

# The Inspector

Volume 14, Issue 2

Fall 2007 Issue

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715-648-5000

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## A WORD FROM OUR PRESIDENT

By: Don Mathes:

### Seasons of Change

I want to thank all those involved with setting up 3<sup>rd</sup> Annual Industry Days Seminar. It was a great success. We are currently gearing up for the 4<sup>th</sup> Annual Seminar will be held in Marshfield, WI. We have set aside the 28th and 29th of April so please make plans to attend.

The State Boiler Code Advisory Council meetings are coming up this Fall. The WBIA is a voting member of the 10 member advisory board. Suggestions regarding boiler code changes are discussed and recommended to the State Legislature for future implementation. We would appreciate any suggestions that you have to introduce to the Council. We would like to be your voice.

The WBIA is always looking for new ideas and input. We would like to get some of the younger Inspectors and Contractors more involved with the WBIA either as a Board Member or Officer. All it takes to be more involved is to give us a call.

I hope you all had a great Summer and enjoy the upcoming Fall weather. For me, I have had all the hot weather I need for a long time

and look forward to Autumn. Everyone working in the hot boiler rooms knows what I mean.

## 4th Annual Industry Days April 29 & 30

**Plans are in the works for the next Boiler Industry Days**

**Location: Marshfield Holiday Inn  
750 South Central Ave  
Marshfield, WI 54449**



**Looking Forward to See You All!**

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## IMPORTANT

**Continuing Education Requirements for All National Board Commissioned Inspectors Started in 2005!**

**Attending WBIA Seminars helps you meet these requirements.**

# The Chief's Words:

By: Mike Verhagen, Chief Boiler Inspector



## DEPARTMENT NEWS

First topic of interest is the safe return of District # 7 Inspector, Dean Yourchuck Jr. from his call to active duty in Iraq from over a year ago. His return early summer was a welcome event that began with a little rest and relaxation at home. Did I say R & R ? Actually the time was used for duties to tidy up around the house and clean up after a few storms dropped trees throughout his area. Although his district was covered by state inspectors during his absence, Dean now has his district "ship shape" after only a few short months. Please welcome, thank and acknowledge Dean's excellent service and dedication to "us" and the United States of America. GO NAVY !

Electronic data interface EDI is working extremely well and bringing the number of overdues down. Most inspection agencies (97%) are already reporting electronically, with the remaining companies working with the state to move toward this process. The state boiler inspectors are utilizing Panasonic Tough books "light weight" models to submit all reports to the department electronically. The "Tough Book has made their lives much easier and more efficient. Inspectors are able to have immediate information from their electronic work list and are able to report their inspections as they are accomplished. On September 13th, the department is providing a prototype "EDI CORGI" application to our Service Agent/State Contractor for testing in the field. Inspectors may conduct inspections and submit to us via the EDI CORGI application. Corgi is similar to what our state inspectors are currently using. The testing by service agents will be conducted for approximately a 2-week period. If everything is satisfactory, the department will move them into production and provide the application to 4 other Service Agents. Although the department cross checks data prior to download, the Department requests that inspectors please continue to take their time during data entry to assure accurate record info. Data record accuracy depends on accurate entry by each individual inspector! Keep up the great work !

Talking about great work. Our inspection audits have begun and have been completed successfully on approximately 90 % of our service agents. To lead the auditing program, Duane

Leetch has been assigned as lead auditor / coordinator. Both Inspectors and Inspector Supervisors may receive correspondence from him if they haven't already. Most letter and phone call correspondence has been complimentary toward both inspector and the inspection job completed. The department is very satisfied with the results. Thanks to Duane, some of the obstacles and crooks in the process will be straightened out and run even better in the future. As a quick reminder to inspectors, violations written on reports shall include a code compliance date and the following three items:

1. **Identify each specific violation with Comm 41 section numbers, "Comm 41.29"**
2. **State present conditions of violation on date of inspection, "Requires two temperature controls, only one temperature control is installed"**
3. **State corrective action, "install a high temperature control with maximum setting 250° F"**

Thanks again to everyone for their past work to reduce the number of overdue objects and hopefully the EDI CORGI system will help in those efforts. For more detailed information on EDI CORGI, contact Section Supervisor Rick Merkle directly @ 608-266-3037.

