

FEBRUARY 2005

**SKILL SHORTAGE ASSESSMENT
OCCUPATION: FITTER AND WELDER**

Current situation: Skill shortage

Short-term outlook: Skill shortage

Executive summary

1. Results from the Survey of Employers who have Recently Advertised (SERA) indicate that there is currently a substantial shortage of fitter and welders. Less than four out of 10 fitter and welder vacancies analysed in the SERA were filled. This report considers these survey results in the context of trends in the demand for and supply of fitter and welders.

Table 1: employer survey indicators, 2004

	Fill rate	Average number of suitable applicants
Fitter and Welders	33%	0.8
All trades surveyed	41%	0.7

Source: Department of Labour, SERA

2. Employment of fitter and welders grew only slightly between 1991 and 2001 (0.2%), and has remained flat since then. This is despite strong output growth in the past three years in the two main employing sectors for fitter and welders: *metal product manufacturing*, and *machinery and equipment manufacturing*. Low employment growth for fitter and welders can be partly explained by the increased use of labour saving technology. Demand for metal products is likely to remain strong next year. However, growth in demand for fitter and welders will be modest at best and may not translate into increased employment because the availability of skilled labour is limited.
3. The number of trainees achieving the three relevant national certificate level 4 qualifications for fitter and welders has increased slightly during the past three years. A comparison of this number with the number of fitter and welders employed yields a training rate for fitter and welders of 2.4%. This is higher than the average training rate for all trades analysed by DoL but is lower than the equivalent training rate in New South Wales, Australia (3.0%). The New Zealand training output of relevant national certificates is sufficient to cope with retirements (which occur at a rate of 0.9% per annum). It may however not be sufficient to cope with additional losses of fitter and welders through migration and movement into other occupations.
4. Considering the extent of the current shortage of fitter and welders, coupled with modest growth in demand, the Department of Labour (DoL) concludes that the shortage will persist over the next year or two.

Introduction

The purpose of this report is to investigate shortages of fitter and welders in New Zealand. It aims to provide an assessment of whether there is a shortage of fitter and welders and an explanation of the demand and supply factors contributing to this situation. It also offers an outlook for shortages in this occupation.

Fitter and welders, (code 72124 under the New Zealand Standard Classification of Occupations), are skilled tradespeople who fit and weld prefabricated cast and forged metal components to assemble structural forms, such as machinery frames, tanks, pressure vessels, furnace shells and building and bridge parts¹. DoL estimates that there were approximately 6,200 fitter and welders employed in New Zealand in 2003.

A background and technical note to this report is available from DoL. The note provides an overview of the broader Job Vacancy Monitoring Programme, of which this report is an output. It also provides a brief description of the employer survey conducted for this report and explanations of indicators and definitions used in the report.

Demand for fitter and welders

Historical demand

Employment of fitter and welders increased only slightly between 1991 and 2001, averaging 0.2% per annum.

Table 1: employment growth of fitter and welders, 1991-2001

	Annual average growth in employment		
	1991-1996	1996-2001	1991-2001
Fitter and welder	-2.7%	3.3%	0.2%
All trades	0.0%	-0.4%	-0.2%
All occupations	3.2%	1.2%	2.2%

Source: Statistics New Zealand, Census of Population and Dwellings 1991, 1996 and 2001

Household Labour Force Survey (HLFS) data show that employment of *metal moulders, sheet metal and related workers* (the broad category grouping in which fitter and welders fall) continued to grow slowly since 2001².

Table 2: employment of metal moulders, sheet-metal and related workers, 2001-2004 March years

	2001	2002	2003	2004
Metal moulders, sheet-metal and related workers	15.2	16.6	16.3	15.4

Source: Statistics New Zealand, HLFS

This slow employment growth occurred despite modest overall employment growth and strong activity in the *metal product manufacturing* and *machinery and equipment manufacturing* sectors, where output growth averaged 4.5% per annum between 2001 and 2004. These sectors employ 70% of fitter and welders according to the 2001 census. With businesses adopting labour-saving tools and machinery, output growth was achieved mainly through increases in labour productivity rather than additional labour.

¹ The description is taken from ACC provider resource worksheets (<http://www.acc.co.nz/for-providers/resources/worksheets/trades-workers/>)

² Due to the close association of the constituent occupations, the trend at the broad occupational group level is considered to be reflective of the trend for fitter and welders.

Future demand

Demand for metal products is likely to remain strong during the coming year. However, demand for fitter and welders is likely to be modest at best, given the advances in technology. Whether even modest demand translates into employment will be dependent on the availability of skilled labour.

