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Changing the Flow:

Rethinking Respect and Inclusion in Plumbing

Stage A

Final Report

30 April 2026

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Acknowledgments

There are many people to thank in the preparation of this report.

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This document is the report for **Stage A** of the *Changing the Flow: Rethinking Respect and Inclusion in Plumbing* research project.

This report provides the research background and aims, the research methodology adopted, and the analysis of the primary data collected via focus groups and interviews.

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EXECUTIVE SUMMARY

Highlights

- This report identifies the underlying conditions that are working together to limit the participation of women in the Australian Plumbing Industry. It contributes to the evidence base for a National Framework to support diversity and inclusion in the industry.
- The industry operates through a high degree of informality. As a result, women's experiences of inclusion vary significantly depending on site conditions and supervisor practices. Workers are often distanced from centralised support systems, including formal inclusion policies.
- Masculinity operates as the default behavioural standard. It shapes expectations of how workers should behave, communicate, and fit in – often excluding those who do not align with this template.
- Women's participation in plumbing requires more than technical skills. Women and those outside the dominant template must do additional work to navigate the environment, manage how they are perceived, and prove their competence under heightened scrutiny.
- Increasing women's participation alone will not address diversity and inclusion. Workplace conditions and everyday practices must also change for participation to be sustained and meaningful.

Introduction

The Plumbing Industry in Australia faces a growing need to attract and retain more workers, making workforce diversity an economic imperative. While women's overall participation rates in the industry have gradually increased across several occupational categories, their representation in the key role of plumber remains stagnant. In 1991, women made up only 1% of plumbers nationwide, and three decades later, this figure has not increased.

About this report

This report presents findings from Stage A of a broader research program to develop a National Framework for diversity and inclusion in the Australian Plumbing Industry.

The analysis draws on data from eight focus groups and forty-eight interviews conducted across the sector. This work forms part of the *Building Futures: Breaking the Barriers for Women in the Plumbing Industry* project, funded through the Australian Government's *Building Women's Careers Program*.

The next stage of the research, Stage B, will develop a Plumbing Industry Cultural Inclusion Maturity Model, which will underpin the Plumbing Industry National Framework.

Understanding Women's Participation in Plumbing

This research addresses a central question:

> *Why has women's participation in the plumbing industry remained persistently low, despite the expansion of formal policies, training initiatives, and regulatory frameworks aimed at improving inclusion?*

Related questions emerging across the study include:

- Why does the industry continue to be experienced as uneven or exclusionary by some groups?
- Why are certain groups consistently overrepresented, while others remain marginal or absent?
- Why do formal efforts toward inclusion not translate into consistent change in everyday experience?

Key findings

The findings show that low participation is not simply a pipeline issue. Instead, three interconnected elements within the system of work continue to limit progress.

1. Informality

Plumbing work is highly mobile and decentralised. Workers move across sites, teams, and supervisors, resulting in constantly shifting work environments. Day-to-day decisions are guided by individual judgement, supervisor discretion, and shared informal understandings of "how things are done."

Why this matters to inclusion:

- Informal practices decide how learning, safety, progression, and belonging are experienced. Opportunities are not standardised and depend heavily on supervisor judgement.
- Informal learning environments shift responsibility from the organisation to the individual. Workers who self-advocate, or 'put their hand up,' progress more quickly; this advantages workers who can navigate the informal dynamics and feel confident and safe in their workplace.
- In the absence of formal processes, supervisors become gatekeepers for what's acceptable in the workplace. Their judgement determines what is acceptable and whether issues are escalated.

2. Masculinity

Masculinity functions as the behavioural template that defines what is considered normal, capable and appropriate on site. Because masculinity operates as the default behavioural mode in plumbing, its role in shaping exclusion is often unrecognised.

Why this matters to inclusion:

- It sets expectations for how workers should behave, communicate, and engage with others, as well as what work conditions are acceptable, including work hours.
- It narrows the definition of a "good worker" to those who naturally fit this template. When individuals do not fit, the issue is attributed to them and not the structure.
- Communication practices such as banter are used to test belonging. While this can build cohesion, it also excludes those who do not engage, including new entrants, younger workers, and those from different backgrounds.

3. Participation burden

Participating in the plumbing industry requires navigating both the informal structure and the masculine behavioural template in order to be accepted, trusted, and given opportunities to progress. This creates an added burden for those who do not naturally align with these norms.

Why this matters to inclusion:

- Fitting into the workplace takes on a performative dimension for women and some men. Atypical workers may need to adjust how they speak, respond, or engage in order to be accepted.
- Workers in the industry describe an expectation to tolerate discomfort – whether it's the tough physical conditions or the workplace banter. Those who are seen to respond differently to these situations can face greater scrutiny on the job.

- The participation burden falls heaviest on those who are early in their career. Some apprentices can focus on learning, while others must simultaneously prove their legitimacy. In an informal setting, exclusion directly reduces access to skill development and progression.

Conclusions

There is limited internal pressure for change within the system. The industry prioritises getting the job done, and inclusion is often positioned as secondary rather than essential. Because the starting point has been historically low, small improvements can create a perception of progress, reducing momentum for deeper change.

The qualities that are valued in plumbing also stabilise the status quo. Endurance, resilience, and the ability to "push through" are highly valued. This contributes to the normalisation of harm, whether in working conditions or social interactions, and reduces the likelihood that issues are recognised or addressed.

Formal systems do not consistently translate into practice. Policies exist, but their application depends on supervisors and team dynamics. Reporting issues can carry social risk, leading many concerns to be managed informally and remain invisible at organisational level.

The industry can appear functional while remaining unequal. Work is completed, and conditions are perceived to have improved relative to the past. However, the underlying dynamics continue to limit participation and progression for some groups. This explains why formal inclusion efforts can coexist with persistent inequality.

Increasing women's participation alone will not lead to lasting change. Without improvements to everyday workplace conditions and behaviours, women may enter the industry but struggle to remain or progress.

The National Framework will provide practical tools and resources to help organisations address these underlying conditions. It will offer a practical pathway to ensure that genuine efforts to change are more achievable and more likely to endure, helping the industry build a more sustainable and inclusive environment where all workers can thrive.

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1. INTRODUCTION AND OVERVIEW

1.1 Introduction

The "Building Futures: Breaking the Barriers for Women in the Plumbing Industry" (BFBB) Project is funded via the Australian Government's "Building Women's Careers Program"[1] and aims to increase women's participation in the Plumbing Industry.

> *The project will create, promote, and deliver a national training program within the Australian Plumbing Industry, addressing the cultural and attitudinal changes needed to make the industry attractive, welcoming, and culturally safe for women*.[2]

The BFBB Project was established with two specific outcomes.

1. Developing a National Framework which supports a structured approach to promote a culturally safe environment, reduce gender discrimination and promote career pathways.
2. An Education Program for individuals, addressing the role they play in promoting the change in the current industry culture.[3]

The Plumbing Industry Climate Action Centre (PICAC), which is leading the BFBB Project, along with a diverse and representative group of industry partners, has stated its commitment to working with industry and government to create lasting change and build a more diverse, skilled workforce for the future.

Therefore, the aim of any work undertaken as part of the BFBB Project is to support the creation of more inclusive and equitable work environments that attract and retain a more diverse, talented plumbing workforce in Australia. By fostering a culture of respect, the project endeavours to transform traditional workplace attitudes and practices, paving the way for sustainable change.

Ultimately, the BFBB Project aspires to ensure that the plumbing sector is recognised as a viable, supportive, and rewarding career choice for individuals from all backgrounds, thereby strengthening the industry's capacity to innovate, adapt, and thrive in the future.

1.2 The National Framework

Background

The Plumbing Industry has laid the necessary groundwork to promote diversity, inclusion, and workforce development through various projects and programs,[4] and now the "Building Futures: Breaking the Barriers for Women in the Plumbing Industry" (BFBB) project seeks to build on that momentum.

As noted, the BFBB Project centres on two primary objectives: establishing a National Framework and delivering an education programme that empowers individuals to contribute to positive cultural change. It is

[1] The Australian government, through the Department of Employment and Workplace Relations, is investing $60.6 million in the Building Women's Careers Program to drive systemic, structural, and cultural change in key industries, including construction and clean energy.
[2] https://www.dewr.gov.au/building-womens-careers-program/industry-construction#toc-building-futures-breaking-the-barriers-for-women-in-the-plumbing-industry
[3] https://www.dewr.gov.au/building-womens-careers-program/industry-construction#toc-building-futures-breaking-the-barriers-for-women-in-the-plumbing-industry
[4] Refer to Adepoyibi, T. (2025). *Contemporary Practice Review Report: Breaking Barriers for Women in the Plumbing Industry*, McEncroe and Associates, Vermont, Victoria, Australia, for a review of these programs.

important to note that Constructing Equity's work focuses specifically on the project's first outcome, namely the development of a National Framework.

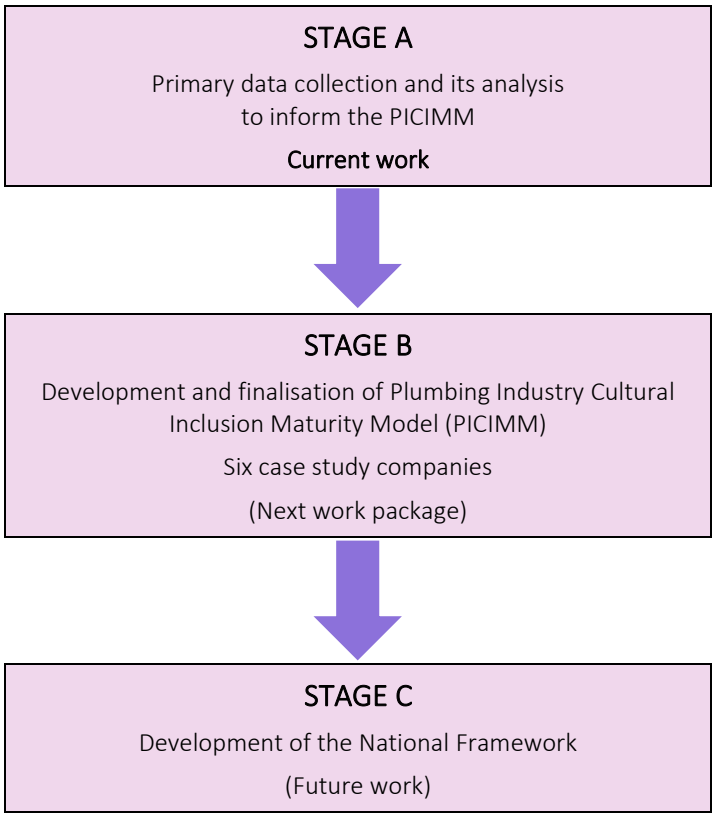
The principal outcome of Constructing Equity's work will be the creation of the Plumbing Industry Cultural Inclusion Maturity Model (PICIMM), along with the development of a National Framework (including its resources and tools) for the Australian Plumbing Industry.

The National Framework and its staging

Constructing Equity work has been conceptualised in three interconnected but distinct stages. This sequential progression enables the findings and insights from one stage to directly influence and shape the subsequent stages.

Stage A, summarised in this report, has involved collecting and analysing primary data from across the industry to identify industry expectations as well as formal and informal workplace norms, and how they enable or limit inclusion. Stage B focus will be on the development and validation of the PICIMM. The PICIMM will then provide the organising logic for Stage C, namely the National Framework. It is in this stage that the documentation required to support the rollout and implementation of the PICIMM will be developed, along with tailored resources for industry employers.

The work will ensure that the National Framework, with its tools and resources, is precisely tailored to the unique and evolving needs of the Australian Plumbing Industry. By leveraging robust, local, plumbing-specific evidence generated in Stages A and B, the resulting framework will not only be highly relevant and practical but will also instil greater industry confidence and potentially hasten wider spread adoption among Australian plumbing stakeholders.



1.3 Stage A study

Research aims and outcomes

The primary objective of the National Framework is to facilitate the industry's ongoing transformation toward a more inclusive and culturally safe plumbing sector. Stage A is dedicated to gathering foundational primary data essential for developing the PICIMM, which will be central to the National Framework.

Given the work the Plumbing Industry has already invested in diversifying its workforce, this research aims to investigate the persistent underrepresentation of women and other marginalised groups in the Plumbing Industry, despite these changes intended to foster more equitable participation. The central research question underpinning this Stage A is as follows:

> *Why has women's participation in the Plumbing Industry remained persistently low, despite the expansion of formal policies, training initiatives, and regulatory frameworks aimed at improving inclusion?*

Related to this are broader concerns raised across the Building Futures, Breaking Barriers project:

- Why does the industry continue to be experienced as uneven or exclusionary by some groups?
- Why are certain groups consistently overrepresented, while others remain marginal or absent?
- Why do formal efforts toward inclusion not translate into consistent change in everyday experience?

In order to address these questions, a deep understanding of diversity and inclusion in the plumbing context was required, so that common understandings, differing experiences, cultural friction points, enabling conditions, and operational pressure points could be fully explored.

Research assumptions

The research:

- Accepts that diversity and inclusion in plumbing have been a long-standing issue, despite industry and government efforts in this area. The literature review and desktop search by McEncroe and Associates provide further details of this[5].
- Acknowledges that some companies have established diversity and inclusion strategies, but others are at an earlier stage of awareness and have currently given less attention to these issues.
- Recognises the value of a stepwise approach for the industry. The development of a multi-level maturity model for the Plumbing Industry (PICIMM) could help organisations progress in a systematic manner and thereby achieve sustainable change.
- Considers that the National Framework should enable companies to assess their progress in this area and assist them in implementing targeted improvements in diversity and inclusion on an ongoing basis.

Significance of this work

The research in Stage A will inform knowledge that will be embedded in the PICIMM. The model, along with the associated National Framework tools and resources, if adopted, will ultimately support the future recruitment and retention of women and other minorities in plumbing roles. The PICIMM will allow companies and the industry to understand not just whether inclusion exists, but how advanced or embedded it is across different organisations. The model will enable a tiered understanding, from basic

[5] The BBBF project engaged McEncroe and Associates to undertake a literature review and a desktop search of initiatives in the Plumbing Industry worldwide (secondary data collection plus 7 interviews with key stakeholders). This report is summarised later in this report. Other parties are currently being selected to undertake the BFBB's second objective on education. These aspects therefore do not form part of this research's remit.

compliance to complete cultural transformation, and this will help structure both assessment and progress tracking. The current research may also inform future projects in the area. It could also be used to collect baseline and ongoing data for benchmarking, via annual industry surveys or follow-up research, to assess the Plumbing Industry's progress over time.

Overview of the research approach

This research employed predominantly qualitative methods to generate rich, industry-informed data. Primary data collection occurred over several phases and engaged a diverse range of stakeholders, including male and female senior managers, supervisors, plumbing staff, plumbers, apprentices, and representatives from key Plumbing Industry Groups (e.g. Employer Associations and Plumbing-related Unions). Forty-eight in-depth interviews were conducted, along with four apprentice focus groups and four plumber and supervisor focus groups. One women-only group was included in each focus group category to ensure women's specific perspectives were captured.

The involvement of multiple stakeholder groups ensured a comprehensive understanding of diversity and inclusion in the Plumbing Industry was gathered. Stage A data were rigorously analysed using inductive research methods, with thematic analysis as the principal approach and discourse analysis applied where appropriate. This approach ensured that insights developed were firmly grounded in real industry experience and that participants' authentic voices were reflected in the findings.

1.4 Structure of this report

This report is organised into five key sections, each building on the last to provide a coherent account of the work undertaken for Stage A, including the research process, findings, and implications. The introductory section introduces the BFBB Project and the National Framework, explaining both Constructing Equity's research and the foundational role of the research in the National Framework's development.

Section 2 provides detailed background information: first, it offers an overview of the Australian Plumbing Industry; next, it examines women's representation in the Plumbing Industry using Australian Bureau of Statistics data to illustrate trends, challenges, and gaps. The section closes by summarising key insights from the McEncroe & Associates review report, situating the research within existing scholarship, and demonstrating the urgency and importance of addressing gender inequality in the Plumbing Industry.

Section 3 outlines the research design for Stage A, explaining the study's methodological foundations, the approach to participant recruitment and sampling, and the data collection instruments. This section also describes the processes for data analysis and interpretation, and details how the team maintained data integrity and security throughout the study.

Section 4 presents the research findings, first discussing the Plumbing Industry context and then examining the three data-driven themes uncovered. First, it explores the industry's informal culture; second, the ways in which this culture codes as male; and third, the resulting need for negotiated belonging, which places unequal pressures on women entering the trade. This section answers how the system operates and why women's and other minority groups' participation remains uneven.

Section 5 moves from description to interpretation. Its subsections show how the industry's informal culture, embedded masculinity, and participation conditions form an interconnected system. This system resists change due to diffuse responsibility, localised governance, and the mediation of formal policies through informal practices. The research explains why formal inclusion efforts often fail to bring meaningful change. It also shows why inequality and resistance persist. The final section concludes with a summary of Stage A findings and analyses and discusses the implications for Stages B and C.

2. BACKGROUND

2.1 Introduction

This section provides an overview of the Plumbing Industry, demonstrating the need for diversification by referencing relevant census data and summarising key insights from "Literature and Contemporary Practice Review Report: Breaking Barriers for Women in the Plumbing Industry"[6] report. By highlighting the vital role of plumbing in Australia's construction sector and discussing the industry's regulatory landscape, workforce composition, and range of services, it establishes a solid foundation for the research. This section emphasises the complexity and importance of the sector and provides a strong justification for developing a National Framework. A National Framework is essential to support industry progress and promote best practices to tackle emerging workforce challenges across Australia's Plumbing Industry.

2.2 The Plumbing Industry

The Plumbing Industry can be considered the cornerstone of Australia's construction sector, as it plays a critical role in supporting public health, safety, and economic development. The industry provides essential skills needed for residential to large-scale infrastructure developments, including water supply, drainage, sanitation, gas fitting, HVAC and fire safety system installations, as well as their ongoing maintenance and repair. Unlike some other parts of the Construction Industry, the Plumbing Industry is highly regulated to protect the public and the environment. The industry adheres to strict codes of practice and standards and restricts entry to trained plumbing professionals.

The work of the Plumbing Industry, therefore, underpins the functionality of buildings and supports compliance with safety and energy standards, making it indispensable for new domestic, commercial, and industrial buildings and infrastructure developments. It is also an industry that is evolving, with an increased focus on sustainability, water conservation, and innovative technologies such as smart plumbing systems and solar and greywater recycling.

A broad overview of the services offered by the Plumbing Industry includes:

Water Supply: Installation and maintenance of systems for hot and cold water, including potable and non-potable water, as well as rainwater harvesting.
Gas Fitting: Installation and repair of gas piping systems for domestic and commercial use.
Drainage and Sanitation: Construction and repair of drainage, sewer, and septic systems, including sanitary.
Mechanical Services: Installation and maintenance of HVAC (heating, ventilation, and air conditioning) systems and refrigerated air-conditioning.
Roofing and Guttering: Services related to stormwater management and the installation of metal roofing.
Fire Protection: Installation of fire suppression systems.

The industry encompasses a complex ecosystem of professionals, organisations, and institutions that support, regulate, and advance the sector. At the heart of it are the tradespeople who install and maintain systems. Plumbers are defined by the Australian Bureau of Statistics (ABS) as those who ….

> "*… install, maintain and repair pipes, drains, guttering and metal roofing, mechanical services & related equipment for water supply, gas, drainage, sewerage, heating, cooling and ventilation systems*"[7].

While plumbing companies provide one or more of the services described above, the ABS highlight the diverse

[6] Refer to Adepoyibi, T (2025), *Literature and Contemporary Practice Review Report: Breaking Barriers for Women in the Plumbing Industry*, McEncroe and Associates, Vermont, Victoria, Australia.
[7] https://www.abs.gov.au/statistics/classifications/anzsco-australian-and-new-zealand-standard-classification-occupations/2022/browse-classification/3/33/334/3341

specialisations required, with a further classification of plumber classifications or subspecialties as follows:

- Plumber (General) (334116)
- Airconditioning & Mechanical Services Plumber (334112)
- Drainer (334113)
- Gasfitter (334114)
- Roof Plumber (334115) and
- Fire Protection Plumber (334117)*

*Only added in 2022, so not represented separately in the latest 2021 census

The Plumbing Industry, being fundamentally people-driven, is currently grappling with skill shortages. This reality highlights the urgent need to attract talent and to actively promote diversity and inclusion, thereby ensuring the industry's future strength and resilience. While bridging the skills gap is often cited as a primary reason for encouraging more women to enter plumbing, it is equally important to acknowledge women's right to work in highly skilled, well-compensated roles and to recognise the unique insights and capabilities they could bring to the industry. By raising awareness of plumbing as an appealing and rewarding career option for women — and by fostering more supportive, inclusive workplace environments — the industry can both attract and, importantly, retain a broader range of talent. Efforts such as the BFBB Project, led by the Plumbing Industry, will not only help address existing workforce gaps but also enrich the sector, making it stronger and more innovative for the years ahead.

2.3 Women's representation within the Plumbing Industry

To better understand the Plumbing Industry in Australia, a review of the Australian Bureau of Statistics (ABS) Census data was conducted. As census data is collected every five years in Australia, the 2021 data was the most recently available. It was necessary to use census (whole population) data rather than ABS workforce data, as the workforce data is based on a sample of just 30,000 people, which makes extrapolation to the entire workforce unreliable for gender disparate occupations being considered. Figure 1 was derived from the 2021 census data (ABS, 2025a[8]) shows the gender composition of all 19 Australian industries.

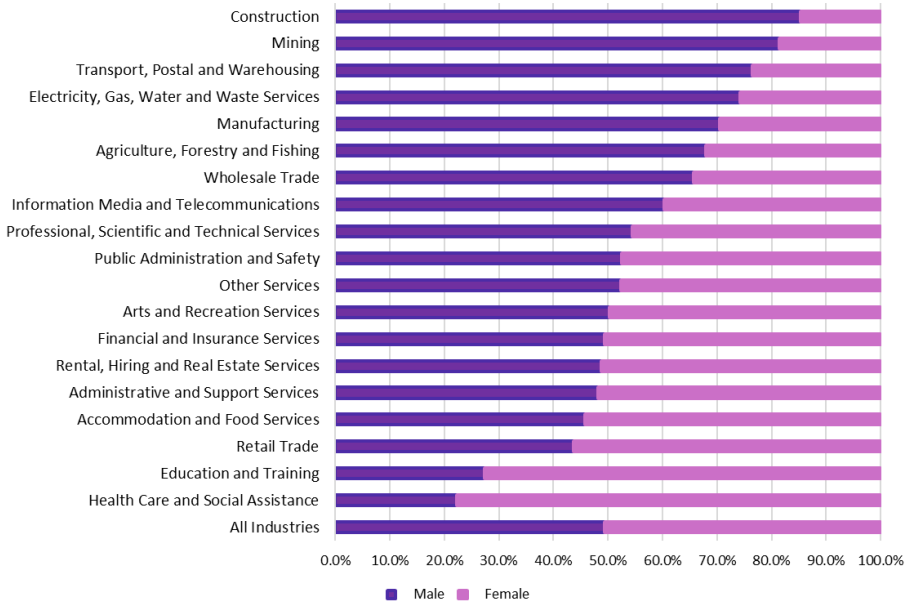


Figure 1: Gender composition of Australian industries in 2021 (ABS, 2025a)

[8] Australian Bureau of Statistics. (2025a). *2021 Census - counting persons, 15 years and over*. [TableBuilder]. Retrieved Dec 1st to 7th, 2025. https://tablebuilder.abs.gov.au/webapi/jsf/tableView/tableView.xhtml

While 50.7% of the overall workforce are women, the gender composition of each industry varies considerably, with Health and Education being the most female-dominated, with nearly 78% of workers being women. Construction has historically been the most male-dominated industry in Australia, and in 2021, 85.3% of its workers were men.

A review of all available census data, both paper-based (from 1901 to 1981) and electronic (from 1986), was conducted (refer to Figure 2), demonstrating the stark reality of the Plumbing Industry's gender composition since the early 1900s. Women were found to be around 1% of all plumbers in the earlier part of the twentieth century, then either dropping off the records or noted at 0% for many years.[9] Over the past 40 years, female plumbers' participation rates have hovered around 1%. By contrast, women's representation in the broader Construction Industry[10] has increased significantly since the early 1960s, however, their entry into trades such as plumbing has been slower.

