# BULLETIN

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The National Board of Boiler and Pressure Vessel Inspectors was organized for the purpose of promoting greater safety by securing concerted action and maintaining uniformity in the construction, installation, inspection, and repair of boilers and other pressure vessels and their appurtenances, thereby assuring acceptance and interchangeability among jurisdictional authorities empowered to assure adherence to code construction and repair of boilers and pressure vessels.

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*On the Cover:* Jay Leno in his California garage.
*Read more on Page 8.*

*Cover photograph* by John Lamm.

# Cover Story



# Features



# Departments

# In Defense of Consistency

BY DONALD E. TANNER, EXECUTIVE DIRECTOR

When The National Board discontinued publication of our annual Incident Reports in 2005, we were beset with questions.

Why, the industry asked, did we abandon such an enlightening and important service? How, they protested, could we suspend distribution of vital accident and death statistics used to justify pressure equipment safety efforts – and more important, the *resources* to support those safety efforts?

Many of you, I'm sure, recall the dismal Incident Report analyses appearing each summer in this space.

Quite frankly, there is no positive way to communicate death and destruction. Similarly, there is no accurate way of using death and destruction statistics to evaluate the kind of job we're doing year after year.

That's why the Violation Tracking Process was created. Not only does this program chronicle the number of inspections, it identifies the number of violations discovered during those inspections. It also categorically breaks down violations by total and percentage, thus providing a comparative snapshot of our success.

So what has violation tracking revealed since displacing numbers of gloom?

It demonstrates – in convincing fashion – that pressure equipment inspection has been a model of consistency. And "consistency," as noted British statesman and philosopher Roger Bacon once observed, "is the foundation of virtue."

Over the past five years, participating authorized inspection agencies have conducted over 3.8 million inspections. What resulted from those inspections were nearly 270,000 violations. Each year during this period, the total violations to inspections ratio has remained constant at 8 percent. (See 2007 Violations Report on opposite page.)

The category reflecting the most violations during this time period – totaling over 80,000 – was that of **Boiler Controls** (low water cut-off/flow sensing devices, pressure gages, water gage glass, pressure controls, and "undefined"). Once again, each year over this time span, the violations-to-inspections ratio totaled within one point of 30 percent.

The least number of violations recorded was the **Alterations and Repairs** category, which came in at 2 percent or less over each of the past five years. That's an outstanding endorsement of the quality of work performed – *consistently* – by qualified alteration and repair professionals.

Statistical differentials in the remaining boiler categories **(Piping, Data Report/Nameplate, Components, and Pressure-Relieving Devices)** were also similar, often falling and climbing each year within several percentage points.

In light of the multiyear 8 percent violation rate: our industry should be very pleased. After all, in a business of mechanical apparatus where absolutes are seldom attained, 92 percent of anything is exceptional – especially over a period of five years. And when the correction of 270,000 violations has prevented potentially 270,000 accidents, it gets even better.

Granted, it only takes one catastrophic accident to change public perception. But we should never yield to critics, many of whom have no real understanding of the pressure equipment industry.

So what do 3.8 million inspections tell us?

Thanks to violation tracking, it says pressure equipment professionals are doing a pretty good job. And while accident prevention statistics may not be as dramatic as body counts, it is after all consistency and quality of work that define our achievement.

We know the process is working.

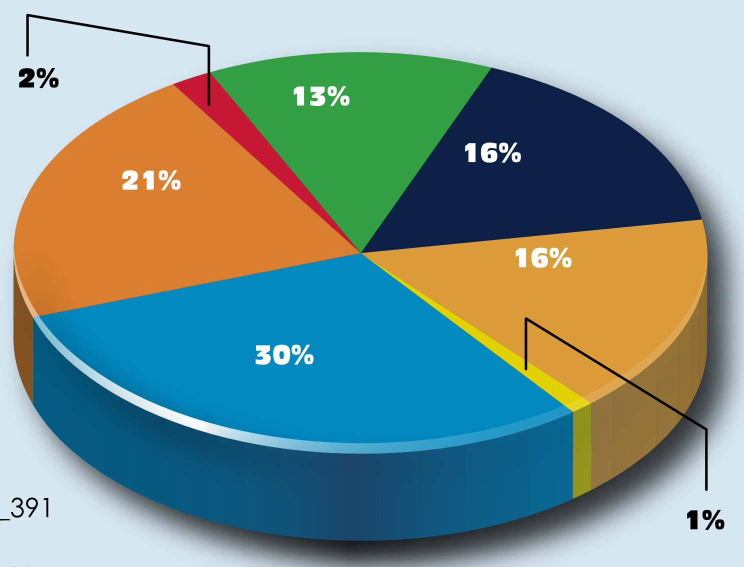
And we have the numbers – accurate numbers – to prove it.

# 2007 Report of Violation Findings

The National Board Annual Violation Tracking Report identifies the number and type of boiler and pressure vessel inspection violations among participating member jurisdictions. The chart below details violation activity for the year 2007.

## Annual Report 2007

| Category | Number of Violations | Percent of Total Violations |
|---|---|---|
| Boiler Controls | 19,552 | 30% |
| Boiler Piping and Other Systems | 13,526 | 21% |
| Boiler Manufacturing Data Report/Nameplate | 1,292 | 2% |
| Boiler Components | 8,388 | 13% |
| Pressure-Relieving Devices for Boilers | 10,599 | 16% |
| Pressure Vessels | 10,559 | 16% |
| Repairs and Alterations | 783 | 1% |




## Summary for 2007

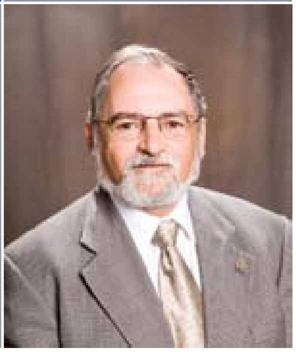
Number of jurisdictional reports:_______391

Total number of inspections: ______778,085

Total number of violations: _________64,699

Percent violations:____________________ 8%

*The Violation Tracking Report indicates problem areas and trends related to boiler and pressure vessel operation, installation, maintenance, and repair. Additionally, it identifies problems prior to adverse conditions occurring. This report can also serve as an important source of documentation for jurisdictional officials, providing statistical data to support the continued funding of inspection programs.*



FEATURE

# A Safe Approach for Hydrostatic Testing

BY ROBERT D. SCHUELER JR., SENIOR STAFF ENGINEER

Hydrostatic testing of boilers and pressure vessels had been with us long before there were ASME and NBIC Codes to follow. With the possible exception of close visual examination, such testing was used as a primary, if not only, nondestructive examination in the early days of the industry.

As entry-level engineers and inspectors, we were taught by our mentors to look in the code for rules covering required pressure testing. This was one of our first lessons. We all called out the applicable rules from memory: NBIC, Part 3, Section I, PG-99, Section IV, heating boilers in Article 5 and hot water tanks in HLW-505, Section VIII, Div. 1, in UG-99; the list goes on and on.

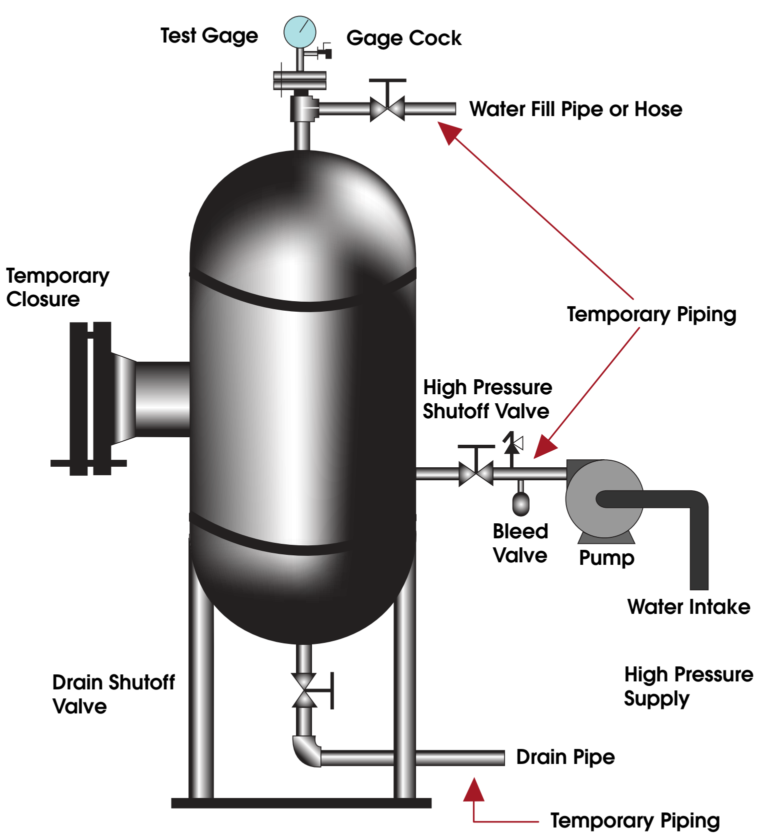
Our codes establish rules for testing all such items within their scopes. Most, if not all, codes provide limits for pressure and temperature for all code scope pressure-retaining items. But what about the rest of the testing equipment? What pressure and temperature should be used to design the fill, drain, and pressurizing equipment? Who did the design, or was it just assembled from what was available in the area at the time? These are very troubling questions, as they can directly affect the safety of all involved individuals.

This leads to a number of questions, not the least of which is, Who is responsible? Under most federal, state, and provincial regulations, the owner-user is responsible for everything which takes place at his or her facility. In the case of a boiler or pressure vessel manufacturer, the manufacturer is the owner-user of temporary piping in his or her facilities. Our National Board repair organizations are the owner-users of piping at their shop. All parties performing such testing are responsible for the safety of personnel at their testing sites.

For the most part, temporary piping for hydrostatic testing is unregulated. It is up to the manufacturer, repair organization, and/or owner-user to perform such testing in a responsible, safe manner.

In the absence of formal rules, we need to apply common sense. The following are suggestions intended to reduce risk and problems associated with hydrostatic testing:

## Typical Hydrostatic Test Piping Arrangement




### Oversight

Overall responsibility for hydrostatic test facilities and procedures should be assigned to an individual who has authority to ensure the overall safety of test facilities and site. Personnel safety is the first consideration, but this individual responsibility should also include assurance that only proper materials, fabrication, and procedures are employed.

### Fill Connections and Piping

The uppermost nozzle, used as a fill and vent connection, needs to be flush inside. Allowing internal projection can result in trapped air.

Sometimes the vessel drain line is used as the fill line. If this is the case, the uppermost vent connection should be flush inside. If there is not a nozzle at the uppermost point in the vessel, one should be added.

With complex shape equipment, multiple vent connections may be necessary.

Fill piping or hoses should be rated to match supply water pressure and be disconnected from the equipment prior to test pressurization.

### Temporary Piping and Closures

As a minimum, all temporary equipment should be designed for the same, or higher, pressure than that of the equipment being tested with a design temperature equal to the test temperature. In no case should temporary equipment be allowed to exceed 90 percent of its yield strength.

Temporary closures should be made of known specification material and be of a design satisfying the test conditions. Temporary closures should be of configurations permitted by code. This is especially true if the closure is to remain on the vessel as a shipping closure.

Temporary blind flanges must be suitable for pressure and have a full complement of studs. They need to be trimmed out with studs, nuts, and gaskets suitable for test conditions.

If proprietary fitting and/or closures are used, careful attention must be made to manufacturer's instructions and limitations as to the use of these closures. Such items as quick disconnects, clamps, expandable fittings, and sleeves are examples of some proprietary fittings. Special consideration may be required to anchor or secure such devices.

### Welding of Pipe Joints

All welding should be in accordance with a nationally recognized welding code utilizing standard or qualified procedures along with qualified welders.

