



The Inspector

Volume 18, Issue 2

Fall 2011 Issue

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A WORD FROM OUR PRESIDENT

By: Jay Eckholm, President

The venue for the 8th Annual Industry Days has been reserved!! Based upon your recommendations we decided to go further northwest; so on April 18th and 19th we all will meet at the Winter Green Resort and Conference Center in Wisconsin Dells.

Your WBIA Board hopes to meet or exceed your expectations. The information you filled out on the critique sheets after last year's seminar gave us most of the topics we will cover for this seminar. The topics we will try to cover are:

1. CSD-1
2. Drum Level Instrumentation
3. Newer Styles from Raypak Boiler
4. Commercial Refrigeration
5. DA Tank

These and other presentations are planned and we will let you know the final list when we secure presenters.

Compared to other seasoned inspectors in the field, I feel humbled every time we get together for the Industry Days seminars. Along the way I have been mentored by some of the industry's greats whom have taught me some critical inspection techniques that have led me to see flaws in boilers and pressure vessels. It is critical that we continue to expose these flaws and lead owners to correct them. One such technique I was taught was from a boiler repair specialist, Jim Denson from PBBS. His over 20 years of experience has given him a unique opportunity to see what adverse affect can happen when things go wrong. About 5 years ago he showed me a flaw in a common

pipng technique used to connect the steam pressure manifold on most fire tube boilers and I want to pass it along.



The yellow arrow points to the connections I was told that can plug over time.

The elbowed steam manifold connection to the water column shows up on 50% of

Fire Tube boilers.

I was shown that this rear connection opposite of the sight glass gage valve can accumulate deposits and eventually cut off the steam to all the pressure controls. About 40% of the fittings I have checked since learning this has revealed significant deposits.

Out of those 40%, about 1 in every 4 had to have the pipes/fitting removed and replaced.



The picture to the left shows how when the upper sight glass valve is removed you can see that the connection is 40% plugged.

If you have techniques that can be shared, then my hope is that over the next 4 months we can share your insights to the attendees of the 2012 seminar. Send inspection techniques to jeck-hollm@thewbia.com

2012 8th Annual

Boiler Seminar

April 18 & 19, 2012

Wisconsin Dells, WI.

Winter Green Resort & Conference Center

IMPORTANT

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

Attending the WBIA Seminars helps you meet these requirements.

The Chief's Words:

By: Mike Verhagen, Chief Boiler Inspector



Although leaves are turning and winter is around the corner, I am presently making preparations for hunting late November. This year, hunting with my Dad and three sons will be short because I will get the trophy buck or huge doe opening day. It never happened before, but this year I have a feeling my deer will be shot, sliced, diced, wrapped and frozen before Thanksgiving. Good luck to all and have a safe, enjoyable hunt this season.

Great news from the WBIA committee meeting on October 19th ... Our "8th ANNUAL" Boiler Safety Industry Days is taking shape. In brief, the training location as suggested by our membership, will be held @ in Water-park resort city "Wisconsin Dells" which is centrally located for all statewide travelers. Mark your map and date today for Industry Days 2012 April 18-19, 2012. More details to come in our Spring Newsletter.

Continue to visit our WBIA website @ www.thewbia.com and provide your input to our webmaster and Secretary Matt Keenan. He has put a tremendous amount of hours revamping and organizing our "membership" WEBSITE. It has boiler and pressure vessel incidents, equipment recalls, specks of boiler history and beneficial links that can take you to other organizations that share our interest. New updates and sponsors for "Everything Boiler" is at your finger tips". Try it, and give us some input to make it better. A special thanks goes out to American Society of Power Engineers "ASOPE" organization for sponsorship of our "thewbia" website.

DEPARTMENT NEWS

The re-organization of the Department of Commerce to the **Department of Safety and Professional Services** (DSPS) is moving forward. Retirements from state service are happening regularly with most new hires on hold due to our budget crunch. All state Departments are doing more with less and the work involved is on the increase with the rising economy. More changes are on the way for every Wisconsin employee come January 2012. Until then, operations in the Waukesha office are running as usual. District Inspectors are maintaining overdue inspections and assisting customers when the need arises. I am available in my office M-F, 8-4:00 pm but will be skipping the office routine for a few days during the next six months to audit our very own District Inspectors. Yes, the "well received" audits on other agency "certified boiler inspectors" will also include state inspectors.

