

# BULLETIN

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HAWAII VISITORS & CONVENTION BUREAU (HVCB)

### ON THE COVER:

*The beauty of Hawaii provides a stunning setting for the 72<sup>nd</sup> General Meeting. Complete information, including registration form and preliminary program, begins on page 12.*

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# Safety: One Goal. One Chance.

BY DONALD E. TANNER, EXECUTIVE DIRECTOR

One.

There is perhaps no other word that simply says it all, especially when it comes to safety.

After all, there can only be *one* goal: to protect the public's well-being. The number of opportunities — or chances — to achieve that goal is sometimes open to debate. But the fact remains: if safety standards are satisfied the first time, there should be little concern or need for a second or third chance.

To focus on the importance of doing our job properly the first time, the National Board has designated ***SAFETY: One Goal. One Chance.*** as the theme for the 72<sup>nd</sup> General Meeting, April 28 – May 2, in Honolulu.

To illustrate the significance of executing every job as if it were the only opportunity to prevent an accident, we will bring in two exceptional individuals who are acutely attuned to setting goals and accomplishing high performance standards.

National Basketball Association (NBA) and Hall of Fame legend Bill Russell knows what it takes to realize both personal and team goals. With the Boston Celtics from 1957 to 1969, he helped his team win 11 championships in 13 seasons — two as Celtics coach. A five-time MVP, he has been called “the game’s greatest living legend” by no less than basketball superstar Michael Jordan. The first African-American to coach a professional sports team, the 6’ 10” Monroe, Louisiana, native and member of the 1956 Olympic Gold Medal United States basketball team is considered to be the greatest defensive player in the history of the NBA. Mr. Russell was recently recognized by ESPN as one of the 50 greatest athletes of the twentieth century. He is the author of a new book entitled *RUSSELL RULES: 11 Lessons on Leadership from the Twentieth Century’s Greatest Winner.*

Our second speaker is also a legend and expert on performance standards. As one of the most recognized female athletes in the world, figure skater Peggy Fleming has earned five U.S. titles, three world titles, and a Gold Medal in the 1968 Olympics. Today, there is perhaps no other one individual who has come to better personify the grace, beauty and athleticism associated with figure skating. A two-time Emmy winner for her TV skating specials, Ms. Fleming has served for 20 years as an on-air analyst for ABC Sports. In 1999 at the *Sports Illustrated 20<sup>th</sup> Century Awards*, she was honored among a group of seven “Athletes Who Changed the Game,” joining the elite company of Arnold Palmer, Billie Jean King and Jackie Robinson.

Because of the unique location of this year’s General Meeting, there will be several notable changes *for this year only* to help maximize the enjoyment of your visit.

And it all begins with attire: for the first time in the long history of this distinguished event, we encourage all General Meeting participants to dress in the style referred to as “smart casual.” Although Hawaiian shirts are optional, they are very much suggested at all General Meeting events.

In addition to the temporary changes at this meeting, there will be several permanent modifications as well. Perhaps the most notable is the elimination of the Tuesday General Session presentations [see Preliminary Program on page 23].

Make your plans today to attend the 72<sup>nd</sup> General Meeting. While you may come home with a tan, it is our hope that you will also bring home a renewed sense of commitment to making safety your foremost objective. Whatever the investment, it will be worth every penny . . . and then some. ❖

# Installation of Boiler Rivets

By Richard Stone

**I**n some respects, boiler riveting has become a lost art. Once a common practice in construction and repair, riveted joints are seldom used today.

Even so, knowledge of boiler riveting is still necessary for repair firms engaged in repairs of riveted boilers and pressure vessels found in some power plants constructed in the 1920s to 1940s, for example. Repair firms may also be called upon to execute repairs of the firetube boilers found on some steam locomotives, steam traction engines and steamboats.

A typical repair might include replacement of isolated rivets having corroded heads, replacement of sheets or shell courses, or installation of a welded patch that encompasses part of a riveted seam.

Skillful riveting can simplify and lower the cost of repairs considerably and allow a boiler to be repaired instead of scrapped.

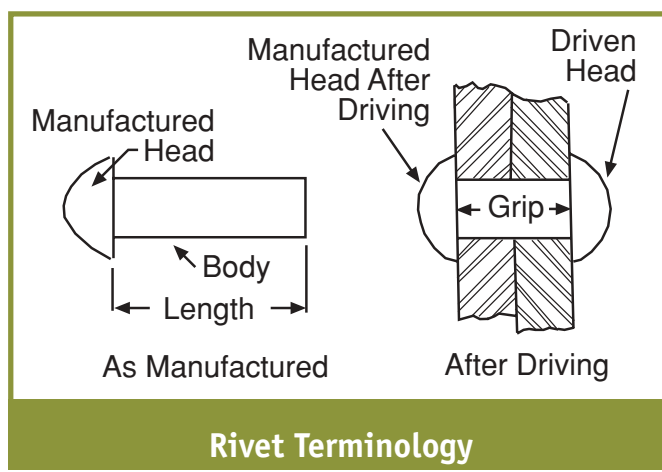
Although riveting is a straightforward process, it is viewed with apprehension by many repair firms because of their lack of experience and equipment. Part of the concern stems from the fact that riveting can be accomplished using a variety of equipment and associated procedures that can easily confuse those not familiar with them.

This article focuses on hot riveting as used in boiler repair work and briefly describes the riveting process as well as the tools and fixtures used, but the information is applicable to both hot and cold riveting used for structural steel construction and ship repair.

## Fundamentals of the Rivet

A boiler rivet is a straight, round pin, generally made from steel, with a forged head at each end. It is used as a fastener

to clamp and lock two or more plates or parts together by applying an axial clamping force onto them. The rivet is installed into a hole that extends completely through the plates and has each head located on the plate exterior. One head is forged during manufacture of the rivet (the “manufactured head”) and the other during the installation (the “driven head”).



The rivet possesses several attributes as a fastener. In particular, the head-forging process during installation causes the rivet body to expand radially outward and fill the hole over the entire hole depth, preventing leakage and creating a large surface area to prevent shear and movement of the plates without the stress-magnifying threads of threaded fasteners. It also provides a large bearing surface throughout the hole depth which reduces bearing stress and the risk of tear-out of plate material.

Rivets are weaker, however, in direct (axial) tensile load than threaded fasteners because the tensile load transmits a prying action on the rivet head that can lead to fatigue failure. Boiler designers compensated for this fact by designing joints having a large number of rivets to keep the

tensile load on each rivet low. In addition, with hot riveting, although the rivet shank outside diameter (OD) will expand to fill the entire rivet hole inside diameter, the rivet shank OD will shrink slightly during cooling and create a small clearance approximately 0.0508 mm (0.002") with the hole, which can lead to leakage.

Boiler riveting usually is done by the "hot riveting" method, a procedure similar to hot forging. The rivet is heated uniformly to a temperature above the upper critical limit of the steel and immediately inserted into the rivet hole. Then, while the rivet metal remains above the upper critical limit temperature, the section of the rivet shank protruding from the plate is plastically deformed to form the driven rivet head, either by rapid impact blows from a pneumatic rivet hammer or by steady force from a hydraulic squeeze-type riveter. The forging of the rivet head is stopped before the temperature of the rivet steel has dropped much below the lower critical limit of the steel, in order to prevent creating fractures in the head or shank.

The axial clamping force the rivet applies to the boiler plates is created by the length reduction of the rivet body as it cools. The length reduction draws the rivet heads closer together, causing each head to place a large clamping force on the plates, holding them together tightly. The strength of the rivet is obtained from the resistance of the rivet head to shear and the resistance of the shank to tensile stresses.

Hot riveting requires several steps to prepare the work. The process is also highly temperature sensitive. Proper heating and driving of the rivet is critical to the quality and successful completion of the job, because damaged rivets cannot be repaired by use of supplementary heat-treating methods such as annealing, nor by using welding to build up damaged rivet heads. Instead, a damaged rivet must be scrapped.

Cold riveting is a process by which the rivet head is forged cold, at ambient temperature, using a hydraulic squeeze-type riveter. The main advantage of it as compared to hot riveting

is that the rivets can be installed with much less clearance, which enables the rivet to fill the hole completely when driven, and the work pieces are not subject to hole misalignment caused by thermal expansion of the plates by contact with the hot rivets. However, the size of rivets that can be driven cold is limited to 25.4 mm (1") because of the large force and equipment required. Moreover, it is often impossible to provide the portable hydraulic riveter with simultaneous access to both sides of the repair location on an assembled boiler.

Calking is the process of sealing the edges of rivet heads and the plates that comprise the rivet seams by hammering the edges together. Calking is accomplished by use of a calking tool (essentially a chisel having a rounded or flat face) and powered either by a pneumatic chipping hammer or a hand hammer. The calking tool functions by making repeated rapid blows onto the edge of one plate or rivet-head edge, to force it against the adjacent plate. The procedure is a form of "cold working" the steel by plastic deformation and affects only the edge of the steel plate or rivet.

Calking is performed during new manufacture to prevent steam/water leakage from riveted seams and rivet heads, as well as to confirm that the edges of all plates are tightly held together. It is used on operating units as a repair process to stop leakage. It is a standard step in the application and maintenance of rivets and riveted seams, and the need to use it should not be taken automatically as an indicator of defective work.

## Rivets

Rivets are classified by the configuration of the head. The American Standard styles are shown at right, and the head dimensions are listed in ANSI B18.1.2, "Large Rivets." This standard replaces the previous standard ASA B18.4 - 1960.

It is common for a different style of head to be used on each end of the rivet. The head type used for a specific applica-

tion is dependent on the load placed on the rivet, the clearance required with other boiler components, and the preference of the original design engineer.

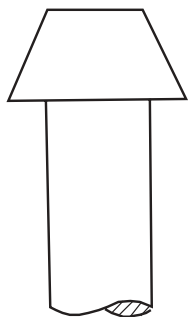
Button-head and pan-head rivets are considered to be the best types for general boiler work because the heads are easy to form, possess high strength, and can be calked for sealing with little trouble. Countersunk head rivets are used in locations where clearance with adjacent parts is necessary, and on interior firebox seams because the countersunk rivet head is not exposed to overheating damage and erosion from radiant heat and the products of combustion.

Boiler rivets are manufactured either by hot forging or cold forming. All rivets must have a radius between the shank

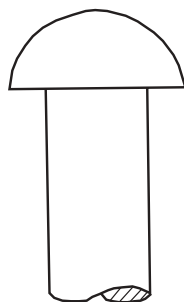
and manufactured head, typically not exceeding 1.59 mm (1/16"), to reduce the stress concentration at this location. The swell-neck rivet design is superior to the straight-shank rivet because the swell-neck section facilitates better sealing of the manufactured head against leaks by providing additional material for filling in the cavity between the outer end of the rivet hole and the rivet shank.

