

ASME and the National Board

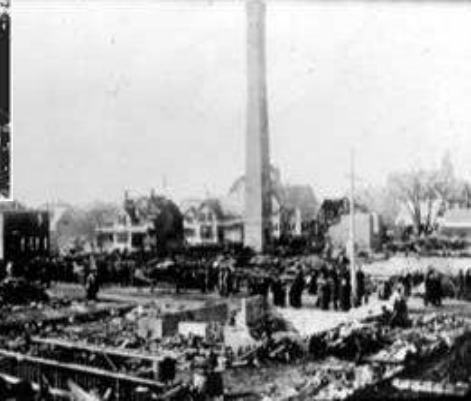
Our Shared Mission and Vision



Jon Labrador
Managing Director
ASME Conformity Assessment

History of ASME Standards

- Industrial revolution: fueled by novel applications of steam power
- ASME Founded in 1880
- Between 1898 and 1903 alone, over 1200 people were killed in the U.S. in ~1900 separate boiler explosions
- Lack of standardization, consistency, and safety features in boiler design and operation
- Call to action – Industry experts answer the call



ASME Standardization Milestones



1880

ASME founded to address issues with industrialization and mechanization

1884

Issues first standard, Code for the Conduct of Trials of Steam Boilers

1905

Standard for Proportions of Machine Screw Sizes

1914

First edition of the Boiler and Pressure Vessel Code

1916

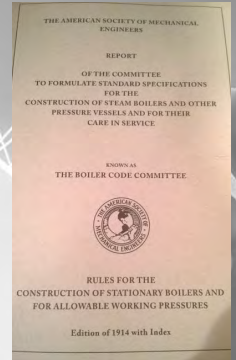
ASME Conformity Assessment founded

1919

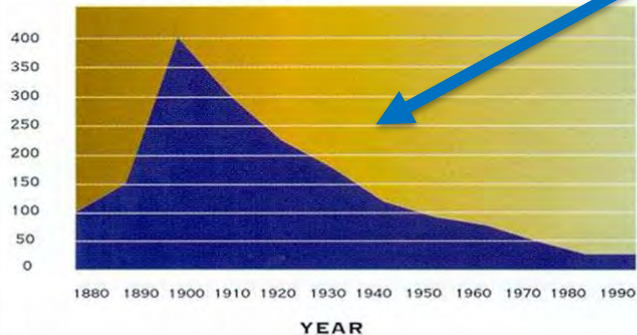
National Board founded

1921

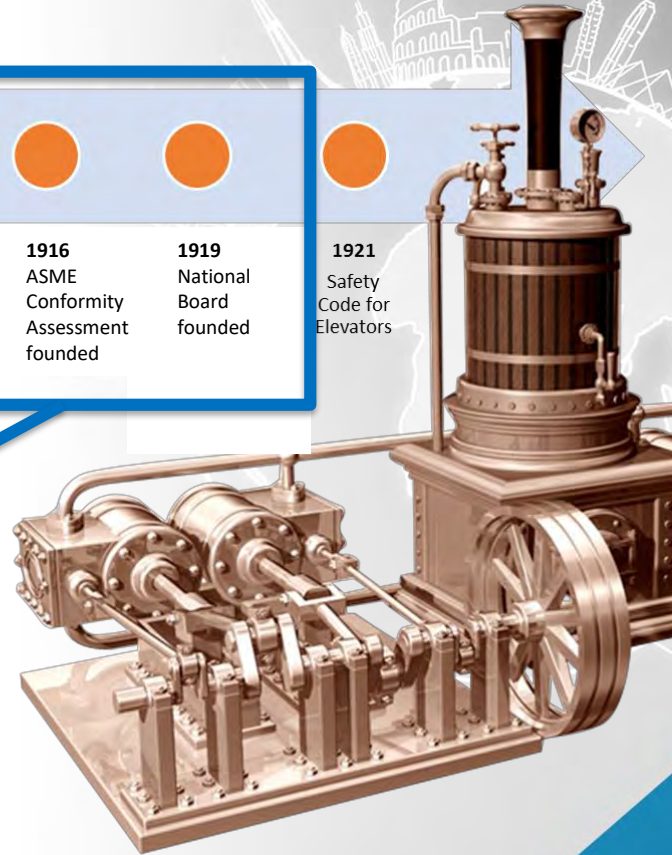
Safety Code for Elevators



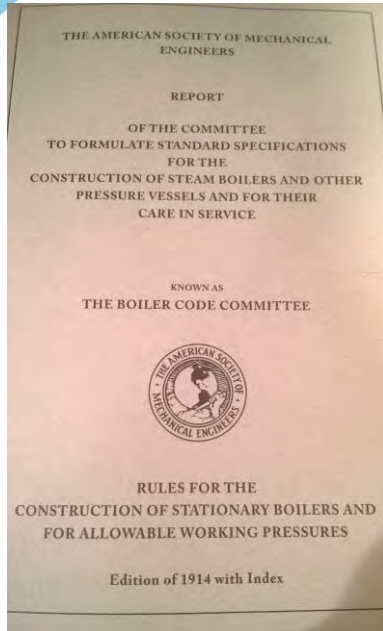
NUMBER OF EXPLOSIONS



Early 20th century RUUD Instantaneous Automatic Water Heater



Founders understood the need for oversight

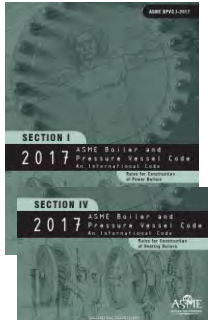


1914 Code – “The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchase is being performed... All tests and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified.”

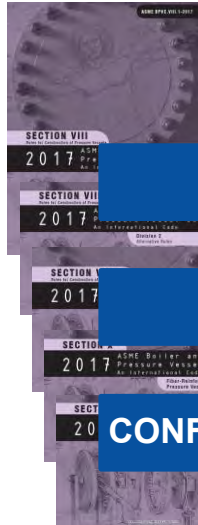
Part I Section I para. 61, (1914)

ASME Boiler and Pressure Vessel Code

Construction Sections



Service Sections



Nuclear Sections



TECHNICAL REQUIREMENTS

ADMINISTRATIVE REQUIREMENTS

CONFORMITY ASSESSMENT REQUIREMENTS

2017 Edition:
12 Sections
31 Volumes
~16,500 pages
Updated every 2 years

Understanding the need for uniformity

Founding of the National Board - 1919