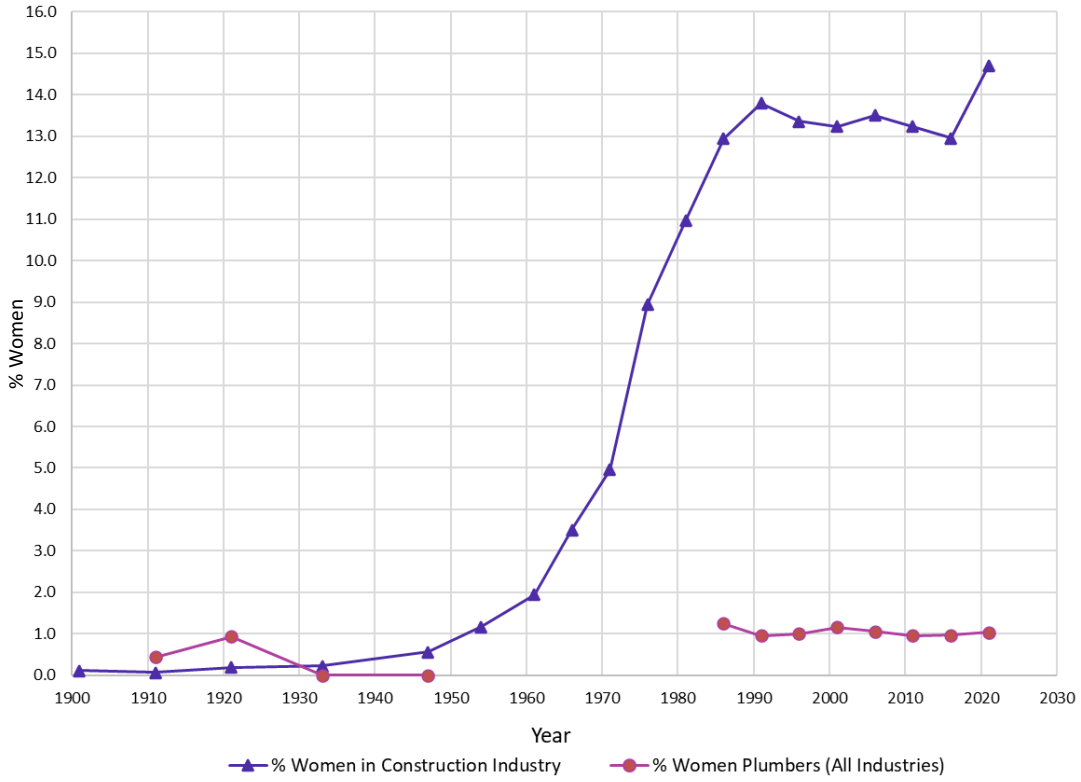


Figure 2: Percentage of women in construction and plumbing over time[11]

As plumbers are considered central to the Plumbing Industry, a review of their participation is presented, followed by a broader consideration of the plumbing sector.

In Australia, in 2021, there were 80,451 Plumbers (refer to Table 1), representing approximately 0.6% of all employed persons. The majority were General Plumbers, with Roof Plumbers the next largest cohort[12].

In 2021, there were 835 female plumbers in Australia (all Industry data), representing 1.0% of all plumbers. While plumbers are engaged across all Australian industries, it would come as no surprise that the majority of

[9] It is unknown why women dropped from 0.93% in 1921 to 0% in 1933. It could be that this was due to issues such as the introduction of registration of the plumbing profession or the reclassification of women into other roles not reported in the paper-based census data.
[10] No Plumbing Industry or Plumbing sector data was provided in early census records.
[11] Australian Bureau of Statistics census data, various years, including paper-based historical records and electronic data (all industry) from 1986, historic data from 1986 to 2011, accessed March 1st to 20th, 2025.
[12] Fire Protection Plumber (334117) speciality was only added in 2022, so it is not included in the latest 2021 census.

all plumbers are employed by the Construction Industry (88.6%), with the next highest percentage in the Public Administration and Safety industry (2.1%). In the Construction Industry, the 653 female plumbers represent 0.9% of all plumbers.

Table 1: Male & Female Plumbers in all Industries and the Construction Industry in 2021 (ABS, 2025a)

	Construction Industry				All Industries			
	Male	Female	Total	% Women	Male	Female	Total	% Women
Plumber (General)	46642	464	47105	1.0%	52761	593	53352	1.1%
Roof Plumber	10033	86	10113	0.9%	10442	90	10532	0.9%
Gasfitter	5859	48	5904	0.8%	7489	75	7566	1.0%
Drainer	4387	32	4422	0.7%	4779	47	4825	1.0%
AC & Mech Services Plumber	3484	23	3502	0.7%	3898	26	3922	0.7%
Plumbers (not further defined)	198	0	202	0.0%	252	3	257	1.2%
Total	70595	653	71251	0.9%	79619	835	80451	1.0%

Table 2 illustrates that it is not just the plumbing profession that has lower participation rates of women; other construction trades (including electricians) do as well. However, across most construction trades, change has started to occur, with women's representation increasing by just over 30% (from 1.3% to 1.7%) from 2016 to 2021 (refer to Table 2). Variation in women's involvement is apparent across the trades, with participation rates in 2021 ranging from 0.9% in Plumbing and Carpentry to 5.6% in Painting. The trades that have seen greater increases from 2011 to 2021 are Carpentry (up from 0.5%, with a 120% increase in the number of women), Electrical (1.1% to 1.5%, 74% increase in the number of women), and Painting (up from 3.7%, 63% increase in the number of women). Whilst women's representation in Plumbing has increased more slowly, it did rise by 0.1%, with the number of women increasing by 34% from 2011 to 2021. In reality, the increase in the number of women is more closely tied to overall growth in the Plumbing Industry.

Table 2: Male & Female Tradespeople (Construction Industry only) from 2011 to 2021 (ABS, 2025b[13])

	2011			2016			2021		
	Male	Female	% Women	Male	Female	% Women	Male	Female	% Women
Carpenters and Joiners	79800	430	0.5%	86169	512	0.6%	99152	931	0.9%
Electricians	66380	736	1.1%	69303	804	1.1%	83311	1281	1.5%
Plumbers	57447	487	0.8%	61069	506	0.8%	70595	653	0.9%
Painting Trades Workers	34447	1311	3.7%	35990	1436	3.8%	35680	2132	5.6%
Plasterers	24091	345	1.4%	24260	300	1.2%	21392	273	1.3%
Bricklayers & Stonemasons	20361	174	0.8%	19129	134	0.7%	17295	138	0.8%
Wall and Floor Tilers	13394	314	2.3%	16262	332	2.0%	16275	417	2.5%
Floor Finishers	6617	160	2.4%	6529	139	2.1%	6631	178	2.6%
Glaziers	3860	48	1.2%	5776	67	1.1%	6288	76	1.2%
Roof Tilers	5774	73	1.2%	5183	44	0.8%	5928	70	1.2%
Total*	315702	4145	1.3%	332397	4320	1.3%	365842	6225	1.7%

* Not further defined (nfd) categories are included in the total numbers

[13] Australian Bureau of Statistics. (2025b). *2011, 2016 and 2021 Census*. [TableBuilder]. Retrieved Dec 5th, 2025. https://tablebuilder.abs.gov.au/webapi/jsf/tableView/tableView.xhtml

So, do women choose different types of plumbing specialities? As illustrated in Figure 3, women's representation across the plumbing trade follows a very similar pattern to that of men. Both tend to select similar specialities, with women having a slightly greater preference for General Plumbing and slightly lower preference for Roof Plumbing than men. Patterns in Gas Fitting, Drainer, and Air Conditioning and Mechanical Services are very similar, with women represented slightly less than men in each speciality.

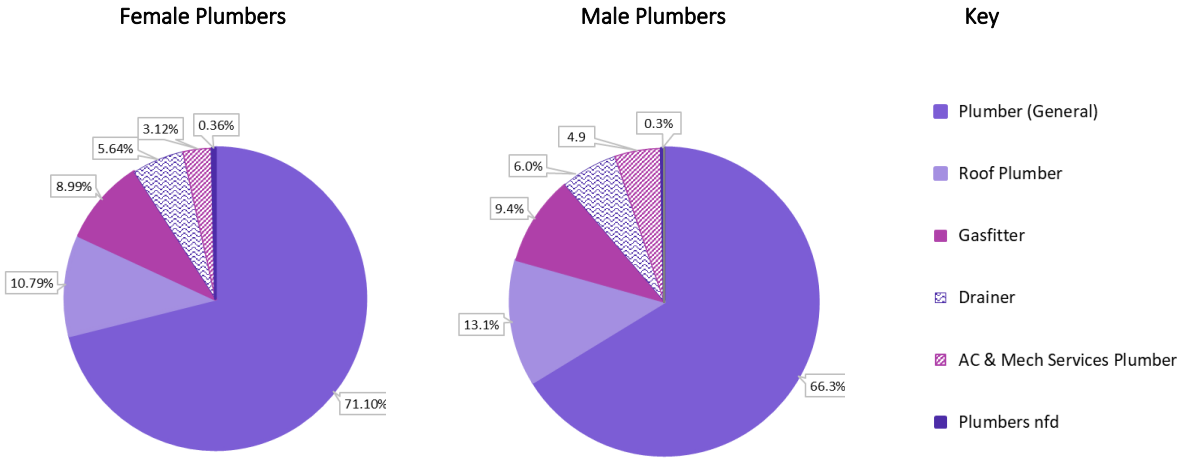


Figure 3: Female and Male Plumbers by speciality (all industry data), ABS (2025a)

There are also other roles associated with Plumbing that are not accounted for within the Plumber occupational category. These include some labouring roles specific to plumbing and the role of Plumbing Inspector. In 2021, across all industries, there were 350 Plumbing Inspectors (5% women), 1,562 plumbing assistants (6.4% women), and 3,095 Drainage, Sewerage, and Stormwater Labourers (5.3% women) in Australia. Given that fewer than 850 women work as plumbers in Australia, it is surprising that 350 women work as Plumbing Inspectors, with the majority working in industries outside the Construction Industry. It could be that qualified women are choosing these roles to advance their careers, and/or that these roles are deemed preferable due to their being outside of mainstream construction.

Table 3 presents the same occupational roles, but only for the Construction Industry. Again, women were more highly represented in Plumbing Assistant roles and as Plumbing Inspectors than in any of the plumber specialities. However, in this instance, it is important to note that the Plumbing Inspector role is a small employment category in construction. Women in the Plumber's Assistant role may be worth targeting for further training as registered plumbers.

Table 3: Roles associated with Plumbing roles (Construction Industry only), 2021 (ABS, 2025a)

Associated with plumbing CI only	Male	Female	% Women
Plumber's Assistant	1211	81	6.3%
Drainage, Sewerage and Stormwater Labourer	442	6	1.3%
Earthmoving Labourer	1296	39	2.9%
Plumbing Inspector	53	3	5.8%

Turning back now to the plumber occupational category, across the different states and territories of Australia, in 2021, participation patterns for plumbers were similar by speciality. The only exception was in Victoria, which has notably more plumbers in the Air Conditioning and Mechanical Services discipline than any other State. In smaller states and territories, women were completely absent from some plumbing subdisciplines.

Table 4 provides overall data for all Plumbers (not by speciality) and shows a slight variation in women's representation across larger states. In contrast, rates vary more in smaller jurisdictions (e.g. ACT and NT) because fewer women are involved.

Table 4: Male & Female Plumbers (All Industries data) by State or Territory in 2021 (ABS, 2025a)

STATE	Male	Female	% Women
Victoria	27410	266	1.0
New South Wales	22428	197	0.9
Queensland	13696	179	1.3
Western Australia	7404	83	1.1
South Australia	5208	61	1.2
Tasmania	1472	23	1.5
ACT	1353	11	0.8
NT	630	11	1.7
Other Territories	24	0	0.0
Total	**79619**	**835**	**1.0**

As stated earlier, nearly 90% of all plumbers work in the Construction Industry. Table 5 shows variations across the Construction Industry sub-sectors (only sub-sectors with more than 1000 Plumbers are shown). While their participation varies across many subsectors of the industry, 78.6% are perhaps unsurprisingly associated with the Plumbing Services area. The next highest rates of involvement are Roofing Services at 7.9%, with Other Heavy and Civil Engineering Construction at 2.6%, and Air Conditioning and Heating Services at 1.8%. While women's participation rates are higher in Other Heavy and Civil Engineering Construction, the majority of female plumbers are employed in the Plumbing Services subsector of the Construction Industry.

Table 5: Male & Female Plumbers (Construction Industry) by Industry subsectors in 2021 (ABS, 2025a)

Construction Industry sub-sector (4 digit)*	Male	Female	Total	% Women
Plumbing Services	55444	531	55970	0.9%
Roofing Services	5585	39	5622	0.7%
Other Heavy and Civil Engineering Construction	1838	36	1871	1.9%
Air Conditioning and Heating Services	1301	6	1306	0.5%
Fire and Security Alarm Installation Services	1172	10	1172	0.9%
Non-Residential Building Construction	1099	9	1106	0.8%
Other Residential Building Construction	1030	5	1041	0.5%
Total Construction Industry (all subsectors)	**70595**	**653**	**71251**	**0.9%**

* Only subsectors with more than 1000 plumbers are represented in the table. Total numbers include all subsectors

Looking then specifically at female participation in the Plumbing Services sector (Table 6), it is apparent that women play an essential role in the Plumbing Industry, representing 12.7% of the Plumbing Services Industry overall. Their participation in traditionally male occupational categories, such as Managers, Professionals, and Labourers, is relatively high when compared with the broader Construction Industry data. However, in plumbing, a higher percentage of women are in traditionally female clerical and administrative roles than in other industries. What is also apparent is the very low rate of women in the trades areas and the need to focus efforts in this area.

Table 6: Male & Female participation in the Plumbing Services Sector (compared with rates found for the same major occupational categories in the overall Construction Industry and generally across all Industries. 2021 (ABS, 2025a)

Major Occupational Categories	Plumbing Services Industry				All Industries	Construction Industry only
	Male	Female	Total	% Women	% Women	% Woman
Managers	2702	775	3470	22.3%	39.6%	14.7%
Professionals	367	271	640	42.3%	56.3%	31.7%
Technicians & Trades Workers	57228	631	57859	1.1%	16.7%	2.8%
Clerical and Administrative Workers	699	7225	7928	91.1%	75.2%	79.9%
Sales Workers	531	220	753	29.2%	60.8%	35.7%
Machinery Operators & Drivers	1694	66	1760	3.8%	12.5%	3.2%
Labourers	1714	196	1917	10.2%	36.3%	6.3%
Total*	**65174**	**9492**	**74662**	**12.7%**	**51.1%**	**14.7%**

* 1-digit occupational categories with fewer than 500 workers overall are not included

Figure 4 clearly demonstrates the different roles that women take on compared with men in the Plumbing Services sector. A completely different employment pattern is evident.

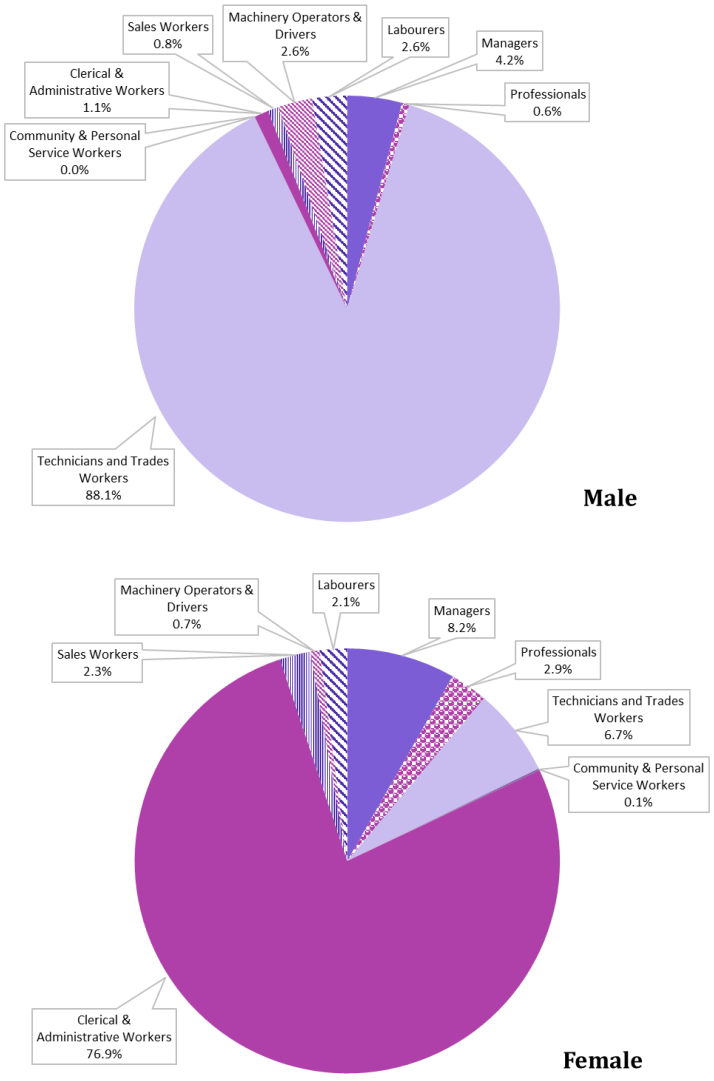


Figure 4: Female and Male by different occupational categories (plumbing sector data), ABS (2025a)

To illustrate what Figure 4 means, a room with 100 representative women in plumbing would include 77 in clerical or administrative roles and only 7 in technical or trade roles. In a room of 100 representative men, 88 would be in a technical or trade role, while only 1 would be in a clerical or administrative role.

Table 7 presents a more sobering picture of demographic change in the Plumber Services sector from 2006 to 2021. While the number of women has increased, it has just kept pace with the sector's growth. Women's participation rates in most occupational categories have not significantly changed. So yes, there are more women overall in the plumbing sector, rising from 5,946 to 9,492 over that 15-year period, but it actually reflects a slight decrease in women's overall representation in the sector.

Table 7: Male & Female participation in the Plumbing Services Sector for the same major occupational categories in 2006 and 2021 (ABS, 2025b)

Major Occupational Categories	2006		2021	
	Female	% women	Female	% women
Managers	267	23.9%	775	22.3%
Professionals	130	45.5%	271	42.3%
Technicians and Trades Workers	320	0.9%	631	1.1%
Community and Personal Service Workers	27	62.8%	13	59.1%
Clerical and Administrative Workers	4919	91.7%	7225	91.1%
Sales Workers	70	29.3%	220	29.2%
Machinery Operators and Drivers	23	2.6%	66	3.8%
Labourers	141	9.1%	196	10.2%
Inadequately described	39	35.1%	68	30.9%
Not stated	20	29.9%	22	22.9%
Total	**5946**	**12.8%**	**9492**	**12.7%**

Overall, the ABS data demonstrates that women are contributing in a vital way in the Australian Plumbing Industry[14]. The examination of historical longitudinal census data shows that, as early as 1911, women were recorded as plumbers in Australian census data. In examining the plumbing services industry data, the broader Construction Industry and all industry data, the number of women participating in plumbing has increased. While women's participation rates as plumbers, compared to men, have not grown significantly over the past 35 years, the data does demonstrate a slow but steady increase in the number of women working as Plumbers and contributing across the range of plumbing specialities. Women make up 12.7% of the Plumbing Services Industry in 2021 and participate in managerial and professional roles at a higher rate than is usually seen for women across the Construction Industry as a whole; however, when compared with 2006 Plumbing sector data, these rates have not changed significantly. The role of greatest concern is that of the female plumber.

The data tells a story of ongoing transformation: some change is happening; however, more remains to be done to create a more equitable industry. Continued commitment from industry stakeholders, policymakers, and the broader community will be essential to maintaining and increasing the momentum for positive change. Women's expertise and presence across all occupational categories will not only help address critical skills shortages but also provide meaningful long-term opportunities for women. As more women enter and establish themselves in plumbing specialities, management, as professionals, and in other roles,

[14] It should, however, be noted that the data does not capture turnover among women in the industry, which, anecdotally, is high in both training and industry engagement.

they will help shape a more diverse workforce that benefits the Plumbing Industry and society more broadly. Overall, the data strongly indicate that further work in this area, as acknowledged by PICAC and the other BFBB Project Partners, is necessary to enhance women's participation in all aspects of the Plumbing Industry, including key roles such as plumbers.

2.4 The Review

The review undertaken by McEncroe and Associates[15] examined current research, grey literature[16] and industry evidence, and included some stakeholder interviews related to breaking barriers for women in the Plumbing Industry. The review highlighted that women's participation in the Plumbing Industry remains extremely low — around 2% of the workforce — despite ongoing labour shortages and targeted national initiatives. As shown in the previous subsection, the reality is even worse, with only 1% of plumbers being women. This persistent underrepresentation is not due to a lack of capability, but rather to deeply rooted cultural and structural barriers that have proven resistant to change over many decades. These barriers are evident in both the formal systems and the everyday practices that shape the industry.

Cultural barriers were found to be particularly influential. The review describes how hypermasculine workplace norms — such as physical toughness, risk-taking, and endurance — are reinforced through exclusionary behaviours, including sexualized humour, derogatory language, and informal banter. These norms serve as gatekeeping mechanisms, often resulting in women being assigned repetitive or low-complexity tasks, which limit their opportunities for skill development and career progression. Such patterns are not unique to plumbing; they are also prevalent in other male-dominated sectors, such as mining, construction, defence, and emergency services. The cumulative effect is that women frequently encounter doubts about their competence, experience tokenism, and face heightened visibility due to their minority status, which can be isolating and discouraging.

Structural barriers further restricted women's participation and advancement. Many work sites lack suitable amenities, such as toilets, change rooms, and breastfeeding spaces, and personal protective equipment (PPE) is often not designed for women. Rosters and working hours tend to reflect assumptions of an "ideal worker" without caregiving responsibilities, disproportionately affecting women who may have family or other commitments. Recruitment pathways frequently rely on informal networks, making it difficult for those without pre-existing industry connections to access opportunities. Apprenticeship pathways are fragmented and inconsistent, with the quality of placements varying widely; positive placements can support women's development, while poor placements can expose them to unsafe cultures and limited learning opportunities. These structural factors, combined with cultural dynamics, create a cycle in which low representation reinforces prevailing conditions, making increased participation difficult.

Intersectionality was found to be a critical lens in understanding women's experiences in plumbing. Indigenous, migrant, and disabled women face compounded challenges due to overlapping forms of marginalisation. This underscores the importance of recognising that women's experiences are diverse and shaped by multiple, intersecting identities. The review also highlighted the impact of discriminatory workplace cultures on psychological safety and well-being. Harassment, exclusion, and a lack of support contribute to stress, anxiety, burnout, and physical health impacts, which in turn influence safety performance and retention. Unsafe cultures compromise not only individual well-being but also organisational effectiveness.

Interventions that could support progress include bystander intervention programs, which improve team-level accountability and reduce tolerance for inappropriate behaviour; male allyship, which helps challenge

[15] Adepoyibi, T. (2025), Literature and Contemporary Practice Review Report: Breaking Barriers for Women in the Plumbing Industry, McEncroe and Associates, Vermont, Victoria, Australia.
[16] Material that is not formally published in traditional academic or commercial channels such as journals or books e.g. reports, government documents etc.

bias and expand access to networks and learning opportunities; and redesigning amenities and work systems to improve attraction and retention. Successful initiatives typically integrate structural, behavioural, and cultural components, rather than relying on standalone training. Programs that build awareness, develop behavioural skills, improve infrastructure, and align organisational systems are effective. Leadership accountability and robust evaluation frameworks are essential, along with communication strategies that resonate with workforce values. The review also notes that technological changes, such as digitalisation and remote operation, are beginning to shift traditional notions of competence. These changes reduce the emphasis on physical strength and increase the value placed on operational, communication, and coordination skills.

Interviews with industry stakeholders, conducted by McEncroe and Associates for the report, reinforced their findings, describing entrenched masculine cultures, normalised harassment, and limited career pathways for women. Stakeholders identified the importance of clear behavioural expectations, consistent consequences for misconduct, and accessible tools for smaller enterprises lacking dedicated HR infrastructure. Training that incorporates lived experience, practical examples, male allyship, and mental health awareness was regarded as essential, as is early engagement with young people to broaden pathways into the Plumbing Industry.

The report concludes that increasing the number of women in plumbing is not enough; meaningful progress depends on long-term, systemic, and well-resourced reforms that address both workplace conditions and everyday behaviours. Intersectional approaches are necessary to reflect the diversity of women's experiences, and awareness efforts should correct misconceptions about plumbing, highlight its skilled and essential character, and present diverse workers in authentic roles. It is apparent that only through comprehensive, sustained, and inclusive strategies can the industry achieve lasting change and build a more equitable future.

2.5 Summary

PICAC and the BFBB Project Partners have acknowledged the necessity to enhance women's participation in the Plumbing Industry from both a skills shortage and a social justice perspective. This conclusion is supported by both the ABS data and the Review Report by McEncrow and Associates. The ABS data demonstrates that women are contributing in a vital way to the Australian Plumbing Industry. While the participation rate of women working as plumbers is very low and has been for a considerable amount of time, it does demonstrate that women contribute across the range of plumbing specialities and in a range of roles. Women make up 12.7% of the Plumbing Services Industry and hold managerial and professional roles at a higher rate than is typically seen across the wider Construction Industry.

The Plumbing Industry relies on a skilled workforce, and the shortage of plumbers has been foreshadowed for several years. Women could help address both the current and future skills shortages, and the Plumbing Industry could provide good long-term career opportunities for women. However, cultural and structural barriers continue to impede women's entry and retention, particularly for those working on-site. Challenges are even greater for Indigenous, migrant, and disabled women. However, through structured and inclusive strategies, the industry could build a more diverse, skilled, and equitable workforce for the future.

As the literature review revealed, focusing on increasing female participation alone will not achieve lasting change. Meaningful progress requires comprehensive, sustained, and well-resourced reforms that address workplace conditions, everyday behaviours, and misconceptions about the industry. The development of a National Framework based on the Plumbing Industry Cultural Inclusion Maturity Model (PICIMM) would support this transformation. This would be a practical tool for an industry seeking change, as it would, if adopted, guide organisations at every stage of their inclusion journey. It would enable companies to assess their current position, set goals, implement targeted improvements, and, over time, benchmark their progress.

