“What’s under *YOUR* hood?”

Balancing cost against risk when sourcing pressure equipment

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Context

- Use of the ASME BPV Code and NBIC in Latin America
  - Spec'd absent formal certification (<10% of equip't built to ASME is actually certified)
  - Little to no control over repairs/alterations (role of the National Board and NBIC not understood)
  - What drives the use of the Codes? (regulatory climate)
  - Who builds/repairs equipment?
  - How is compliance verified?
- Issues
  - Perception of NBIC and ASME Code usefulness
  - Impact on public safety and property

Bentley GT Convertible

Modified Chrysler Sebring

What's the difference?

Sebring Bentley Conversion

- 2.7L Chrysler V-6
- 189 hp @ 6400RPM
- Fully-functional lighting
- Original Bentley badges
- Genuine exhaust tips
- $3000 wheel/tire pkg.

$20,000 price (used)

Bentley Continental GTC

- 4L twin turbo V-8
- 520 hp @ 6000RPM
- Sports suspension w/continuous damping control
- 4-wheel ventilated ABS w/electronic distribution/assist and pop-up roll bars
- $64,000 (used)

What you see may not be what you get

- In Chrysler/Bentley example, low risk.
  - Easy to see what's different.
  - The Chrysler ***can't*** be operated like the Bentley, so the main risk is paying too much for what's, essentially, a Chrysler.
- Extending the concept to pressure equipment;
  - Very difficult to determine quality from an external view of the constructed vessel/boiler.
  - Inferior equipment can easily be placed into service for which its not suitable.
  - Risk is that the equipment fails prematurely, and possibly catastrophically.

Cost is Key

- Nothing wrong with saving money, that's important.
- ***If you're being promised equipment that's the same as "certified," but at significant savings, you need to take a closer look "under the hood!!!"***
- Understanding the methods manufacturers use to cut costs is critical.
  - Actions can be taken to determine in advance which substitutions/sacrifices are acceptable.
- We'll explore methods commonly used by manufacturers to reduce cost and present some real-world examples of risks and mitigation…

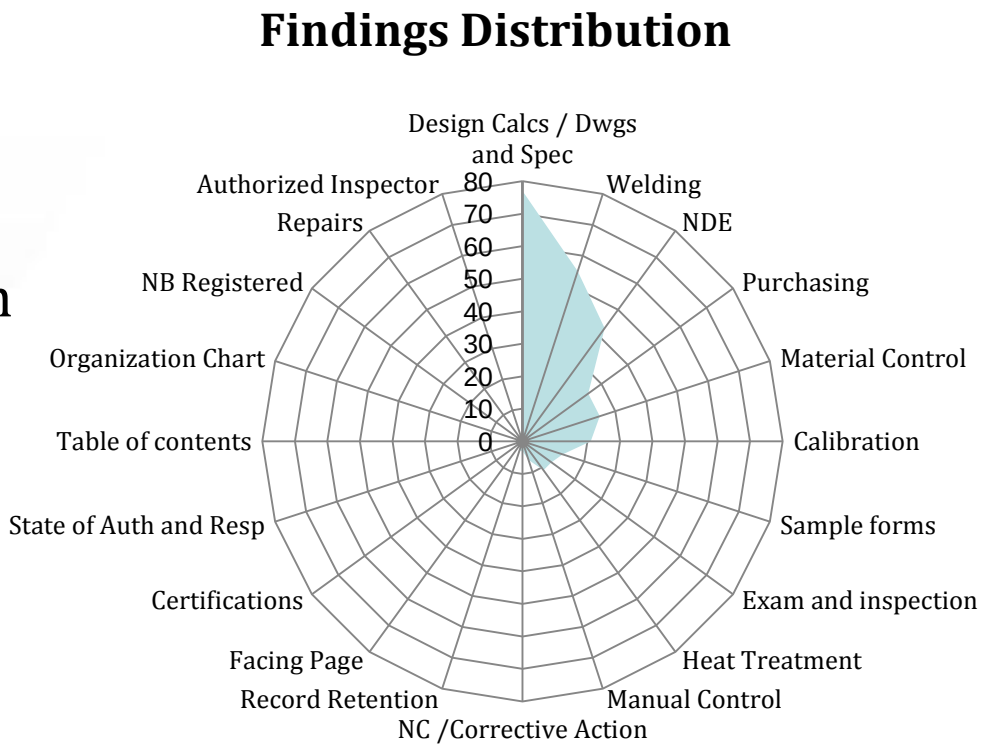
Ways for a Manufacturer to Cut Costs

Bypass expensive Code or spec rqmt's	Consequences
Use less expensive materials.	Premature failure (owing to corrosion, cracking and other failure modes for pressure equipment in service).
Reduce in-process inspections (by mfr).	Production takes short cuts, failing to meet quality program.
Don't use qualified welders/procedures and/or misapply procedures/welders.	Welding defects (often not visible through other than volumetric examination/NDE).
Fail to properly control filler materials.	Compromised properties of final weld.
Misapply NDE (methods, extent, personnel qualifications).	Unidentified defects, particularly subsurface.
DO outsource critical activities (heat treatment, forming, welding).	Reduces control/verification of critical activities.
Reduce calibration frequency.	May lead to erroneous test results (particularly for pressure tests).
Don't keep sufficient records	Complicates asset repair/maintenance/sale.
Don't use qualified third-party inspectors	Reduces inspection effectiveness/impartiality.

