Study Report SR446 [2021]

Construction industry performance update 2019

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Preface

This is the second of two reports on the BRANZ Levy-funded project ER0899 Monitoring industry performance. The project allows us to report on the performance of the industry, comment on what these changes mean for the industry and update the BRANZ Construction Dashboard.

Acknowledgements

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BRANZ Study Report SR446

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Abstract

This report provides up-to-date productivity data for the construction industry. It presents the results of BRANZ research project ER0899, building on previous work undertaken by researchers interested in the performance of the construction industry.

The official productivity measures had been trending upwards for several years but took a slight hit in 2019. This comes at a time of continued record highs in consenting numbers and sector output. The sector overall continues to suffer from difficulties hiring skilled managers and tradespersons, stresses from high workloads, cost pressures and low profit margins.

Keywords

Productivity, labour productivity, multi-factor productivity, construction productivity, innovation, industry performance.

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Executive summary

The latest official technical productivity statistics show a slight tailing off for the construction industry over the last year after consistent year-on-year growth since March 2014. Labour productivity in the construction industry increased by an average of 1.4% between 2012 and 2018, before falling in 2019 by 0.7%.

The level of profitability differs significantly between sub-industries in construction. The house construction sub-industry has consistently made a profit of about 7% each year for the past 3 years. Some of the subtrades have had profit margins consistently above 10% over the same period, whereas the non-residential sub-industry has seen significant reductions in profit margins over the past few years.

Client satisfaction with the new residential sub-industry has been trending downwards as industry workloads have continued to increase to 40+-year highs. Client satisfaction with the build process seems to be strongly linked to the handover process and how well the builder rectifies any defects.

Finally, internal business processes such as worker turnover, ability to recruit, health and safety and downtime all play a role on the performance of the industry. Worker turnover is lower in the construction industry than the average for New Zealand. Worker-related injury claims have been trending downwards in the construction industry since 2013 but look to be flattening off at around 160 claims per 100,000 workers. In a 2013 survey, we found that weather delays and waiting for subcontractors were the largest causes of downtime in the residential sector.

1. Introduction

The construction industry has been troubled by low productivity. Understanding how to improve industry performance centres on understanding why it matters to the industry. We believe that, if we can move the conversation from productivity to performance, we can help the industry understand how improvements can be made and create enduring change for the industry.

As part of our productivity calculation in Figure 1 below, we show that accounting profits are a key driver of productivity growth. By increasing accounting profits, all other things being equal, productivity will improve. This is where business goals meet sector goals and is a key target for improving productivity long term in the industry.

We also understand that, for part of the sector, there is a lifestyle aspect to working in construction. An owner-operator, for example, may be looking to maximise accounting profits and their salary, so they are able to trade off work time for leisure time.

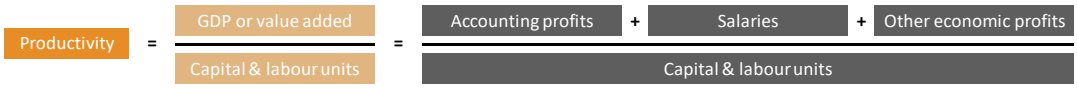


Figure 1. Profits, GDP and productivity.

What firms are actively measuring can provide evidence about what is important to firms. In 2018, BRANZ surveyed builders on what types of measures they currently undertake (Figure 2).

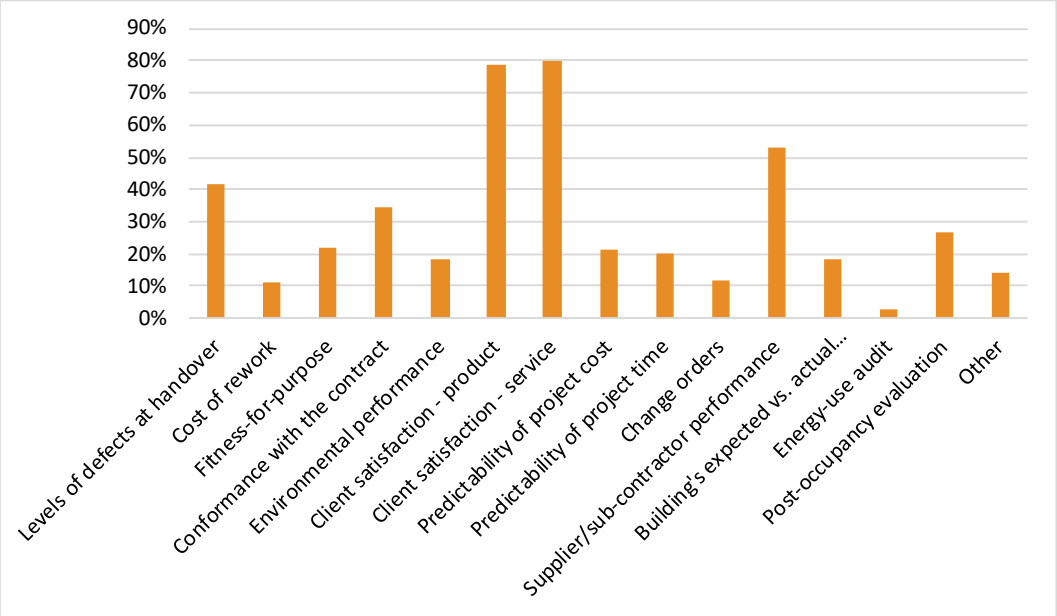


Figure 2. What measures do you currently undertake?

The two most common measures undertaken related to client satisfaction, either with the product delivered or the service provided. These measures have been shown to directly impact on the ability of firms to get new work, particularly in the residential space. The New House Owners' Satisfaction Survey 2018 showed that 29% of respondents chose their builder based on recommendations from friends and/or family (Brunsdon & Lockyer, 2019).

Levels of defects at handover, supplier/subcontractor performance and conformance with the contract were the next most commonly used measures. These measures all have an impact on accounting profits, as they will impact the amount of time spent on a job to varying degrees (Duncan & Lockyer, 2021).

This report first highlights changes in the technical productivity measures since 2008. This time period has been chosen to show how productivity and/or performance:

- was impacted by the global financial crisis (GFC)
- has responded to the building boom.

We compare the performance of the construction industry against several industries selected based on their similarities and/or interactions with the construction industry. The comparator industries used are:

- agriculture, forestry and fishing
- manufacturing
- electricity, gas, water and waste services.

We also include an analysis of the financial performance of several key sub-industries, the service of the new residential sub-industry, industry businesses practices and industry learning and growth trends.

2. Technical productivity measures

Technical (labour, capital and multi-factor) productivity measures fell immediately following the GFC (Figure 3). However, the measures have been steadily increasing since. Between 2012 and 2018, labour productivity increased by an average of 1.4% per year. There was a slight decrease in technical productivity between 2018 and 2019, with labour productivity, for example, falling by 0.7%.