### Test Temperature

Metal temperature at the start of test pressurization should be 30°F (17°C) above the minimum design metal temperature (MDMT) for pressure vessels and a minimum of 70°F (20°C) for boilers. At time of visual inspection, metal temperature should not exceed 120°F (50°C) for personnel protection.

### Materials

Piping, fittings, and valves used should be of known specification. Valves and fittings should be in accordance with applicable ASME B16 series standards. Materials which may be susceptible to brittle fracture or stress corrosion cracking should not be used.

### Equipment Reused from Prior Testing

All reused pressure-containing and pressure load-bearing items need to be inspected prior to use. Questionable equipment should not be used. Bolts, studs, and nuts should never be repaired; damaged ones need to be replaced. Shut-off valves should be checked for internal leakage across the valve seat.

### Test Gages

Gages used in hydrostatic tests should be calibrated in accordance with the testing organization's quality control program prior to each test. The gage should have a range between 1-1/2 and 2 times intended test pressure.

### Supports

Piping supports must be designed and properly installed considering the loadings which may be applied during hydrostatic testing.

### Drain Piping and/or Hoses

Draining equipment following the test presents its own considerations. Opening a valve with high pressure behind it into a fire hose is not a good practice. It is necessary to relieve pressure before opening the valve into a drain hose or actually pipe the drain line to point of safe discharge.

### Pressure Relief Device

With very high-pressure tests or where test facilities are permanent, consideration should be given to installing a pressure-relieving device in the high-pressure supply line to prevent pressure from exceeding a predetermined maximum. Adjustable hydraulic relief valves are available covering a wide range of adjustable pressure settings. Rupture disk or breaking pin devices can be used if testing is always at the same pressure.

### Bleeding the Equipment of Air

This operation addresses the risk factor involved in the test. Equipment which is fully purged of air should not fail in a catastrophic manner. Air under compression could be considered as a storage battery of energy. The more air within the equipment, the greater potential of danger. Of course, everyone fills the equipment until water flows out the top, but that is not the full story. Did someone bleed the pipe from the high-pressure supply source to shut-off valve in the high-pressure line? Did someone test for presence of air by bleeding a small amount of water to determine if the pressure falls sharply?

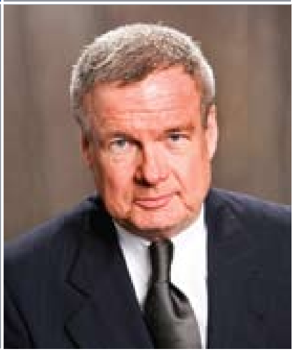
If air is present in the equipment, bleeding of fluid will result in having the pressure on the gage remain quite high and slowly decline. If there is no air in the equipment, gage pressure will drop quickly.

### At Time of Testing

Clear area of all nonessential personnel. Block off area with suitable barriers and warning signs. For those individuals who must remain in the test area, an effort should be made to minimize their exposure.

### Conclusion

Knowing there is always one more thing to consider, the above checklist should serve to stimulate your thoughts on the often neglected aspects of hydrostatic testing. With a little common sense, we can minimize the number and extent of problems which could otherwise occur.



PERSPECTIVE

# Pressure Equipment Accidents:

## Communicating the Human Toll

BY PAUL BRENNAN, DIRECTOR OF PUBLIC AFFAIRS

Not a month goes by when at least one industry outsider cites pictures of death and injury as the most compelling of reasons supporting accident prevention efforts.

Yet the *BULLETIN* has steadfastly chosen not to publish such photos.

The reason?

It has always been National Board's priority to focus on *prevention* of accidents, not the *consequences*. While explicit accident images may spark visual impact, there is no logical or moral justification to publish same. As a matter of fact, it stretches believability beyond reason to suggest vivid photos of deconstructed human forms would serve as some sort of graphic deterrent, let alone ignite an epic decline in incidents.

However, despite the absence of graphic photos, there is no rationale *not* to educate those seeking a more detailed explanation of accident reality: that is, revealing – via the written word – the horrible human suffering that may occur when a person is within close proximity of either an equipment explosion or rupture.

So without getting too graphic, I have cobbled together – with the help of several outside sources – a short primer on what happens to a body when a catastrophic release of pressure ensues.

### CAUSE AND EFFECT

It can be correctly assumed concussion resulting from an explosion is responsible for most deaths and injuries. But is flying debris always the primary cause?

In his November 2000 presentation *DEFINING DISASTER: THE EMERGENCY DEPARTMENT PERSPECTIVE,* noted physician Dr. Joseph Zibulewsky of the Department of Emergency Medicine at Baylor University Medical Center observed:

*"Most blast fatalities are from brain injuries, skull fractures, diffuse lung contusions, and liver lacerations . . . Only about 15% of those who come to the emergency department for blast injuries are admitted to the hospital; others are either well enough to go home or do not survive the initial blast."*

Dr. Zibulewsky explained the initial pressure wave of a high-energy explosion travels at 800 m/sec. The body parts most affected by a blast wave, he noted, are lungs, ears, and gastrointestinal tract. Injuries are caused by a series of "mechanisms."

The first involves the movement of particles in the body from more dense areas of the body to less, as when liquid in the lungs is displaced and causes pulmonary hemorrhage. With pressure differentials, the blast wave forces fluid from its space, which can cause death hours or even days after the explosion. Compression and decompression can also rupture membranes in the ears.

> ***It has always been National Board's priority to focus on prevention of accidents, not the consequences.***

"Among secondary injuries are cuts caused by flying glass, shrapnel, and debris that can imbed deeply into tissues," Dr. Zibulewsky expounded. "Tertiary injuries occur as people are thrown against hard surfaces."

Doctors say most surviving explosion patients fail to remember anything relating to the blast concussion. As a child, I was struck by a car and knocked unconscious. There was no pain. And to this day, I have no recollection what happened in the minutes preceding the accident.

Going into shock, doctors explain, is the brain's way of dealing with a traumatic event.

### STEAM CAN BE DETRIMENTAL TO YOUR HEALTH

Although concussion from a pressure equipment blast is the foremost cause of death and injury, steam – or more precisely, superheated steam – is the most feared by those understanding its precarious potential.

One of the oft-told anecdotes in our industry is of utility operators using a broomstick to check for high-pressure steam leaks. Because superheated steam can sever appendages, it was believed passing a broomstick over a suspected leak area was preferable to any alternative involving truncation.

While this makes for a good story, I have been unable to find anyone in the utility industry who subscribes to the broomstick practice. The reality is any leak of superheated steam will produce a significant sound not unlike an air horn that can be distinctly heard throughout many generating plants.

According to columnist Cecil Adams, the broomstick practice may have started aboard ships with steam boilers many years ago. “Tight quarters and noisy conditions could have made it difficult to find leaks quickly without some direct evidence,” he speculates.

Although the broomstick story may only be an old wives’ tale, the dangers of superheated steam are not.

Searing heat notwithstanding, any blast of high-pressure gas can render significant physical damage. Adams cites US Army medical reports describing a number of high-pressure gas injuries. “Just 12 psi can likely pop your eyeball from its socket,” he opines. (OSHA limits air pressure used in industrial cleaning to 30 psi.)

As we all know, a high-pressure leak is dangerous for a variety of reasons, including turning any loose objects into flying projectiles (see explosion effects above). Tools, tanks, lunchboxes – anything – being jettisoned at a high rate of speed can be lethal to the unsuspecting.

Those lucky enough to escape being struck may not be as fortunate when dodging a steam leak, particularly in a confined space.

“Even at lower temperatures enough steam in a small area can suffocate you as it displaces air,” Adams writes. “A big steam leak ... can quickly raise the surrounding air temperatures so high you’ll cook from the inside if you breathe.”

There are perhaps few who can better describe the internal and external effects of steam than Dr. Michael Badin, respected pathologist whose expertise is frequently sought on TV news and reality programs.

“A steam burn does not singe the hair or char the skin,” notes Dr. Baden. “Steam has a temperature of 212°F or more and can cause burns of the outside of the skin. In the steam deaths that I've seen, the causes of death have largely been burns of the air passages (the mouth, the windpipe, the air passages in the lungs). When superheated air, vapors, and steam are inhaled into the body, the exposure can cause very rapid death.”

The media often wrongly equates steam and smoke inhalation: the difference being the quantity of heat carried by steam. (Some studies indicate steam’s heat carrying capacity as 4,000 times greater than hot air.) Industry authorities say humans can withstand air temperatures and dry steam up to about 200°F. Conversely, hot condensate can generate pain (burning of the skin) at 120°F. As air is displaced and the percent of steam by volume increases above 12 percent (not unusual in confined spaces), temperatures exceed 120°F and, well . . . there is seldom a happy outcome.

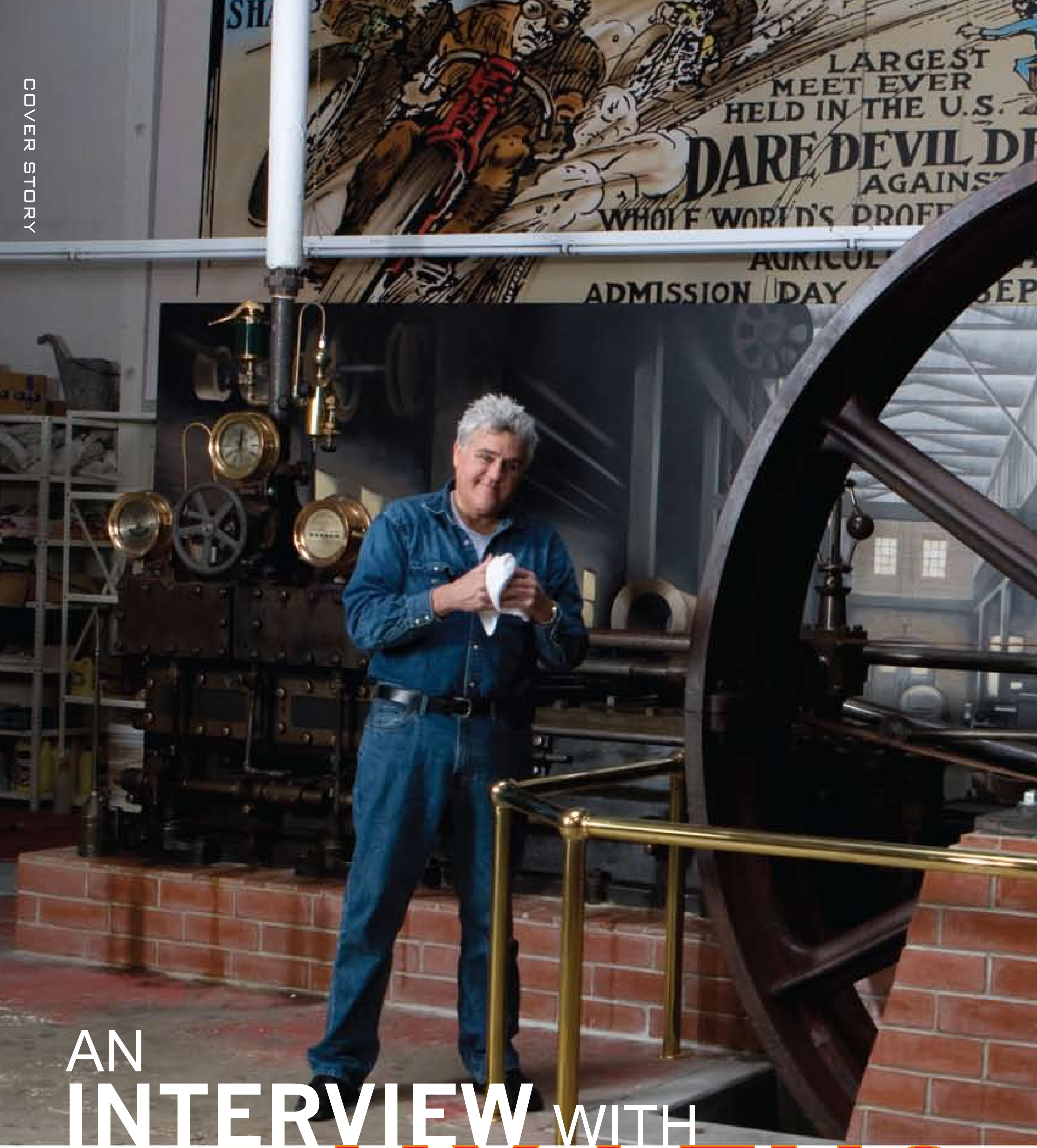
Those fortunate enough to survive face years of surgery and disfiguration both externally and internally. But there is yet another injury victims might endure: post–traumatic disorder brought about by stress and shock.