The length of a rivet required for a given application equals the joint thickness ("grip length" or hole depth), plus the length of material required to form the driven rivet head. The latter must be taken into account when calculating the rivet length needed because the length of rivet stock required for each type of head configuration is different. This information is available from rivet manufacturers and is also

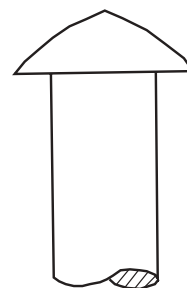
### Common Types of Rivet Heads



Cone Head



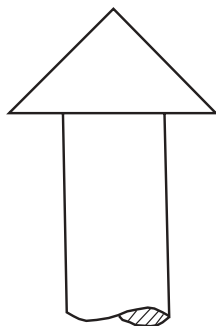
Button Head



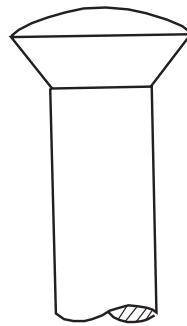
Double Radius Head



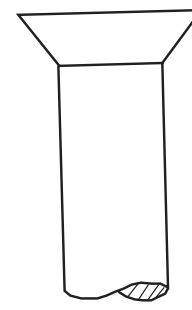
Swell Neck Shank



Steeple Head



Oval  
Countersunk Head



Flat Top  
Countersunk Head

listed in several engineering handbooks as well as in the ANSI B18.1.2 "Large Rivets" specification. In addition, some engineering and steel design handbooks include charts showing the rivet length needed for different combinations of plate thicknesses and rivet heads. In these charts, the rivet industry term "grip length" is often substituted for "joint thickness."

Additional factors that must be taken into account when determining rivet length are the clearance between the rivet and hole, the condition of the rivet die, and the curvature or radius of the plates. Existing holes in old plates may have to be reamed slightly oversized during fit-up, requiring that a slightly longer rivet length be used to compensate for the extra material needed to fill the entire hole.

Industry practice is to make the rivet length slightly longer than calculated, to ensure there is enough material to form the driven head completely and fill the entire hole. When the rivet is driven, the extra rivet material will be extruded from the rivet die, creating the appearance of a thin washer on the rivet head that is referred to as a "fin" or "flash." The 1940 *Proceedings* of the Master Boiler Makers Association (MBMA) recommended that the optimum fin/flash thickness be 1.59 mm to 2.38 mm (1/16" to 3/32"). In most applications, the fin or flash is removed using a chipping hammer and calking tool after the rivet has cooled, but sometimes it is left in place.

If the rivet length is too short, the rivet will be defective because the rivet head will not be formed completely. In addition, the rivet may be loose in the hole if the short length of the protruding rivet stock allows the rivet die to contact the plate.

As a precaution to confirm that the length dimension is correct before ordering all the rivets necessary to complete the job, several rivets having the estimated length should be driven into the work or into a test block of equal hole depth.

## Safety Equipment

Use of proper safety equipment in the riveting process is mandatory. Vision protection, hearing protection, and work gloves are obvious. Even temperature/flame-resistant protective clothing is among the equipment required, because hot scale may be discharged from the rivet during handling and driving.

Depending on the repair site, the following list of suggested equipment should also be considered, to ensure the riveter's safety as well as that of all nearby personnel.

Remote communication equipment, such as radiotelephone headsets, enable the operators to communicate and coordinate their actions even when separated by the boiler shell.

Ventilation equipment or fans are necessary when working inside of a boiler to remove heat and fumes; hot rivets can create localized flame from paint or solvent remaining on the plates, as well as from the oil used to lubricate the pneumatic rivet hammer or added to the compressed air line by the air line lubricator.

Even riveting done with good air circulation must be approached with caution. For example, workers on the Golden Gate Bridge became ill from hot riveting: the lead-based paint used on the prepainted structural steel gave off toxic fumes when hot rivets were inserted into it.

All combustible material, including liquids and compressed gas canisters, must be removed from the work area to prevent fire by contact with the hot rivets and tools.

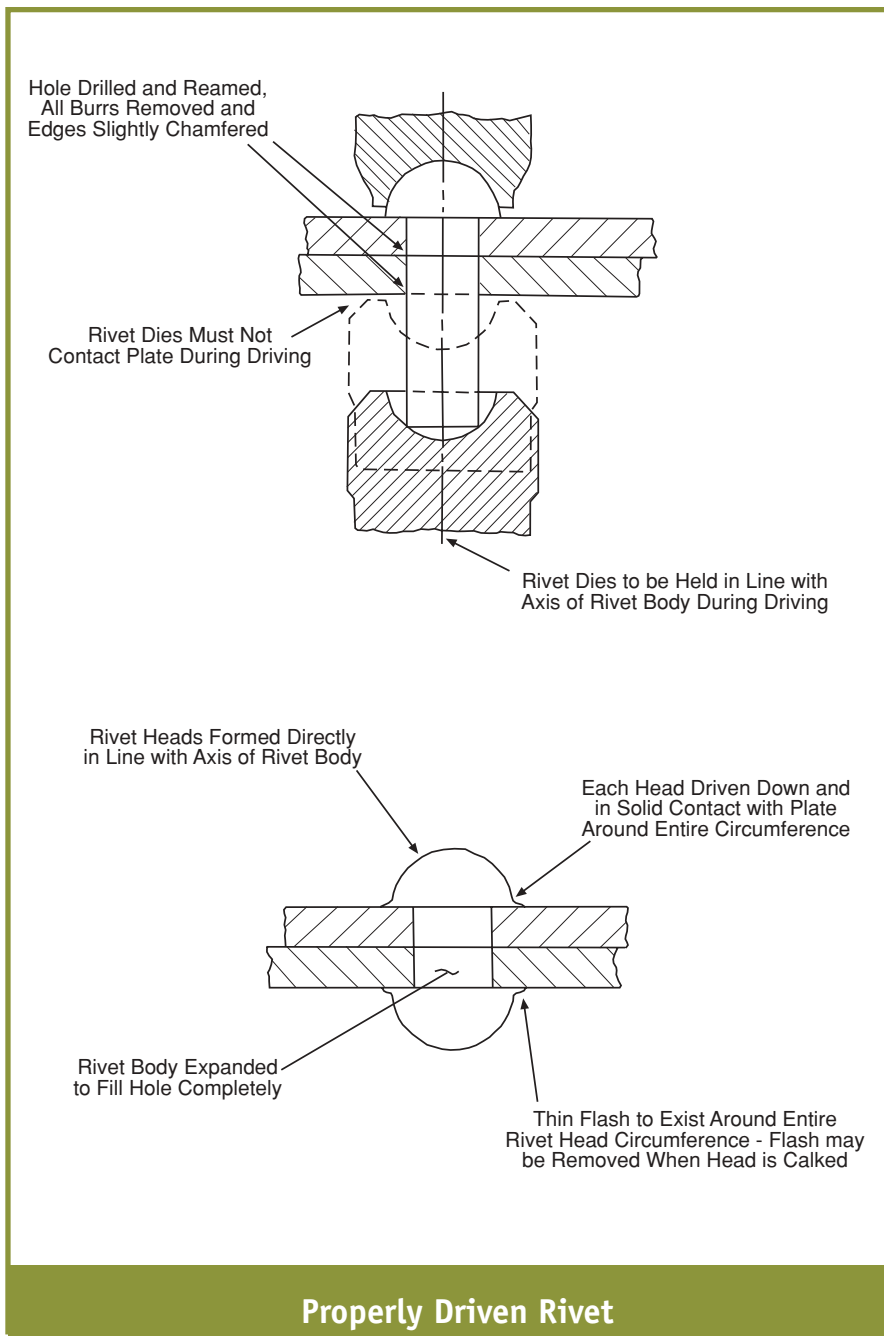
Riveting creates considerable noise as well, and hearing protection should be given to all personnel in the work zone. Applying a large canvas tarpaulin over the work piece to dampen vibration can lower the noise level around the work zone greatly.

The same requirements apply to calking: vision protection, hearing protection, work gloves, and protective clothing are all required.

## The Riveting Process: An Overview

Presuming first that all appropriate safety equipment is in place, the riveting process can be broken down into the following steps. The example listed is for riveting in conjunction with installation of a welded boiler shell patch. The assembly sequence can be changed as required to suit other configurations of riveted repairs.

1. Remove old rivets and defective sections of plate.
2. Lay out and form new plate. Drill rivet holes undersize as necessary.
3. Assemble new plate into position. If new plate will be installed using full-penetration welds in addition to rivets, perform all welding at this time.
4. Install all tack bolts as required. Apply a bolt in every other rivet hole unless a larger number of bolts is needed.
5. Check the gap (fit-up) between the new and old plate and correct it as required — zero gap is recommended. Use the “heat and hammer” method if major adjustment of the gap is required.
6. Ream all rivet holes not equipped with tack bolts to the required size and chamfer the holes on the new and old plates. Clean all reamed holes of cutting oil and metal chips.





7. Determine length of new rivets.
8. Cut rivets to length.
9. Heat the rivets a few at a time.
10. One at a time, insert a rivet into its hole. Arrange the holder-on equipment if required.
11. Drive the rivet (refers to the process of forming the rivet head during installation).
12. Continue installing rivets in all open rivet holes one at a time and position rivets over the length of the seam to avoid local heating of the plate.
13. When rivets have been installed in all open holes, one at a time remove the tack bolts from the adjacent rivet holes. Ream the rivet holes to size and chamfer.
14. Drive the rivet into the reamed rivet hole.
15. Continue removing the tack bolts and installing rivets in all remaining rivet holes.
16. Check all finished rivets for tightness using a light hammer. Replace all loose and incorrectly formed rivets as required.
17. After all rivets are installed and cool, remove the "fin" or "flash" from all rivet heads and calk all rivet heads if required.
18. Calk all joint seams.
19. Perform hydrostatic test and correct all defects. Calk all leaks as required. ❖

Mr. Stone's guide to the riveting process is available in its entirety on the National Board Web site. Please access [nationalboard.org](http://nationalboard.org) and click on "Installation of Boiler Rivets" on the homepage's Gold Feature Bar.

### Editor's Note

### About the Author

Richard Stone is a senior consultant for the Technical Services Division of Alstom Power, specializing in coal pulverizers and firing systems. He holds a B.S. degree in mechanical engineering and has over 25 years' experience in the inspection, maintenance and repair of riveted firetube boilers for steam locomotives on railroads in the United States and England.

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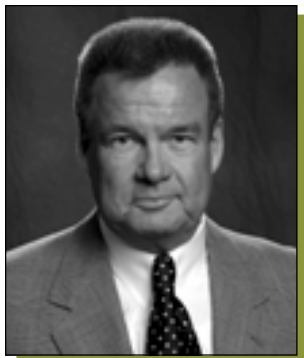
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# A New Year. A New Synopsis.

BY PAUL BRENNAN, DIRECTOR OF PUBLIC AFFAIRS

Few recent events in the boiler and pressure vessel industry have met with as much anticipation as the new *National Board Synopsis of Boiler and Pressure Vessel Laws, Rules and Regulations*.

Since word began circulating in July that the National Board had assumed publishing rights to this popular industry reference, we have received numerous phone calls and emails inquiring of the new edition's publication date.