National Board BULLETIN

Official Publication of the National Board of Boiler and Pressure Vessel Inspectors

C. O. MYERS, Secretary-Treasurer, 145 North High St., Columbus, Ohio

Vol. 1

July 1943

No. 1

THE NEW ORLEANS MEETING

The Fourteenth Meeting of the National Board of Boiler and Pressure Vessel Inspectors which was held in New Orleans with that city and the State of Louisiana as joint hosts, will go down in the records as one of the most enjoyable in its history. It was something of an innovation to venture so far away from the urban and industrial centers visited in previous meetings, but the experiment was highly successful. The weather was warm but pleasant throughout the entire week and the members enjoyed the many attractions of this very interesting city with great enthusiasm.

While the Meeting sessions were not scheduled to start until Tuesday, May 19th, quite a number of members, due to the war time travel conditions, arrived late Sunday, the 16th, or on Monday, the 17th, and spent the day Monday visiting and renewing acquaintances in the secretary's headquarters room on the third floor of the Roosevelt Hotel. Late in the afternoon on Monday our genial hosts, Messrs. James E. Leddy and A. L. Colby, surprised the guests with an impromptu sightseeing trip out through the city and suburbs. A group of about a dozen automobiles drove the party first across the Huey P. Long bridge across the Mississippi River and proceeded thence through the suburbs of Metairie, Gretna, and Algiers, back across the Algiers ferry, out Gentilly Boulevard to Lake Pontchartrain. The trip ended at Benson's restaurant where a delicious crab, crawfish, and shrimp dinner was enjoyed and the guests gained valuable experience in the art of dissecting crustaceans for food. The party then returned to the headquarters room at the Hotel to greet new arrivals.

