

Certification Requirements: Crane Inspection

Issued under the Authority of the
Certification Board for Inspection Personnel (CBIP), New Zealand

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1. Introduction

These Certification Requirements: Crane Inspection (CR Cranes Inspection) must be read in conjunction with CBIP's Certification Requirements: General (CR General). Together, these documents define the requirements for the issue of discipline recognition to crane inspectors performing inspection of cranes within the scope of the Health and Safety in Employment (Pressure Equipment, Cranes and Passenger Ropeways) Regulations 1999 (PECPR Regulations).

Inspectors performing specified activities defined in the PECPR Regulations must hold certificates of competence that are relevant to the activity. CBIP issues Competence Certificates as the WorkSafe NZ recognised 'Qualification Issuing Agency'. CBIP's Competence Certificates are the certificate of competence referred to in the PECPR Regulations.

CBIP's requirements for a Competence Certificate are detailed in the CR General and include that a crane inspector must hold a relevant discipline recognition before they can hold a Competence Certificate.

2. Scope

CR Crane Inspection covers the qualifications, training, experience, and examination requirements for the issue of a discipline recognition to crane inspectors performing new-construction and in-service inspections of cranes.

The discipline recognitions granted under CR Crane Inspection are:

Crane Inspector: Category A (Cranes Cat A)

- Overhead travelling cranes
- Goliath and semi-goliath cranes
- Monorail cranes

Crane Inspector: Category B (Cranes Cat B)

- Tower cranes

Crane Inspector: Category C (Cranes Cat C)

- Mobile cranes
- Reachstackers and Telehandlers
- Container handlers
- Self-erecting cranes. See Note 1.
- Truck loader-type cranes
- Straddle carriers

Note 1.

A self-erecting crane means a crane that is not disassembled into a tower element and a boom or jib element in the normal course of use, and where erecting and dismantling processes are an inherent part of the crane's function.

Crane Inspector with Endorsement

- Special category - Container crane

3. Certification Process

Candidates must meet the requirements of CR General and CR Crane Inspection for their category of crane inspection selected from:

- Crane Cat A
- Crane Cat B
- Crane Cat C

Candidates with Crane Cat A and Cat B or Crane Cat A and Cat C recognition together with suitable related experience may gain recognition for Special Endorsement - Container Crane.

4. Pre-Requisites for Discipline Recognition

Candidates for crane inspection will:

- a) demonstrate proficiency of welding process technology, metallurgy, weld testing and inspection, standards and specifications relating to steel structures to at least the level of Welding Supervisor (AS 2214) or be able to demonstrate equivalent knowledge.

This knowledge could be demonstrated by holding a Welding Supervisor's Certificate (AS 2214) (CWS), CBIP Certified Welding Inspector (CWI) or Senior Welding Inspector (SWI) Competence Certificate on applying for discipline recognition; and

- b) have training, qualifications and experience which demonstrate understanding of cranes, including their manufacture, maintenance, inspection and/or operation.

4.1. Qualifications

Candidates will have training and a qualification such as (but not limited to):

- A trade qualification in a relevant engineering or inspection discipline.
- 1st Class Marine Engineer's Certificate.
- Degree in engineering or a relevant technology or science.
- AAVA New Zealand Certificate of Engineering (Mechanical) or an equivalent qualification, e.g. UK Higher National Certificate in Engineering (Mechanical), NZQA Diploma in Engineering Practice (Mechanical).

Applications will include evidence of qualifications.

For candidates whose background does not include one or more of the above qualifications, a Statement of Experience and Competence relevant to these certification requirements from the employing or contracting Recognised Inspection Body may be acceptable.

4.2. Industry Experience

Candidates will have the minimum number of relevant engineering experience years in relation to the qualification(s) held as shown in Table 1, preferably with increasing responsibility. The experience will be on a range of cranes.

Table 1. Industry Experience relevant to cranes (years)

Qualification held	Number of years required
Degree in engineering	2
1st Class Marine Engineer's Certificate	2
CBIP Competence Certificate in a relevant PECPR discipline	2
NZ Diploma in Engineering Practice	3
NZ Certificate in Engineering (formerly AAVA)	3
UK Higher National Certificate in Engineering	3
Engineering Trade Certificate	4
Other qualification	To be determined by CBIP

4.3. Inspection Training

Candidates will undertake training in crane inspection sufficient for them to be knowledgeable in the requirements of CR Cranes Inspection Section 5.