Summary

Employment of fitter and welders grew marginally between 1991 and 2001 (0.2%), and has remained flat since then. This is despite strong output growth in the past three years in the two main employing sectors for fitter and welders (*metal product manufacturing* and *machinery and equipment manufacturing*) and overall growth in employment in these sectors. Slow employment growth for fitter and welders can be partly explained by the increased use of labour-saving technology. Demand for metal products is likely to remain strong over the coming year. However, demand for fitter and welders will be modest at best, and may not translate into increased employment because the availability of qualified fitter and welders is limited.

Supply of fitter and welders

Training – National certificate (Level 4) qualifications and equivalent

This section investigates the growth in supply of *fully qualified* fitter welders through training. It considers three sources of supply:

1. The award of the National Certificate in Maintenance and Diagnostics in Mechanical Engineering (Level 4), the National Certificate in Engineering – Heavy (Level 4) and the National Certificate in Engineering Fabrication – Welding (Level 4) by the NZ Engineering, Food and Manufacturing Industry Training Organisation (Competenz). These are the three nationally recognised qualifications for fitter and welders, which were designed by Competenz to meet the needs of employers of fitter and welders in the engineering and manufacturing industries. They take an average of three years to complete.
2. The award of the National Certificate in Maintenance and Diagnostics in Mechanical Engineering (Level 4), the National Certificate in Engineering – Heavy (Level 4) and the National Certificate in Engineering Fabrication – Welding (Level 4) by other providers such as polytechnics.
3. The award of qualifications apart from national certificates which are deemed to be equivalent to the national certificates in terms of level and number of credits.

Table 3 shows that all qualifications at this level were awarded by Competenz. Total and new enrolments increased between 2001 and 2002, with new enrolments rising from 523 in 2001 to 539 in 2002. However, both total and new enrolments declined slightly in 2003. Table 4 shows that achievements of these qualifications have increased steadily between 2001 (92) and 2003 (146). There were no non-national certificate qualifications at the equivalent level of the national certificate awarded over this time period. A list of national certificate level 4 and equivalent qualifications and the proportion of trainees enrolled for these qualifications is provided in Appendix 1.

Table 3: enrolments for the level 4 national certificate qualifications for the fitter and welder trade and other equivalent qualifications

		National Certificate in Maintenance & Diagnostics in Mechanical Engineering Level 4 (Competenz)	National Certificate in Engineering (Fabrication – Heavy) Level 4 (Competenz)	National Certificate in Engineering (Fabrication – Welding) Level 4 (Competenz)	National (Level 4) (Other providers)	Other equivalent qualifications	Total
2001	Total enrolled	936	497	48	None	None	1481
	New enrolments	301	205	17	None	None	523
2002	Total enrolled	1004	576	36	None	None	1616
	New enrolments	321	206	12	None	None	539
2003	Total enrolled	1144	411	32	None	None	1587
	New enrolments	295	189	5	None	None	489

Source: NZ Engineering, Food and Manufacturing Industry Training Organisation (Competenz)

Table 4: number of trainees achieving the level 4 National Certificate qualifications for the fitter and welder trade and other equivalent qualifications

	National Certificate in Maintenance & Diagnostics in Mechanical Engineering Level 4 (Competenz)	National Certificate in Engineering (Fabrication – Heavy) Level 4 (Competenz)	National Certificate in Engineering (Fabrication – Welding) Level 4 (Competenz)	National Certificate in (Level 4) (Other providers)	Other equivalent qualifications	Total
2001	99	35	2	None	None	136
2002	51	57	4	None	None	112
2003	95	48	3	None	None	146

Source: NZ Engineering, Food and Manufacturing Industry Training Organisation (Competenz)

Training rate indicators are given in table 5³. A comparison of the number of trainees achieving the national certificates in fitter welding (level 4) and equivalent qualifications with the number of fitter and welders employed yields a training rate (NC level 4) of 2.4%. This indicator provides a crude measure of the rate at which the supply of fully qualified fitter and welders can potentially grow through industry training⁴. This training rate for fitter and welders is slightly less than the average for all SERA trades surveyed

³ The calculation of the training rates for fitter and welders recognises that the nationally recognised qualifications for this trade are also the nationally recognised qualifications for other trades. The National Certificate in Maintenance and Diagnostics in Mechanical Engineering is also a recognised qualification for fitter and welders and the National Certificate in Engineering Fabrication (Heavy) is also a recognised qualification for boilermakers. In calculating training rates for occupations that involve multiple occupation qualifications it is assumed that the number of completions from each qualification available to each occupation is in proportion to the number of people employed in those occupations.

