1.9
Small firms	79.9	1.9	0.4	0.3
All firms	4,257.6	100	n/a	n/a

**based on grossed up figures.*

While small and medium sized firms make up over 90 per cent of the firms in the industry, a small number of large firms dominate, with 87.5 percent of overall revenues.⁴ The average per firm revenue for large firms can be misleading, however, due to heterogeneity amongst them. Only one firm in the sample had revenues from MMER of over \$1 billion, with one having revenues between \$500 million and \$1 billion, and a six having MMER revenues between \$100 and \$500 million. These eight companies comprise around 70 percent of the industry, a level of concentration which is not unusual in Australian manufacturing. The median revenue amongst the large firms is \$53 million per annum.

Medium and small companies are numerous, but each is considerably smaller in size. This means that they comprise a small share of industry output.

³ Some firms which ACIL Tasman knew to be large from publicly-available information did not respond. Based upon information available in annual reports and other public documents (where available) ACIL Tasman estimates that these firms could add between \$300 and \$500 million in revenues and between \$60 and \$70 million in profits to the industry totals shown above.

⁴ Note that there are other large companies operating in the MMER industry, but these produce a wide range of outputs, earning only a small share of their revenues from MMER. Within the MMER industry, they are classified as small or medium firms.

2.2 Value adding and profitability

Revenues earned by a firm are not a true picture of the value of that firm to the economy. This is because most firms buy some or all of their inputs from other firms. Thus, when revenues are summed across firms, if Firm A buys inputs from Firm B, then part of its revenues will be compensation for its input costs, which also form the revenues of Firm B. The net result if only revenues are provided is double-counting.

To avoid this, a more accurate measure is industry value adding, which includes profits, payments to labour, taxes, government transfers, inventories and the production of capital for own use.⁵ These represent, collectively, the net contribution of the relevant firm's activities to the Australian economy, without any double-counting.

It is difficult for firms to calculate many of the elements which comprise economists' exact definition of value adding, but a proxy that can be readily calculated by most firms is earnings before income tax and depreciation allowances (EBITDA) - which covers pre-tax profits, returns of capital and wages. These are summarised on a grossed up basis for the Australian MMER industry below.

Table 2 **Australian MMER industry value added***

Item	Large firms (\$m)	Medium firms (\$m)	Small firms (\$m)	Total (\$m)
Gross profits (EBITDA)	326.8	121.9	58.5	507.1
Wages	924.6	122.2	44.3	1,091.1
Total	1,251.3	244.1	102.8	1,598.2

*based on grossed up figures.

Gross profits in the industry are relatively modest, with roughly a third of value adding going to gross profits, and the remainder to wages. This, however, is largely a function of firm size; the smaller the firm, the larger the share of gross profits and the smaller the share of wages. This is partly due to wages being lower in these firms (see Section 3.2), but is also due to the fact that, in general, the smaller the firm, the fewer are the number of wage-earners relative to the number of entrepreneurs or business-owners who earn a share of the profits rather than a wage.

2.3 Employment

Employment in the industry on a grossed-up basis is summarised in Table 3.

⁵ See ABS Cat no 8155.0 for more details

– MMR employees more than 15,000 workers with an average wage of \$70,000 per annum.

Table 3 **Industry employment**

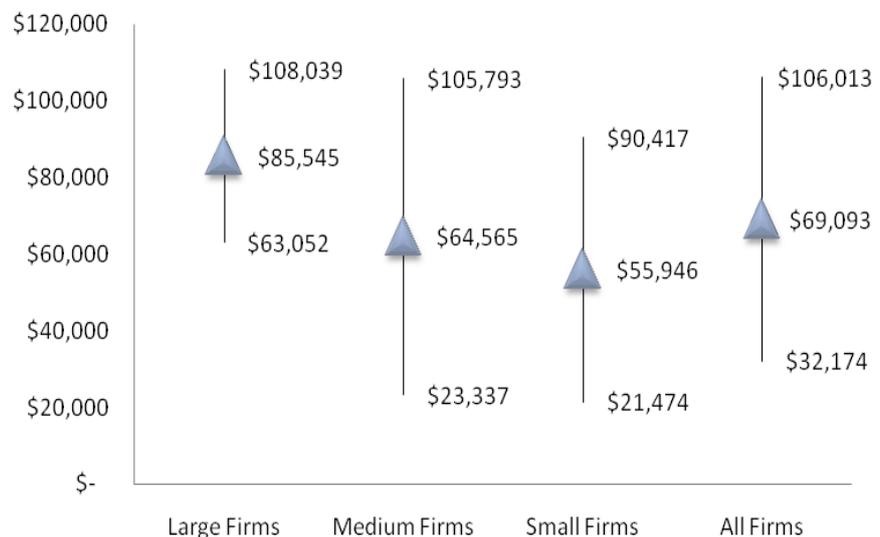
	Total	Average per firm	Standard deviation
Large firms	11,154	557	1016
Medium firms	2,436	17	17.2
Small firms	1,783	9	12.7
All firms	15,373	n/a	n/a

**based on grossed up figures.*

As is the case with revenues and value adding, the larger firms dominate the industry in terms of employment, employing 72 percent of workers in the industry. This compares with only 16 percent for medium-sized, and 12 percent for small firms. The diversity of large firms, in terms of size, is seen in the large standard deviation around the average for employee numbers.

The average wages of these workers, by firm size and by state, are shown in Figure 1 and Figure 2 respectively. The standard deviations around each average are also shown. A comparison between wages in MMR and elsewhere in manufacturing is shown in Figure 14.

Figure 1 **Average wage by firm size**

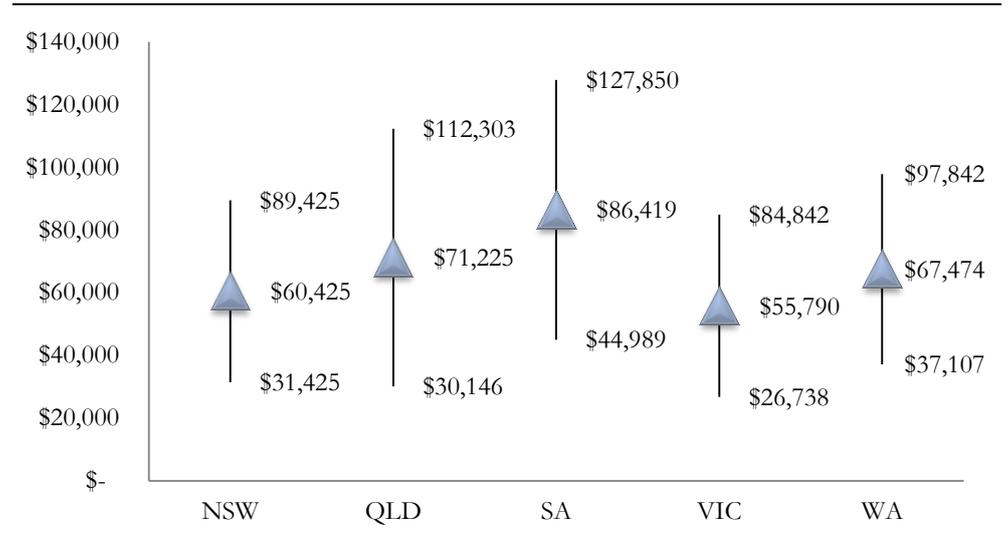


The differences in averages do not appear to be due to the types of workers in small, medium and large firms (see Section 3.1). Instead, it appears to be the firm size itself which drives wages.

Perhaps the most interesting result when comparing firms of different sizes is the medium-sized firms. Small firms generally pay lower wages than large firms, as they have fewer resources. However, the wide variation around the average for medium-sized firms could be due to the fact that some of these firms are engaging in relatively basic tasks, whilst some have reached sufficient

levels of technical expertise to move up the value chain and produce high-value, research-intensive products requiring highly-paid staff. For the larger firms, the high average wage and low spread of wages may be indicative of a high level of unionisation in the industry, which tends to both increase average wages and reduce the variation in wages between different workers in a given firm.

Figure 2 **Average wage by state**



The results for wages by state suggest that MMER workers in Victoria are the lowest-paid in the country, although the differences between Victoria and New South Wales may be minor when the higher cost of living in Sydney is taken into account.⁶ The numbers of firms for which information was available on both staff numbers and wages in Western Australia and South Australia was small (six and four firms respectively), so some caution should be used when interpreting these results. However, together with the results in Queensland, they perhaps show some of the influence of the minerals boom on wages, as trade skills needed by the MMER industry often have a strong correlation with those needed in mining.

⁶ Many of the firms in New South Wales have operations in Sydney.

3 Industry Characteristics

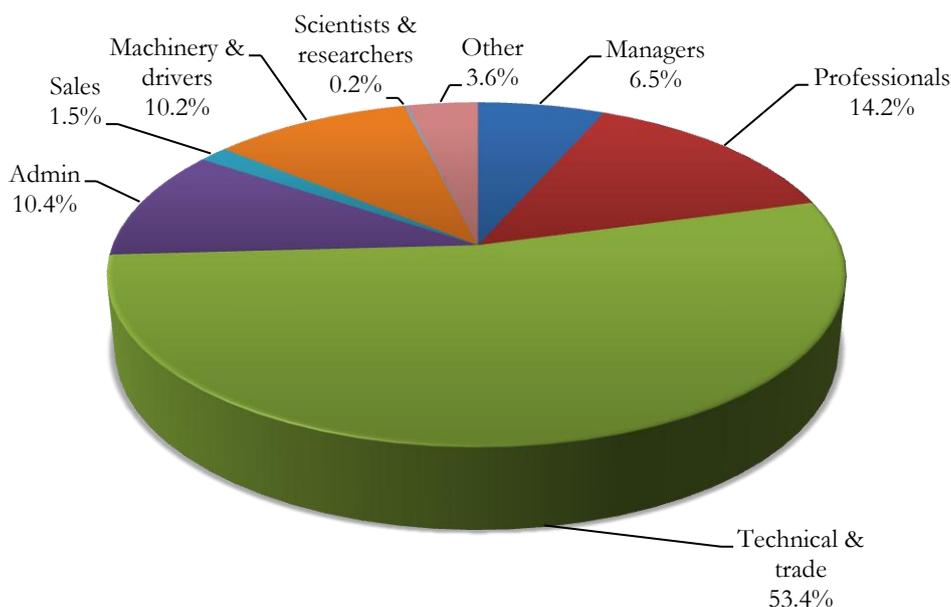
The MMER industry has a complex structure, with larger Tier One firms usually contracting directly with final customers (usually Australian railways), and then smaller firms usually sub-contracting to the Tier One firms for a variety of services. There is also a degree of similar interaction between Tier One firms. The industry operates across a wide variety of MMER products and services, and is active in every state and territory. In this chapter, the characteristics of the industry revealed by the survey results are discussed.

3.1 Labour characteristics

Wages by state and by firm size have already been discussed. This section focuses on the types of workers prevalent in the industry.

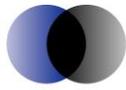
Figure 3 **Workers by type – All firms**

– Around half of the workers in the industry and technical and trade workers, with only small numbers of scientists and around 20 per cent of the workforce being categorised as managers or professionals.