The Convention was called to order at 10 A.M. on Tuesday morning with an attendance of about 100. Chairman Book opened the session with a comprehensive message to the members and then Dr. Frank E. Conliffe, Commissioner of Public Safety of New Orleans, gave an address of welcome to the assembly. Dr. D. S. Jacobus, Honorary Chairman of the Boiler Code Committee, next gave the members an interesting account of the



WHAT DOES THE NATIONAL BOARD DO?

Chief Inspectors, Engineers and Many Other Specialists From Across the Country Tirelessly Work on Maintaining Pressure Equipment Safety

BY CHRISTOPHER CANTRELL

Nebraska Chief Boiler Inspector Since 2007,
First Vice-Chair of the National Board's Board of Trustees

First, let me take a moment to congratulate the National Board of Boiler and Pressure Vessel Inspectors for achieving the historic milestone of having been in operation for 100 years. Throughout its century-long history, the National Board has consistently demonstrated a commitment to uniformity (One Code, One Inspector, One Stamp), to public safety, and to its member jurisdictions. Well done!

Second, let me fill you in on what, or who, the National Board is. The National Board is an organization comprised of the many Chief Inspectors representing most of the states of the United States, including some of its larger cities, and the provinces of Canada, all focused on pressure equipment safety. The National Board is also comprised of the very talented engineering and code professionals, training specialists, consultants, administrative and executive professionals, support staff, and volunteers, who are all focused on supporting the membership and on promoting pressure equipment safety. When I think of the National Board, I think of all of these as one.

A typical day in the life of a chief inspector can be, and usually is, anything but typical. A morning spent crawling through a 1960s-era stoker-fired boiler can be followed by a rush to get home, get showered, and then appropriately dressed for an afternoon meeting with a senator. Calls from a boiler manu-



THIS IS WHERE THE NATIONAL BOARD SHINES. WHEN A MEMBER NEEDS HELP WITH JUST ABOUT ANYTHING, THE NATIONAL BOARD ORGANIZATION AND MEMBERSHIP ARE THERE.

face challenges from new technology, hiring freezes, travel bans, legislative priorities, budget restrictions, and a myriad other reasons. Being a chief is not simply inspecting boilers or reviewing reports. It is being the person in the jurisdiction that knows, or is supposed to know, everything.

In addition to being the jurisdictional chief overseeing boiler and pressure vessel safety in their jurisdiction, there are many National Board members that add to their schedule by selflessly volunteering to serve on ASME and National Board Code Committees, industry task groups, and in community organizations. These women and men take on these extra roles because of their knowledge of Codes and Standards, their experience adopting and implementing them on a local level, and because of their desire to make the world a safer place in which to live, work, and play. They

do their day jobs first, put their people and jurisdictions first, and then they spend the extra time to work with other safety-minded individuals and organizations from around the world to create consensus standards that are understood, mostly uncontroversial—mostly—, and USEABLE. Great work, if you can get it. In short, chief inspectors are expected to be able to do it all. But they don't do it all alone.

When I became a chief inspector for the state of Nebraska in 2007, we had had no chief for about a year, and there were no field inspectors on staff. It really felt like I was alone on an island. Who could I turn to for guidance? Where could I find out what other states or chiefs were doing to cope with some of the problems that I was facing? How the heck was I going to afford code

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All Contribute to Safety and Uniformity

- Chief inspectors at the front lines in the U.S. and Canada focused on Pressure Equipment Safety
- Engineering and Code Professionals
- Training Specialists
- Consultants
- Administrative & Executive Professionals
- Volunteers
- Member support from the National Board

THE WORKINGS OF THE NATIONAL BOARD

The Intricate System Of Rules, Qualifications, Registrations and Certifications Ensures Pressure Equipment's Safe Operation

BY JOE BRZUSZKIEWICZ

Retired Project Engineering Manager For ASME

The year 2019 marks the one hundredth anniversary of the founding of the National Board of Boiler and Pressure Vessel Inspectors (National Board). The ASME has been involved with the National Board since its inception to ensure the safe operation of pressure equipment. There are three important areas in which this relationship has proved to be most effective: qualification of personnel who perform the inspection of pressure equipment, registration of equipment built in accordance with ASME requirements, and rules for inservice inspection and repairs or alterations to equipment.