Luckily there are no changes to the Boiler Safety staff to date but some program job duties and responsibilities have been shifted or re-assigned due to retirements. Most re-assignments do not affect boiler safety operations but may tighten existing work schedules. Since Supervisor, Rick Merkle continues to spend 4 days of his week in the Waukesha office, all should be aware every Tuesday he works in the Madison Office attending to Administrative duties and meetings. Needless to say, Rick persistently answers phone and emails from any office and any time. Please review Rick's article in this newsletter for important inspector issues of concern and recent Boiler code revisions in Comm 41 that are in process with plans for Fall 2012 approval.

Inspection report processing in Madison continues to run effortlessly and I wish to extend my appreciation for everyone's help and efforts to make timely inspections and "accurate" reports. Accurate reports, greatly increase the efficiency of our automated computer processing. Good health and safe travels while inspecting in Wisconsin.

In conclusion, everyone including the private sector is sharing similar economic pains so hopefully we can feel fortunate in our job positions and graciously help or assist our customers to the best of our abilities during this difficult time. In addition and based on several telephone calls about boiler position vacancies, the boiler industry employment outlook appears to be improving but our industry is in great need of commissioned inspectors. Since job security in these positions are better than most, let's spread some good news during our rounds and enlist the possible, qualified and experienced individuals "hopeful future Boiler Inspectors" to join our profession and fill those vacancies.

Thanks in advance for your cooperation and support and ... Go Packers !

Department Safety and Professional Services

DSPS

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Con't Page 5

Department News:

By: Rick Merkle, Section Chief, Department of Safety and Professional Services



timely inspections.

October, 2011

Thanks for an outstanding year 2011, in maintaining a safe place to live in Wisconsin and wishing everyone a happy and safe holidays.

On a more serious note:

It has been brought to my attention that we are not following up in a timely matter on objects that are placed on hold by our Service Agents (Boiler Insurance carriers) and State contractors with objects that may have code violations.

When placing objects on hold, it is the responsibility of that inspector of record that placed that object on hold to follow up within the required compliance re-inspection date time lines, 30-45 days (Max) unless otherwise coordinated with the state. Failure to do so can result in the state and the City of Milwaukee going out and doing the follow-up inspections, thus costing your insured's additional inspection fees. On another note, it is not acceptable to allow owners to operate a boiler and/or pressure vessels without a current permit to operate.

Don't take for granted that all of the safety devices are in place on objects just because someone told you so. Make sure you are reviewing schematics and wiring diagrams before issuing the permits to operate.

Be aware the costs of the boiler and pressure vessel "permit to operate" have gone up to \$50.00 in Wisconsin, please let your customers know.

When I say it's been a great year "2011" I can certainly report that the number of over dues are down. Again, I want thank our State Inspectors, State Contractor (Damarc), City of Milwaukee (Boiler Program) and each and every Service Agent for doing a tremendous job keeping up with workloads and keeping over dues to a minimum for this quarter, ending September 2011. Due to your efforts, you managed to bring the numbers down for Boilers and Pressure Vessels from 2.5 to 2.3%...TREMENDOUS JOB! I would like to see us achieve less than 2.0% for the next quarter. As a reminder, the state will pursue anything that is 90 days over due, so ... please make every effort to get to the locations and complete

Your help in the matters above will enhance the efficiency of our Inspection Support Staff during processing.

We have concluded the review of Comm 41, Boiler and Pressure Vessel Admin. Code which will adopt the CSD-1 Requirements and NPFA-55 for cryogenics fuels most likely next summer. Until then, please do not enforce (require CSD-1) requirements with the exception in the City of Milwaukee.

Thanks again and have a great winter and see you all at spring training...remember you need 24 hours of Continued Education credits in your 4-year cycle.

Best Regards,

Rick Merkle

State of Wisconsin

Department of Safety and Professional Services

Section Chief, Division of Safety and Buildings

Boiler, Pressure Vessel, Mechanical Refrigeration, Gas Systems, Anhydrous Ammonia, Welding

Programs and Waukesha Office Manager

Bureau of Integrated Services

141 NW Barstow St 4th FL

Waukesha, WI 53188-3789

Primary Ph: 262-521-5065

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Words From the City of Milwaukee Chief:

By: Randy Puscek, Chief Boiler Inspector

This year (2011) marks 100 years of boiler inspections in the City of Milwaukee. On March 27th, 1911 the city ordinance requiring stationary engineers and boiler inspection was passed. Under this new law, it was the duty of the chief examiner to license boiler operators and inspect all power boilers.