Now that a distribution date of March 31 has been revealed, a collective sigh of relief can be heard from those who have anxiously missed the *Synopsis*.

So what took so long?

It was the commitment of National Board Executive Director Donald Tanner. Popularity of the *Synopsis* notwithstanding, Mr. Tanner was of the firm opinion that this was an opportune time to completely evaluate this publication's utility and value to the user. That meant closely examining every *National Board Synopsis* component to make certain each and every entry was as accurate and up-to-date as humanly possible.

On first blush, the changes may appear only cosmetic. Indeed, there are many. In addition to a larger new typeface and layout, one of the *Synopsis*'s more popular features — the registration map — has been totally revamped to include distinguishing color breaks and bigger, more discernible graphics. (This new map can be found on the National Board Web site at [nationalboard.org](http://nationalboard.org).)

One of the first things past users of the *Synopsis* will note is the new edition's slightly larger size. This was necessary for the purpose of opening up the format to better use available space and make each entry easier to read.

But there is more than meets the eye.

Content-wise, references for each jurisdiction in the new *Synopsis* are more concise. Where possible, we streamlined the editorial content to make phrases and terminology more uniform so that there would be no second-guessing as to what is being communicated.

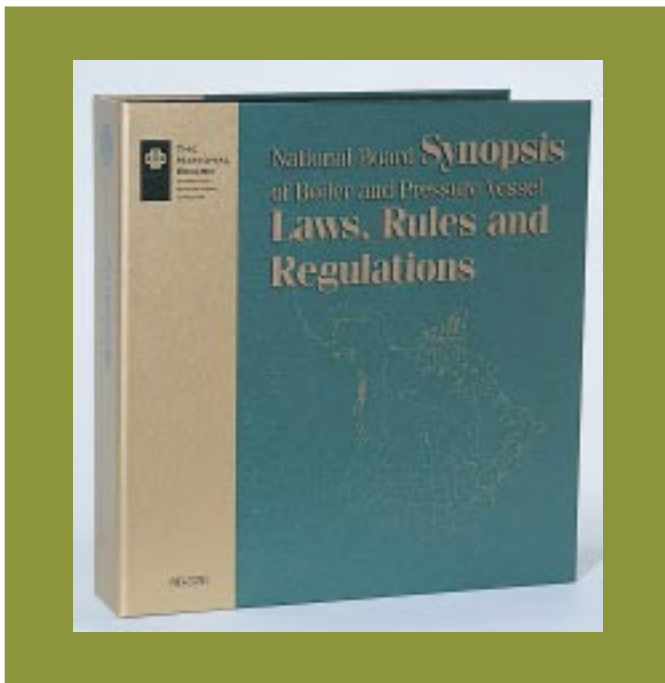
Beyond the editing process, we contacted each and every jurisdiction in an attempt to confirm accuracy of content and clarify references that may have seemed ambiguous.

While the National Board looks forward to introducing the newest member of its publication family, readers should be reminded that the *Synopsis* is exactly what its name implies: a brief outline or distillation of each jurisdiction's laws, rules and regulations. As such, users are cautioned to consult the jurisdiction's chief inspector before reaching any decision that may have critical consequences. This in no way reflects on the quality of the published information. Rather, it is merely good common sense to avoid misinterpretation of the data or failing to understand the regulatory nuances of each jurisdiction.

Of course, a publication is only as good as the currency of material it contains. Because the *Synopsis* will now be only annually revised for distribution, the National Board was faced with the challenging task of keeping this constantly evolving material updated. To accomplish this, we are providing purchasers of the new *Synopsis* with access to a specially designed Web site featuring an electronic, continually updated listing of jurisdictional information.

The end result of these efforts is an even more exceptional reference source — one that has been significantly enhanced for the user.

That's the good news. But there is even better news: the National Board plans to make its *Synopsis* available for \$100.00 per copy, or \$250.00 *less* than the purchase price of one year ago.



STEAMED: A recent email from a plumbing inspector in a large U.S. municipality inquired about what should be done when government officials interfere with boiler inspection efforts involving the city's own buildings.

While this is not an unusual situation, it points to the problem of communications affecting both city and state jurisdictions alike. Having to bring equipment the government owns and operates up to code is many times not a priority, especially if that

equipment has been significantly neglected. Add a tight economy and the problem becomes one of considerable frustration.

Attempting to persuade reluctant city officials under these types of conditions is often accompanied by political consequences. It generally begins with a challenge to the inspector's jurisdictional authority and may even result in legal action. That is why an inspector must be intimately familiar with his or her jurisdiction's laws and regulations.

While the above scenario involved a resumption of inspections following a lengthy suspension of inspection activity, it still underscores the importance of all inspectors fully understanding and developing a comfort level with their individual mandates. And it also highlights the necessity of inter-department communications within a jurisdiction. After not having to deal with boiler inspections for an extended period, it is understandable why those responsible for operating and maintaining the city's buildings would be skeptical of a new inspection initiative.

How might this situation have been avoided?

A meeting with building and maintenance officials in advance to review the inspection process might have resulted in a better understanding of *what* needed to be accomplished as well as *how*. More importantly, the inevitability of confrontation might have been significantly lessened and resulted in a mutual understanding.

While shutting down a boiler should be an implement of last resort, inspectors sometimes fail to employ perhaps the most useful and effective tool at their disposal. That tool is communication, and it is as essential to the public's safety as the inspector's keen eye and experience. ❖

# Public Affairs Department Established

The National Board has reorganized its governmental relations and communications functions under the formation of a new public affairs department.

“The integration of communications and governmental affairs will allow us to better serve our membership by maximizing the effectiveness and outreach of our safety message,” National Board Executive Director Donald E. Tanner explains. “As part of this reorganization, governmental affairs will go from a proactive process to a support function specifically tailored to the membership. As such, each member will be involved in the individual jurisdictional issues affecting his or her respective department to the maximum extent possible.”

One function of the National Board Public Affairs Department has involved developing an accurate database of jurisdictional boiler and pressure vessel laws, rules and regulations, including both member and non-member jurisdictions. The database is being used to publish the *National Board Synopsis of Boiler and Pressure Vessel Laws, Rules and Regulations*. In June 2002, the National Board acquired the rights to publish the *Synopsis* from the now dissolved Uniform Boiler and Pressure Vessel Laws Society.

To head the reorganized department, Mr. Tanner named Director of Communications Paul Brennan to the newly created position of Director of Public Affairs. “Mr. Brennan’s more than 30 years of experience in governmental relations and communications brings a seasoned and vital dimension to our public affairs process,” explains Mr. Tanner. “His expertise in the area of issues management will be particularly helpful in establishing new priorities and controls that will streamline our governmental relations efforts.” ❖

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## EDT Celebrates One-Millionth Registration



Marking the one-millionth milestone with cake and a plaque are (l to r): David Trent (Senior Programmer Analyst), Donna Radcliff (Registration Processing Coordinator), Executive Director Don Tanner, Nikki Estep (Data Reports & Accounts Receivable Manager), Dick Allison (Assistant Executive Director – Administrative), and Dolores Kefalos (Programmer Analyst).

In November 2002, the National Board registered its 1,000,000<sup>th</sup> item using a Web-based database system called Electronic Data Transfer, or EDT. EDT allows manufacturers to electronically create, edit, sign and submit Manufacturers Data Reports to the National Board for registration.

Established in November 1999, the process has undergone continuous improvement over the past three years.

Initially, only U-1A MDRs could be accepted. Now the HLW-6 can be accepted, and within a few months, other forms will be added (U-1, U-2, U-2A, U-3, H-2 and H-3). Currently there are over 267 EDT system users, representing 30 manufacturers, 46 locations and 86 authorized inspectors from six AIAs. ❖

# Hawaiian: The Language of Para

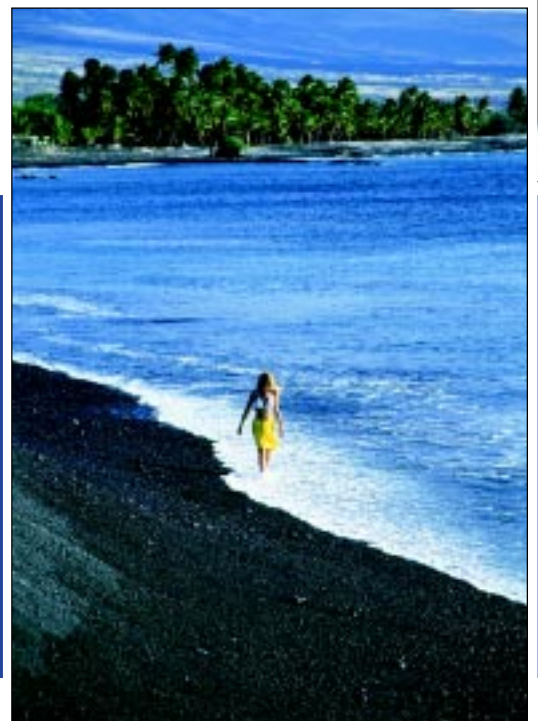
In the Hawaiian language, there are more than 30 definitions for the word *Aloha* alone, from the widely known meanings of *hello* and *goodbye*, to the lesser known terms of *love*, *pity*, *charity* and *affection*.

But in any language, the word *Hawaii* itself means just one thing: a beautiful island paradise. And much of the appeal stems from the islands' isolated location in the Pacific. In fact, the Hawaiian Islands form the most remote island chain in the world, over 2,000 miles from the nearest landfall.

For beach-goers, Hawaii is a true delight. The islands boast more than 750 miles of coastline in a land area roughly the size of Connecticut. An array of exotically colored beaches is a feast for visiting eyes – from the sandy white powder of Waikiki, to the rich volcanic ash of Punaluu to the olive green sands of Puu Mahana.

Though Hawaii consists of eight major islands (Kauai, Nihau, Kaho Olawe, Oahu, Lanai, Molokai, Maui and the Big Island), the state also includes 124 smaller islands, reefs and shoals, sprinkled over an area more than 1,500 miles across the Pacific.

The tiny group of islands is best known as the last of America's 50 states, but Hawaii has a diverse history that pre-dates the establishment of the United States. The islands were first settled around 700 A.D. by intrepid Polynesian seafarers, sailing from



PHOTOGRAPHY COURTESY OF HVGB



dise



Welcome to  
Honolulu and the  
72<sup>nd</sup> General Meeting



Marquesas in hand-built canoes, using the night sky as their only navigational tool. The influx of Polynesians was the first group to build upon what would become the varied tapestry that is today Hawaii's diverse population.

In 1778, British explorer Captain James Cook landed on the island of Kauai, beginning an era of interaction between the native Hawaiian population and Europeans. In 1810, Hawaiian monarch Kamehameha united the Hawaiian Archipelago under his rule (with the aid of Western weapons). Ten years later, the first Calvinist missionaries arrived in Hawaii, introducing native Hawaiians to religious devotees from the United States.

