

QUALIFICATION REVIEW:

NZC ELECTRICITY SUPPLY (LINE MECHANIC DISTRIBUTION)

MAY 2019



Executive Summary:

This review concludes the qualification is suitable for traditional overhead line mechanics. This role continues to be important in the Electricity Supply Industry, and growth in the number of line mechanics is expected. Most line mechanics will also need to work underground and with low voltage overhead lines.

Purpose:

The purpose of this review is to determine whether the qualification still meets the needs of the Electricity Supply Industry. This is the first review since the qualification was published. The programme and unit standards are also reviewed to ensure they are fit-for-purpose.

Qualification

New Zealand Certificate in Electricity Supply (Line Mechanic Distribution) (Level 4) [Ref: 2197]

History:

This qualification was approved in July 2014 as a replacement for the National Certificate in Electricity Supply (Line Mechanic Distribution) (Level 4) [Ref: 874] which is now discontinued. It has been republished twice: in December 2015 to transfer to Connexis and update information in the conditions relating to the graduate profile; and in May 2016 to remove US 6400 from the mandatory conditions associated with outcome 3.

Three organisations have approved programmes leading to the qualification: Connexis Infrastructure Industry Training Organisation; Industry Skills Limited; and MITA Consulting Ltd.

The programme was approved in September 2014. It was transferred to Connexis in July 2015. In version 3, US 6400 was removed (June 2016). In version 4, US 30265 replaced expiring US 17602 (Sep 2018).

Feedback from survey:

Employers, graduates, trainees and other interested people were surveyed in April-May 2019. Responses were received from 23 people: three graduates, 15 employers, and five others. Most people agreed or strongly agreed with the statements:

This qualification provides the skills and knowledge required by Distribution Line Mechanics. 82%

The evidence required for assessments is easily gathered from day-to-day workplace activities. 79%

The assessment materials are relevant to my workplace. 78%

More details are available in Appendix 1.

Suggestions for improvements:

More practical observations, less written assessments I.e there is a distinct imbalance to the amount of time spent doing the theory to practical ratio especially if it is more of a practical nature

Requirements for electrical testing can be improved and there are no low voltage live work unit standards as compared to high voltage live line work.

Needs low voltage skills and knowledge added to the qualification

Line mechanic fields of works have changed so much over the years I would think that a longer training period would benefit trainees

Assessment evidence needs to be current with industry and legislative requirements and presently it is out of date and incorrect and therefore misleading.

Some of the evidence structure is based around the completion of the task as if the individual was running the job (Supervisor). It would be beneficial for the trainee to have levels of participation similar to the old WAP sheets. I have implemented similar structures with my current business. This has helped with lifting the current standard of trainees' performance, as well as giving the attestation credibility.

I am an Overhead Works Manager and I feel that the current qualification caters well for traditional OH Line Mechanic tasks. I think the qualification needs to include more focus on works on Underground Networks, as all Line Mechanics are required to work with UG networks from time to time. I suggest a focus on: 1. Low voltage underground jointing. 2. Best practice cabling installation methodologies. 3. Develop higher level of teaching/assessing Single Line Diagrams and interpreting circuit diagrams. 4. Entry level fault finding on low voltage UG cabling (and OH lines).

Some of the Connexis material is written by academics and is hard to decipher the meaning of the questions and could be expressed better.

Unfortunately, on job training is only as good as work being done Some trainees will have very little exposure to low voltage work because of the set-up of the network and others not a lot of high voltage line work for the same reason

Streetlighting experience is not always available for trainees. Streetlighting is not necessarily in-house and is performed by external contractors for the SL owners.

Advice from NZQA Approvals and Accreditations

Each time a change to a qualification or programme is requested, the whole qualification or programme is reviewed. Some items that were previously approved do not meet current expectations, and therefore would not be approved now.