Training will include:

- Knowledge requirements for inspection, including cranes fabrication, commissioning, in-service, repairs inspection; and
- Practical inspection training on cranes of the types relevant to the discipline being applied for as per the documentation provided. The suitability of the training is subject to CBIP's approval.

Where the training has been provided by a Recognised Inspection Body within its Effective Supervision system, the candidate must provide detailed documentation showing their training progression through the relevant supervision levels e.g. initial assessment record, reports of inspections on a wide range of simple to complex equipment types, report on trainee's readiness for CBIP exams.

4.4. Pre-requisite for Recertification

Candidates who have held a Cranes Inspection Competence Certificate for a period of ten years and are seeking re-certification are required to demonstrate experience in crane repairs, including welding inspections as part of their crane inspections.

The proof of welding inspection knowledge described in 4(a) is not required for re-certification.

4.5. Referee Statement

Candidates will provide a Referee Statement sourced from CBIP's Website and signed by a suitable referee to verify that their training and experience meets or exceeds these certification requirements.

5. Competence Requirements for Certification

Mechanical integrity, reliability, safety and fitness for purpose and service are important factors in the safe and reliable operation of any crane. It is therefore essential that Inspectors have the necessary knowledge to be competent to decide whether to recommend to the Inspection Body that a Certificate of Inspection be issued.

Candidates must demonstrate knowledge of:

- (a) New Zealand Rules and Regulations relating to the design, construction, commissioning inspection/testing and safe use of cranes, and
- (b) recognised standards and codes of practice used in the construction and testing of the types of cranes in the discipline applied for, and
- (c) procedures for in-service inspection and repairs to the types of cranes in the discipline applied for, and
- (d) PECPR Regulations requirements for crane certification.

5.1. Core Competencies

To be certified as a Crane Inspector, candidates must demonstrate competencies shown in Table 2.

Table 2. Core competencies and assessment methods for certifying Crane Inspectors

Q Code ¹	Competency	Assessed by		
		Method	Gen	Cat
REGS	Health and Safety at Work Act and PECPR Regulations	Exam	✓	
REGS	Approved Code of Practice	Exam	✓	
INSP	Approved Code of Practice	Exam		✓
REGS	Design/Manufacture Codes and Standards	Exam		✓
REGS	Quality Assurance Systems	Exam	✓	
ENG	Crane usage and operational implications	Exam		✓
ENG	Engineering drawings	Exam	✓	
ENG	Metallurgy and Welding	Exam	✓	
ENG	Non-Destructive testing	Exam	✓	

¹ Q Codes are an internal CBIP reference categorizing questions

ENG	Acceptance of replacement parts	Exam		✓
ENG	Defect types and causes	Exam		✓
ENG	Maintenance/Repairs	Exam		✓
INSP	Inspection safety	Exam	✓	
INSP	Inspection procedure	Exam	✓	
INSP	Loading and stability testing	Exam		✓
INSP	Repair inspection	Exam	✓	
ENG	Inspection judgement (justification for failing inspection)	Exam	✓	
INSP	Inspection of wire ropes, hooks, twistlocks	Exam	✓	
ADMIN	Report writing	Submissions		
ADMIN	Report/Certificate comprehension	Exam	✓	
ADMIN	Inspection and Testing Procedure (ITP) approval	Exam	✓	

5.2. Crane Inspection Regulations

The Inspector must have a sound knowledge of the hierarchy and applicability of the NZ rules and regulations in relation to crane certification which originate from the Health & Safety at Work ACT 2015 and Its Amendment Act 2023 being the legal framework that requires that workers and others are given the highest level of protection from workplace health and safety risks, so far as is reasonably practicable.