In the years following the 1914 publication of the first edition of the ASME Boiler and Pressure Vessel Code manufacturers proved they met the requirements of the Code through self-certification and stamping of the equipment. The process soon evolved into a system of third-party inspection, control of the certification process by ASME and stamping by the manufacturer. Prior to 1921, a boiler manufactured in one state would not necessarily be accepted for operation in a neighboring state even if it had been constructed in accordance with the ASME code. States and several large cities had their own qualification requirements for inspectors, which, in most cases, meant little or no reciprocity. In order for a boiler to be installed in a state other than in which it was manufactured inspections had to be performed—during fabrication—by an inspector from the state where the boiler would be installed. This was costly and discouraged boiler sales across state borders. After its founding in 1919, the National Board proposed a two-part solution: qualifying all inspectors to a common set of requirements and issuing a National Board commission to successful candidates; and authorizing manufacturers to stamp a National Board number on boilers inspected by a National Board Commissioned Inspector.

Currently the National Board has two separate commissions for inspectors: the Inservice Commission (IS) and the Authorized Inspector Commission (AI). The qualification requirements for employment, education, and

experience are specified in National Board publication NB-263, RCI-1, *Rules for Commissioned Inspectors*.

The Inservice Commission is issued to individuals who have been qualified to perform inspections related to installation and inservice—that is, the jurisdictionally required periodic inspections of boilers and pressure vessels that are in operation. The purpose of these inspections is to assure the continued safe operation of pressure equipment within the regulatory requirements established by the jurisdiction in which it is installed.

The Authorized Inspector Commission is issued to individuals who have been qualified to perform inspections of boilers and pressure vessels during the fabrication process as required by the ASME Boiler and Pressure Vessel Code.

The applicant must pass a National Board examination as described in *Rules for Commissioned Inspectors*. Upon successful completion of all the requirements, each new inspector is issued a Certificate and a Commission Card. The Commission Card must be renewed annually.

Besides the commissions for IS and AI, the National Board also qualifies inspectors for new construction and inservice inspection of nuclear power plants and for those who perform inspections of repairs and alterations required by the National Board Inspection Code. Personnel who perform supervisory duties for Authorized Inspectors are also qualified by the National Board.

Registration of a boiler with a National Board number could now be completed with the manufacturer submis-

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Stronger Together

- One system to qualify all inspectors to a common set of requirements
- Standards Development process that is second to none with ASME, National Board and all user categories involved
- Conformity Assessment process verifies that pressure equipment is constructed in compliance with the Code
- National Board & Manufacturer Certified Data report – acceptance by respective jurisdictions

A FRUITFUL PARTNERSHIP

The ASME Boiler and Pressure Vessel Code is The Society's Crown Jewel

Because the National Board of Boiler and Pressure Vessel Inspectors is There to Oversee its Enforcement

BY THOMAS COSTABILE
Executive Director, ASME

ASME is recognized worldwide for its safety standards and associated conformity assessment programs. Working together with groups of dedicated volunteers and industry stakeholders, ASME standards for boilers, pressure vessels, elevators, pipelines, and other equipment have encouraged safety both in the United States and internationally. I think every member of ASME can feel good about the contribution that the Society makes for the common good.

But setting the standards isn't enough. Someone has to make sure that the equipment is up to code—in its manufacture, installation, operation and repair. That's particularly true of boilers and pressure vessels, which always carry the risk of catastrophic failure if they are not made, used, and repaired properly.

The ASME Boiler and Pressure Vessel Code is the crown jewel of the Society, established 104 years ago in the wake of several deadly accidents. In the century since, the number of accidents has plummeted—no coincidence—and the Boiler Code has expanded to encompass sections on composite tanks, non-destructive examination, and nuclear power plants.

We established the parameters for safe construction and use of boilers, yet a safety standard like that is only useful as long as it is followed. So ASME is particularly lucky to have a longstanding partnership with the National Board of Boiler and Pressure Vessel Inspectors, which this year is celebrating its 100th anniversary. The National Board is a body made up of men and women who serve as the chief boiler inspectors in their state, city, or province and oversee the enforcement of the ASME Boiler and Pressure Vessel Code and its code symbol stamp. ASME details the standards that are written into law, then the chief boiler inspectors, the sheriffs, are making sure the laws are enforced.