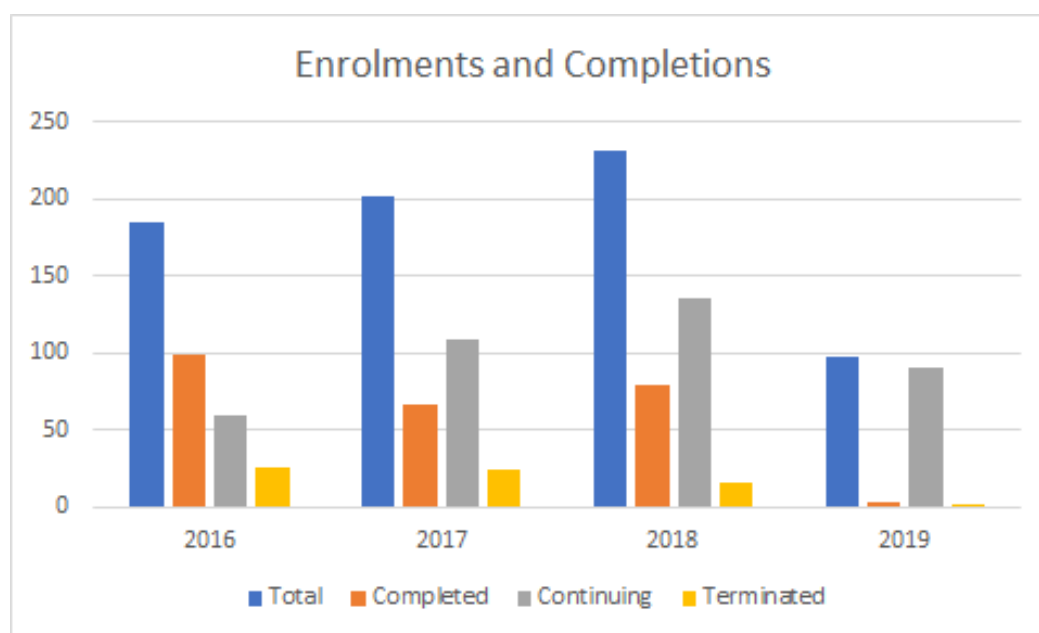
For example, this qualification has the level 2 qualification embedded into it. While it was approved in 2014, it is no longer accepted practice.

Qualification Completions (from NZQA)