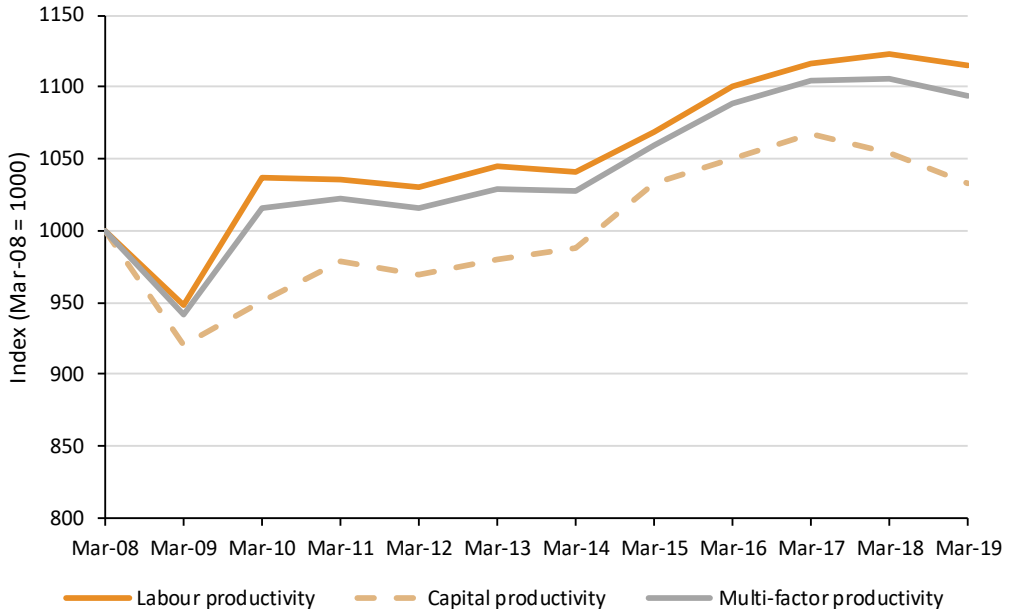


Figure 3. Technical productivity in the construction industry.

Technical productivity is strongly linked to industry output. The period from the GFC through to the latest data for construction industry GDP is shown in Figure 4. It shows a sharp fall in output immediately following the GFC, a further but flatter decline in output from 2009 and 2012, a sharp increase in output between 2012 and 2017 and more modest growth from 2017 onwards.

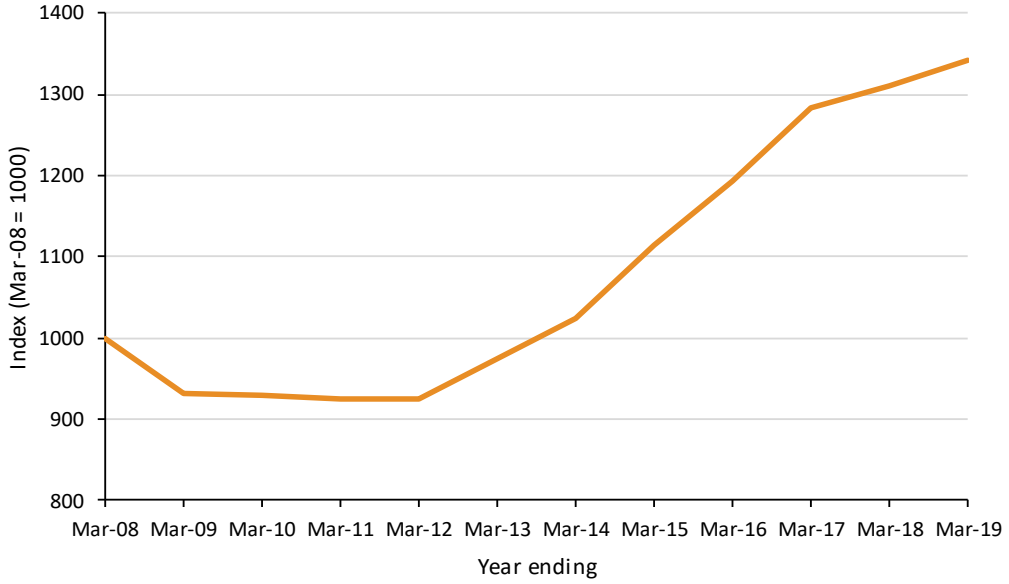


Figure 4. Construction industry production (GDP).

GDP is a key input into technical productivity measures as illustrated in Figure 1. As GDP increases, all else being equal, productivity will increase. If GDP can increase at a faster rate than inputs (labour and capital), productivity will also increase. Where inputs increase at a faster rate than GDP, productivity will fall, even during times of a construction boom – for example, the year ending March 2018.

The construction industry tends to respond to increases in demand for construction work by employing more workers. Figure 5 shows the productivity challenge for the industry by charting both GDP and full-time equivalents in the construction industry. The two indices move largely in line with each other throughout the analysis period, making changes in industry productivity difficult to achieve.

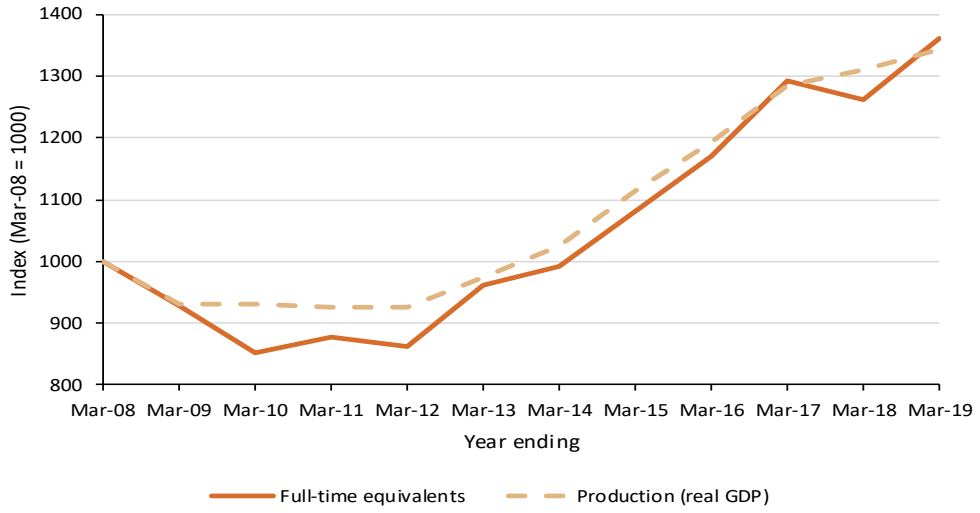


Figure 5. Full-time equivalents and production.

2.1 Labour productivity

Changes in labour productivity in the construction industry was similar to both the manufacturing and electricity, gas, water and waste services industry immediately following the GFC (Figure 6).

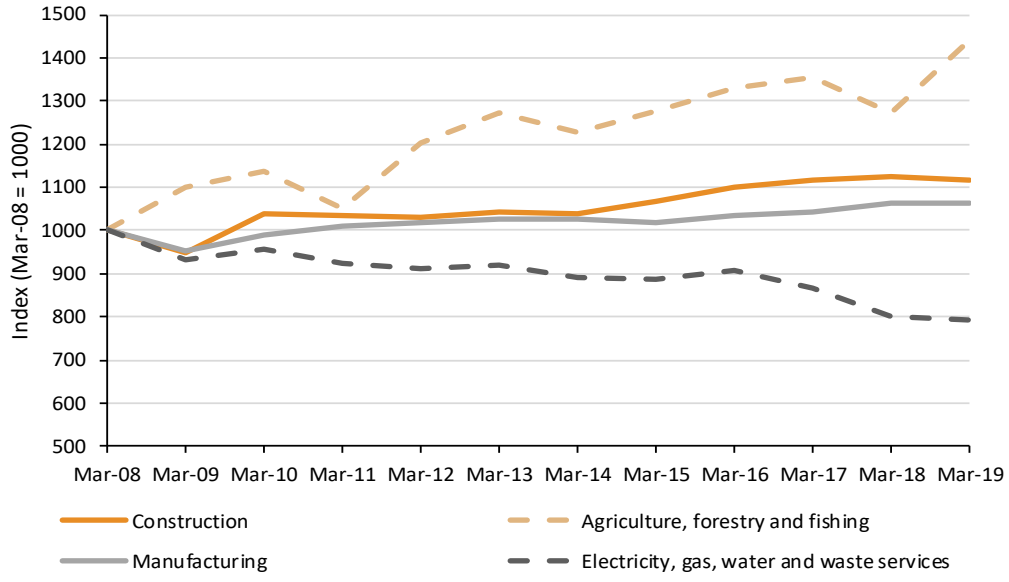


Figure 6. Labour productivity.