The way they wrote codes 100 years ago makes it look totally different than today's version. One thing I found in the old code is to be a stationary engineer each applicant must be of temperate habits and good character. All of which must be vouched for in writing by at least two citizens of the city of Milwaukee.

Another duty of the examiner was to inspect all steam engines and boilers. This is how the code was worded then:

“In addition to the duties hereinbefore prescribed for the said board of examiners, it shall be the duty of the members thereof to inspect all steam engines, boilers or all appurtenances belonging thereto in the city of Milwaukee, as frequently as in the judgment of the member thereof it may be necessary for proper protection of life and property, at such times as may be reasonable. “

To me looking at the old code and seeing how it was written is fascinating. But, the one thing I noticed is that no matter how the code was written. Today or 100 years ago we were both charged with the same job, the protection of life and property.

DuVERNAY, RONALD W., SR.

With the Deepest Sympathy from the WBIA we want to recognized the passing of Ronald W. DuVernay, Sr., age 67, of Appleton. Ronald passed away from pancreatic cancer on Thursday, October 13, 2011 at his home. He was born on September 11, 1944 in New Orleans, Louisiana. He served in the U.S. Navy during Vietnam. Ron worked for years with FM Global. Ron enjoyed his time with his family, fishing, golfing and fixing/building in Grandpa's workshop.



Acronyms

By: Jay Eckholm



was seen throughout the World Series to remind people that it is Breast Cancer Awareness month and that if you use their credit card a portion of the purchase goes to cancer. The use of acronyms are clever techniques used in advertising campaigns.

I have been working on an acronym that I can use to remind me what an inspector is supposed to do while looking at pressure vessels. INSPECTOR

I- Check ID to verify the NB and State Number

N-Use my nose; Gas leaks, Improper Combustion

S-Check Safety Controls, SRV's

P- Check Perimeter, Paperwork, How's Performance

E- Exhaust, Stack

C- Combustion, Gas Trane, Venting

T-Testing Controls, Talent/ Skills of Operator

O- One More Glance/ Look at the Room/Proximity

R- Repairs, Recommendations

My example is not polished but I'm sure there are Acronym geniuses out there who can have fun coming up with examples.

Send your suggestions for INSPECTOR or other names to jeckholm@thewbia.com

I will share your suggestions at the next seminar and their could be a prize for the best Acronym.

WBIA WEBSITE



THEWBIA.com

The WBIA operates a website and you should take a look at what it can do for you! The Jurisdiction Section allows you access to Codes and Search engines for eight different States. Our Newsletter back issues and Seminar information is available a click away. We also link to all ASME/NB forms and every important Organization having Boiler and Pressure Vessel information. More links coming daily. Our website is easily usable from your Blackberry or other hand held devices. You are always near the information you need! Try it! Tell others about it!

Wisconsin Inspectors Map

DEPARTMENTAL CORRESPONDENCE

Continue to mail general correspondence to the Madison office:

DSPS

Safety and Buildings Div/Inspection Support

PO Box 7302

Madison WI 53707-7302

INSPECTOR MATERIAL ORDERS

Material orders for registration tags "B or U" # s, may be ordered preferably via materialorders@wisconsin.gov

or contact Kelly @ 608-266-9374.