		2016	2017	2018
8136	Connexis Infrastructure ITO	62	124	148

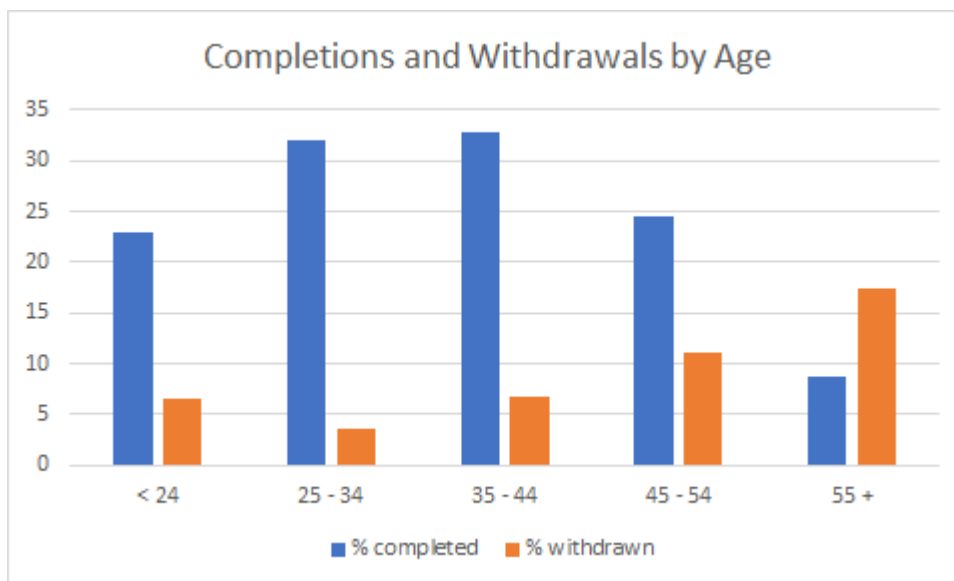
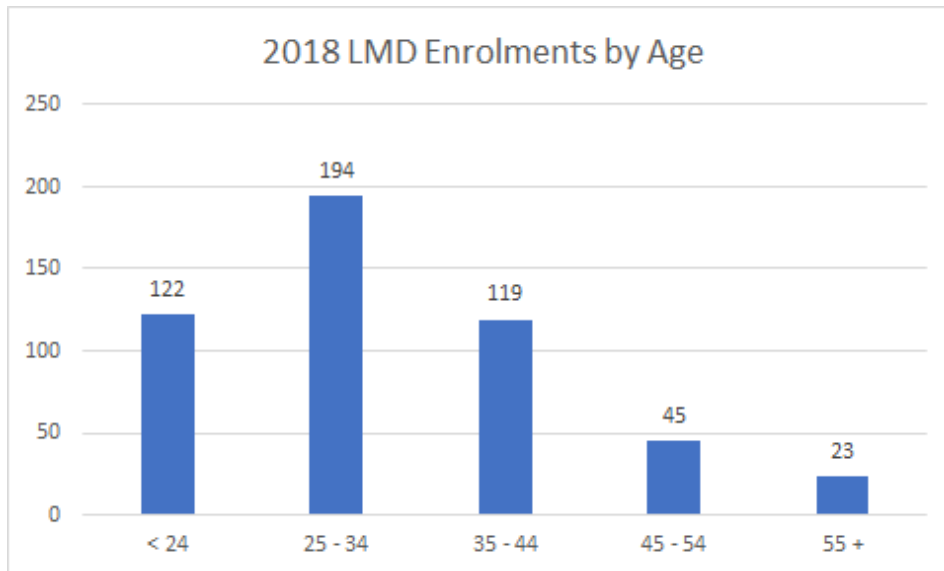
Enrolments, completions, terminations and continuing trainees

Since the programme was released, more than 700 learners have enrolled, with numbers increasing each year. A third of learners have completed their qualification. Approximately 10 per cent of learners have terminated. [Data from Connexis database]