Sound horrible? You bet.

The next time you read about a person killed or injured in a pressure equipment accident, thoughtfully reflect on the victim and what he or she endured. With disturbing images all around us on television and in movies, one doesn’t require much imagination.

Or a photograph . . .

COVER STORY




# AN INTERVIEW WITH JAY LENO


# KEEPER OF THE FLAME

If you're one of the six million or so people who watch "The Tonight Show" every night, then at some point you've seen a clip of Jay Leno driving down a Hollywood street in a car from his automobile collection. The collection, spanning 100 years of automotive history and housed in a 17,000-square-foot building called Jay Leno's Big Dog Garage, includes several steam cars. But it's just not the steam cars themselves Leno has a passion for; it's steam in general. In fact Leno, who owns a steam motorcycle and a couple of steam engines, is an aficionado. "Steam built this country," he says. "Henry Ford put us on wheels, but steam built the factories, the railroads, heated the homes." The *BULLETIN* recently talked with Mr. Leno about his passion for steam.

Photography by
John Lamm


***BULLETIN:* When did you first become interested in steam?**

Mr. Leno: I've always been interested in steam. When I was a kid, I had all the model engines with the pellets and all that kind of stuff. But 18 or 19 years ago, I got my first steam car – a Stanley – and was fascinated by it. Now I've got a White and a Doble and a few other Stanleys.

***BULLETIN:* What do you find fascinating about steam cars?**

Mr. Leno: A fun thing about steam cars is modern mechanics have absolutely no knowledge of them. Take my Doble. It was considered – and still is today – the most advanced steam car of all time. You turn the key, and under a minute or two, you pull away with a full head of steam and a thousand pounds of pressure. Anyway, I do a lot of work for car companies, and a bunch of engineers from Mercedes Benz came to my garage. They'd heard about the Doble, but they really didn't know anything about it. I turned the key, and it was quiet and powerful and didn't put out any pollutants. It had a two-million Btu fire going. They were astounded; they just couldn't believe it.

That's what makes it fun. Everything is the exact opposite of what you do in a gas-powered car. In a gas-powered car you're trying to get the heat out of the motor; in a Stanley or White or Doble, you're trying to keep the heat in. You're constantly looking for places where heat is escaping. Because the more heat you can keep inside, the more power you're going to have.

It's also fun to deal with problems you don't get in gas-powered cars, like oil separation, the compound engine timing, the gear valve timing. A steam car is just the flip side of a gas car. It's the difference between a VHS player and a DVD player.

***BULLETIN:* What's it like driving a steam car?**

Mr. Leno: You know, for people who've never driven a steam car, it's a fascinating experience. They are amazed at the amount of torque you get with a steam engine. I always say that when you get in a Stanley, it's like the Hand of God. What I mean is when you open the throttle, it's like someone has just pushed you. There's no revving up, there's no clutch to release, there are no gears or transmission. You have so much torque that all you do is open the throttle, and you go.

And when you see a steam engine work, it has a more natural gait. It's like a horse going down the road. Everything doesn't go faster than the eye can comprehend. You can sit back and watch a steam engine and enjoy it, can form a sort of bond with a steam engine that you sometimes can't with other things. A steam engine is like opening up the back of a watch. There are guys who like electric watches. You put a battery in them, and they're dependable, they're more reliable, but they're not as much fun as just taking your watch and turning that main spring and tightening it. Just hearing that click, click, click. That's what's fun about steam.

***BULLETIN:* How does the Doble steam engine differ from the Stanley?**

Mr. Leno: The Doble engine is a compound, much like the White is a compound. In the Doble and White, you're using superheated steam as quickly as you can. The Stanley is about the simplest sort of steam engine you can get. It's got the slide valve, and it's a two-cylinder. It came in 10, 20, and 30 horsepower. Twenty seems to be about the best. You've got a tremendous amount of torque because you've got power on both sides of the pistons, so you have just as many power impulses as you do in a V-8. The Stanley moves at 357 revolutions per mile. And of course the Stanley is a firetube, so that takes 15 to 20 minutes to heat up.

***BULLETIN:* Which one do you drive the most, the Doble or the Stanley?**

Mr. Leno: You could actually drive the Doble almost every day. You can get in and turn the key and never have to touch fire or flame and pull away. The Stanleys are wonderful tinkerer's cars. There's always something that's a bit off. You can get under it, look like an expert, the thing will backfire, go boom, and people will run away. It's a lot of fun.

Another fun thing about a Stanley is taking it down the freeway. In the manual, it tells you if the car catches fire, increase speed until the fire blows out. So I've gone down the freeway with flames coming over the front, and I shut off the fire, increase the speed, and get up to 65 or 70 until the fire blows out. If you know what you're doing, it's a lot of fun. For someone else next to you on the freeway, it's terrifying.

I've gone down the freeway on fire [chuckling], then the fire has gone out, and I'll go eight miles or so, and I'll hear

[makes sound of siren] and see a firetruck behind me with the lights on. I signal them to go by me, and they're signaling me to pull over because they'd heard there was a red Stanley steamer on fire. I'll say, "No, no, the fire went out 20 minutes ago."

***BULLETIN:* Do you ever pull over and let people look at the car?**

Mr. Leno: Oh, sure, all the time. That's the fun part – when you pull up in a White or Stanley steamer, people just stand back because they don't quite know what they're looking at. They don't understand how it works. And when you take them for a ride, they go, "Why aren't we doing this now?"

I always take a kid for a ride because the sad thing about this hobby is everybody has gray hair. So a 19- or 20-year-old guy that's interested in steam, that guy is going to be the keeper of the flame someday. So you try to share as much as you can. That's why I think it's wonderful to keep these artifacts and keep them running.

***BULLETIN:* Do many people come by the garage to look at the steam cars?**

Mr. Leno: A lot of people come through the garage and look at cars, but they want to know about the Hemi Challenger or Ford GT. But the enthusiasts are the ones interested in the old stuff, and the real enthusiasts are the ones interested in the steam stuff.

***BULLETIN:* Do you have much contact with other steam enthusiasts?**

Mr. Leno: Oh, yeah, they all come by. In terms of knowledge about these things, I'm probably about halfway. You have the older guys who really know this stuff, who went to college for thermodynamics, guys like Jim Crank, Steve Lucas, Buck Boudeman [Robert Boudeman, featured in the fall 2007 *BULLETIN*], just a lot of guys who are keepers of this thing. It's like you travel to their doorstep and sit at their feet and listen to what they have to say.

***BULLETIN:* Have you ever blown the boiler on a Stanley?**

Mr. Leno: This is one of the great myths the gas people started – that Stanleys would blow up. It's impossible to blow a boiler on a Stanley. Can't be done. First, it's a fire-tube boiler, and it's wrapped in piano wire, so it's incredibly strong. You've got two safety valves. If those fail, you have copper tubes at the bottom, which will literally melt if it gets too hot. There's never been a case of a Stanley blowing up. I know the Stanley brothers once buried a boiler in the ground at the factory, ran it up to about 2500 pounds, and sealed it all off. That blew pretty big, but they were trying to make it explode.

Now once in the Doble, I blew a tube off. You've got 600 feet of coil, and if you run it dry, you can get the coils red, and they'll bust under pressure. You'll blow a hole in it, and it will sound like a shotgun blast. But a Doble boiler never holds more than two quarts of water. Well, they call it a "generator"; a Doble generator never holds more than two quarts of water at one time. So the most you'd blow out is two quarts, and that would come out pretty quick. There's not a lot of danger there.

***BULLETIN:* Do you have any plans to get any more steam cars?**

Mr. Leno: My wife isn't going to read this, is she? If so, no, I don't have any more plans. Secretly, oh sure, I'd love to. The reason is it's sort of fun to be the keeper of old technology.

You know, when I was a kid, I used to read about monks in the sixteenth century who had books and hid them or had pieces of artwork and buried them in the bowels of the church, and I used to think, What kind of life is that, saving things? But then I realized that's what I do, that's what I admire – these people who save things that are considered outdated or are no longer interesting to anybody, because, like I say, it's lost technology. You get to pass it on to other people.

***BULLETIN:* Do you have a steam motorcycle?**

Mr. Leno: I do have a steam motorcycle. This is an odd story, but before 9/11 I was able to get from the Air Force a heat exchanger off a Titan missile. It's beautifully made and must have cost the government 80 grand to make; I got it for 250 bucks. We use it as the boiler and run it on propane. It produces 2,500 pounds of steam for a 1902 Knox steam engine. The frame is from a '36 Harley. It's a more money than brains project.

***BULLETIN:* Talk a little about the 1860 steam engine shown on your Web site.**

Mr. Leno: That's one of those deals where you find these old guys who bought this stuff with the dream of one day putting it together and never got a chance to. I mean, it takes a lot of effort, and it takes a lot of manpower to set that up. That thing weighs 11 tons. You need fork lifts, transmission jacks, it's tricky. It took seven tons of cement to get it level. We had to dig a hole, then put the cement

in, then keep leveling it. We had to have a professional construction crew set it up and do it properly.

Unfortunately a lot of the guys don't run their steam engines because they don't have the boiler capacity to do it. Luckily I'm in a position I can get myself a nice boiler and run the whole thing. We have a Clayton [steam generator]. It's a modern unit, it's outside. I didn't want to sit out there and stoke coal and do all that kind of stuff. So I have a modern boiler with all the safety equipment.

I also put in an 1832 Beam steam engine, which ran a color and dye factory in England for almost a hundred years. It's amazing how durable steam engines are. For instance, take my 1866 engine. Henry Ford bought it in '31 and stuck it in the Ford Museum. Now this thing hadn't run in some 70 years, and I brought it back to my garage. We shimmed it up, got everything balanced, fired it up. It runs – and will run for another hundred years. It's bullet proof. A thousand years from now, when all the small block aluminum Chevy motors have deteriorated into the earth, this thing will look the same as it does right now.

***BULLETIN:* Do you actually use the steam engines to power things in the garage?**

Mr. Leno: I don't really use it for that, because the amount of gas and steam that you need to run this [chuckling], it's not really cost effective. It's fascinating to watch, but no, I'm not using it for those purposes because it uses way too much water for horsepower.

***BULLETIN:* How many people work in your garage?**

Mr. Leno: Well, there's a lot of people there, but I don't know how many are actually working [laughing]. There are about four or five guys on staff.

***BULLETIN:* How often do you get a chance to get down there?**

Mr. Leno: Every day. I go every day. That's my Malibu beach house. I'm not a summer guy, I'm not a pool guy. I'm in the garage all the time. In fact today we're working on my White.

***BULLETIN:* How would you compare the engineers of the steam age with those of today?**

Mr. Leno: It's funny: we live in an age when we just assume we're smarter than the people who came before us. For instance, take my 1866 Wright steam engine. It's an enormous thing, weighs 11 tons. It's a big single cylinder, 125-horsepower. I got a manual on it, and I said to myself, "I'm a twenty-first century person – this should be easy to read." I got about five pages into it, and there was so much math and science I knew I was way in over my head. And that's when you realize that tools change, applications change, but engineers have always been engineers. The steam engineers of the mid to late 1800s were as good as – and in some ways better than – engineers now because they had to do the whole thing themselves. Now we can get statistics and figure out things with computers. Back then, it was all done by hand.