However, the agriculture, forestry and fishing industry bucked the trend and saw strong growth in labour productivity. The agriculture, forestry and fishing industry continued to grow through to March 2010.

The electricity, gas, water and waste services industry has continued to decline in labour productivity post GFC, down 20% (-2.1% per annum) over the time period. In contrast, labour productivity in the agriculture, forestry and fishing industry has increased by 44% (3.4% per annum) over the time period.

Data on full-time equivalent employees in the agriculture, forestry and fishing industry was not available at the time of writing the report. However, there is still value in looking at the comparison between our top performing comparator industry and the construction industry. Figure 7 shows that output and labour productivity in the industry have typically moved in line with each other. This suggests that labour is relatively stable in the industry and the workforce is able to scale up to deliver a greater level of output.

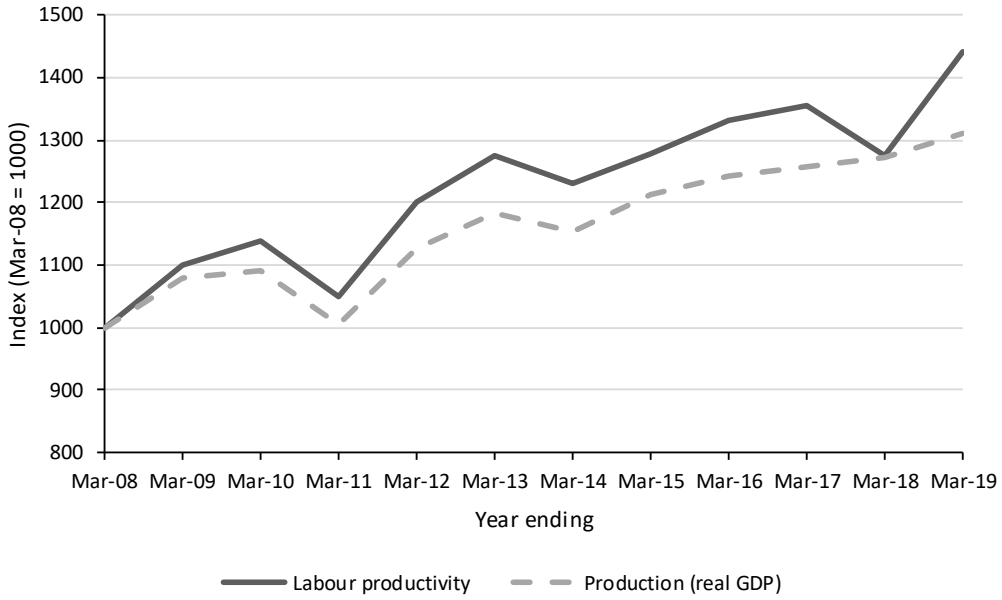


Figure 7. Labour productivity and output in the agriculture, forestry and fishing industry.

2.2 Multi-factor productivity

Multi-factor productivity measures changes in total productivity. It looks to estimate changes in productivity that are not associated with changes in the number of labour and/or capital units. The idea is that, once changes in labour and capital units are accounted for, this shows the impact of changes in processes, technology, skills/training and management.

The agriculture, forestry and fishing industry and the electricity, gas, water and waste services industry have tracked in opposite directions over the analysis period (Figure 8). The manufacturing and construction industries, in comparison, saw little change over the period. The agriculture, forestry and fishing industry saw particularly strong growth in multi-factor productivity between March 2008 and March 2009 and between March 2011 and March 2013.

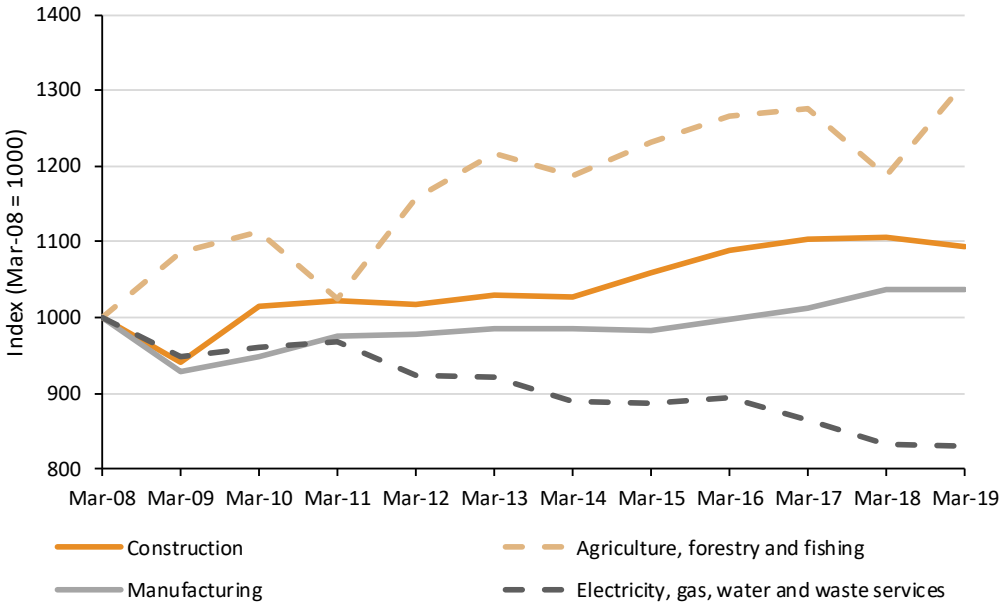


Figure 8. Multi-factor productivity.

3. Industry performance

Moving from technical productivity to industry performance, we can better understand how the industry is performing in a way that matters to firms. These are the aspects that impact accounting profits, salaries, other economic profits or the number of inputs (both capital and labour inputs). These factors can be impacted in several ways, such as financial performance, customer service, internal business processes, and learning and growth of firms within the industry.

3.1 Financial performance

Several key sub-industries have been examined in detail to determine their financial performance. These sub-industries were identified as either having a strong contribution to the sector (in terms of employment or output), having some interesting characteristics (such as being capital intensive) or having high levels of rework (Brunsdon & Lockyer, 2019).

The sub-industries identified are:

- E301100 House construction
- E302000 Non-residential building construction
- E310100 Road and bridge construction
- E321100 Land development and subdivision
- E321200 Site preparation services
- E323100 Plumbing services
- E323200 Electrical services
- E324100 Plastering and ceiling services
- E324200 Carpentry services
- E324400 Painting and decorating services.

These sub-industries represent approximately two-thirds of the workers in the construction industry.

The average number of workers per firm is illustrated in the Table 1, showing how different sub-industries use direct labour versus outsourcing to deliver their output.

Table 1. Average workers per firm by sub-industry

	Average workers per firm in 2018	Salaries/wages as percentage of total expenses
House construction	2.5	14%
Non-residential building construction	9.3	11%
Road and bridge construction	40.6	21%
Land development and subdivision	1.4	7%
Site preparation services	5.1	26%
Plumbing services	3.7	33%
Electrical services	3.6	36%
Plastering and ceiling services	2.7	30%
Carpentry services	2.3	25%
Painting and decorating services	2.5	39%

The land development and subdivision sub-industry has few workers and salaries/wages make up a small percentage (7%) of total expenses, whereas the road and bridge construction sub-industry has a high number of workers per firm, which is unusual for the construction industry. The subtrades (plumbers, electricians, plasterers, painters) tend to have few workers per firm, generally between 2.5 and 3.7, and salaries/wages account for a higher proportion of expenses than other sub-industries in the construction industry.

3.1.1 Profitability

For the purpose of this section, we have defined profitability as the surplus before income tax over sales of goods and services (i.e. earnings before interest, tax, depreciation and amortisation). This measure of profitability/profit margin is useful as it measures industry performance from everyday activities. However, it is worth considering the impact of the number of small-scale firms in the construction industry in New Zealand where the owner's income may be derived from the profit on their jobs instead of taking a salary.