3. STAGE A: RESEARCH DESIGN

3.1 Overview

This research was structured to examine how respect and inclusion are understood, practised, and sustained across the Plumbing Industry, from entry-level training to executive decision-making. It adopted a multi-layered qualitative design, which was deemed most appropriate for investigating the fundamentally relational nature of (Plumbing Industry) culture. Each method was selected for what it would uniquely reveal about the mechanisms through which culture operates: how it is taught, reinforced, resisted, or reinterpreted.

Rather than treating inclusion as a static attribute, the design views it as a system of interdependencies: leadership sets the tone, middle management translates it, practitioners reproduce it, and apprentices absorb it. The research will document these connections and identify where intention and lived reality diverge. Stage A has focused on collecting primary qualitative data that will be used to inform the Plumbing Industry Cultural Inclusion Maturity Model (PICIMM), which will be developed, tested, and refined (or validated) through company-based reflection and action planning. The PICIMM will provide the organising logic for Stage C, ensuring the National Framework and its associated tools and resources are not generic, but are directly shaped by the plumbing-specific evidence generated through Stages A and B.

The Research Design described is referred to as Stage A in this section's title, but due to the interrelatedness of Stage A and B, frameworks and models that will be used more dominantly in Stage B, are also covered in this section.

3.2 Methodological foundations

This research is grounded in established approaches for understanding how cultural change occurs, and why it often stalls in traditionally male-dominated industries. Rather than applying frameworks prescriptively, they are used as guiding lenses to support interpretation while keeping participants' lived experiences at the centre of the analysis.

At its core, the study adopts a qualitative approach combining thematic and discourse analysis. Thematic analysis provides a systematic way to identify recurring patterns, shared experiences, and points of divergence across the dataset. Through iterative coding and constant comparison, it enables the research to move beyond individual accounts to identify broader cultural dynamics shaping participation, belonging, and progression within the industry.

Discourse analysis complements this by focusing on how these dynamics are expressed and sustained through everyday language. In this study, particular attention is paid to how participants describe work, relationships, competence, and “fit”. This is critical in an industry where culture is not primarily transmitted through formal training or written expectations, but through interaction, storytelling, and shared norms. A discourse lens therefore allows the research to examine not only what participants experience, but how workplace realities are constructed, normalised, and reproduced over time.

Together, these approaches allow for a more complete analysis of both pattern and mechanism: thematic analysis identifies what is happening across the dataset, while discourse analysis helps explain how and why those patterns persist. This combined approach is particularly suited to examining informal cultural systems, which are central to the findings presented in later sections of the report.

The analysis is further informed by key theoretical lenses. Intersectionality theory (Crenshaw, 1989[17]) recognises that gender is not experienced in isolation; people's experiences in the workplace are shaped by an interaction of multiple identities — such as race, age, migration background, class, and caregiving responsibilities. By embedding intersectionality into the model, it is ensured that inclusion efforts don't benefit only one group of women but respond to the diversity within the female workforce.

In addition, the analysis draws on Organisational Change Theory, especially work that emphasises bottom-up cultural shifts supported by leadership (Schein, 2010[18]). Rather than seeing culture as something that can be 'fixed' with a single policy or training session, this framework highlights how beliefs, behaviours, and values are learned, reinforced, and adapted within a workplace over time.

Insights from Social Identity Theory (Tajfel & Turner, 1986[19]), which explains how people's sense of belonging is shaped by the groups they are part of, are also incorporated. In workplaces where the dominant identity is male and culturally homogenous, those who don't "fit" often withdraw, disengage, or leave. This theory helps analyse why women may feel excluded and what forms of visible and invisible support can improve their sense of belonging.

The primary structuring framework guiding interpretation is the Constructing Equity "Maturity Model for Cultural Inclusion". This model provides a way to organise insights into stages of cultural development, allowing the research to move beyond isolated observations to identify patterns of progression, resistance, and uneven change across the industry. Rather than imposing predefined categories, the model is iteratively refined using empirical insights from the data. As part of this project, these insights will inform the development of a PICIMM, tailored to the specific conditions and complexities of the sector.

Finally, the project's qualitative components are informed by feminist qualitative research traditions, particularly those that value lived experience, reflexivity, and co-construction of knowledge (Moser, 2012[20]; Longwe, 1995[21]). This framework ensures that the methods in this research are grounded in respect, relationality, and a commitment to change based on what participants actually say. Together, these frameworks allow the research process to move beyond surface-level statistics to ask deeper questions about voice, power, and everyday experience, while offering a structured path forward. Reflexivity is embedded throughout the research process, with ongoing engagement within the research team to test interpretations, challenge assumptions, and ensure that findings remain grounded in the data.

Overall, this methodological approach enables the study to capture the complexity of workplace culture and provides a robust foundation for generating contextually grounded insights that can inform both understanding and action within the industry.

3.3 Sampling strategy and participant logic

Rationale for a multi-layered sample

Workplace culture in the Plumbing Industry is not shaped by one group alone. It is produced through the combined actions, expectations, and norms of many different people, from apprentices taking their first steps into the trade, to plumbers who define daily behaviour on worksites, to trainers and HR teams who

[17] Crenshaw, K. (1989). Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics, *University of Chicago Legal Forum*, 138–67.
[18] Schein, E. H. (2010). *Organizational Culture and Leadership*, Vol. 2. John Wiley & Sons.
[19] Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behaviour. *Psychology of intergroup relations*, 2, 7-24.
[20] Moser, C.O. (2012). *Gender Planning and Development: Theory, Practice, and Training*. London: Routledge.
[21] Longwe, S. H. (1995). Gender awareness: the missing element in the Third World development project. In: Wallace T, March C, editors. *Changing perceptions: writings on gender and development*. Oxfam. p. 149–57.

influence systems and processes, to leaders who set the strategic tone. Cultural inclusion is reinforced and challenged in each of these spaces, often in subtle ways.

For this reason, the sampling strategy adopted a multi-layered, ecosystem-based approach rather than relying on a single perspective. The aim was to understand how inclusion is experienced across the full life cycle of a plumbing career: at entry, in training, during day-to-day work, at leadership and organisational levels, and even among those who have exited the industry. This approach captures not only the visible behaviours that shape culture but also the underlying systems, pressures, and interpersonal dynamics that influence why people feel respected, excluded, supported, or pushed out.

By engaging participants across industry layers (strategic, organisational, cultural, developmental, and social), the study builds a detailed and interconnected picture of how culture operates in practice. This ensures that the resulting PICIMM is credible, evidence-based, and practical for the diverse range of plumbing businesses and training environments across Australia.

Participant groups and why their voices matter

1. Apprentices

Apprentices offer insight into how culture is absorbed at its earliest stage. They enter the industry with limited exposure to its informal norms, which makes their observations especially valuable. Their experiences highlight the cues they receive about who belongs, what behaviour is expected, and where boundaries are drawn, long before habits and attitudes become entrenched. For many apprentices, early interactions with trainers, supervisors, and peers shape their confidence, sense of safety, and long-term willingness to stay in the trade.

Understanding their perspectives is essential for identifying subtle forms of exclusion that may appear "normal" to long-term workers but are immediately visible to newcomers. Their voices help define the entry-level expectations and pressures that the maturity model must address to support a sustainable pipeline of diverse talent.

2. Practising Plumbers

Plumbers sit at the heart of the industry's culture. They shape the tone of daily interactions on worksites — through humour, language, feedback, mentoring, and the way work is organised. Because culture is lived, not written, plumbers provide crucial insight into the difference between formal policy and actual practice.

Female plumbers offer additional depth, sharing their experiences as one of the very few women on predominantly male teams. Their perspectives reveal how inclusion is negotiated moment to moment: from gaining trust and respect to managing microaggressions, to navigating informal hierarchies. Some groups may also help identify examples of positive culture; what supportive work environments look and feel like, and which behaviours actually make a difference.

Together, these voices illuminate the everyday cultural norms that either reinforce or disrupt inclusion on the ground.

3. Small Business Owners (including women-led plumbing companies)

Small businesses form the backbone of the plumbing sector. Their cultural environments differ from those of large companies because they often lack formal HR structures, operate with lean teams, and rely heavily on interpersonal relationships. Owners, especially those who work alongside their staff, have a direct influence on team dynamics, conflict management, and expectations around behaviour.

Women who run plumbing businesses add a vital counterpoint, perhaps offering leadership models and cultural practices that differ from the industry's traditional norms. Hearing from these owners helps identify

the challenges small operators face when trying to implement inclusive practices, as well as the opportunities that exist in more responsive environments.

Their voices ensure that the maturity model is realistic and usable for many small companies that lack formal policies yet aim to foster respectful workplaces.

4. Organisational and Administrative Staff (HR, admin, customer service)

These staff sit at the operational centre of many companies. They handle customers, recruitment, rostering, complaints, leave, and performance documentation; all areas where inclusion can be quietly strengthened or undermined. Because they are often involved when issues arise, they may see patterns that others do not recognise. These may include recurring sources of conflict, inconsistencies in how supervisors treat staff, or moments where informal decisions disadvantage certain groups. They routinely observe gaps between organisational intentions and everyday practice.

Their insights shed light on the system-level factors that influence culture, helping clarify which organisational structures support inclusion and which inadvertently create barriers.

5. Trainers and TAFE Educators

Training environments play a major role in shaping early professional identity. Trainers influence how apprentices understand topics like respect, safety, teamwork, and communication and often more powerfully than formal curriculum materials.

These educators also witness how apprentices of different genders and backgrounds interact, which provides early signals about bias, confidence gaps, or peer dynamics that may carry over into the workplace. They can identify points where culture is either reinforced or challenged, and were outdated assumptions still show up.

Their contributions help define the developmental layer of the maturity model – how inclusion is formed before apprentices ever set foot on a worksite.

6. CEOs, Directors, and Senior Managers

Leadership determines the strategic direction of an organisation and strongly influences whether cultural change is prioritised, resourced, or sustained. Senior leaders provide insight into how inclusion is framed: as a business priority, a compliance requirement, a workforce strategy, or something else entirely.

Their perspectives show how companies interpret risk, manage reputation, communicate expectations, and establish accountability. Leaders often have a high-level view of the challenges facing the sector, as well as a strong influence on whether diversity and inclusion efforts gain traction.

These voices shape the upper tiers of the maturity model, where inclusion becomes embedded in governance, metrics, and long-term planning.

7. Industry-wide Leadership – Industry Associations and Unions

These organisations represent members and the industry more widely. They are a crucial part of the industry, leading, guiding, and representing it, with a broader understanding of its role within the industrial landscape. They engage with multiple companies and work sites, giving them a broad view of the issues facing the plumbing workforce. They are often the first to be approached when disputes arise or when workers feel unsafe, marginalised, or unsupported.

Because of this sector-wide vantage point, they can identify systemic patterns, whether certain behaviours are widespread, whether problems cluster in particular environments, or whether new forms of support are emerging. Their insights help distinguish between isolated incidents and broader cultural trends. This group strengthens the sector-wide relevance of the maturity model and helps ensure the framework reflects real industry conditions.

8. Support and Advocacy Roles (mentoring programs, women's networks, industry initiatives)

People working in support and advocacy roles often hear concerns that remain invisible within workplaces. They provide confidential guidance, mentoring, and resources to women and minority workers who may not feel safe raising issues internally.

These conversations reveal the hidden experiences of exclusion, the practical barriers women face, and the kinds of support that actually make a difference in retaining diverse talent. They also observe which interventions are effective and which ones fail to gain traction.

Their insights contribute to the enabling conditions and support pathways needed for cultural change.

9. Individuals who have left the industry

Those who exit the industry provide some of the clearest insights into where culture breaks down. However, these are the most difficult participants to gain access to, and we are reliant on others for their recruitment. Their stories reveal not only what drove them away but also what might have encouraged them to stay. Unlike current workers, they can speak openly about experiences that may have been difficult or unsafe to raise at the time. Their perspectives highlight the cumulative impact of exclusion, disrespect, unsafe dynamics, or a lack of opportunity. They also shed light on structural issues that limit retention, such as inflexible work arrangements or a lack of pathways.

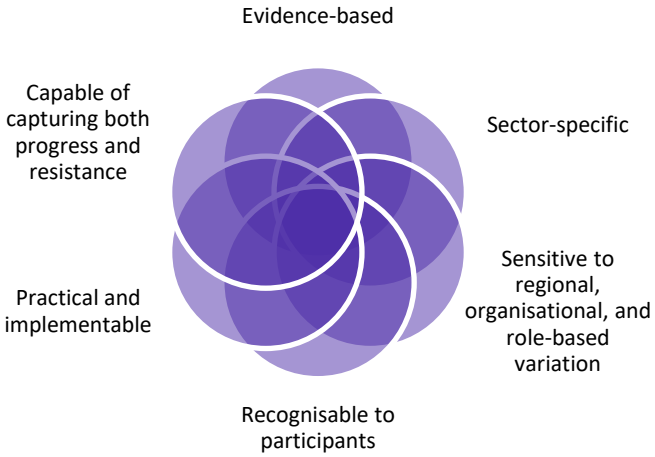
Understanding these experiences allows the maturity model to address retention risk, rather than focusing solely on recruitment or training.

This multi-layered sampling approach creates the scaffolding for the entire project. Each group contributes a distinct perspective that illuminates how culture functions as an ecosystem rather than a series of isolated experiences. Together, they allow us to map how attitudes flow from policy boards to classrooms to job sites and even into family life. Taken together, these groups constitute a multi-layered cultural sample designed to mirror the plumbing sector's structure.

By engaging with this diverse range of stakeholders who have direct experience of the sector, the research will map the Plumbing Industry across five distinct yet interconnected levels. These levels encompass strategic leadership and accountability; systemic policies and HR practices; cultural norms and peer behaviours; developmental pathways through training and entry-level experiences; and the broader social ecosystem shaped by family roles, community perceptions, and factors influencing career exits. This multi-layered approach ensures that the research framework captures the full complexity of the industry, providing a nuanced understanding of how these elements interact to influence workers' experiences, retention, and progression within the sector.

Strategic	Systemic	Cultural	Developmental	Social/Ecosystem
Leadership vision and accountability	Policies, procedures, HR practices	Peer norms, behaviour, belonging	Training and entry-point experiences	Family roles, community perception, career exit

This layered approach ensures that PICIMM is firmly grounded in real-world evidence and tailored to the industry's unique context. It is designed to be recognisable and relevant to those working within the industry, while remaining practical and feasible for implementation. By accounting for regional, organisational, and role-based differences, the model is sensitive to the diverse realities present across the sector. Furthermore, it is structured to track not only areas of progress but also instances of resistance, providing a comprehensive tool for assessment and change.



The following table identifies the participant groups selected for data collection at each of the five levels of analysis. It specifies the purpose for including each group, thereby ensuring a comprehensive and targeted exploration of the sector's cultural, organisational, and strategic dynamics.

Level of Analysis	Participant Groups	Purpose of Inclusion
Strategic (System)	CEOs, Association & Union leaders	Capture policy intent, leadership accountability, and sector-wide direction
Institutional (Organisational/Training)	HR staff, trainers, site managers	Understand system translation and procedural application
Cultural (Workforce)	Plumbers & staff (mixed and women-only)	Access lived experiences and workplace norms
Developmental (Entry-Level)	Apprentices	Examine early cultural formation and belonging
Social (Peripheral)	Families & associated women	Explore external reinforcement and intergenerational transmission of culture

This integrated sampling approach ensures the research captures various aspects of culture from what they learn in training onwards.

3.4 Data collection: methods and instruments

Data collection was designed as a layered and iterative process, allowing insights from early sessions to inform later stages. This was done to strengthen the credibility of the process through triangulation and responsiveness to emerging patterns. The approach primarily employed two qualitative methods – focus groups and semi-structured interviews, supported by observations, reflective and analytical memos and some secondary data (to contextualise the qualitative findings). These methods were carefully selected for

what they could uniquely surface about how culture is experienced, enacted and interpreted across the industry. Focus groups and semi-structured interviews were preceded by extensive protocol development; all protocols were purpose-built for this project, informed by existing literature on organisational culture and inclusion, and tailored to the unique dynamics of the Plumbing Industry.

Focus groups

Focus groups allow participants to build on one another's experiences, surface group norms, and reveal the social dynamics that shape workplace culture (Morgan 1997[22]; Wilkinson, 2004[23]). Focus groups were, therefore, considered well-suited for identifying what gets normalised, what gets minimised, and whose experiences shape dominant culture – themes central to the Plumbing Industry Cultural Inclusion Maturity Model.

This method was used for apprentices and plumbers, as these groups share deeply interconnected experiences related to site culture, safety, belonging, and career progression.

Protocols are structured guides that set out how data will be collected, including who is involved, what questions are asked, and how interactions are conducted. The focus group protocols were designed to help people talk about what actually happens on sites, how they learn their trade, how teams function, and what makes workplaces feel safe or unsafe.

Across all versions, the protocols followed a broadly similar structure:

However, the follow-up probes[24] were different depending on whether it was an apprentice or plumber focus group, the gender make-up of the group, and the ongoing discussion in the group. For instance, apprentice focus groups explored how people first encounter the norms of the plumbing trade and how expectations around respect, learning and belonging are communicated early. Plumber focus groups explored daily routines, team culture, supervision, learning opportunities, experiences of inclusion or exclusion and so on.

Peep into the Process: <u>WHY</u> the 3 different types of groupings?

The groups were structured as women-only, men-only and mixed groups

- Women's plumber groups were used to create a space to discuss gendered experiences, safety concerns, credibility challenges, and strategies for navigating male-dominated work sites.
- Male plumber groups helped surface prevailing norms, informal rules, and perceptions of women in the trade.
- Mixed groups helped us observe how participants talk across gender and what becomes normalised or minimised in group settings.

[22] Morgan, D. L. (1997). *Focus groups as qualitative research* (Vol. 16). Sage.
[23] Wilkinson, S. (2004). Focus groups. Doing social psychology research, 23(1), 344-376.
[24] Probes in qualitative research are neutral, open-ended questions or prompts that elicit more detailed responses, clarifying or elaborating on participant insights to gather richer data.

Semi-structured interviews

Semi-structured interviews were used for all other participant groups, including people who left the industry and people working in plumbing-related but non-trade roles. These interviews involved a one-on-one conversation, guided by a flexible protocol that allowed the interviewer to probe, clarify, and follow participants' experiences in depth while still keeping the discussion focused on key topics linked to culture, safety, learning, and organisational systems (Guest et al., 2012[25]). Each group required its own protocol, depending on their role, experience, and level of influence, and therefore separate semi-structured interview protocols were developed.

Peep into the Process: <u>WHAT</u> ideas are being captured?

- Leadership and organisational perspectives (from CEOs and association heads)
- Hiring pathways, complaints processes, and documentation practices (from HR and admin roles)
- Training culture and apprentice readiness (from trainers, PICAC staff, and support workers)
- Gendered experiences outside fieldwork (from women in office-based or coordinating roles)
- Push-and-pull factors behind why people leave the trade (from former plumbers)
- Insights from small women-owned businesses who understand both technical work and organisational challenges

Peep into the Process: <u>HOW</u> are the protocols designed?

- Multiple instrument iterations (4–6 rounds) were completed for each protocol.
- Two researchers independently drafted questions, exchanged notes, and integrated feedback.
- Mock interviews and simulated focus groups were conducted to refine sequencing, clarity, and depth.
- Early pilot interviews and the first two focus groups were deliberately used to test and refine the instruments.
- Protocols were systematically adjusted to:
  - Remove leading questions
  - Avoid priming participants
  - Increase specificity in daily practice
  - Ensure safety for women-only groups
  - Align with the Cultural Inclusion Maturity Model domains
- Instruments were also updated to incorporate emerging concepts such as:
  - "What gets fixed vs what gets ignored"
  - Informal hiring networks
  - Organisational silence
  - Safety-belonging-retention pathways
  - Psychological vs physical safety distinctions

Researcher observations & analytical memos

Researcher observations involve systematically noting behaviours, interactions, body language, inter-personal dynamics, etc., in real or realistic settings (Angrosino, 2007[26]). For instance, observations recorded at focus groups held at the training sites allowed for noting cultural dynamics - like hierarchy, banter,

[25] Guest, G., et al. (2012). Collecting qualitative data: A field manual for applied research. Sage.
[26] Angrosino, M. (2007). *Doing ethnographic and observational research*. Sage.

learning practices, inclusion and so on, being enacted in practice – that were not explicitly articulated in the focus group transcripts.

To support these observations and to maintain methodological quality, the researchers also maintained analytical memos to record emerging patterns, interpretations, decisions and questions at each step of data collection (and analysis) (Angrosino, 2007). After each data-collection round, the research team held debrief sessions to review patterns, participant dynamics, and language use. These discussions directly influence subsequent protocols.

Peep into the Process: HOW are analytical memos used?

- Real-time reflections from early interviews/focus groups guide instrument revisions.
- Overlapping data collection and analysis ensure emerging insights shape later protocols.
- Regular debriefs identify contradictions, gaps, and unexpected themes that require deeper probing.

Secondary data

Secondary data, like company policies, training materials, codes of conduct, and WGEA reports, will be used to contextualise the findings. This will be primarily used in Stage B. This data:

- Shows what companies intend to create.
- Reveals gaps between policy and lived experience.
- Helps test whether cultural patterns are systemic.
- Informs model language and sector benchmarks.

3.5 Data analysis and interpretation

All interviews and focus groups were transcribed verbatim. In keeping with the inductive and emergent design of the study, analysis was primarily guided by thematic analysis principles (Charmaz, 2006[27]). This allowed the researchers to identify recurring patterns across interviews, focus groups, observations, and field notes, while staying close to participants' own words and meanings. Researcher notes on tone, body language, pauses, emphasis, group dynamics, and interactional patterns were also used where relevant to support interpretation.

Analysis followed an iterative process, with ongoing movement between data, codes, and emerging patterns. A constant comparison approach was used, in which new data were continually checked against existing codes and interpretations, allowing patterns to be refined, expanded, or challenged over time. This ensured that findings were not based on isolated accounts but reflected consistent dynamics across the dataset.

At the same time, the analysis was not limited to what participants said. It also paid attention to how people spoke about work, respect, learning, safety, gender, belonging, and authority. For this reason, discourse analysis was used as a complementary lens within the broader thematic process. This was added because workplace culture is carried through language as much as through policy or behaviour. The words people choose, the jokes they normalise, the labels they use, the contrasts they draw, and the things they treat as obvious or unremarkable can reveal deeper assumptions about who belongs, what counts as competence, and how exclusion is reproduced in everyday practice.

Discourse analysis, therefore, focused not only on the topics being discussed, but on how meaning was constructed — including the terms used, the contrasts drawn, and the assumptions embedded in everyday expressions. For example, repeated phrases, shared descriptions, normalising humour, and taken-for-

[27] Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Sage.

granted expressions were treated as analytically important because they showed how workplace norms were being reinforced, justified, softened, or challenged. This was particularly important given the informal nature of the industry, where many of the rules shaping participation are not formally stated but are instead communicated through interaction. As a result, analysing language was critical to understanding how expectations around "fit", behaviour, and belonging were produced and maintained in practice.

To ensure the credibility and robustness of interpretations, findings were systematically tested across participants, roles, and organisational contexts.

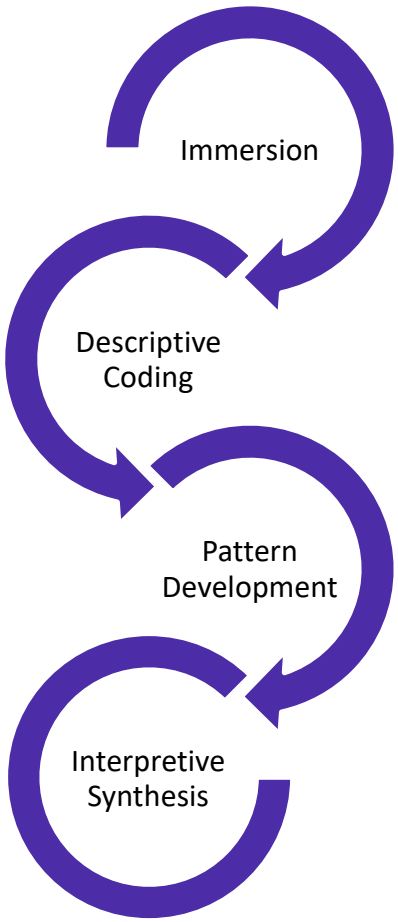
Peep into the Process: HOW is the credibility of findings ensured?

Credibility is built through triangulation — comparing evidence across roles (horizontal) and across organisations (vertical)

- Horizontal triangulation checks whether apprentices, plumbers, and leaders describe similar dynamics in a different language.
- Vertical triangulation tests whether company narratives align with worker realities.
- Where perspectives diverge, those differences are analysed directly; any contradiction is treated as data and not as an anomaly.

Differences in interpretation within the research team were actively discussed and resolved through reference back to the data. Where multiple readings were possible, the interpretation that was most consistently supported across participants and contexts was retained, and alternative explanations were documented and considered as part of the analysis.

Each dataset (focus group, interview, observation, or memo) was treated as part of a larger cultural system. Analysis across Stage A proceeded through four connected steps:



Each transcript was read in full by at least two team members to capture tone, emotion, and context before any coding began. The goal at this stage was to understand the conversation as the participant experienced it.