WEB SITE INFO

Wisconsin Boiler inspector's Association

www.thewbia.org Coming soon ... 8th Annual

Industry Days

National Board

www.nationalboard.org

ASME

www.asme.org

DSPS ...Safety & Buildings, then Boiler Program

<http://dsps.wi.gov/sb/SB-HomePage.html>

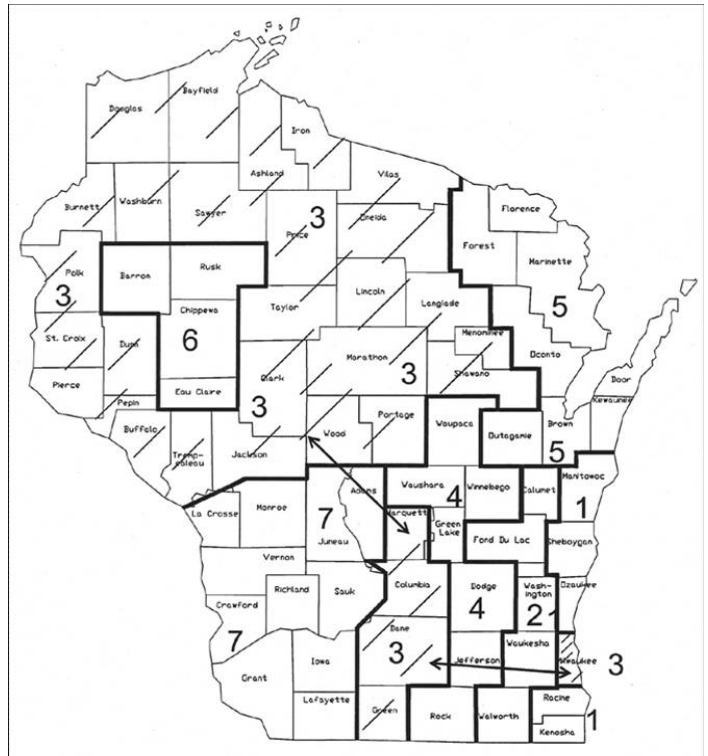
Boiler Program ... Sign-up "Group email" to be notified of program updates

<http://dsps.wi.gov/sb/SB-BoilerAndPressureVesselProgram.html>

Credential-License Check ...verify current certifications, registrations & licenses

http://apps2.commerce.wi.gov/SB_Credential/index.jsp

Happy and Safe Holidays to all.



1-David Homan 262-424-1471 / 608-283-7433

2- Terence Waldbillig 414-303-8575 / 608-283-7429

3- Damarc Quality Inspection Services,
866-361-4321, Fax 715-755-4800

4-Jon Wolf 920-723-0032 / 608-283-7435

5- James Markiewicz 920-428-9423 / 608-283-7434

6-Duane Leetch 715-559-8817 / 608-283-7431

7-Dean Yourchuck 608-235-0607 / 608-283-7430

Supervisor Rick Merkle 608-266-3037 / 608-267-9723

Thought of the Day

Those who can laugh without cause
have either found the true meaning of
happiness or have gone stark raving
mad.

Norm Papernick

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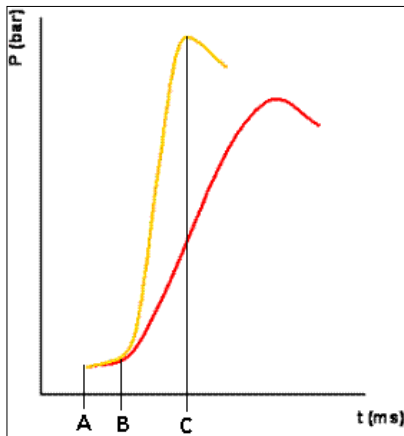
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Conduct of the explosion

Dust explosion

Although explosion can occur like extremely fast and single action, its running can be divided into several parts, which always take place and which has their rules. Also, different matters have different explosion conducts because of their different nature and explosion characteristics.



On this graph, there are 2 different dust explosions pictured. These two dusts have various K_{ST} . Yellow graph is the conduct of explosion which is more aggressive, "faster" (the dust has higher K_{ST}) than red dust. Notice that in the same period of time, the pressure rise was much higher in the first case. Also you can notice that dusts with higher K_{ST} usually (not always) reach also higher maximum explosion pressure (p_{max}).

On the yellow graph we can also demonstrate the basic phases of explosion:

A - ignition

Point A is the point of ignition - it means that this is the time in which the ignition source occurred in dust-air atmosphere and the energy of this ignition point is higher than lower explosion limit (LEL) of the dust in the atmosphere. From this point relatively slow combustion of small amount of particles very close (or touching) from ignition source are burning, heating neighbour particles and compressing the atmosphere very close to the ignition source. The pressure in the vessel starts rising, but relatively slowly because volume of burning particles

(producing exhaust gases of bigger volume than original atmosphere - reason of explosion overpressure) is small comparing to the whole volume of the vessel.