The level of profitability varies significantly between sub-industries (Table 2). The house construction industry, for example, has managed to consistently make a profit of about 7% across the last few years. Profits tend to be a bit higher for some of the subtrades, such as plastering and ceiling services and carpentry services, with profit margins consistently above 10%. The non-residential building construction sub-industry has seen significant reductions in profit margins over the last 3 years to the extent that the sub-industry was not profitable in 2018.

Table 2. Profit margin by sub-industry.

	2016	2017	2018
House construction	7.1%	7.1%	7.0%
Non-residential building construction	7.4%	2.6%	-3.3%
Road and bridge construction	4.9%	5.1%	5.6%
Land development and subdivision	17.2%	24.8%	22.5%
Site preparation services	10.8%	8.5%	9.2%
Plumbing services	9.2%	9.9%	9.6%
Electrical services	10.6%	8.3%	7.9%
Plastering and ceiling services	13.7%	13.1%	12.4%
Carpentry services	12.8%	13.3%	12.2%
Painting and decorating services	9.8%	11.2%	10.9%

3.1.2 Solvency

The current ratio is used to determine the financial solvency of firms. It measures whether current assets are sufficient to cover current liabilities. A ratio of at least 1 (or 100%) is needed to indicate a solvent firm/industry. The most solvent sub-industries are land development and subdivision, house construction and plumbing services (Table 3). The land development and subdivision sub-industry had 1.6 times more current assets than total income in 2018. The ratio was 0.42 for the house construction sub-industry and just 0.27 for the plumbing services sub-industry. This shows how unusually strong the land development and subdivision sub-industry's current assets are. The plastering and ceiling services sub-industry has the lowest current ratio at 118%. Both the road and bridge construction and site preparation services sub-industries have a ratio of 120%.

Table 3. Current ratio by sub-industry.

	2016	2017	2018
House construction	128%	139%	147%
Non-residential building construction	127%	128%	123%
Road and bridge construction	112%	115%	120%
Land development and subdivision	174%	165%	177%
Site preparation services	130%	116%	120%
Plumbing services	116%	133%	145%
Electrical services	126%	131%	137%
Plastering and ceiling services	117%	146%	118%
Carpentry services	137%	136%	131%
Painting and decorating services	138%	135%	135%

3.1.3 Outsourcing and input costs

We do not have the complete picture on the level of outsourcing in the industry. However, we can approximate this by looking at the level of purchases and other operating expenses (rent, equipment, marketing, insurance etc.) in each sub-industry. In the absence of data that is further broken down, it provides a good picture of outsourcing in the industry. This includes the purchase of materials and provides a good gauge of how susceptible each sub-industry is to changes in the prices of inputs.

We measure the level of outsourcing by comparing the ratio of total expenses to purchases and other operating expenses, that is, the percentage of total expenses that are not related to interest and donations, indirect taxes, depreciation, salaries and wages paid to employees and non-operating expenses.

Sub-industries representing main contractors, house construction and non-residential building construction have had relatively stable levels of outsourcing, representing 83% of expenses for house construction and 87–88% for non-residential building construction over the last 3 years (Table 4). Those sub-industries that would be considered trades have a much lower level of outsourcing, typically 60–70%.

Table 4. Level of outsourcing by sub-industry.

	2016	2017	2018
House construction	83%	83%	83%
Non-residential building construction	87%	88%	88%
Road and bridge construction	69%	71%	75%
Land development and subdivision	90%	88%	85%
Site preparation services	64%	64%	66%
Plumbing services	63%	64%	63%
Electrical services	61%	61%	61%
Plastering and ceiling services	61%	62%	67%
Carpentry services	67%	69%	71%
Painting and decorating services	59%	59%	56%

The construction industry did not do particularly well at recovering cost increases between March 2008 and March 2016 (Figure 9). However, over the last 3 years, the price of outputs has increased at a faster rate than the price of inputs, indicating the industry has been better at recovering costs. This has been particularly important as

costs of inputs have increased quite sharply over the last couple of years, with a 3.2% increase year on year in March 2018 and 4% year on year in March 2019.

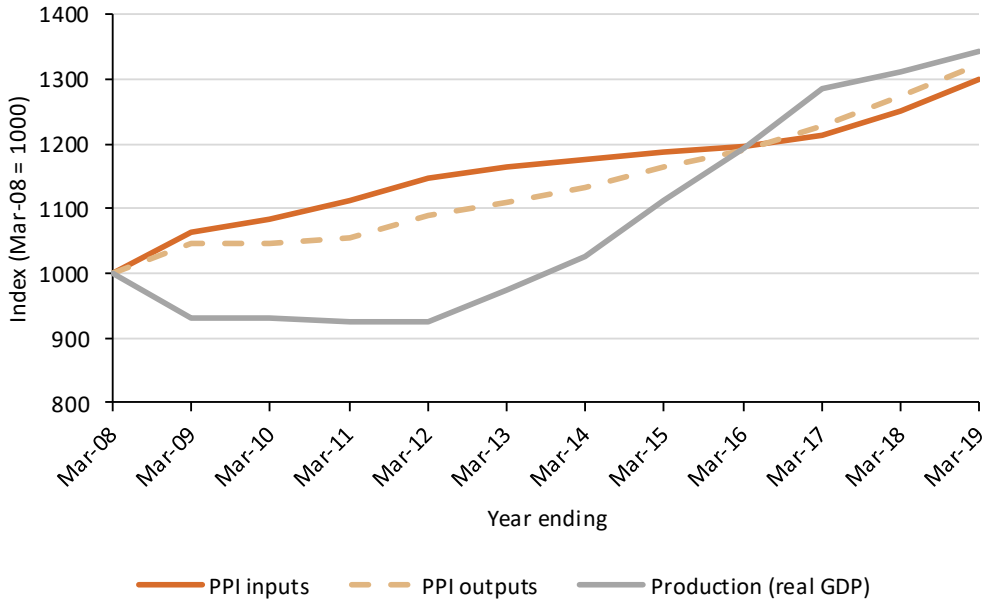


Figure 9. Changes in producer price index (PPI).

3.2 Customer service

The BRANZ New House Owners' Satisfaction Survey is an annual survey of clients of the new residential sector in New Zealand. It gathers feedback from clients on the performance of their builder and is one of the few measures of quality in construction in New Zealand. Of particular interest for this report is the information collected on client satisfaction and call-backs after completion of the house.

The residential sector accounts for a large proportion of total construction output each year (Figure 10). In the year ending March 2019, residential activity accounted for 55% of the total value of construction output. Therefore, it is a good (if incomplete) indicator of the customer service of the industry.