I have some really good mechanics, and they look at my White steamer, and they're amazed at the level of the fit and finish and engineering that went into it. It's not like any other car or vehicle they've ever seen. It's just different; it's not better, it's not worse, it's just different. When you see the level of the fit and finish and all the little brass fittings and how everything is connected – everything is just so well-made; it's just a fascinating piece of engineering.

***BULLETIN:* It sounds as if you have a great deal of respect for the engineers of the steam age.**

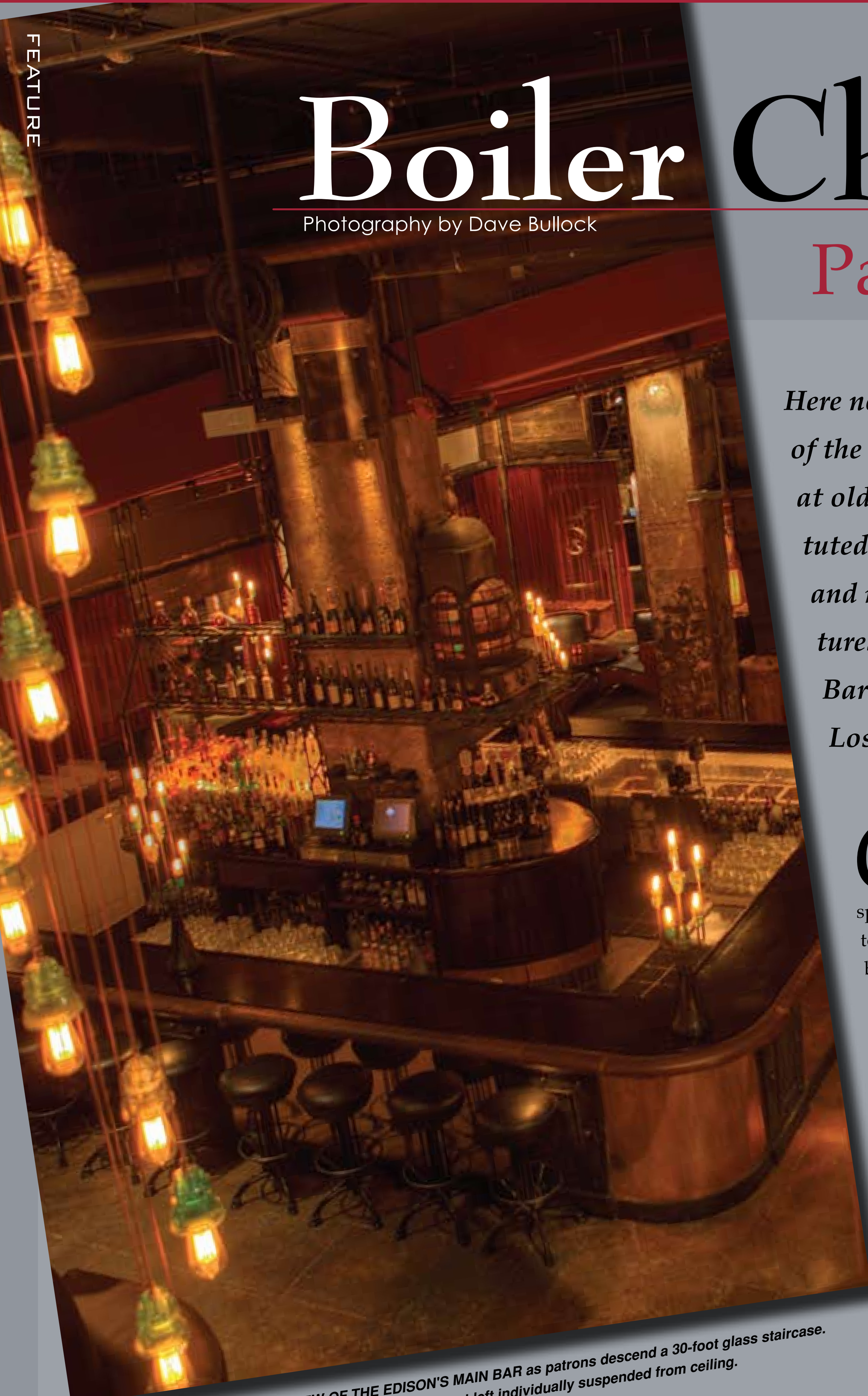
Mr. Leno: We owe a great deal to steam. Most people think it's old technology. And in some ways it is, but sometimes the last days of old technology are better than the first days of new technology.

*BULLETIN:* Thank you, Mr. Leno, for sharing your expertise with *BULLETIN* readers.

FEATURE

# Boiler Chic: Part II

Photography by Dave Bullock



VIEW OF THE EDISON'S MAIN BAR as patrons descend a 30-foot glass staircase. Note Edison-style lamps at left individually suspended from ceiling.

***Here now the final installment of the* BULLETIN *series looking at old power plants reconstituted as stylish restaurants and nightclubs. Part II features the signature Edison Bar nightclub in downtown Los Angeles.***

*Condé Nast Traveler* recently called the Edison Bar one of the city's "swankiest nightspots." *Esquire* magazine referred to the posh lounge as "one of the best new bars in America." And it is all within LA's very first private power plant.

From the time one enters, the Edison Bar's noire motif beckons all to pad about its imposing collection of antique power equipment. Here, retired generators lie in quiet repose. Slumbering boilers two stories high – once producing steam to generate enough electricity to power a small city – are now but fatigued props. Internally illuminated gages cast a watchful eye on club-goers, many of whom have never before set foot in a power plant.


ANTIQUE AIR TANK AND GENERATOR add to the stylish ambience of the Generator Lounge.

**FACT: it can be somewhat difficult to make an entrance at the Edison – particularly on weekends.**

However, before gaining entry, one must find this jewel within the city of angels. Be forewarned: the address is a bit misleading. Although listed at 108 West 2nd Street, the Edison Bar actually fronts an alley called Harlem Way. Upon arrival, don't look for a sign. There is none.

What can be found is the Higgins Building. It is here in a vaulted basement one discovers the 14,000 square-foot Edison Bar.

Developed in 1910, the Higgins Building was known for its revolutionary construction techniques. Featuring commercial office space with both AC and DC outlets and LA's first electric elevators, it was the tallest building west of the Mississippi and the city's first structure to be both fire and earthquake proof. Thusly, it should come as no surprise the Higgins would also host its own source of power.

Elegantly appointed to accommodate prominent business leaders (Clarence Darrow, he of Monkey Trial fame, was a tenant), the Higgins building began its plunge into disrepair during the mid-1920s. At one time the basement was filled with eight feet of rainwater littered with floating garbage. The floors above hosted a motley assortment of tenants best described as vagrants.

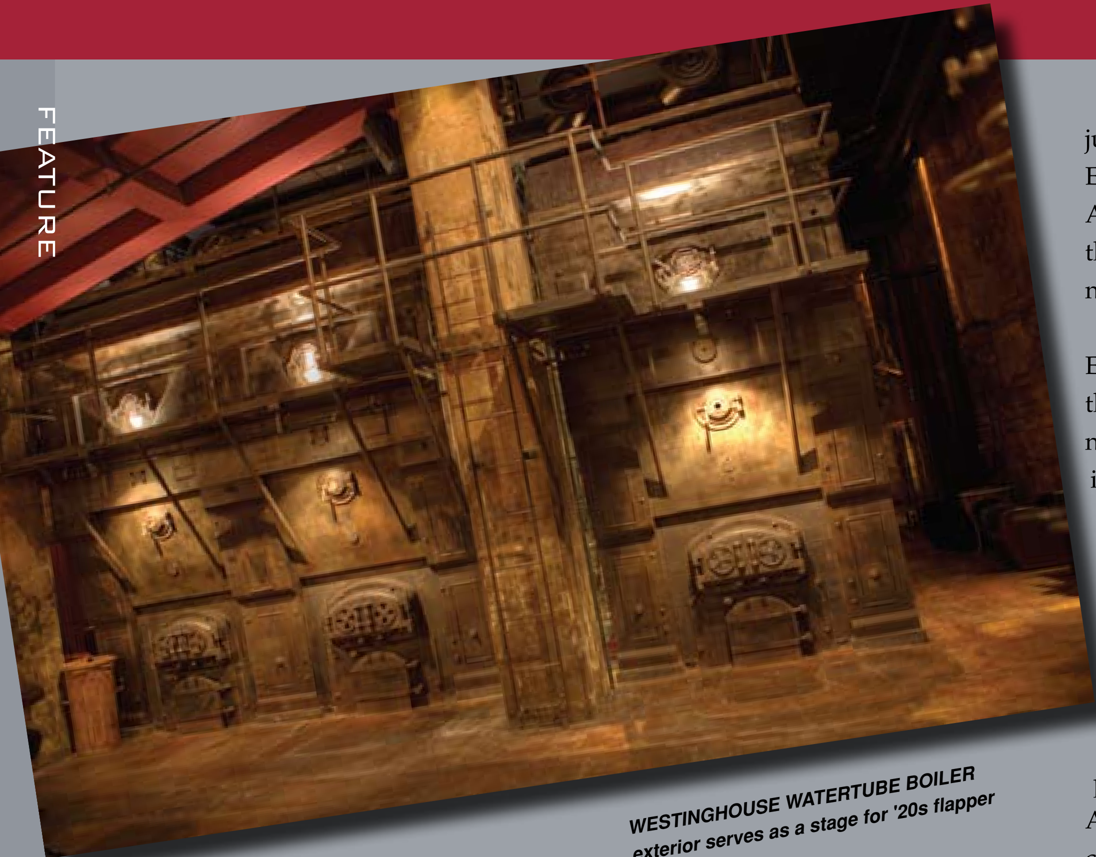
And that's how designer and preservationist entrepreneur Andrew Meieran found the Higgins in 1998. Having restored a number of buildings in his hometown of San Francisco – including the mansion once belonging to Charlie Chaplan – Meieran purchased the Higgins with similar intent.

The supplanted San Franciscan declared the former office spaces would be converted to residential lofts (completed in 2003). As for the water in the basement: drainage revealed a forgotten time in history denoting closure of the Industrial Revolution. The sodden boiler room also revealed Meieran's desire to create an upscale lounge with panache.

But this was not to be just a lounge defined by Webster's unabridged. Investing six years and $2 million (the Higgins was originally constructed for $400,000), Meieran's sui generis creation opened February 2007 and instantly piqued the anticipation of thirsty patrons waiting beyond the velvet rope.

Those so entitled enter from the alleyway where they are immediately greeted by a 40-foot mural celebrating the power of light. Patrons descend a grand 30-foot glass staircase to find themselves in a cavernous, almost mystical ambience not unlike a movie set. (Interestingly, this exquisite venue has been used in recent productions featuring the likes of Jim Carey and Adam Sandler.)

In the spirit of old Hollywood (discovered the same year the Higgins was built), clientele attention is immediately drawn in the direction of two opposite walls which are, appropriately enough, featuring silent movies from the 1920s.



**WESTINGHOUSE WATERTUBE BOILER** ***exterior serves as a stage for '20s flapper routines.***

Above the din of mixed corporate types, big band music resounds from origins unknown. Like the movies, the melodies are also of 1920s vintage. Suddenly, one knows the feeling of having been in a speakeasy.

Once resigned to visiting a different era, it becomes easy to navigate the Edison's dark, compartmentalized labyrinth. And the choices are countless.