⁴ This assumes that there is full employment of fitter and welders. This is a reasonable assumption in the current environment of low unemployment and skill shortages.

(1.8%), but lower than the training rate for a comparable trade in New South Wales (NSW), Australia. The training rate for metal fabricators in NSW is 3.0%⁵.

An alternative measure of training levels is the enrolment rate (NC level 4) which compares the number of trainees enrolled for the national certificates with the number of fitter and welders employed. The enrolment rate for fitter and welders was 17.5% in 2003.

Training – Other related qualifications and courses

While either of the three level 4 national certificates may be regarded as the qualification required to be a fully qualified fitter and welder, there are other lower level qualifications available in fitting and welding (such as the Certificate in Welding Level 3). These qualifications may be regarded as adequate to some employers of fitter and welders, especially during times of acute skill shortages. They are also of significance as these qualifications may staircase trainees towards the national certificate level 4 qualifications. Credits obtained in these qualifications may be recognised towards a national certificate level 4, should the trainee later wish to become a fully qualified tradesperson. A list of these qualifications and the proportion of trainees enrolled in courses leading to these qualifications is provided in Appendix 1.

Training in these courses is reflected in the training enrolment rate (all related training) which compares the number of trainees enrolled in fitting and turning-related training with the number of employed fitter and welders. The enrolment rate (all related training) is measured at 71.5% in 2003.

A number of other government-funded vocational educational and training programmes (including Training Opportunities, Youth Training and Skill Enhancement Training) offer trades related training which lead to credit achievement on the National Qualifications Framework⁶. A further 76 people were enrolled for this training in 2003 (see Appendix 1).

Table 5: training rates for fitter and welders, 2003

Indicator	Explanation	Fitter and welder (NZ)	All SERA trades surveyed (NZ)	Metal Fabricator (NSW, Australia)	All trades (NSW, Australia)
Training rate (national certificate L4 and equivalent)	Number of trainees achieving relevant national certificates (level 4) and equivalent non-national certificate qualifications expressed as a percentage of employment in that occupation.	2.4%	1.8%	3.0%	2.8%
Training enrolment rate (national certificate L4 and equivalent)	Number of trainees enrolled for relevant national certificates (level 4) and equivalent non-national certificate qualifications expressed as a percentage of employment in that occupation.	17.5%	16.4%		
Training enrolment rate (all related training)	Number of trainees enrolled in all relevant courses expressed as a percentage of employment in that occupation.	71.5%	30.5%		

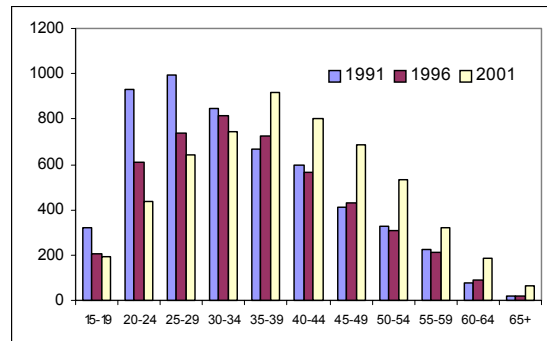
Source: Department of Labour (New Zealand), Department of Employment and Workplace Relations (Australia)

⁵ NSW Labour Economics Office, Department of Employment and Workplace Relations.

⁶ Enrolments in these programmes are not included in the training enrolment rate (all related training).

Employers contacted during the SERA confirmed the low NZ national certificate level 4 training rate, saying that there were limited numbers of young people wanting to become fitter and welders. The perception among employers is that young people who really want to become apprentices are hard to find. Figure 1 shows an age profile of employed fitter and welders. It confirms the large drop in fitter and welder numbers in the 15-19 and 20-24 age groups between 1991 and 2001. Survey participants commented that very few qualified people under the age of 35 apply for fitter and welder positions.

Figure 1: age profile of fitter and welders



Source: Statistics New Zealand, Census

Migration

Migration data for fitter and welders is presented at the broader occupational group level of *metal moulders, sheet-metal and related workers*.

Between 1998 and 2004, New Zealand experienced a net outflow of 514 *metal moulders, sheet-metal and related workers* (table 2) which amounted to between 3% and 4% of the metal trade workforce. With economy-wide net inward migration expected to slow over the coming year, DoL concludes that migration is unlikely to significantly boost the supply of fitter and welders.