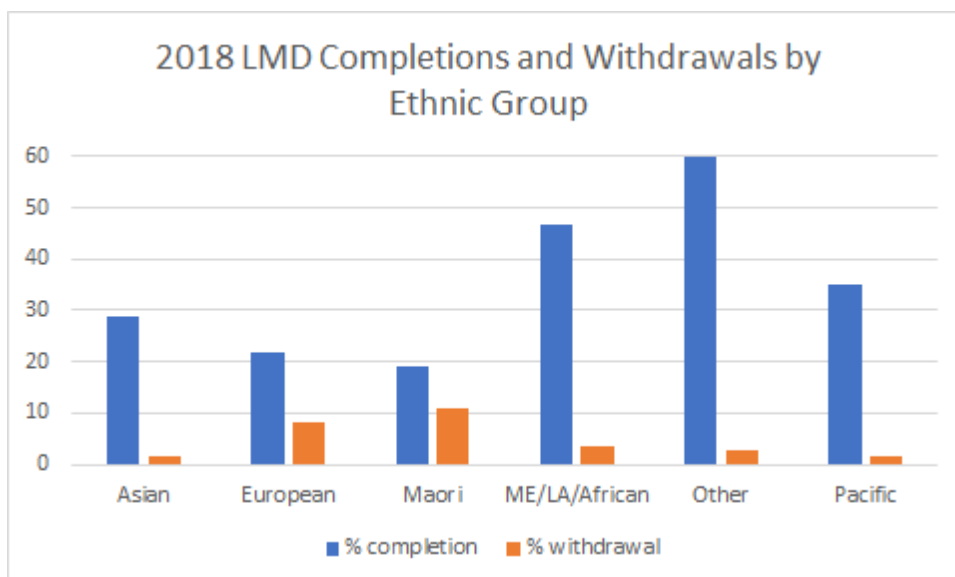
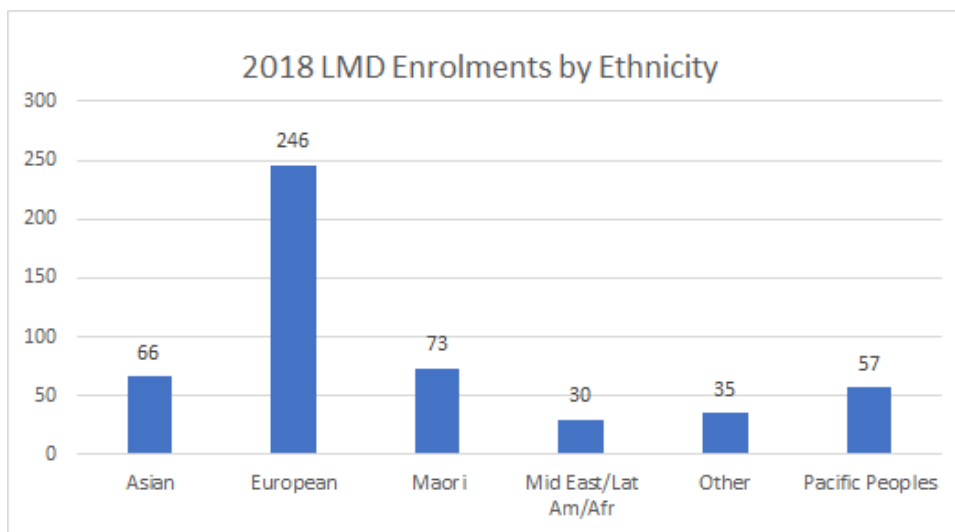


Learners enrolled in 2018

The enrolments by age group is shown in the charts below. The group of learners between 25 and 34 years old is the largest of the five age groups (38%). A third of those aged 25 – 44 completed the qualification in 2018. The percentage of learners who withdrew is lowest for 25 – 34 age group (4%) and increases to 17% of learners aged 55 years old or more. Loss of employment was the reason for two-thirds of the withdrawals.



The ethnicity of learners is shown in the charts below. The proportion of each ethnic group is similar to the population of New Zealand. People of 'other' ethnicities had the highest completion rate (60%) while Maori had the lowest (19%), a little lower than European (22%). The percentage of learners who withdrew is lowest for Asian and Pacific peoples (2%) and highest for Maori (11%).



Learners at MITA

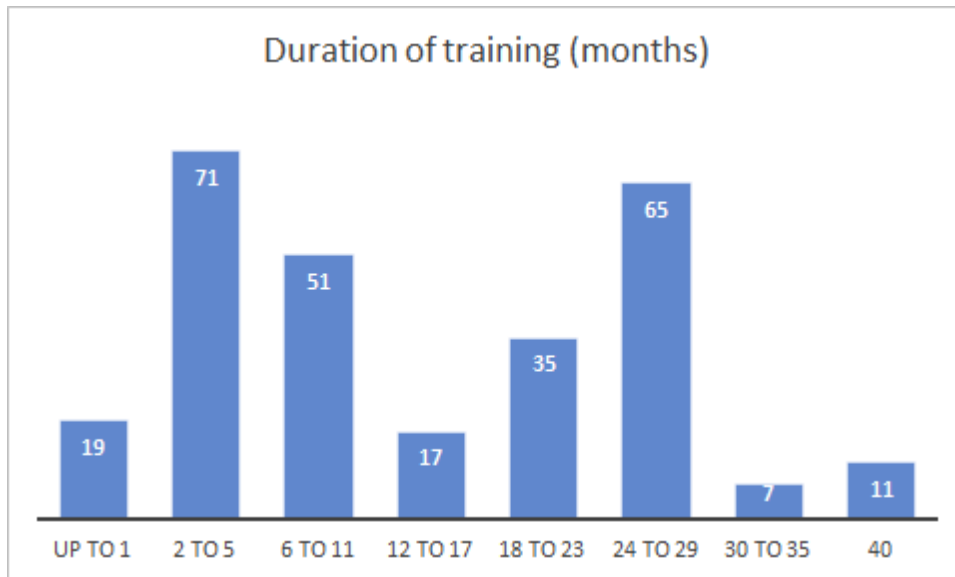
	2015	2016	2017	2018	2019
Total enrolments	78	63	120	224	111