The interaction between native Hawaiians and outside forces has not always been positive. In 1843, the British Navy seized Hawaii for Great Britain, but later that same year recognized Hawaiian independence. Fifty years later, Hawaii's Queen Lili'uokalani was deposed by a group of Americans with the support of U.S. Marines and diplomats. The U.S. then established a provisional government, which was later rescinded by President Grover Cleveland, who called for the queen to be restored as sovereign. A few years later, in 1900, Hawaii was illegally annexed to the United States as a territory. Finally, Hawaii became America's 50<sup>th</sup> state through a 1959 plebiscite.



Even though it is a part of the United States, Hawaii is distinctly an island unto itself, with a unique cultural identity that is neither American nor Asian. From the commercial capital of Honolulu and the beaches of Diamond Head, to the remote wilderness of Kauai, Hawaii's sparsely populated "island of discovery," this amazing group of islands offers unparalleled natural beauty along with a rich cultural history.



The Polynesian Cultural Center, located on Oahu's beautiful North Shore in the town of Laie, provides a unique opportunity for visitors to personally experience the history of ancient Polynesia. Founded in 1963 by the Church of Jesus Christ of Latter Day

Saints, the center affords indigenous students a means to work their way through college by sharing their Polynesian heritage with visitors. The center today offers information and cultural displays on seven Polynesian islands, including Samoa, Fiji, Tahiti, Tonga, Hawaii, Marquesas and New Zealand.

One of the most awe-inspiring aspects of a visit to Hawaii is its varied geography. All but two of the world's 13 climactic zones are represented on this tiny group of islands. In fact, with this ecological diversity, it shouldn't be surprising that more than 90 percent of all plants and

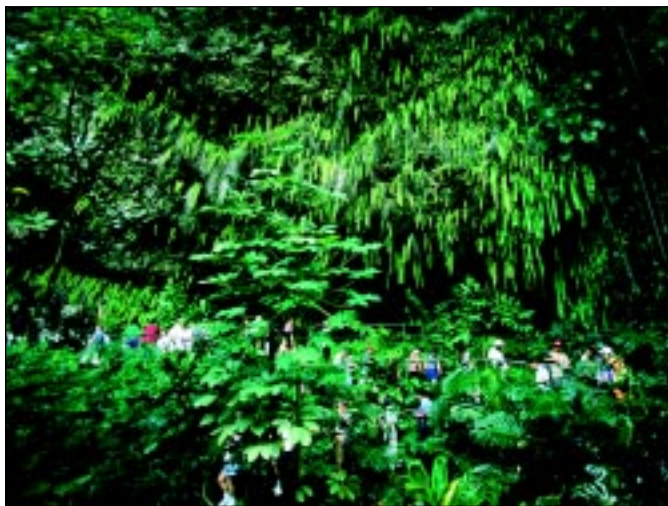




animals native to Hawaii are found nowhere else on earth. Further, approximately one-third of all endangered species of the U.S. can be found only in Hawaii. From tropical rainforests to snow-capped mountains to active volcanoes, Hawaii is a geographer's joy! The Big Island's Mauna Loa is the world's largest single mountain mass, if measured from its base at sea level, and Maui's Haleakala is the world's largest dormant volcano.

Hawaii's ideal geography makes for enjoyable leisure pursuits as well, such as sunbathing on Oahu, whale watching on Maui or snorkeling off the coast of tiny Molokini Island. Visitors may take a riverboat tour to Kauai's fern grotto, a cavern of lava rock covered with lush tropical ferns, or enjoy the view from Molokai's Kahiwa Falls, the longest waterfall in the state.

With all of this natural beauty, it stands to reason that Hawaii's chief industry is tourism. However, agriculture is a dominant force as well, from flower growing –



including the world's largest orchid-production facility, located at Hilo – to the flourishing production of coffee, pineapple and macadamia nuts. More recently, Hawaii has

shifted focus to high-tech industries and government centers, including modern military bases.

History buffs will not want to miss the island's memorials to 20<sup>th</sup>-century history, commemorating the pivotal role Hawaii played in World War II. The sunken hull of the USS *Arizona* commemorates the site of the Japanese attack on Pearl Harbor, on December 7, 1941; and the USS *Missouri* marks the spot where the Japanese surrendered four years later, thereby ending the war.

A tropical island paradise with breathtaking beauty, world-renowned natural landmarks, a fascinating cultural heritage, and world-class hospitality. In any language, Hawaii is a true vacationer's paradise. ❖

Aloha  
Aloha  
Aloha



# PREREGISTRATION FORM

# ROOM RESERVATION FORM

Name \_\_\_\_\_  
 Name for Badge \_\_\_\_\_  
 Title \_\_\_\_\_  
 Company/Affiliation \_\_\_\_\_  
 Telephone Number (\_\_\_\_) \_\_\_\_\_  
 Company Address \_\_\_\_\_  
 \_\_\_\_\_  
 Home Address \_\_\_\_\_  
 \_\_\_\_\_  
 Guest Name \_\_\_\_\_  
 Guest Address \_\_\_\_\_  
 Additional Guest\* Name \_\_\_\_\_  
 Additional Guest Address \_\_\_\_\_  
 \_\_\_\_\_

\* Additional guests (16 years of age or older) may register for a fee of \$110.00.

*Those requesting special or handicapped facilities are asked to contact the Public Affairs Department at 614.888.8320.*

### FEES

Only one registration fee will be charged for each attendee and one guest (guest program participant).

General Meeting Preregistration Fee ..... \$ \_\_\_\_\_  
 (includes ONE banquet ticket)

Registration fee is \$245.00 if received on or before March 28.  
 Registration fee is \$275.00 if received after March 28.

\*Additional Guest Fee(s)  
 \_\_\_\_\_ Additional guests at \$110.00 each ..... \$ \_\_\_\_\_  
 (Each includes ONE banquet ticket)

Additional Banquet Ticket(s)  
 \_\_\_\_\_ Additional tickets at \$30.00 each ..... \$ \_\_\_\_\_

AMOUNT ENCLOSED ..... \$ \_\_\_\_\_

To preregister by telephone or fax using your VISA, MasterCard or American Express, contact Joan Webster at 614.888.8320, ext. 226, or FAX 614.888.0750.

VISA     MasterCard     American Express

Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

All checks and money orders must be payable in U.S. dollars to:  
**The National Board of Boiler and Pressure Vessel Inspectors**

Accounting Department Only: AMOUNT \$ \_\_\_\_\_ DATE \_\_\_\_\_

The National Board  
 of Boiler and Pressure Vessel Inspectors *and*  
 ASME International  
 72<sup>nd</sup> General Meeting • April 28 – May 2, 2003

All room reservations must be received by March 25.  
 Room cancellations must be received 72 hours  
 in advance of arrival date in order to obtain refund.

**Mail this form to:** The Hilton Hawaiian Village  
 2005 Kalia Road, Honolulu, HI 96815-1999; or  
 fax to 808.947.7898.

Reservations can also be made by telephone at  
 808.949.4321 or 1.800.HILTONS, or via the Web at  
*www.hilton.com*.

**WHEN CALLING, PLEASE MENTION GROUP NAME:  
 National Board (AJO)**

PLEASE PRINT OR TYPE:

Name(s) \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State/Province \_\_\_\_\_ Zip/Postal Code \_\_\_\_\_

Telephone Number (\_\_\_\_) \_\_\_\_\_

**Indicate desired accommodations:**  Single \$199.00  
 Double \$199.00

**Request:**  Nonsmoking Room  
 1 Bed (King)  
 2 Beds (Double/Double)

*\$45.00 for each additional person, with up to four guests per room.  
 No charge for children 17 and under rooming with parents.*

### Method of Guarantee

Deposit for one night plus 11.41% room tax enclosed.  
 Make check or money order payable to:

**The Hilton Hawaiian Village.**

*Do not send currency.*

Credit Card for guarantee:

American Express     VISA     Diners Club  
 MasterCard     Discover     Carte Blanche

Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

Arrival Date \_\_\_\_\_ Number of Nights \_\_\_\_\_  
*Check-in after 2:00 p.m. Check-out by 11:00 a.m.*

Sharing Room With: \_\_\_\_\_

# Hilton Hawaiian Village — Much More than a Hotel



To call the Hilton Hawaiian Village a hotel is an enormous understatement. Located on 20 acres of premiere Waikiki beachfront, Hilton Hawaiian Village is, as the name implies, a mini luxury village, offering guests their own complex of restaurants, lounges, shopping areas and a world-class spa.

The six separate towers of the Village boast a unique feature guaranteed in every room — **an adjoining balcony or lanai!** Other extraordinary hotel amenities include:

- ◆ Beautiful grounds, with vividly hued fishponds inspired by Asian landscaping
- ◆ Superb beachfront with an excellent selection of beach activities
- ◆ A convenient walkway leading to downtown Honolulu's best shopping and sightseeing.

**IMPORTANT NOTE:**

*The Hilton Hawaiian Village has made available a limited number of oceanfront rooms that can be requested at the special General Meeting room rate. These rooms will be available on a first-come, first-served basis.*



With such amenities, it's no surprise that Hilton Hawaiian Village has garnered numerous accolades as one of North America's finest resort hotels, among them:

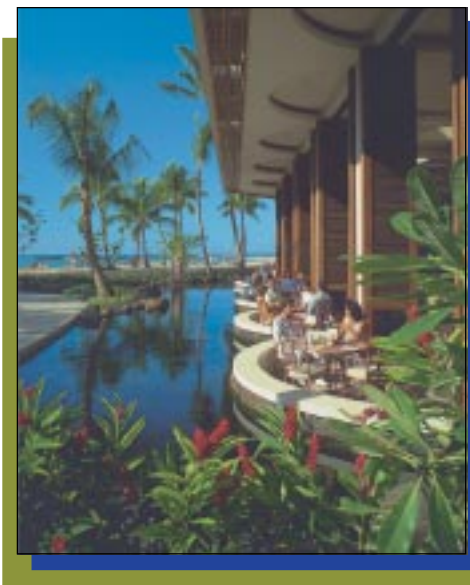
- ◆ The Triple-A Four-Diamond Award
- ◆ *Family Circle's* Best Hotel in America – Beach Category Award
- ◆ Conde Nast's Top 100 of the Best in the World and Top 25 Pacific Rim Hotels.



The Village offers a host of recreational activities, combined with first-rate shopping and cultural opportunities. The international shopping center features 90 retail stores, offering everything from cards and gifts to fine jewelry. Perennial favorites include **Tiffany's**, **Esprit** and **Louis Vuitton**.

The 10,000-square-foot **Super Pool** is the largest in Waikiki, and is located just steps away from the beach. The Village's other pools include the sparkling **Tapa Pool** and the **Keiki Pool**, which is specially designed as a separate area for children.

One of the highlights of a visit to Hilton Hawaiian Village is fine dining in one of the resort's beautiful indoor/outdoor restaurants. **Bali by the Sea** is among the finest ocean-side dining experiences on the islands. Savor the award-winning Euro-Asian cuisine of chef Jean-Luc Voegele in the open-air dining room, offering stunning views of Waikiki Beach. Overlooking the tranquil Hilton Lagoon, the beautiful **Golden**



**Dragon** restaurant specializes in Cantonese and Szechuan cuisine. This indoor/outdoor restaurant also offers fabulous views of the sun setting over the ocean and two Chinese-style gardens.