**CREDENTIALS Comm 5:** Inspectors are responsible maintain a valid WI credential card. Boiler Inspector credentials are valid for four years. Credential code Comm 5.60(5) c (1) requires 24 hours of education per 4 year period prior to renewal. Renewal applications are available from our website @ <http://www.commerce.wi.gov/SB/SB-FormCredAppList.html>

**BOILER CODE: Comm 41** is available from our website

@

<http://commerce.wi.gov/SB/SB-DivCodesListing.html>

The department is making preparations for opening Comm 41 for revisions and adoption of current ASME and NBIC codes. Find **sign up to receive code updates** on the website in Boiler Program - section 1.0.

**REFRIGERATION CODE:** Comm 45 is available from our website @

<http://www.commerce.wi.gov/SB/SB-DivCodesListing.html>

Continued on Page 3

**ATTEND OUR 4<sup>th</sup> ANNUAL INDUSTRY DAYS  
APRIL 29-30, 2008**

What are surrounding state code enforcement officials doing in our Industry Days? On the 1<sup>st</sup> day, be informed by the respective Chief Boiler Inspectors from participating states. The first day will also include a synopsis of Code revisions in Comm 41, Boiler Code which may include adoption of the ASME 2007 edition. On the 2<sup>nd</sup> day, the plan is to switch gears a bit to inform installers, AC-refrigeration / repair firms and inspectors with details of air conditioning and refrigeration safety in Wisconsin. Presentations may include highlights in the Comm 45, Mechanical Refrigeration code, applicable Commerce credentials, equipment registration and installation requirements and hopefully other applicable state or Federal regulations. In addition, one can obtain continuing education credit toward credential renewal. Watch for WBIA flyer distribution soon and mark your calendars today to attend the 4<sup>th</sup> Annual Boiler Safety Industry Days.

**DEPARTMENTAL CORRESPONDENCE TO:**

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Supervisor: Barb Lasek @ 608-266-7548

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Department of Commerce (262-548-8617/  
fax 548-8614)

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141 NW Barstow St, 4<sup>th</sup> floor  
Waukesha WI 53188  
Email: [mike.verhagen@wi.gov](mailto:mike.verhagen@wi.gov)

My office hours M-F, 7:45 to 4:30 PM When I am not available, contact Section Supervisor, Rick Merkle @ 608-266-3037 or Program Manager, Joe Hertel @ 608-266-5649.

**WEB SITES**

<http://www.thewbia.com/> ..... Wisconsin Boiler Inspectors Association

[www.commerce.wi.gov](http://www.commerce.wi.gov) ..... Department of Commerce (Click on Safety & Buildings Division)

[www.nationalboard.org](http://www.nationalboard.org) ..... National Board info

[www.asme.org](http://www.asme.org) ..... ASME Info

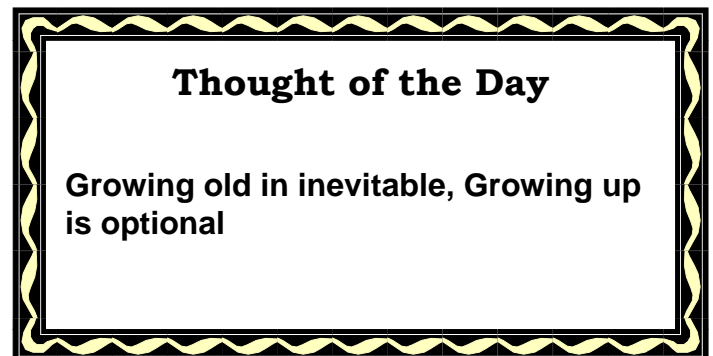
Look forward to your continued cooperation in our industry and seeing everyone again during the 4<sup>th</sup> Annual Boiler Safety - Industry Days planned in Marshfield, WI.

Take care.



**What is It?**

Answer page 6



# Staybolts

## National Board Inspection Code

Appendix 3 of the *National Board of Boiler and Pressure Vessel Inspectors Inspection Code* (1998) specifies that all staybolts shorter than 8 inches in length shall have telltale holes of 3/16- to 7/32-inch diameter and at least 1-1/4 inches deep. This applies to both threaded staybolts and staybolts installed using full penetration welds. Even though this is an inspection code, there is no mention of any hammer test for broken staybolts.