A-B - compression

Between the points A and B the process of burning starts spreading in chain reaction (every burning particle emblaze several others in the same time). The amount of exhaust gases is bigger and it starts effecting the whole vessel. This phase is about 3-10 milliseconds long and this the most critical part for the functionality of the explosion protective system - in this phase the explosion *shuld be* detected and the explosion protection system should start acting against the explosion.

B - combustion of the whole mixture starts

In the point B the explosive mixture is so hot and so comprimed, that the ignition and burning spread through the whole volume by extremely high speed. This is the main phase of the explosion. Immediately after this point the pressure rises to the point which is above the static opening pressure of explosion venting systems (panels, membranes, rupture discs, special valves). In this point also the extinguish agent from sup-pression systems starts to flow inside.

B-C - the main phase of the explosion

This is the phase described as explosion. The speed of spreading of the explosion depends on K_{ST} parameter of the dust and also on original pressure (if there is higher pressure before the explosion, the mixture needs only shorter time to compress) and the original temperature (higher temperature means that the mixture reaches temperature necessary for spreading of the explosion much faster).

This period is approximately 10-500 millisecond long, depending on the volume of explosive atmosphere and its parameters. If there is no protective system acting during the explosion or if the vessel is not explosion pressure resistant, this is the time when it collapses or dissipates and the explosion starts to spread to connected devices and to the surroundings of the device.

C - reaching of the maximum explosion pressure

After all particles of dust are burnt down, the pressure stops rising, reaching its maximum. After this point the mixture starts cooling down and releasing of the pressure by the breaches and holes. This is the point when interesting effect can occur: if the exhaust gases will cool down fast, damaged device is not able to withstand under pressure caused by cooling and shrinkage of the exhaust gases inside and the device collapses inside

itself (implode). This happens usually to silos projected to withstand big overpressure caused by the weight of the material inside, but where the designer never expected under pressure inside the device.

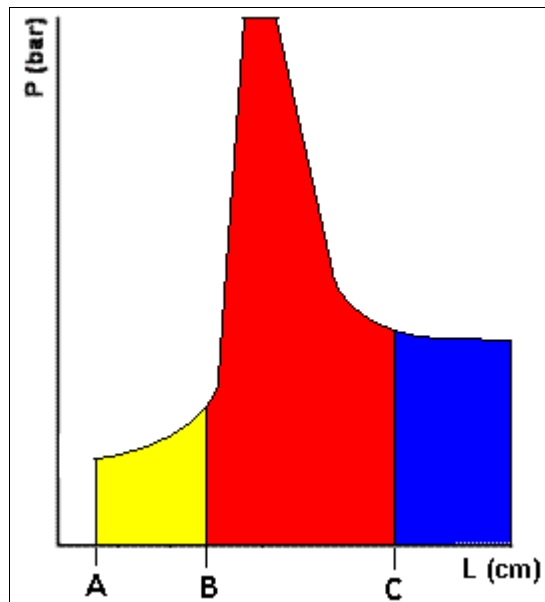


Picture: tank collapsed due internal underpressure. Although this time the explosion wasn't the reason, this can happen even to big industrial and agricultural silos

Gas explosion

Explosion of a explosive gas or vapors of flammable liquids in closed vessel has the same running as the dust explosion, but with much faster rising pressure, reaching higher values. It is true that the gas or vapor explosion almost always ends up with the destruction of the vessel where the explosion occurred with subsequent fire. Because there is no effective protective system for gas explosion in closed vessel (but some special membranes for slow running mixtures), it has no big sense to study the running of the explosion of the gases and vapors of flammable liquids.

In this case much more important is to check how the explosion spreads through the pipelines - the pressure acts mostly in axial direction, round pipeline is also usually strong enough not to collapse during the explosion. It means that it is crucial to stop the explosion, sparks or ignition source going through the pipelines, which could ignite the explosive atmosphere on the places where the pipeline goes to. The explosion or flame going though the pipeline can be easily stopped, so it is good to know how it goes.



In contradistinction to the dust explosion it is not the time what is important but the distance from the point of ignition or from the beginning of the ducting. The nature of the explosion changes with different distance from the point of ignition, as could be seen on the graph above.