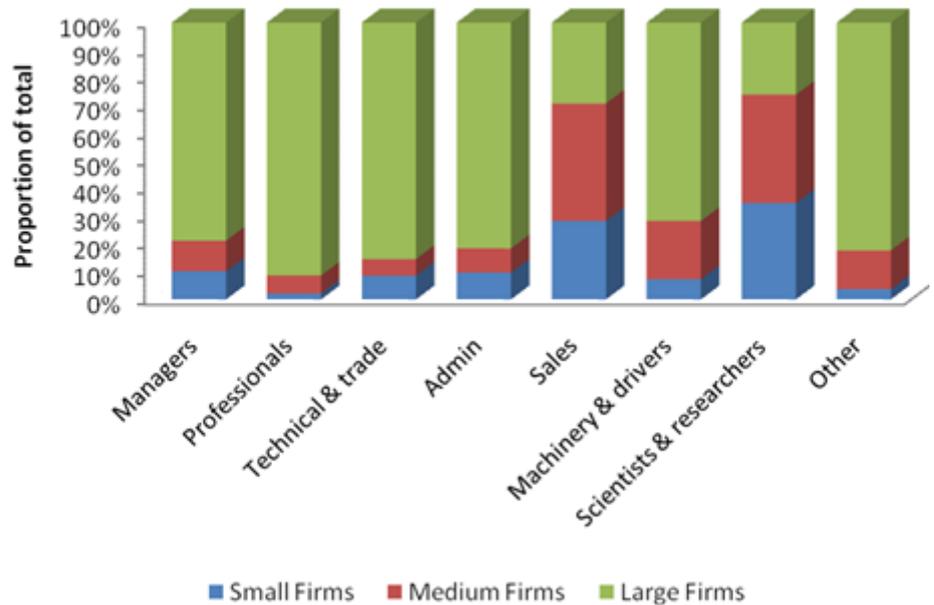
The industry is dominated by technical and trade workers, which is typical of the manufacturing sector⁷. The levels of other types of workers are also typical of the manufacturing sector. One aspect which may influence ongoing

⁷ The 2006 Census suggests that 26 percent of workers in manufacturing are “technical and trades” workers, and 20 percent are “labourers”; totalling 46 percent overall. Labourers were not included in the survey as a distinct category, but of the categories included, this seems the most likely place for labourers to be placed. Thus, the survey results of 53 percent and the ABS results of 46 percent appear approximately comparable. Other categories in the Census are very similar in proportions to the survey results.



technical and productivity growth is the very small number of scientists and researchers in the industry. If it is to innovate, and remain a leading edge industry, more investment in research and development may be required.

Figure 4 Proportion of workers by size of firm



Larger firms dominate in terms of overall numbers of workers, employing 63 percent of the total. However, the proportion of workers overall differs from the picture at the occupation level. The larger firms are over-represented (compared to their proportions of workers overall) in terms of the numbers of managers, professionals, technical and trade and administrative workers, but under-represented in terms of sales workers and scientists and researchers. Part of this may be due to the types of work undertaken; to the extent that large firms are Tier One firms responsible for managing large contracts with the railways, they may require a higher share of managers and professionals. Some of the pattern may be due to economies of scale; large firms may need a relatively smaller number of salespeople than smaller firms because a single sales person can handle many accounts, and this may mean they can employ more technical and trade workers to produce goods. The results for scientists and researchers, although they are associated with a small number of workers overall (see Table D1) are suggestive of small and medium-sized firms being an important core of research in the industry.

3.2 Ownership characteristics

In this section, ownership of MMER firms in Australia is explored. Different types of ownership structure are summarised in Table 4.

Table 4 **Ownership by type**

	Public (%)	Private (%)	Government (%)	Other (%)	Joint Venture (%)
<i>Large firms</i>					
Australian-owned	16.7	33.3	11.1	5.6	0
Foreign-owned	5.6	27.8	0	0	0
Australian and foreign ownership	0	0	0	0	0
<i>Medium firms</i>					
Australian-owned	1.8	81.5	0	1.9	0
Foreign-owned	0	3.7	0	5.6	0
Australian and foreign ownership	0	3.7	0	0	1.9
<i>Small firms</i>					
Australian-owned	4.6	84.6	1.5	0	1.5
Foreign-owned	1.5	6.2	0	0	0
Australian and foreign ownership	0	0	0	0	0
<i>All firms</i>					
Australian-owned	5.1	76.6	2.2	1.4	0.7
Foreign-owned	1.5	8.0	0	2.2	0
Australian and foreign ownership	0	1.5	0	0	0.7

Amongst large firms, privately-held, Australian-owned firms are most common, followed by privately, foreign-owned firms and Australian-owned, publicly-listed firms. For small and medium-sized firms, the dominant form of ownership is private, Australian ownership.

From Table 4, there appears to be very little foreign ownership in the industry, only 11.6 percent of firms. However, this may understate the degree of foreign penetration of the industry. Some of the firms that indicated that they were out of scope also stated that they were the local branch of a foreign subsidiary that imported MMER goods from the parent company overseas, but undertook no manufacturing in Australia. These firms are not covered in the survey.

3.3 Key locations of operation

In this section, an overview of where production occurs around Australia is provided. The survey asked where the head office was located, and also where each firm had operations around Australia. Many firms, particularly the larger ones, have operations in numerous states, though relatively few operate across Australia.

Figure 5 provides an overview of the distribution of head offices, based upon postcodes, across Australia, and shows how these are divided amongst small, medium and large firms.

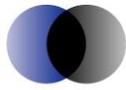
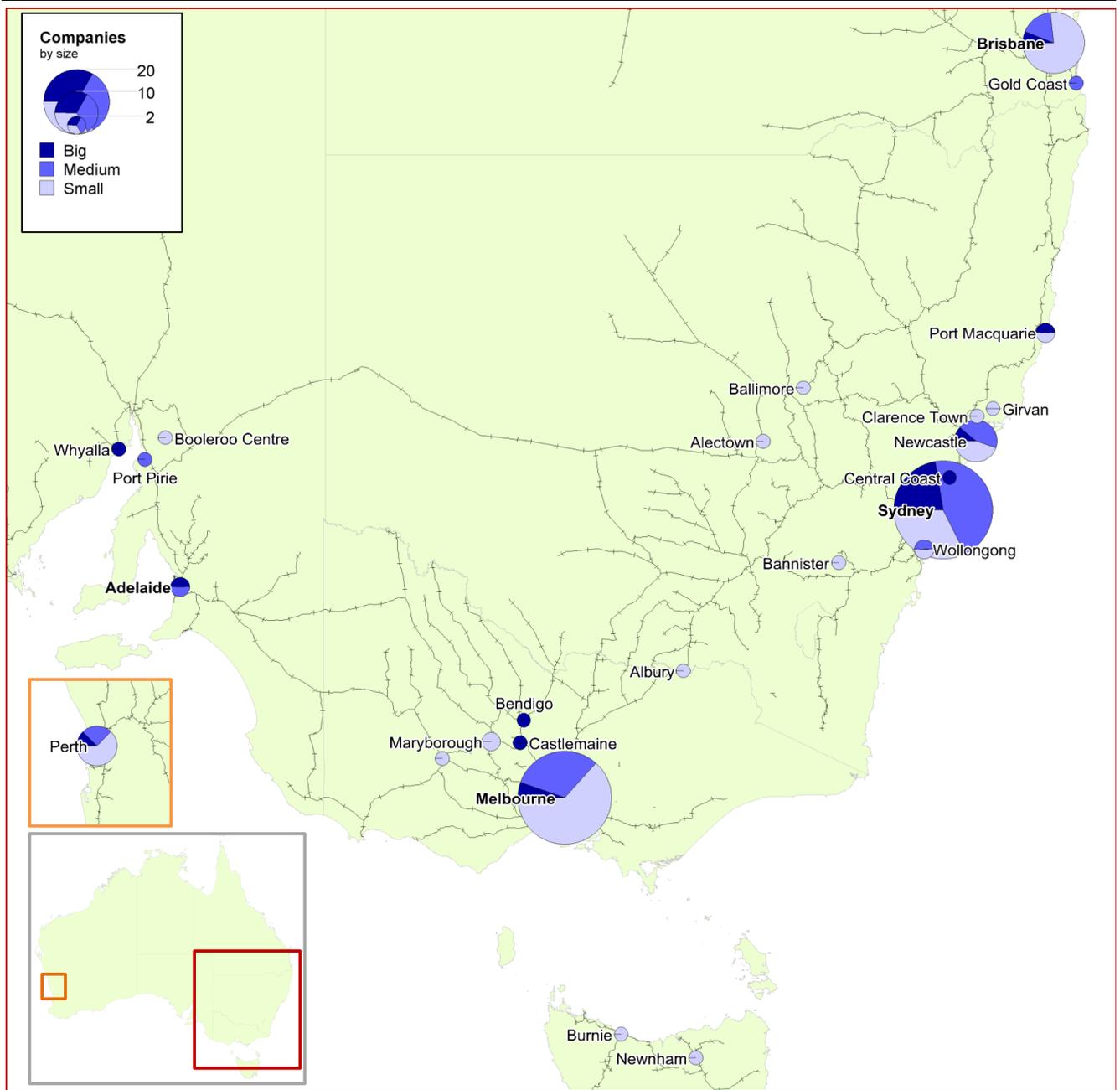


Figure 5 Location of head offices by firm size



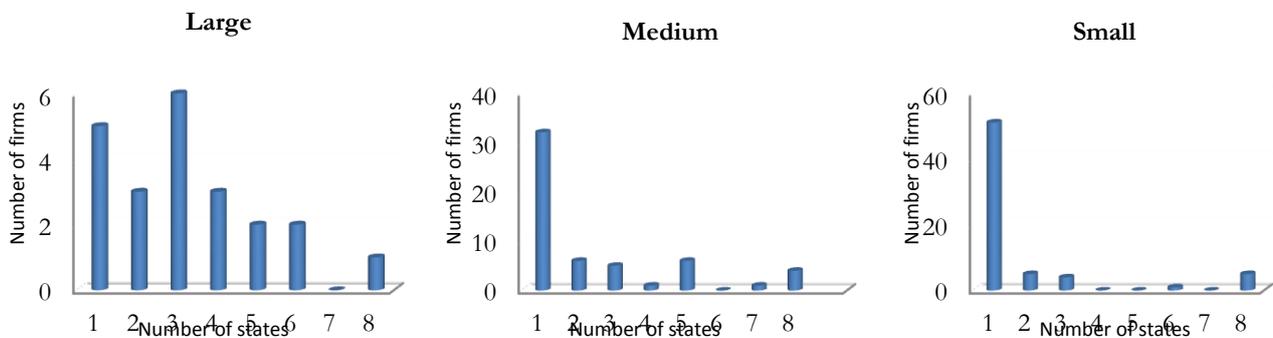
There is a concentration of firms in areas in and around Sydney (28 percent), Melbourne (29 percent) and Brisbane (13 percent). However, there are also a reasonable number of firms (13 percent) which base themselves in regional locations. In Figure 5, a map of the rail network has been included, and most

of these regional locations lie on railway tracks where they are best-positioned to serve their end customers.⁸

In Figure 5, it is clear that the industry is not characterised by large firms concentrated in the major cities, and regional areas being dominated by small firms. In fact, and most particularly in Victoria and South Australia, there are also large firms in regional areas.

Figure 5 provides an overview of the locations of head offices, but most firms operate from more than one location. Figure 6 provides an overview of the number of states of operation across different firm sizes, based on survey responses (see data in Appendix D2).

Figure 6 Number of states in which a firm operates – by firm size



The larger firms are spread across more states. However, even among smaller firms, some have operations across Australia. This may be due to the fact that some of the smaller firms are in fact large firms with a small presence in MMER (see Figure 8 and associated discussion). In terms of where each firm locates its branch offices, the results are shown in Table 5. Note that no firm had a head office in the Australian Capital Territory or the Northern Territory, but several firms had branch offices in those locations. Note also that the two firms in the sample with head offices in Tasmania had no branch offices in other states.⁹

⁸ Note that the survey asked about head offices, so some centres with large manufacturing operations, such as Maryborough in Queensland, are not included.

⁹ Note the small sample size for Western Australia and South Australia. As discussed in Section 2.3, the results for these two states should be interpreted with caution.

Table 5 **Head and branch office locations***

	Branch offices							
	NSW (%)	Vic (%)	Qld (%)	WA (%)	SA (%)	TAS (%)	NT (%)	ACT (%)
Head office NSW	n/a**	27.4	28.8	17.8	15.1	1.4	5.4	4.1
Head office Vic	21.2	n/a	18.2	16.7	16.7	9.1	9.1	9.1
Head office Qld	25.0	20.8	n/a	16.7	12.5	8.3	8.3	8.3
Head office WA	33.3	33.3	33.3	n/a	0	0	0	0
Head office SA	25.0	12.5	12.5	12.5	n/a	12.5	12.5	12.5

* Numbers may not add to 100 percent due to rounding.