- The candidate must have a working knowledge of the **Health and Safety at Work Act 2015 (HSWA)** and its Amendment Act 2023, the Regulations and Approved Codes of Practice relevant to crane certification made under it
- HSWA requires that workers and others are given the highest level of protection from workplace health and safety risks, so far as is reasonably practicable.
- The **Pressure Equipment, Cranes and Passenger Ropeway Regulations (PECPR) 1999** outline the duties of equipment controllers, designers, manufacturers and suppliers, as well as workers. The Regulations contain the legal definitions of items such as 'cranes', 'design verifiers', 'certificate of inspection', 'inspection bodies', etc, and legally set the general duties of people designing, manufacturing or supplying, operating plant or protective equipment.
- The **Approved Code of Practice for Cranes** is a statement of preferred work practices. Compliance with the Code of Practice is not mandatory; however, compliance with an approved code of practice may be used in Court as evidence of good practice of an employer or other duty holder having taken "all practicable steps" to meet the duty of compliance with the provisions of the Act.

- In essence, PECPR determines 'what equipment' to inspect and the ACoP provides more information on 'how to inspect'.

5.3. Quality Assurance Systems

The candidate must be fully conversant with and comply with the Quality Management System (QMS) and Procedures Manuals of the Recognised Inspection Body they report to. They must be aware of their responsibilities towards the Inspection Body and the Accreditation Body when recommending the issue of a Certificate of Inspection for any equipment they inspect.

The candidate must be aware of the difference between Quality Assurance and Quality Control concepts/systems such as those used by crane manufacturers/suppliers/maintainers, e.g. ISO 9000 standards and the AS/NZS ISO 17020 standard under which Inspection Bodies are accredited.

The candidate must be aware of the legal implication of making a recommendation to the Recognised Inspection Body for the issue of a Certificate of Inspection.

5.4. Crane Usage and Operation

It is essential that the candidate understands the operation of the equipment to identify where and what damage/degradation mechanisms are expected and consequently where to concentrate the inspection effort.

The importance of crane overload prevention systems and component metal fatigue must be well understood by all Crane Inspectors.

Good knowledge in the following is also required:

- operational requirements of the various types of cranes in which certification is sought.
- loading and stability requirements of cranes.

5.5. Metallurgy and Welding

Metallurgy plays a large part in crane design and construction where welding is commonly used as bonding method in steel components.

Welding knowledge is a prerequisite and may be demonstrated by the candidate holding a Welding Supervisor (WS) certificate, Certified Welding Inspector (CWI) or Senior Welding Inspector (SWI) Competence Certificate or being able to demonstrate equivalent knowledge (e.g. evidence of offshore qualification and experience supervising structural welding etc.) to be submitted for approval by the CBIP Board.

As a minimum, the candidate must have a working knowledge of:

- The criteria that dictate the selection of materials.
- Mechanical testing and acceptance criteria for materials and weldments.
- The relationship between metal properties and the phenomena of corrosion, fatigue, ductile/brittle fracture and embrittlement.
- Knowledge of fundamentals of composition and structures of ferrous materials and their responses to heat treatment both during manufacturing and welding.

- (e) The codes and standards that pertain to welding procedures, welder qualifications and associated consumables.
- (f) The various forms of welding techniques as well as the QA and QC procedures that apply to the common welding processes, i.e. MMAW, GMAW, FCAW, GTAW, SAW.

5.6. Inspection Techniques and NDT

The candidate must be conversant with the following stages of crane manufacture and inspection:

- (a) Design drawings and Design Verification by a Recognised Inspection Body;
- (b) Inspection during manufacture by a qualified Crane Inspector or under the CE Mark duly authorised by a Notified Body or another approved process for cranes manufactured outside New Zealand.
- (c) Commissioning and in-service inspections by a qualified Crane Inspector.
- (d) Repairs under the supervision of a qualified Crane Inspector.
- (e) NDT testing of suspected defects or after welding repairs by an IANZ Accredited Laboratory.

The candidate must understand the applicability, safety and accuracy of various NDT methods and inspection techniques (invasive and non-invasive) used to detect manufacturing defects or degradation mechanisms in all types of cranes and their service conditions. Knowing the limitations of the various methods and techniques it may be necessary to supplement one method or technique used with another to increase confidence.

The candidate's knowledge of this subject should be such that they can converse with specialists in the field and evaluate the results of their examinations.

Training in the methods and techniques of NDT is only required to create an awareness of NDT methods and their application; it is not required for inspectors to execute routine NDT activities other than visual inspection.