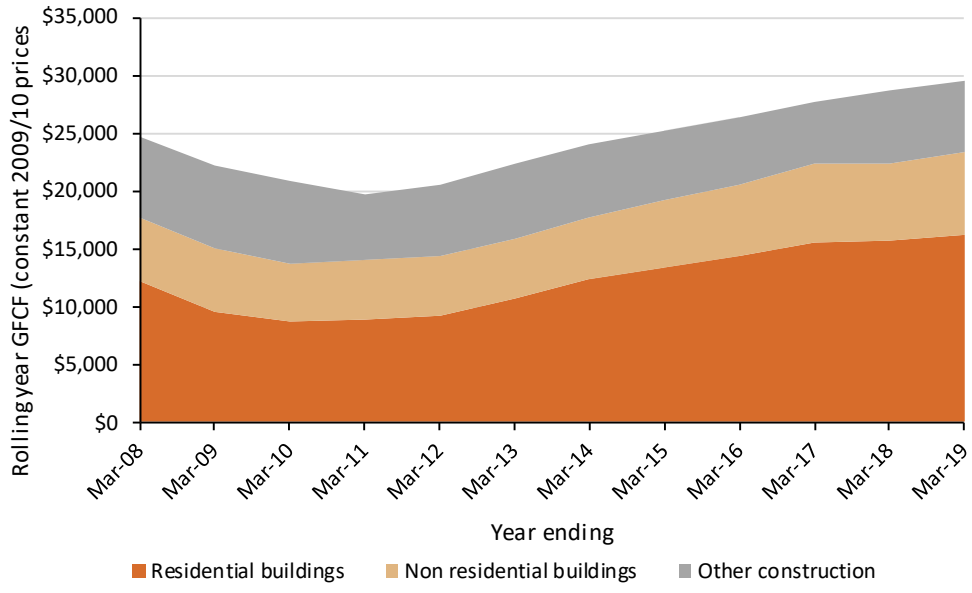


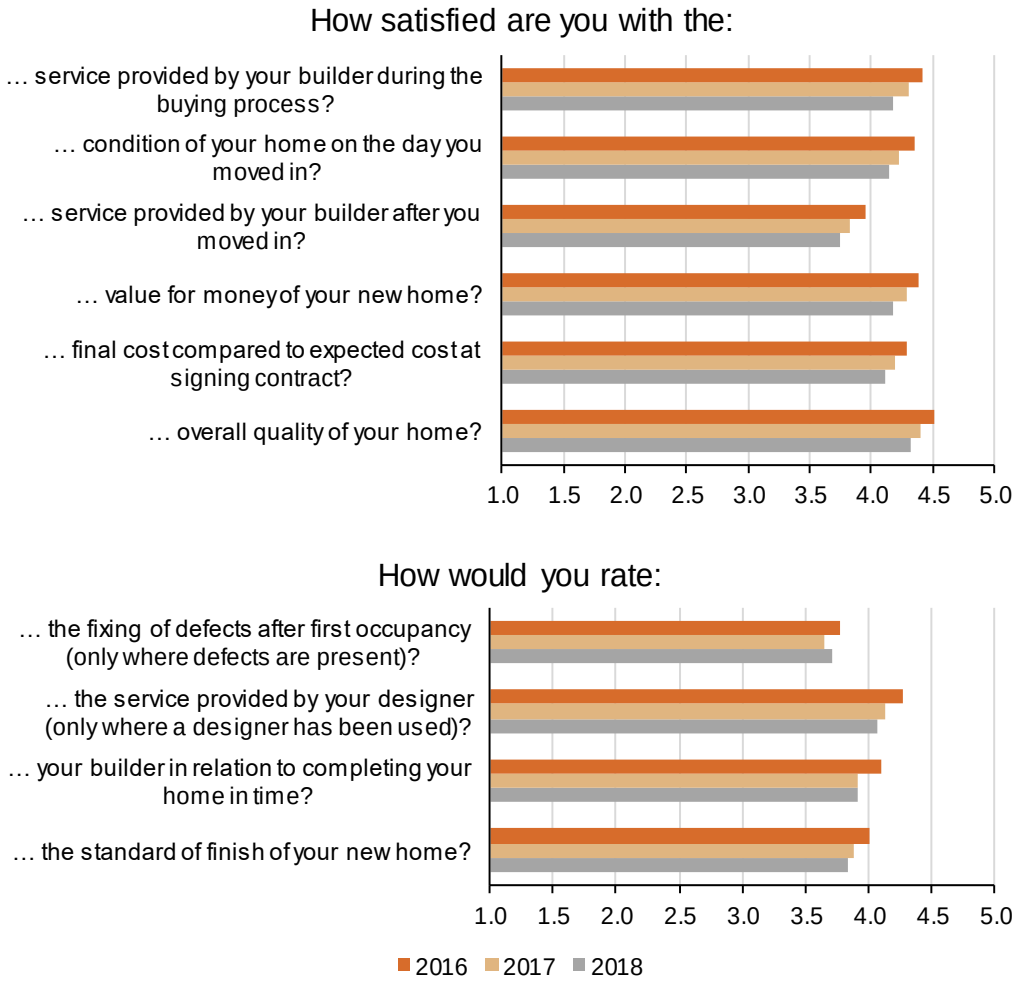
Figure 10. Construction output.

3.2.1 Client satisfaction

BRANZ collects information on several measures of client satisfaction throughout the build process. These include:

- service provided by the builder during the buying process
- level of communication from the builder
- condition of the home on the day they moved in
- service provided by the builder after moving in.

The average level of satisfaction has decreased across most of the measures over the last 3 years (Figure 11). Most measures would be expected to change as workloads change. In particular, service provided by those involved in the build and the final quality of the build would typically be directly related to how many jobs a builder has on the go at a time. The challenge for the industry is to maintain or improve across these measures as workloads change going forward.



Note: 1= Very dissatisfied, 2= Fairly dissatisfied, 3= Neither, 4= Fairly satisfied, 5= Very satisfied.

Figure 11. Average satisfaction scores 2016–2018.

A key measure of client satisfaction is how likely clients are to recommend their builder. The vast majority of respondents said that they would recommend their builder (68%) in the 2018 survey (Figure 12).

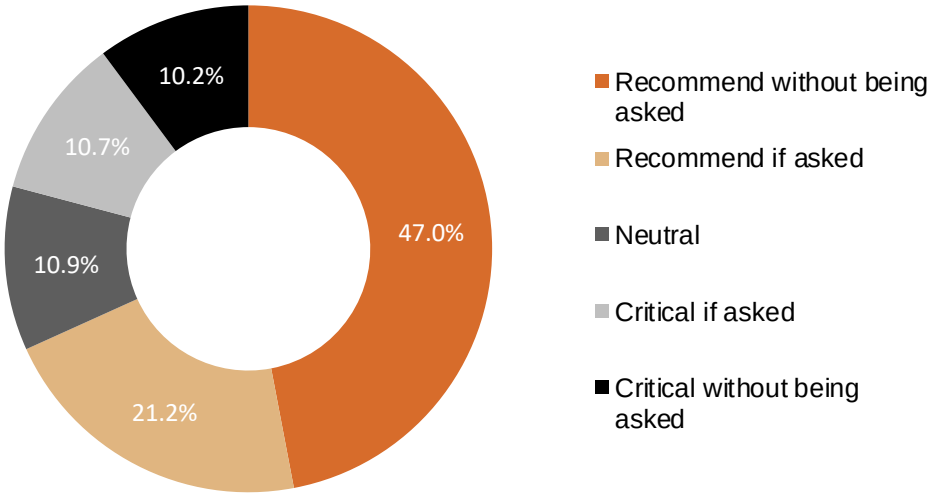


Figure 12. Likelihood of recommending builder – 2018.

Recommendations are a key method for builders in the residential sector to gain work, with about 30% of respondents to the survey stating that it was how they chose their builder. This was the second most common method behind looking at show homes.

3.2.2 Call-backs in new housing

The call-back rate in new housing in New Zealand increased steadily between 2012 and 2014 as the industry coped with increasing workloads (Figure 13). This reached a high of 87% in 2014 but has since trended downwards to 81% in 2018. These call-backs eat into the profit margin of each build.

