NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

Final date for issue of award is 31 December 2008

NEW ZEALAND CERTIFICATE IN ENGINEERING - ELECTRICAL

WORK EXPERIENCE GUIDELINES

Aim of Work Experience

The aim of the work experience component for the New Zealand Certificate in Engineering is to supplement and integrate the academic learning with practical knowledge and experience, and hence to develop further competence in technician engineering through actual on-job experience.

Sources of Suitable Experience

Electrical power engineering covers all aspects of power supply from generation and transmission to distribution and customer supply including protection, SCADA systems, audio frequency injection and metering. It also includes the manufacture and assembly of power system equipment such as transformers, switchgear, generators and cables. Work experience may come from the design and/or construction of power stations, substations, transmission lines or distribution lines. It may also be gained in the design, manufacture or assembly of switchgear or transformers. The design, installation or operation of electrical equipment in a major industrial plant would also provide appropriate experience.

Employers who can provide suitable work experience are generation companies, transmission companies, distribution companies and electricity suppliers or transformer and switchgear manufacturers (industrial installations with an installed load of 1 MW or greater).

Advising the Employer

The candidate's employer should be advised by the candidate of the requirements of these guidelines, preferably prior to the candidate commencing employment but in any event as early as possible in the work experience, in order to ensure that the employer is aware of the type of experience required and can make the appropriate arrangements to provide it.

Core Expectations

Basic Academic Knowledge

The basic academic knowledge will be acquired through a course of full or part time study generally at a polytechnic. Often this study is completed prior to commencing work experience. The requirements are specified in the Qualifications Authority's Advanced Vocational Awards Handbook.

Breadth

A broad range of experience is desirable including exposure to investigation, design or development, supervision, management, testing, operating, installing, commissioning and servicing. The work undertaken towards NZCE should have a variety of activities that require thought as to method, reliability, cost, and commercial as well as engineering factors. An exposure to real situations and equipment is advisable, as this will give an appreciation of what is feasible and practical in the design and operation of systems. A candidate should also be able to appreciate projects as a whole from specification through to completion, even if involved in only a small part.

It is expected that a candidate will exhibit skills that show a broad understanding of systems and processes, both technical and managerial, rather than only having knowledge of individual items of equipment, small parts of a manufacturing process, or limited commercial understanding.

Level of Accomplishment

On completion of academic and work experience the candidate should be capable of self-directed work, leading small teams, making judgements covered by defined methods or procedures, and then deciding, using readily available information, which procedure, system or component to use. This level of accomplishment should be achieved in one or more of the following generic areas:

- generation
- transmission
- distribution
- equipment manufacture
- customer supply
- manufacturing
- industrial installations.

Work Experience Credit for Related Qualifications

Between six months and eighteen months work experience may be credited from a completed apprenticeship, a Trade Certificate, an Advanced Trade Certificate or a National Certificate at level 3 or above in any relevant area from the following:

- industrial wiring
- electrical fitting
- electrical technician.

The time credited will be determined according to the details recorded in the Work Experience Record Book. Candidates should submit a certified copy of the certificate of completion of apprenticeship, Trade Certificate, Advanced Trade Certificate or National Certificate (a certified copy is one which is signed by a legally authorised person such as a justice of the peace, a solicitor, or a notary public as an authentic copy of the original).

It may be possible that time can be credited from qualifications other than those above. Advice should be sought from the Qualifications Authority.

Fundamental Practical Knowledge

Candidates should be able to demonstrate by the type of work undertaken during their work experience that they understand the capabilities, limitations and important requirements governing the use of the particular processes, devices or equipment. The work must include sufficient practical experience, either hands-on or by direct observation, to enable candidates to have a general understanding of most of the following:

- using meters, tools and working with system control and protection equipment
- undertaking installation of generators, switchgear, transformers, cabling and other power system equipment
- working with (producing and/or reading) technical drawings
- using and calibrating measuring and test equipment
- developing safe practices for work environments and working within statutory or industry standards for safety.

NZCE Work Experience Relevant to Electrical

Candidates should gain experience in the following fields - investigation, design and development, supervision, management, testing, operating, installing, commissioning, and undertaking maintenance. These experiences may be gained in one more of the industry sectors listed below.

Note that the items in the following lists are not to be regarded as having equal weighting; it is important that the candidate completes a wide range of activities in the fields listed in the previous paragraph. The process of approving Work Experience Record Books will be assisted by cross-referencing activities entered in the book to these activities.

1 Generation

1.1 Operating power systems, including generation scheduling, frequency and voltage control and reactive power flow.

1.2 Installing, commissioning and maintaining generation and general power station equipment.

1.3 Designing layout and integration of auxiliary systems

2 Transmission

2.1 Undertaking transmission line survey.

2.2 Maintaining transmission line.

2.3 Erecting towers and stringing conductors, supervising construction.

2.4 Designing, constructing and maintaining grid substations.

2.5 Operating transmission networks at 220kV, 110kV and 66kV

3 Distribution

3.1 Designing, constructing and maintaining distribution and sub transmission lines at voltages such as 110kV, 33kV, 11kV, 0.4kV and 0.24kV for overhead and underground supply.

3.2 Designing, constructing and maintaining of 110/33kV, 110/11kV and 33/11kV substations.

3.3 Designing, constructing and maintaining 11kV/400/240V and 33kV/400/240V distribution substations, pole and ground mounted.

3.4 Mapping and locating underground cables.

3.5 Diagnosing faults on a distribution network.

3.6 Designing, constructing and maintaining substation protection and control systems.

3.7 Undertaking substation and consumer metering.

3.8 Supervising line crews, electricians and fitters.

3.9 Estimating costs of system projects such as line construction and substation.

3.10 Preparing quotations for customers supply.

3.11 Operating distribution networks.

Note It is not expected that candidates will have experience in all the voltage levels prescribed

4 Customer Supply

4.1 Metering installations, whole current and CT/VT systems.

4.2 Providing tariff advice and making calculations.

4.3 Undertaking HV switching and transformation on customer premises.

4.4 Ensuring conservation and efficiency.

4.5 Inspecting and testing of completed installations on customer premises.

4.6 Analysing customers business needs and researching alternative telecommunications solutions to meet those needs.

4.7 Trouble-shooting. Diagnosing and resolving faults.

5 Manufacture

5.1 Manufacturing and assembling HV switchgear.

5.2 Manufacturing and assembling transformers.

5.3 Designing layout of and assembling protection and control panels.

6 Industrial

6.1 Installing industrial process motors.

6.2 Maintaining industrial process plant.

6.3 Designing and installing industrial process controls.

6.4 Designing, installing and maintaining power supply for industrial plant.

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