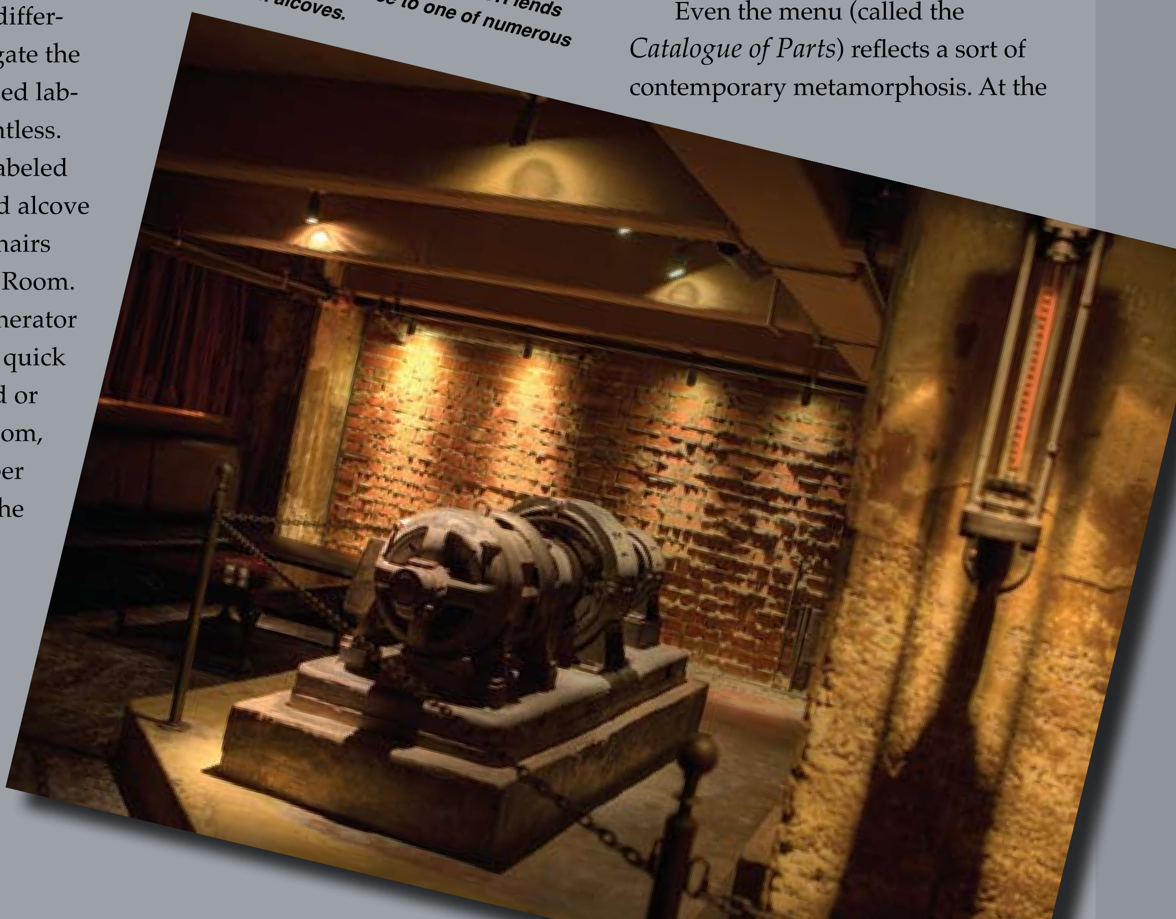
Enjoy a vivid, fashionably labeled drink in a real boiler: a curtained alcove with plush 1920s-style leather chairs located in, of course, The Boiler Room. Or pop over to the mirrored Generator Lounge for some nostalgia, or a quick nosh and nightcap. Play a round or two of billiards in The Game Room, or simply enjoy a naughty flapper routine performed atop one of the venue's two Westinghouse watertube boiler units (two others were removed to create space). One can also check out any of the numerous flat screens strategically located about the venue. Additionally, patrons can make their way to an antique coal bin where a beautifully restored jukebox yields two tunes for a buck. End the evening with a draught Anchor Steam beer at The Lab where the possibilities are . . . well, just too numerous to recount.

There is no doubt regarding Edison's power plant pedigree. If the equipment is not enough, look no further than the studied art deco influence. Notice the stained concrete floors, metal, exposed brick walls, metal, hardwood, and metal. Lots of metal. Seemingly everywhere.

Giving texture to the nostalgic theme is Edison's liberal use of copper cladding throughout the lounge. (M.J. Higgins was a copper magnate.) Replicas of Thomas A.'s first crude lightbulbs suspend chandelier-like from 20–foot ceilings providing illumination not unlike that available in the plant's more productive days. Other lighting fixtures, some original, some purchased via eBay, cast a golden yet subtle glow on Meieran's maze of intimate recesses.

Even the menu (called the *Catalogue of Parts*) reflects a sort of contemporary metamorphosis. At the

**VINTAGE 1915 ERA GENERATOR** ***lends an intimate presence to one of numerous Edison alcoves.***



***CONVERTED ANTIQUE TURBINE** at right serves as a convenient rest stop for imaginative libations and the occasional weary elbow.*

TRADITIONAL FLOWMETER *exquisitely framed between two rich high-back leather chairs.*

Edison, the faithful shot and beer BoilerMaker is replaced by an exotic elixir of Champagne and Guinness.

A pat on the back is well deserved for Mr. Meieran. Who would have ever envisioned boiler rooms as cultural shrines? Where social pressure displaces that of steam pressure. Where old generators give way to new generations. Where the only inspectors to be found are most likely from the city health department.

Herewith recycling to the extreme: where old equipment and buildings are revisited to exist another day – and for entirely different reasons.

So unique the interior, so colorful the drinks, so positive the vibe . . . the Edison Bar must be seen by those in the pressure equipment industry.

Interested?

The best time to gain entry is on a weeknight. A late night weekend rendezvous can be an adventure. If fortunate to find the lounge's general location, just look for the bouncer. And perhaps a velvet rope.

However, standing in line will not guarantee admission. Nor will fetching attire. But there are some dress guidelines: *No athletic wear of any kind, flip flops or sandals, T-shirts, collarless shirts, or torn or baggy jeans.*

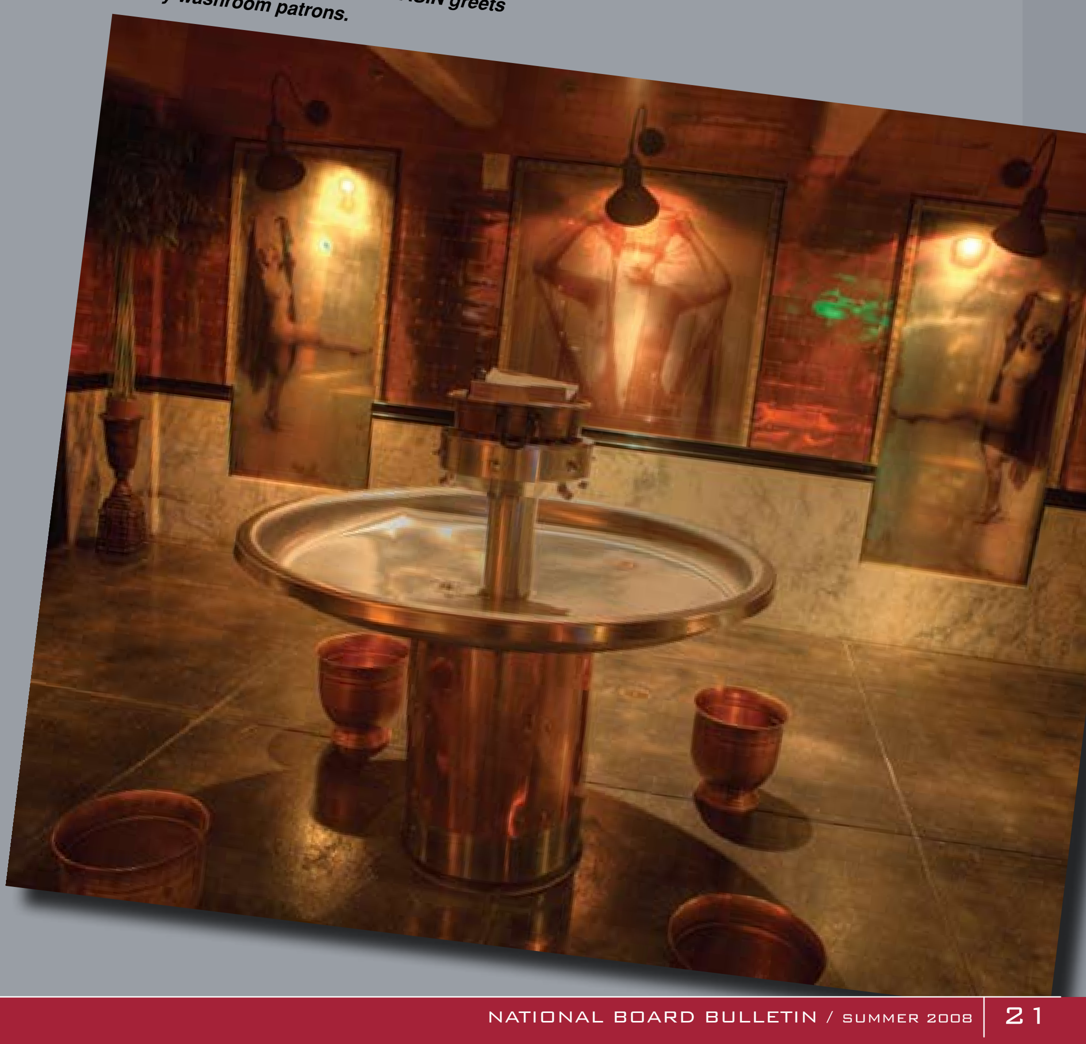
According to the Edison Web site, "We will always strive to more quickly accommodate those who achieve the highest understanding of our dress code."

Rigid clothing requirements notwithstanding, the Edison crowd remains undaunted. Most have nothing but praise for Meieran's self – described "industrial cathedral."

Before finding her way out of the Edison and disappearing seductively into the night, a tall, stylish blonde gushes: "This is *the* bar of the 21st century!"

We'll know for sure in 92 years.

METAL ART DECO-STYLED BASIN *greets lady washroom patrons.*



INSPECTOR'S INSIGHT

# Repair or Alteration:

## A Primer for the Novice "R" Certificate Holder

BY BILL SMITH, SENIOR STAFF ENGINEER

It is an exciting time to be involved in the world of "pressure-retaining items." Whether your involvement is in manufacturing, repairing, installing, operating, or the inspection of pressure-retaining items, our world is changing. The National Board has always been proactive in responding to the needs of its members and clientele; thus, the 2007 edition of the *National Board Inspection Code* (NBIC) was published in a completely different format. Two notable changes are (1) the NBIC now comprises three parts instead of one and (2) the paragraph identification scheme has changed from the original alpha-numeric format.