All learners in 2015-2016 achieved the qualification. Those enrolled in 2017-2019 are yet to complete. The proportions of Maori, Pacific Peoples, and Other ethnicities enrolled at MITA 2015-2019 are higher than those of the New Zealand population.

Ethnicity	European	Maori	Pacific Peoples	Other
MITA	43	18	10	28
New Zealand (2013)	77	11	5	11

Duration of training

The programme has 229 credits and is expected to take 37 months to complete. Most people who have enrolled with Connexis complete in less than the expected time. The average duration is 14 months but there are two different groups evident in the chart. The group that complete in less than 12 months are probably using the RCC process (Recognition of Current Competency). [Data from Connexis database]



Consistency Review

A consistency review was held in 2017. Connexis was the sole organisation with graduates. The evaluation question is 'How well does the self-assessment and supporting evidence provided by the education organisation demonstrate that its graduates match the graduate outcomes at the appropriate threshold?' Final rating: Sufficient.

Recommendation: The education organisation recommended that the skills, knowledge and attributes related to underground electricity supply should be considered as part of this qualification at the next qualification review.

Current trainees and workplaces

As at 20 May there are 395 current trainees enrolled with Connexis at 41 companies.

Use of unit standards

Eleven unit standards in this programme are common to most of the Electricity Supply programmes; those that assess knowledge of industry standards and codes, health and safety, and first aid. For this reason, there is high usage of these common standards. For example, in the period 2014-2018, there were 10695 reports for US 10507 *Use personal protection equipment within an electricity supply environment*.

A summary of the unit standard usage is found in Appendix 2.

Consent to assess some or all of the unit standards is held by some polytechnics and secondary schools, but the majority of training providers are private training establishments or companies. Refer to Appendix 3 for a list of organisations with consent to assess.

During the period 2014-2018, reporting by Connexis has decreased, while reporting by training providers MITA and iSkills has increased. There is also a decrease in the reporting by polytechnics, probably because New Zealand qualifications do not have to be assessed with unit standards.

Feedback on unit standards:

Updates to legislation and guidelines are required, e.g. Health and Safety at Work Act 2015. Some terminology has changed e.g. Mobile Elevating Work Platforms. Suggested changes are listed in Appendix 4.

Assessors:

At present Connexis has 22 assessors who have full scope to assess LMD and 14 assessors also assess by RCC. Out of these, 17 have assessed in the past year.

Moderation history:

At present Connexis has seven moderators for the unit standards in LMD. There were 448 assessments moderated during the period, mainly from the Core Skills domain. Most assessor decisions were supported (89%). Refer to Appendix 5.

Five unit standards had higher proportions of unsupported decisions than others: 10507, 10508, 10509, 17025, and 17026. Common problems were a lack of evidence to support the assessor's decision, and incomplete attestation by the verifier or employer.

Moderators commented that pre-requisites were not included for 17025 (mainly by PTEs).

Two of the unsupported assessments for US 17026 were incomplete; the assessor had commented that an arborist wouldn't do certain sections of that assessment. Some of the evidence was more than 12 months old.

Line Mechanic

A line mechanic, also known as an electrical linesworker, installs, maintains, repairs and patrols electrical sub-transmission and distribution systems.

