

**82<sup>nd</sup> National Board ASME General Meeting**

**Inspection Quality:  
One AIA's Perspective**

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# The National Board

The National Board of Boiler and Pressure Vessel Inspectors was created in 1919 to promote greater safety to life and property through uniformity in construction, installation, repair, maintenance and inspection of pressure equipment

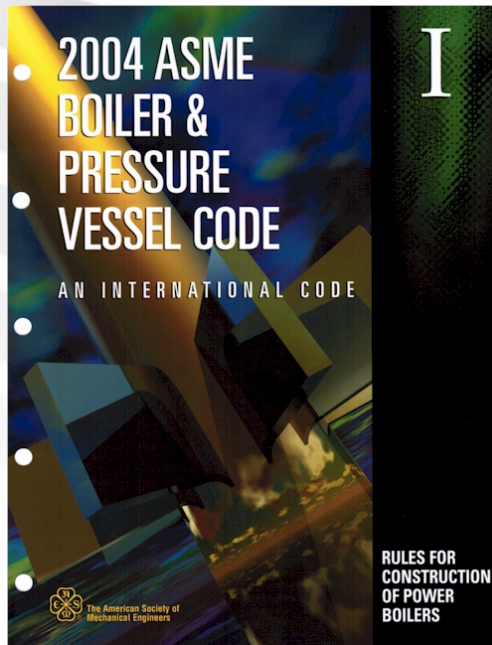
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# Why are These Important?



THE  
NATIONAL BOARD  
OF BOILER AND PRESSURE VESSEL INSPECTORS



# My First Impression: That's Odd!

- Service Delivery Staff (Inspectors) are certified by National Board.
- Inspectors decide amount of inspection to perform based on their interpretation of the Code requirements.
- AIA's have minimal accreditation audits every three years
- Almost no quality metrics available for AIA's
- Quality assessed observation. Internal and external reputation.

# A Common Thread - 1920



# 1920s Assumptions Still in Use

## New Construction

### Original Assumption:

- Insurers involved in all aspects of construction
- Also provided insurance to bear the risk of loss

### Current Reality:

- Most insurers do not inspect the construction of pressure equipment they insure

# 1920s Assumptions Still in Use

## New Construction

### Original Assumption #2:

- Owners, insurers, jurisdictions and manufacturers all understood the ASME rules
- Most work was executed in the USA

### Current Reality:

- Global Manufacturers
- Global Owners



# 1920s Assumptions Still in Use

## New Construction

### Original Assumption #3:

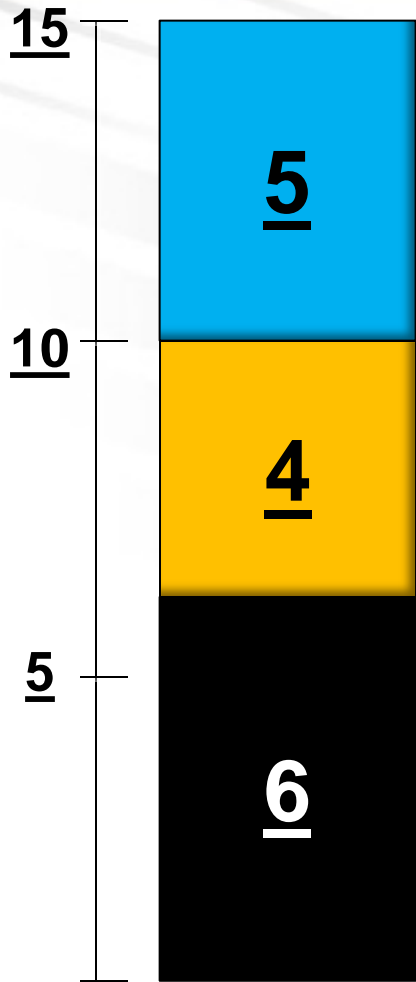
- Inspectors are an integral part of the Insurer
  - AI's spent most of their time working to the boiler code
  - Inspections viewed as risk reduction, invested in:
    - Training
    - Technical Support
    - Sufficient Inspections to Reduce Risks

### Current Reality:

- Many Inspections Not Done By Insurers
  - AIs may occasionally do ASME Work
  - Inspection Productivity Important (Reducing Hours to Inspect)
  - Technical Support is Expensive Overhead

# NB 360 & ASME

## Authorized Inspection Agencies – 2013\*



- Inspection Companies Only , No Insurance
- Inspection Companies w/ Insurance Tie
- Four Agencies Direct Written Premium of < \$1M
- Insurance Companies with Inspections
- Six Agencies Direct Written Premium of > \$2 Billion.