A-B - deflagration phase (yellow)

In the phase of deflagration, which starts in the ignition point and ends approx. at the distance of **10 * diameter of the pipeline** the speed and pressure are rising almost linearly. The mixture warms up and compresses, particles start to burn from each other. In this place, the explosion is relatively easy to stop due slow speed and small pressure, that's why the protective system (flame arrester) is usually placed here - deflagration type of the flame arrester is needed. Detonation version can be used too, but it is not necessary.

B-C - unstable detonation phase (red)

In the zone of unstable detonation the speed and pressure rising change rapidly due the big turbulences in the mixture. There can be several peaks of pressure in this zone and the values of pressure are extreme. It is the most complicated place to stop the explosion and there is only few types of flame arresters able to stop even unstable detonation. To be true: it is usually useless because the flame arresters can be usually installed closer or farther from the ignition source, to the zone of deflagration or stable detonation. Also it is possible to add some extra pipeline just to get far enough and it is cheaper than to invest in unstable detonation flame arrester.

Please Join the WBIA in Welcoming our new Sponsor, ASOPE!!



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ASOPE® is not a labor organization and is not affiliated with any other organizations. ASOPE® recognizes and promotes other organizations such as the American Society of Mechanical Engineers, National Association Power Engineers, National Board of Boiler and Pressure Vessel Inspectors, and governmental regulatory agencies such as Environmental Protection Agency and OSHA.

The ASOPE® Main Power Engineer Competency license program consists of Facilities, Power Plant and Combustion Turbine simple and combined cycle classifications.

A person who is looking to start their career in the Power Engineering profession may start at the Facility Operating Engineer 3rd Class level, which is designed as an entry point for the person with minimal experience. As the person gains experience, they can continue to progress to Facility Operating Engineer First Class. If the person desires to progress further in the profession of Power Engineering, they may cross over to the classification of Power Plant Operating Engineer at the Facility Operating Engineer First Class level. The person may elect to use the experience gained as a Facility Operating Engineer Second Class to cross over to the classification of Power Plant Operating Engineer 3rd class.

If a person proves they meet the qualification for a particular classification and grade of license the person may take the examination for that classification and grade with out taking the lower grade examination for the classification.

It is possible a person may also start their career in Combustion Turbines. This part of the program is designed for entry level to start at the Simple Cycle Combustion Turbine Operating Engineer 3rd class and progress through the various steps of the simple cycle and combined cycle combustion turbine program. A person could use their experience gained as a Simple Cycle CT Plant Operating Engineer second class to cross over to Combined Cycle CT Plant Operating Engineer Third Class.

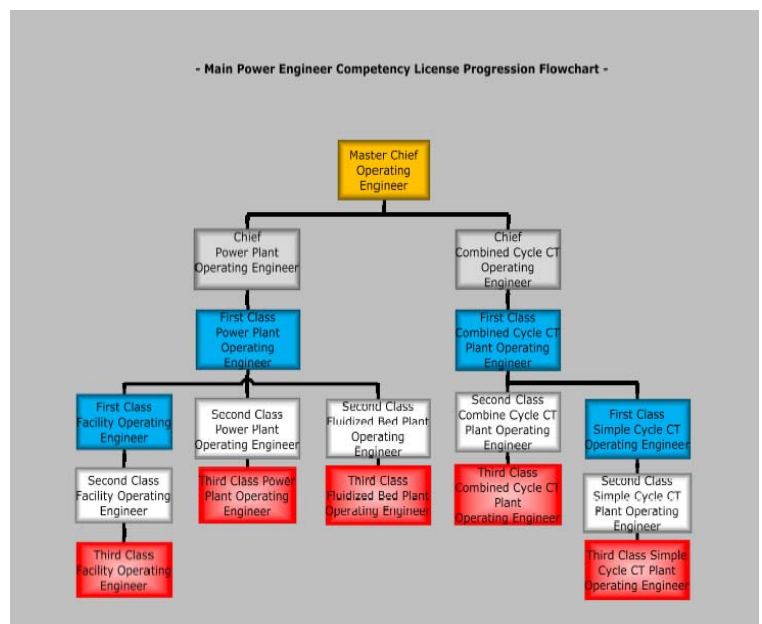
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In this zone the speed of explosion passes the speed of sound (explosion spreading becomes supersonic).