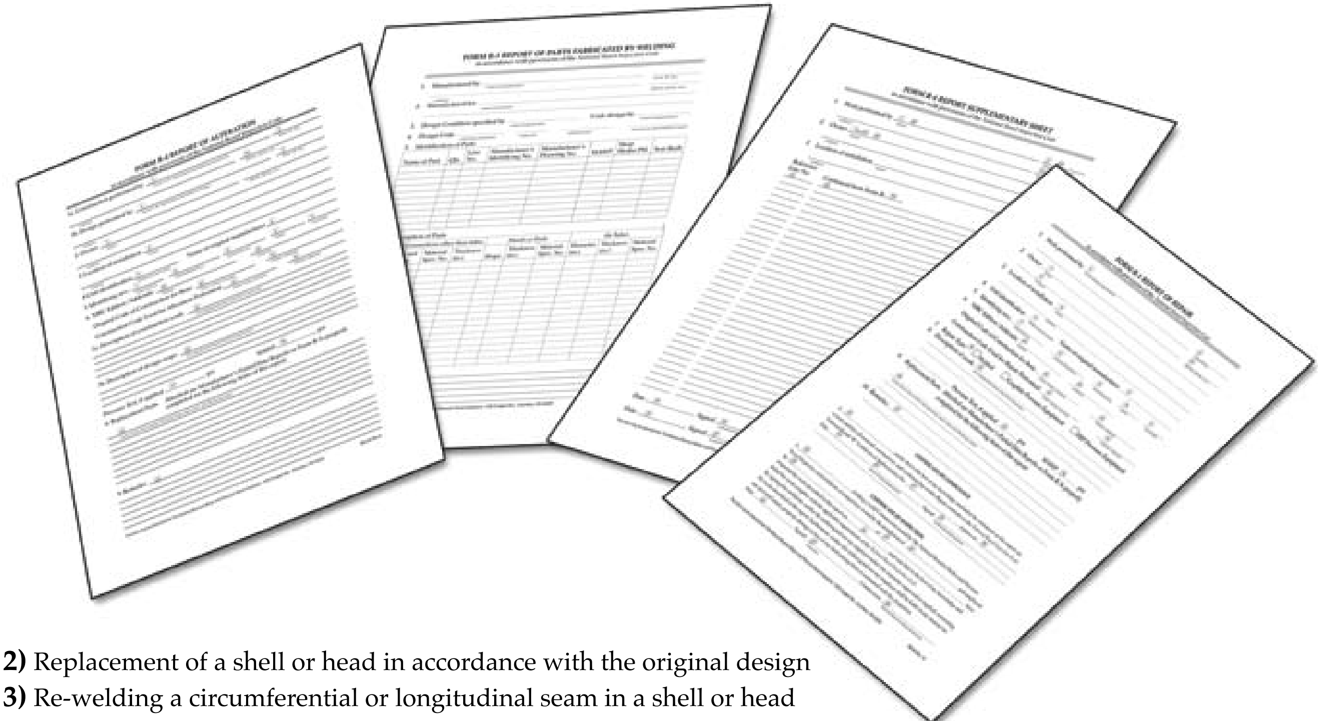
Information concerning the installation of boilers, pressure vessels, and other pressure-retaining items is located in Part 1. General guidelines for inservice inspection of pressure-retaining items are located in Part 2. Information and methodology for repairs and alterations to pressure-retaining items, formerly found in Parts RC & RD, are now in Part 3.

With regard to repair or alteration, it is *normally* pretty clear whether the intended work is going to be a repair or an alteration. But in some circumstances the work will be a repair, while under other conditions the same work will be an alteration. With that in mind, let's look at their definitions as found in Part 3, Section 9 of the 2007 NBIC:

> A repair is the work necessary to restore a pressure-retaining item to a safe and satisfactory operating condition.
>
> An alteration is any change in the item described on the original *Manufacturer's Data Report* affecting the pressure-containing capability of the pressure-retaining item. Nonphysical changes such as an increase in maximum allowable working pressure (internal or external), increase in design temperature, or a reduction in minimum temperature of a pressure-retaining item shall be considered an alteration.

Let's look at examples of each. First, examples of **REPAIRS** can be found in the 2007 NBIC, Part 3, Section 3.3.3 and are listed below:

**a)** Weld repairs or replacement of pressure parts or attachments that have failed in a weld or in the base material;
**b)** The addition of welded attachments to pressure parts, such as:
  **1)** Studs for insulation or refractory lining
  **2)** Hex steel or expanded metal for refractory lining
  **3)** Ladder clips
  **4)** Brackets having loadings that do not affect the design of the pressure-retaining item to which they are attached
  **5)** Tray support rings;
**c)** Corrosion resistant strip lining, or weld overlay;
**d)** Weld buildup of wasted areas;
**e)** Replacement of heat exchanger tubesheets in accordance with the original design;
**f)** Replacement of boiler and heat exchanger tubes where welding is involved;
**g)** In a boiler, a change in the arrangement of tubes in furnace walls, economizer, or super heater sections;
**h)** Replacement of pressure-retaining parts identical to those existing on the pressure-retaining item and described on the original *Manufacturer's Data Report*. For example:
  **1)** Replacement of furnace floor tubes and/or sidewall tubes in a boiler



**2)** Replacement of a shell or head in accordance with the original design
**3)** Re-welding a circumferential or longitudinal seam in a shell or head
**4)** Replacement of nozzles of a size where reinforcement is not a consideration;

**i)** Installation of new nozzles or openings of such a size and connection type that reinforcement and strength calculations are not a consideration required by the original code of construction;
**j)** The addition of a nozzle where reinforcement is a consideration may be considered to be a repair provided the nozzle is identical to one in the original design, located in a similar part of the vessel, and not closer than three times its diameter from another nozzle. The addition of such a nozzle shall be restricted by any service requirements;
**k)** The installation of a flush patch to a pressure-retaining item;
**l)** The replacement of a shell course in a cylindrical pressure vessel;
**m)** Welding of gage holes;
**n)** Welding of wasted or distorted flange faces;
**o)** Replacement of slip-on flanges with weld neck flanges or vice-versa;
**p)** Seal welding of butt-straps and rivets;
**q)** Subject to the administrative procedures of the jurisdiction and approval of the inspector, the replacement of a riveted section or part by welding;
**r)** The repair or replacement of a pressure part with a code accepted material that has a nominal composition and strength that is equivalent to the original material, and is suitable for the intended service; and
**s)** Replacement of a pressure-retaining part with a material of different nominal composition, equal to or greater in allowable stress from that used in the original design, provided the replacement material satisfies the material and design requirements of the original code of construction under which the vessel was built.

All repairs are to be documented on a Form R-1, *Report of Repair*. If all of the information will not fit on the Form R-1, the Form R-4, *Report Supplementary,* sheet shall be used to record the additional data. It is the responsibility of the organization holding the "R" *Certificate of Authorization* performing the work to document and distribute the Form R-1 and any attachments.

Examples of **ALTERATIONS** can be found in the 2007 NBIC, Part 3, Section 3.4.3 and are listed below:

**a)** An increase in the maximum allowable working pressure (internal or external) or temperature of a pressure-retaining item regardless of whether or not a physical change was made to the pressure-retaining item;
**b)** A decrease in the minimum temperature;
**c)** The addition of new nozzles or openings in a boiler or pressure vessel except those classified as repairs;
**d)** A change in the dimensions or contour of a pressure-retaining item;
**e)** In a boiler, an increase in the heating surface or steaming capacity such that an increase in the relieving capacity is required;

**f)** The addition of a pressurized jacket to a pressure vessel;

**g)** Except as permitted in (s) above, replacement of a pressure-retaining part in a pressure-retaining item with a material of different allowable stress or nominal composition from that used in the original design; and

**h)** The addition of a bracket or an increase in loading on an existing bracket that affects the design of the pressure-retaining item to which it is attached.

All alterations are to be documented on a Form R-2, *Report of Alteration*. If the information will not fit on the Form R-2, the Form R-4, *Report Supplementary Sheet*, shall be used to record the additional data. It is the responsibility of the organization holding the "R" *Certificate of Authorization* performing the work to document and distribute the Form R-2 and any attachments. We have looked at the formal definitions, listed some examples, and determined the necessary forms on which to document Repairs and Alterations. So let's take a little quiz to see how we are doing:

# Quiz

**1.** You are going to replace a 6-inch nozzle in a pressure vessel with the same size nozzle of the same material. **Repair or Alteration**?

**2.** You are going to add an additional 6-inch nozzle into the shell of a pressure vessel in which one already exists. It will be located 20 inches away from the closest connection. The material and thickness of the nozzle being added are the same as the existing nozzle. **Repair or Alteration**?

**3.** You are going to add a 3/4-inch, 3000-pound SA105 coupling into the 48-inch O.D. shell of a 150-psi steam boiler. It will be added in an area where no other connections are located. The shell is made of SA516-70 material and is 1/2-inch thick. **Repair or Alteration**?

**4.** You are going to replace a 4-inch Class 150, SA-105, Raised Face Weld Neck Flange because the face has become corroded and leaks. You are going to replace it with a 4-inch, Class 150, SA-105, Raised Face Slip-On Flange. **Repair or Alteration**?

**5.** You are going to add a 6-inch nozzle into the shell of a pressure vessel in which none existed before. It will be located 20 inches away from the closest connection. The material and thickness of the nozzle being added are sufficient for the design. **Repair or Alteration**?

**6.** Due to a change in the operating parameters in the system where a pressure vessel is installed, it is necessary to decrease the design temperature of the pressure vessel by 20ºF. No physical change is required. **Repair or Alteration**?

**7.** Due to a change in the operating parameters in the system where a boiler is installed, it is necessary to increase the design pressure of the boiler by 20 psi. No physical change is required. **Repair or Alteration**?

**8.** You are going to replace a corroded shell section in a boiler. According to the *Manufacturers Data Report*, the shell is made from 3/8-inch SA285-C material. You replace the shell section with 3/8-inch SA516-70 material. **Repair or Alteration**?

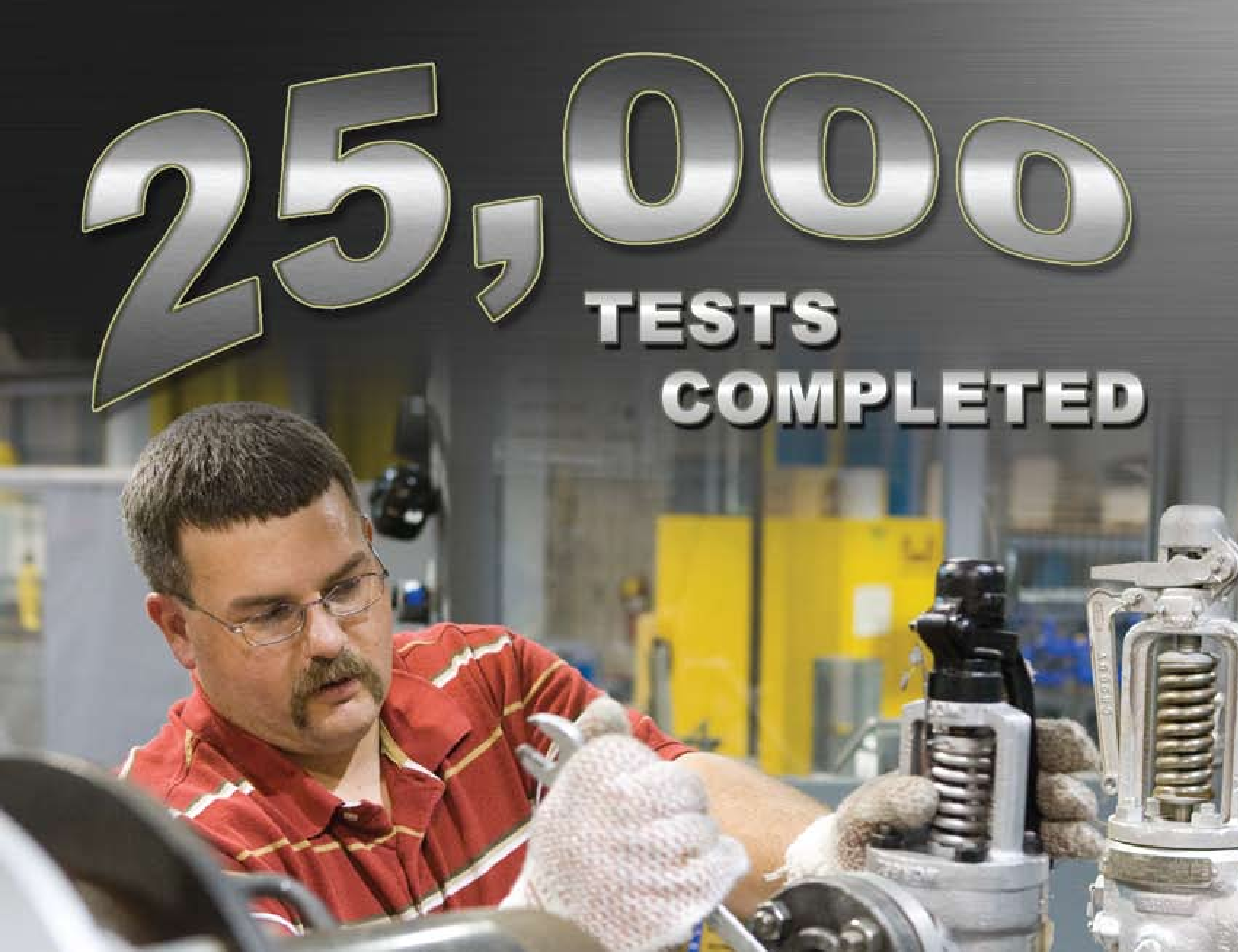
## ANSWERS

1. Repair 2. Repair 3. Repair 4. Repair 5. Alteration 6. Alteration

7. Alteration 8. Repair

Common sense and experience will always help when deciding if the intended work is a repair or an alteration. The commissioned inspector can help with guidance, but the final authority rests with the jurisdiction where the pressure-retaining item is installed. So, if in doubt, check with the chief inspector in the appropriate jurisdiction.