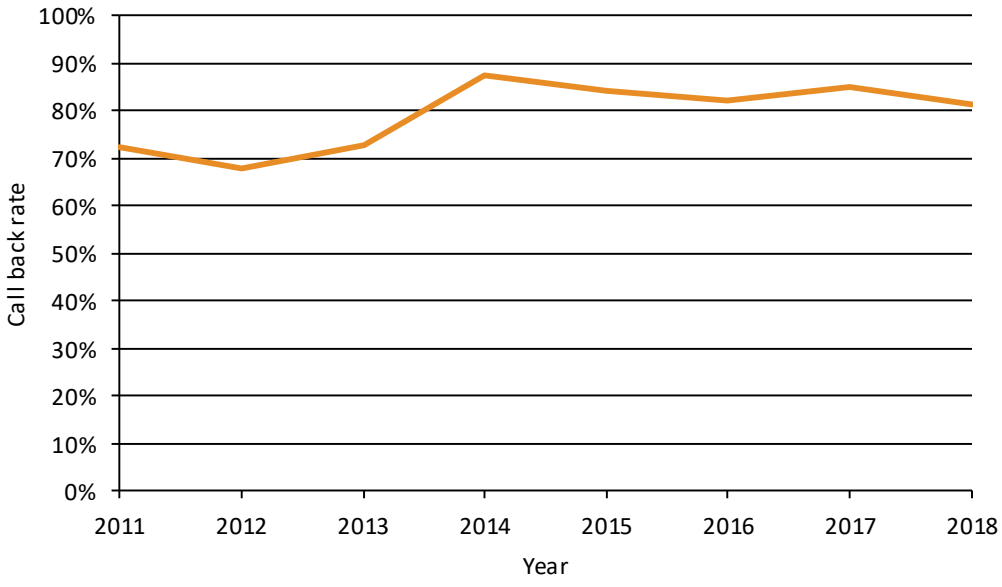


Figure 13. Call-back rate in BRANZ New House Owners' Satisfaction Survey.

Call-backs were most frequent in the Canterbury region (Figure 14). About 86% of respondents from Canterbury reported having to call back someone involved in their build to fix something after moving in. Auckland was significantly lower than this with a call-back rate of 76.5% in 2018.

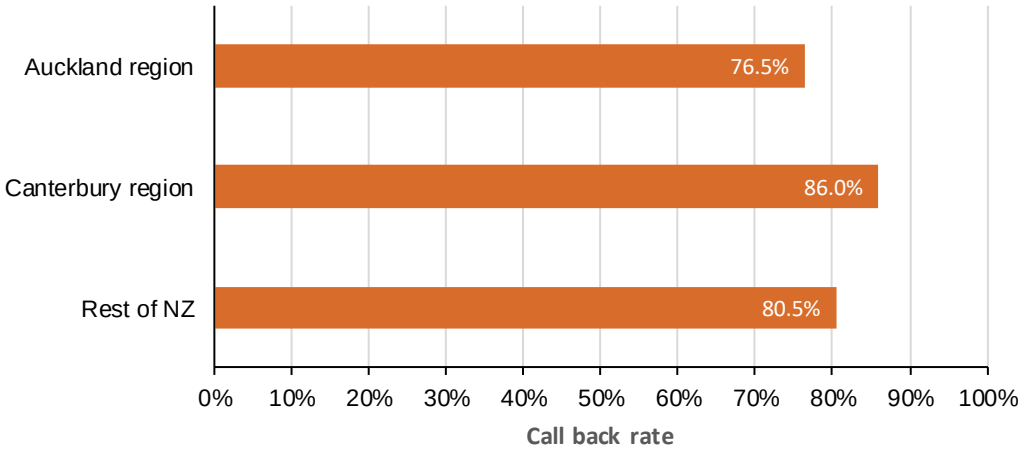


Figure 14. Call-back rates by region in 2018.

The most frequently called back trades in new housing in 2018 were the painter, plumber and electrician (Figure 15). These three trades have consistently rated amongst the most highly called back trades throughout the duration of the survey.

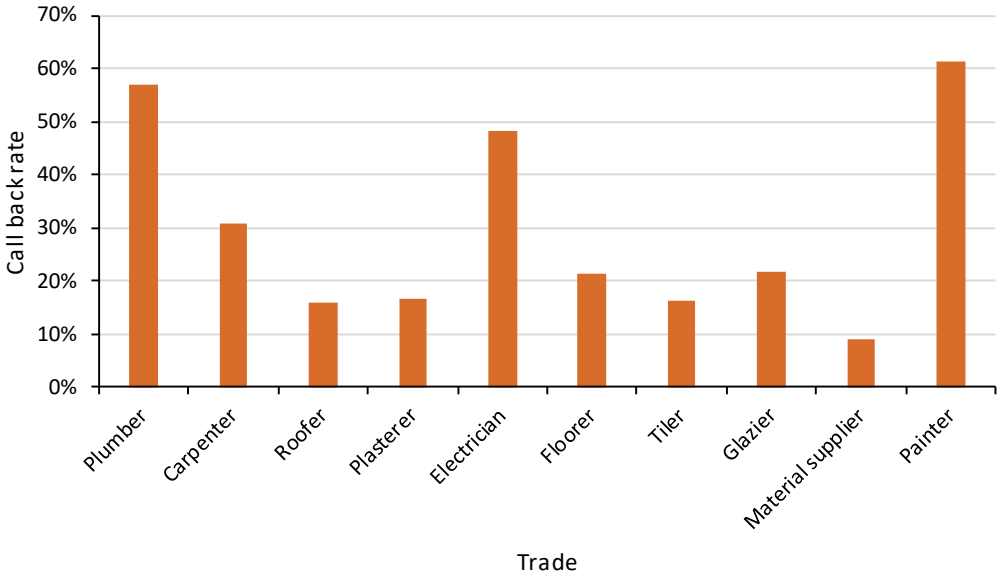


Figure 15. Call-back rates by trade.

3.3 Internal business processes

Internal business processes are those processes related to business performance, such as worker skills, turnover, health and safety and downtime.

3.3.1 Worker turnover rate

The available workforce has a role to play in industry performance and productivity. The ability to retain good staff and minimise new-hire training costs while recruiting the right mix of skillsets are critical characteristics of a well-functioning workforce.

Worker accessions and separations looks at the worker turnover rate in the industry. It measures the proportion of the industry workforce that are leaving or entering a new job each year. Over the analysis period, the construction industry has had a lower worker turnover rate than average for all industries in New Zealand (Figure 16).

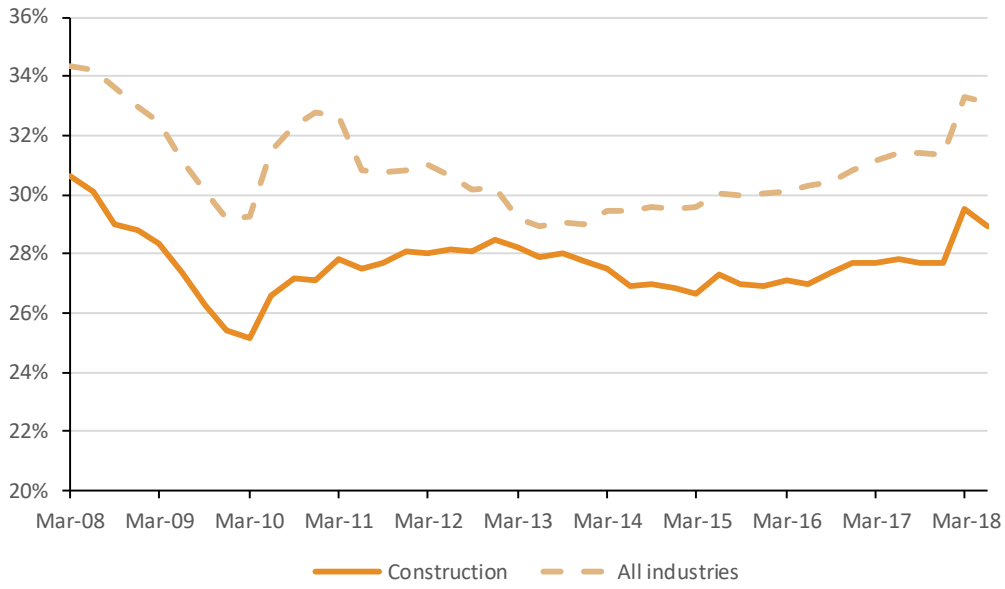


Figure 16. Worker accessions and separations.