C and on - stable detonation (blue)

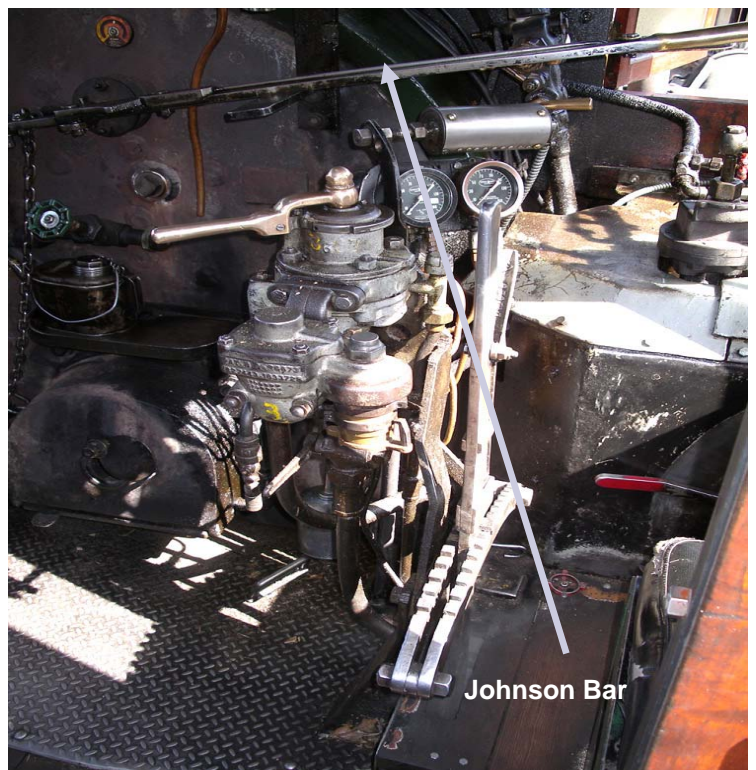
From the point C, which usually in the **distance of 100 times of the diameter of the pipeline**, the zone of stable detonation begins. From this point the speed and pressure of the explosion are not changing anymore. Explosion is spreading by supersonic but constant speed. If there could be any obstacles in the pipelines (detectors, valves, branches), the explosion can slow down and new turbulences can occur, leading to creating new unstable detonation part. This must be always taken in mind when considering the placement of the flame arrester.

In the phase of stable detonation the explosion can be easily stopped too. The flame arrester can be more expensive than deflagration one (usually there is longer element), but especially for lower classes (like IIA or IIB1), the flame arrester has the same construction for deflagration and stable detonation.

What is a Johnson Bar on a Boiler?

On the 1,700-odd U. S. railroads from the Aberdeen & Rockfish to the Yreka Western, all conventional locomotives have what engineers call a "Johnson bar" —a manually-operated seven-foot steel lever which puts the locomotive either in reverse or forward motion and also controls the flow of new steam into the boilers to adjust speed. On small engines the Johnson bar causes no trouble, has been used for 50 years without improvement. When bigger engines began to appear 20 years ago, however, handling the bar became back-breaking work and the Brotherhoods of Locomotive Engineers and of Locomotive Firemen and Enginemen began agitating for relief. Then came the power reverse gear which did the same job by air or steam-pressure released by nicking a small lever. Insisting on its installation, the Brotherhoods got the Interstate Commerce Commission to order it. Because each installation costs \$500, the railroads fought the case to the U. S. Supreme Court where the I.C.C. ruling was reversed because of a technical error.

Meanwhile the 131 railroads which operate 97% of the nation's tracks compromised with the Brotherhoods by agreeing to put the power reverse gear on all new engines and on old ones brought in for Class 2 repairs. The Brotherhoods then asked the I.C.C. to drop the matter, but the I.C.C., anxious to assert itself, refused. It did rule that the gear must be installed on all new engines and on old ones brought in for Class 3 repairs.* The minor U. S. roads for whom the change will be a major expense indicated that they would again appeal.





WELCOME TO ALLIED COUNTRY



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8th Annual Boiler Industry Days

APRIL 18 & 19, 2012



***60 Gasser Road
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Start to plan on attending now. Good training being planned for the two days. Remember attending will provide CEU's.

Check our website often for updates and registration.

Thewbia.com