# 25,000 TESTS COMPLETED



## Testing Lab Milestone

On Friday, April 11, the National Board Testing Laboratory conducted its 25,000th test of pressure-relieving devices in just over 17 years of operation at its Pingue Drive location.

With regard to past testing, this rate is nearly double the quantity of testing at the original National Board Lab, which was located adjacent to the Picway Power Plant in Ohio for 17 years.

"Tests have been numbered sequentially since the facility opened in 1991. I would like to thank the laboratory staff for their dedication to our programs and their hard work to get to this milestone," stated Pressure Relief Department Director Joe Ball. The safety device that was part of this milestone originated from Carbone of America, a manufacturer of high-performance, National Board-certified rupture disks headquartered in Virginia.

# Jack M. Given Jr.

## Bureau Chief, North Carolina

BULLETIN *photo by Rierson Photography*

North Carolina Bureau Chief Jack Given admits to being "a little nervous" when he dialed the telephone number two days before Thanksgiving 1987.

"Hello," the voice on the other end responded.

"Is this Jack Given Sr.?" then 40-year old Jack Given Jr. inquired.

"Yes," the voice acknowledged without hesitation.

For several uncomfortable moments, the North Carolina official posed a series of questions to determine if the elder man on the line was indeed the person for whom he had been searching.

Satisfied with the answers, the junior Given declared: "I think you are my dad."

Undaunted, the voice declared "Of course I am!"

After 39 years, father and son had been reunited, albeit electronically and via long distance.

"We talked about 30-35 minutes and agreed to meet in February," the North Carolina official smiles.

"My parents divorced when I was just a youngster," Jack recalls without emotion. The breakup resulted in the junior Given spending most of his youth in Raleigh, North Carolina, and Coshocton, Ohio. "I eventually went to live with my mother and my grandparents in Raleigh," he explains. An Ohio native, his dad entered the Navy where he met and married a woman, Evelyn Moseley, while stationed in Washington, D.C. That was the last anyone heard from him.

Jack's mother remarried when he was 7 years old. "My stepfather was a good man although we didn't have a close relationship," he recollects.

"I spent a lot of time with my grandparents. They were great role models – always encouraging me and building my confidence," Jack continues. "I have some great memories of sitting by a large heating stove in the middle of my grandmother's kitchen. They were kind people who were nonjudgmental. Even though my dad was divorced from their daughter, my grandparents were always positive and told me my father was 'a good man.'"

An individual of strong Christian and traditional convictions, Jack fondly remembers growing up in Raleigh. "It was a community where everyone knew their neighbors. If you roamed the neighborhood and were up to no good, it wasn't unusual for one of those neighbors to administer a good spanking." In high school the state official played football when he wasn't bagging groceries at the local Winn Dixie or cutting grass for twenty-five cents a yard.

Having joined the Naval Reserve while still in high school, the junior Given left school during his senior year. "I worked for a couple of local companies before starting Naval "A" School in January 1968." He went on active duty later that year.

Jack missed out being graduated with his senior class. But he never abandoned the idea of securing his diploma. While on active duty, he took the high school equivalency test to earn his GED.

Jack's renewed interest in learning prompted him to think about a possible Navy career. But one thing altered that thought: marriage.

"I had known my future bride since we were 13," he smiles. "Frances and I used to attend YWCA dances together." The acquaintance continued as Jack attended "A" school. Following his graduation, the two began dating and in June of 1969, they married. After a one-night honeymoon in Winston-Salem, Jack shipped out.

The North Carolina official completed two years active duty before returning to Raleigh. In 1974 he exited the reserve program and was hired that March as a trainee inspector by then state chief Ben Whitley. "I literally studied code books right outside Ben's office," the bespectacled official explains. "I studied Section I like a textbook." His efforts paid off in June when Jack passed the National Board exam.

In 1978, the deputy inspector left North Carolina for what turned out to be a series of professional positions that helped bolster his nuclear credentials. Eventually, the nuclear work required considerable travel that kept Jack away from his family.

Finally in 1996, the Navy veteran rejoined the Boiler Safety Bureau staff as assistant chief. Jack worked under five commissioners of labor before being named chief himself in July 2003.

Upon taking over the bureau, Jack Given Jr. launched an effort to "revitalize" operations. Presently responsible for more than 93,000 registered pressure equipment items, the bureau consists of an assistant, two field supervisors, an administrative officer, 14 inspectors, four processing assistants, and secretary.

Since assuming his responsibilities as head of the bureau, the official has focused on increasing efficiency and production. "Our day-to-day operation really had no need for 20 inspectors when I came to the position. Through attrition, I reduced the number by six and also eliminated two staff slots."

Jack has also created a department strategic plan and proudly exclaims his section is now financially self-sufficient. He humbly points to the work of his "goal-oriented staff," which he refers to as "a wonderful, dedicated team." The state officer also credits Deputy Commissioner Andy Frazier for supporting his proactive strategies.

If there is one person who deserves more credit for Jack's successes, it's the woman behind the man. "She is my backbone. I would not be where I am today without Frances being by my side," he beams. "Her faith and strength have made her the love of my life!"

Jack also boasts a grown son and daughter and three granddaughters who reside in the North Carolina area. "My children and grandchildren are all great kids . . . the type of kids that make a dad proud."

Proud dads seem to be a Given trait, particularly in light of what happened following Jack's fateful telephone call in 1987.

Several weeks later, as Jack and his family returned from a trip, they spotted a note on their door. From Jack Given Sr. Having visited earlier, the elder Given promised to return at 6 p.m.

Later that day, in Jack's driveway, father and son reunited with a tearful hug. And thus began a relationship that lasted until the senior Given passed away on October 14, 2005.

"Those 17 years were perhaps the happiest of my life," Jack explains with a half-smile. But why didn't the elder Given try to contact his son sooner?

"He wasn't sure if I would want him back in my life, particularly given the circumstances of the divorce," reveals Jack. "He never expected I would hear positive things about him from my mother's family."

Jack and his father became very close following their reunion. "Although I live in North Carolina and he resided in Mt. Vernon, Ohio, we talked and visited frequently," the Navy veteran explains. Later, his dad moved to Roanoke Rapids, N.C., where he and Evelyn resided until his death.

What Jack learned about his dad during their 17-year reconnection had a profound impact on the way the junior Given views relationships. "He was a wonderful human being who never met a person he didn't like," Jack observes. "He taught me a great deal."

So too, Jack admits, did his grandparents. It was their positive influence that gave their grandson the courage to make a difference . . . and, the most important phone call of his life.

## New British Columbia Member Elected


Ed Ferrero

**Ed Ferrero** has been elected to The National Board representing British Columbia. He is acting provincial safety manager for the British Columbia Safety Authority.

Mr. Ferrero began working for the province of British Columbia in 1997. From 1970 to 1997, he held numerous positions in power plant operations, gas plant operations, teaching, hospital facilities management, and project management. He also worked in private consulting in plant operations, training, and staffing.

The new chief was graduated from the British Columbia Institute of Technology as a first class power engineer. He also holds a bachelor's degree in religious education from Briercrest Bible College.

Residing in Nanaimo, he holds National Board Commission No. 12226 with endorsements "A" and "B." He and his wife Bev have four children, Scott, Ruth, Joel, and Lydia.

## New Arizona Member Elected


Randy Austin

**Randy Austin** has rejoined The National Board representing Arizona. He is chief boiler inspector for the Industrial Commission.

Mr. Austin was employed by the state of Colorado, Department of Labor and Employment as a boiler inspector from 1980 to 2002. In 2002, he became the chief inspector in Colorado until he retired in 2007.

Mr. Austin served in the US Navy from 1975 to 1980 aboard the USS *Ramsey* as a boiler technician 2nd class, as well as in the Colorado Army National Guard from 1980 to 1989 as a staff sergeant in the 157TH Field Artillery. From 1989 to 1990, he served in the US Naval Reserve in Denver, Colorado, as a boiler technician 1st class.

Residing in Phoenix, he holds National Board Commission No. 10798 with endorsements "A" and "B." He and his wife Frankie have two children, Monique and Jerry.

## New Tennessee Member Elected


Audrey Rogers

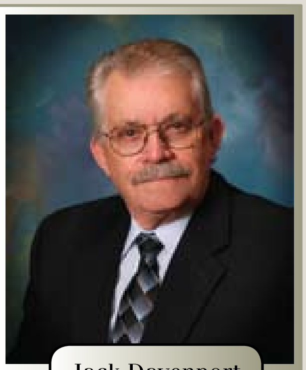
**Audrey Rogers** has been elected to The National Board representing Tennessee. He is chief boiler inspector for the Department of Labor and Workforce Development.

Mr. Rogers was employed from 1967 to 1980 by Combustion Engineering as a welder. He joined the state in 1980 as a boiler inspector where he worked for 28 years before becoming the chief boiler inspector early this year.

Mr. Rogers served in the US Army from 1968 to 1970.

Residing in Chattanooga, he holds National Board Commission No. 9564 with endorsements "A" and "B." He and his wife Carolyn have two sons, Mack and Ben.

## New Pennsylvania Member Elected


Jack Davenport

**Jack A. Davenport** has joined The National Board representing Pennsylvania. He is director of the Labor and Industry Boiler Section.

Mr. Davenport was employed by Airco as on-site supervisor from 1987 to 1989 before becoming an HVAC technician for Livingston HVAC in 1989. In 1995 he joined the commonwealth of Pennsylvania as a boiler inspector and became the assistant director in 2004.

Mr. Davenport served in the US Navy from 1961 to 1987 onboard several different ships. He retired as a master chief machinist mate.

Residing in Harrisburg, he holds National Board Commission No. 11838 with "A" and "B" endorsements. He and his wife Margaret have two children, Bobbi and Pamela.

## New Alaska Member Elected


Chris Fulton

**Chris Fulton** has been elected to The National Board representing Alaska. He is chief inspector for the Department of Labor and Workforce Development.

Mr. Fulton was employed by Cam Industries from 1972 to 1974 before going to work at the Puget Sound Naval Shipyard in 1974. From 1978 to 1981, he worked in boiler operations at the Bangor Naval Base. From 1981 to 2007, he was employed by Royal Insurance, Kemper Insurance, and Factory Mutual Insurance, as well as the states of Alaska and Nevada. He joined the state of Alaska in 2007, when he became chief boiler inspector.

The new chief served in the US Army from 1969 to 1971 in the United States and Germany as an NDE Specialist.

Residing in Anchorage, Mr. Fulton holds National Board Commission No. 9678 with endorsement "A."

## New Colorado Member Elected


Steve Nelson

**Steve Nelson** has been elected to The National Board representing Colorado. He is chief inspector for the Department of Labor and Employment.

Mr. Nelson worked for Hartford Steam Boiler from 1979 to 2007 as field services supervisor before joining the state of Colorado. Before that he served in the US Navy in the Nuclear Power Program as an interior communications technician, first class from 1970 to 1978.

The new chief was graduated from the University of Phoenix with a bachelor's of science degree in business information systems.

Residing in Thornton, Mr. Nelson holds National Board Commission No. 9110. He and his wife Marlene have three children, Melissa, Natalie, and Eric.