5.7. Crane Design, Manufacture and Repairs

The candidate must have sound, detailed knowledge and experience in the use of the codes and Standards covering manufacturing and repair and a working knowledge of design, to ensure compliance with the applicable norms. Familiarisation with the full range of Standards relevant to the various categories of cranes covered is essential. The candidate must understand the fundamental principles within the standards sufficiently to resolve any conflict between them and to advise their client of their applicability.

Candidates must be able to read and understand Certificates of Design Verification and ensure that all commissioning requirements identified in such Certificates are complied with.

Candidates must have the ability to read and understand engineering drawings, such as those typically supplied with Certificates of Design Verification.

It is essential that the candidates are fully aware of the requirements for the development, review and implementation of Inspection and Test Plans (for both fabrication and repairs).

5.8. Mechanical Maintenance

The candidate must be aware of the purpose, tasks, and roles of the maintenance function. They should have a clear understanding of routine and non-routine activities and constraints (work preparation, planning, financial considerations, reliability vs. safety requirements etc.).

The candidate must be aware of the importance of routine maintenance in ensuring the equipment is kept in a safe condition and be capable of determining if the equipment is being maintained adequately, by referring to the Controller's maintenance and service records and the manufacturer's instructions.

The candidate must be capable of assessing the amount of use the equipment has been subjected to from information provided by the Controller's records and direct observations, to ensure that:

- (a) Maintenance intervals are satisfactory, and
- (b) The equipment is not being used outside of its design parameters including ultimate design life.

5.9. Technical Competence

A candidate must demonstrate knowledge and sound judgement in the course of their activities, such as the following:

- (a) Approval of inspection and test plans and preparation/approval of any specific inspection procedures required (fabrication and repairs).
- (b) Witnessing and verifying tests including mechanical testing of welding procedures during fabrication, repairs and in-service inspection.
- (c) Understanding and recognising the types and causes of deterioration and defects (in-service inspection).
- (d) Inspection of fabrication, repairs and alterations.
- (e) Interpretation and evaluation of inspection reports.
- (f) Issuing recommendations on future inspection periods and on the remaining life of the equipment, based on the records of the amount and type of usage.
- (g) Demonstrating the ability to determine when a defect requires that a crane be withdrawn from service on safety grounds.

5.10. Record Keeping and Report/Certificate writing

The candidate must be capable of understanding relevant reports written by others; and of preparing and maintaining accurate, legible, and proper inspection records and reports in English of all inspections undertaken.

6. Examinations

6.1. Examination content

Examinations will include questions on the following aspects of crane inspection for both new construction and/or repairs and in-service inspections:

- a) inspection method for cranes.
- b) documentation, records and assessing existing inspection reports.
- c) fabrication materials used, and welding procedures required in cranes.
- d) types and causes of defects found in cranes.
- e) safety of personnel and cranes during inspection and of all personnel involved in the operation or maintenance of cranes.
- f) methods of fabrication, testing and inspection used during the construction of cranes.

6.2. General paper

The General Paper is a core requirement for all crane certifications.

The General Paper covers:

- a) General topics from the Health and Safety at Work Act 2015, the PECPR Regulations 1999, and the Approved Code of Practice (ACoP) for Cranes.
- b) Fabrication, repairs and alterations, wire ropes, hooks, operating, maintenance, and incident records.
- c) General knowledge of practical aspects of crane inspections.

6.3. Specific papers and endorsement

Table 3 shows the examination papers that can be completed in addition to the core General Paper.

Table 3. Examination papers

Certification Category	Exam Paper
Crane Cat A	Crane A
Crane Cat B	Crane B
Crane Cat C	Crane C
Special Endorsement Container Crane	Crane A and C; or Crane B and C

6.4. Recertification examination

The recertification examination is one paper comprising questions selected from the General Paper and questions selected from the relevant certification.

Re-examination of the General Paper is not required where candidates take examinations for additional categories of crane inspection during the period of certification applicable to their current discipline recognition.

6.5. Examination references

Information about Crane Inspection examinations and supporting documents are listed on CBIP's website: <https://www.cbip.co.nz/certifications/cranes/downloads>



7. Assessment of Certification Applications