Table 2: permanent and long-term (PLT) annual arrivals, departures and net migration of metal moulders, sheet-metal and related workers, June years

	1998	1999	2000	2001	2002	2003	2004
PLT annual arrivals	226	127	152	136	158	146	124
PLT annual departures	304	341	299	250	119	130	140
PLT net migration	-78	-214	-147	-114	39	16	-16

Source: Statistics New Zealand, External Migration

Although employers mentioned that they receive applications from migrants, the majority of employers interviewed for the SERA had little confidence in the competence of fitter and welder tradespersons from other countries (with the exception of the U.K.). The reasons given range from poor English language ability to 'not working to New Zealand standards' and 'not having a New Zealand work ethic'.

Retirement

Approximately 0.9% of the fitter and welder workforce retires each year⁷. This amounts to an annual loss of between 40 and 50 fitter and welder workers.

Summary

The number of trainees achieving the three relevant national certificate level 4 qualifications for fitter and welders has increased slightly during the past three years. However, the training rate for fitter and welders (2.4%) is still lower than the equivalent training rate in New South Wales, Australia, for metal fabricators (3.0%). The New

⁷ This is estimated from the 2001 population census.

Zealand training output of relevant national certificates is sufficient to cope with retirements (which occur at a rate of 0.9% per annum). It may however not be sufficient to cope with additional losses of fitter and welders through migration and movement into other occupations.

Employer recruitment experiences

Is there a shortage of fitter and welders?

The SERA results suggest that there is a severe shortage of fitter and welders in New Zealand and that recruiting conditions for fitter and welders are much tighter than for other trades.

Only 33% of vacant fitter and welder positions were filled after more than six weeks of advertising, which is lower than the 41% average fill rate for all trades surveyed. An average of only 0.4 suitable applicants for each fitter and welder vacancy further emphasises the difficult recruitment environment faced by employers of fitter and welders.

Table 5: SERA results for fitter and welders

	Number of employers	Number of Positions	Positions filled	Fill rate	Suitable applicants	Average number of suitable applicants
Fitter and welders	14	24	8	33%	9	0.4
All trades surveyed	240	453	186	41%	337	0.7

Source: Department of Labour, SERA

Employers interviewed for the SERA reported that the shortage of fitter and welders was constraining their business. They were either unable to expand, unable to exploit new work opportunities, having to turn work away or having difficulty in meeting deadlines. In reaction, employers were increasing overtime, making use of lower skilled labour and/or apprentices, and increasing pay rates and perks offered.

What are employers paying?

Fitter and welders are relatively well paid compared with other trades. Table 6 shows that the mean wage of fitter and welders exceeds that of the mean for all trades. This is despite the fact that fitter and welder wage growth has recently been less than the all-trade average. A comparison of June 2003 and June 2004 Labour Cost Index (LCI) data shows that fitter and welder wages have increased by 2.8% compared with an all-trade average of 4.3%.

Table 6: fitter and welder wage rates

	Mean
Fitter and welders	\$21.29
All trades	\$19.54

Source: Statistics New Zealand, LCI

Changes in market conditions

Employers were asked whether it was harder or easier to fill their recent fitter and welder vacancies compared with twelve months earlier. Fifty percent of employers felt that it was harder.

Outlook

There is currently a substantial shortage of fitter and welders. Demand for fitter and welders is expected to increase modestly in the short term due to continued growth in its two main employing sectors, *metal product manufacturing* and *machinery and equipment manufacturing*. While supply of qualified fitter and welders from training is expected to increase modestly over the next few years, it is unlikely that the current and future number of trainees achieving national certificate level 4 will be adequate to cope with new demand arising from job creation, replacement demand arising from retirements, occupational wastage, outward migration and current shortages. Therefore, DoL predicts that the shortage of fitter and welders will persist for the next one to two years.

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Appendix 1: TRAINING ENROLMENTS FOR FITTER WELDER TRADE: 2003

Enrolments in National Certificate Level 4 and equivalent qualifications: 2003

Qualification Title	Qualification Code	Provider Name	Level	Credits	Share of Enrolments (%)
NC in Maintenance & Diagnostics in Mech Engineering	NC5330	Competenz	4	286	48.5%
NC in Engineering Fabrication - Heavy Fabrication	NC5327	Competenz	4	285	48.8%
NC in Engineering (Fabrication - Welding)	NC5327	The Open Polytechnic of New Zealand	4	285	0.2%
NC in Engineering Fabrication - Welding	NC5327	Competenz	4	285	2.4%
					100.0%