Trades were difficult to hire heading into the GFC, with over 60% of respondents to the Business Operations Survey (BOS)[1] reporting at least moderate difficulty in hiring tradespersons and apprentices in 2007 and 2008 (Figure 17). Since the ramping up of construction activity post-2012, it has become more difficult to recruit tradespersons, with over 70% of respondents to the BOS reporting difficulty.

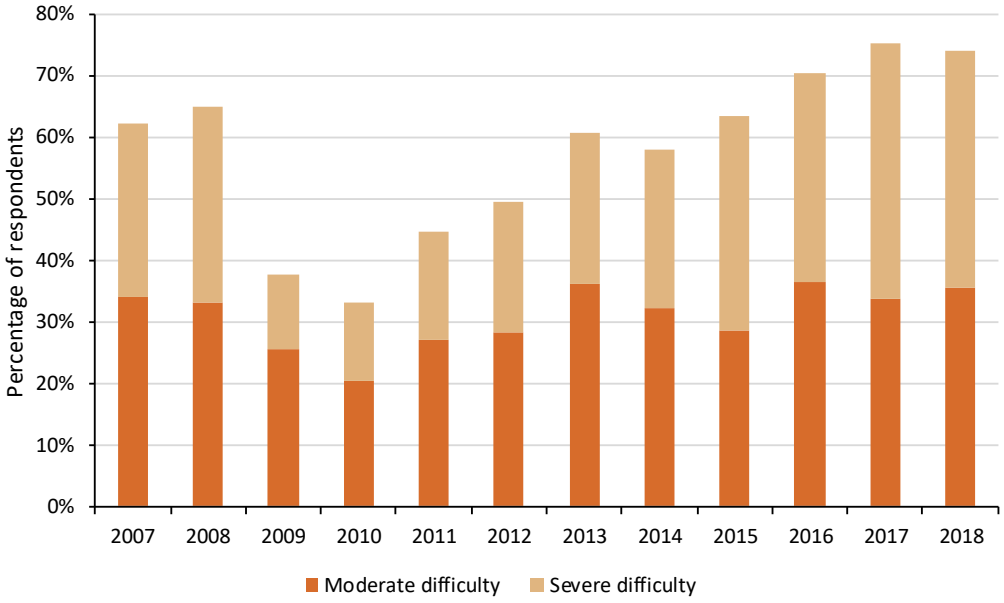


Figure 17. Difficulty hiring tradespersons including apprentices.

Managers and professionals have been easier to hire than tradespersons throughout the BOS period (Figure 18). However, since 2017, almost a quarter of respondents have stated difficulty in hiring managers and professionals, compared to 17% of respondents in 2007 and 14% of respondents in 2008.

[1] https://www.stats.govt.nz/help-with-surveys/list-of-stats-nz-surveys/information-about-the-business-operations-survey/

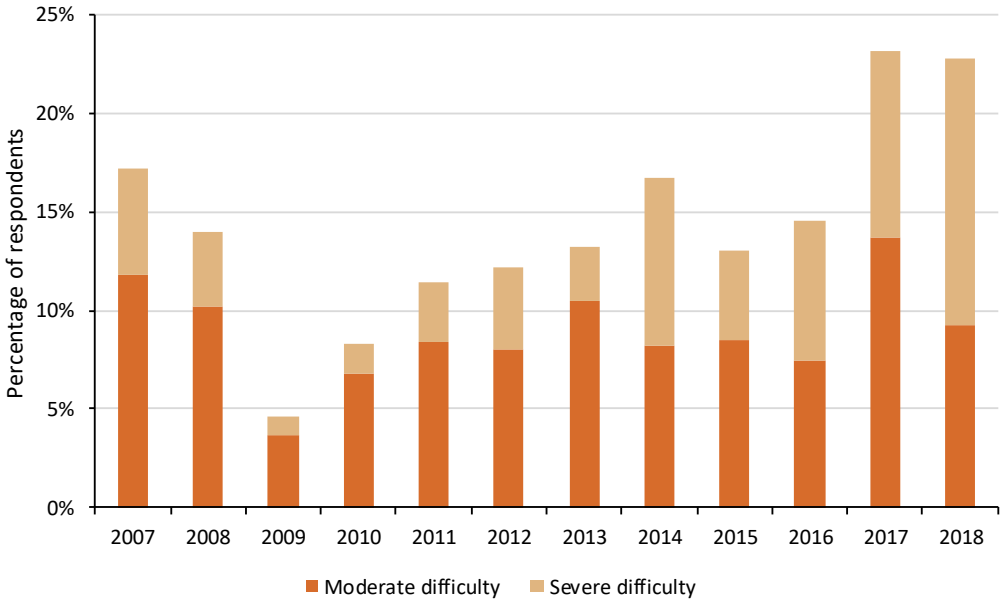


Figure 18. Difficulty hiring managers and professionals.

3.3.2 Health and safety

Health and safety is a key business process, particularly in the construction industry where a lot of effort has gone in to improving performance. A major step change, for example, was the change in guidelines for working at height introduced in November 2011. Best-practice guidelines were then released in April 2012.

The incidence of work-related injury claims in the construction industry has been trending downwards since 2013 (Figure 19). At the peak in 2013, construction had 186 claims per 100,000 workers. This reduced to 161 claims per 100,000 workers in 2018, similar to the incidence of claims for the manufacturing industry.

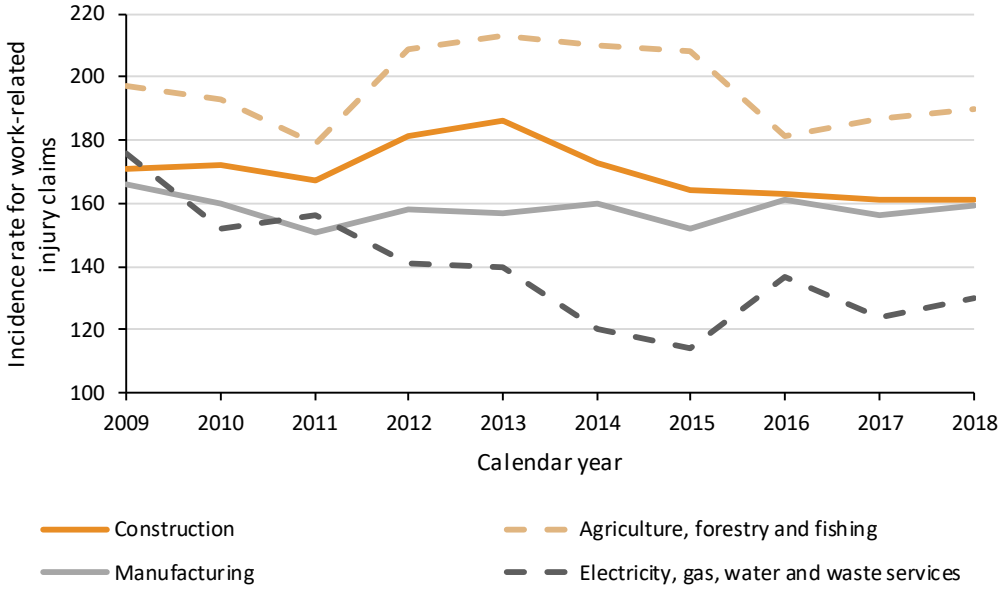


Figure 19. Incidence of work-related injury claims by industry.

3.3.3 Downtime

Little information is available on time use by construction companies in New Zealand. Some companies may utilise timesheets or some other system to determine how time is being used by their workforce. However, this may only capture a small proportion of the work as the use of subcontractors is prevalent in the construction industry.

In 2013, BRANZ undertook a study to understand the differences between small and large firms in the residential sub-industry. This included a survey on how employers and employees used their time. Employers were asked to fill in a timesheet for themselves and one representative worker (if applicable). The categories used to describe the time use and how we have categorised it for the analysis and charts is shown in Table 5.