The *National Board Inspection Code* includes this provision: "Telltale holes shall be reopened after driving." This seems to indicate that staybolts can be drilled prior to being installed, as long as the holes are drilled out after the end of the bolt is riveted over. The Inspection Code also states, "Bolts are to be driven in such a manner as to expand radially the bolt body and threads into the sheet prior to forming the head." This would undoubtedly close up the "telltale" hole and require it to be drilled out after the staybolt was headed. This would also apply to hollow staybolts mentioned in the ASME code.

## Federal Railroad Administration Codes

The following provisions regarding staybolts are extracted from the current federal railroad regulations for steam locomotives. You will note that these regulations require both telltale holes and hammer testing of locomotive staybolts.

### "Sec. 230.38 Telltale Holes.

(a) Staybolts less than 8 inches long. All staybolts shorter than 8 inches, except flexible bolts, shall have telltale holes 3/16- to 7/32-inch diameter and at least 1-1/4 inches deep in the outer end.

(b) Reduced body staybolts. On reduced body staybolts, the telltale hole shall extend beyond the fillet and into the reduced section of the staybolt. Staybolts may have through telltale holes.

(c) Telltale holes kept open. All telltale holes ... must be kept open at all times.

(I have seen locomotives where mud-dauber wasps have filled every telltale hole. According to one source, these nests are sometimes capable of withstanding the pressure of the steam.)

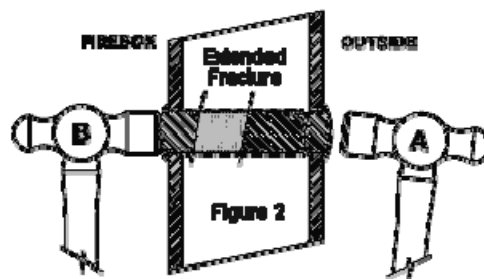
### Sec. 230.39 Broken Staybolts.

(a) Maximum allowable number of broken staybolts. No boiler shall be allowed to remain in service with two broken staybolts located within 24 inches of each other, as measured inside the firebox or combustion chamber on a straight line. No boiler shall be allowed to remain in service with more than four broken staybolts inside the entire firebox and combustion chamber combined.

### Sec. 230.40 Time and Method of Staybolt Testing.

(a) Time of hammer testing. (1) General: All staybolts shall be hammer tested at every 31-service-day inspection, except as provided in paragraph (a)(2) of this section. All staybolts also shall be hammer tested under hydrostatic pressure any time hydrostatic pressure above the MAWP [maximum allowable working pressure] specified on the boiler specification form is applied to the boiler.

(b) Method of hammer testing. If staybolts are tested while the boiler contains water, the hydrostatic pressure must be not less than 95 percent of the MAWP. The steam locomotive owner and/or operator shall tap each bolt with a hammer and determine broken bolts from the sound of the vibration of the sheet. Whenever staybolts are tested while the boiler is not under pressure, such as during the 31-service-day inspection, the staybolt test must be made with all the water drained from the boiler."



## Retirees

Anyone knowing of inspectors retiring please inform us so we can get their names in this Newsletter.

## Coal Gasification?

You are hearing this term more and more today. What is coal gasification? Coal gasification is a process that converts coal partially or completely to combustible gases. After purification, these gases - carbon monoxide, carbon dioxide, hydrogen, methane, and nitrogen - can be used as fuels or as raw materials for chemical or fertilizer manufacture.

Did you know that from the early 19th century until the 1940s almost all fuel gas distributed for both residential or commercial use in the United States was produced by the gasification of coal or coke.

In the 1800s, lamplighters once made their rounds down the streets of many of America's largest cities lighting street lights fueled by "town gas," the product of early and relatively crude forms of coal gasification. (Town gas is still used extensively in some parts of the world, such as China and other Asian countries).

In the 1940s the growing availability of low-cost natural gas led to its substitution for gases derived from coal. Interest in coal gasification has been renewed, however, with recent predictions that natural gas reserves in the United States will begin to diminish.

In the 1970s, interest in coal gasification revived, due largely to concerns that the U.S. supply of natural gas was waning. The massive Great Plains Coal Gasification Plant in Beulah, North Dakota, was built with federal government support to use coal gasification to produce methane, the chief constituent of natural gas.

Coal gasification, however, found its most important market application in the 1980s and 90s. Driven primarily by environmental concerns over the traditional burning of coal, gasification emerged as an extremely clean way to generate electric power. By turning coal into a combustible gas that could be cleansed of virtually all of its pollutant-forming impurities and burned in a gas turbine, coal could rival natural gas in terms of environmental performance.