Enrolments other qualifications: 2003

Qualification Title	Qualification Code	Provider Name	Level	Credits	Share of Enrolments (%)
MIT Certificate In Engineering Trades	MN4414	Manukau Institute of Technology	1	40	0.1%
LCP - NC in Manufacturing and Mechanical Engineering	na	Competenz	1	na	8.4%
NC in Manufacturing & Mechanical Engineering	NC5331	Competenz	1	50	20.1%
NC in Manufacturing & Mechanical Engineering	NC5331	NZITO	1	50	0.1%
Certificate in Welding, Machining and Fabrication	MA4198	Universal College of Learning	2	131	0.2%
Certificate in Pre-Apprenticeship Engineering	BP3193	Bay of Plenty Polytechnic	2	124	0.4%
Certificate in Steel Fabrication and Welding -	MA4113	Universal College of Learning	2	51	0.5%
Certificate in Welding	CH3750	Christchurch Polytechnic Inst of Tech	2	51	6.8%
Certificate in Welding and Engineering	MA3946	Universal College of Learning	2	72	0.8%
Wairiki Certificate in Introduction to Welding and Fabrication	WR2754	Wairiki Institute of Technology	2	43	0.8%
Christchurch Polytechnic Inst of Tech	CH3879	Certificate in Engineering (Fabrication) EQL2	2	68	0.9%
Manukau Institute of Technology	MN4432	MIT Certificate in Fabrication Trades	2	60	0.3%
Foundation Certificate in Welding	ST4977	Southern Institute of Technology	2	45	0.9%
MIT Certificate in Welding	MN4371	Manukau Institute of Technology	2	120	1.7%
LCP - NC in	na	Competenz	2	na	12.2%

Manufacturing and Mechanical Engineering (Health and Safety)					
NC in Engineering (General Engineering-Mechanical)	na	Competenz	2	77	0.3%
NC in Manufacturing & Mechanical Engineering	NC5332	Competenz	2	130	20.1%
NC in Manufacturing & Mechanical Engineering	NC5332	NZITO	2	130	0.1%
Certificate in Basic Engineering (Armourer) - Eastern Institute of Technology	MA4215	Universal College of Learning	3	85	0.2%
Certificate in Welding	HB3905	Bay of Plenty Polytechnic	3	120	0.2%
MIT Certificate in Welding	BP3213	Manukau Institute of Technology	3	65	1.2%
NC in Manufacturing & Mechanical Engineering	MN4372	Competenz	3	120	0.4%
Certificate in Advanced Welding	NC5333	Competenz	3	210	0.5%
Northland Certificate in Advanced Welding & Fabrication	PC9021	NZ Welding School	4	75	0.8%
NC in Manufacturing & Mechanical Engineering - created	PC1955	Rural Training Solutions Ltd (Whangarei)	4	69	0.3%
4711 WELDING	na	Competenz	4	280	0.1%
Basic Arc, Mig and Gas Welding	PA0731	Southern Institute of Technology	na	43	0.6%
Certificate in Welding Processes	G52320	Bay of Plenty Polytechnic	na	na	1.4%
Community Education - Metal Trades General Hobby Courses	AO3116	Aoraki Polytechnic	na	120	2.3%
Industrial Welding Certification	G52323	Universal College of Learning	na	na	0.3%
NZS 4711 Arc Welding	PA0731	Western Institute of Technology Taranaki	na	57	1.3%
NZS Welding 4711 Testing	PA0738	Christchurch Polytechnic Inst of Tech	na	43	0.5%
Waikato Institute of Technology	TC5424	Universal College of Learning	na	43	3.7%
Wellington Institute of Technology	HV4142	Fitting and Welding Trade Certificate	na	na	0.3%
NZ Welding School	PC3246	Certificate in Fabrication and Welding	na	121	0.9%
Certificate of Achievement in MIG and TIG Welding	HV4153	Certificate in Welding & Fabrication Skills	na	76	7.3%
NZS 4711 Welding	BP3270	Wellington Institute of Technology	na	na	1.6%
WITT Certificate in Welding	TK0011	Bay of Plenty Polytechnic	na	43	0.8%
		Western Institute of Technology Taranaki	na	110	0.8%
					100.0%

Enrolments in Training Opportunities Programme, Youth Training and Skill Enhancement Training related to the fitter welder trade

Course name	Programme type	Share of Enrolments (%)
Manuf & Mechanical Engineering	TOP	23.7%
Mechanical Engineering	YOUTH	17.1%
Mechanical Engineering	TOP	19.7%
Engineering/Small Motors	TOP	18.4%
Carpentry and Mechanical Engineering	YOUTH	21.1%
		100.0%