**The survey does not pick up whether a firm has one or multiple offices in a single state.

New South Wales is a little more popular than other states for branch offices. However, geography does not, on the whole, appear to be driving the formation of branch offices.

3.4 Goods and services produced

This section explores in more detail what is produced by firms in the MMER industry. This is shown in Table 6.

Table 6 **Production by type (percentage of sample involved)***

	Large (%)	Medium (%)	Small (%)	Total (%)
Rail track, ballast and sleepers manufacture	8.1	2.6	1.5	3.6
Rail track, ballast and sleeper maintenance & repair	7.1	3.3	2.2	3.9
Track signalling components manufacture	4.1	5.3	5.2	4.9
Track signalling components manufacture and repair	5.1	4.0	5.2	4.7
Locomotive manufacture	4.1	0.7	0.7	1.6
Locomotive maintenance and repair	8.2	5.3	3.7	5.5
Locomotive components	10.2	18.5	15.6	15.4
Freight wagon manufacture	5.1	0.7	0.7	1.8
Freight wagon maintenance and repair	6.1	4.6	5.2	5.2
Freight wagon components	7.1	9.3	8.1	8.3
Passenger car manufacture	4.1	0.7	1.5	1.8
Passenger car maintenance and repair	10.2	4.0	5.9	6.2
Passenger car components	10.2	15.9	21.5	16.4
Railway communication components	3.1	5.3	7.4	5.5
Overhaul of subsystems	4.1	3.3	3.0	3.4
Other	3.1	16.6	12.6	11.7

* Numbers may not add to 100 percent due to rounding.

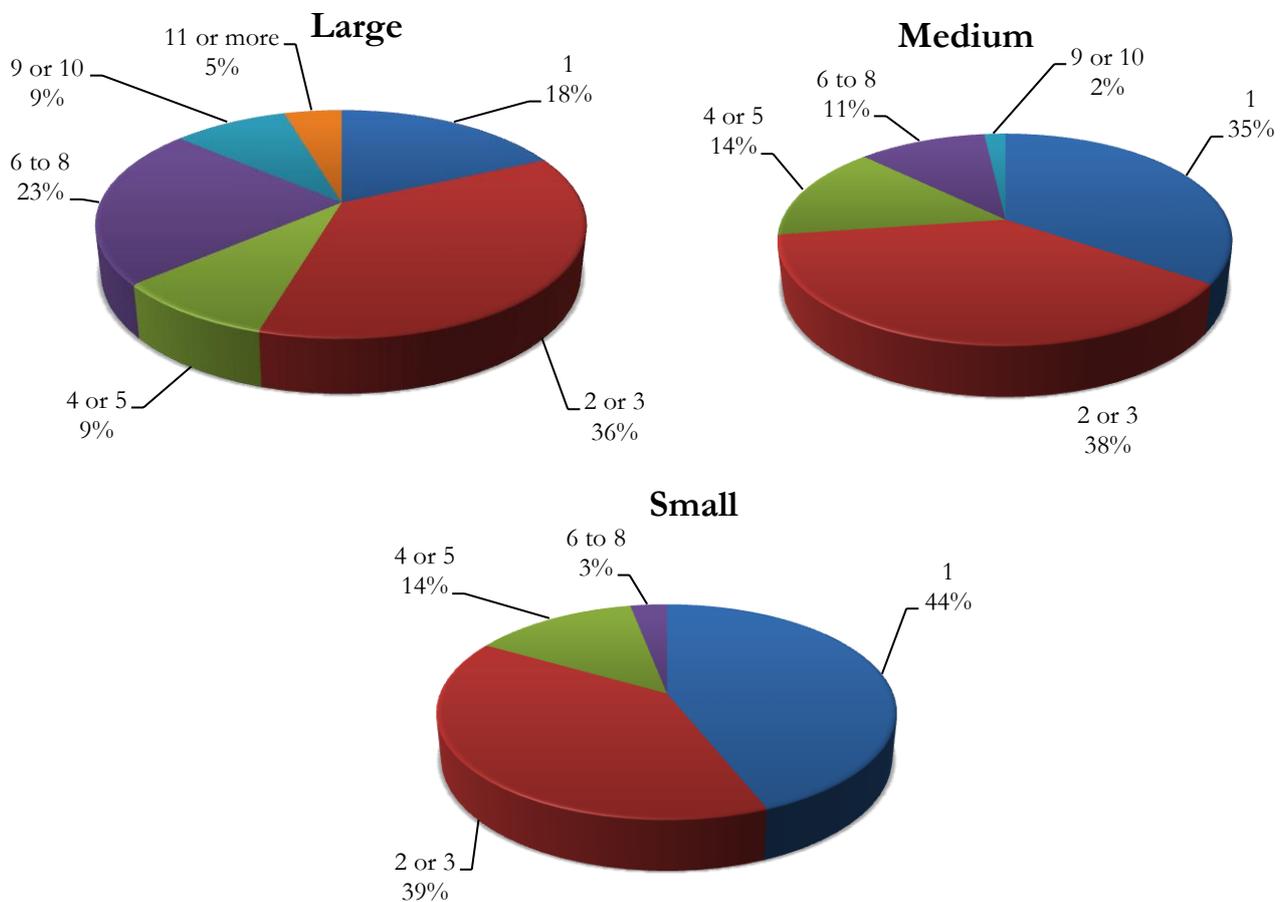
Table 6 suggests that the larger firms make items used by the railways themselves, whilst the smaller firms either make components, or maintain equipment. For example, almost no small or medium-sized firms are involved in locomotive or wagon manufacture; what little of this is undertaken in



Australia is done by large firms. However, medium-sized firms are almost as likely as large firms to be involved in locomotive maintenance and repair, and small firms are only a little less likely to be involved than medium-sized firms. For components, small and medium-sized firms are much more likely to be involved in the business than large firms.¹⁰

In Figure 7, the number of different MMER categories (from the 16 in Table 6) firms are involved in, based on their size is examined.

Figure 7 **Scope of production by size of firm**



The three different sizes of firm have almost exactly the same likelihood of producing two or three items from the list in Table 6. However, as firms become larger, they have the capacity to produce a larger number of different components (economies of scope). Small and medium-sized firms tend to

¹⁰ This adds empirical support to industry anecdote about Tier One and Tier Two firms.

specialise in a smaller number of components, while larger firms tend to be more diversified.

Production versus capacity

Firms were surveyed on the proportion of their capacity utilised to produce MMER goods and services in 2008/09.¹¹ On average, the larger firms were producing at 86 percent of their capacity, whilst medium-sized firms were producing at 53 percent and smaller firms at only 28 percent. It is difficult to be definitive with only one year of data, but the disparity raises the possibility that the Tier One/Tier Two system may be partially designed so that larger companies can better utilise their capacity. As demand expands, it tends to do so in a lumpy fashion, particularly from the perspective of smaller firms. However, it is capital intensive for all sizes of firm, and thus small firms need to invest in more capital (relative to output) in order to produce the volume of items required. In between orders, this capital remains under-utilised. This may explain the relatively low utilisation ratios of small and medium-sized firms, compared to their larger peers.

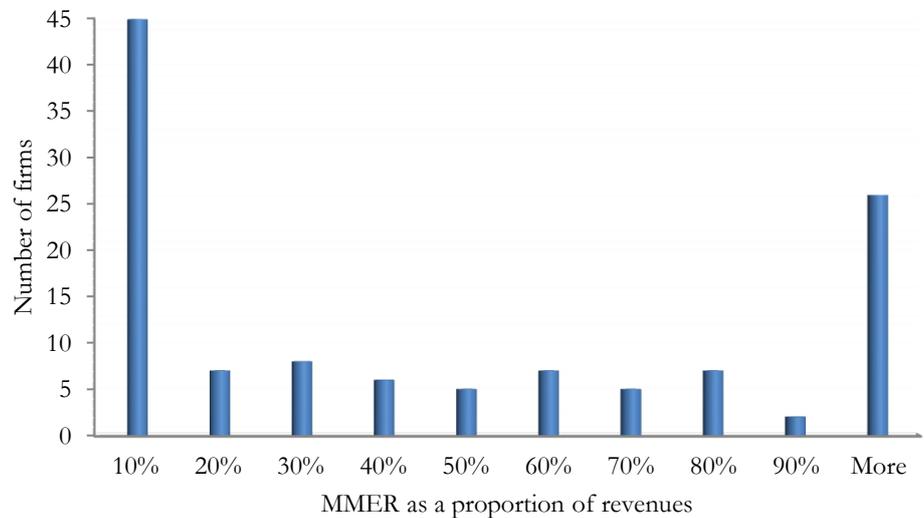
On a location basis, New South Wales, South Australia, Western Australia and Tasmania appear to be performing with average capacity utilisation of around 60 percent. However, Queensland and Victoria have more spare capacity; with each having an average capacity utilisation of roughly two thirds of the leading states.

Focus on MMER

The industry exhibits a dichotomy in its production characteristics; firms tend to either devote almost all of their productive capacity to the production of MMER goods and services, or they devote only a very small proportion of their productive capacity to MMER goods and services; there is little in between, as shown in Figure 8.

¹¹ It may be that some firms utilise some of their capacity for other manufacturing goods, when demand for MMER is low. This was not explicitly canvassed in the survey.

Figure 8 **MMER revenues as a proportion of total revenues**



The industry appears to be comprised of specialists, and generalists that also produce a range of other goods and services. The larger firms in the industry tend to be the industry specialists. When smaller firms are examined, most tend to cluster in the lower range of Figure 8, but this is partially a result of the construction of the definition of small, medium and large firms, which pertains to their MMER revenues; some of the firms listed as small are large firms, but with small amounts of revenue coming from MMER.

Figure 8 should not be counter-intuitive. MMER is an industry dominated by a small number of large firms providing much of its output. Around these firms sit a much larger number of firms which provide inputs to the industry. Within that group of suppliers are a large number of small to medium enterprises which have specialised in the industry, but it also contains a number of small and large businesses which produce some MMER goods and services, but which have diversified across other lines of business as well. These sit at the right hand end of Figure 8.

Regional specialities

This section provides a brief discussion on regional specialities, based upon the location of head offices and answers provided as to what is produced by the relevant firm.¹²

¹² Note that not all production by type necessarily occurs in the relevant head office, an issue discussed in more detail in Appendix C.

The industry operates across a wide variety of MMER products and services and is active in every state and territory, with production largely concentrated on the East Coast.

Table 7 **Production by location (percent of sample answering positive)***

	NSW (%)	QLD (%)	VIC (%)	SA, WA & TAS (%)	Total (%)
Rail track, ballast and sleepers manufacture	2.1	3.8	5.3	9.1	3.8
Rail track, ballast and sleeper maintenance and repair	4.7	0.0	2.1	6.1	3.5
Track signalling components manufacture	5.3	5.8	4.2	3.0	4.9
Track signalling components manufacture and repair	4.2	9.6	1.1	6.1	4.3
Locomotive manufacture	1.1	1.9	1.1	3.0	1.4
Locomotive maintenance and repair	5.3	3.8	6.3	6.1	5.4
Locomotive components	17.4	17.3	15.8	3.0	15.7
Freight wagon manufacture	1.1	5.8	1.1	3.0	1.9
Freight wagon maintenance and repair	5.8	3.8	4.2	6.1	5.1
Freight wagon components	10.0	5.8	8.4	3.0	8.4
Passenger car manufacture	1.1	3.8	2.1	3.0	1.9
Passenger car maintenance and repair	6.8	3.8	7.4	6.1	6.5
Passenger car components	16.8	15.0	22.1	6.1	17.0
Railway communication components	3.7	7.7	5.3	9.1	5.1
Overhaul of subsystems	4.7	1.9	3.2	0.0	3.5
Other	10.0	9.6	10.5	27.3	11.6

* Numbers may not add to 100 percent due to rounding.