In addition to fine dining, the Hilton Hawaiian Village offers more than 20 restaurants and lounges for every taste. Whatever is on the agenda – be it a long day of meetings or sight-seeing – guests may conclude the evening in any one of the Village's lounges, featuring nightly live entertainment!

So sit back and enjoy both the show and the spectacular view while sipping a refreshing tropical drink.

For those interested in experiencing true Hawaiian culture, Hilton Hawaiian Village also offers an array of free activities for guests, including coconut frond weaving, penguin and turtle feeding on the 20-acre complex, snorkeling lessons, tai chi stretches and lei making demonstrations. In addition, the Village hosts an 8,000-

acre wing of the **Bishop Museum**, located in the new Kalia Tower. The museum tells the story of life in Waikiki, using cultural interpreters, music and dance, as well as priceless artifacts.

Those looking to experience authentic Hawaiian culture, as well as those looking to be pampered in world-class luxury, will find Hilton Hawaiian Village a true delight. More than just a hotel, this premiere luxury village is sure to amaze and charm visitors, creating vacation memories that will last a lifetime. ❖



# Two “Golden” Legends — Peggy Fleming and Bill Russell

No strangers to victory, basketball great Bill Russell and ice-skater Peggy Fleming can both proudly include Olympic Gold Medalist on their impressive résumés.

Bill Russell is a man described as “the game’s greatest living legend” by another living legend himself – Michael Jordan. With the Boston Celtics from 1957-1969, Mr. Russell helped his team win an incredible 11 championships, with two of those seasons as head coach. In fact, he became the first African-American to coach a professional sports team. The 6’10” Louisiana native was a member of the 1956 Olympic Gold Medal-winning basketball team, and was recently recognized by ESPN as one of the 50 greatest athletes of the twentieth century. Mr. Russell is the author of a new book entitled *RUSSELL RULES: 11 Lessons on Leadership from the Twentieth Century’s Greatest Winner*.

Fellow Olympic athlete Peggy Fleming skated her way into American living rooms with a chartreuse dress and a Gold Medal performance in Grenoble, France, in 1968. Ms. Fleming is one of the most recognizable female athletes in the world, and aside from her Gold Medal, she has also earned a spectacular five U.S. titles and three world titles. Ms. Fleming is also a two-time Emmy Award winner for her skating specials and has served as a skating analyst for ABC Sports for more than 20 years. At the *Sports Illustrated 20<sup>th</sup> Century Awards* in 1999, Ms. Fleming was honored as one of seven “Athletes Who Changed the Game,” joining Arnold Palmer, Billie Jean King and Jackie Robinson.

When it comes to setting goals and accomplishing high performance standards, both Peggy Fleming and Bill Russell know what it takes to succeed – their impressive careers in sports have spanned decades. ❖

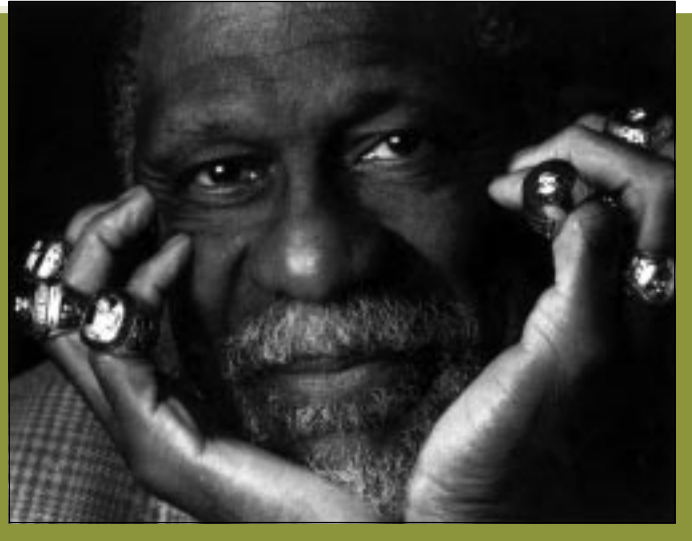


Photo courtesy of Jim Britt

## Featured Speakers for Honolulu 2003

# guest program

## Monday, April 28

Mini Circle Island Tour  
1:30 p.m. - 4 p.m.

*All tours depart from the Tapa Tower Bus Depot*

The Mini Circle Island Tour is the best way to experience the sights and sounds of Hawaii in one afternoon. Circling Oahu by bus, guests will first visit the gorgeous Pali Cliffs in Nuuanu Valley. Overlooking the 985-foot cliffs of the Koolau Mountain Range, this is one of the best views on Oahu, as well as the historic site of King Kamehameha's victory and conquest of Oahu.

The next stop is a tour through the historic Waimanalo community to the eastern coastline, home to the famous Sandy Beaches and Makupuu, two areas known for their excellent surfing conditions. Blow Hole – a natural saltwater geyser – is the next stop, followed by the plush residential district of Kahala. Finally, the tour finishes at Diamond Head Crater. One of Oahu's most popular walks is to the peak of Diamond Head, which boasts another spectacular view of Oahu. On a clear day, visitors can see the outline of Molokai Island to the east, and the Koolau Mountains in the center of the island. ❖



### **Important Notice:**

*Registrants are not permitted to attend the Monday or Tuesday tours or continental breakfasts intended for designated guests. This policy will be strictly enforced at the 72<sup>nd</sup> General Meeting.*



# guest program

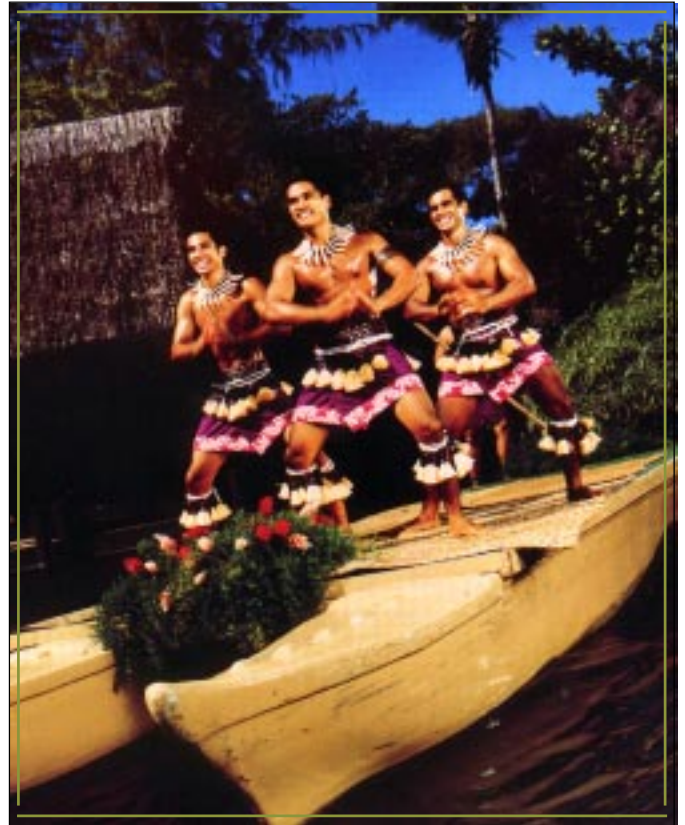
Tuesday, April 29

Polynesian Cultural Center  
10:00 a.m. - 4:30 p.m.

All tours depart from the Tapa Tower Bus Depot

Hawaii's most popular attraction, the Polynesian Cultural Center brings the Pacific Islands of Polynesia alive on the beautiful campus setting of Oahu's North Shore. The Cultural Center features displays, artifacts and live shows which educate visitors about the seven Polynesian Islands of New Zealand, Tahiti, Hawaii, Fiji, Tonga, Samoa and Marquesas. Founded in 1963 by the Church of Jesus Christ of Latter Day Saints, the Cultural Center provides Polynesian students with jobs to finance their education while teaching visitors about their ancient culture.

The IMAX film *Polynesian Odyssey* depicts the early Pacific voyagers' incredible journey to the current land of Hawaii. A special feature during the visit, the Pageant of the Long



Canoes is a spectacular example of how Polynesians passed down their oral histories through dance and song, in lieu of a written language. Brilliant displays of costumes, colors, and ceremonial performances will dazzle and delight crowds.

Lunch will be served at the Cultural Center, consisting of a choice of oriental chicken, steamed fish, fettuccini and marinara or clam sauce. ❖



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# guest program

## Wednesday, April 30

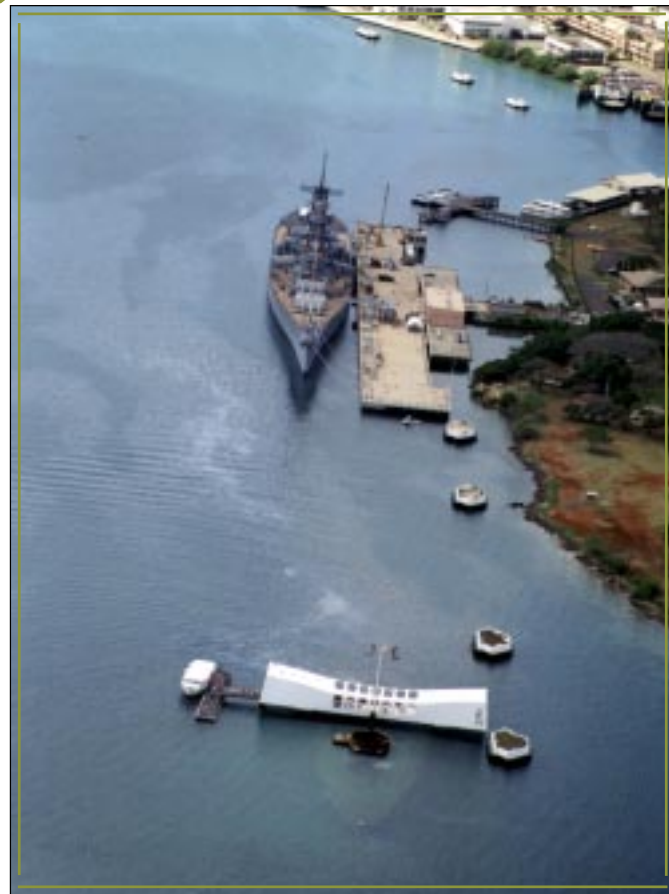
*USS Arizona and Missouri*  
9:00 a.m. - 3:00 p.m.

*This tour includes moderate physical activity of walking and climbing. No fanny packs, diaper bags, backpacks, camera bags, purses, luggage, shopping bags, large cameras or umbrellas are permitted. Guests may bring clear plastic bags to hold their belongings.*

*All guests must arrive via pre-arranged transportation, such as motorcoach arranged through the National Board. Rental cars and taxi cabs are not permitted without prior permission (submitted to the U.S. military 72 hours prior).*

**From** the site where World War II began for the United States to the site where it ended, Wednesday's Outing is a sure bet for history enthusiasts, as guests tour the USS *Arizona* Memorial and the USS *Missouri*.