Key ideas and phrases were coded line-by-line, using both participant language and preliminary analytic categories derived from project frameworks (e.g. voice, agency, respect, inclusion, power dynamics). The intent was to keep the codes as close to lived reality as possible.

Codes were clustered into broader patterns that describe how culture operates. At this stage inductive reasoning was the strongest: letting the data tell us what matters, not the other way around.

The emerging patterns were then interpreted through the project's theoretical and methodological lenses, including the maturity model, intersectionality, social identity theory, and discourse analysis. This helped explain not only what was happening, but why particular patterns of inclusion, exclusion, trust, or silence appeared to persist. .

This layered approach ensured that the analysis remained grounded in participant accounts while also building a deeper understanding of the meanings, assumptions, and social norms embedded in the data. It enabled the research to move from description to explanation, identifying not only what participants experienced, but the underlying cultural mechanisms that shaped those experiences, and how they were sustained across different contexts within the Plumbing Industry.

Peep into the Process: WHAT is Real-Time Iteration?

- Early themes refine later questions.
- Contradictions across groups are deliberately explored.
- Language is adjusted for clarity and accessibility.
- Builds a richer dataset, not just a larger one.

3.6 Data integrity and quality assurance

Ethical framework and confidentiality

Maintaining integrity in this project meant ensuring that the findings genuinely reflect what participants intended to convey. Every stage of data handling, from recording to reporting, has been designed to protect that principle. All reasonable steps have been taken to protect confidentiality, support voluntary participation, and encourage honest engagement.

Voluntary participation, Transparency, Confidentiality

Before primary data collection, all participants receive a plain-language statement outlining the project purpose, data use, and limits of confidentiality.

Their informed consent is sought before proceeding with the research.

Participants are informed that their identities will be protected through pseudonyms and the removal of identifying details in any outputs from the research.

Care is taken to avoid reporting configurations that could lead to deductive disclosure, particularly in small groups.

The limits to confidentiality arising from small groups are also clearly communicated prior to participation.

People share more honestly when they trust the process, and that honesty strengthens the quality of research findings. Therefore, this process is deemed necessary for both ethics compliance and data reliability.

In a small number of instances, specific insights have not been reported directly in this document due to confidentiality considerations. Given the size of some participant groups and the identifiable nature of certain experiences, including these accounts in detail could risk deductive disclosure, even where names and explicit identifiers are removed.

Where this is the case, decisions to exclude or generalise specific examples have been made conservatively to prioritise participant safety and trust. Importantly, these insights have not been disregarded. They have been incorporated into the overall analysis and have informed the interpretation of findings, as well as the ongoing development of the PICIMM. This ensures that the analysis remains comprehensive while maintaining the ethical commitments of the research.

Data security

All audio recordings were transcribed verbatim, and each transcript was checked by a researcher against the audio for accuracy and tone, ensuring that pauses, emphasis, and emotional nuances were retained where relevant. Transcripts are stored in a secure, encrypted cloud workspace accessible only to the research team. Hard copies, where unavoidable, are kept in locked storage with only the research team having access to the keys.

Researcher reflexivity

Researchers maintain reflexive logs documenting assumptions, reactions, and perceived influence on data collection. These reflections are reviewed during team debriefs and analysis to guard against interpretive bias. A central project log is maintained that documents every methodological decision, from protocol changes to coding revisions. This audit trail ensures that any external reviewer could trace how an interpretation was reached.

For data analysis, regular calibration meetings were held to review discrepancies and refine definitions. Disagreements were resolved through evidence; whichever interpretation best fits the data was retained, and the rationale documented.

Researcher reflexivity is, therefore, embedded at every stage of the study and is treated as an ongoing quality assurance mechanism rather than a one-off exercise.

3.7 Addressing the limitations of the qualitative approach

This study draws on eight focus groups and 48 interviews, enabling a robust and in-depth exploration of participants' experiences across different roles within the industry. The combination of data sources, alongside iterative data collection and analysis, allowed for the triangulation of insights and strengthened the consistency of emerging patterns.

As with all qualitative research, the purposive sampling approach means findings are context-specific and not intended to be statistically generalisable. However, the aim of this study is depth of understanding rather than prevalence, and the design is well suited to identifying underlying cultural patterns, mechanisms, and shared experiences across the dataset.

To ensure credibility and rigour, multiple safeguards were built into the research process. These included double-coding, regular calibration discussions within the research team, and ongoing reflexive engagement with the data. Interpretations were continuously tested against multiple data sources and perspectives, reducing the likelihood of individual bias and supporting well-founded conclusions.

While thematic and discourse analysis are inherently interpretive, this was actively managed through collaborative analysis and systematic cross-checking of interpretations. Rather than a limitation, this approach enabled a more nuanced understanding of how meanings are constructed and reinforced within the industry context.

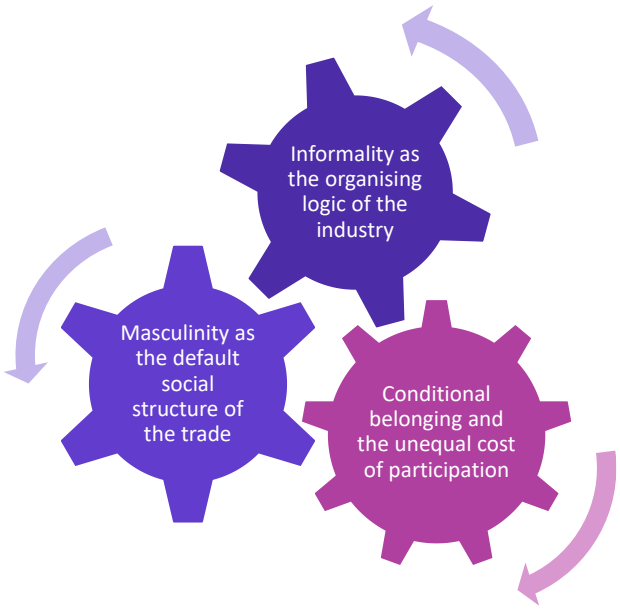
Finally, while the study does not produce statistical estimates or claims of prevalence, it provides rich, evidence-based insights into the cultural dynamics shaping participation and experience. These insights are critical for informing targeted, contextually grounded interventions and industry responses. This research would not have been possible if a quantitative approach had been adopted.

4. RESEARCH FINDINGS

This section presents the findings from the qualitative data collected using eight focus groups with apprentices and experienced plumbers, as well as forty-eight in-depth interviews with plumbers, supervisors, employers, industry representatives, and training stakeholders. The findings capture and synthesise perspectives from individuals occupying diverse roles, spanning a range of experience levels and organisational contexts. By incorporating perspectives from participants of different backgrounds and responsibilities, the findings offer a detailed, nuanced understanding of the challenges, opportunities, and complexities shaping the Plumbing Industry, and how diversity and inclusion should be addressed within it.

The data analysis identifies a set of recurring and interrelated themes that offer a deep understanding of the ways in which work is organised, how workplace culture operates in practice, and how participation is experienced within the Plumbing Industry. These themes are firmly grounded in participant accounts and illustrated throughout with representative quotes. While presented thematically, they do not operate in isolation. Taken together, they point to an interconnected system shaping day-to-day work, learning, behaviour, and progression in the industry.

This section begins by outlining the structural conditions shaping the context in which plumbing work is performed. It then explores three interrelated themes that have emerged from the research data. The first theme, informality as the organising logic of the industry, considers how unwritten rules and informal networks structure workplace practices and relationships. The second theme, masculinity as the default social infrastructure of the plumbing trade, examines how gendered norms and expectations shape daily interactions and professional identities. The third theme, conditional belonging and the unequal cost of participation, addresses the complexities of inclusion, exclusion, and the varying burdens placed on women and those who do not conform to dominant norms.



Each of these themes comprises several interconnected dimensions, and the analysis highlights how they intersect and influence one another across the industry.

4.1 Context

This subsection outlines the structural conditions within which the research findings should be understood. This context does not examine individual behaviours or cultural dynamics in detail. Instead, it describes the organisational and operational context that shapes how work is performed, how decisions are made, and how workplace experiences vary across the Plumbing Industry. While this may not be true for every plumbing work environment, it reflects what we heard from most participants.

A fragmented and decentralised industry

The Plumbing Industry operates through a highly fragmented and decentralised structure. Work is organised across a mix of mostly small and medium-sized enterprises, and subcontracting arrangements are standard practice. Plumbers can work alone, with an apprentice or within a larger team. Site-based teams often form and dissolve according to project requirements. Individuals and companies work with multiple clients who can also change over time. As a result, there is typically no single, stable workplace environment that defines the experience of work in the plumbing sector.

Participants consistently described moving between sites, teams, and supervisors, with each location often operating according to its own local norms, expectations, and pressures. Supervision is often immediate and site-specific, with limited standardisation across organisations or projects. This creates a system in which authority is distributed rather than centralised, and where day-to-day decisions are typically made locally rather than through consistently applied organisational processes.

In this context, the "workplace" is not a fixed organisational entity, as is the case in many industries, but a shifting set of relationships, practices, and expectations that can vary across sites and over time.

Variability as a normal condition of work

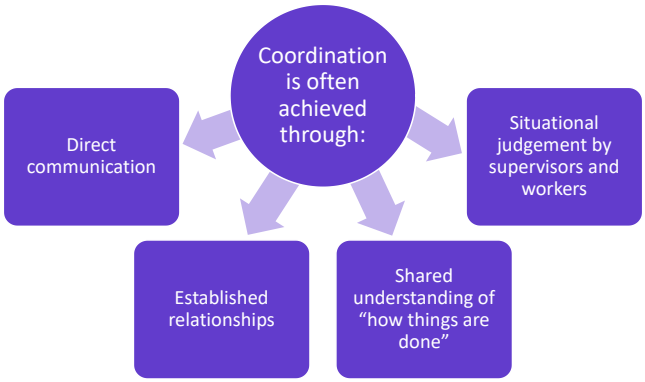
Within this decentralised structure, variability is a defining feature of the industry. Participants frequently described their experiences in terms of differences across sites, work teams, and supervisors, often summarised through phrases such as "it depends on the boss" or "it depends on the crew."

This variability extends to expectations of behaviour, access to learning opportunities, tolerance of inappropriate conduct, willingness to intervene or provide support, and the interpretation of organisational policies and practices.

As a result, workers' experiences are often uneven not only across the industry, but also within the same organisation across different sites. What is acceptable, supported, or addressed in one context may not be in another. This variation is not simply a matter of inconsistent practice. It reflects the underlying structure of the industry, where local discretion and site-level autonomy shape how work is organised and governed.

Decentralised and adaptive coordination

Given the decentralised and variable nature of work, coordination is largely managed at the site level rather than through centralised systems. Work on site requires speed, practical judgement, and ongoing adjustment to changing conditions. In this environment, various factors come into play when coordinating work.



Participants across roles, including plumbers, apprentices, supervisors, and managers, described relying on experience, familiarity, and interpersonal trust to navigate work. Employers similarly confirmed that decisions about task allocation, learning opportunities, and problem resolution are often made in real time and adapted to local conditions. While these coordination patterns reflect how work is practically organised in a fragmented system, their broader implications for workplace culture and behaviour are further explored in later sections.

Representation and the "pipeline" positioning

As demonstrated in subsection 2.3, the Plumbing Industry has historically been male-dominated, and this continues to shape patterns of participation today. In particular, women remain significantly underrepresented in the plumbing trade, across both training pathways and the workforce.

Across different stakeholder groups, participants frequently referred to this imbalance as a "pipeline" issue. The limited number of women entering the trade was often attributed to broader societal factors, including awareness, perception, and career preference. Several participants noted that plumbing is not widely considered a viable or attractive option for women, particularly for those without prior exposure to the industry.

> *"Most people don't even think of plumbing as an option… especially girls coming out of school."*

Perceptions of the plumbing trade were often described by those on the ground in narrower, often outdated terms, associating the scarcity of female plumbers with the physically demanding, male-oriented nature of the work. In contrast, industry-wide leaders, CEOs, and managers more often acknowledged plumbing as a skilled, diverse profession, but noted community perceptions tended to be narrow and dated. In this context, entry into the industry is shaped not only by access, but also by whether plumbing is seen as a possible or desirable pathway in the first place. As a result, the number of women entering the industry remains low, reinforcing existing patterns of representation. This has contributed to a widely held view that improving gender diversity is primarily a matter of increasing supply; that is, attracting more women into training and apprenticeship pathways.

At the same time, participant accounts suggest that entry alone does not explain ongoing patterns of participation. This indicates that the "pipeline" explanation captures part of the story, but not the full set of conditions shaping experience once people enter the plumbing trade.

Synthesis

Taken together, these structural features help explain why workplace experience in plumbing is so variable and why formal policy alone does not fully determine how work is performed or how people experience the industry. In a fragmented, site-based environment, many aspects of work are coordinated through local judgement, relationships, and practical adaptation.

The next three subsections look specifically at each of the themes identified. The first examines informality more closely, showing that it is not peripheral to the industry, but one of its central organising logics.

4.2 Informality as the organising logic of the industry

Data analysis indicates that day-to-day culture in plumbing is shaped less by formal systems than by informal norms, hierarchy, and interpersonal dynamics. In this context, informality is not simply the absence of formal rules. It is a patterned system through which work is organised, decisions are made locally, expectations are communicated implicitly, and outcomes are shaped through relationships, judgement, and experience.

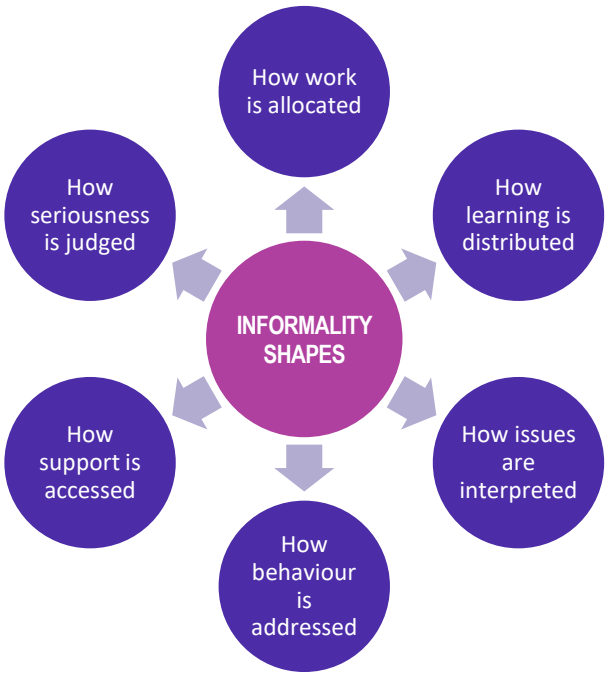
Across apprentice groups, plumber discussions, supervisor interviews, and leadership accounts, informality emerged as a primary operating logic of the Plumbing Industry. Participants did not describe this informality as unusual or inherently problematic; rather, it was largely taken for granted as part of how the industry works.

Participants consistently described work as organised through tacit understandings, local judgement, direct relationships, and context-specific decision-making, rather than through fully standardised or consistently applied formal systems.

Apprentices and plumbers described learning "how things work" through observation, relationships, and gradual exposure. Supervisors described making decisions in real time, based on the immediate demands of work, the composition of the crew, and their assessment of what was practical or manageable. Leaders,

while often using more formal organisational language, also acknowledged the variability of worksites and the difficulty of translating policy into a fragmented, site-based industry.

Taken together, these accounts show that informality is not simply a gap left by inadequate management. It is a routine mode of how the industry functions.



How informality is embedded in practice: Informal allocation of learning

Apprentices are exposed to this informality from day one. Their learning was described as predominantly on-the-job, informal, and dependent on who the apprentice was paired with and the tasks they were exposed to. While this model was often framed as practical and realistic, apprentices also highlighted substantial variation in learning experiences across teams and supervisors.

> *"It really depends who you're working with. Some guys teach you heaps, others just want you doing the same thing over and over."*

In practice, this places considerable discretion in the hands of leading tradespeople and supervisors.

> *"When you get a boss who actually teaches you, it changes everything — otherwise you're just cheap labour."*

Across participant accounts, formal procedures were rarely described as the main mechanism guiding day-to-day learning. Instead, workers described learning "how things work" through observation, experience, and interaction with others on site. Expectations regarding behaviour, communication, and performance were not always explicitly stated. Workers are required to interpret what is acceptable, what is expected, and what will be overlooked.

This interpretation happens continuously and is shaped by prior experience, feedback from supervisors and peers, and reactions to others' behaviour.

> *"The law says that apprentices have to be supervised, but that doesn't mean working with a plumber one-on-one. That just means that there's a plumber on site, and a lot of apprentices will be working on their own."*

As a result, the system operates through tacit alignment rather than formal instruction. Workers who can accurately read these expectations may integrate more easily, while those less familiar with the environment may struggle to understand what is required of them.

Importantly, this does not mean that formal systems are absent. Rather, formal systems coexist with a parallel informal system that often takes precedence in shaping everyday learning and behaviour.

> *"No one really tells you, you got to do this or that… you sort of pick it up automatically"*

Spotlight: Early apprenticeship exposure to informal authority

These dynamics become especially visible in the first year of apprenticeship, when status is lowest, expectations are least explicit, and apprentices have the least power to interpret or challenge what is happening. First-year apprentices, particularly male apprentices, described frequent yelling and belittling from bosses, with some characterising this behaviour as "borderline bullying."

> *"My son's first 6 months of his apprenticeship were quite harsh … there was a bit of hazing going on … but that was just part of it, you know? He had to get through that to be accepted."*

Although often normalised as part of an apprenticeship, apprentices felt that clear instruction rather than aggression would improve learning and reduce early dropout.

Because the baseline is already harsh, first-year apprentices—particularly younger or less confident ones—may find it difficult to distinguish between a normal apprenticeship experience and inappropriate behaviour. Many described staying quiet to avoid being labelled weak, sensitive, or unfit for the trade.

This dynamic allows inappropriate behaviour to recede into the background of "how things are done," reducing the likelihood of early reporting or intervention.

> *"Not everybody has a voice to say what they want… apprentices get taken advantage of because they don't know their rights."*

When learning pathways are informal, opportunity and outcome become closely linked. Some apprentices progress quickly through broader exposure, guidance, and feedback, while others plateau doing repetitive tasks. These differences shape confidence, perceived competence, and readiness for advancement—outcomes that are often later attributed to the individual rather than to the system that shaped their development.

Key Insight: Layered vulnerability in early apprenticeship

For female apprentices, and male apprentices who do not fit the dominant workplace style, apprenticeship status can intersect with gender, age, sexuality, confidence, or social presentation to intensify vulnerability. In these cases, low formal power combined with heightened scrutiny makes it harder to speak up, seek clarification, or challenge treatment without risking retaliation.

How informality shapes learning and progression: Self-advocacy as a requirement

Within this environment, access to learning is not consistently structured. Instead, participants repeatedly described the need to "put their hand up" in order to access opportunities. Apprentices, trainers, and employers described apprenticeship learning as variable and highly dependent on both the initiative of the apprentice and the willingness of individual tradespeople to teach. Few employers had formal systems for monitoring

progression. Self-advocacy—including asking questions, requesting opportunities, and making ambition visible—was framed as expected and treated as part of becoming capable and independent in the trade.

> *"You've got to put your hand up. If you don't, they just assume you're happy doing what you're doing."*

Opportunities to engage in more complex or skill-building work were often offered to those already seen as capable, motivated, or reliable. These perceptions were shaped not only by performance, but also by how individuals were read within the team and whether they were informally included in particular activities.

This created a system in which learning is allocated relationally rather than evenly, progression depends partly on visibility and recognition, and individuals are expected to actively seek out opportunities.

While this gives supervisors flexibility in managing work, it also produces uneven development trajectories, because access to skill-building is not consistently structured.

Digging Deeper: Informal learning allocation vs Informal advocacy for learning

These two mechanisms are closely related but analytically distinct. Informal learning allocation refers to how opportunities are distributed. Self-advocacy refers to how individuals are expected to compensate for that uneven distribution.

> *"No one's really checking if you're learning everything. It's kind of on you to ask."*

The data suggest that these mechanisms reinforce one another. Where learning is unstructured, those who are confident, familiar with workplace norms, or socially supported are better positioned to ask for opportunities. Others may hesitate, resulting in slower or narrower development despite comparable capability.

Self-advocacy, therefore, functions as a visibility filter. Those who confidently request opportunities tend to receive more varied work and take on responsibility earlier. Those who are quieter, newer, or less certain of the social rules are less likely to access the same opportunities, even when their capabilities are similar.

> *"Not everyone has a voice… and that's the biggest issue."*

Key Insight: Not everyone self-advocates equally

The expectation to self-advocate advantages those who are confident, experienced, or already familiar with workplace norms. When access to opportunity depends on self-advocacy, confidence becomes a structural advantage — not just a personal trait.

> *"Some people are better at pushing for things. Others just don't feel comfortable doing that."*

Younger apprentices, quieter workers, and those without strong informal backing are less likely to push for opportunities, which affects both the pace and visibility of their progression. The system does not ask why someone is quiet. It simply moves forward without them.

This reliance on self-advocacy shifts responsibility from the organisation to the individual. Rather than being consistently structured, opportunities and support become contingent on a worker's capacity to navigate informal dynamics. That capacity, however, is not evenly distributed. It is shaped by experience, confidence, familiarity with the environment, and the perceived safety of speaking up.

This is closely connected to psychological safety: the belief that asking questions, seeking clarification, or requesting opportunity will not result in ridicule, exclusion, or negative judgement. Where psychological safety is low, workers are less likely to advocate for themselves, even when they need to.

This was particularly evident in accounts from women, who described needing to advocate for learning while also managing heightened scrutiny. Asking too early could risk being read as incompetent, creating an additional layer of pressure not experienced equally across the workforce.

How informality operates: Informal escalation thresholds

Informality does not shape learning alone. The same reliance on tacit judgement and local discretion also shapes how problems are recognised, interpreted, and acted upon.

Participants across groups drew a clear distinction between issues considered serious enough to warrant action and those seen as part of everyday site life. Serious safety incidents, extreme behaviour, or major breaches were understood to fall squarely within organisational responsibility.

> *"If it's something that's actually dangerous, like proper safety, that gets fixed straight away. The other stuff… you just work around it."*

In contrast, ongoing conditions such as inadequate amenities, poor equipment fit, physical strain, exclusion, inappropriate behaviour, and repeated low-level discomfort were often minimised, normalised, or managed individually rather than escalated.

> *"This is not an industry that was designed for women… everything is not designed for women — the amenities, the uniform, the tools."*

This distinction was rarely contested. Instead, it appeared to be widely shared and socially reinforced.

Key Insight: Informal threshold for action creates organisational blind spots

Over time, the distinction between what is serious and what is not may become an informal threshold for action – a tacit rule about what counts.

- Workers may learn which concerns are likely to be taken seriously and which are unlikely to result in change (or make them appear "soft")
- Supervisors learn which issues demand intervention, and which can be absorbed through expectation-setting, humour, or silence (without consequence)

As a result, organisations may become highly responsive to acute, visible risks while more persistent and cumulative conditions remain largely unmanaged. These experiences rarely cross formal reporting thresholds and therefore remain organisational blind spots.

This informal thresholding creates a shared understanding of where formal systems begin and end.

> *"There's kind of an understanding of what's worth saying something about and what's not."*

Importantly, it means that many experiences remain invisible unless they cross a clearly recognised line.

How informality governs: Peer signalling and supervisory filtering

In the absence of consistently applied formal processes, governance is not simply enacted in a formal, top-down manner. It is produced collectively through shared understandings of what is acceptable, what crosses a line, and what should be acted on. These understandings are often not formally defined. Instead, they are communicated through everyday language, interaction, and expectation.

Participants repeatedly described these boundaries as obvious and widely understood:

> *"Everyone knows when it's too far…"*
>
> *"I think everyone knows the unwritten rules."*
>
> *"It is common sense. Everyone knows the unwritten rules."*
>
> *"Everyone knows when to pull the handbrake up…"*

Across focus groups, phrases such as "everyone knows" and "common sense" were used to explain how behaviour is regulated on site. These expressions do important work; they present workplace norms as shared, natural, and uncontested, even where experiences of those norms differ.

In practice, this framing turns cultural boundaries into something that does not need to be explicitly stated or formally enforced. If "everyone knows", then there is less perceived need for clarification, reporting, or intervention. Responsibility for managing behaviour is instead distributed across the group.

This creates a form of peer signalling, where workers learn and reinforce expectations through observation, interaction, and subtle correction. Behaviour is adjusted not only in response to formal authority, but in response to how others react, what is laughed at, what is ignored, and what is quietly discouraged.

Within this environment, governance operates as self-regulating. Issues are often assessed first through this shared lens before being recognised as problems requiring action.

Digging Deeper: *Silence, endurance, and exit*

Within this system, responses to workplace challenges are shaped by how individuals interpret both the issue itself and the likely outcomes of taking action. Participants described a range of responses, including addressing issues directly, managing them individually, remaining silent, or leaving the situation altogether.

Silence is often a considered response rather than a passive one. Where thresholds for action are unclear, and where formal escalation is perceived as uncertain or potentially costly, individuals may choose not to report concerns.

This reflects a system in which:

- Reporting is not always seen as effective
- Escalation may carry social or professional risks
- Informal resolution is prioritised over formal processes

Endurance becomes one way of remaining within the system, while exit becomes an alternative where conditions are no longer tolerable. Both responses operate within the constraints of an environment where formal mechanisms are not consistently relied upon.