Most of the goods and services produced are fairly widely spread across the country. In most cases, the degree of the spread of production appears to be related to value-adding. For example, the value of sleepers and ballast is such that they must usually be produced locally rather than transported long distances. Items that can be economically transported further, such as locomotive and passenger and freight car components indicate a degree of regional speciality, with production largely concentrated on the East Coast.¹³

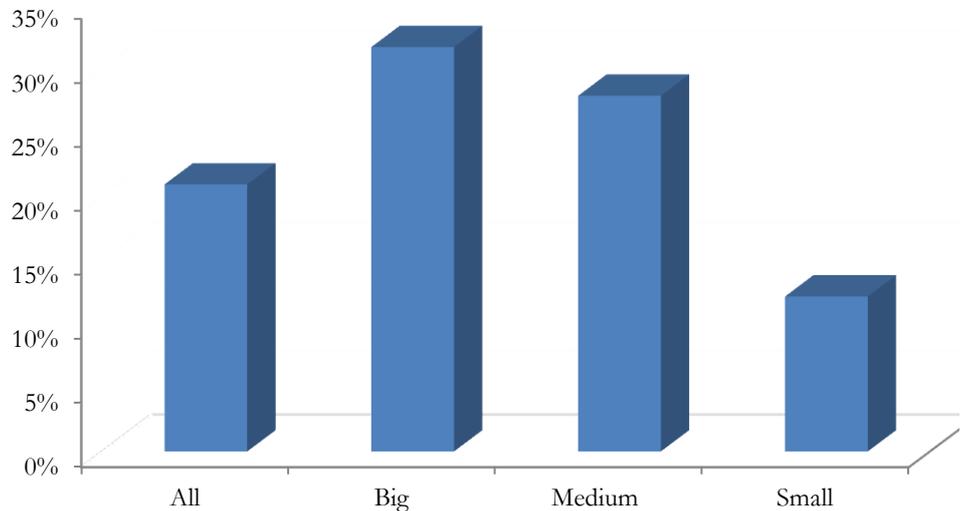
3.5 Exports

Overall, roughly a fifth of the industry is involved in exporting, and the value of exports (calculated using the same grossing up process as followed in the calculation of revenues) is roughly \$173 million per annum, or four percent of overall revenues. This relatively small percentage indicates only a limited focus on exports by the industry, which is focussed towards production for the national rail industry. The proportion of firms that export, by size of firm, is shown in Figure 9.

– Around one fifth of the industry is involved in exporting at a value of \$173 million per annum.

¹³ Although the survey results do not indicate why this concentration has occurred; government emphasis on the development of manufacturing in regional areas or long-standing historical regional speciality are both potential reasons. Future work could examine this in more detail.

Figure 9 Proportion of firms exporting by firm size



Exporting is a function of firm size, with more large and medium-sized firms than smaller firms exporting. However, the balance of values of exports does not follow the value of production in terms of shares amongst large, medium-sized and small firms; the amount of exports for medium-sized firms is only a little less than those for large firms, while large firms account for 87 percent of revenue and medium-sized firms only ten percent. This perhaps indicates that some of the medium-sized firms are sufficiently specialised in their activities that they can compete on a world stage, which is very useful in the context of driving future export opportunities for the industry.

The division of exporting firms by state are shown in Figure 10. There is a distinct difference between firms in New South Wales, Queensland and Victoria, and firms in Western Australia and South Australia, with the latter being much more likely to export than the former. The small number of firms in South Australia and Western Australia means results for these states should be treated with some caution, but it appears as though the states with smaller domestic markets are more likely to rely upon exports for their business.

Figure 10 Proportion of firms exporting by state

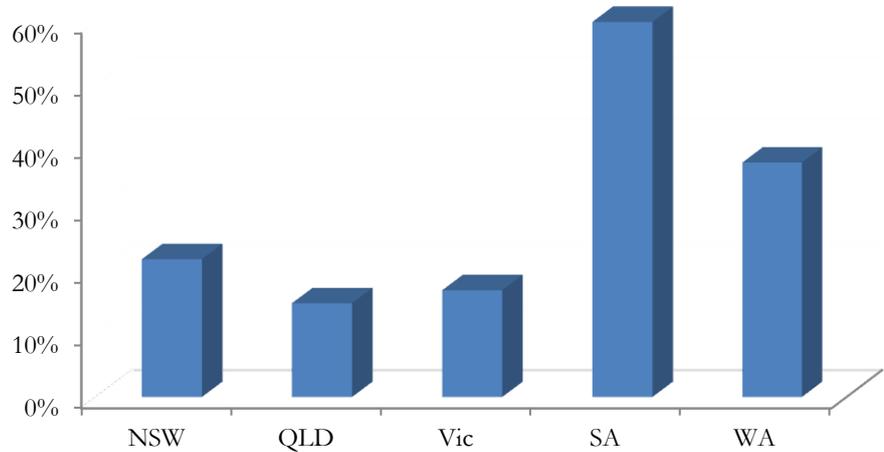
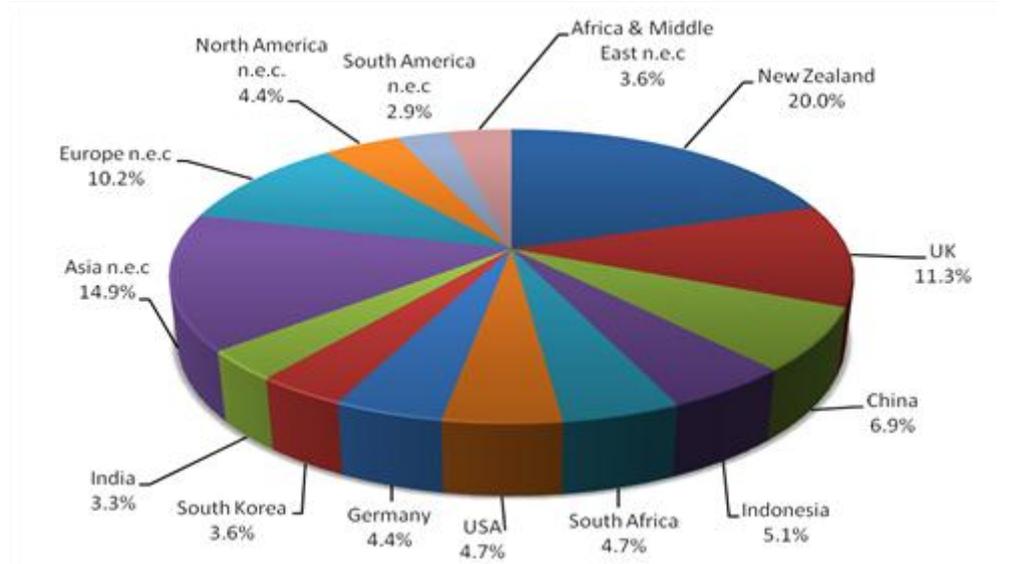


Figure 11 provides an overview of export destinations. The survey asked firms to identify the five top nations in terms of their own exports. The score for each country is a weighted score; for each time a country was identified as being the most important export destination, it scored a five, being identified as the second most important export destination attracted a score of four, and so on down to a score of one for the fifth most important export destination.

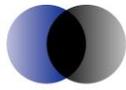
- New Zealand was the most important export destination.
- Asia as a continent is the most important, but spread across a number of countries.
- Most exports are components of larger systems, but no definitive pattern of types of components.

Figure 11 Importance of export markets*



Note: n.e.c = not elsewhere classified.

New Zealand was the most important export destination, which is perhaps due to location. However, the next most important single country for exports was the United Kingdom. Asia as a whole is important, but with a small share for most countries, with the exception of China and Indonesia. This result for



China is driven by exports of small firms (China is also the fourth most important market for medium-sized firms). This is interesting as China is usually considered to be an origin for manufactured products, but smaller Australian MMER firms are making inroads into this market. One reason for this could be the massive expansion in the Chinese rail industry that is happening at present, which is attracting suppliers from many countries.

There are no real definitive patterns in terms of what is exported, with the exception that most are components of larger systems. There appears to be something of a division between relatively low value-adding components such as wheels and bogies, and much higher value-adding items such as monitoring equipment. The latter perhaps provides scope for future value-adding opportunities through exports. Finally, examining the way in which firms described their exports, it appears that many exports, particularly at the smaller end of the market, are the result of opportunistic exploitation of contracts for the supply of particular items; several respondents indicated that they have a contract to supply a particular item.

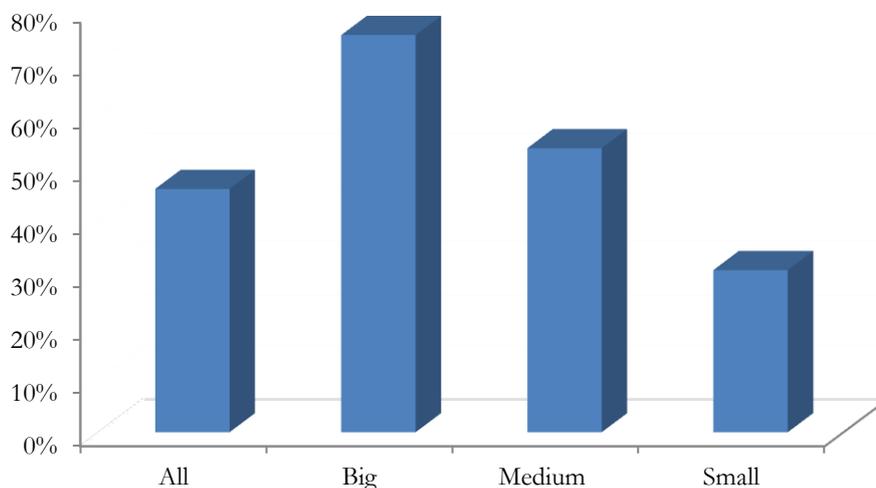
3.6 Imports

This section explores the quantity and nature of imports of MMER in Australia.¹⁴ The overall value of imports is much larger than that of exports; imports (estimated using the grossing up methodology described previously) were worth \$771 million in 2008/09, which is almost a fifth of total industry revenues. The proportion of firms importing by firm size are shown in Figure 12.

– Imports were worth \$771 million in 2008/09

¹⁴ Note that this does not include firms who are daughters of parent companies overseas, and import from the parent without manufacturing in Australia. This issue is discussed in more detail in Appendix C.

Figure 12 Proportion of firms importing by firm size



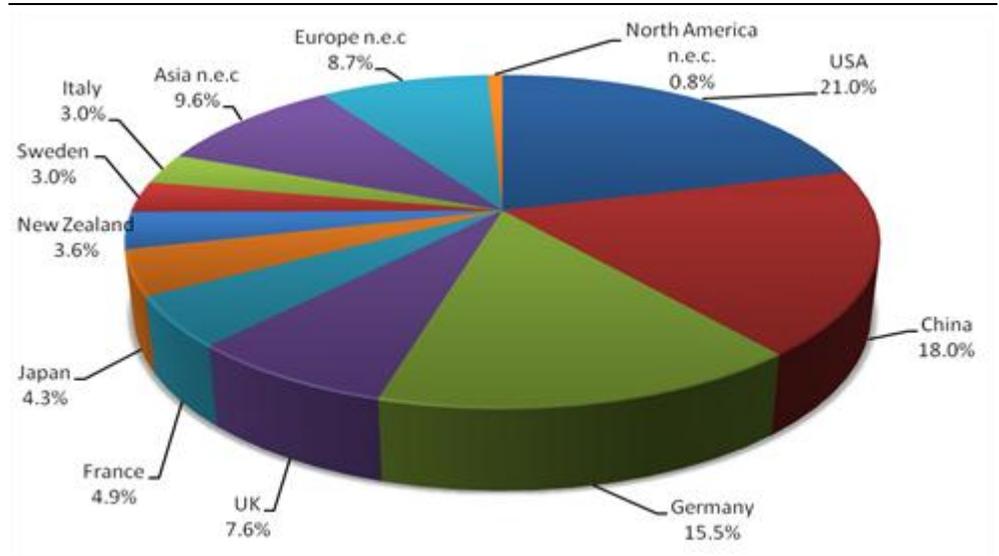
Most large firms indicated that they imported equipment during the year, along with over half of medium-sized firms and a third of small firms. The greater likelihood of importing amongst larger firms is likely to be a function of size; it may be more difficult for small and medium-sized firms to access international suppliers than it is for larger firms.