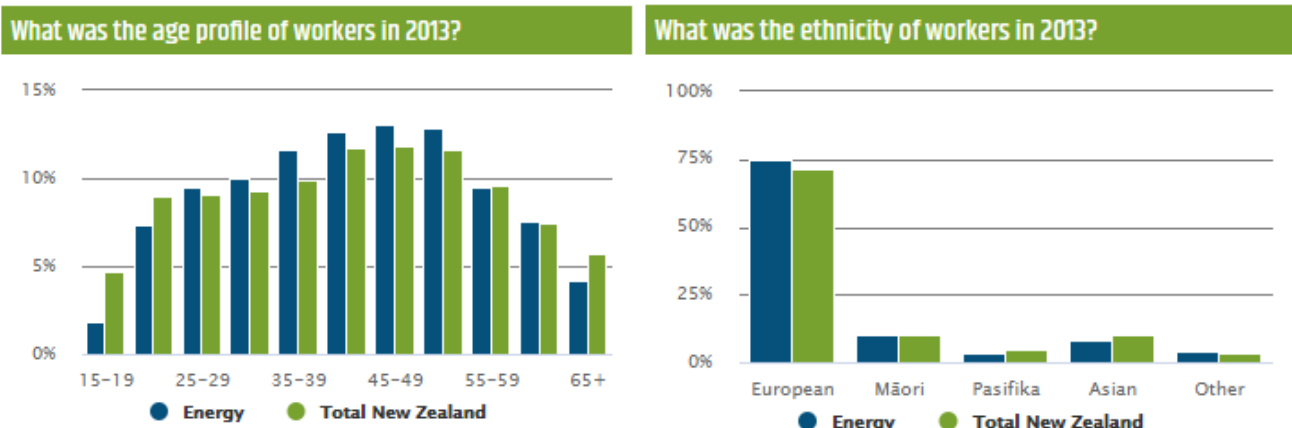
Electrical line mechanic is second on the list of the top five occupations in the Energy sector (2584 workers in 2018). The top occupation is electrical engineer (2771 workers)¹.

Chances of getting a job are good, and the Electrical Linesworker is on Immigration New Zealand's Long-Term Skills Shortage list for all regions².

After completing the qualification, line mechanics must apply for registration with the Electrical Workers Registration Board (NZ). New limits of work came into effect in October 2017 and include 16 classes of registration. These are presented in Appendix 6.

A line mechanic with up to 5 years' experience can expect to be paid \$37 – 60,000 annually. Senior line mechanics can expect increases in pay with more experience, and some team leaders can earn \$100,000 annually³. This compares with the national average of \$66,000.

95% electricians are in full-time employment, mostly as paid employees (72%) in small-medium enterprises⁴.



Data source: Infometrics and Statistics New Zealand - This report relates specifically to the sector as defined by the client (Connexis).

Demographics of current workforce in Energy

The age profile and ethnicity of workers in the Energy Sector is representative of New Zealand, but women are under-represented (27% of workers), although this proportion is higher than other areas of infrastructure, for example, the Civil sector is 18% female⁵.

¹ Infometrics, 2019

² Immigration NZ, 2019

³ Careers NZ, 2019

⁴ MBIE, 2019

⁵ Infometrics, 2019

Summary

Electrical Line Mechanics are in demand so there continues to be a strong need for the qualification. Most responses to the survey statements were positive and indicate the qualification provides the skills and knowledge required by Distribution Line Mechanics. Several respondents recommended the addition of skills and knowledge for underground and low voltage cabling.

Enrolments have increased each year and about a third of those enrolled have completed. The proportion of terminations or withdrawals is acceptable at 10% and mostly because of loss of employment. The age and ethnicity profiles of learners in 2018 were similar to those in the New Zealand population.

The unit standards and associated assessment material need updating to reflect current legislation and industry requirements. One respondent commented that activities were more suited to a supervisor role than a trainee role. One graduate recommended more practical assessments. Most assessor judgements were supported by the moderators.