> *"It's easier to just deal with it than be seen as someone who is difficult."*

Supervisors do not sit outside this process. They operate *within* it, but with greater authority to confirm, soften, or escalate how those shared norms are applied.

Because supervisors are often the first point of contact for workplace concerns, they act as key interpretive actors. As one participant noted:

> *"A lot of it comes down to the supervisor. They set the tone… what's okay, what's not."*

Supervisors influence whether concerns remain local or progress further, but their decisions are rarely made in isolation from the broader crew environment. Instead, they interpret behaviour through the same shared assumptions that underpin peer signalling.

Several supervisors described addressing issues through informal conversation rather than formal escalation, often to preserve working relationships and resolve matters quickly on site. From their perspective, local resolution was often seen as practical and appropriate.

> *"We try to deal with it on site first. We don't want to escalate unless we have to."*

However, how supervisors *interpret* behaviour becomes critical in determining whether an issue is treated as minor or escalated. Behaviour may be framed as:

- a misunderstanding between workers
- a personality clash
- humour that went too far, or
- a difference in communication style

These interpretations do not necessarily reflect deliberate minimisation. In many cases, supervisors described themselves as trying to preserve team cohesion and avoid unnecessary conflict. However, when concerns are consistently interpreted through this lens, the threshold for escalation remains high.

Taken together, peer signalling and supervisory interpretation reinforce each other. Shared assumptions about what is "normal" shape how issues are first understood at a peer level. Supervisors then filter concerns through these same assumptions, determining whether they warrant further action.

As a result, governance becomes distributed and highly dependent on individuals, teams, and local conditions.

Participants described this variation as expected:

> *"It depends who you're working with."*

The same issue may be handled differently depending on the supervisor's leadership style, the crew composition, and the perceived impact on relationships and workflow. Positive environments are often attributed to individuals — such as a supportive supervisor — rather than to consistent organisational practice.

> *"Some supervisors will shut things down straight away. Others just let it go — it depends who you've got."*

Spotlight: When leadership works around the system

Across the interviews, even leaders who were actively committed to creating safer and more inclusive environments described working within the existing supervisory structure, rather than fundamentally reshaping it.

As one leader explained:

> *"We need to make sure they're [women are] getting the right leadership and support, and they're also getting the right supervision. I know within our site supervision ranks, there's certain people we would be onboarding our female apprentices with, and there's certain people that we say, no… we wouldn't be putting them in that situation."*

In practice, this meant carefully managing who individuals are paired with, and avoiding placements where risks were anticipated. These decisions were often made with the intention of protecting apprentices and ensuring a positive experience.

However, this approach also reflects the broader pattern identified here: outcomes remain highly dependent on who individuals are working with. Rather than removing variability in supervision, inclusion is achieved by working around known risks. This is deemed easier than addressing those risks at the source.

The relational logic that underpins peer signalling and supervisory filtering extends into how individuals enter into the industry and how early inclusion is established.

How informality influences entry & trust: Networks as comfort, continuity, & closure

Informal systems do not begin once work starts on site; they also shape how individuals enter the industry, how trust is established, and how early inclusion is negotiated. Entry into the industry was commonly described as occurring through personal connections, informal referrals, or being "known" to someone already inside, often through family.

> *"Most people get in because they know someone."*

> *"A lot of them come from the same family… half of them will be like, 'yeah, my dad was a plumber, or my uncle.'"*

These accounts indicate that access is primarily structured through relational familiarity rather than through open or publicly visible pathways. The relational familiarity functions as a basis for trust and decision-making.

Spotlight: Perceptions of plumbing work and impact on recruitment

Participants also spoke indirectly about how the industry is perceived from the outside. Several accounts suggested that people unfamiliar with plumbing often associate it with a narrow range of tasks, whereas those inside the industry understand the diversity and complexity of work involved.

"People don't really know what plumbing actually involves unless they're around it."

This gap in perception can limit who considers plumbing a viable or attractive option, reinforcing reliance on insiders to bring in new people.

"If you didn't grow up around it, you probably wouldn't even consider it."

Similarly, securing an apprenticeship was frequently described as easier and quicker through known contacts, reinforcing the tendency for opportunity to circulate within existing networks.

"This industry is really who you know… I tried so hard to find an apprenticeship. It took me months…"

Beyond shaping who considers plumbing, networks also structure how opportunity flows once individuals seek to enter.

Digging Deeper: Networked entry as cultural reproduction

Entry through networks does more than shape access. It reproduces the culture itself. When opportunity flows through family ties and known relationships, the same norms, expectations, and identities are carried forward.

"It's sons, it's daughters… if you bring the same people that got told the only way to get a job is because my dad knew someone, then of course you're just repeating it."

This creates continuity not only in workforce composition but in how the plumbing trade understands itself, who belongs, and what is considered normal.

Returning to entry processes more broadly, referrals, prior connections, and being known to others were described as playing a significant role in the speed with which trust was established. In a high-risk, skills-based environment, networks functioned as shortcuts for trust.

"You wouldn't just take any dodgy bloke out there. You want it to be someone known to you."

Trust, once established, becomes a key mechanism through which work is allocated and responsibility is shared. Individuals who are known and trusted are more likely to be included in opportunities and decision-making processes.

In contrast, those without these networks must build trust over time, often without the same level of initial support. This affects how quickly they can integrate into teams and how readily they can access opportunities within the system.

However, this reliance on familiar networks also narrows the field. Those without prior connections—including first-generation entrants, career changers, and those without family ties—enter from a different position, with less social capital and fewer buffers when things go wrong. Over time, this reproduces a sense of comfort and belonging for those who fit established pathways, while limiting diversity at the point of entry and reinforcing a closed-loop pipeline in which new entrants resemble those already in the industry.

Key Insight: Networks don't just open doors; they cushion falls

When networks shape opportunity, the system tends to reproduce itself. Those who resemble existing workers or come through familiar channels are more likely to receive early trust and support.

"If you're known, people look out for you a bit more."

Others may face higher scrutiny and lower tolerance for error, increasing early-career risk.

Synthesis

Taken together, these findings show that informality operates as a structured system shaping everyday work in the Plumbing Industry. It is not simply a context in which inequality appears. It is also a mechanism through which inequality can be produced, normalised, and made difficult to identify.

Differences in experience are often absorbed into the variability of local practice and therefore appear incidental, when in fact they are patterned. Informality enables flexibility and responsiveness, allowing work to be adapted to changing conditions.

At the same time, it produces unevenness in:

- how individuals experience the workplace;
- how opportunities are accessed; and
- how issues are addressed.

However, informality does not operate in a social vacuum. The judgements, relationships, and discretionary decisions described above are shaped by the cultural norms within which they are exercised. To understand how informality affects participation in practice, it is therefore necessary to examine the social environment that gives those informal systems their content.

The next theme details how these everyday workplace norms are structured around a **masculine-coded interactional order** that shapes how workers are expected to behave, how belonging is assessed, and how conduct is interpreted.

4.3 Masculinity as the default social infrastructure of the trade

This theme examines how workplace culture is shaped by a set of shared norms, expectations, and interaction styles that participants consistently described in ways that align with a masculinised environment. These norms function as an underlying social infrastructure that interacts with the informal systems outlined earlier, shaping how behaviour is interpreted, how belonging is assessed, and how individuals are expected to participate.

Across apprentice and plumber focus groups, as well as interviews with supervisors and industry stakeholders, participants described a work environment structured around directness, endurance, humour, and a high tolerance for discomfort. While rarely labelled explicitly as "masculine" by participants

themselves, these expectations reflect a shared understanding of how a worker should behave, communicate, and respond to challenge within plumbing.

In this context, masculinity is not only a demographic feature of the workforce. It operates as a behavioural template that defines what is considered normal, acceptable, and competent on site.

Across the data, this behavioural template was visible through three interrelated dimensions: the characteristics of the "right" kind of worker, the interactional norms through which these expectations are enacted, and the ways in which these norms are learned and reinforced over time.

A behavioural template for participation

Many participants described a consistent set of expectations regarding how workers should conduct themselves on site. These expectations extended beyond technical competence to include how individuals communicate, respond to challenges, and position themselves within the work environment.

The Plumbing Industry, as demonstrated in subsection 2.3, has historically been male-dominated, and many everyday norms can be seen to reflect this history. Behaviour that aligns with traditional masculine expectations is often treated as standard workplace behaviour rather than a specific cultural style.

Across the data, participation appears to be organised around a relatively narrow understanding of the "right" kind of worker. This was not usually expressed directly but was visible in how participants described who settles in easily, who is seen as capable, and who is read as a natural fit for the plumbing trade.

Digging Deeper: Typical worker is linguistically male

When the workforce is casually referred to as "the boys," maleness becomes the unmarked category of worker. It does not require explanation; it is treated as normal.

Women, by contrast, are introduced as a marked subset:

- "a few girls on site"
- "one of the girls"
- "women in trades" as part of a special category

This linguistic asymmetry matters analytically. The unmarked category defines the baseline for who the workplace is imagined around, who is presumed to belong, and whose presence is treated as normal. Those outside it are more likely to be read as exceptions who must be interpreted, accommodated, or assessed in relation to existing norms.

Male participants often described the trade in terms that normalised a particular combination of physical confidence, practical directness, ease with banter, and comfort within rough or highly masculinised environments. These qualities were framed as ordinary or expected aspects of the job rather than culturally specific traits.

Many participants also described expectations such as "being able to take a joke", tolerating physically demanding conditions, avoiding making a fuss, and maintaining a steady work pace regardless of discomfort.

> *"You've just got to get on with it. No one wants to hear complaints."*

These expectations appear to operate as a *behavioural template* against which workers are informally assessed. Fitting in is not only about technical competence, but also about demonstrating the right attitude, communication style, and emotional response to the conditions of work.

"If I have anyone that turns up, does what they're told, and doesn't complain — that's it."

Spotlight: Endurance, toughness, and the expectation to absorb discomfort

Participants frequently described the importance of endurance in plumbing, both physical and emotional. Work was characterised as demanding, with long hours, challenging environments, and exposure to discomfort as a routine part of the job.

"You don't want to be the one who can't handle it."

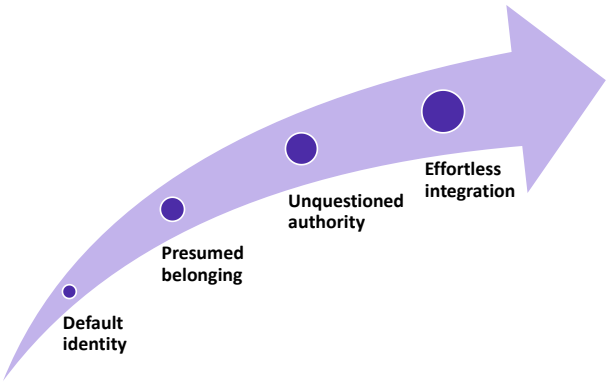
Within this context, the ability to tolerate strain without complaint was often framed as a marker of competence and commitment. Several participants, particularly supervisors and experienced tradespeople, described this as part of "toughening up" or becoming suited to the trade.

This expectation extends beyond physical work to include how individuals respond to interpersonal challenges. Workers are expected to manage frustration, ignore minor conflicts, and continue working without disruption.

As a result, discomfort, whether physical, social, or emotional, is often absorbed rather than addressed. This reinforces the informal escalation thresholds described earlier, where only issues that exceed a certain level of severity are considered worthy of action.

These expectations align closely with traits historically associated with masculine forms of work — stoicism, physical resilience, and emotional restraint — though they are rarely named in these terms within the workplace itself. Workplace ease, in this sense, is not simply a result of personal confidence but a product of alignment between the worker and the existing behavioural expectations of the environment.

Workers who align with this template, whether due to gender, personality, communication style, or background, are more easily accepted into teams and less likely to be questioned or scrutinised. Those who do not align are more likely to be seen as difficult, overly sensitive, or unsuited to the plumbing trade. They may also experience increased scrutiny and reduced tolerance for error.



Importantly, this assessment happens continuously and informally, through everyday interactions rather than formal evaluation processes. Some participants also suggested that this dynamic extends beyond gender. Quieter men, less physically imposing men, or those less fluent in the prevailing interactional style may also struggle to move easily through the workplace, though these experiences are more likely to be individualised rather than recognised as structural.

The causal implication is subtle but important. Where alignment with existing expectations is taken as given, movement through the workplace appears seamless and unremarkable. Where it is not, greater effort is required to be recognised as capable and accepted within everyday working relationships. This dynamic is rarely framed as structural. Instead, it is often described as a matter of "fit" or "vibe", positioning these differences as natural rather than shaped by the organisation of the work environment.

Interactional norms of the behavioural template: banter and mateship

The expectations described above are not only defined through descriptions of the "right" worker but enacted and reinforced through everyday interaction. Across focus groups and interviews, participants consistently described the social environment of plumbing as built around banter, humour, and a strong sense of mateship. These were described as central to how teams function, how relationships are built, and how work is experienced on a day-to-day basis.

> *"If someone can't handle a bit of banter, they're probably not going to last."*

For many participants, banter was framed as a normal and expected part of site interaction. It was associated with keeping morale high, passing time during physically demanding work, and building rapport within crews. Workers often described it as a shared language through which familiarity and connection were established.

> *"The banter's always got to be there… that's what makes our days go good."*

Mateship was similarly described as a defining feature of the trade. Participants spoke about the importance of being part of a crew that "gets along," supports each other, and works collectively under pressure. This sense of cohesion was not only social, but also practical — enabling coordination, trust, and efficiency on site.

> *"We look after each other… you've got to trust your mates."*

At the same time, these forms of interaction were not neutral. While often described in positive terms, banter and mateship also functioned as informal mechanisms through which *social acceptance* was established, tested, and reinforced.

Spotlight: Banter as an informal test of fit

Participants across the apprentice and plumber focus groups described banter as something that required active participation. Being able to "give it back," not take offence, and respond in kind was often treated as a sign of fitting in.

In this sense, banter operated not only as humour, but as a low-visibility test of social alignment. It provided a way for crews to assess whether someone could engage with the dominant interaction style of the site without disrupting group dynamics.

Workers who were able to participate in this style were more likely to be read as easy to work with, adaptable, and part of the team. Conversely, those who hesitated, disengaged, or challenged the tone of interaction risked being positioned as overly sensitive, difficult, or not suited to the environment.

> *"It's like you're being tested all the time… how much you can take, how you react, whether you'll crack."*

Importantly, participants rarely described this process as intentional or exclusionary. Rather, it was understood as part of the normal functioning of the plumbing trade — something that "just happens" through everyday interaction.

Digging Deeper: What Banter Does in Practice

Because banter is ongoing and relational, its effects accumulate over time. Workers who feel less comfortable engaging in this style may receive fewer informal opportunities, less feedback, and weaker social backing. Over time, this influences confidence, learning, and retention — without any explicit breach of conduct.

Several participants implicitly acknowledged that if someone is uncomfortable but does not object or is seen as "taking it too seriously", the behaviour is unlikely to be challenged. In this way, banter can mask bullying or exclusion while remaining socially protected as normal interaction.

"You gotta take a joke. You can't be a soft person in this industry."

When jokes cross a line, the expectation is that the individual addresses it privately and directly, rather than through formal channels. This approach favours those who feel confident challenging peers and disadvantages those who are young, new, marginalised, or simply uncomfortable with confrontation. The social pressure to appear unbothered further suppresses an open discussion about boundaries.

"If you complain, you're a snitch. You're meant to handle it yourself."

- Banter is described as essential for bonding, but it polices norms

"If you take it seriously, you're the one with the problem."

- Women use banter strategically – start the jokes first, laugh things off, hide hurt.

"I start the jokes so they know I can dish it out and take it."

- Banter is a test of gender conformity ("not fragile", "one of the boys").

"They always bag me for not lifting heavy enough… every day they bag me."

- Apprentices insist that banter "is equal for everyone" but simultaneously express sexist and homophobic boundaries.

"Sometimes the jokes are so targeted …. imagine if someone here was actually gay."

Banter is, therefore, the industry's informal inclusion system. However, it only includes those whose identity aligns with dominant masculinity; for others, it becomes a quiet source of danger, self-censorship, or disconnection.

Alongside banter, mateship functioned as a broader organising principle for how teams operated. However, this emphasis on cohesion also meant that maintaining group harmony often took priority over raising concerns or disrupting existing dynamics. Participants described a general expectation to "not make a fuss," to handle issues informally where possible, and to prioritise getting along with the team. In this context, mateship acted as a form of informal governance — shaping how behaviour was regulated on site without relying on formal processes. Acceptance within the group was linked not only to technical competence but also to the ability to align with the social norms of the team.

While banter and mateship were widely described as positive aspects of the plumbing trade, participants' accounts also pointed to uneven experiences of these dynamics over time. These differences do not always appear immediately as was clear from the male and female apprentices' focus groups. They become more visible over time, as evidenced by a comparison of the male and female plumbers' focus groups.

Spotlight: Divergence in "mateship" over time

Across the male and female focus groups, entry into plumbing was not experienced differently in a significant manner at the outset. Both male and female apprentices spoke about interest in hands-on work, variety, and the appeal of a trade-based career. For many, joining the industry was a deliberate and positive decision:

"It ended up being probably one of the best decisions of my life…"

However, as participants moved from entry into everyday participation, differences emerged in how they experienced and navigated workplace culture.

Male apprentices consistently described early participation in terms of learning the norms of the trade — particularly around attitude, humour, and resilience. This included an expectation to accept banter and adjust to the pace and hierarchy of site life:

"Sometimes you just gotta know your place."

These expectations were not necessarily described as exclusionary, but as part of "how the industry is", and something to be learned and accepted early.

Women apprentices encountered many of the same expectations but described their early experiences in more conditional terms. While enthusiasm remained, it was often accompanied by a need to actively manage how they participated — building credibility, navigating interactions carefully, and avoiding conflict:

"It can be hard to make that connection… a lot of the guys are very standoffish."

"I felt like I had to try harder and be better than everybody else to be accepted."

This pattern becomes more pronounced when comparing how qualified plumbers describe their day-to-day experience. Male plumbers frequently spoke about the value of a good crew, shared humour, and the ease that comes from working within a group that "gets along":

"Having a good crew… it makes life a lot easier."

By contrast, while many women who remained in the plumbing trade continued to express commitment to their work, their accounts were less centred on ease and more on persistence and staying power:

"There's so many times that I've wanted to cry…"

"I'm just stubborn. That's it."

Taken together, these accounts suggest that the same workplace culture is not experienced uniformly over time. While some participants come to describe it in terms of camaraderie and fit, others sustain their participation through ongoing adjustment, self-management, and determination.

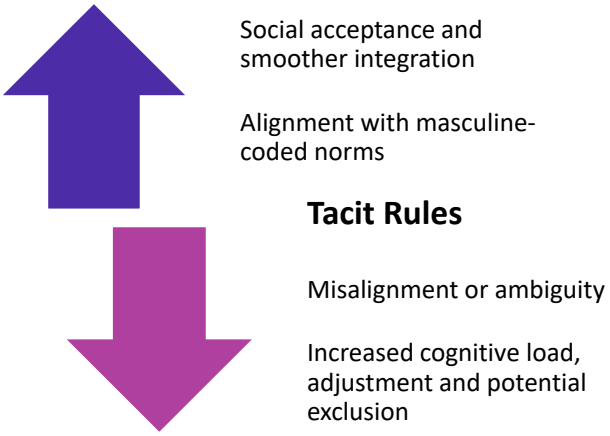
Learning the behavioural template: unwritten rules and tacit transmission

Participants consistently described that becoming part of the plumbing trade involves learning a set of unwritten rules that shape how work and interaction take place on site. These rules are rarely formally articulated.

While formal training provides technical instruction, understanding the social dynamics of the workplace relies heavily on informal exposure. For some apprentices, this process felt relatively straightforward. For others, it involved navigating unclear expectations and adjusting behaviour without explicit guidance.

Participants repeatedly referred to these "unwritten rules" as shaping what is considered acceptable, serious, or worth addressing. In this sense, workplace behaviour is governed less through formal policy and more through shared, tacit understandings.

However, these norms are not neutral. They are embedded within a workplace culture that is already shaped by masculine expectations around humour, resilience, and interaction. As a result, what is being learned informally is not just "how the job works," but how to operate within a masculinised social environment.



Over time, this process contributes to the reproduction of existing cultural norms, as new entrants adapt to the expectations already embedded within crews. Informality, therefore, does not simply enable flexibility; it also stabilises the cultural status quo by embedding norms in practice rather than making them visible or open to negotiation.

Because this learning is informal, expectations are often not clearly explained but are nonetheless consistently reinforced. Participants described becoming aware of what is acceptable through subtle cues, reactions from others, and ongoing participation in team environments. This contributes to the reproduction of the existing culture, as new entrants adopt the same norms in order to integrate effectively.

Spotlight: Masculinity as structural design

Participants' accounts suggest that masculinity in the plumbing trade is not only expressed through interaction but is also embedded in how work is structured and organised.

Across interviews, expectations of reliability were closely tied to continuous physical presence and uninterrupted availability. This was reflected in descriptions of attendance norms that extended beyond formal requirements.

As a senior industry participant noted:

"Don't be sick on a Friday… and if you happen to be sick on a Monday or a Friday, you turn up to work… and they will send you home."

Even where these expectations were acknowledged to conflict with formal protections, they were framed as necessary for maintaining workflow.

"I know this goes against national employee standards, and I know this probably goes against workplace law. I don't care."

In this context, time away from work — even for legitimate reasons — may be interpreted as a lack of commitment.

"12… 12 Mondays off in a year, and he let his team down."

These expectations intersect with how life events such as pregnancy are understood within the industry. As one employer noted:

"The pregnancy… that's a flag that we need to look at."

These expectations, though unwritten, were clear to the workers as well. A female plumber echoed the sentiment of many others:

"It's not safe or easy to be pregnant in this work… you never see pregnant women on job sites"

Some key stakeholders also described assumptions that women's participation may be discontinuous, with one suggesting that women should leave the workforce during child-rearing years and return later, rather than being accommodated within existing structures.

This reflects a broader model of work organisation based on uninterrupted availability, where flexibility is limited and often informally penalised. While such expectations may be manageable for those who fit this model, they create structural constraints for others, particularly those with caregiving responsibilities.

In this sense, masculinity is embedded not only in how individuals are expected to behave, but in how work itself is designed.

Synthesis

Masculinity, as described by participants, operates as a default social infrastructure within the Plumbing Industry. It defines a behavioural template for participation, shapes interaction through humour and endurance, and influences how individuals are assessed and included. These norms are embedded within the informal systems outlined earlier, reinforcing patterns of local discretion, tacit judgement, and relational

governance. Together, they create a work environment in which belonging is negotiated through alignment with shared expectations, rather than determined solely by formal role or technical competence.

While these norms can support cohesion and efficiency within teams, they also shape whose behaviour is seen as acceptable, whose concerns are taken seriously, and who is able to participate without additional adjustment.

Digging Deeper: Perception vs Reality

From the outside	From the inside
Everyone starts at the same level	Workers may enter the same trade, but not under the same conditions. Some begin with an assumed fit; others must establish it early and repeatedly.
If you work hard, you'll do well.	Progress depends not only on effort, but on access to trust, learning opportunities, and informal support.
It's just about having the right attitude.	Attitude is interpreted through existing norms. What counts as right is shaped by culture, not neutral standards.

The next theme examines the implications of this more directly. It shows that although all workers enter the same industry, they do not do so on equal terms. For some, belonging is assumed. For others, it must be established, defended, and maintained over time. In practice, this often involves adapting to existing norms, behaviours, and interaction styles that define what is considered acceptable on site.

4.4 Conditional belonging and the unequal costs of participation

The previous themes showed that everyday work in the Plumbing Industry is organised through informal systems operating within a strongly masculinised cultural environment. Building on this, participation in the plumbing trade is not experienced uniformly. While formal entry pathways may appear similar on paper, the conditions under which workers are accepted, supported, and able to sustain participation differ in important ways.