## New Virginia Member Elected

Edward G. Hilton

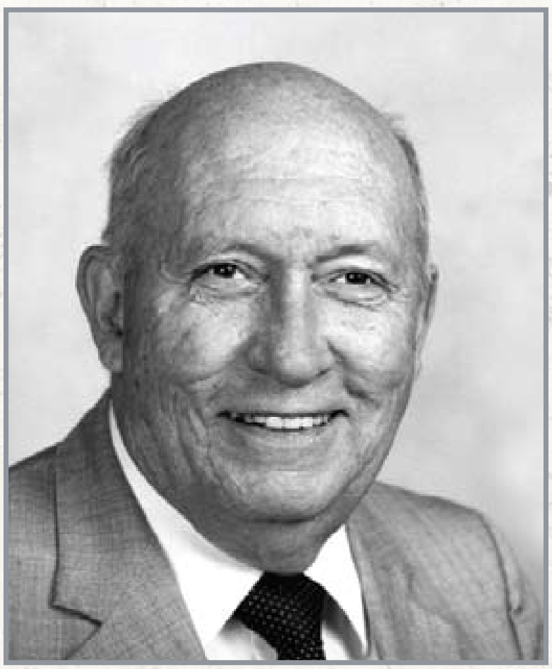
**Edward Hilton** has joined The National Board representing Virginia. He is chief boiler inspector for the Industrial Commission.

Mr. Hilton was employed by Atlas Machine and Iron Works as a welder and fitter from 1974 to 1976 before working as a radiographer for Precision Inspection from 1976 to 1977. He then went back to work for Atlas as a quality control inspector from 1979 to 1985 before working for Trans-Eastern Inspection as a technical inspector from 1985 to 1987. In 1987 he joined Virginia Power at NDE Level III and worked there until 1995, when he began working for the state of Virginia.

The Virginia chief was graduated from Virginia Polytechnic Institute State University with a bachelor's of science degree in biology.

Residing in Glen Allen, he holds National Board Commission No. 11911. He and his wife Mary Jo have two children, Kelsey and James.

## National Board Announces Passing of Past Chairman, Safety Medal Recipient Charles W. Allison



It is with deep sadness the National Board announces the February 20 passing of former National Board chairman, field staff representative, and Safety Medal recipient Charles W. Allison. He was 94 years old.

Mr. Allison became Director of the Tennessee Division of Boiler and Elevator Inspections in 1962 and retired from the position in 1979. In addition to serving as team leader during this time, the Jackson, Tennessee, native was an ASME Executive Committee member from 1971 to 1979, National Board Second Vice Chairman from 1971 to 1973, First Vice Chairman from 1973 to 1975, Chairman from 1975 to 1977, and Past Chairman from 1977 to 1979.

Additionally, Mr. Allison served as alternate to the Executive Director of The National Board on the ASME Nuclear Accreditation Subcommittee. He was also a member of the ASME XI Nuclear Inservice Inspection Subcommittee, the ASME Subgroup for Fabrication and Examination - Section III, and the Data Reports S/C III Subgroup. For The National Board, he served as Chairman of the Nuclear Repair Accreditation Committee and as a member of the Examination Committee. Mr. Allison performed the first ASME review in China.

"Charlie Allison's contributions to the pressure equipment industry were monumental," stated National Board Executive Director Donald Tanner. "He was personally responsible for hiring me and bringing me into inspection work at the state level. Having directly worked for him, I know of no other individual who was more dedicated or committed to the discipline of safety. Although he will be missed, Charlie's legacy within our industry will never be forgotten."

Mr. Allison worked for the National Board as a Field Representative from 1979 to 1991. In 1991, he became a consultant.

In addition to being an honorary National Board member, he was the organization's 7th Safety Medal Award recipient in 1994.

Mr. Allison is survived by wife Ruby; daughter Anita Parish of Shreveport, Louisiana; sons Charles Jr. and James; 12 grandchildren; and 16 great-grandchildren.

Photography by Greg Sailor

# Francis Brown

## Senior Staff Engineer

Two hundred and forty-three is significant to Francis Brown. No, it has nothing to do with his weight. And though he does have a bachelor's degree in aerospace engineering and, in a previous job, helped design nuclear-power systems, it has nothing to do with his IQ.

Two hundred and forty-three is the number of hours Francis, a licensed pilot, has logged in the air – specifically, in a four-seat, 180-horsepower Cessna 172, which he rents from time to time at Fairfield County Airport near Lancaster, Ohio. Francis got his license in the 1980s after putting in 40 hours of flying time and passing a three-part test (written, oral, and practical). "Flying takes your mind off everything," he says, "and lets you see the world from a different perspective."

Francis began at The National Board in January 1992. What he finds most satisfying about working here is serving on code committees and helping people from all over the world understand the codes. "I get emails from people in Germany, China, Australia. Helping them apply the codes makes you feel you're making a difference, that you're contributing to the overall safety of users."

Before coming to The National Board, Francis, who grew up in southeast Ohio and graduated from The Ohio State University, worked at McDonnell Douglas in St. Louis, Boeing in Seattle, GE in Cincinnati, and Babcock & Wilcox in Barberton, Ohio. He'd rather forget his time in Seattle, where he lived for one year. "The work was fine, but the location lousy. I couldn't take the climate. It rained most of the time and was very depressing."

Francis and his wife of 40 years, Anne, live on two acres near Baltimore, Ohio. Anne works in nurse education at Fairfield Medical Center and is pursuing a master's degree at Capital University. They have three grown sons – Edward, Andrew, and Matthew – and two grandchildren, Amanda, 8, and Ian, 3. Francis and Anne enjoy working in their vegetable garden, where they grow sweet corn, watermelons, tomatoes, and green beans.

They also enjoy flying when they get a chance. "She loves to fly with me," Francis says. "Sometimes, on the weekends, we'll take short trips through southeast Ohio. Our most memorable was a trip to Oxford to see Matthew."

Of course one would expect Francis, who focuses on safety in his vocation, to do the same in his avocation. And he does. Each time before he flies he conducts a preflight inspection of the plane, checking, among other things, the oil, gas, and control surfaces. And when some 3,000 feet in the air he follows the dictum: "See and Avoid." Such caution came in handy at least once when he found himself about a mile away from another Cessna. (At an altitude of 3,000 feet and a speed over 100 mph, pilots try to maintain a distance of three to five miles. One mile gives them little time to react.) Fortunately the plane was below him, so Francis didn't have to take evasive measures.

One of the most exciting things he finds about flying is making an instrument-only approach to the runway. He isn't certified yet to make an approach by himself, but has done it with an instructor. "I wore a hood over my eyes, so all I could see were the instruments. It was the neatest thing."

*"Do You Know . . .?" is a* BULLETIN *feature introducing readers to the dedicated men and women who comprise the National Board staff.*

# Practice Makes Perfect

BY KIMBERLY MILLER, MANAGER OF TRAINING

As children we were all told "*don't touch, it's hot*!" But of course, until touched – and burned – we did not truly understand the meaning of the word *hot*.

That same basic principle can be applied to training. Until getting our hands into what we are studying, we cannot completely and fully understand whatever it is we are attempting to learn. That is the underlying concept behind hands-on training.

*Until we get our hands into what we are studying, we cannot completely and fully understand whatever it is we are attempting to learn.*

With construction of the National Board's new Inspection Training Center well underway, the training department staff is closely examining the current curricula to determine how to best integrate hands-on training into each course, where and whenever possible. We are finding abundant opportunities!

Debuting with the Inspection Training Center will be the more comprehensive *Introduction to Inspection* course. An expansion of the current *Introduction to Boiler Inspection*, this new course will encompass a wider variety of pressure-retaining items seen by an inspector in the field. Students will also have the opportunity to see internal components of a boiler, providing them a more thorough understanding of equipment function and location under the boiler casing. With the goal of getting inspectors educated and ready to meet the demands of the industry, this course is a perfect stepping stone to bringing forth the next generation of inspectors.

Another example of how hands-on instruction will be incorporated into National Board training can be found in the "A" Endorsement course. A student enrolled in the *Authorized Inspector Course* (A) currently receives in-depth instruction on relevant ASME Code sections, performing shop inspections, the role of the authorized inspector, quality programs, and much more. Now add to that already detailed agenda the ability to put into action what was taught in the classroom. After discussing physical hardware and its supporting design documentation normally seen during an inspection, a student will be able to see it for himself, take in the nuances of what was taught in lecture and translate that information into a practical working knowledge.

The popular *Boiler and Pressure Vessel Repair* (R) and *Repair of Pressure Relief Valves* (VR) seminars will also benefit with the training department's expansion. Students attending valve repair seminars held in the new training facility will participate in actual valve assembly and disassembly as well as learning valve operating characteristics in a workshop setting. "R" seminar students will perform actual nondestructive examinations – all topics covered through discussion and slide presentations today.

And these areas are only scratching the surface of what the new facility will offer to each course and seminar.

No matter how you look at it, the National Board's new Inspection Training Center will provide new opportunities to train and educate inspectors for inservice and new construction inspections by incorporating hands-on practical experience into the classroom where lecture and visual aids are already offered.

The new Inspection Training Center will be a welcomed addition to an already comprehensive program. And, in essence, afford students the opportunity to truly understand the meaning of the word *hot*.

## ENDORSEMENT COURSES

(A) **Authorized Inspector Course —**
TUITION: $2,500
September 8-19

(B) **Authorized Inspector Supervisor Course —**
TUITION: $1,250
August 11-15

(C) **Authorized Nuclear Inspector (Concrete) Course —**
TUITION: $1,250
October 27-31

(I) **Authorized Nuclear Inservice Inspection Course —**
TUITION: $1,250
September 29-October 3

(N) **Authorized Nuclear Inspector Course —**
TUITION: $1,250
September 22-26

(NS) **Authorized Nuclear Inspector Supervisor Course —**
TUITION: $1,250
November 3-7

## CONTINUING EDUCATIONAL OPPORTUNITIES

(IBI) **Introduction to Boiler Inspection Seminar —**
TUITION: $2,500
July 21-August 1

(PEC) **Pre-Commission Examination Course —**
TUITON: $2,500.00 Full two-week course
August 18-29
$660 Self-Study (Week 1) portion
(self-study materials sent upon payment)
$1,190 Week 2 of course
August 25-29

(R) **Boiler and Pressure Vessel Repair Seminar —**
TUITION: $400
September 23-25 (Houston) October 27-28

(VR) **Repair of Pressure Relief Valves Seminar —**
TUITION: $1,250
July 14-18

(WPS) **Welding Procedure Workshop —**
TUITION: $670
October 29-31

## 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 ____________________
Signature* ____________________

***Required**

### Hotel Reservations

A list of hotels will be sent with each National Board registration confirmation.

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, or visit the National Board Web site at nationalboard.org.

# National Board Bulletin Index by Title

# National Board Bulletin Index by Author


*Vintage 1850 The Illustrated London News*

# Building Lifted from its Foundation

## *Hague Street, New York*

On February 4, 1850, in New York City, a boiler in the basement of a building on Hague Street exploded, killing 67 people and injuring 50.

The explosion occurred around 7:30 a.m. in the large machine shop and printing-press manufactory of A.B. Taylor and Company, which had recently installed a new boiler for the steam engine. The building, originally six stories, was reduced to rubble in less than a minute.

According to the *New York Weekly Herald*, witnesses said the whole building "was actually lifted from its foundation to a height of six feet, and, when it reached that elevation, it tumbled down, crushing in its ruins a vast number." The *Herald* also stated:

> So great was the force of the explosion, that fragments of the building were scattered in every direction; the windows in the neighborhood were broken; and a large portion of the front wall of the fated building was thrown with tremendous power in the houses opposite. In fact, the building was completely wrecked, hardly one brick being left standing on another…

One man said the explosion sounded like the "reports of two cannons fired in quick succession," the first being the explosion, the second, the falling building.

After the building crumbled, a fire broke out. Firemen rushed to the scene and divided their efforts, with some subduing the blaze and some rescuing survivors. By 10:00 a.m. there was "scarcely any flame issuing from the wreck." ⚙