

Certification Standard: Cranes Inspection

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

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1. Introduction

Please read this Certification Standard: Cranes (CS Cranes Inspection) in conjunction with CBIP's Certification Standard: General Requirements (CS General). Together, these Certification Standards 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 CS General and include that a crane inspector must hold a relevant discipline recognition before they can hold a Competence Certificate.

2. Scope

CS Cranes 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.

Discipline recognitions granted under CS Cranes 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
- Self-erecting tower cranes
- Truck mounted cranes
- Truck loader-type cranes

Crane Inspector with Special Category Endorsement (Cranes with Endorsement)

- Endorsement: Container Handler (Reachstacker, straddle carrier etc.)
- Endorsement: Container Ship-to-Shore (Portal-type or harbour mobile)

3. Certification Process

Candidates seeking a discipline recognition must meet the requirements of the CS General and the CS Cranes Inspection for their category of crane inspection selected from:

- Cranes: Cat A
- Cranes: Cat B
- Cranes: Cat C

Candidates with Cranes: Cat A or Cranes: Cat C may gain an endorsement to include a special category of crane.

4. Pre-Requisites for Discipline Recognition

Candidates for CS Cranes 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 current Welding Supervisor's Certificate (AS 2214) (WS), CBIP Certified Welding Inspector (CWI) or Senior Welding Inspector (SWI) Competence Certificate; 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 this Standard from the employing or contracting Inspection Body may be acceptable.

4.2 Training

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

- Knowledge requirements for inspection, including new construction and in-service inspection; and
- Practical inspection training on cranes of the types relevant to the Category being applied for.

4.3 Experience

Candidates will have a minimum of three years' experience, preferably with increasing responsibility. The experience will include in-service inspection as a competent person or under supervision, be on a range of cranes, and include documentation of results sufficient to demonstrate competence in the requirements of section 5.

The guidance provided in Appendix A should be noted for inspection report preparation.

4.4 Pre-requisite for Discipline Recognition Recertification

Candidates who have held a Cranes (Cat A, B and/or C) with an associated Competence Certificate, for a period of five years or more, and who carry out welding inspections as part of their crane inspections are required to hold a current WS, CWI or SWI certificate.

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 matches the requirements of this Standard.

5. Competency Requirements for Certification

To be certified as a Cranes Inspector, candidates must demonstrate knowledge of:

- (a) operational requirements of the various types of cranes in which certification is sought.
- (b) inspection method for cranes.
- (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) documentation, records and assessing existing inspection reports.
- (g) PECPR Regulation requirements for crane certification.
- (h) loading and stability requirements of cranes.
- (i) various standards and codes of practice used in the construction and testing of the types of cranes in the discipline applied for.
- (j) methods of fabrication, testing and inspection used during the construction of cranes.
- (k) requirements outlined in Appendix A.

6. Examinations

6.1 Examination References

References for the Crane Inspector examinations and completing the examinations are listed on the CBIP website at <https://www.cbip.co.nz/page/cranes-inspector/3/5/>

6.2 General Paper

The General Paper¹ is core requirement for all discipline recognitions.

The General Paper covers:

- a) General topics from the Health and Safety in Employment² 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 inspection.

Table 1 shows the examination papers that may be completed in addition to the core General Paper.

Table 1. Examination papers for discipline recognition³

Discipline Recognition	Exam Paper
Cranes Cat A	Cranes A
Cranes Cat B	Cranes B
Cranes Cat C	Cranes C
Cranes: Ship-to-Shore	Cranes A <u>and</u> Ship-to-Shore endorsement
Cranes: Container Handler	Cranes C <u>and</u> Container Handler endorsement

¹Re-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.

² Now Health and Safety at Work Act 2015

6.3 Technical content of examinations

The examinations will include questions on the following aspects of crane inspection for both new construction/repair, and in-service inspection:

- (a) Approval of inspection and test plans and preparation/approval of any specific inspection procedures required.
- (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. ISP
- (d) Inspection of repairs and alterations.
- (e) Interpretation and evaluation of inspection results.
- (f) Recommendations on future inspection periods, and on the remaining life of the equipment, based on the records of the amount and type of usage.

6.4 Recertification examination

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

Appendix A: Knowledge Requirements

The following are core requirements:

A.1 Process operation

Understanding of the operation of the equipment in order to identify where and what damage/degradation mechanisms are expected and consequently where to concentrate the inspection effort.

A.2 Metallurgical and corrosion degradation mechanisms

Understanding of the equipment operational conditions and underlying reasons that dictate materials selection and the interpretation of the relevant standards and codes of practice in respect to material selection.

A.3 Metallurgy and Welding

Welding knowledge is a prerequisite demonstrated by the candidate holding a WS certificate, CWI or SWI Competence Certificate or being able to demonstrate equivalent knowledge. As a minimum, the inspector must understand:

- a) The criteria that dictate the selection of materials.
- b) Mechanical testing and acceptance criteria for materials and weldments.
- c) The relationship between metal properties and the phenomena of fatigue, ductile and brittle fracture, and embrittlement.
- d) Knowledge of fundamentals of composition and structures of metallic 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.

A.4 Inspection techniques and NDT

Understanding of 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. Appropriate techniques commonly applied include visual and other NDT techniques.

The Inspector must recognise the limitations of the various methods and techniques and take this into account when deciding on the value of the method employed (i.e., it may be necessary to supplement one method or techniques used with another to increase confidence). The inspector'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. For these activities certified NDT technicians shall be used.

A.5 Mechanical Maintenance

The Inspector 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, expenditure control, impact of work volume generated by inspection, reliability, etc.).

The Inspector 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 Inspector must be capable of assessing the amount of use the equipment has been subjected to from information provided by the Controller's records, 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.

A.6 Design and manufacturing codes and standards, and methods of manufacturing, inspection, and repair

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

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

Inspectors 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 Inspectors are fully aware of the requirements for the development, review and implementation of Inspection and Test Plans (ITP's).

A.7 Quality Assurance Systems

The Inspector must be aware of Quality Assurance and Quality Control concepts/systems, e.g. ISO 9000 standards.

A.8 Record keeping and report writing

The Inspector must be capable of understanding relevant reports written by others and of preparing and maintaining accurate and proper records and reports in English of all inspections undertaken.