Recommendations (to be finalised after Reference Group meeting and wider industry consultation)

Qualification

- *No change to Strategic Purpose Statement or Graduate Profile Outcomes.*
- *Update paragraph on consistency*
- *Remove conditions unless required for health and safety or by EWRB*
- *Remove embedded level 2 qualification and list it as an entry requirement*

Programme and Unit Standards

- *Include unit standards on low voltage, underground cables,...*
- *Update terminology and legislation across all unit standards*
- *Lift levels of some unit standards so that most are Level 4*

Appendix 1: Survey results

23 Respondents:

12 employers with current trainees, 1 employer with graduates, 2 employers with neither.

2 graduates completed with workbooks and practical assessments, 1 RCC graduate

5 other: a provider, a trainer, Connexis staff member, a live line mechanic and supervisor, Training and Assessment Team leader.

Statement	Percentage				
	Strongly agree	Agree	Neither	Disagree	Strongly disagree
This qualification provides the skills and knowledge required by Distribution Line Mechanics.	30	52	4	13	0
The evidence required for assessments is easily gathered from day-to-day workplace activities	22	57	13	9	0
The assessment materials are relevant to my workplace.	17	61	13	9	0

Appendix 2: Use of Unit Standards 2014-2018

Underlined unit standards are common to most Electricity Supply programmes.

Domain	ID	Reports 2014-2018
Electricity Supply - Core Skills	<u>10507</u>	10695
	<u>10508</u>	10188
	10509	6875
	<u>12300</u>	6320
	17025	6524
	<u>17026</u>	2575
	17027	900
	<u>18038</u>	10387
	18272	1414
	18273	1088
	18274	1317
	<u>18275</u>	2681
	18276	3396
	19950	3027
	<u>20092</u>	2252
	23897	894
	28109	437
	28110	440
	28111	430
28194	513	
Electricity Supply - Distribution Networks	10511	695
	10512	725
	10513	692
	10521	822
	10522	684
	10526	908
	10529	704
	10544	1337
	10545	770
	17632	681
	20423	709
	23896	955
	28113	599
	28192	513
	28193	613
Power System Management	28195	515

Appendix 3: Organisations with Consent to Assess Unit Standards

	Number of US reported 2014-18
Blackwoods	2
Broadspectrum	15
Energy Trainers	7
Genesis	2
iSkills	36
ITPs	9
M&O	1
MITA	36
Occupational Safety Management*	3
Secondary schools	4
Thoughtplanters	8
Transpower	27
Utilitech Training Centre	27
Vertical Horizons	8

*Formerly known as Safety n Action, this organization has applied for consent to assess a further 20 unit standards.

Appendix 4: Feedback on unit standards

Guidance information (all US)	Review workplace/off-job stipulation. Replace expiring first aid US with current US. Update HSW Act 2015. Add HSW Regulations 2016? Definitions: Add 'asset owner' because it has a specific meaning in ESI, delete 'asset owner standards', define LV, HV consistently. <i>Consider adding:</i> "This unit std is intended for the assessment of CJ and LM and all terminology and workplace assessment should be related to that sector of the industry."
10511	<i>Outcome 3 Develop a work schedule</i> does not fit current workplace environment, trainee can't easily collect evidence (more likely to be given a work schedule)
10521	10521 PC 1.3 requires evidence of 2 but may be difficult to get evidence. Installation most commonly with crane, uncommonly with helicopter and manual, winch is no longer best practice.
10522	PC 3.1 add number e.g. evidence of two is required
10526	Remove 10509 from pre-requisites (no climbing needed)
10545	Remove box and other out-of-date range items from PC 2.6. May be difficult for trainees to get evidence unless they work in a place with old wiring
12300	Delete 'and how to access them' from Outcome 1 (not mentioned in any PC) Remove GI 2 because it is a repeat of purpose.
16617	Trainers are finding it difficult to source training in order to train others.
18272	Change to MEWP (mobile) and reference in GI
18276	Remove knots that are not used in ESI e.g. splicing, sheepshank PC 1.3
20092	Title includes 'distribution', but it is not specified in US. Delete from title or add outcome for distribution.
28020	Use of personal locks and keys not common in ESI but it should be. (Use of 1 common key and man on line tag and lock is common).
Final sign off	Add statement to all US 28109, 110, 111, and 28278? "This unit standard is intended for final sign off of the practical skill set of Distribution or Transmission Line Mechanics."
28110	Change title: cost of electrical energy consumption; Outcome 2: inductance and capacitance, OR inductors and capacitors Add 'are described' to PC 2.4
28113	Outcome 4 'Report on pad mounted' (Why not structure mounted as well?)
28193	Remove words from Purpose not in outcome 3 Remove 'Unless stated' GI 6 and all GI 7 Difference between Outcome 1 'and manuals' and PC 'or manuals' Which? Remove duplicate 'as-built' from Outcome 2 range.
28194	Add the word "tests" to title and outcomes to reflect PC 1.6 and 2.4 Outcome 1: What is the difference between 1.3 and 1.5 because they are reading like the same thing?
28195	Suggested change from DKO to Explain throughout US