Large firms also accounted for 87 percent of imports by value, with medium-sized firms accounting for around nine percent and small firms four percent. These are in line with the shares of revenues amongst these three types of firms. Just over half of those firms based in New South Wales indicated that they had imported MMER goods and services in 2008/09, with 45 percent of firms doing so in Queensland, and roughly a third of firms elsewhere in Australia.

The sources of imports are shown in Figure 13. Again, the survey asked for the top five, and the scores are formed by the same weighting mechanism as is used for exports.



Figure 13 Importance of import sources*

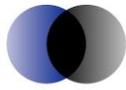


Note: n.e.c = not elsewhere classified.

In the case of imports, there does appear to be a pattern emerging; imports either come from advanced countries with a reputation for high-end, precision goods in railways (mostly Germany and the US), or they come from China, which has less of a reputation for technical excellence and more of a reputation for cost-effectiveness. This is similar across all sizes of firms, although China is a less important source of imports for small firms. While one cannot draw strong conclusions from a single survey, it does not appear that the larger firms are “hollowing-out” Australian manufacturing by sourcing inputs from lower-cost suppliers overseas at the expense of small and medium suppliers in Australia. Although customers in the railway industry were not surveyed and they may be sourcing manufacturing goods from overseas. However, it seems that all types of MMER firms are making decisions about where they source their inputs that are based upon the comparative advantage of their suppliers.

– A wide variety of items imported, from both advanced and low cost producing countries.

While there is a wide variety of items imported, high end technical components dominate in comparison to rail wheels and other relatively low value-adding products. However, the former appears to dominate. There is also a number of modular components, such as recline seat assemblies, which suggests that the MMER industry in Australia undertakes a degree of final assembly of component systems for trains (such as seat assembly), rather than manufacturing the whole system in Australia. However, there are many basic items, such as wiring, LED lights, and nuts and bolts that are imported, which suggests more than final assembly occurs in Australia.



Opportunities for value-adding and import replacement

From the list of what is imported, there would appear to be several opportunities for import replacement. These are described very briefly, cognizant of the fact that DIISR, ARA and state governments are collaborating to undertake a Rail Manufacturing Technology Roadmap. Firstly, it would appear that some items which are imported, such as nuts, bolts wires and so on might easily be produced in Australia (if they are not already being produced here). It is not clear whether it is price that causes supply to be sourced overseas, or whether there are insufficient channels of communication within the industry, so that smaller firms on opposite sides of the country are unaware of what can be sourced in Australia, and hence move overseas.

However, low value-added components are not a solid basis for the industry going forward. Looking at what Australia imports and where it is imported from, the countries with a tradition of excellence in manufacturing, where specialist components can be sourced, such as Germany and the United States, do not appear to have been undercut, or forced out of the marketplace by China.¹⁵ This suggests that there is room at the top-end of the market, for manufacturing exports, that is not competed away on price by China and other relatively low-wage countries. This, then, would seem to be a useful focus for Australian firms, particularly given the existing expertise in manufacturing exports associated with diagnostic and monitoring equipment.

3.7 Profitability

It would appear that the industry is profitable. Dividing the EBITDA (see Section 2.2) from MMER activities by the revenue from MMER activities provides average (pre-tax) profits for the large firms of around nine percent, for medium-sized firms of around 16 percent, and for small firms of 19 percent. These figures, particularly for small and medium-sized firms, appear large, and may be reflective of the fact that these questions were not well answered by smaller firms (see Appendix B).

Many firms that undertake MMER production also provide other goods and services, and it is thus useful to consider whether MMER is a relatively profitable activity, compared to other forms of manufacturing. The average ratio of MMER activities as a proportion of EBITDA, compared to its proportion of revenues is 1.24 for all firms, 0.95 for large firms, 1.39 for medium-sized firms and 1.23 for small firms. However, the median for firms of all sizes was one. This suggests that there are a handful of generalist firms

¹⁵ Further work on the wider global context and/or more years of data on the MMER industry in Australia would provide further information.



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engaging in MMER production that are highly profitable. The comparison between MMER and manufacturing in the following chapter highlights differences in profitability more clearly (See Figure 16).

– The MMER sector represents approximately 1% of the manufacturing sector in Australia in terms of revenues, value-adding and

4 Comparison with the Wider Manufacturing Industry

This chapter provides a brief comparison between the MMER industry and the manufacturing industry more generally. For this, the ABS publication *Manufacturing Indicators Australia* (ABS Cat No 8229.0) is used, the most recent publication of which was in June 2010. Table 8 provides an overview of the wider manufacturing industry.

Table 8 **ABS manufacturing industry indicators 2008-09**

Statistic	Value
Industry gross value added (\$m)	103,139
Labour productivity (index)	98.3
Value of manufacturing exports (\$m)	92,485.1
Value of manufacturing imports (\$m)	195,106.2
Manufacturing index of industrial production	99.0
Articles produced by manufacturing industries price index	168.0
Materials used in manufacturing industries price index	187.8
Wages and salaries (\$m)	53,158
Sales and service income (\$m)	420,921
Employment ('000)	1,008
Operating profit before tax (\$m)	27,256

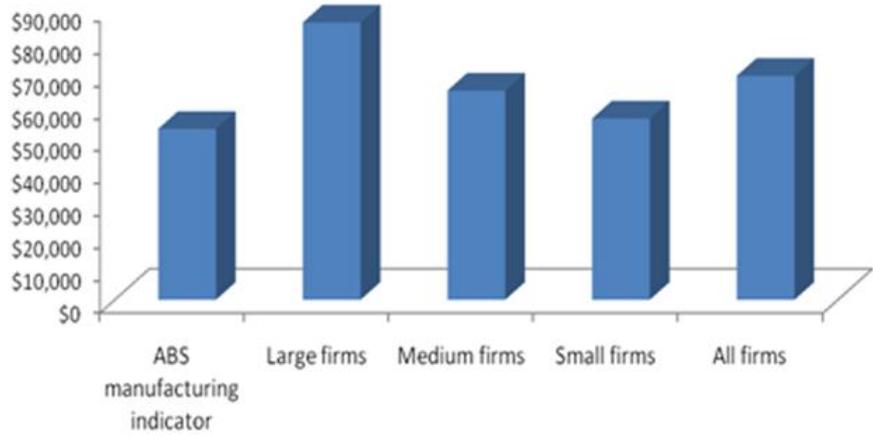
Data source: ABS Cat no 8229.0

Several of these are index numbers, and are thus not amenable to direct comparison. In addition, data on the overall number of firms are not provided, and thus the most appropriate form of comparison is by employee. Five different indicators are thus examined:

- Average wage.
- Revenue per employee.
- Operating profits per employee.
- Exports per employee.
- Imports per employee.

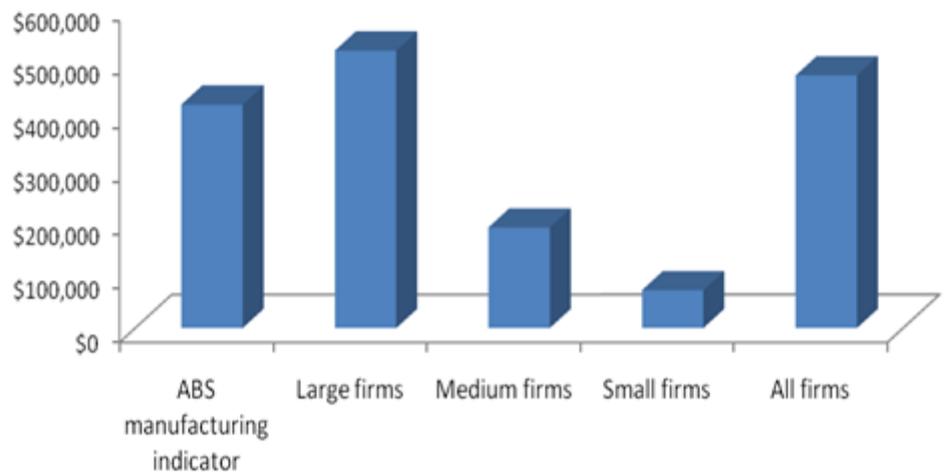
Some caution should be exercised in comparing profits, because the survey figures are for EBITDA, and the ABS figures are for operating profits, which are not identical. Industry value added is not included as, whilst it is roughly wages plus EBITDA (see Section 2.2), it includes other elements which have not been collected in the survey.

Figure 14 **Average wage**



Workers in MMER are paid considerably better than is the case for manufacturing as a whole. The exception is smaller firms, but this is not atypical, as smaller firms generally have lower wages than larger firms, and the ABS average comprises of firms of various different types.

Figure 15 **Revenue per employee**



Although wages are considerably better in MMER than in manufacturing more generally, revenues are roughly the same. This may be due to issues in relation to the collection of revenue data, and its attribution to MMER (see Appendix B). Alternatively, it may be that, through unionisation or some other factor,

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firms in the MMER industry remit more revenues to wages than other manufacturers.

Figure 16 **Profit per employee**

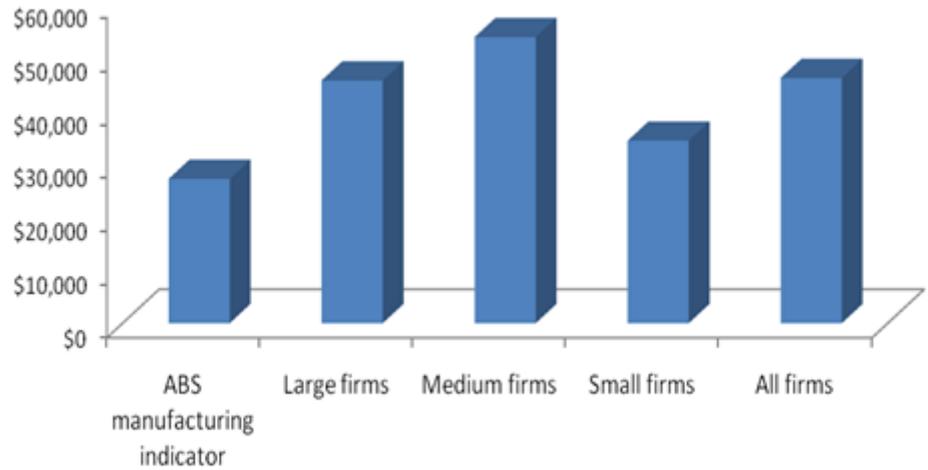
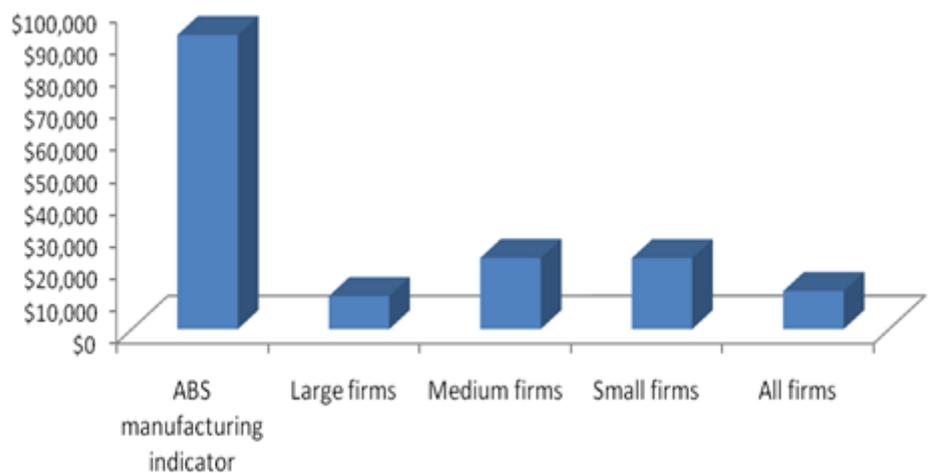


Figure 16 suggests that all levels of MMER production are more profitable than manufacturing in general.