Table 5. Categorisation of time use.

Item on survey form	Category in following figures
Preparing quotes	Quotes
Meeting with potential clients	Meeting clients
Invoicing, bills and tax returns	Invoicing
Visiting council	Other
Visiting suppliers (e.g. materials)	Materials
Clarifying or getting design details	Other
Addressing health and safety issues	H&S issues
Tool time	Tool time
Collecting materials from off site	Materials
Moving materials around site	Materials
Idle – waiting for consent	Idle
Idle – waiting for materials	Idle
Idle – waiting for instructions	Idle
Idle – weather delays	Idle
Idle – visits/waiting for inspector	Idle
Idle – insufficient work	Idle
Doing rework – defect in work	Other
Doing rework – client/designer changes	Other
LBP paperwork and training	Other
Socialising	Breaks
Teabreaks and lunch	Breaks
Other time use	Other

Tool time was reported as being the major time use for both employers and employees in the residential building sub-industry (Figure 20). Employers stated that, on average, 22.4 hours of their week was spent on the tools compared to 28.9 hours for their employees. Collecting and/or moving materials was the next big time use for employers, followed by breaks, quotes, invoicing and meeting clients.

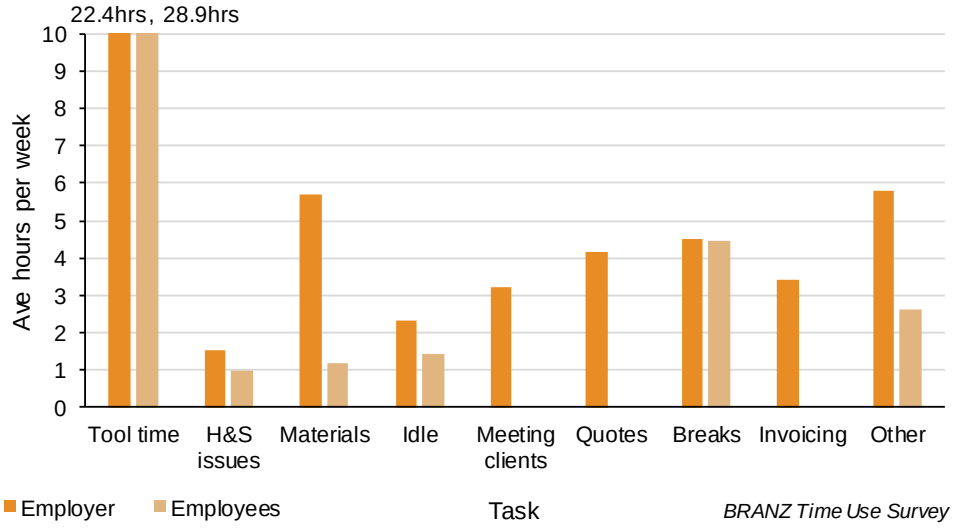


Figure 20. Time use by employers and employees.

The largest causes of downtime for both employers and employees were weather delays or waiting for subcontractors (Figure 21). Employers reported being idle for just over 2 hours each week compared to just under an hour for employees.

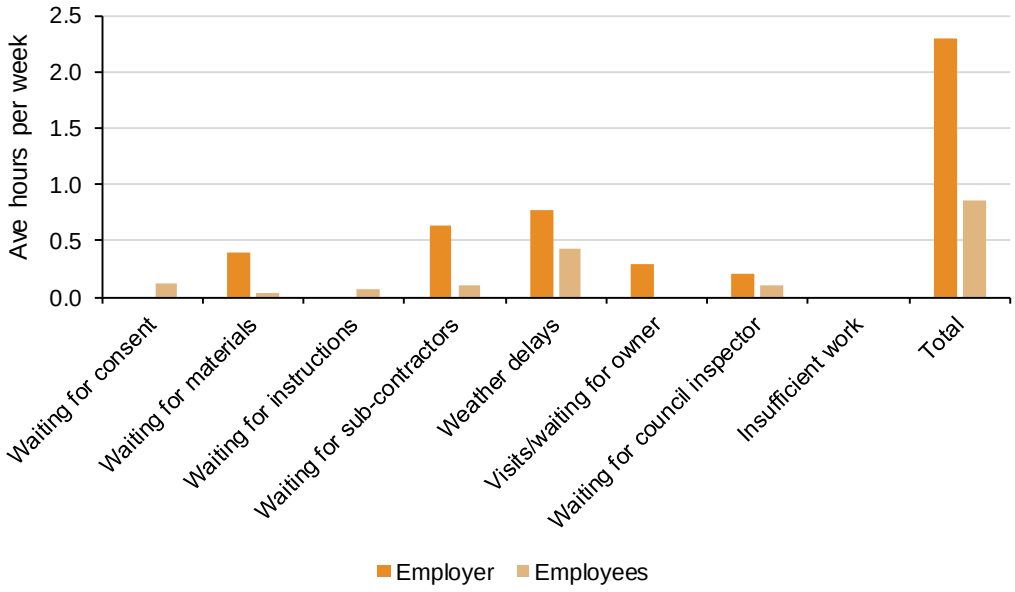


Figure 21. Causes of downtime.

3.4 Learning and growth

Research and development offers learning and growth opportunities for firms. The BOS asks firms whether they funded any R&D activities in the last financial year. This includes the gaining of new knowledge, new or improved materials, products, services or processes and the purchasing of overseas knowledge or information.

Construction has typically had few firms undertaking R&D activities, with just 2% of respondents to the BOS stating that they undertook R&D activities in 2018 (Figure 22). This was down from the peak of 9% in 2011 when construction activity was at its lowest point over the analysis period.

In comparison, the manufacturing industry has a much higher reported proportion of firms undertaking R&D activities throughout the period. Approximately one in five firms in the manufacturing industry were undertaking R&D activities compared to about one in 20 firms in the construction industry.

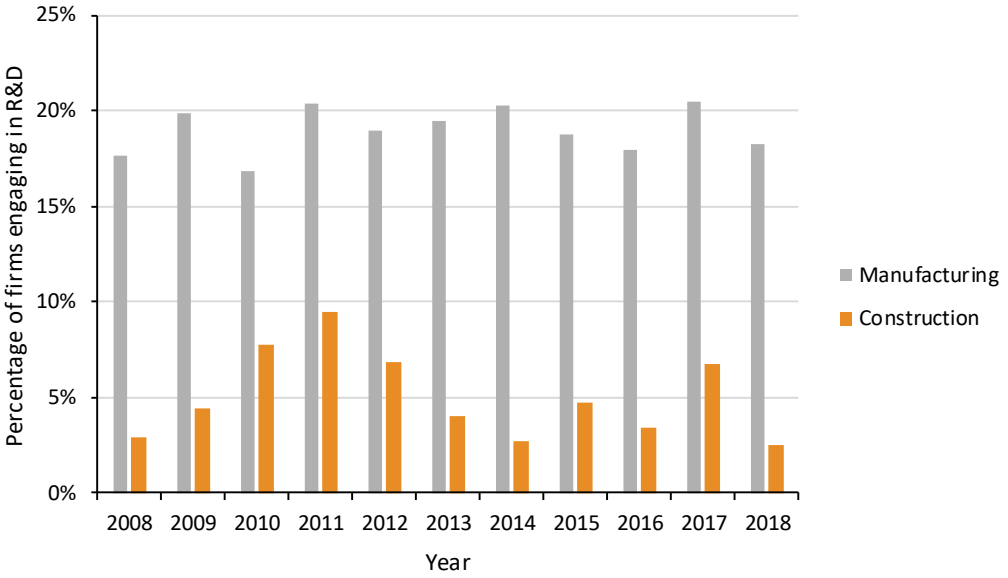


Figure 22. Proportion of firms undertaking research and development.

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