The National Board provides the most comprehensive boiler and pressure vessel inspection training in the world. The inspectors who are commissioned by the National Board diligently review boilers and pressure vessels at every point in their construction and service life. Where a pressure vessel is constructed, an inspector makes sure that the manufacturer is following the code. When it is installed, an inspector verifies that the company doing the work meets all safety standards. Repair

and alteration companies, in-service authorized inspection agencies, and owner-user inspection organizations all must be certified and accredited by the National Board. Also, in the case of accidents, inspectors go to the site, determine the cause and utilize the findings for further enhancements to ensure safety.

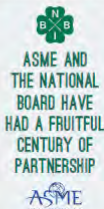
In addition to enforcing the ASME Code, the NBBI publishes the National Board Inspection Code for the installation, inspection, and repair, and alteration of boilers, pressure vessels, and pressure relief devices. The National Board issues its own stamps certifying that facilities are certified to produce or repair various pressure components. For instance, the "NR" stamp is issued to companies who repair or replace nuclear components, and the "R" stamp certifies that a

company is authorized to repair or alter boilers, pressure vessels, and other pressure-retaining items.

The National Board also archives data on items constructed to the Code through a robust registration program. This archive serves as an essential resource to regulatory agencies.

In all, ASME and the National Board have had a fruitful century of partnership. The National Board has created a motto for its centennial celebration—"One Code. One Inspector. One Stamp. One Hundred Years"—and I am pleased that the ASME Boiler and Pressure Vessel Code figures prominently as a partner. Both ASME and the National Board depend on the work done by the other to fulfill the mission of safety and public service.

Let's all lift a glass in honor of the National Board of Boiler and Pressure Vessel Inspectors. Congratulations on 100 years of service to the public good. And here's to another century of partnership between our two organizations. ♦



The Crown Jewel

- ASME Standards
- ASME Conformity Assessment
- National Board Inspection
- National Board Training
- State & Jurisdictional Enforcement

Shared Mission and Vision

ASME S&C

- **Vision** – Develop the best, most applicable codes, standards and conformity assessment programs in the world for the benefit of humanity
- **Mission** – Involve the best and the brightest people from all around the world to develop, maintain and promote the use of these ASME products and services world about

National Board

- **Vision** – to reduce the risk of life and property by promoting safety in the construction, installation, inspection, operation, over-pressure protection and repair and alteration of boilers, pressure vessels and other pressure retaining devices
- **Mission** – driven by the vision of global uniform safety of boilers and pressure vessels so that every man, woman and child may never again experience the devastation of pressure equipment failure

Technological Advances in Boiler and Pressure Vessel Equipment Yield New Challenges

BY MICHAEL PISCHKE, P.E.

Assistant Executive Director, Administrative,
The National Board of Boiler and Pressure Vessel Inspectors

After 100 years of existence of The National Board of Boiler and Pressure Vessel Inspectors and the 105th milestone of the ASME Boiler and Pressure Vessel Code, we can clearly state that the partnership between both organizations has been a resounding success. Boiler and pressure vessel explosions have gone from almost a daily occurrence back in the early 1900s to virtually no incidents in the 21st century.

Although these results are encouraging, we must continue our efforts. As American professional tennis player Arthur Ashe once stated, "Success is a journey, not a destination." Now our challenge is to sustain this safety record while adopting new materials, designs, manufacturing processes, and examination technologies. At the same time, we must avoid the natural, age-old apathy that can set in when everything appears to be safe and under control.

The key to the future of both organizations may lie in the past. Just look at the technological advancements that have occurred over the last century. In 1919, iron and steel were the metals of choice, and the preferred method for joining metals was riveting. Now there are dozens of welding processes and thousands of materials used in the production of boilers and pressure vessels. The primary products back then were coal-fired boilers and simple pressure vessels. Now this industry includes products like heat recover steam generators (HRSG's), complex heat exchangers, and solar boilers.

The speed at which technologies, such as material production, have advanced has only increased over time. During the last few decades, material production

volume has increased tremendously and at the same time, improved production controls have allowed material suppliers to better control their chemistries to meet minimum specification requirements. This is both good and bad because now materials can be produced to the absolute minimum requirements of a specification rather than to a nominal composition that is well above the minimums. In other words, consistency has improved at the cost of a natural margin of error needed in these materials to lose alloying elements during welding or heat treatment and still maintain their physical properties over corrosion resistance.