The USS *Arizona* Memorial is a 184-foot-long structure that sits atop the midsection of the sunken battleship USS *Arizona*. It serves to commemorate the 1,177 crew members who lost their lives on the ship, as well as the additional 1,211 military personnel who were killed in the Pearl Harbor attack. The memorial consists of three parts: the entry or assembly area, a central area for ceremonies, and the shrine room where the names of those killed are



engraved on a marble wall. The memorial was completed in 1961 with public funds and is now part of the U.S. National Park Service.

The site of Japan's unconditional surrender to the Allies in September 1945, the USS *Missouri* has securely marked its place in twentieth-century history. The last battleship built by the U.S. Navy, the *Missouri* was first launched in 1944.



Photography by Hal Krause, courtesy of Friends of the *Missouri*.

A vital part of the Pacific front in World War II, the *Missouri* also saw action in the Korean War and the Persian Gulf War. The ship's last mission was to sail into Pearl Harbor in 1991 to commemorate the 50th anniversary of the Japanese attack.

Lunch will be served onboard the USS *Missouri*, and includes roasted New York strip loin with horseradish sauce, seared pacific fish medallions and grilled island breast of chicken, as well as tomato and onion salad, roasted Yukon Gold potato salad, mini indigo rolls and choice of dessert. ❖





# preliminary program

for the

## 72<sup>nd</sup> General Meeting

of

The National Board of Boiler and Pressure Vessel Inspectors



The ASME International Boiler and Pressure Vessel Committee

Monday, April 28 —

### Opening Session:

9:30 a.m. Remarks by Peggy Fleming and Bill Russell

11:30 a.m. LUNCH BREAK

### General Session:

1:00 p.m. PRESSURE VESSEL BURST TEST STUDY

ZACHARY QUANDT, P.E., Director  
General Physics Corporation

1:45 p.m. HIGH STRENGTH FE-CR-W ALLOY IN BOILER AND  
PRESSURE VESSEL APPLICATIONS

DR. MAAN JAWAD, Nooter Corporation *and*  
DR. VINOD SIKKA, Oak Ridge National Lab

2:15 p.m. BREAK

2:30 p.m. SAFETY UNDER HIGH PRESSURE

VICKY CAYETANO, CEO  
United Laundry Services, and former First Lady,  
State of Hawaii

3:00 p.m. TO BE ANNOUNCED

3:45 p.m. THE PED-COMPLIANT SULCIS BOILER

JOHN FISHBURN, Consultant  
Alstom Power, Inc.

4:15 p.m. COMMON ARC CORPORATION: BRINGING ECONOMIES  
AND EFFICIENCIES TO THE WORKPLACE

JOHN ERICKSON, Executive Director  
Common Arc Corporation

To obtain a discount of \$30, all preregistration forms and fees must be received by March 28.

Preregister TODAY via email with your credit card through *InfoLink!* on the National Board Web site at [nationalboard.org](http://nationalboard.org).

Or mail the preregistration form with your check or money order to: The National Board, 1055 Crupper Avenue, Columbus, Ohio 43229.

Reminder: All details about the General Meeting can be found in this *BULLETIN* issue or through *InfoLink!* on the National Board Web site at [nationalboard.org](http://nationalboard.org). No other brochures will be mailed.

Distribution of any and all literature, other than informational materials published by the National Board and ASME International, is strictly prohibited at the General Meeting.

**NEW!** All photos taken by the General Meeting photographer will be available for purchase on the photographer's Web site at the meeting's conclusion. ❖

# Biofuels from the Barnyard?

## A Boiler Experiment in Georgia



While the U.S. is currently the third-largest oil-producing nation in the world, domestic production has declined over the last 30 years, due in part to depletion of some of the more readily available and accessible fossil fuel resources.

Meanwhile, with crude oil prices rising and conditions in the Middle East unstable, the search is on for viable alternatives to foreign oil. American scientists are studying wind power, solar power, and chicken fat as possible solutions to this country's energy problem.

Chicken fat? Indeed. Also yellow grease (from restaurants), choice white grease (pork fat), and tallow (beef fat).

Last year, some University of Georgia (UGA) researchers set out to show that chicken fat is not just "chicken feed" when it comes to alternative energy sources.

For three weeks in January and February 2002, they experimented with using these animal byproducts as industrial boiler fuel in the 100,000 lbs./hr. No. 2 boiler at the UGA steam plant in Athens, Georgia.

The research project was funded by the University of Georgia, the Fats and Proteins Research Foundation Inc., and the Poultry Protein and Fat Council of the U.S. Poultry and Egg Association.

Its objectives were to publicly demonstrate the use of biofuel for industrial steam production and to examine the procedures necessary for its use.

### BIOFUELS

The viscous biofuels were purchased locally, all readily available from nearby meat, poultry and other food-processing operations. In fact, the annual production of these biofuels in Georgia alone exceeds 100 million gallons, while the United States as a whole generates almost 11 billion pounds of chicken fat, yellow grease, choice white grease and beef tallow each year.

UGA scientists tested the fats and greases singly and also as biofuel blends, mixed with No. 2 fuel oil. Biofuel blend ratios consisted of 33% fat or grease and 67% No. 2 fuel oil. Natural gas and unadulterated No. 2 fuel oil tests also were conducted periodically throughout the research period.

## STEAM PLANT MODIFICATIONS

Manufactured in 1970, UGA's No. 2 boiler is a pressurized watertube unit. It was designed to combust natural gas, No. 2 oil, and No. 6 oil for the production of 100,000 lbs./hr. of saturated steam at 250 psig. The boiler usually operates at 100 psig using natural gas, with No. 2 fuel oil as an alternative.

The only modification made to the boiler itself for the project was the temporary addition of a flue gas recirculation (FGR) duct and damper. No modifications were made to either the boiler internals or instrumentation.

## TIMING

The University of Georgia in Athens is subject to mild winter conditions. The winter heating season is relatively short, extending from late November to mid-February. Steam demand on the central steam plant is in the 100,000 to 200,000 lbs./hr. range during the winter heating season.

The project team scheduled the biofuel tests during the winter heating season to allow for testing of the No. 2 boiler at maximum load. The tests began January 28, 2002, and continued daily for three weeks, until February 15.

## BIOFUEL-HANDLING SYSTEM

Biofuels were transported to the university and stored on site in a 7,000-gallon tanker-trailer. A second tanker-trailer was utilized for biofuel/fuel-oil batch mixing.

Previous industrial experience indicated that after a 24-hour exposure to extreme winter ambient temperatures, a 7,000-gallon tanker-load of biofuel could become too viscous for handling. Therefore, all biofuel was delivered warm (over 100°F, or 38°C) and within four hours after loading. All biofuel suppliers were located near Atlanta, Georgia, less than 80 miles from the University of Georgia's steam plant.

The fuel system continuously recirculated the biofuel to the tanker and kept it warm and mixed. A heat exchanger was included in the fuel-handling system, maintaining the biofuel temperature at approximately 165°F (74°C), to reduce its viscosity to that of No. 2 fuel oil. The source of heat for this unit was 5 psig steam.

Viscosity was not the only problematic characteristic that fats and grease "brought to the table." Early in the test period, one particular load of chicken fat was determined to be substandard: the particulate content of this load kept plugging up the fuel-handling system's filters. Moreover, flue gas testing indicated high levels of NO<sub>x</sub>, and subsequent laboratory analyses showed high levels of insoluble impurities. The results from the combustion of this particular load of chicken fat were eventually discarded altogether. They confirm, however, the need for a high degree of filtration for fats and greases delivered as boiler fuel. Inadequately pre-filtered biofuel causes fuel-handling problems and may increase gaseous emissions.



■ Tanker setup at the steam plant. One tanker was used to store the heated, recirculating biofuel while the other was used to transport the biofuel from the rendering plant to the university steam plant.

## COSTS

All in all, the construction costs for the fuel-receiving and heating station were less than \$31,000, including the temporary flue gas recirculation damper. That sum does not include any expense for the construction of fuel storage facilities, which were not required for the demonstration program. The heat exchanger for warming the biofuels was obtained without cost to this project, but could add significantly to a biofuel-burning system.

Nor were the biofuels themselves free. By the end of the combustion test period, about 300,000 pounds of fats and grease were burned, with costs ranging from \$0.10 to \$0.13 per pound.

## COMBUSTION CHARACTERISTICS

The steam plant did not experience any unusual operating problems while burning biofuel or biofuel blends. The boiler lit off quickly and ran quietly.

Observations through the furnace sight glasses indicated that biofuels generally burn with a flame that is more yellow-colored and widely dispersed than with either natural gas or No. 2 fuel oil.

Previously, the test team inspected the interior of the boiler after several months of firing natural gas exclusively; then, after firing No. 2 fuel oil exclusively; and finally, after three weeks of biofuel combustion testing. The test team observed that the watertube exterior surfaces were clean and soot-free after natural gas firing. The tube surfaces were soot covered, black in color, and somewhat greasy after firing with No. 2 fuel oil.

Following biofuel burning, the interior of the furnace appeared to be almost as clean as it was

after firing natural gas, and much cleaner than it was after burning No. 2 fuel oil. A slight blackening of the tube surfaces, following the flame pattern, was observed in the front half of the 25-foot-long furnace.

A scattering of baked-on solid deposits (each approximately 2 mm to 3 mm in diameter) was found on the tube surfaces in the back half of the furnace. Lab analysis found that the deposits consisted predominately of the elements Fe (iron), Na (sodium), P (phosphorus), K (potassium) and Ca (calcium).

## EMISSIONS

Surprisingly, there were no fat or grease odors in the steam plant, nor were any detected during the 17 tests taken downwind. There were, however, noticeable fat and grease odors detected in the vicinity of the biofuel tankers themselves (within 100 feet).

The research team recorded both average and instantaneous measurements of flue gas concentrations for oxygen, carbon



■ Inspection of boiler heat transfer surfaces after testing biofuels. The surfaces were almost as clean as after burning natural gas, and much cleaner than after burning No. 2 fuel oil.





■ The particulate testing probe as it was placed in the stack. The particulate probe tested the amount of particulate coming off the burned biofuel.

monoxide, carbon dioxide, combustible gases, excess air, nitric oxide, nitrogen dioxide,  $\text{NO}_x$  ( $\text{NO} + \text{NO}_2$ ), and sulfur dioxide. Air emissions from the combustion of the biofuel oils met or exceeded state and federal air-quality permit requirements for the University of Georgia.

Advanced Air Consultants Inc. (AAC) of Murrayville, Georgia, performed emissions tests for condensible (both organic and inorganic) and non-condensable particulate. The particulate testing location was in a straight section of the No. 2 boiler breaching, between the boiler and a combined boiler stack.

Total particulate emissions from biofuel oils as a group were not significantly different from particulate emissions from No. 2 fuel oil. However, total particulate emissions from chicken fat fuel were significantly higher than from the other biofuels, and both chicken fat and choice white fat particulate emissions were significantly higher than from No. 2 fuel oil.