Figure 17 **Exports per employee**



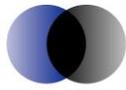


Figure 18 Imports per employee

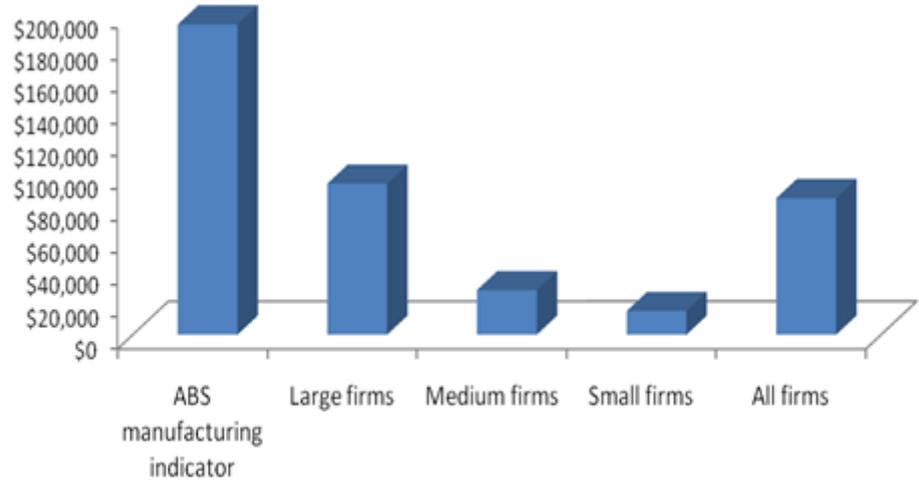


Figure 17 and Figure 18 tell a similar story; this is a part of the manufacturing industry which is largely focused on domestic production. A domestic focus may also partly explain its higher levels of profit and wages, as it does not compete as much with firms overseas as other parts of manufacturing and therefore does not have to price at global market prices, which tends to drive lower profits and wages lower. However production costs will be driven further down over time with increased exposure to international competition caused by non-inferior imported goods being sold domestically.



5 Conclusions

This report has focussed on the activities of firms that provide manufacturing and maintenance services for the railway industry in Australia. The MMER sector represents roughly one percent of the manufacturing sector in Australia (in terms of revenue and employment), generating around \$4.26 billion in revenues, and adding \$1.6 billion in value to the Australian economy each year. It employs more than 15,000 workers who earn more than a billion dollars in wages.

The industry is dominated by a small number of large firms, with the top 22 firms contributing 87 percent of industry revenues, and the top six firms around 70 percent of total industry revenues. This is typical in the manufacturing sector, particularly in a relatively small economy such as Australia's.

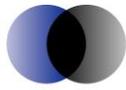
Around half of the workers in the industry are technical and trade workers, with only small numbers of scientists and researchers (less than one percent), and only around a fifth of its workforce being categorised as managers or professionals. Wages, however, are relatively high, with workers earning, on average, around \$70,000 per annum.

The industry is largely Australian-owned, with most firms responding to the survey indicating they were privately-held Australian-owned businesses. Moreover, this was not a function of the size of the firm; most large firms were also owned by Australians. Within Australia, firms are concentrated around Sydney, Melbourne and Brisbane. However, there are important operations in regional areas, and in Perth and Adelaide.

When examining industry output by firm size, there is a clear split between the larger firms (often known as Tier One firms in the industry) and smaller (or Tier Two or Tier Three) firms. The end customers, mostly Australian railways, will often contract out large projects to the Tier One firms, who will then, in turn, subcontract out work to the Tier Two and Tier Three firms. This can be seen in examining output, with larger firms having a greater presence in more capital intensive areas of production such as the manufacture of track and the construction of rolling stock, and smaller firms focussing more on components.

The industry tends to focus on domestic production, with exports and imports having a lower share of industry output than is the case for other parts of the manufacturing sector. This may be one reason for the relatively high wages and profits (relative to manufacturing more generally) in the industry, and may also explain why there is a fringe of generalist manufacturers who earn only a

– Large MMER firms have a greater presence in more capital intensive areas of production such as the manufacture of track and construction of rolling stock, and smaller firms focus more on components.



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small part of their revenues from MMER. However, it also provides scope for increasing export intensity in the industry, if suitable niche markets can be found that support Australia's competitive advantages.

This is the first time the MMER industry has been surveyed to the extent undertaken in this project. There are many lessons learned which might be applied to future surveys (see Appendix C), but the data gathered provide a useful initial step towards the better understanding of an industry which has been poorly understood in the past.



Glossary

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ARA	Australasian Railway Association
BITRE	Bureau of Infrastructure, Transport and Regional Economics
DIISR	Department of Innovation, Industry, Science and Research
EBITDA	Earnings Before Income Tax and Depreciation Allowances
FTE	Full Time Equivalent
LED	Light Emitting Diode
m	Million
MMER	Manufacturing and Maintenance of Equipment for Railways
NEC	Not Elsewhere Classified
NSW	New South Wales
NT	Northern Territory
QLD	Queensland
SA	South Australia
TAS	Tasmania
VIC	Victoria
WA	Western Australia

A Process of Analysis

This appendix presents an overview of the process by which the industry was surveyed for this report. A few issues with the survey and its results, which need to be borne in mind when assessing results, are discussed in Appendix B.

A.1 Survey

This report is the result of a survey completed by businesses engaged primarily in the manufacture and maintenance of equipment to be used for: railway and/or tramway track infrastructure; railway and/or tramway rolling stock (such as locomotives, wagons and passenger carriages); and signalling and communication. For the purposes of the survey, this sector was called the manufacture and maintenance of equipment for railways (MMER) industry.

The 500 MMER firms surveyed were identified by the Industry Capability Network and the Australasian Railway Association (ARA).¹⁶ The firms were sent the survey via email on October 3rd 2010, with reminder emails sent on the 12th and the 19th of October to those who had yet to respond. During that same week, ACIL Tasman contacted 241 firms via telephone, to remind them to respond to the survey. The ARA also sent out a reminder email on October 28th.

Through this process, 202 responses up to November 11th were obtained, of which 119 were positive responses (the survey was filled out) and 79 were from firms that indicated they were out of scope.¹⁷

Between November 11th 2010 and February 11th 2011, the ARA undertook a process of following up with non-respondents, 28 additional responses were received as part of this process. Other respondents were contacted to clarify certain points. Amongst the various responses, some were repeats and a small number contained no information. The final sample was 142 usable responses.

¹⁶ An additional 13 firms that were not on the original list of firms to survey also provided responses to the survey, which they had heard about through the various industry publications in which DIISR had publicised the survey, or from being contacted by other firms in the industry. One firm emailed all of its suppliers on ACIL Tasman's behalf asking them to respond, for which ACIL Tasman is grateful.

¹⁷ ACIL Tasman received numerous detailed responses from firms who indicated that the survey was not relevant to them, and this information was useful in understanding the industry in more depth. In each case, where a firm indicated that the survey was not relevant to its operations, this firm was recorded as being out of scope. Note that a very small number of firms simply stated that they would not be filling in the survey without giving a reason. These are not included in the 79 out of scope firms.

ACIL Tasman examined other publically available data on remaining firms to ascertain whether some information such as firm revenue or staffing could be found.

A.2 “Grossing up” results

In order to estimate industry size, in terms of revenues, employment, value added, exports and imports, an approach of “grossing up” the sample was followed to ascertain relevant values for the industry as a whole. In so doing, ACIL Tasman is cognizant of the fact that there are a small number of very large firms in the industry, whose characteristics are unique. If these firms were to be included in some form of industry average, and industry aggregates based on this average, estimates of industry size would be less inaccurate.

Based upon an initial examination of the data, ACIL Tasman determined that firms with an income over \$10 million should be considered to be large. This cut-off point contrasts with the ABS categories of firms (ABS Cat no 8165.0) which has all firms earning more than \$2 million per annum in turnover in the same category. However, examining the characteristics of firms with MMER earning below \$10 million reveals many firms with similar characteristics, whilst those above this cut-off point are unique. It was thus considered a useful cut-off point for estimating industry size and, as the analysis in the main report shows, for picking out differences amongst firms based on their size.

The large firms, of which there were 22, had their results entered into industry totals individually. That is, the values for revenue, profit, employment and wages for these firms were summed when calculating the totals.¹⁸ For the remaining firms, averages for revenues, wages, profits and employee numbers were taken, and multiplied by the number of (small or medium-sized) firms in the industry. Since there was still a diversity of firms earning less than \$10 million in revenues in the sample, they were divided into medium sized enterprises, earning between \$1 million and \$10 million in revenues from MMER, and small firms earning less than \$1 million. Subsequent analysis of results indicates that there are differences between firms in these two bands.

To estimate the number of firms in the industry as a whole, the number of responses from the survey prior to November 11th 2010 who indicated they

¹⁸ Not all firms provided responses for revenues, profits and wages, although all responded for employees. In terms of revenues, the non-respondents were all railways, who in fact earn no revenue from MMER (as it is a cost item for railways). For profits, the railways who had not responded for revenues also did not respond for profits, and three additional firms likewise provided no response. One of these was estimated based on profit rates at several of its competitors (who all had similar rates of profit), but the remaining two could not be estimated in this fashion. Wage estimates are missing for four firms, two of them being railways who did not respond for revenues or profits.

were out of scope (79 out of 202) were taken as being indicative of the number of firms out of scope in the whole sample (513), and thus estimated a total industry size of 313 small and medium firms, to which the 22 large firms were added to give a total industry size of 335 firms. The proportion of firms in the small and medium-sized categories in the sample (66 and 54 respectively out of a population of 120 non-large firms) were used to estimate totals of 172 small firms in the industry, and 141 medium-sized firms.

Thus, average revenue, value-adding and employment for the small and medium-sized firms were multiplied by 172 and 141 (respectively) before being added to the totals for the large firms to obtain overall industry statistics.

A.3 Response rates for particular questions

Overall, ACIL Tasman received 142 usable responses. However, not every respondent answered every question. Table A1 provides an overview of response rates on a question-by-question basis. With the exception of questions on profits and wages (Questions 20 and 21 respectively), response rates were very high. A copy of the survey is appended at Appendix E.

Table A1 **Response rate by question***

Question	Missing	Completed (Number)	Response rate (%)
Question 1	0	142	100
Question 2	2	140	98.59
Question 3	2	140	98.59
Question 4	2	140	98.59
Question 5	3	139	97.89
Question 6	22	120	84.51
Question 7	17	125	88.03
Question 8	4	138	97.18
Question 9	4	138	97.18
Question 10	11	131	92.25
Question 11	3	139	97.89
Question 12	6	136	95.77
Question 13	7	135	95.07
Question 14	4	138	97.18
Question 15	10	132	92.96
Question 16	9	133	93.66
Question 17	15	127	89.44
Question 18	20	122	85.92
Question 19	14	128	90.14
Question 20	59	83	58.45
Question 21	47	95	66.90

A.4 Comparison with ABS Results

In order to assess whether the results from the survey are realistic, they were compared with ABS figures and ARA figures on spending by railways on MMER. These provide a lower and upper bound (respectively) for the survey results. The results of this comparison are provided below.

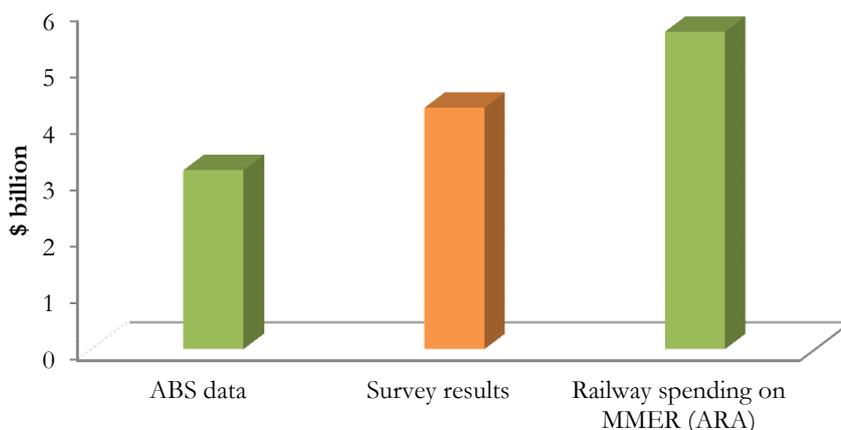
In regards to the ABS data, it collects manufacturing statistics on the basis of the prime activity of the relevant business (an issue in respect of this industry), and one of the categories it reports on is “Railway, Rolling Stock Manufacturing and Repair Services” (ABS Cat no 8165.0). However, this only covers rolling stock, not track and signalling, which is a crucial part of the railway industry. For this reason, it understates the true size of the MMER sector as we have defined it.