Appendix 5: Results of moderation for unit standards in NZC ES (Line Mechanic Distribution)

Engineering and Technology > Electricity Supply > Electricity Supply - Core Skills				
Unit standard	Supported	Unsupported	Borderline	Total
10507	36	5	1	42
10508	59	7	0	66
10509	23	6	1	30
12300	25	0	1	26
17025	18	9	0	27
17026	52	6	2	60
17027	9	0	1	10
18038	34	3	1	38
18272	7	2	0	9
18273	7	0	0	7
18274	6	0	0	6
18275	17	0	0	17
18276	15	0	2	17
20092	15	0	0	15
23897	3	0	0	3
28109	4	0	1	5
28110	4	0	0	4
28111	4	0	0	4
28194	4	0	0	4
Engineering and Technology > Electricity Supply > Electricity Supply - Distribution Networks				
Unit standard	Supported	Unsupported	Borderline	Total
10511	1	0	0	1
10512	6	0	0	6
10513	1	0	0	1
10521	5	0	0	5
10522	1	0	0	1
10526	7	0	0	7
10529	2	0	0	2
10544	4	0	0	4
10545	3	0	0	3
17632	1	0	0	1
20423	1	1	0	2
23896	5	0	0	5
28113	11	1	0	12
28192	1	0	0	1
28193	6	0	0	6
Engineering and Technology > Electricity Supply > Electricity Supply - Power System Management				
Unit standard	Supported	Unsupported	Borderline	Total
28195	1	0	0	1

Appendix 6: Limits of Work

Distribution Line Mechanic limits of work

The installation, connection, disconnection or maintenance of conductors, and fittings, but only in relation to electric lines that are part of distribution infrastructure (network)

The testing certification and supervision of that work.

This means: Can repair, replace, or install electric lines up to the connection point, (this includes all conductors associated with the electric line)

Can test electric lines up to and including at the connection point if necessary, (to confirm correct polarity), but Distribution Line Mechanics must have the skills, experience and training to safety and competently carry out this work.

Distribution Line Mechanic (Endorsed) limits of work

Can do all the work a Distribution Line Mechanic is permitted to do and in addition the restoration of supply to an installation.

Restoration of supply means all PEW necessary to allow the safe reinstatement of a supply to an installation following a loss of supply due to a fault situation. This includes any work inside the MEN board on the consumers mains, including the fittings but does not extend to sub circuits and their protective devices. Sub circuits may be isolated to allow for the safe restoration of supply.

Fittings may include: Mains entry box, Main Switch, Main fuse, Consumer's mains connections and terminations

But Distribution Line Mechanic (Endorsed) must have the skills, experience and training to safety and competently carry out this work.

(EWRB, 2019)

References

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