AAC also monitored smokestack opacity. Maximum opacity with chicken fat was 4% and yellow grease was 6%. There was no opacity observed while burning tallow. Opacity was not monitored while burning choice white grease.

## CONCLUSIONS

The UGA researchers concluded that the biofuels they used, including chicken fat, yellow grease, choice white grease and

beef tallow, either singly or when blended with No. 2 fuel oil, are technically and economically viable alternatives to No. 2 fuel oil burned alone.

The addition of biofuel combustion capability is simple and inexpensive. It is not necessary to replace or compromise the operation of existing fossil fuel systems.

Less hazardous than petroleum fuels, biofuels have high heating value; low amounts of ash, nitrogen, and moisture, and negligible amounts of sulfur. Heating values of the biofuel oil blends tested to within 95% of the heating value of No. 2 fuel oil alone.

These biofuels are more viscous than No. 2 fuel oil, but much less viscous than No. 6 fuel oil. When heated to about 160°F (71°C), biofuels are easily atomized and ignited. Moreover, a blend of 30% biofuel with 70% No. 2 fuel oil has a viscosity that is close to that of No. 2 fuel oil alone. Boiler efficiency while burning biofuel oil is comparable to that of burning unadulterated No. 2 fuel oil.

UGA researchers recommend further research into such issues as the effect of different biofuel/fuel oil blend proportions on viscosity and miscibility; how to maintain fluidity over the range of ambient storage temperatures typical in industrial applications; and how to establish minimum requirements for solids removal (screening).

Georgia Chief Safety Engineer Earl Everett supports the biofuel research being conducted in his jurisdiction. "The experiments being held at the University of Georgia have great merit. As we enter into the 21st century, not only must we have a skilled work force to operate the equipment, we must also have alternate sources of energy," he remarks.

A two-day biofuel symposium is planned for February 18 and 19, and will include combustion testing of brown grease at the UGA steam plant. ❖

## Missouri Chief James Pratt Elected to National Board

Missouri's new chief boiler and pressure vessel inspector James L. Pratt has been elected to National Board membership.

Prior to joining the Missouri Division of Fire Safety last August, he worked for six years at Hartford Steam Boiler as an inservice inspector.

Mr. Pratt's service in the United States Navy from 1976 to 1996 included duty as a boiler technician first class. In that capacity, he was qualified in surface warfare and operating 600/1200 propulsion boilers. He has received numerous citations, including the Navy Expeditionary Medal, the Meritorious Unit Citation and the Navy Achievement Medal.

Mr. Pratt holds National Board Commission No. 11965. ❖



James L. Pratt

## Randall Austin Elected to Membership Representing State of Colorado

Randall Austin, Colorado's acting chief boiler inspector, was recently elected to the National Board. Mr. Austin has been employed by the State of Colorado Department of Labor and Employment, Boiler Inspection Branch, for more than 22 years.

Prior to joining Colorado's Department of Labor and Employment, Mr. Austin served in the United States Navy from 1975 to 1980, as boiler technician second class on the USS Ramsey. He also served in the U.S. Naval Reserve as a petty officer first class boiler technician, and in the Colorado Army National Guard, where he was a staff sergeant and crew chief for the 8-inch self-propelled howitzer.

Mr. Austin holds National Board Commission No. 10798, with "A" and "B" endorsements. ❖



Randall Austin

## Hoveke Elected to Advisory Committee

Hudson Boiler & Tank Co. President Edward J. Hoveke has been elected to the National Board Advisory Committee, representing National Board stamp holders. Mr. Hoveke assumes the term of Russell I. "Muggs" Mullican, who passed away in May 2002.

Mr. Hoveke has served as president of Hudson Boiler & Tank Co. in Chicago since 1979. He has also held several leadership positions in organizations throughout Illinois, including as president of the Industrial Council of Northwest Chicago, president of the Boiler and Tank Contractors Association of Illinois, boiler manufacturing representative for the Illinois Board of Boiler & Pressure Vessel Rules, and trustee of the National Boilermaker Industrial Health and Welfare Trust.

Mr. Hoveke's term will expire in August 2004. ❖



Edward J. Hoveke

## The National Board Remembers Former Member Steve Matthews

Former National Board Member and first vice chairman Steven M. Matthews died on August 30, 2002, of a heart attack. He was 53 years old.

Mr. Matthews became the director and chief inspector for the Texas Department of Labor & Standards Boiler Division in Austin, Texas, in 1981. He had served previously as boiler inspector, supervising inspector and assistant director.

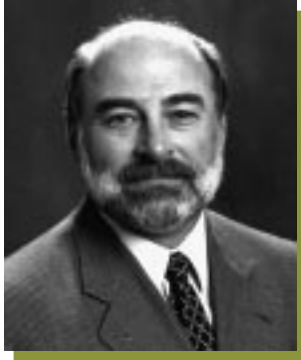
He was elected to National Board membership in 1982, holding National Board Commission No. 9112 and Texas Department of Labor & Standards Boiler Division Commission No. 1024.

In 1986, Mr. Matthews was elected to the National Board Board of Trustees, on which he served for 3 years, including a term as first vice chairman from 1987 to 1989.

Mr. Matthews is survived by his wife and two children. ❖







## Documentation — It's Part of the Job

BY JOHN HOH, ASSISTANT DIRECTOR OF INSPECTIONS

Generally speaking, a large part of an inspector's job can be divided into two very broad categories: looking at hardware and looking at documentation. I believe it is safe to say that most inspectors would rather be inspecting fit-ups or some other process than reviewing documentation. Human nature causes us to concentrate on the things we enjoy while avoiding those we do not. As difficult as it may be some days, the review of documentation is part of the job.

The inspector's review of documentation is an integral part of the quality system and plays a key role in the checks and balances of that system. That is why inspectors must ask themselves two questions:

- (1) As an inspector, do I review all applicable documents thoroughly before accepting them?; and
- (2) As an inspector, am I sure the documents meet all applicable requirements before accepting them?

The following case study illustrates the importance of these points.

A company applied for an "R" Certificate of Authorization to perform repairs and alterations. For the sake of this case study,

let's say it was last week. Upon review of the company's quality system manual, it was found that the repair and alteration section of the manual was written around the *National Board Inspection Code* (NBIC) requirements dating back to the 1989 edition. In order to obtain an "R" certificate, the applicant must have a quality system which, as a minimum, meets the requirements of the latest effective edition and addenda of the NBIC. The applicant must also possess a current edition of the NBIC. The applicant in this case had neither.

The Table of Contents page in the manual exhibits the signature of the applicant's quality control manager approving the manual as well as the signature of a National Board commissioned inspector accepting the manual. The inspector's acceptance of the manual would imply that the inspector has reviewed the entire document and has found it to meet not only the methods employed by the applicant to perform the work, but also the requirements of the NBIC. Were the documents reviewed thoroughly? Were the applicable requirements met?

Inspectors help provide for public safety. Our ability and willingness to perform our jobs can have a direct impact on our lives and the lives of others. As inspectors, we must be committed to performing all aspects of our jobs at the highest level of quality. We expect it of others — why not of ourselves? ❖

## Inspector Notices

The recent National Board Inspector Commission renewal process included a request for each inspector to submit his or her home address to the National Board. The purpose is to ensure that every inspector receives a copy of the *National Board BULLETIN*. The *BULLETIN* is the most effective means to communicate news, activities, reminders and advisory items to all inspectors. We plan to group such messages together, so please look for this information. And if you are aware of a commissioned inspector who is not receiving the *BULLETIN*, please have that person contact Margie Emigh at [memigh@nationalboard.org](mailto:memigh@nationalboard.org).

Inspectors working with "R" certificate holders at field sites face different challenges than an inspector assigned to a shop. Frequently an inspector is assigned to work with an "R" certificate holder during a repair or alteration in the field, but he or she may not be the same inspector who originally accepted the quality system manual. In fact, the inspector may or may not be employed by the same authorized inspection agency. What responsibilities does the field inspector have with regard to the manual?

First, the inspector should not dive blindly into the work without reviewing the manual. The primary purpose is not to look for mistakes but rather to become familiar with this "R" certificate holder's methods and procedures. They may be slightly different from those used by other companies the inspector has worked with in the past. It is worth

noting that "different" does not equal "wrong." If the inspector is unsure of something in the manual, he or she should ask questions. Sometimes a simple explanation can easily resolve what, at first reading, appeared to be a serious or confusing issue. Only after reviewing and understanding the manual should the inspector authorize the work to commence.

**Most Common Findings at "R" Certificate Reviews:** Recent reviews of repair organizations' quality systems often have revealed the deficiencies listed below, which need to be addressed by the inspectors involved. All inspectors must be aware of the requirements and ensure that they comply with applicable codes and duties as denoted in the *Rules for Commissioned Inspectors*.

- ➔ **Unsigned documents:** Documents are not signed in accordance with the procedures in the organization's Quality Control Program.
- ➔ **Material specifications:** Material ordered and/or receipt inspected to specifications other than "SA" material for work performed on ASME boilers or pressure vessels.
- ➔ **Exceeding ranges of WPS or PQR:** The actual weld used on the implementation item exceeds the range in the WPS or the WPS range exceeds the range qualified by the PQR.
- ➔ **NDE personnel qualifications not updated:** The records on site do not reflect current qualifications. ❖

# Gerard Mankel

## Safety Manager/Technical Advisor, State of Nevada

Those interested in becoming a chief boiler inspector are well advised to examine the life and times of one Gerard Mankel. And for a very simple reason: there is perhaps no other individual who better exemplifies a career path specifically tailored for chief inspectors.

Although the title of Nevada safety manager/technical advisor may appear to be a bit misleading, there is also justification: in addition to boilers and pressure vessels, Jerry is responsible for inspections involving the state's elevators, escalators, moving walks — and most recently — amusement rides.

While that may not sound like a lot in one of America's less densely populated states, there is more to the story. Like having entertainment capital Las Vegas in your backyard. Literally.

Offices located just outside of Las Vegas in Henderson keep Jerry close to the action — so to speak. "There are approximately 9,000 boilers in Nevada," he offers with a smile. "About 4,600 are being operated in Las Vegas. Of those, the state is directly responsible for about 1,100 units that are not presently insured." Add 5,500 elevators in Las Vegas and the scope of Jerry's challenge — and his title — take on a whole new significance. Revealing the understated manner for which he is known, Jerry wryly observes: "It kinda makes things interesting."

But back to the career path thing. After all, we're talking about an individual who not only ascended to the top inspector's role in Nevada but also held the position of chief boiler inspector for the State of Alaska from 1992 until his first retirement in 1997.

So how did a homegrown lad from Grand Rapids, Michigan, rise to achieve the top inspector positions in two of America's more interesting jurisdictions?

By his own admission, Jerry describes his childhood as "pretty typical." One of four children, the Nevada official recalls his



lone teenage obsession of working at a variety of part-time jobs, the motive for which was "to keep my car running so I could continue to date my girlfriend."