Resulting Quality = Less than expected

Reality – Deficiencies Happen

- Distribution of findings from Certificate Holder audits
- QC Program implementation demonstration (QC Program content findings are common too, but not represented here)
- Certificate Holder is given several months to prepare
- Highly-trained auditor.
- Scope is limited to what can be found in 1.5 days.



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Real-World Examples – Materials

- Boiler manufacturer substitutes welded pipe for seamless pipe required by construction code. Mfr's inspectors pressured by production to accept substitution.
- Risk
  - Failure in service (lost production and/or damage to persons/property)
- Possible solutions
  - Buyer and/or third-party inspection by qualified inspectors.
  - Insist on full compliance with code of construction (including inspection requirements, if any).
  - Identify critical parts up front and ensure inspection and/or certification.

Real-World Examples – Materials/Parts

- Manufacturer convinces buyer to remove engineering requirement for certified welded parts. Welded heads received, but not certified.
- Risk
  - Welding deficiencies (were qualified procedures/personnel used?)
  - Was heat treatment required/performed?
  - How was forming performed/controlled?
  - What inspections were performed and by whom?
- Possible solutions
  - Insist on full compliance with spec.
  - Identify critical parts up front and ensure inspection and/or certification.

Real-World Examples - Welding

- Weld Inspection
  - Inspector rejects properly-qualified WPQ's (requests that welders be qualified for each welded joint vs. accepting qualified ranges)
  - Inspectors accept PQR's (while properly qualified, thickness to be welded falls outside qualified thickness range)
- Risk
  - Production delays as buyer's engineering group evaluates
  - Mfr. looks for other ways to recover cost of unnecessary extra work
- Possible solutions
  - Buyer specifies qualification requirements for weld inspector.
  - Buyer insists on demonstration of inspectors' proficiency (specific to welding standard(s) used).
  - Leverage welding qualifications mandated by applicable std's.

Real-World Examples – NCR's

- Non-conformities
  - Inspector arbitrarily rejects construction, mfr. disagrees.
  - Production halted while determination is made as to who can authorize mfr. to proceed (or not).
  - On hold as Buyer's engineering department evaluates.
- Risk
  - Delayed delivery, pressure to justify accepting deficiencies, poor quality and/or cost overruns.
- Possible solutions
  - Clearly specify acceptance criteria (leverage codes)
  - Define methods for resolving conflicts, up front.
  - Insist on mfr demonstration of NCR handling (an absence of NCR's should be a warning sign!!!!)

How to Protect Yourself

Action	Example
Define mandatory requirements up front	Certified parts/materials Acceptance Criteria
Demand that mfr identify the source of cost savings	Material/personnel substitutions Outsourcing
Help mfr reduce cost w/o sacrificing quality	Leverage best practices (monitoring, procedure/personnel reviews, etc.) Risk-based sampling vs. 100% inspection Eliminate redundant inspections
Verify mfr's activities	Second or Third-party Inspection Based on risk associated with activity
Match qualification of the inspector(s) to the activities verified	Accreditation to the standard/spec used. Demonstration of proficiency/experience
Push conformity assessment tasks to experts	Resolution of NCR's Establishing inspection points Coordination of inspection visits

Reduced Cost while Maintaining Quality

Summary

- Cost controls should be considered carefully in the context of final quality (compliance to spec./standard).
- Mfr should be asked to explain what's generating significant savings
  - Quantify
  - Demonstrate equivalency for substitutions of material, services or personnel.
- Participate to ensure cost measures are acceptable
- Verification by the buyer or qualified third-parties is key for critical processes/equipment
- ***The results you get are only as good as the effectiveness of your look under "the hood"!!!***

Take Aways

- Buyers are key to changing the current approach to use of the ASME BPV Code and NBIC.
- NBIC, in particular, can be leveraged to demonstrate added value of certification
  - Economic climate drives repair vs. replacement.
  - Construction Code is generally known, so NBIC rules can be followed to certify repairs/alterations.
  - Increases population of certified repair firms (and/or mfr's) and provides an incentive for them to meet the Codes.
- Demonstration of value (and cost reduction) should feed increased market insistence on ASME and NBIC certification.


Thanks