Accuracy of measurements for revenue

In order to assess the accuracy of these figures, a comparison was undertaken with ABS results for rolling stock manufacturing (ABS Cat no 8159.0) and with figures on the railway industry’s expenditure on equipment and maintenance collected by the ARA. These represent an upper and a lower bound respectively, because the ABS industry classification represents a narrower scope and the ARA industry classification a broader scope, than used in this report.

A comparison between ABS, ARA and the survey results for revenue are shown in Figure A1.

Figure A1 **ABS ARA and survey revenue findings**



Data source: ABS Cat no 8159.0, ARA Australian Railway Industry Survey

The most recent release of the *Experimental Estimates for the Manufacturing Industry 2008-09* (ABS Cat no 8159.0) from the ABS covers the financial year 2008/09; the same time period as the survey. The ABS figures suggest that total industry revenue was \$3.157 billion, with \$961 million in industry value added. The most recent ARA data comes from its 2008 *Australian Railway Industry Survey*, which suggests that railways had \$3.106 billion of new assets on order in 2007/08 for delivery in 2008/09, and spent \$2.346 billion on maintenance in 2007/08. This represents growth of roughly 24 percent from 2004/05, or 7.5 percent per annum.¹⁹ Applying the same growth factor to extrapolate from 2007/08 figures to 2008/09 estimates, suggests that the Australian railway industry spent roughly \$5.6 billion on MMER in 2008/09. The survey results sit between these two estimates, which suggests that they are at least roughly correct.

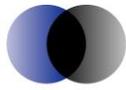
The ABS also includes counts of business numbers in its *Counts of Australian Businesses, including Entries and Exits, June 2007 to June 2009* publication (ABS Cat no 8165.0), according to turnover size and employment. There are some important differences between category sizes between the survey results and those for the ABS. However it would appear that the survey captures the larger firms reasonably well (outside Victoria), but has far fewer small firms than the ABS. The reason why smaller firms are poorly represented is unclear.²⁰ From the perspective of understanding the industry overall, however, it is not clear that this causes major issues, as most activity is undertaken by larger firms.

Accuracy of measurements for employment

The employment results are tested by making reference to existing data; in this case just the ABS data, because the ARA data can be used to check only what is sold by the MMER industry, not how many people the industry employs. In its *Experimental Estimates for the Manufacturing Industry 2008-09* publication (ABS Cat no 8159.0), the ABS suggests that there are 6,357 employees (earning \$500 million in wages) in rolling stock manufacturing and maintenance, which is roughly 5,000 fewer than the survey results suggest. This is roughly in line with differences in revenues and value-adding between this work and that of the

¹⁹ ACIL Tasman notes that the ARA suggest that different samples across different years mean that growth figures should be interpreted with caution. However, the basic conclusion still stands.

²⁰ There may be issues with the ABS sample. ACIL Tasman cannot comment on this, as ACIL Tasman is not privy to its data collection methods. However, it does seem odd that a third of the industry in most states is comprised of firms whose revenues are less than the average household wage.



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ABS. ACIL Tasman thus believes that employment in the sector has not been under-counted.

In comparing results with the ABS data for employment, the issues are very similar to that in respect of revenue; smaller firms comprise a much smaller proportion of the survey sample than is the case for the ABS, whilst larger firms comprise a much larger proportion.

B Issues with Data

When considering the results of the survey, there are several factors that should be borne in mind. The most obvious, from a practical perspective, is the non-responses, particularly from some of the larger firms. ACIL Tasman has estimated that these firms may add between \$300 and \$500 million in revenues to the industry and \$60 and \$70 million in profits. The revenue figures are roughly 12 percent of the total of the estimated figures for total industry revenue, but ACIL Tasman believes it would be more prudent to work, for policy purposes, with an error band around the gross industry results of between 15 and 20 percent of the totals.²¹

A more fundamental issue is the nature of MMER itself; many firms involved in MMER do not see themselves as being so involved. For example, some of the 79 firms who indicated they were out of scope were engineering companies designing and building railway track infrastructure. They do not physically manufacture anything themselves, but are involved in the process by which track is manufactured. In the automotive industry, for example, designers and project managers are often in-house, and thus their activities are included in the statistics covering the relevant automobile firm. The railway industry is more fragmented, meaning various links in the production chain are often undertaken by different firms, with the result that some firms do not perceive themselves as part of a manufacturing process, such as the engineering firms referred to above.²² The borders of the MMER industry are thus difficult to delineate, which means that the number of firms in the industry is not precise. It was not appropriate to set such limits for this survey, however, as it represents the first detailed survey of the industry.

Another key issue is the inter-relationships between firms. In the past, the railways manufactured much of what they used, and maintained almost all of it. However, the railways now often sub-contract out a large part of their manufacturing and maintenance task. Moreover, the firms to whom they sub-contract will often themselves sub-contract out components of the task to smaller firms. These inter-linkages between firms are important, not only to ensure that double-counting is avoided, but also to understand how the industry works as a whole. It is difficult to develop an appreciation of these

²¹ ACIL Tasman has not formally calculated confidence intervals around the results, as the omission of one or two large firms results in much larger errors than would be associated with the statistical process of grossing up results for the small and medium firms.

²² One steel-maker also indicated it did not see itself as part of MMER in its response to the survey, whilst others did see themselves as part of the industry, despite all producing essentially the same items.

linkages from a survey which asks firms only about their tasks. Future work might usefully explore these inter-linkages in more detail than has been possible here.

There are also a number of issues associated with particular survey questions. These are summarised below.

Employee numbers

The questions in relation to employment in the survey were well answered, in that they had a high response rate. However, it appears to be the case that many firms find it difficult to apportion employees to their MMER task, except when their entire business is based around MMER. This is perhaps not surprising; a small business which employs 20 people and occasionally produces wheels for a railway might very easily be able to apportion revenue to MMER as the value of the wheel contract appears on the accounts. However, it might not keep easily extractable data on how many man-hours were spent manufacturing the wheels.

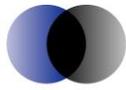
In responding to the questions on employment, some firms appear to have indicated their total number of employees, rather than the number of full time equivalent workers allocated to the production of MMER goods and services during the reference year. In some cases, this is obvious. For example, if a firm indicates 100 full time employees in its answers to the employment questions, but only \$1 million in revenues from MMER (and indicates MMER accounted for less than 100 percent of its revenues in the reference year), it seems unlikely that these 100 employees were fully employed in the production of MMER goods and services. In calculating industry statistics, obvious errors were removed when calculating employment numbers.

However, it is not always obvious that an error has been made, as the revenue per employee might not be significantly different from other firms. To the extent that this occurs, estimates of employee numbers in the aggregate totals may be biased upwards. ACIL Tasman believes, however, that this bias is not likely to be substantial, as there are not many outliers.²³

Profits

The questions on profits were not well answered, particularly by smaller firms, and ACIL Tasman suspects that there may be errors in some of the answers,

²³ To calculate industry average wages each firm's wage bill was divided by its stated number of employees, and only a very small number (outside the obvious errors discussed above), had wages which seemed abnormally low, and none of these had staff numbers which were significantly higher than the average across firms in the relevant category.



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which overstate profits by confusing revenues with profits. It is common in surveys that questions about profit are poorly answered, as the information is considered commercially confidential by most firms, and many have a policy of not releasing such information. As part of the process of checking answers, ACIL Tasman rang every firm that did not provide answers to the questions about profit; of the 59 firms involved, only three were prepared to provide figures after this phone call. This is indicative of the difficulties associated with obtaining this kind of information.

C Directions for Future Analysis

This is the first time the MMER industry has been surveyed, and the process revealed several important lessons which might usefully inform the construction of future surveys, to elicit new or richer information. Some of these lessons are summarised below.

Daughter companies

Several of the firms which indicated that they were out of scope noted that they are daughter companies of overseas parents who do no manufacturing in Australia but who rather import goods from their parent overseas for sale in Australia. It may be useful to explore the attributes of these kinds of firms in more detail in future versions of the survey, as this may provide some useful information about the degree and nature of competition local suppliers face from foreign firms.

Linking questions

The survey asked which states and territories a firm operates in. One question which might be asked in future surveys is the amount of business generated in a given state. The survey asked about location and amount of production, but did not link the two questions to ask how much was produced where.

Although doing so would increase the complexity of the survey, it would assist in developing a better picture of the spread of production across Australia.

This might be considered in future surveys.

In a similar fashion, whilst the survey asked where a firm operated and what it produced, it did not link the two questions to ask what items were produced in which branches of the firm. This would form a useful addition to a future survey, though it would increase complexity.

Exports and imports

The issues of linking production locations with what is produced are replicated in trade; in future surveys, it might prove more useful to examine in more detail what is exported where, and what is imported from where, to allow the development of a detailed picture of where each type of export went, or from where each type of import was sourced.

More information about what is exported and imported from where might also assist in developing policies to enhance exports. Figure 17 and Figure 18 show a relatively low share of exports and imports compared to the rest of the manufacturing industry. However, there is insufficient information in the



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survey responses to understand why this might be the case. Further research, potentially involving surveys more closely focussed on imports and exports, may assist policymaking in this regard.

D Data Summary

In this section, the raw survey data underpinning each of the figures in the main body of the text is provided in tabular form. Note that data on individual firms, or data which might be able to be used to identify an individual firm, are not provided.

Table D1 **Data on employment characteristics (Figure 3 and Figure 4)***

	Large Firms	Medium Firms	Small Firms	All Firms
Total FTE workers	11154	1503	1198	13855
Managers	692	111	102	905
Professionals	1785	134	45	1964
Technical & trade	6277	460	664	7401
Admin	1164	130	144	1438
Sales	61	89	59	209
Machinery & drivers	1014	298	103	1415
Scientists & researchers	6	9	8	23
Other	155	273	73	501

* Note that the total does not add to the industry total in Tables ES1 and 3, and that the figures for small and medium firms are different. This is because the numbers for small and medium firms in Tables ES1 and 3 have been grossed up. This table shows the raw survey data which underpins Figures 3 and 4.

Table D2 **Number of states in which firms operate (Figure 6)**

Number of States	Large firms	Medium firms	Small firms
1	5	32	51
2	XX	6	5
3	6	5	4
4	XX	XX	0
5	XX	6	0
6	XX	0	XX
7	0	XX	0
8	XX	4	5

Note that where there are one, two or three firms in a given category, ACIL Tasman has obscured results to maintain confidentiality.

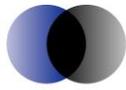


Table D3 **Production by type (Table 6 and Table 7)**

	large firms	medium firms	small firms	All firms	NSW	QLD	VIC	SA, WA & TAS
Rail track, ballast and sleepers manufacture	8	4	XX	14	4	XX	5	XX
Rail track, ballast and sleeper maintenance and repair	7	5	XX	15	9	0	XX	XX
Track signalling components manufacture	4	8	7	19	10	XX	4	XX
Track signalling components manufacture and repair	5	6	7	18	8	5	XX	XX
Locomotive manufacture	4	XX	XX	6	XX	XX	XX	XX
Locomotive maintenance and repair	8	8	5	21	10	XX	6	XX
Locomotive components	10	28	21	59	33	9	15	XX
Freight wagon manufacture	5	XX	XX	7	XX	XX	XX	XX
Freight wagon maintenance and repair	6	7	7	20	11	XX	4	XX
Freight wagon components	7	14	11	32	19	XX	8	XX
Passenger car manufacture	4	XX	XX	7	XX	XX	XX	XX
Passenger car maintenance and repair	10	6	8	24	13	XX	7	XX
Passenger car components	10	24	29	63	32	8	21	XX
Railway communication components	XX	8	10	21	7	4	5	XX
Overhaul of subsystems	4	5	4	13	9	XX	XX	0
Other	XX	25	17	45	19	5	10	9

Note that where there are one, two or three firms in a given category, ACIL Tasman has obscured results to maintain confidentiality.

