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# Modularisation of In-service Inspector Examinations and Certification

## Background

The pressure equipment industry is in continual change and clients are looking at reduction in operating cost, while ensuring compliance and safe operations of pressure equipment. Inspection is the first-place, operators and plant owners believe costs can be reduced. The industry is evolving and have made suggestions for some type or form of “Modularisation” or “Qualification levels” for the in-service inspection competency, examination and certification. While maintaining and promoting a safe work environment for employees and the general public.

## Opportunities

Entry level into the inspection industry has been hindered by tradition pathways become unsupported with a modern economy. Workplaces like marine engineering, public works, oil refineries, WorkCover, power stations and steel mills being in decline have removed opportunity for interested employees to be mentored and gain valuable experience. Contractor based employment contracts and changed work environments have contributed a limited pathway for pressure vessel inspectors.

Qualification levels will allow individuals to have the opportunity of an entry level into the pressure equipment inspection industry and while assisting industry and employers, there will be the ability to have someone working and inspecting lower hazard vessels, as they gain:

- Exposure to different types of pressure equipment and processes
- Develop inspection skills, working on the job
- Gain experience from other industry experts
- Mentoring from more experienced inspectors

The qualification “Level 1” skill set has been aligned with vessels and equipment from AS/NZS 3788, table 4.1. These groups require like inspection knowledge, training, skills and experience. This will allow the inspector working on the job to quickly develop the necessary inspection acumen, awareness and understanding to advance to other or higher levels or utilise these specific skills to inspect the large proportion of pressure vessels that are in service in Australia, e.g. Air Receivers, accumulators and refrigeration vessels.

The current “In-Service Inspector” will maintain the qualification “Level 2” position with the same responsibilities for pressure equipment inspection as seen in AS/NZS3788, table 4.1 and related appendix.

Senior In-Service Inspector (SISI) will be equivalent to the higher qualification “Level 3”. This directly relates to exposure to greater industry experience in management and high-level equipment assessment for continued service.

Pressure Equipment Industry representatives have approached AICIP to provide a solution of poor compliance to low hazard level vessels inspection. The importance of ensuring a safe and compliant workplace is on some occasions overlooked when scheduling of multiple contractors for servicing and inspection. The “level 1” inspector will have plant availability, access and opportunity to develop valuable on the job exposure and experience.

## **Method**

### **Level 1**

Core Study Requirement which must be completed first with any combination of inspection level 1 units. This is should assist with industry understanding and what is expected of a competent in-service inspector. It will provide the inspector with key guidance of responsibilities and expectations for a competent inspection. The examination headings will provide topics for assessment and determination of competence.

- Safety relief devices used on vessel and low risk equipment (not fitted to a steam boiler)
  - set pressure,
  - correct installation,
  - sizing,
  
- Standards
  - AS/NZS3788 vessel inspection requirements
    - Inspection objectives and responsibilities
    - Ethics
    - Table 4.1
    - Inspections and certificates
  - AS4343 – Hazard Levels
    - Volume/size calculations
    - Volume/MPa relationship for hazard level calculation
    - Liquid/gas/ harmful/non-harmful
  - AS1210 – Design and construction
    - Data stampings
    - Fittings and installation
  - AS1271- safety valve
    - discharge volume (accumulation test),
    - tests,
    - Certificates

- WH&S
  - Codes of practice
  - Safety In inspection
  - WH&S reg's
  
- AICIP rules
  - Certificates
  - Rules
    - Integrity and dignity
    - conflict of interest
    - confidentiality

### **Level 1.1**

#### **Compressed Air Vessels, Accumulators and Refrigeration Vessels.**

Level 1 is the combination of like vessel inspections. As an entry level for inspection it provides opportunity for

- exposure to pressure equipment inspection
- site and installation risk and hazard assessment
- inspection procedure
- assessment of common failures related to fatigue
- equipment compliance and installation to standards.

**This level of certification is suitable for inspectors to operate within a restricted range of pressure equipment, ensuring safe operation of pressure equipment assets.**

#### **Compressed Air Vessels**

Compressed air vessel, As seen in AS/NZS3788 table 4.1 item 6

#### **Accumulators**

Accumulators, As seen in AS/NZS3788 table 4.1 item 10

#### **Refrigeration Vessels**

Refrigeration Vessels, As seen in AS/NZS3788 table 4.1 item 11

## **Examination Content**

### **AICIP Examination Headings Level 1.1**

- 1.1 Materials
  - 1.1.1 Basic, uses and problems
  - 1.1.2 Basic physics, chemistry and properties of materials
- 1.2 Design Calculations
  - 1.2.1 thickness equation, Minimum required thickness
  - 1.2.3 calculation pressure, design temperature and design strength
- 1.3 Design Approval
  - 1.3.1 Worksafe requirement
  - 1.3.2 Customer needs
  - 1.3.3 Hazard level calculations
- 1.5 Data Plates
  - 1.5.1 MDR information + Data
  - 1.5.2 Data plate
- 3 Pressure Equipment Installation
  - 3.1 Pressure equipment inspection
    - 3.1.1 Periodic inspection (internal and external).
    - 3.1.2 Special inspections.
    - 3.1.3 Process engineering operation
  - 3.2 Assessment of pressure equipment integrity
    - 3.2.1 Responsibilities and documentation.
    - 3.2.2 Acceptance criteria for imperfections
  - 3.3 Standards, Acts, Regulations or codes of practice
    - 3.3.1 Understand, interpret and apply customer and contractual inspection requirement
    - 3.3.2 Respond and act appropriately to unexpected situations

## 4.2 Inspector's responsibilities, duties and attributes

### 4.2.1 Safety during inspection

### 4.2.2 Inspector's responsibilities, duties and attributes

## **Level 1.1 AICIP Inspector**

### **Roles and Responsibilities**

A level 1 .1 AICIP Inspector has clear guidelines of the type of pressure equipment that could be inspected with this level of competence. The pressure equipment will be limited to:

- Compressed Air Vessels
- Accumulators
- Refrigeration Vessels

### **Determination of Competence**

The same assessment process will apply which has three (3) papers

Paper A – Multiple-choice

Paper B – Short answer

Paper E- Practical inspection

The examination will take place over 1 day.