The increased use of recycled materials is another area of material production that has required an adjustment in strategy. As more and more new materials are produced using recycled scrap, the possibility of tramp elements increases. Some of these elements

may not be in the current material specifications because they were never present when these same materials were produced from ore. Once these elements reach a critical concentration, they can have a marked effect on the properties of the material. Again, the effect can be reduced impact resistance, degraded corrosion resistance, or poor high-temperature properties that may not be detected during routine room temperature testing. These are just some of the things we need to be mindful of while advancing new materials and material production processes.

At the turn of the last century, nondestructive examination (NDE) was limited to primarily hydrostatic testing and visual inspection. Over the last 100 years, we have advanced to using tools such as magnetic particle (MT), liquid penetrant testing (PT), radiographic testing (RT), and many others. As newer NDE and inspection technologies continue to advance, they are being tested and adopted by our codes and standards as they prove themselves to be viable methods for flaw detection. One example is the expanded use of phased array ultrasonic testing (PAUT) that offers volumetric examination similar to radiography, but without the same health risks as radiography. Like all new examination processes, we need to understand their capabilities and limitations in order to get the most out of their use in industry.

Another very recent area of potential



Drone used to perform pressure vessel inspections.

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Challenges Ahead

- Sustaining the Safety Record as technology & capability advance
- Adopt new materials, design, manufacturing processes and examination techniques
- Avoid natural, age old apathy that can set in when everything appears under control
- Look to the past to ensure future success
- Continuously educate and expand our outreach efforts

Global Outreach

ASME/NB 360 Workshops – Existing/Potential CH's, Standards Users, Ministries, Agencies, Government Officials



The screenshot shows the ASME website's navigation bar with the ASME logo, a search bar, and links for Topics, Events, About ASME, and Shop ASME. The main content area features a header for the 'Certification 360 Workshop' and a list of workshop locations: United States, China, and an upcoming schedule. A featured image shows two workers in hard hats and safety glasses, with the text 'Applying ASME Global Standards and Enhancing Public Safety'. Below the image, the workshop details are listed: August 9-10, 2016, at the Crowne Plaza Columbus North Worthington in Columbus, Ohio. A 'Program Information' section includes a link to download a draft agenda, and a 'Register Online' section with a link to register.

- Reach potential Certificate Holders
- Retention of existing CH's
- “Demystify” the auditing process
- Establish proper auditing preparations
- Establish the ASME/NB Value Proposition vs. competing programs vs. no program
- Explain why ASME/NB programs are “best in class” and “the gold standard”

Global Outreach

ASME/NB 360 Workshops – Existing/Potential CH's, Standards Users, Ministries, Agencies, Government Officials



Certification 360 Workshops

EVENTS

Certification 360 Workshops

- 2019 Germany Workshop
- 2019 Saudi Arabia Workshop
- Upcoming Workshop Schedule
- Contact Us
- 2018 China Workshop
- 2018 Italy Workshop
- 2018 Kazakhstan Workshop
- 2018 Spain Workshop

CERTIFICATION 360 WORKSHOPS

Applying ASME Global Standards and Enhancing Public Safety

ASME Conformity Assessment certification is a clear indication of your organization's commitment to quality and public safety.

ASME Certification 360 Workshops are an opportunity for the certification community to gain insight into the policies and procedures of the ASME Conformity Assessment Certification and Accreditation Programs. They are also a forum where high-profile topics related to design, fabrication, and stamping of code items are discussed.

At this workshop you'll learn how to best prepare for the certification and renewal process. You'll also gain insights into the value of ASME certification and on how to leverage your organization's ASME certification in global markets. These workshops are complimentary for the certification community.