Table D4 **Scope of production by size of firm (Figure 7)**

Number of types of goods produced	Large firms	Medium firms	Small firms
1	4	19	29
3	8	21	26
5	XX	8	9
8	5	6	XX
10	XX	XX	0
More	XX	0	0

Note that where there are one, two or three firms in a given category, ACIL Tasman has obscured results to maintain confidentiality.

Table D5 **Focus on MMER (Figure 8)**

Proportion of revenue from MMER	All firms	Large firms	Medium firms	Small firms
10%	45	XX	10	33
20%	7	0	XX	4
30%	8	XX	4	XX
40%	6	0	XX	XX
50%	5	0	XX	XX
60%	7	XX	XX	4
70%	5	XX	XX	XX
80%	7	XX	4	XX
90%	XX	0	XX	0
More	26	10	8	6

Note that where there are one, two or three firms in a given category, ACIL Tasman has obscured results to maintain confidentiality.

Table D6 **Exports and imports by firm size and state (Figure 9, Figure 10 and Figure 12)**

	Exports value (\$m)	Proportion of firms exporting (%)	Imports value (\$m)	Proportion of firms importing (%)
large firms	74.0	31.6	676.7	75.0
medium firms	59.8	27.8	74.9	53.7
small firms	40.2	12.1	19.5	30.8
All firms	174.0	20.9	771.0	46.0
NSW	n/a	22.0	n/a	55.0
QLD	n/a	15.0	n/a	45.0
VIC	n/a	17.1	n/a	34.1
SA	n/a	60.0	n/a	60.0
WA	n/a	37.5	n/a	25.0

Table D7 **Importance of export markets (Figure 11)**

Destination	All firms	Large firms	Medium firms	Small firms
Asia	2	0	2	0
Asia-Pacific	3	0	3	0
Austria	5	0	5	0
Brazil	5	0	5	0
Belgium	2	2	0	0
Canada	7	2	5	0
China	19	0	9	10
Czech Republic	4	0	0	4
Europe	13	0	8	5
France	4	4	0	0
Germany	12	3	4	5
Hong Kong	6	0	0	6
India	9	4	5	0
Indonesia	14	3	11	0
Japan	5	0	5	0
Kazakhstan	5	5	0	0
Malaysia	7	4	3	0
New Caledonia	5	0	5	0
New Zealand	55	13	29	13
North America	5	0	5	0
Singapore	1	1	0	0
South Africa	13	11	2	0
South America	3	3	0	0
South Korea	10	2	3	5
Taiwan	1	1	0	0
Thailand	7	5	2	0
UAE	5	0	5	0
UK	31	10	14	7
USA	13	3	5	5
Vietnam	4	0	4	0

Table D8 **Importance of import sources (Figure 13)**

	All firms	Large firms	Medium firms	Small firms
USA	111	35	64	12
China	95	34	52	9
Germany	82	26	36	20
France	26	12	0	14
UK	40	10	20	10
Thailand	9	9	0	0
Japan	23	8	10	5
Switzerland	11	6	5	0
Sweden	16	6	5	5
India	12	4	3	5
Holland	4	4	0	0
New Zealand	19	4	0	15
Belgium	3	3	0	0
Italy	16	1	12	3
Taiwan	13	0	8	5
Malaysia	6	0	6	0
France	5	0	5	0
Indonesia	5	0	5	0
Austria	10	0	5	5
Czech Republic	5	0	5	0
Canada	4	0	4	0
Europe	8	0	4	4
Korea	6	0	2	4

Table D9 **Comparisons with wider manufacturing sector (Figure 14, Figure 15, Figure 16, Figure 17 and Figure 18)**

Indicator	ABS manufacturing indicator (\$)	Large firms average (\$)	Medium firms average (\$)	Small firms average (\$)	All firms average (\$)
Revenue per employee	417,580	518,528	187,968	70,797	472,040
Profit per employee	27,040	45,498	53,634	34,200	45,973
Wages per employee	52,736	85,545	64,565	55,946	69,093
Exports per employee	91,751	10,305	22,196	22,128	11,849
Imports per employee	193,558	94,215	27,805	14,746	85,190

Data source: Survey and ABS Cat no 8229.0



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E Survey Instrument



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Important information about the survey

- This survey is relevant to businesses involved in the manufacture and maintenance of equipment to be used for: *railway and/or tramway track infrastructure; railway and/or tramway rolling stock; and signalling and communication for railways and/or tramways*. This includes businesses manufacturing/maintaining equipment for a range of sectors, of which rail and/or tram is one. For the purposes of this survey, this sector will be called the **manufacture and maintenance of equipment used by railways (MMER)**.
- The questions in this survey only relate to the Australian MMER component of the business. Non-MMER components of your business, MMER operations which occur within your company but offshore and any services components of your business should not be considered. Exports of production undertaken in Australia should be considered.
- All questions in this survey are only relevant to the business's MMER operations in the business's financial year ending 2009. If you are unable to provide an exact figure, a close estimate is acceptable.
- If you are unable to provide an answer to a particular question, please leave that question blank and continue on to the next relevant question.
- The survey should take 30 minutes to complete.

How to complete and send the questionnaire using desktop email (eg. Outlook or Lotus Notes)

- The form should be opened in **Adobe Reader**. If a message appears when you open the file advising you that the form contains an email submit button, click **Close** to continue. If you receive a security warning, click **OK** to allow. This file was checked for viruses before being sent.
- Once you are in the form, ensure the **Highlight Fields** button in the top right hand corner of the page is pressed. Move through the form, completing all the highlighted fields as appropriate. Click your **left** mouse button in a field to select or enter an answer.
- Using the *File* menu, you can **Save** the form at any time and your answers will be saved.
- Once you have completed the form, click the **Submit by Email** button at the end of the form. If prompted, choose the appropriate setting for your email and press **OK**. An email with an .xml form attached should be automatically generated. The email should be addressed to n.wills-johnson@aciltasman.com.au and have the subject line "Survey of Rail Manufacturing and Maintenance Sector 2010" already entered. Click **Send**.

If you have problems with the questionnaire form, please contact Nick Wills-Johnson at ACIL Tasman on 08 9449 9600 or n.wills-johnson@aciltasman.com.au for assistance.

Use of information provided in the survey

All data collected by ACIL Tasman as a result of this survey will remain confidential. Individually recognisable company information will not be made available to the Commonwealth but may be made available to the Australasian Railway Association (ARA) to allow them the ability to develop time series data with future data collection. Only aggregated data will be published and no specific company information will be identifiable in the industry report produced as a result of this study.

Please refer to the confidentiality statement issued by the ARA and the Department of Innovation, Industry, Science and Research at the end of this survey.

Australian Government
Statistical Clearing House
Approval Number:

XXXX-XX

About the business

1. Please provide the following information about the business you represent:

Business name

Key contact

Postcode in which the business has its main manufacturing site

Website (if applicable)

2. Please select the state(s) and/or territory(ies) in which this business operated in the financial year ending 2009?

- New South Wales
- Queensland
- South Australia
- Tasmania
- Victoria
- Western Australia
- Australian Capital Territory
- Northern Territory

3. Please select the statement that best describes ownership of the business?

- This business is fully Australian owned.
- This business is fully foreign owned.
- This business is part Australian and part foreign owned.

4. Please identify the structure of this business in Australia.

- Publicly listed business
- Privately held business
- Joint venture
- Government-owned entity
- Other (please specify)

Business production

5. Please identify the MMER activities this business undertakes in Australia.

- Rail track, ballast and sleepers manufacture
- Rail track, ballast and sleeper maintenance and repair
- Track signalling components manufacture
- Track signalling components manufacture and repair
- Locomotive manufacture
- Locomotive maintenance and repair
- Locomotive components
- Freight wagon manufacture
- Freight wagon maintenance and repair
- Freight wagon components
- Passenger car manufacture
- Passenger car maintenance and repair
- Passenger car components
- Railway communication components
- Overhaul of subsystems
- Other (please specify)

6. What was the total amount of MMER goods manufactured and maintained in the financial year ending 2009 (e.g. number of locomotives, number of seats)?

7. What proportion (%) of full production capacity for MMER goods was this business operating at in the financial year ending 2009?

 %

Exports

8. Did this business export any MMER goods overseas in the financial year ending 2009?

- Yes (**continue with Question 9**)
- No (**continue with Question 12**)

9. Please list the type and quantity of MMER goods exported in the financial year ending 2009 (e.g. 3,000 seats, 100 circuit boards).

10. What was the value (in \$A) of the MMER goods exported in the financial year ending 2009? \$

11. In terms of the \$A value of MMER exports, please list (largest to smallest) the business's Top 5 overseas export markets in the financial year ending 2009.

- 1.
- 2.
- 3.
- 4.
- 5.

Imports

12. Did this business import any goods (including from the company's overseas sites) to assist in the manufacture and maintenance of MMER goods in the financial year ending 2009?

- Yes (**continue with Question 13**)
- No (**continue with Question 16**)

13. Please list the type and quantity of goods imported to assist in the manufacture and maintenance of MMER goods in the financial year ending 2009 (e.g. 3,000 seats, 100 circuit boards).

14. What was the value (in \$A) of the goods imported to assist in the manufacture and maintenance of MMER goods in the financial year ending 2009? \$

15. In terms of the \$A value of the goods imported to assist in the manufacture and maintenance of MMER goods, please list (largest to smallest) the business's Top 5 overseas markets from which imported goods were received in the financial year ending 2009.

1.
2.
3.
4.
5.

Employee characteristics

16. How many full time equivalent (FTE) MMER workers* were employed by this business on the last day of the financial year ending 2009?

* MMER workers includes full time, part time, contract and casual workers who spent most or all of their time engaged in MMER activities.

FTE workers

17. How many FTE MMER workers does the business have in each occupation group?

Managers	<input type="text"/>
Professionals	<input type="text"/>
Technicians and trades workers	<input type="text"/>
Clerical and administrative workers	<input type="text"/>
Sales workers	<input type="text"/>
Machinery operators and drivers	<input type="text"/>
Scientists and/or researchers	<input type="text"/>
Other (specify)	<input type="text"/>

Total should add to the number reported in Question 16

Key financial characteristics

18. What was the total revenue* (in A\$) of the business in the financial year ending 2009? \$

* Revenue is the amount of money earned through business activities (excluding GST).

19. Of this business's total revenue, approximately what proportion (%) was earned from MMER goods (as opposed to any non- MMER goods)? %

Note: Some businesses contacted to participate in this survey are likely to supply one another. Questions 20 and 21 are asked so that ACIL Tasman can avoid double counting in terms of industry size.

20. a) What was the business's reported Earnings Before Interest, Tax, Depreciation and Amortization (EBITDA)* (in A\$) in the financial year ending 2009?

* EBITDA = gross profit minus any selling, general and administrative expenses.

\$

b) Of this business's total EBITDA, approximately what proportion (%) was earned from MMER goods (as opposed to any non- MMER goods and services)?

%

21. a) Please indicate (in A\$) total gross wages and salaries (including superannuation) paid to the business's workers in the financial year ending 2009.

\$

b) Of this business's total gross wages and salaries, approximately what proportion (%) was paid to workers involved in MMER activities?

%

Confidentiality Statement

All data collected by ACIL Tasman as a result of this survey will remain confidential. Individually recognisable company information will not be made available to the Commonwealth but may be made available to the Australasian Railway Association to allow them the ability to develop time series data with future data collection. Only aggregated data will be published and no specific company information will be identifiable in the industry report produced as a result of this study.

Signed on behalf of the **Department of Innovation, Industry, Science and Research**



Mike Lawson
General Manager, Competitive Industries

Signed on behalf of the **Australasian Railway Association**



Bryan Nye
Chief Executive Officer

Thank you for your support with this survey

Submit by Email

Print Form