While the car may be history, not so the girlfriend. Last year, Jerry and Rosie Mankel, high school sweethearts, celebrated their 45<sup>th</sup> wedding anniversary.

"Being one year older, I waited for Rosie to graduate high school before we were married," the National Board member explains. In the meantime, he took a job as a breakfast cook right out of high school and then landed a position as a metal worker at a local fabrication company.

Unbeknownst to him at that time in 1955, Jerry was embarking on an 11-year learning odyssey that would see him become a certified welder and cultivate an interest in boiler inspection. "Because the company performed repairs in addition to manufacturing, it gave me the opportunity to work on a variety of different projects involving pressure vessels, elevators and boilers," he points out. And then it happened.

"I met my first boiler inspector," Jerry relates with a grin. "What I remember most from that first encounter was how

grubby I looked and how fresh and composed the boiler inspector appeared. As a matter of fact, he was actually wearing a suit!”

Deciding that a change in career — and attire — was in order, the future National Board member acquainted himself with the Hartford boiler inspector, who encouraged Jerry to attend a night school where he was teaching. “I went two to three nights a week for three months before joining Hartford Steam Boiler Insurance Company as a boiler inspector early in 1967,” he explains.

That year, Jerry passed the National Board Commission Examination. In 1968, he became a boiler inspector at CNA for three years before moving on to Maryland Casualty in Detroit.

An opportunity to work for the State of Michigan in 1972 took Jerry and his young family (now consisting of Rosie and four small children) to the Upper Peninsula. “I was there for four years before moving back to Grand Rapids for a year and finally accepting a position with Commercial Union in Minneapolis,” he explains.

While admitting the early part of his career may have earned him a reputation as somewhat the vagabond, the Nevada official is quick to note that his goals as a young inspector were “to provide for my family and better prepare myself professionally.”

But Jerry’s restlessness was not yet at an end. The Commercial Union boiler inspector casually mentioned to his supervisor that he would like to some day work in Alaska. “As a kid, I enjoyed doing a lot of camping and it seemed like the Alaskan wilderness would be a great place to live and work.”

To Jerry’s surprise, his supervisor told him of a boiler inspector opening with the State of Alaska. “I saw it as a great opportunity,” he recalls. Rosie agreed.

Accepting the State of Alaska position, Jerry pulled up stakes in July of 1978 and moved Rosie and their four children to the rugged confines of Anchorage.

Over the next 13 years, Jerry would hold a number of state job titles that would include chief of the mechanical section, assistant chief for safety and standards, and assistant chief

boiler inspector. “In 1991, the chief boiler inspector retired and I was named to the position and to the National Board,” the Grand Rapids native explains.

While the Mankels admit a great fondness for the forty-ninth state during Jerry’s 19-year tenure with the department of labor, Rosie developed serious knee problems that, it was feared, could have been aggravated should she trip or fall on the treacherous and seemingly omnipresent Alaskan ice.

“In 1996, we decided that we would have to move to a warmer climate,” Jerry remembers. “In April of 1997, I retired as chief from the State of Alaska and went to work in Nevada as senior supervisor in charge of new installations.”

Given the wider scope of his new responsibilities, the then ex-National Board member found himself having to expand his professional qualifications. “One of the first things I did was to get my qualified elevator inspector (QEI) certificate,” he notes.

Less than six months after arriving in Nevada, Jerry was named the state’s chief elevator/boiler inspector and once again became a member of the National Board. Last year, his title was changed to safety manager/technical advisor to better describe the more encompassing nature of his responsibilities.

With four grown, married children and a family that includes 10 grandchildren and one great grandchild, Jerry and Rosie relish all the free time they can accumulate. But don’t look for the chief inspector’s job near Las Vegas to open up anytime soon. “I’m planning on working as long as I’ve got my health,” he emphasizes with a smile. “Then maybe I’ll start thinking about retiring . . . again.”

As for the notion that his career would be an excellent model for anyone aspiring to become a chief inspector, the Nevada official is amused.

Now 65 and with over 45 years of experience under his belt, he smiles and agrees that yes, perhaps his life is a good one on which to base a career path. Except maybe the part about being a breakfast cook.

“That,” he notes with a wink, “is strictly an option.” ❖





# New Year, New Course, New Career

BY RICHARD MCGUIRE, MANAGER OF TRAINING

In February, the National Board will hold its first National Board Commission Preparation Course at our Training and Conference Center in Columbus, Ohio. This new two-week course will be conducted four times each year, and will conclude one to two weeks prior to the administration of the National Board Commission Examination.

Successful course participants will be better prepared to take the rigorous two-day National Board Commission Examination. Emphasis will be placed on requirements for inservice inspection and the requirements applicable to an "R" stamp program, including the commissioned inspector's involvement during the performance of repairs or alterations as required by the NBIC. Also included in the curriculum are reviews of construction code requirements as they relate to the repair and alteration of existing boilers, boiler external piping, and pressure vessels, including ASME Code Sections I, IV, V, VIII (Division 1), IX, and B31.1.

Course instructors are National Board technical staff members, each having extensive practical experience and a thorough understanding of the subjects they teach. Instructional styles will include lectures, videos, student workshops and discussion groups. The use of varied presentation techniques combined with instructor feedback is designed to help students better understand NBIC and ASME requirements. In order to measure individual student progress, sample problems, daily quizzes, and evening and weekend assignments will be given, to identify strengths as well as areas requiring further study.

The National Board is also in the process of developing an alternative for the first week of this two-week plan of study, namely, a correspondence/home-study course. In order to improve ASME Code and NBIC familiarity, a series of self-paced reading assignments will be completed, along with corresponding test modules that will be graded by the National Board.

Based upon successful completion of the home-study component, the student need attend only the second week of the course at the Training and Conference Center in Columbus to receive full credit. We plan to have the correspondence/home-study course developed by the end of March. An announcement will be posted on our Web site as soon as this course is available.

The goal of the new National Board Commission Preparation course is to help participants better prepare for the rigorous two-day National Board Commission Examination. Attendance and successful completion of the course can credit the participant with either the one-point minimum requirement for education per Article 3.2 (a) (2) of the National Board's *Rules for Commissioned Inspectors* or, alternately, the minimum requirement of 80 hours of technical training per Appendix 4, Paragraph 2.2.

With the establishment of this new course, the National Board is hoping to encourage more men and women to pursue a career in boiler and pressure vessel inspection. In fact, an individual choosing to attend the annual Introduction to Boiler Inspection Course (offered each summer), followed by the commission preparation course, could be well on his or her way to joining an elite and respected group of boiler and pressure vessel professionals.

Please plan to register early. So that individualized instruction may be better afforded each student, class size for this new course is limited to the first 25 registrants.

To learn more about upcoming dates and review additional information on this and other classes offered by the National Board, visit our Web site at [nationalboard.org](http://nationalboard.org) and access the "Training and Conference Center" link on the homepage. ❖

## ENDORSEMENT COURSES

- (A) **Boiler and Pressure Vessel Inspection Course** (ASME Code Sections I, IV, V, VIII – Divisions 1 and 2, IX, X, and B31.1) — TUITION: \$2,500  
 March 10–21                                  June 9–20
- (B) **Authorized Inspector Supervisor Course/ Owner-User Inspector**  
 (O) **Supervisor Course** (Duties and attributes of a supervisor) — TUITION: \$1,250  
 February 3–7
- (N) **Basic Nuclear Inspection Course on Fabrication, Nondestructive Examination and Inspection of Welded Pressure Vessels** (ASME Code Sections III, V, IX, SNT-TC-1A, N626 and NQA-1) — TUITION: \$1,250  
 March 31–April 4

## CONTINUING EDUCATIONAL OPPORTUNITIES

- (CWI) **Certified Welding Inspector Review Seminar** —  
 TUITION: \$1,150 (all three seminars),  
 \$375 Structural Welding (D1.1) Code Clinic  
 \$440 Welding Inspection Technology (WIT)  
 \$335 Visual Inspection Workshop (VIW)  
 February 3–7 (CWI Exam February 8)  
 May 12–16 (CWI Exam May 17)

*Only time offered in 2003!*

- (IBI) **Introduction to Boiler Inspection** — TUITION: \$2,200  
 July 14–25

*New Course!*

- (PEC) **Pre-Commission Examination Course** — TUITION: \$2,500  
 February 10–21                                  May 12–23

- (R) **Boiler and Pressure Vessel Repair Seminar** — TUITION: \$335  
 February 10–11                                  April 23–24  
 March 17–18    June 23–24

- (RTL) **Review Team Leader Seminar** — TUITION: \$300  
 July 8–10

- (VR) **Repair of Pressure Relief Valves Seminar** — TUITION: \$1,250  
 April 7–11    July 28–August 1

- (WPS) **Welding Procedure Workshop** — TUITION: \$670  
 February 12–14                                  April 15–17  
 March 19–21    June 25–27

## REGISTRATION FORM

Please circle the seminar/course(s) and date(s) you wish to attend. Please print.

Mr.    Ms.    Mrs.

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State/Zip \_\_\_\_\_

Telephone \_\_\_\_\_

Fax \_\_\_\_\_

Email \_\_\_\_\_

NB Commission No. \_\_\_\_\_

### PAYMENT INFORMATION (CHECK ONE):

- Check/Money Order Enclosed  
 P.O. # \_\_\_\_\_  
 Payment by Wire Transfer  
 VISA                       MasterCard                       American Express

Cardholder \_\_\_\_\_

Card # \_\_\_\_\_

Expiration Date \_\_\_\_\_

### HOTEL RESERVATIONS

The National Board recommends the Holiday Inn Worthington. The room rate is \$85.00 plus tax. Reservations may be made via the Internet by visiting [holidayinnworthington.com](http://holidayinnworthington.com) or by calling 1.800.HOLIDAY. Reference group code NBB.

All seminars and courses are held at the National Board Training and Conference Center in Columbus, Ohio, unless otherwise noted, and are subject to cancellation.

For additional information regarding seminars and courses, contact the National Board Training Department at 1055 Crupper Avenue, Columbus, Ohio 43229-1183, 614.888.8320, ext. 300, or visit the National Board Web site at [nationalboard.org](http://nationalboard.org).

## Roses and Boiler Compounds?

### *An Old Twist on the Even Older Adage that "Sex Sells"*

Tame by today's standards, these 'racy' ads for Lord's Boiler Compounds of Philadelphia show the evolution of women in advertising. Published around the early 1900s, the back of the ad below — with the woman holding roses — boasts: "Apart from established reputation and natural abilities, the difference between men in every calling is the difference in their experience."

The ad featuring the woman leaning on a barrel employs a more straightforward approach on its flip side: "To secure safety, economy and durability in the operation of steam boilers, use Lord's Boiler Compounds."

In both cases, it's unclear whether the advertisements led to increased sales for Lord's, but at least they caught the public's attention.



*The era was estimated based on hairstyle.*

*Know anything else about these advertisements? Email [getinfo@nationalboard.org](mailto:getinfo@nationalboard.org).*

Lord's  
Boiler  
Compounds.

Lord's  
Boiler  
Compounds.