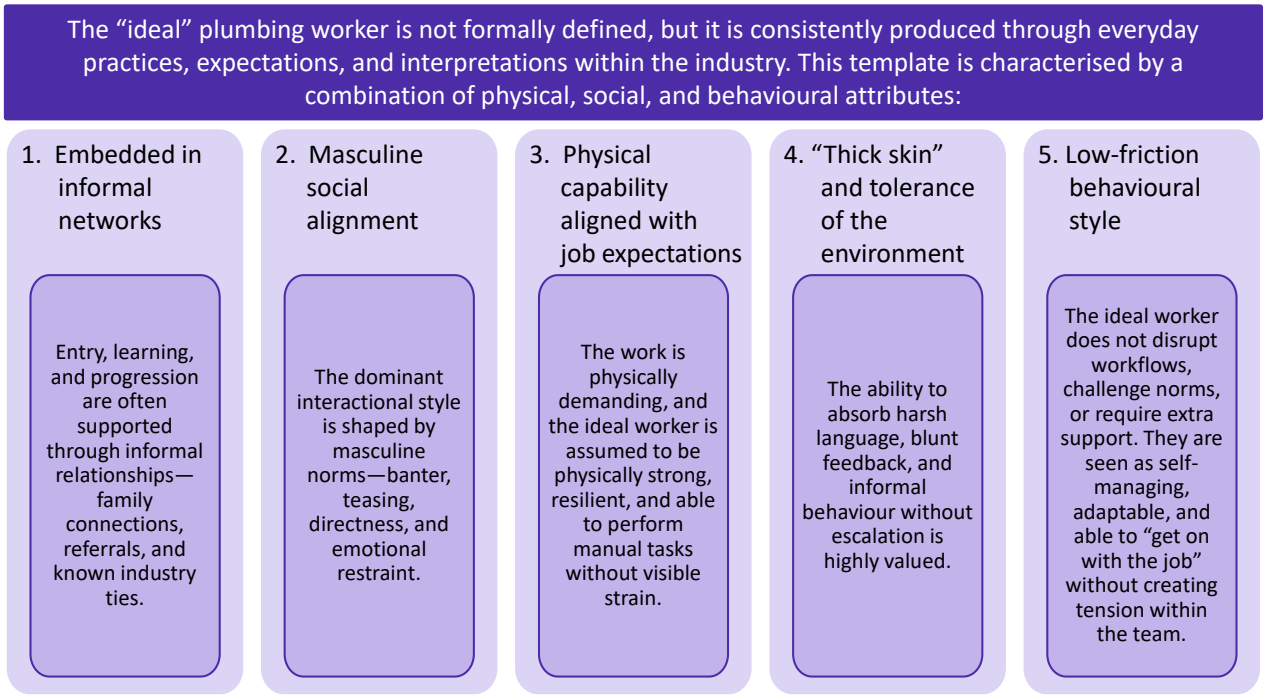
This theme examines how belonging in the industry is often conditional rather than automatically extended. In particular, it explores how women, and to some extent other workers who do not fit the dominant worker template, are required to establish and maintain their place in their work teams in ways that extend beyond technical competence. The findings show that participation for these workers often involves navigating informal expectations, managing interactional risk, adapting to physical and organisational conditions, and maintaining legitimacy over time.

As a result, the costs of participation are not evenly distributed. These costs take multiple forms, including heightened scrutiny, the need to manage behaviour and boundaries carefully, adaptation to environments designed around male norms, and pressure to remain socially workable while proving competence. The argument of this theme is not simply that some workers are excluded. It is that participation itself is unevenly demanding. Workers who fit the dominant template move more easily through systems of

learning, interaction, and recognition. Those who do not fit that template are required to do additional social, emotional, and interpretive work in order to learn, belong, and remain.

Performing fit with a narrow worker template

As described earlier, the industry is calibrated to a particular worker template. This template is not expressed in official policy but appears in practice through who is assumed to fit, who is trusted early, who is given room to learn, and who can move through the workplace with relatively little friction.



Male participants most often described this fit as natural, ordinary, or unremarkable. They did not necessarily see themselves as beneficiaries of a system; rather, the system felt familiar. **Privilege within this environment, therefore, appeared as normality rather than as advantage.**

For workers who did not align easily with the dominant template of an ideal plumbing worker, participation often involved a disproportionate amount of labour. Female plumbers described the workplace as requiring conscious adaptation. Their accounts repeatedly highlighted the need to manage communication, monitor responses, prove that they could handle the environment, and work out how to remain socially workable without giving up too much of themselves. These accounts made visible the additional labour that is otherwise hidden when the dominant template is treated as neutral.

Participation in the plumbing trade also emerged as involving a **performative dimension**. For some workers, staying in the workplace required not only doing the job, but also managing how they appeared within the social and cultural environment. This included adjusting communication style, humour, emotional responses, tone, body language, and levels of visible discomfort.

> *"You're always thinking about how you're coming across — not being too much, not being too quiet."*

Male participants often described fitting in as something that happened relatively naturally through exposure and team interaction. Female plumbers, by contrast, more often described this as deliberate work. Their accounts included modifying how they spoke, calibrating when to joke, deciding when to challenge something and when to let it pass, and managing how much of their authentic reaction could be shown safely.

> *"You kind of just learn to laugh along even when it's not funny, because if you say something, you're the problem."*

"I feel… I'll just stay quiet, or I'll just like smile or laugh it off… because I don't want there to be any awkwardness or tension. So, I'll just kind of laugh things off that I don't find funny."

Key Insight: Participation as performed fit

This is not simply an adaptation in the ordinary sense of learning a new workplace. It is better understood as the **performance of acceptable participation**. The worker is not only completing tasks, but also presenting a version of self that can be absorbed by the existing culture without generating friction.

This creates a tension between participation and authenticity. The more strongly the environment rewards one style of being, the more workers outside that style may feel pressure to edit or suppress aspects of themselves in order to remain legible as competent, easy to work with, or worth investing in.

An experienced female plumber detailed:

"I feel like I can let my guard down and be more true to myself with my girlfriends… but in my workplace, I am not completely true to myself."

Spotlight: Belonging as an outcome of informal performance

Where belonging must be earned, the system absolves itself of creating the conditions for it. Rather than operating as a standalone process, belonging emerged as the cumulative outcome of the mechanisms described above.

"You can belong, but only if you don't push back too much."

Participants consistently described belonging as something that is earned over time through performance, reliability, and fitting into informal norms.

"You have to show you're not just a box-ticker… you have to prove yourself first."

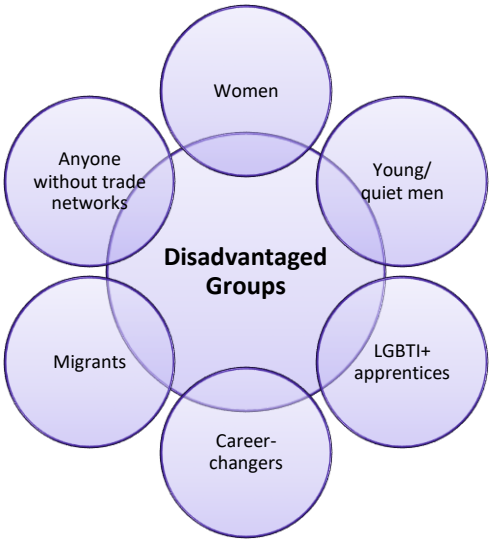
As a result, belonging, in this sense, is not granted through membership, induction, or formal inclusion practices. It is assessed informally, judged continuously, and rarely articulated. Because the criteria for belonging are not explicit or standardised, they are experienced differently across individuals.

"Everyone likes the same kind of jokes… if you're not into that pattern, you're the odd one out."

Those who align easily with informal norms — including communication styles, banter, and self-advocacy expectations — tend to settle more quickly. Others may take longer to feel comfortable or may disengage before reaching that point. This helps explain why retention challenges can persist even in the absence of overt exclusion or discriminatory intent.

- → Belonging in plumbing is not a right … it is a performance.
- → The performance is masculine, humorous, and confrontational.
- → Women must perform it to survive; atypical men are punished for failing to embody it.

Taken together, these accounts suggest that belonging in plumbing does not operate as a simple consequence of entry. It is achieved through ongoing performance within an existing social order. That performance is shaped by interactional norms that are already gendered and culturally specific, including humour, directness, toughness, and the ability to absorb challenge without disrupting the group. For women, and for some men who do not align easily with this style, belonging is therefore less likely to be assumed and more likely to depend on continued adjustment, careful self-presentation, and proof of workability.



This also means that participation burdens are not simply encountered later through workplace experience. They are built into the starting conditions of recognition. Some workers arrive already closer to the norm, more readily trusted, and more easily read as fitting the industry. Others enter from a position in which belonging, legitimacy, and even basic ease must be established before equivalent learning and acceptance become available. In this sense, the burdens of participation are pre-distributed rather than evenly encountered.

Front-loaded labour in apprenticeships and the early career stages

These pressures are not distributed evenly across a worker's career. In many cases, they are especially intense at the point of entry, when fit has not yet been established, and legitimacy is still fragile.

The burden of adaptation is often front-loaded. Before some workers can settle into the work itself, they must first establish that they can handle the environment, be read as workable, and avoid being dismissed as a poor fit. This burden is not identical across workers but falls more heavily on those whose fit is not automatically presumed.

> *"You don't get the benefit of the doubt; you have to earn it straight away."*

This early labour can take several forms: demonstrating toughness, showing they can "take" the culture, minimising visible discomfort, performing confidently before genuine familiarity has developed, and anticipating how they may be judged before trust has been established.

Female plumbers described this particularly clearly, noting that participation often began not from a position of assumed fit, but from one in which they had to quickly signal that they were not fragile, difficult, or merely symbolic hires.

> *"At the start, you've got to prove yourself. Once people trust you, it gets easier."*
>
> *"People are watching how you go early on — whether you can keep up, whether you're reliable."*

This matters because it changes the starting conditions of participation. Some workers begin by learning the job. Others must first establish their right to be in the learning environment at all.

As a result, a plumbing apprenticeship becomes more than a period of skill development. It also becomes a period of identity work, impression management, and self-protection. Women described heightened vigilance, sustained performance pressure, and the need to navigate informal expectations carefully from the outset. Over time, this creates additional cognitive and emotional load.

Importantly, this does not always appear as a direct barrier to entry. Women can and do enter and progress in the plumbing trade. The issue is that their pathway is more conditional and often requires continued proof.

Authority under scrutiny: Senior and supervisory roles

As women move into more experienced, supervisory, or instructional roles, this dynamic does not disappear. Instead, it shifts in form. At this stage, the issue is less about initial inclusion and more about whether authority is readily recognised.

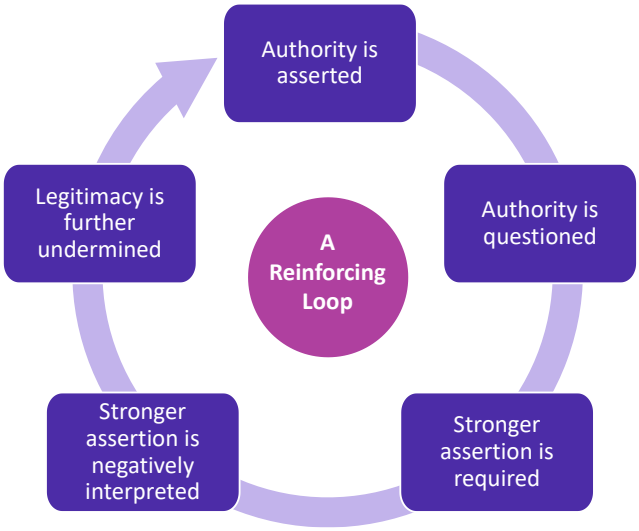
Women in these roles described ongoing questioning, repeated demands for clarification, and subtle forms of pushback from apprentices or colleagues. These interactions were not always overtly confrontational. More often, they took the form of conversational contestation: instructions being revisited, decisions being second-guessed, or authority being indirectly challenged.

A senior female plumber on her interaction with male apprentices mentioned:

> *"When I give them an instruction… they don't always listen… they'll talk back, whereas if a man gave them the same instruction, they would do it straight away."*

From an organisational perspective, these exchanges may appear to be ordinary discussion or debate. From the individual's perspective, they are experienced as a repeated need to defend authority in interaction.

In response, greater firmness may be required to maintain clarity and control. However, that response carries reputational risk. Across accounts, a pattern emerged in which firmness could be recoded as aggression, and directness as being "difficult."



Authority, in this context, is not simply granted by role, but also filtered through gendered expectations of who is seen as legitimate. It must be repeatedly performed and defended.

> *"I don't have as much respect from my co-workers as the men."*

Dual testing: Competence and social tolerance

Across interviews and focus groups, apprentices and early-career plumbers consistently described technical skill testing as a normal and expected part of training. Learning the plumbing trade involves being corrected, assessed, and gradually trusted with more complex tasks. This process is widely understood and accepted.

However, for women (and some men who do not align with dominant norms), this technical testing operates alongside a second, less visible process: social tolerance testing.

This second layer is not formally defined. It is embedded within everyday interactions — particularly within crew-based work, where relationships are shaped through humour, banter, teasing, and informal exchanges. These interactions are often described as part of "how the job works" and are closely tied to team bonding and cohesion.

Within this context, participation requires more than technical competence. It also requires the ability to navigate and absorb the social environment. Women apprentices and early-career plumbers describe needing to demonstrate that they can "take a joke", avoid "making it a big deal", and manage interactions without escalation. This expectation extends beyond isolated incidents and becomes an ongoing part of daily work.

> *"There's always a bit of testing when someone new comes in. People want to see how they react, whether they can handle it."*
>
> *"If someone pushes back too hard or takes things the wrong way, it can make things harder for them."*

Digging Deeper: Banter as a mechanism of dual testing

Banter functions as a key mechanism through which relationships are formed and maintained. Since it is informal and largely unregulated, it is difficult to challenge without social cost. As a result, participation in banter becomes both a pathway to belonging and a site of risk.

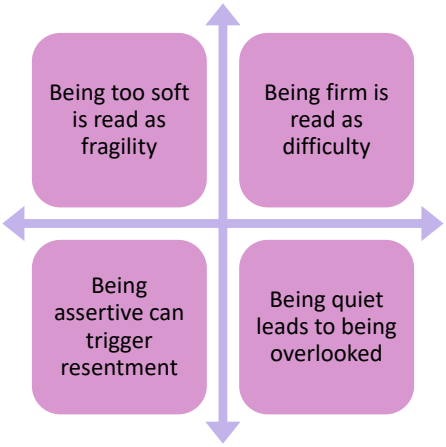
Women describe engaging in strategic adaptation. This includes initiating or participating in banter to signal that they can "fit in", even when this does not come naturally. This is often described not as ease, but as deliberate positioning — a way to reduce scrutiny and establish credibility.

Participation in this interactional style, therefore, involved continuous boundary management, including:

- Monitoring tone,
- Deciding when to laugh,
- Deciding when to ignore,
- Choosing when to respond, and
- Anticipating how others might react.

There are no clear formal rules governing these situations. Instead, workers learn through experience which responses are tolerated and which attract social cost.

When more direct boundary-setting becomes necessary, reputational risks increase. Across accounts, a **constrained behavioural corridor** became visible.



These decisions are not straightforward. There are no clear rules that define what is acceptable. Instead, there are patterns of response that carry consequences, which workers learn through experience. The expectation is therefore not only to do the job, but to do it in a way that maintains social acceptability within the crew.

Digging Deeper: Perception vs Reality

From the outside	From the inside
It's just banter.	Banter can function as a test of belonging, signalling norms and observing who fits within them.
Good teams just get along.	Cohesion can be easier for those already aligned with group norms. Others may need to adjust continuously.
It's about personality.	Patterns across sites suggest broader cultural conditions, not just individual differences.

Informality and supervisor discretion

The dynamics described above are not only produced through peer interactions. They are also reinforced through how supervisors interpret, evaluate and respond to behaviour in the workplace.

A consistent pattern across accounts is that **acceptable conduct is not defined in neutral terms**. It is shaped by existing norms of communication within the trade — norms that are closely aligned with masculine styles of interaction. Within many work sites, directness, bluntness, and confrontation are described as normal and, at times, necessary. Workers are expected to "say things as they are", address issues directly, and not be overly sensitive to feedback or tone. These behaviours are often positioned as part of getting the job done efficiently and maintaining clarity in high-pressure environments.

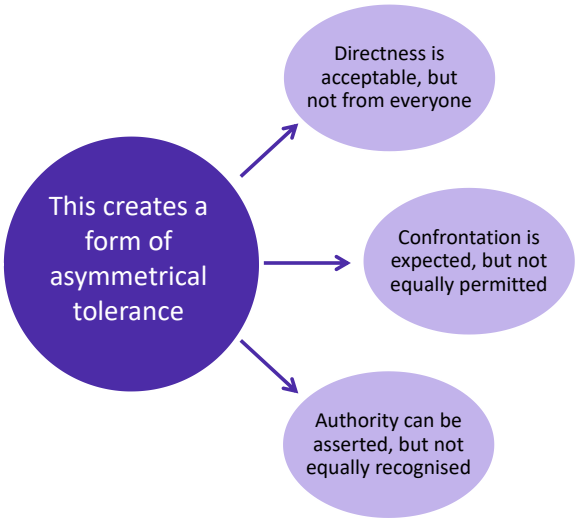
For male workers, these behaviours tend to be read as competence, confidence, or leadership. Expressions of frustration, raised voices, or blunt instruction can be interpreted as part of normal workplace functioning. However, when similar behaviours are enacted by women, they are often interpreted differently.

Supervisors' accounts illustrate this shift in interpretation. In one instance, a supervisor described his "best female worker" as someone from whom there was "not a peep". The value attributed here is not only to her technical ability, but to her lack of disruption — her ability to perform without challenging, questioning or escalating issues.

In contrast, another worker who asserted herself and pushed back was described as having "anger management issues", despite the supervisor acknowledging that "her reasons were right". The issue, in this framing, was not the substance of her response, but the way in which it was delivered.

> *"She stands up for herself, which is good, but at the same time they'll say she's got attitude or anger issues, whereas a bloke doing the same thing wouldn't get labelled like that."*

This suggests that the threshold for what counts as acceptable assertiveness is not consistent. Behaviour that aligns with dominant norms is normalised, while similar behaviour from those outside those norms is recoded as problematic.



Visibility, scrutiny, and representational pressure

These burdens are intensified by differential visibility. Female plumbers in particular described being more noticeable within teams and on site, which heightened awareness of how their actions, errors, and reactions were interpreted.

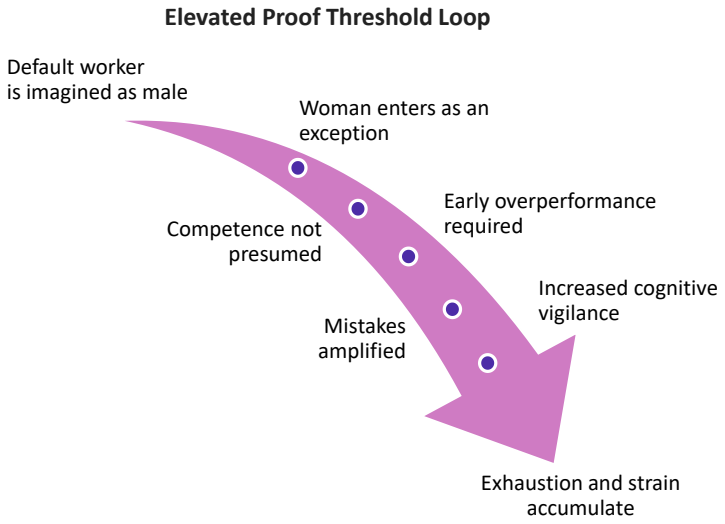
> *"You feel like you're being watched more closely… like you have to prove yourself all the time."*

This visibility often carried representational weight. Rather than being read simply as individual workers, some described feeling that their performance was taken to reflect on women more broadly. Mistakes could therefore feel amplified, while success could carry the burden of proof rather than ordinary acceptance.

This mechanism is not necessarily limited to women. Hypervisibility may also affect other workers who are marked as different from the dominant template. However, women's accounts make the process especially visible because gender difference is immediately legible on site.

Visibility is analytically significant because it amplifies other burdens. It heightens the cost of learning, because mistakes are more exposed. It heightens the cost of authenticity, because reactions are more readily judged. It heightens the cost of conflict, because speaking up can make someone even more noticeable.

This dynamic operates as a reinforcing loop, rather than a series of isolated moments. Workers who are marked different enter without the presumption of competence, which shapes how their performance is read from the outset. This produces heightened scrutiny and pressure to prove oneself, leading to increased vigilance and early overperformance. Over time, this heightened vigilance can contribute to fatigue, constrained participation, or more visible mistakes. These mistakes are read as confirmation of initial biases – which in turn justifies continued or intensified scrutiny. This, therefore, turns into an ongoing cycle of proof, vigilance, and strain.



The differential scrutiny compounds into sustained strain, rather than diminishing with time.

Visibility, therefore, does not operate as a separate issue. It intensifies unequal access to learning, increases the pressure of performative fit, complicates the management of hostility, and magnifies the cost of emotional expression. Again, while women's accounts made this most visible, the mechanism may extend more broadly to other workers who are marked as different from the dominant template.

Diversity policy and the uneven recognisability of burden

An important tension across the data is that not all participation burdens are equally recognisable to formal diversity and inclusion systems. Some forms of non-fit are more legible to policy than others, and this shapes what organisations are able to see, name, and respond to.

Women are more likely to be recognised within formal organisational language as a defined diversity category. This can create at least some basis for targeted initiatives, protection, or monitoring. However, this does not mean that women experience the workplace more easily. In many cases, the burden remains heavier precisely because their difference is visible, their legitimacy is more frequently tested, and their navigation of existing workplace norms is more closely observed.

By contrast, some non-typical men may also struggle under the dominant worker template while remaining almost entirely outside the frame of diversity policy. Their difficulty may be interpreted as individual weakness, low confidence, poor attitude, or a lack of fit, rather than as evidence that the workplace itself is calibrated narrowly. This means that some forms of mismatch are formally recognised but socially burdensome, while others are socially punished but formally invisible.

This creates an important asymmetry. Formal systems are often better equipped to identify overt discrimination or underrepresentation than the hidden work required to remain in the system once admitted. The most persistent burdens described in this report, heightened proof demands, interactional self-monitoring, strategic silence, behavioural calibration, reputational risk, and ongoing adaptation, are often relational and cumulative rather than easily codified.

Participants also suggested that diversity initiatives can themselves produce new interpretive pressures. Women may be read as present because of organisational intent rather than personal capability, creating an additional need to disprove assumptions about why they are there in the first place.

> *"I hear my co-workers saying all the time… any woman that applies will get the job. So, I feel like, you are talking about me as well… that I am not competent…"*

Key Insight: Formal Inclusion vs Informal Legitimacy

Formal inclusion does not automatically translate into informal legitimacy. Formal inclusion may open access, but informal legitimacy determines whether participation becomes sustainable.

A worker may be visible to policy while still not being read as a "natural" or "unproblematic" fit within the everyday culture of plumbing. This helps explain why formal commitments to diversity can coexist with persistent patterns of unequal participation. Entry may be granted formally, while ease, authority, developmental investment, and long-term retention remain governed informally. This explains how formal commitments to diversity can coexist with persistent patterns of unequal participation.

Digging Deeper: How conflict escalates differently

Not all workplace conflict is treated equally. While everyday disagreements between workers are often resolved informally, accounts suggest that incidents involving women are more likely to escalate, attract attention, or require intervention. As one supervisor noted, "when there's a girl involved, they tend to go further."

This does not necessarily reflect greater frequency of conflict, but a difference in how conflict is interpreted and managed. Behaviour that might otherwise remain contained can become more visible, more formalised, or more consequential when it involves a worker who is already more noticeable on site.

In this context, escalation is not only about the incident itself, but about how it is read — shaping who becomes visible, who becomes risky, and how participation is experienced over time.

Unequal access to learning and the competence loop

One of the clearest ways this unequal participation operates is through access to learning. As discussed earlier, learning opportunities in the plumbing trade are often allocated informally through trust, supervisor discretion, and perceptions of who is ready or suitable. In this theme, the importance of that process becomes clearer: unequal access to learning does not simply slow development, but can become part of a self-reinforcing loop.

Apprentices and plumbers described learning as something that often depends on being given the chance to try, being included in particular tasks, and being trusted with more complex work. Male participants more often spoke about these opportunities as emerging naturally through doing the job, building experience, and being brought along by others.

Female plumbers, however, more frequently described having to push harder for those same opportunities or being denied them in subtle ways that were difficult to formally challenge. In some accounts, this withholding was not overtly hostile but occurred through assumptions about what someone was ready for, capable of, or best suited to.

"If you're quiet, one of the quieter people… or if you don't look big… I think the big boys get trained more… The Aboriginal kids say that they don't get trained very well, because they're quite shy."

The supervisor's framing of the "ideal worker" — competent, compliant, and low-friction — reflects this convergence of cultural norms and organisational pressures. Importantly, this does not necessarily reflect deliberate exclusion. Rather, it reflects how existing norms of behaviour, when left unexamined, interact with changing workforce expectations to produce uneven experiences.

Digging Deeper: Self-reinforcing competence loop

This creates a competence loop. Workers who are seen as fitting the role are more likely to be taught, trusted, and exposed to skill-building tasks. That learning then reinforces the perception that they are naturally capable. Workers who are given fewer opportunities to learn may appear less developed, which can then be used—implicitly or explicitly—to justify their continued exclusion from more complex work.

Workers who are read as fitting the dominant template are more likely to be trusted early, exposed to developmental tasks, and gradually brought into more complex work. Male apprentices and plumbers often described this process as natural progression: being shown things, given a chance, and learning by doing. In their accounts, learning flowed through ordinary participation.

Female plumbers more often described this process as conditional and uneven. Some reported needing to ask repeatedly for opportunities, not being taught in the same way, or being directed away from certain tasks under assumptions about capability, suitability, or practicality. Supervisors sometimes framed these decisions as pragmatic or protective rather than exclusionary. Yet the cumulative effect is significant.