\* Excludes  
Jurisdictions

# Changing Inspector Profiles

(HSB Global Standards' Data)

## 2013

- 58% <10 Years Experience
- Source:
  - Navy Nuclear – USA
  - Engineers – Outside USA
- Qualified for NB Commission
- Limited Practical Experience

## 1920 – 2000

- 33% < 10 Years Experience
- Source:
  - Navy Boiler Techs
  - Domestic Industry
- Good Practical Experience
- Live Boiler Work

# Changing AIA Profiles

## Insurance Company 1920 – 1971 – 2010

- Risk Reduction
- Full Time ASME Inspectors
- Full Time Employees
- Sufficient Inspection Time
- US & Canada Business

## Inspection Company Officially 2010\*

- Profit Making, Productivity
- Part Time ASME Inspectors
- Widespread Contracting
- Competitive Inspection Time
- Global Business

\* *Change in*

QAI-1, NB 360 FSB Global Standards

# Six Sigma & DMAIC

- **D**efine - Critical to Quality Elements (CTQs)
- **M**easure – Performance on CTQs
- **A**nalyze - Performance Objectives, Identify Variations
- **I**mprove – Screen Causes, Establish Tolerances
- **C**ontrol – Determine Capability, Implement Controls

# Where's My Data?

- **Define** – **Where is inspection quality defined?**
- **Measure** – **What are the measures for inspection quality?**
- **Analyze** – **No measures, no analysis**
- **Improve** – **No Quantitative Baseline**
- **Control** – **No Measurements, No Controls!**

# Inspection Quality WILL Be Measured Despite . . .

- **Metrics Are Not Defined or Required by ASME or the National Board**
- **Metrics Have Not Generally Been A Requirement**
- **We Have Never Measured This Before**

# What Did We Measure

- **After much debate . . .**
- **We chose to measure our performance against the Code requirements**
  - **Monitoring of Stamp Holder's Quality Systems**
  - **Bound Diary Entries for Completeness**
  - **Audits of Inspectors Required By Code**
- **These are requirements of all AIAs**



# Monitoring Requirements

## The Inspector Must Monitor the Certificate Holder's Quality Program

ASME Code Section I (PG-90)

- ASME Code Section III (NCA 5125 and 5220):

ASME Code Section IV (Appendix 7-400)

- ASME Code Section VIII-1 (The Inspector: UG-91):

ASME Code Section VIII-2 (Responsibilities & Duties . . . Annex 7A)

# Bound Diary

## The Inspector Must Maintain a Bound Diary Recording His Inspection Activities

[NB-263 \(RG-5\)](#)

[QAI-1, Part 1: \(Nuclear Section III, Division 1 & 3\) 1-3.2.18](#)

[QAI-1, Part 2: \(Nuclear Section XI\) 2-3.2.10](#)

[QAI-1, Part 5: \(Non Nuclear B&PV\) 5.3.2](#)

# NB and QAI-1 Audits

**Supervisor Must Audit the Performance of Each Inspector at Least Once Every 12 Months**

**NB-263 (RN-2.1)**

**QAI-1, Part 1: (Nuclear Section III, Division 1 & 3) 1-2.2.6**

**QAI-1, Part 2: (Nuclear Section XI) 2-2.2.6**

**QAI-1, Part 5: (Non Nuclear B&PV) 5-2.2.5**

# Just to Be Clear

- **ASME and the National Board Require Certain Activities**
- **... But no quantitative measures are defined or required.**
- **The following definitions and measures are HSB Global Standards measurements of itself**

# How We Measured

- **Audit Requirements for Each Inspector**
  - **Required Annual Audit(s) AI = 1, ANI = 2**
  - **Required Completed On time Within 12 Months**
  
- **Bound Diary Entries**
  - **Reviewed 1 Month of Bound Diary Entries Per Inspector**
  - **Over 10,000 Entries**
  - **3 Measurement Criteria**

# How We Measured

*(continued)*

- **Monitoring Definition (For Measurement Purposes)**
  - **Monitor all sections of shop quality manual for fully active customers each calendar year.**
  - **Any client with 16 visits over 3 years is considered fully active**
  
- **Measurement**
  - **Number of fully active customers fully monitored in calendar year**