The first major use of coal gasification to generate electric power in the United States took place in the mid-1980s at Southern California Edison's experimental Cool Water demonstration plant near Barstow, California. The 110-megawatt Cool Water plant established the early technical foundation for future integrated gasification combined cycle (IGCC) power plants.

Coal gasification-based power concepts got their biggest boost in the 1990s when the U.S. Department of Energy's Clean Coal Technology Program provided federal cost-sharing for the first true commercial-scale IGCC plants in the United States.

There are a number of ways that coal can be gasified. The simplest method, and the first used, was to heat coal in a retort in the absence of air, partially converting coal to gas with a residue of coke; the Scottish engineer William Murdock used this technique in pioneering the commercial gasification of coal in 1792. Yes this process has been around since 1792.

The Baltimore Gas Company, the first coal gasification company in the United States, was established in 1816.

The most common modern process uses lump coal in a vertical retort. The coal is fed at the top with air, and steam is introduced at the bottom. The gas, air, and steam rising up the retort heat the coal in its downward flow and react with the coal to convert it to gas. Ash is removed at the bottom of the retort.

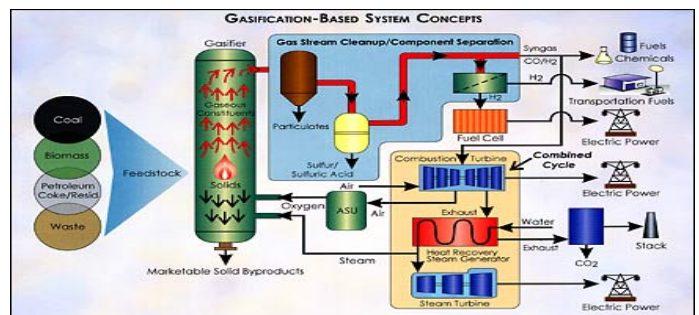
Using air and steam as reacting gases results in a producer gas; using oxygen and steam results in a water gas. Increasing operating pressure increases the productivity.

There are two other processes currently in commercial use which react finely powdered coal with steam and oxygen. One of these, the Winkler process, uses a fluidized bed in which the powdered coal is agitated with the reactant gases. The other, called the Koppers-Totzek process, operates at a much higher temperature, and the powdered coal is reacted while it is entrained in the gases passing through the reactor.

The ash is removed as a molten slag at the bottom of the reactor. Both of these processes are being used for fuel gas production and in the generation of gases for chemical and fertilizer production.

We hear that this process is an extremely clean way of generating power. Then we get the environmentalists who worry about another coal gasification byproduct -- carbon dioxide. Carbon dioxide builds up in the atmosphere and contributes to global climate change.

As petroleum and natural gas supplies decrease, the desirability of producing gas from coal will increase. It is also anticipated that costs of natural gas will increase, allowing coal gasification to compete as an economically viable process. Research in progress on a laboratory and pilot-plant scale should lead to the invention of new process technology by the end of the century, thus accelerating the industrial use of coal gasification.



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# Advertising in the Inspector Just Got Easier & More Cost Effective

The Inspector” is read by people in a 7 State area. These include Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Michigan and Illinois. The Inspector is also domiciled on our website, “TheWBIA.com” which has a unlimited readership.

## Cost to Advertise:

Business Card Advertisement:

\$150.00 year

Full page advertisement.

\$250.00 year +

20% discount on advertising for continuing ad each year &10% discount on seminar fees of employees.

“The Inspector” is published twice a year and reaches boiler operators, Commissioned Inspectors, manufacturers, and many more.

Please contact a board member today to get registered or you can reach the WBIA Secretary at [keenan@lakeland.ws](mailto:keenan@lakeland.ws).

## What effect does Iron Have in Coal?

Did you ever wonder how some of the products found in coal influences what happens in a boiler? Lets talk about one mineral found in coal, Iron. Iron influences the slagging characteristics of coal of the bituminous type. Iron can be found in several forms in coal:

Pyrite (FeS<sub>2</sub>)

Siderite (FeCO<sub>3</sub>)

Hematite (Fe<sub>2</sub>O<sub>3</sub>)

Magnetite (FeO<sub>4</sub>)

Ankerite [CA, Fe, Mg]CO<sub>3</sub>]

Remember that slagging is the formation of molten, partially fused or re-solidified deposits which form on furnace walls and other surfaces exposed to radiant heat. You can find slagging to extend into the convective surfaces if the temperatures are high enough.