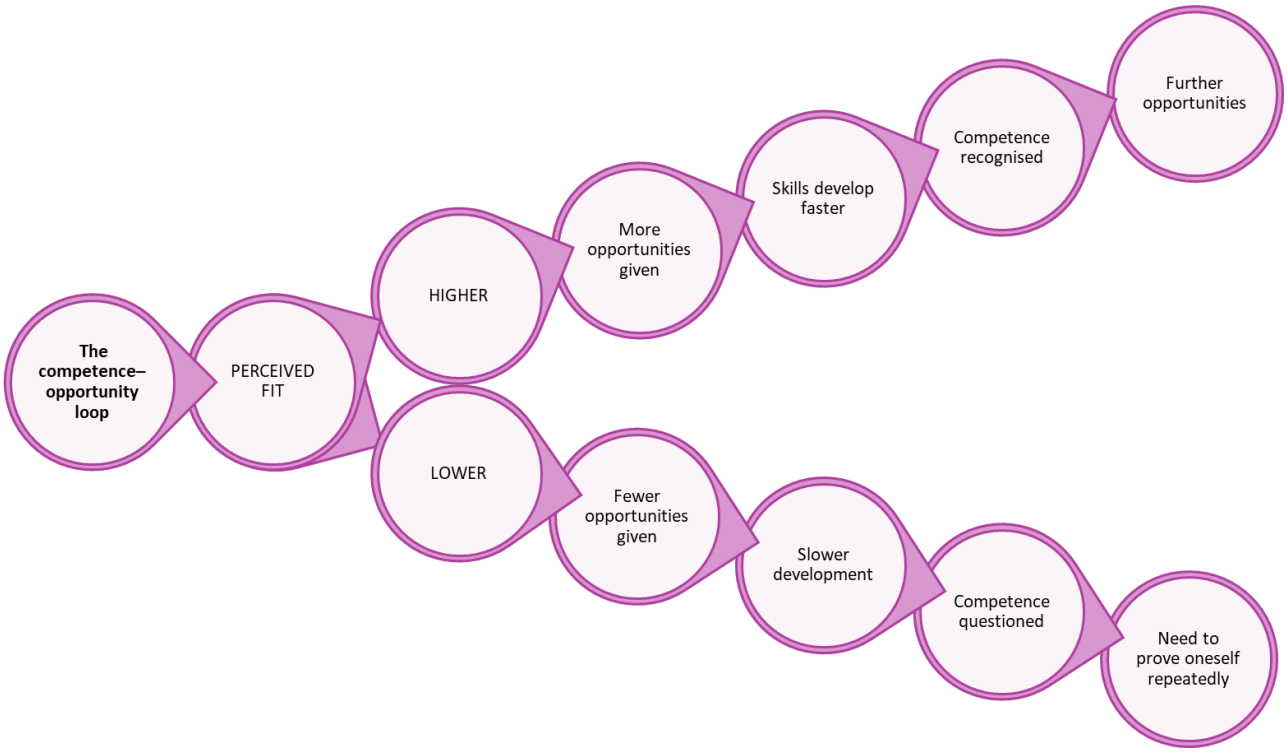
The loop works like this:

- Some workers are trusted more readily.
- That trust leads to greater access to learning.
- Greater access to learning produces more visible competence.
- Visible competence then confirms the original judgement that the worker was a "natural fit."

The inverse also occurs:

- Some workers are trusted less readily or are steered away from developmental opportunities in ways framed as protective or practical.
- They receive less exposure to developmental work.
- Their skills develop more slowly or remain less visible.
- This reduced visible competence is then read as evidence that they were less ready or less suited.

This is not simply a problem of missed opportunity. It is a competence-production system. The workplace does not merely identify differences in capability; it helps create and reproduce them through informal allocation of experience.



The issue here is not simply unequal opportunity. **It is that informal learning systems can reproduce the very differences they later appear merely to observe. Those who are under-taught can come to be seen as under-capable, when the capability gap has been partly produced by the system itself.**

This has a further implication. What later appears as merit, confidence, readiness, or natural fit may in fact be the cumulative effect of earlier uneven access to trust, exposure, and developmental opportunity.

In this sense, the workplace does not simply observe differences in capability; it can also help produce them, and then misread the differences it produces as individual qualities. Ease is read as aptitude, confidence as capability, and slower development as lack of suitability, even where those outcomes have been shaped by prior allocation rather than personal deficit.

Key Insight: Inclusion without Investment

This helps explain why some workers described being treated as symbolic hires or "box tickers."

If workers are brought into the industry in ways that satisfy representation goals without receiving equal developmental investment, formal inclusion can coexist with substantive underdevelopment. This is one of the clearest places where formal diversity efforts and informal workplace practices diverge: **access may be granted but progression is not equally supported.**

Digging Deeper: Protective practices and benevolent exclusion

Not all unequal participation is produced through overt exclusion or openly hostile behaviour. Across the data, there were several examples where women were redirected away from certain tasks, sites, environments, or teams through decisions framed as protective, considerate, or practically sensible.

From the perspective of employers or supervisors, these decisions were often presented as good-faith efforts to shield women from difficult environments, rough crews, or situations perceived as hard to manage. In this sense, the intention could be described as protective rather than discriminatory.

However, the practical effect was often to restrict access to the very experiences through which credibility, confidence, and capability are built in the trade. Being kept away from difficult sites or high-value tasks may reduce immediate discomfort, but it can also narrow exposure, slow development, and reinforce assumptions about who is naturally suited to the full range of work.

This is significant because it relocates the point of adjustment. Rather than changing the environment that is understood to be difficult, the response is often to move the woman around it. The workplace remains intact, while the burden of adaptation is again placed on the individual.

This reflects a form of benevolent exclusion: a pattern in which positive intent coexists with restrictive effect. Because it is framed as care, pragmatism, or concern, it is less likely to be named as exclusion and more difficult to challenge directly. Yet it operates within, and ultimately helps preserve, a broader cultural arrangement in which masculinity remains the assumed norm and full participation remains uneven.

Bodily cost and infrastructure misalignment

Women across interviews described costs associated not only with doing the job, but with managing their bodies in environments not designed with them in mind. These costs were often expressed in practical, everyday terms.

> *"I don't want to look like a bad worker just because I have to walk 30 minutes to find a decent toilet."*

> *"They don't cater for a woman's shape… I had to go and buy my own pants because nothing they gave me fit."*

These examples point to gaps in basic infrastructure, including access to appropriate facilities and suitable personal protective equipment. Importantly, participants were not describing only the absence of provision, but also the gap between provision in principle and usability in practice.

> *"It's not just unlocking the female toilet door that they're currently using as storage…"*

This gap was also evident in relation to tools and equipment. Women did not describe themselves as physically incapable or unsuited to the work. On the contrary, many positioned themselves as strong, fit, and able to meet the demands of the job. However, they highlighted that tools and machinery are typically designed around a default male body — particularly in terms of reach, grip, and leverage. Where tasks required extended arm span, upper-body leverage, or sustained force in specific positions, limitations arose

from a mismatch between equipment design and body proportions; however, this was not attributed to a lack of capability. It was typically perceived by their male peers as women being less suited to plumbing.

Participants noted that conditions have changed over time. In earlier periods, basic facilities for women were often absent altogether. In more recent accounts, worksites were more likely to include designated female toilets or separate spaces, suggesting increased awareness and visible efforts toward inclusion.

However, these efforts did not always amount to full functional inclusion. Toilets could be locked, used for storage, lack proper locks, or be missing basic provisions such as sanitary bins. These gaps may appear minor when considered individually, but they point to a broader pattern: provision has become more visible, while implementation remains partial.

From an employer's perspective, these changes may reflect a genuine effort. The issue is not that nothing is being done. It is that design, maintenance, and day-to-day usability do not always receive the same level of attention. Where facilities remain incomplete or inconsistent, the burden shifts back to the individual, who must plan around the limitation, absorb the inconvenience, or manage the discomfort privately.

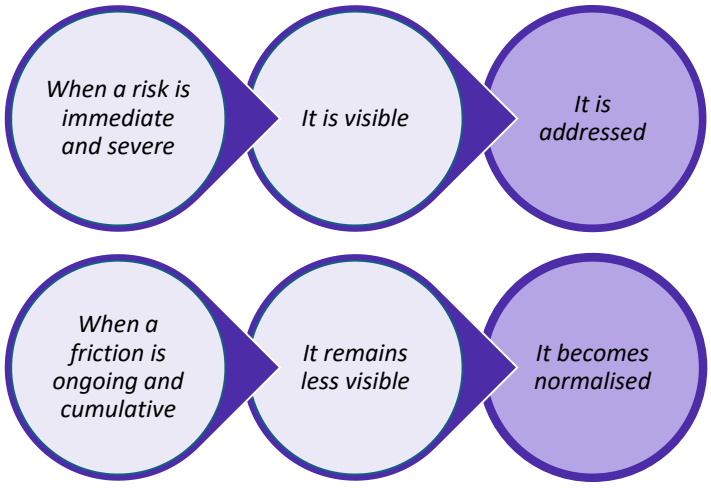
This reinforces a broader pattern across the findings: adjustments are frequently made at the individual level rather than at the system design level.

The distinction between what counts as a "real" problem is important here. When an issue is understood as an immediate safety risk, it is visible, legitimate, and addressed quickly.

> *"If it's something that's actually dangerous… that gets fixed straight away."*

In contrast, issues relating to comfort, dignity, and cumulative inconvenience are less likely to be treated as urgent. The expectation is that workers will adjust around them.

> *"The other stuff… you just work around it."*



This creates a form of layered invisibility. Acute risk is recognised, while chronic friction becomes normalised. Over time, repeated small adaptations require additional time, effort, and attention, affecting how work is performed, how workers are perceived, and how sustainable participation becomes.

Emotional labour as cultural stabiliser

The costs of participation described across this subsection are not only technical, physical, or reputational. They are also relational. Across multiple interview accounts and in observational material from group settings, women were described not only as doing the job itself but as helping manage the relational atmosphere around it.

"You're doing the job, but you're also managing everything around it."

This labour was not formally assigned, yet it appeared repeatedly across interviews and focus groups. Women described listening to frustrations, softening conflict, absorbing emotional spillover, and helping maintain workable relationships in contexts where open emotional exchange between men was often constrained. In this sense, their role extended beyond performing the job itself to managing aspects of the environment in which the job was carried out.

Several accounts suggested that women could become more permissible recipients of vulnerability within crews. Male colleagues might disclose frustration, seek reassurance, or rely on forms of relational support that were less readily exchanged within male peer interactions. In some cases, particularly involving more senior women, this moved toward a more explicit caretaking or "mothering" role, even where such labour had no formal recognition.

This pattern was also visible in observational material. In group settings, women were more likely to take up practical and relational organising work, helping the interaction along, smoothing tension, or stepping into unassigned tasks that supported the functioning of the group. These actions were rarely named as work, yet they contributed to cohesion and reduced the likelihood of visible disruption.

What matters analytically is that this labour is not simply interpersonal generosity. It is structured by the worker's position within the culture. Women are expected to align with the dominant workplace ideal of toughness, competence, and emotional control, while also remaining approachable, non-disruptive, and relationally responsive.

Key Insight: The dual demand on women workers

Women face a dual demand.

Women are required to perform capability in line with masculine-coded workplace norms, such as directness, resilience, and toughness — while simultaneously providing feminised forms of emotional management that help the broader environment hold together.

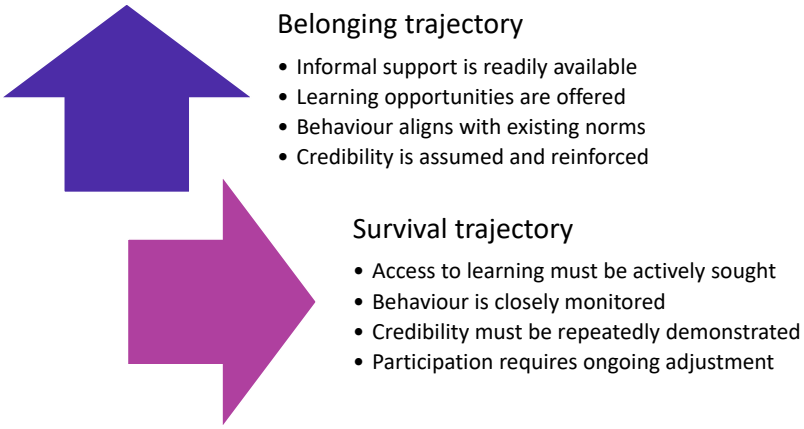
This labour has organisational effects. It preserves cohesion, reduces overt conflict, and helps the informal system continue to function smoothly. Yet it remains largely unrecognised. Because it is not formally allocated, measured, or rewarded, it becomes part of the hidden cost of participation. Emotional maintenance is not an optional extra. For some workers, it is embedded in what it takes to remain workable, credible, and included within the trade.

Synthesis

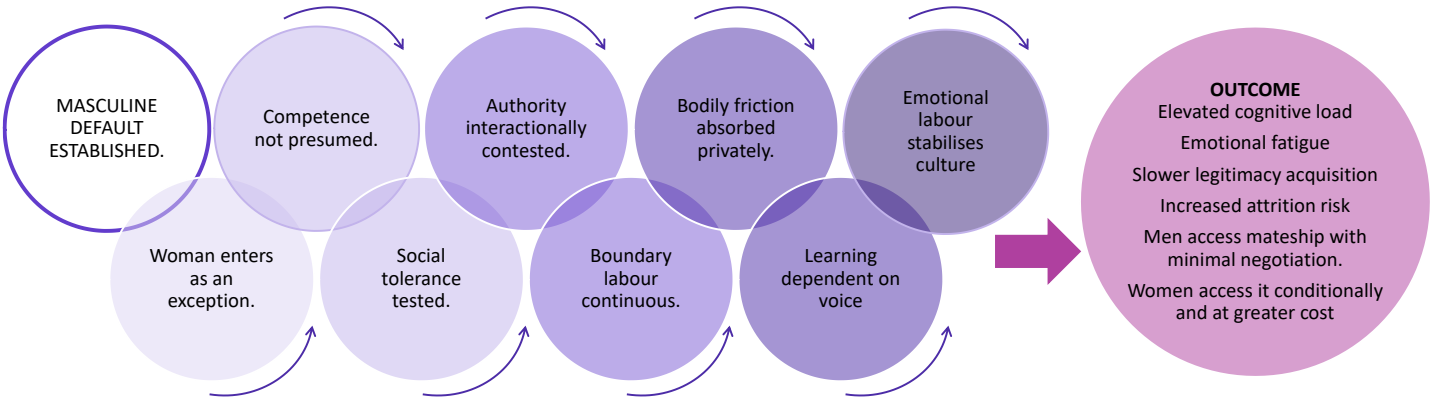
Taken together, these patterns show that the unequal cost of participation is not located in any single barrier, but in how multiple small demands accumulate over time. Each demand, to prove competence, manage interaction, adapt to physical conditions, regulate reactions, and maintain legitimacy, may appear manageable in isolation. In combination, however, they produce a structured environment in which some workers must do more in order to achieve the same level of acceptance.

Within this system, belonging is not automatically granted. It is conditional on ongoing performance across both technical and social dimensions. Because access to learning, support, and progression is shaped by informal judgements about fit, confidence, and workability, participation can appear merit-based while remaining unevenly demanding in practice.

Two distinct participation trajectories can be identified from the data: **a belonging trajectory**, characterised by readily available informal support, assumed credibility, and alignment with existing norms; and **a survival trajectory**, marked by the need for individuals to actively seek learning opportunities and continually prove their credibility and modify their behaviour.



Importantly, these patterns do not rely on overt exclusion. They operate through everyday assumptions, interactions, and design choices that are rarely questioned because their effects are absorbed at the level of the individual. Participation remains possible, but it is not equally sustainable. Acceptance can remain fragile, and belonging can depend on continued proof rather than being taken for granted.



Unequal cost of belonging

The broader implication is that inequality in the plumbing trade is produced not only through discrete acts of exclusion, but also through the cumulative effects of everyday systems calibrated to reward some forms of participation and tax others.

5. INTEGRATED ANALYSIS

5.1 Introduction: Explaining persistent inequality in participation

The central question underpinning this research has been:

> *Why has women's participation in the Plumbing Industry remained persistently low, despite the expansion of formal policies, training initiatives, and regulatory frameworks aimed at improving inclusion?*

Related to this are broader concerns raised across the Building Futures, Breaking Barriers project:

- Why does the industry continue to be experienced as uneven or exclusionary by some groups?
- Why are certain groups consistently overrepresented, while others remain marginal or absent?
- Why do formal efforts toward inclusion not translate into consistent change in everyday experience?

The findings presented in Section 4 suggest that these questions cannot be answered by focusing on entry alone, nor by treating inclusion as a matter of attitudes, awareness, or formal policy in isolation. Rather, the explanation lies in how inclusion operates within the existing structure of work. Across the data, three interrelated conditions were especially significant.

First, the industry is organised through **informality**. Everyday work is coordinated through local judgement, interpersonal trust, discretionary supervision, and tacit norms rather than through consistently applied formal processes. Informality is not simply a cultural preference or a management gap; it is a practical mode of organising work in a fragmented, site-based industry.

Second, this informal system is not neutral. It operates within a **masculine-coded interactional order** that shapes how workers are expected to behave, what is interpreted as competence, and what kinds of conduct are treated as ordinary, excessive, or disruptive. In practice, this means that ease of participation depends not only on technical skill but also on alignment with a relatively narrow behavioural template.

Third, participation in the trade is **conditional and unevenly demanding**. Some workers move through the system with an assumed fit, early trust, and access to informal support. Others must first establish legitimacy, prove they can handle the environment, manage how they are read by others, and absorb additional social and organisational friction simply to remain included. In these cases, participation remains possible, but it is more effortful and less secure.

Taken together, these elements form an interconnected system. They do not merely coexist but reinforce one another. Informality allows local variation and discretionary judgement to dominate everyday experience. Masculine-coded expectations provide the cultural content through which those judgements are made. Conditional participation then emerges as the lived consequence, with some workers more readily recognised as belonging and others required to repeatedly earn, defend, and maintain their place.

This section moves from thematic description to system-level explanation. It argues that persistent inequality in participation is not primarily the result of a simple lack of intent, nor of isolated bad behaviour, nor of women's underrepresentation alone. Rather, it is produced through a system that can absorb pressure, adapt locally, and continue to function without fundamentally altering the conditions that shape who participates, how they participate, and on what terms.

The analysis proceeds in four steps:

- Subsection 5.2 examines why the industry generates limited internal pressure for structural change.
- Subsection 5.3 considers how the trade's self-understanding filters reform and helps stabilise existing norms.
- Subsection 5.4 shows how formal systems are mediated by informal practice, weakening their practical effect.

- Subsection 5.5 then draws these elements together, arguing that the result is a system that is stable and workable for many, but uneven and more demanding for others.
- Subsection 5.6 concludes by identifying what this means for the next stage of the project and the development of the Plumbing Industry Cultural Inclusion Maturity Model.

5.2 Limited internal pressure for change

One of the clearest findings across the data is that the industry does not currently generate strong, sustained internal pressure for structural change. This is not because inclusion is openly rejected, nor because participants are unaware of the issue. Rather, it reflects how the problem is perceived, where responsibility is located, and what kinds of change the system is able to recognise as necessary.

> *"To be honest, the way we run things works for us. We wouldn't really change anything. It's been like this for years, and it gets the job done."*

In many accounts, the Plumbing Industry was described as demanding, fast-moving, and operationally pressured. Across employers, supervisors, and workers, the priority of "getting the job done" remained the dominant organising logic.

Within this environment, inclusion may be acknowledged as desirable, important, or overdue, but it is often positioned separate to core work rather than built into how work is structured. As a result, inclusion is frequently treated as an additional consideration rather than a criterion through which everyday work is organised, evaluated, and redesigned.

This positioning matters. When inclusion is treated as secondary, it becomes something that may be addressed but only when time and capacity allow — rather than something that **actively** reorganises practice. When **operational continuity** remains the benchmark against which decisions are made, other forms of change are more likely to be accommodated only where they do not significantly disrupt workflow, supervision, team dynamics, or productivity. Inclusion is therefore often pursued in ways that are additive, localised, and manageable, rather than systemic.

A second reason internal pressure remains limited is that perceptions of progress are shaped by a **historically low baseline**. Across women's accounts in particular, earlier conditions were described as direct, visible, and difficult to challenge: overt sexualised behaviour, openly hostile environments, lack of basic amenities, and workplace cultures in which speaking up carried high personal and professional risk.

One woman reflected on entering site as a young apprentice:

> *"I was grabbed. I was embarrassed. And I just thought, who am I going to tell? Who's going to believe me?"*

Another described the normalisation of sexualised imagery:

> *"There were posters up. They'd take them down when I came in. But they'd go back up."*

> *"They were upset that they had to take down all of their pornographic pictures off the walls, and one of the men felt that he could manipulate by touching me all the time."*

In these accounts, exclusion was visible, normalised, and embedded within everyday work environments. Importantly, reporting was not avoided because policies were absent, but because the risks of speaking up were immediate and material. As one female participant explained:

> *"If I lost that job, who else is going to put me on?"*

Standing within the industry was fragile, and mobility was limited. In this context, reporting carried reputational and economic consequences, making it a high-risk decision.

This forms the baseline against which current conditions are assessed. Against this backdrop, the presence of policies, increased awareness, less visible overt conduct, or more supportive individuals can be regarded as a significant improvement. These changes are real and should not be discounted. However, they also recalibrate what counts as progress.

Where the baseline is extremely low, partial improvements can produce the impression that the industry has changed substantially, even where the deeper organisation of participation has not. In practical terms, this reduces the urgency felt for further reform.

If the system is seen as having already improved significantly, the need for greater structural change then becomes less urgent or visible.

This also shapes how problems are understood. When past conditions are framed as more extreme or unacceptable, current issues are more easily attributed to individual behaviour rather than recognised as part of a broader system.

The data also showed that responsibility for inclusion is diffused across multiple actors: employers, site supervisors, training organisations, industry associations, unions, and workers themselves. Each occupies a different point in the system and therefore sees only part of the whole. Employers may focus on recruitment, supervisors on team functionality, training organisations on readiness and pathways, industry bodies on sector-level messaging, and workers on the immediate realities of site life. While each perspective captures something important, the cumulative effect is that responsibility becomes distributed without becoming fully owned.

In this kind of environment, problems can be acknowledged without consolidating into a shared mandate for redesign. Challenges are attributed in multiple directions: to schools and pathways, to “bad sites,” to individual supervisors, to particular companies, to workers’ personalities, or to the broader culture of construction. Because responsibility is spread across the system, no single part of the system is compelled to hold the full pattern as its own.

This is reinforced by how workplace culture is commonly understood. Across the data, experiences were frequently explained through individuals rather than structures: a good boss, a bad crew, a supportive supervisor, a rough site, a difficult personality. Variability between worksites was treated as normal, expected, and in many ways inevitable. To some extent, this reflects the genuine decentralisation of the industry. However, it also has an important analytic consequence. When uneven participation is consistently interpreted as site-specific or person-specific, it becomes harder to recognise as a structural outcome.

This normalisation of variability performs a protective function. It enables the system to treat patterned differences in experience as natural variation rather than as evidence of a recurring organisational problem requiring coordinated intervention.

Key Insight: Variability performs a protective function

Variability does not simply reflect the decentralised nature of plumbing work. It also helps shield the system from critique. When experiences are understood as site-specific, supervisor-specific, or crew-specific, uneven participation can be explained as local variation rather than recognised as the recurring effect of broader system conditions.

The result is a system in which the need for reform remains muted. Operational priorities take precedence. Improvements are measured against a low baseline. Responsibility is dispersed. Variability is normalised. Taken together, these conditions limit the emergence of sustained internal pressure for deeper change, even where many participants can recognise that the industry remains uneven in practice.

The cumulative effect is a system that does not feel pressure to change, with various elements combining to produce a stabilising effect that reinforces the status quo. As the various factors interact, the drive for meaningful structural change diminishes.

Quick Question: If more women enter the trade, won't things improve naturally?

Not necessarily. Entry **does not change** how the system operates.

The research findings demonstrate that:

- Participation is shaped by everyday conditions on site
- Belonging is often tested and negotiated
- Progression depends on access to informal support and trust

If those conditions remain unchanged, increasing numbers **may** improve visibility, **but not** change experience or retention.

5.3 Identity of the trade and the filtering of reform

If limited internal pressure helps explain why the industry does not feel compelled to change, the next question is why reforms that do emerge often struggle to take root more deeply. Here, the **identity** of the trade is critical.

Across the data, plumbing was not described simply as a job or a set of technical tasks. It was described as a way of working and, in many accounts, a particular kind of personhood. Competence was closely tied to being practical, resilient, direct, uncomplaining, adaptable, and able to function under pressure. These expectations were not peripheral to the trade, rather they were embedded in how participants described good workers, trustworthy workers, easy workers, and workers who "fit."

This matters because reform is not received into a neutral environment. It is interpreted through an already established understanding of what the work is, what kind of person it requires, and what kinds of behaviour are seen as legitimate within it. In this context, efforts to make work more structured, more regulated, or more explicitly accountable can be interpreted as **interventions into the very identity of the trade.**

A central part of this identity is the **normalisation of endurance**. Across the findings, the capacity to "get on with it," absorb discomfort, and avoid creating disruption was repeatedly tied to competence. This expectation extends beyond physical conditions to include interpersonal life: rough humour, hard feedback, unclear boundaries, tension on site, and the need to work with difficult personalities. The expectation is not necessarily that workers will enjoy these conditions, but that they will manage them without requiring major adjustment from the system around them.

This has important analytic consequences. It means that forms of harm, strain, or exclusion are often not denied outright, but **reframed through the language of toughness, adaptation, and self-management**. Behaviour may be explained as banter, misunderstanding, personality, pressure, or "just how some sites are." The issue is not that participants never recognised that lines were crossed. The issue is that those lines were often interpreted within a framework that already assumes workers should be able to absorb a significant degree of discomfort without escalation.