- April 2015 Busan, Korea
- May 2015 Shanghai, China
- Apr 2016 Mumbai, India
- Apr 2016 Shanghai, China
- May 2016 Salta, Argentina
- Aug 2016 Columbus, OH
- Sep 2016 Bergamo, Italy
- Jan 2017 Mumbai, India
- Mar 2017 Ravenna, Italy
- Apr 2017 Nanjing, China
- May 2017 Mendoza, Argentina
- Sep 2017 Seoul, Korea
- Oct 2017 Dubai, UAE
- Oct 2017 Milan, IT
- Dec 2017 Bariloche, Argentina
- Jan 2018 Dubai, UAE
- Mar 2018 Rome, Italy
- Apr 2018 Madrid, Spain
- May 2018 Kazakhstan
- Aug 2018 Vietnam
- Aug 2018 Thailand

Global Audiences



Ever Growing Global Audiences



Delivering the ASME/NB Message



Strong Bonds



A Strong Bond

is Celebrating its Centennial and Looks Forward to Expand its Message to the World

BY JON LABRADOR

Managing Director, Conformity Assessment, ASME



There was a unifying call to action in the United States after consecutive pressure equipment tragedies led to major loss of life and property in the early 1900s. It was at this time that legends in their field answered the call, gathered for the sake of safety and developed the ASME Boiler and Pressure Vessel Code in 1914. There was an additional genius in their intent not only to standardize

construction and drastically improve quality, but also to build in requirements that facilitated the oversight of such construction. Not only were technical and administrative, but methods to verify the implementation of such requirements were inserted into the code at the outset. These conformity assessment requirements led to the formation of ASME's conformity assessment programs in 1916. However, it was realized that verification through triennial certification was not enough

and those same cod... need for t... ASME with... and the N... National Board have increased the pace of their outreach by educating not only the U.S., but the world on the value of standards and conformity assessment programs.



Staying in Sync ASME / NBBI Biannual Meetings

- Team Leader Coordination
- Program Coordination
- Designee Training
- Coordination of Audits
- Procedure, Policy, Quality Program refresh/review
- Committee Participation

100 Years – Stronger Together

An Ohio Chief Boiler Inspector's Lasting Legacy

BY DAVID A. DOUIN

Executive Director, The National Board of Boiler and Pressure Vessel Inspectors

As we celebrate the 100th anniversary of The National Board of Boiler and Pressure Vessel Inspectors this year, many thoughts come to mind. The first is imagining the conditions at the turn of the 20th century, when a uniform boiler construction standard did not exist, and yet boilers were in high demand and boiler accidents were prevalent. Imagine the difficulties regulators faced trying to assess equipment that was built to many different specifications. This leads to another thought: how fortunate we are today to have boiler uniformity and standardization, and how one individual's vision and mission helped to get us here.

and the joint designs were different as well. Some boilers weren't constructed to any rules and were simply "homemade." This was Myers' everyday world. And it was the norm in every state and jurisdiction. This lack of uniformity was a nightmare for all involved—manufacturers, jurisdictional authorities, insurance companies, and boiler users.

Prior to the establishment of the National Board, American boiler manufacturers wanted one code, one enforcement bureau, one enforcement procedure, and one inspection procedure. In 1910, manufacturers, users of boilers, and insurance companies requested that the American Society of Mechanical Engineers (ASME) develop a single boiler construction standard that would be readily adoptable as law by legal jurisdictions. Above all, they wanted a construction standard that would result in safe boilers to satisfy all the regulators. In 1915, the first ASME boiler design and construction



The first meeting of Ohio inspection officials in 1916.

Carl O. Myers, who was the chief boiler inspector for the state of Ohio, had firsthand knowledge of the problems caused by the lack of boiler regulation. His job was to decide if a boiler or vessel was safe to install and operate, and ensure the equipment would not be a danger to the public. These were extremely difficult decisions because there was no national nor uniform standard for boiler construction that Ohio could adopt and reference in its laws. That type of standardization didn't yet exist. Instead, differing sets of rules had been developed by insurance companies, maritime associations, and government regulators.

Myers, in his role of chief inspector, was regularly approached by boiler manufacturers who wanted to sell and install boilers in Ohio. The problem: these boilers were built to many different rules and specifications. Not only were the formulas for determining safe working pressures different, but the materials of construction



Boiler accidents were prevalent before the establishment of codes and standards.

MAY 2019 • A SUPPLEMENT TO MECHANICAL ENGINEERING MAGAZINE

One Code.
One Inspector.
One Stamp.

Safety First!

“...so that every man, woman and child may never again experience the devastation of pressure equipment failure.”