# Results Against Key Performance Indicators

	<u>1871 – 2007</u>	<u>2008</u>	<u>2012</u>
<u>Active Clients Fully Monitored</u>	<u>Really Good</u>	<u>70%</u>	<u>88%</u>
<u>Audits Completed on Time</u>	<u>Really Good</u>	<u>75%</u>	<u>90%</u>
<u>Satisfactory Bound Diary Entries</u>	<u>Really Good</u>	<u>96%</u>	<u>97%</u>
<u>NCRs On Bound Diary Entries</u>	<u>Really Good</u>	<u>236</u>	<u>19</u>
	<u>Really Good</u>		

# What does this mean to HSB Global Standards?

- We weren't nearly as good as we thought
- Until we measured our performance we were limited in improving our quality
- We have made significant improvements since we started this program
- We can demonstrate our quality to our accreditor and our customers
- We can address any quality gaps so we are consistent globally



# General Observations

- Societal Desire for Transparency is Increasing
- Consistent, Appropriate Measures Increase Transparency
- Measures Are Critical to Improving and Maintaining Quality
- We verify our customer's quality, we should also do our own
- It is much better to address proactively, than have it forced upon us after an incident and an investigation.

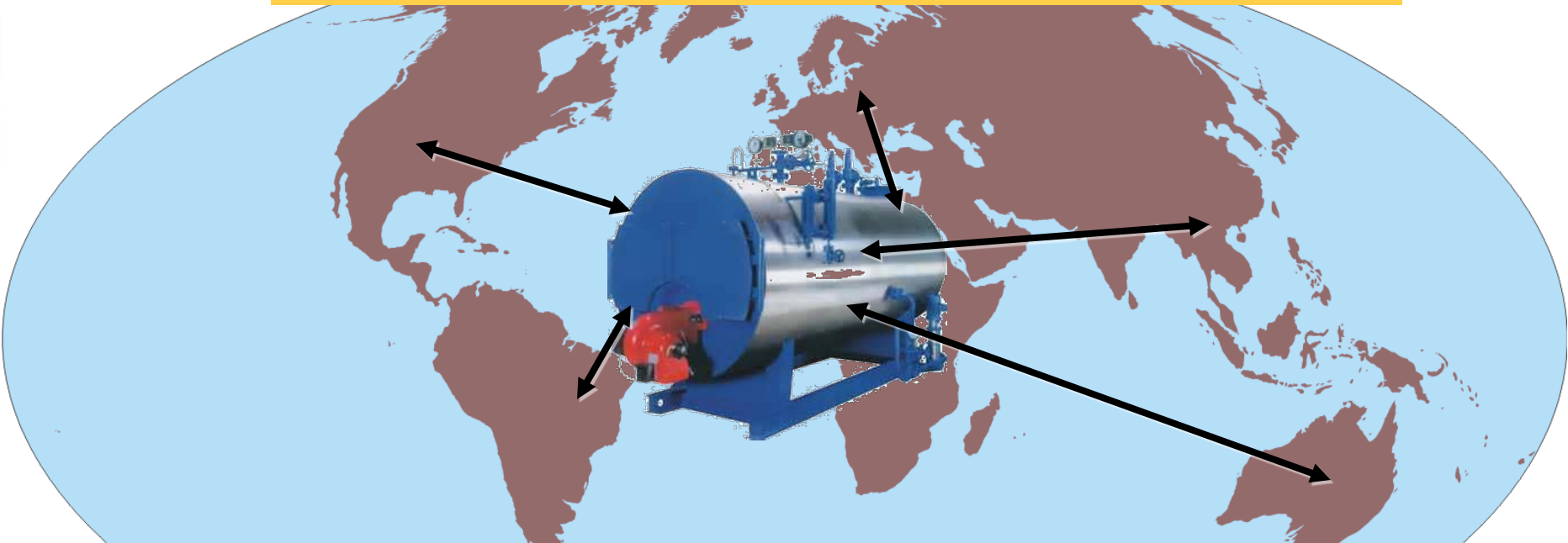
# Kudos to The National Board . . .

- **Proficiency Training Requirements for Inspectors Address A Significant Gap**
- **Requirements for Validation of experience for Obtaining a Commission Address a Significant Gap**

**. . . For Improving the Quality of Inspector Qualifications Through Measurable Actions!**

# Final Thoughts

Are the Inspections Uniform?



How do You Know?