Spotlight: Mateship and resilience as the trade identity

Across the report, mateship and resilience do not operate in the same way.

Mateship reflects the trade's positive self-image: cohesion, camaraderie, backing each other up, and getting through difficult work as a crew.

Resilience, however, often describes what individuals are expected to supply when that social order does not hold for them.

For workers who align easily with the dominant culture, mateship can operate as a resource. For those whose fit is less readily assumed, resilience becomes a compensatory demand: the expectation that they will absorb discomfort, manage exclusion, and continue without disrupting the existing order. This distinction helps explain why the culture can describe itself positively while still distributing participation unevenly.

Where existing ways of working are bound up with pride, identity, and the trade's positive self-image, new approaches are more likely to be softened, localised, or selectively applied than directly rejected. The system does not need to say "no" in order to preserve itself. It only needs to filter the reform attempts.

Therefore, in this setting, reform is not necessarily met with direct resistance; it is **filtered**. Efforts to introduce more structured approaches — such as formal reporting, oversight, or behavioural expectations — are interpreted through the existing identity of the plumbing trade. Where these efforts are seen as misaligned with how work "really operates," they may be:

- Adapted
- Softened
- Selectively applied, or
- Deprioritised

Digging Deeper: Trade identity vs inclusion language

Part of what is happening here is symbolic as well as practical. The plumbing trade often understands itself as practical, earned, site-tested, and grounded in the realities of work. Inclusion language, by contrast, can therefore appear abstract, managerial, or external to the trade's own self-understanding. What is framed as coming from outside "real work" is easier to soften, defer, or localise. Reform is not only filtered because it is inconvenient; it is also filtered because it may be experienced as less authentic than the trade's existing identity.

This filtering is especially evident in the area of banter and mateship. Across many accounts, banter was associated with bonding, morale, familiarity, and everyday stress regulation. Mateship was linked to trust, cohesion, and getting through hard work together. These are not trivial functions; they are a part of how the plumbing trade understands itself positively.

For this reason, efforts to regulate banter or make interactional norms more explicit can be experienced as threatening something valued rather than simply addressing risk. If banter is seen as what "keeps the day moving", what builds team cohesion, or what makes hard work bearable, then questioning it can feel less like an improvement in safety and more like an attack on the social fabric of the trade itself.

Key Insight: Why regulating banter feels like an identity threat

Inclusion initiatives that problematise banter may be interpreted not as protective measures but as disruptions to what makes the plumbing trade meaningful.

The mechanism operates as follows:

Banter = cohesion → Cohesion = identity → Identity = pride → Regulation = threat

This does not mean banter cannot be regulated. It means the cultural work being done by banter must be understood if regulation is to be effective.

This helps explain why efforts to change behaviour are reframed as interfering with what makes the trade feel cohesive, practical, and recognisable to itself.

The identity of the trade also helps explain why structural issues are so often recoded as matters of fit. Where the ideal worker is already imagined as tough, direct, socially fluent in masculine humour, and able to handle pressure without complaint, those who struggle are more easily seen as lacking the right temperament rather than as encountering a narrow and culturally specific work environment. This is one of the main ways structural inequality remains difficult to recognise. The environment presents its own expectations as ordinary and neutral.

This dynamic is especially important in relation to **physicality**. The findings showed that exclusion is not always expressed in direct or explicit ways. Instead, it often shifts from overt exclusion to conditional inclusion, selective redirection, or claims of neutrality.

Spotlight: How PHYSICALITY shifts from exclusion to neutral logic

Across the data, physical strength emerged as one of the clearest ways female participation is shaped. However, what is most significant is not just its presence, but how the reasoning around it has changed over time. Rather than disappearing, exclusion shifts in how it is expressed and justified.

Stage 1: Direct exclusion — physicality as a fixed requirement

In earlier accounts, physical capability was used as a clear and explicit basis for entry.

"If you can't lift 50 kilos, I can't give you a job. You have to be able to lift 50 kilos."

Here, the boundary is direct and non-negotiable. Physical strength is treated as a minimum requirement, and those who do not meet it are excluded outright. There is little ambiguity in how belonging is determined.

Stage 2: Conditional inclusion — support reframed as burden and risk

In more recent accounts, the same boundary is no longer expressed as outright exclusion. Instead, it is framed through the practical realities of work.

"Women are not strong enough, physically strong enough. They would be mentally brilliant at it … their team fit would be great … But the simple fact is that the guys would actually have to help that person with just about every part of their role … So, we're just not … we're just not really able to … take on that safety risk on sites."

Here, women are not entirely rejected as workers. In fact, they are explicitly recognised as mentally capable, socially compatible, and a good team fit. However, inclusion becomes conditional. **The issue shifts from:**

Can they do the job? → What does their inclusion require from others?

Support and assistance are reframed as:

- Additional labour for others
- Disruption to the workflow
- A potential safety concern

This creates a different kind of boundary. Women are **not** explicitly excluded, but their inclusion is positioned as placing strain on the system.

Stage 3: Selective inclusion — redirection into "suitable" roles

At a further stage, exclusion becomes less visible again. Rather than being framed as a

problem, it is resolved through role segmentation.

"We are trying to diversify the work that we do … building maintenance … and we would most definitely take women on for that."

Here, participation is not denied but redirected. Women are seen as suitable for certain types of plumbing work, AND less suitable for others. This creates a form of inclusion that is conditional and contained. The boundary is maintained, but it is softened through the appearance of opportunity.

Stage 4: Neutrality claims — structural bias becomes invisible

At the most advanced stage, exclusion is no longer expressed through capability or role fit, but through claims of neutrality.

"Tools don't know whether you're male or female."

On the surface, this suggests fairness — that the work treats everyone equally. However, this framing assumes that the tools, equipment, and ways of working are **neutral** to begin with. In practice, these have been developed for a workforce historically dominated by men. They are calibrated to:

- Particular body types
- Particular physical norms
- Particular ways of performing work

Treating them as neutral obscures this history. As a result, the conditions that disadvantage some workers are no longer recognised as such — they are seen as inherent to the job itself.

What this shows

Across these stages, the boundary does not disappear. It moves from:

Explicit Exclusion → Conditional Participation → Selective Inclusion → Assumed Neutrality

At each stage, the reasoning becomes more acceptable and harder to challenge. Exclusion is no longer stated directly. It is embedded within how the work is defined, organised, and understood. In this way, existing ways of working are preserved not through explicit resistance, but through shifts in how they are explained and normalised.

Quick Question: Isn't this just about a few bad behaviours?

Individual behaviour matters.

But repeated patterns across sites suggest something more systemic:

- Similar expectations of "fit"
- Similar pressures to adapt
- Similar patterns of uneven participation

This indicates the issue is not only about who is in the system, but also about **how the system itself operates.**

5.4 Mediation of formal systems through informal practice

A further reason formal progress does not consistently translate into lived change is that formal systems do not operate directly in practice. They are mediated by the informal structures through which everyday work is organised and interpreted.

Across the findings, participants widely acknowledged the existence of more developed formal systems than in the past. These include policies, reporting mechanisms, training initiatives, behavioural expectations, and, in some organisations, more visible commitments to diversity and inclusion. However, the existence of these systems does not guarantee their effect. Their practical force depends on how they are interpreted, when they are activated, and how they interact with the informal norms governing crews, sites, and supervision.

> *"You can have policies in place, but on-site, it really depends on how people actually behave day to day."*

Within this environment, formal escalation is not a neutral action; there are **risks** associated with it. Participants indicated that reporting issues formally can carry:

Social risk (being seen as difficult or disruptive)

> *"She is a good plumber… she works well. But in recent complaints she has made, she has an anger issue problem. The attitude and fit with the team is important... her reasons may be right, but the way she went about it was wrong."*

Relational risk (damaging team dynamics)

> *"He spoke up about an issue, and after that there was just no room for him anymore… no one would have him on their crew, and he basically got pushed out."*

Professional risk (affecting future opportunities)

> *"I didn't think anyone would believe me, and I didn't want to lose my job, because it was a small town, so I just thought, if I don't have this job, who else is going to put me on?"*

As a result, workers often weigh the consequences of escalation against the perceived severity of the issue.

Digging Deeper: Perception vs Reality

From the outside	From the inside
Policies now exist, so things have changed.	Policies exist, but everyday behaviour is still shaped by team dynamics and local judgement.
People can report issues if they need to.	Reporting is available, but may carry social and professional risk, leading many issues to be managed informally.
No complaints means no problem.	Silence is often a strategic choice, not an indication that issues are absent.

Supervisor discretion is central here. Supervisors often act as the first interpretive gatekeepers between informal experience and formal response. They decide whether behaviour is framed as rough humour, a misunderstanding, a personality clash, or something requiring escalation. These judgements are rarely made outside the broader cultural environment. Supervisors themselves are operating within the same informal norms, team pressures, and understandings of what counts as serious or manageable.

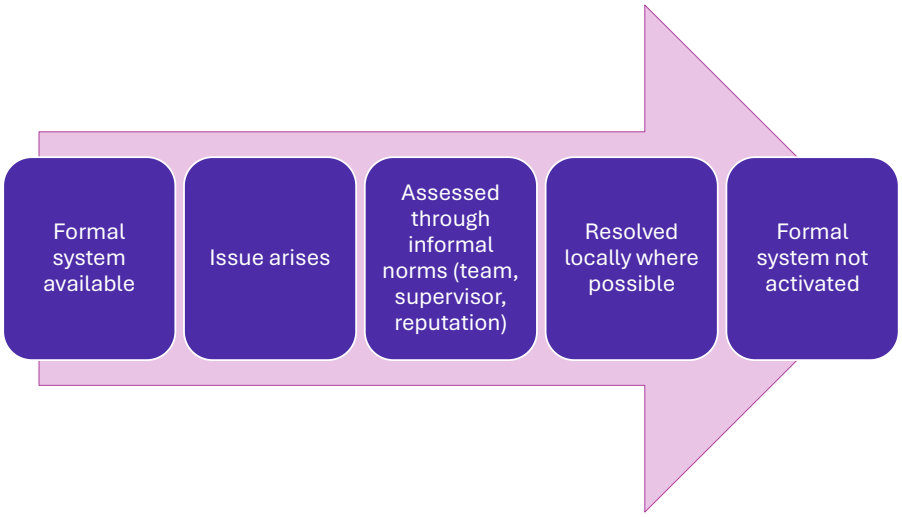
Responsibility for behaviour is also diffused across the structure of work. Given the number of actors on a worksite — including different crews, different subcontractors, and different supervisors, when problems arise, responsibility is often shifted or attributed to different sources, rather than being clearly assigned or understood.

Common attributions include:

- "other people on site"
- particular individuals
- specific contexts

This tendency to attribute issues to others or to specific circumstances prevents problems from being recognised as part of broader, recurring patterns within the organisation. As a result, this prevents behavioural issues from accumulating into a shared understanding of structural patterns, ultimately impeding the implementation of effective, organisation-wide solutions. The result is that pressure is absorbed and does not accumulate.

How formal systems are mediated:



Spotlight: When harm is collective, but reporting is individual

In many accounts, harassment and bullying were not described as isolated behaviours enacted by a single individual. Instead, they often operated within a broader social environment — reinforced by group chat dynamics, shared humour, repeated joking, and peer validation.

In these cases, the issue is not simply that inappropriate behaviour occurs. It is that the behaviour is socially distributed.

A worker considering whether to speak up is not simply weighing a complaint against one person. They are weighing themselves against a social environment in which:

- The behaviour may be normalised or minimised
- Others may have participated in or reinforced it
- Speaking up risks disrupting group cohesion
- The individual may become socially isolated or labelled as difficult

This creates an asymmetry:

Harm is collective, but reporting is individual

This asymmetry significantly raises the perceived cost of escalation.

By contrast, in a hypothetical scenario where inappropriate behaviour is clearly individualised and where multiple people are affected in visible and acknowledged ways, the dynamics of reporting would shift.

Collective visibility can:

- Distribute the social risk of speaking up
- Increase credibility of the concern
- Reduce reputational exposure for any one individual
- Make organisational response more straightforward

In the plumbing context, however, the social embedding of behaviour means that reporting is not simply a procedural step. It is a relational and reputational act.

A reporting pathway, behavioural policy, or training program may exist formally without substantially altering everyday experience. Formal systems matter, but their effect depends on whether they are trusted, whether they are activated, and whether local interpretation allows them to override the informal norms already shaping site behaviour.

Key Insight: Trust deficit undermines formal systems

Even where formal reporting pathways exist, confidence in their effectiveness remains uneven. A trainer detailed:

"I normally tell them to go to management… but honestly, if it's bad, you might just have to leave."

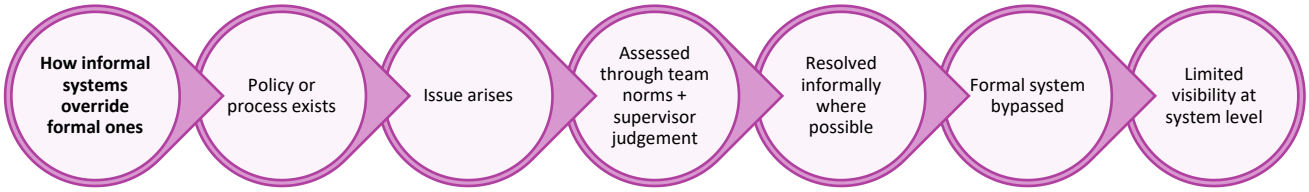
When even intermediaries express limited faith in escalation pathways, formal systems lose credibility before they are activated.

This dynamic further weakens the likelihood that formal systems will be activated, even where they are available and understood.

When asked about bullying escalation, one senior stakeholder voice explained:

> *"There's the silence option. There's the middle option where people talk about it. And then there's the formal written complaint. Most of it [the response to bullying/harassment] sits in that middle option."*

The "middle option" is structurally significant. From a practical standpoint, this can appear sensible. Informal resolution may preserve working relationships, avoid escalation, and fit the pace and immediacy of site-based work. However, it also has a clear systemic effect: it prevents recurring issues from accumulating into visible organisational knowledge. What remains local does not become legible as a pattern. What is managed informally does not produce redesign pressure. In this way, mediation does not merely soften the impact of formal systems in the moment; it also weakens the organisation's capacity to learn from what the system is producing.



Quick Question: If policies exist, isn't the problem already being addressed?

Policies matter — but they do not operate on their own.

Their impact depends on:

- How they are interpreted,
- Whether they are used, and
- How they interact with informal norms.

In many cases:

- Issues are managed locally,
- Formal processes are bypassed, and
- Policies remain under-utilised

This helps explain why organisations can point to formal progress while workers still experience everyday participation as uneven. The intended logic of the formal system and the negotiated reality of the informal system do not always align. A workplace may officially prohibit certain conduct, yet local team norms continue to determine whether that conduct is taken seriously. A company may endorse inclusion, yet access to learning and support still flows through informal trust, visibility, and sponsorship. A reporting pathway may exist, yet the social cost of using it remains high enough that many concerns never enter the system at all.

Key Insight: Diversity beyond gender remains difficult to navigate

Participants raised concerns about how workers who do not fit traditional masculine norms, whether due to personality, body type, sexuality, or cultural background, are treated.

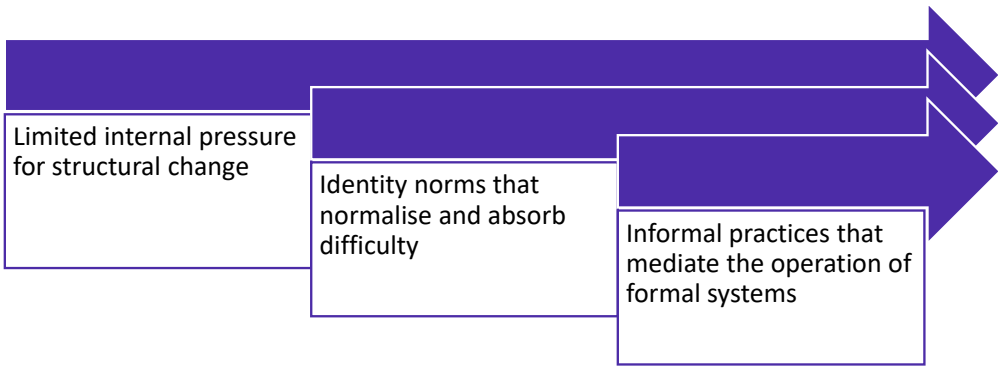
While participants often claimed that "everyone is equal," their descriptions revealed clear boundaries around what kinds of differences are accepted and what kinds are penalised. The combined data painted a coherent cultural system where:

- A masculine apprenticeship hierarchy normalises disrespect as "training."
- Women and atypical men navigate extra layers of proving, performing, and self-protection.
- Banter performs inclusion/exclusion work more powerfully than any policy.
- Learning and progression depend on voice, confidence, and sponsorship — **not** structured opportunity.
- Learning, progression, inclusion, respect, safety all rely on good individuals rather than systems — indicating low organisational maturity.

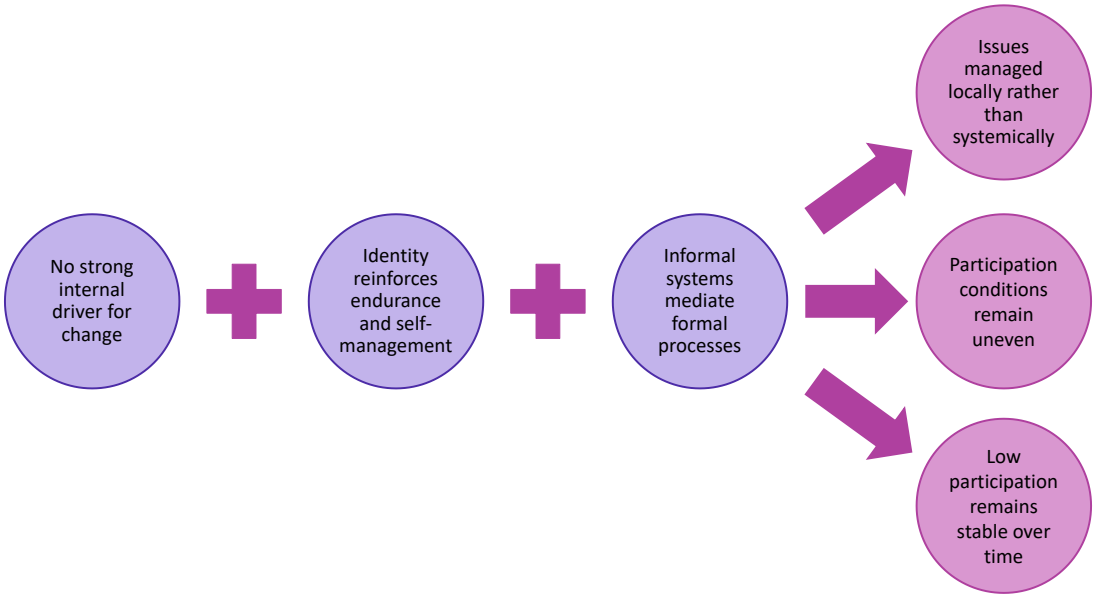
5.5 A stable but unequal system

Taken together, the findings point to a system that is **functional** and **self-stabilising,** but not consistently inclusive. The system is also **self-legitimating**. Because work still gets done, teams often continue to function, some individuals do succeed, and overt behaviour is widely seen as better than in the past, the industry can present itself as fundamentally fair, workable, and already improving. These signs of visible functionality do not disprove inequality. Instead, they help conceal the patterned ways in which ease, legitimacy, opportunity, and endurance remain unevenly distributed. **Inequality is therefore reproduced not only through informal systems, but also through the fact that those systems continue to work well enough for those already aligned with them.**

The system is characterised by:



These elements do not operate independently. They reinforce one another. Limited pressure means issues are not pushed upward; identity norms encourage endurance rather than escalation; and informal systems absorb and manage issues locally. This allows the system to continue functioning without needing to change.

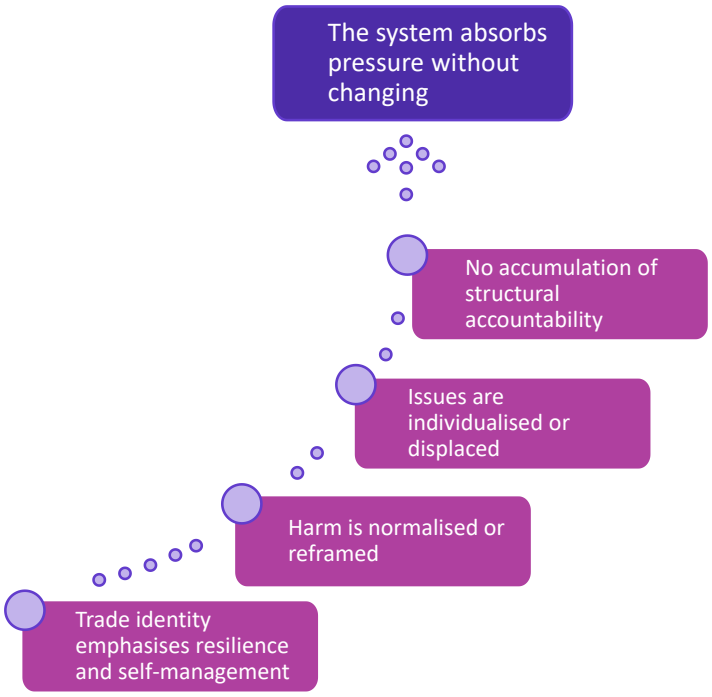


Instead of resolving the pressure to change – the **pressure is redistributed**.

Pressure is redistributed:

- onto individuals, who must adapt, endure, and navigate;
- into informal processes, where issues are managed locally; and
- across actors, where responsibility is diffused

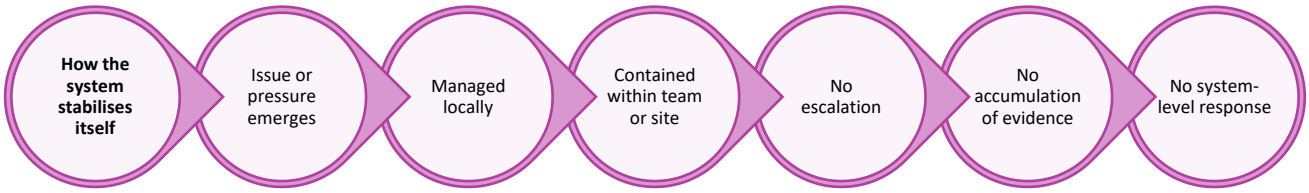
This allows the system to absorb challenges without altering its underlying structure.



This dynamic explains the central pattern observed across the research. Formal inclusion efforts can coexist with persistent inequality because they are operating within a system that:

- Does not generate sustained internal pressure for change,
- Interprets difficulty through identity norms of endurance, and
- Resolves issues through informal, local mechanisms.

As a result, formal change **does not** automatically translate into structural or experiential change.



Individual success stories further reinforce the perception that the system works.

Spotlight: The exceptional woman and the limits of representation

Accounts of women who succeed in the trade are often used as evidence that the system works. These stories are important. However, they can also obscure the conditions that made success possible.

Success is frequently attributed to individual resilience, personality, or determination, rather than to the specific environments, teams, or opportunities that enabled it.

While such accounts provide powerful role models, they can also give the industry a form of narrative cover, suggesting that barriers are personal rather than structural. The presence of successful individuals does not eliminate unequal conditions. It demonstrates that participation is possible, not that it is evenly supported.

Quick Question: If someone succeeds, doesn't that show the system works?

Success shows participation is possible. It does not mean participation is equal.

Some individuals succeed by:

- Navigating informal expectations
- Absorbing additional pressures, and
- Adapting to existing norms

This can mask the fact that the effort required to succeed is **not** evenly distributed

Digging Deeper: Tensions that keep the system unchanged

Informality vs Consistency

- Informal systems allow flexibility
- But produce uneven experiences across sites

Strong teams vs Exclusionary dynamics

- Close-knit crews support cohesion
- But can make entry and belonging more difficult

Resilience vs Suppressed reporting

- Endurance is valued
- But discourages escalation of issues

Progress vs Persistence

- Policies and expectations have improved
- But everyday participation remains uneven

Individual responsibility vs System conditions

- Workers are expected to adapt
- But conditions shaping participation remain unchanged

Variation vs Accountability

- Differences between sites are normalised
- But this limits recognition of systemic patterns

These tensions allow the system to function but also prevent it from shifting.

5.6 Implications for Stage B and C

These findings suggest that improving women's participation in the Plumbing Industry requires a shift in focus.

Expanding formal systems alone is unlikely to be sufficient. Instead, attention must be directed to how inclusion can operate within the existing work structure.

This includes:

- Making informal processes visible
  (e.g. how learning, support, and escalation actually occur in practice)
- Clarifying responsibility across actors
  (reducing diffusion and enabling accountability)
- Reducing the individual risk of participation
  (particularly around speaking up, accessing opportunity, and establishing legitimacy)
- Aligning change with trade identity
  (rather than positioning inclusion as external or incompatible with "real work")
- Creating mechanisms through which recurring local issues can be recognised as patterns rather than repeatedly managed as isolated exceptions.

These directions form the foundation for Stages B and C of Constructing Equity's work, which will focus on identifying practical pathways for organisations to move toward more consistent, accountable, and inclusive participation, within the realities of how the industry operates.