



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

Final date for issue of award is 31 December 2008

NEW ZEALAND CERTIFICATE IN ENGINEERING - CIVIL

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

Civil engineering has a wide field of application concerned primarily with the design, maintenance and construction of infrastructure (roads, bridges, reticulation and utility services), structures (buildings), earthworks, waterways, flood mitigation, ports and harbours. Work experience for this certificate can come from the following fields: building construction, civil construction, drainage, environmental, geotechnical, highway (roads and bridges), mining, sewerage and stormwater, structural, water supply and special adaptations of these branches. Employers for many of the above branches are to be found in government agencies, territorial authorities, local authorities, consulting engineers, contractors and laboratory/testing agencies.

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 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 academic 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 and commissioning. 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.

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.

Work Experience Credit for related qualifications

Between six months and eighteen months work experience may be credited from a completed Trade Certificate, Advanced Trade Certificate, or National Certificate at level three or above related to civil engineering. For example:

- Building Construction
- Plumbing and Drainlaying
- Waterworks Operations
- Civil Construction Works (and sub-branches).

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. (A certified copy is one which is signed by a legally authorised person such as a justice of the peace, a solicitor, or a public notary, as an authentic copy of the original.)

It may be possible that time can be credited from other qualifications or from other work experience (eg in a soils laboratory). Advice should be sought from the Qualifications Authority.

Fundamental Practical Knowledge in Civil Engineering

The work must include sufficient practical experience, either hands-on or by direct observation, to enable the candidate to have a general understanding of the appropriate use of technical methods and aids (including applying engineering basics, application of conventional engineering procedure, documentation, and participating in monitoring technical aids). 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 technical methods and aids.

Fundamental practical knowledge includes the following:

- ability to comprehend plans and drawings produced by others
- ability to produce simple sketches and drawings (hand drawn or CAD) to convey the concept
- basic understanding of the use of construction material commonly used
- be aware of safe practices.

NZCE Work Experience Relevant to Civil Engineering

The candidate should gain experience in the general categories given below. However, where it is not possible for the candidate to gain the broad experience, it is expected that extensive experience will be gained in **at least one** category and that a practical appreciation will be gained in the other categories. Examples of suitable work experience in each category are given as typical, but are not exhaustive. The development experience should include formal training either on the job or at specific courses undertaken during or outside employment. Such training should be included in the Work Experience Record Book.

The process of approving Work Experience Record Books will be assisted by cross-referencing activities entered in the book to the activities listed below.

1 Investigation, Research, Testing & Operating

Activities in this category includes collection of data/information, processing/analysing, testing (laboratory and/or field), operating and reporting. Some of the work may only involve a few components of the listed activities. Examples of this category follow.

- 1.1 Assisting in studies of economic viability of a project (eg costing, estimating, human resource and material duration, general financing and return on investment).
- 1.2 Assisting with legislative and environmental studies.
- 1.3 Assisting in topographical surveys and the production of contour plans.
- 1.4 Collecting of river or channel flows (maximum, minimum and average), precipitation, run-off data and hydrological data.
- 1.5 Assisting in geotechnical investigation, laboratory and field testing and reporting.
- 1.6 Investigating traffic loading, type, and accidents..

- 1.7 Determining physical characteristics of site materials proposed for use in civil engineering works (eg aggregate, stabilised pavement, foundation support structure of soil).
- 1.8 Testing of materials for building construction, including supervising testing processes and techniques.
- 1.9 Investigating and monitoring the quality of the town water supply water, sewerage and stormwater.
- 1.10 Assisting with obtaining statutory consents
- 1.11 Assisting in the preparation of Asset Management Plans (using RAMM and PAM etc)

2 Design & Development

Activities in this category include development, design, draughting, and documentation of civil and structural engineering projects. Some of the work may only involve a few components of the listed activities. Examples of this category follow.

- 2.1 Draughting sketches and drawings of proposals, including any field measurements.
- 2.2 Draughting - interpreting design requirements and producing design drawings (hand-drawn or using CAD).
- 2.3 Designing surface grading for earthworks and pavements, including road alignment design.
- 2.4 Measuring civil engineering quantities such as earthworks volumes, pavement volumes and areas, drainage, and other utility services.
- 2.5 Designing culverts and piped drainage systems.
- 2.6 Undertaking hydrological analysis of drainage catchments.
- 2.7 Designing streetwork and service reticulation.
- 2.8 Obtaining river profiles (computer modelling).
- 2.9 Making calculations for simple structural components, using manual or computer design software programme.
- 2.10 Writing simple and standard form of specifications.
- 2.11 Preparing tender documents.

- 2.12 Preparing solid waste plans.
- 2.13 Planning water supply components.
- 2.14 Planning sewer service components

3 Contract Management & Supervision

The activities for this category are mainly in a support role to the Engineer, Project Manager or Contractor depending on where the candidate is employed.

- 3.1 Assisting in preparing a bid for the tender of a project.
- 3.2 Assisting with site management including an awareness of contractual obligations.
- 3.3 Assisting with ordering materials, stores, and plant including an awareness of financial implications.
- 3.4 Compiling and adjusting progress schedules.
- 3.5 Checking on site progress against target schedules, and reporting areas of potential delay in work progress
- 3.6 Supervising and reporting standards of construction and performance of subcontractors.
- 3.7 Taking samples of work for testing (eg aggregate, concrete, steel, manufactured materials, soils).
- 3.8 Checking quality assurance procedures, and reporting deficiencies of quality of work or in materials used.
- 3.9 Checking labour performance against estimates.
- 3.10 Checking costings against estimates.
- 3.11 Checking work against plans and specifications, and assisting in the smooth and orderly progress of work.
- 3.12 Measuring completed projects, including quantities for variation orders and contract progress payments
- 3.13 Keeping records of plant and materials, including performance, working time and maintenance.

3.14 Supervising job completion (including the disposal of rubbish and waste.)

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