We know that even a small portion fusing to the tubes can interfere with boiler operation. It can and does impede heat transfer which can delay cooling of the flue gasses which leave the furnace.

This can cause the development of blockage between the flow passages which if not corrected can cause a unit to be shut down for slag removal. If large deposits are formed and become dislodged and fall could damage pressure parts in the lower unit of the furnace.

When designing a boiler the type of coal to be burned is a primary consideration. This is because the furnace must be properly sized to prevent the deposition and erosion potential of the ash that is formed. We all know that a boiler can not perform equally well with all types of coal.

The coal being used for boilers in the US today have an ash content somewhere between 6% and 20%. Lower values of 3% to 4% in bituminous coals are rare and when found are used for other commercial uses, particularly in the metallurgical field.

As Iron increases in coal the emissions of SO<sub>2</sub> & NO can increase. Depending on the type of iron and the amount of Iron in coal found can change the amount of emissions. Also there have been studies of how Iron released can be a harm to a persons airway.

It Is interesting how a small change in minerals found in coal can make some big differences.

## Answer from question page 3;

So did you guess what it was? Did you note the bolt wired to the bottom of the weight?

Actual Safety Valve found in Service.

## WBIA Officers & Board Members

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## De-Superheating

Desuperheating is the process by which superheated steam is restored to its saturated state, or the superheat temperature is reduced.

Most desuperheaters used to restore the saturated state produce discharge temperatures approaching saturation (typically to within 3°C of the saturation temperature as a minimum).

Designs for discharge temperatures in excess of 3°C above saturation are also possible and often used.

There are basically two broad types of desuperheater:

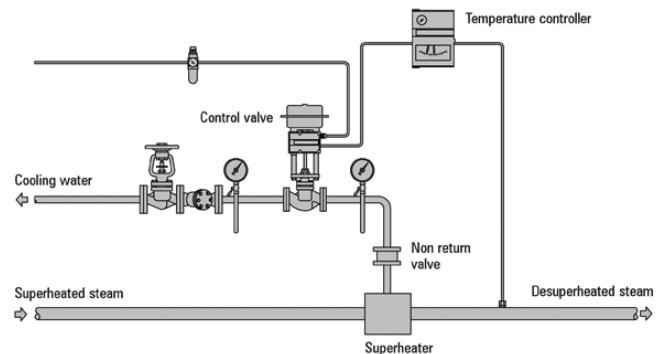
**Indirect contact type** - The medium used to cool the superheated steam does not come into direct contact with it. A cooler liquid or gas may be employed as the cooling medium, for example, the surrounding air. Examples of this type of desuperheater are shell and tube heat exchangers. Here the superheated steam is supplied to one side of the heat exchanger and a cooler medium is supplied to the other side. As the superheated steam passes through the heat exchanger, heat is lost from the steam, and gained by the cooling medium.

The temperature of the desuperheated steam could be controlled by either the inlet superheated steam pressure or the flowrate of the cooling water. Control of the superheated steam flow for this purpose is not normally practical and most systems adjust the flow of the cooling medium.

**Direct contact type** - The medium used to cool the superheated steam comes into direct contact with it. In most cases, the cooling medium is the same fluid as the vapour to be desuperheated, but in the liquid state. For example, in the case of steam desuperheaters, water is used. A typical direct contact desuperheating station is shown in Figure 15.1.3.

When the desuperheater is operational, a measured amount of water is added to the superheated steam via a mixing arrangement within the desuperheater. As it enters the desuperheater, the cooling water evaporates by absorbing heat from the superheated steam. Consequently, the temperature of the steam is reduced.

Control of the amount of water to be added is usually achieved by measuring the temperature of the steam downstream of the desuperheater. The set temperature of the desuperheated steam would typically be 3°C above that at saturation. Therefore, in such arrangements the inlet pressure of the superheated steam should be kept constant.



A typical direct contact de-superheating station

## WBIA Helps You Meet Your Training Needs

The Wisconsin Boiler Inspector's Association is offering training classes/seminars.

If you are interested in setting up boiler & pressure vessel training during the year let the WBIA know and we will tailor training to meet your needs. Certificates issued for all training hours. Contact Matt Keenan, Secretary @ 715-648-5000.



**WBIA**

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