

“Getting it Done Right the First Time”



BOLDT.

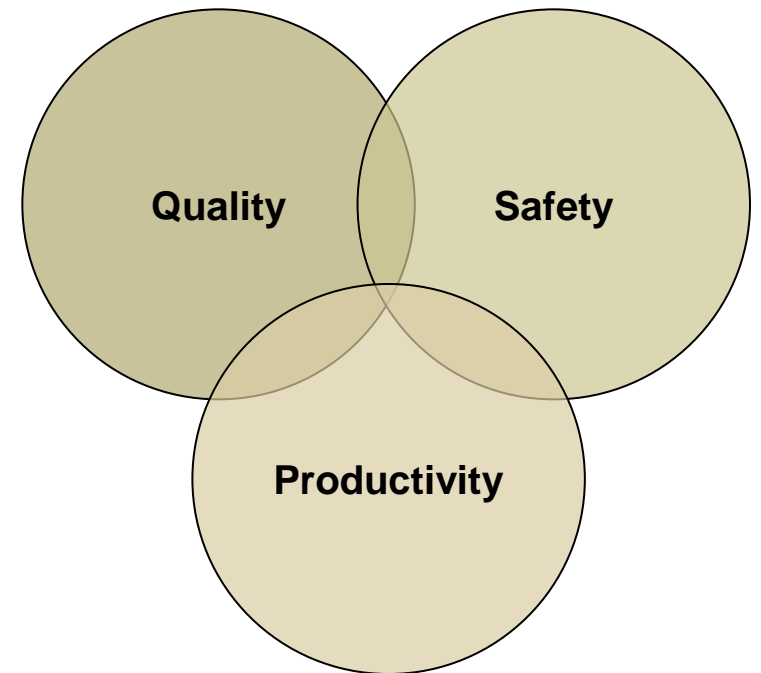
Quality In Construction

Agenda

- Boldt Risk Management is not negotiable
- Boldt's Quality Management system
 - Quality Assurance vs Quality Control
 - Built in Quality
- Main steps in the Boldt Quality Management System
- Is there extra time or cost to do this?
- Can this process work on my project?

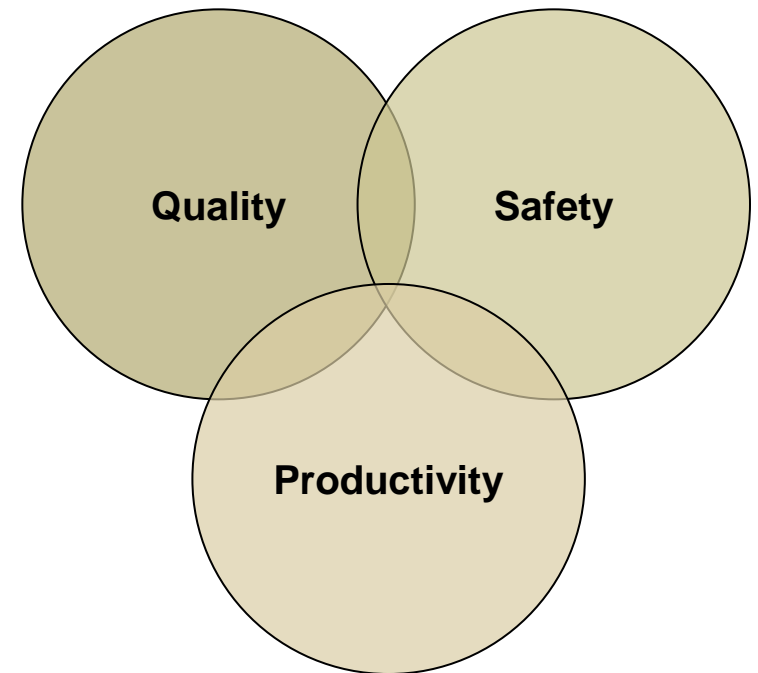
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- **Boldt Risk Management**
 - Our core competencies are not negotiable !
 - Top down expectations & accountability
 - Recession proof
 - Culture provides the foundation
 - Behaviors impact our culture



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- The quality management system:
 - Reduces chance of job site injury
 - Only perform the work once
 - Perform work with proper equipment / tools
 - Improves productivity
 - Reduces cost by reducing rework (increase job profit)
 - Improves owner relations by providing a quality product without architect field reports and punch lists



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Definitions

Quality Assurance (QA) = The continuous proactive management of the construction process, designed to reduce rework and increase productivity.

Quality Control (QC) = The review of installed products

What is the difference?

- QA is used to **manage** quality throughout construction, rather than using qc inspections at the end – when it's too late!

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- QA steps to improve quality in the construction process
 - Plan and specification review / questions
 - On site coordination planning / mock ups – enclosure & rooms
 - Creation of quality assurance requirement lists
 - On site training
 - Superintendent pre-conference with subcontractor trade foreman



Common theme = continuous communication

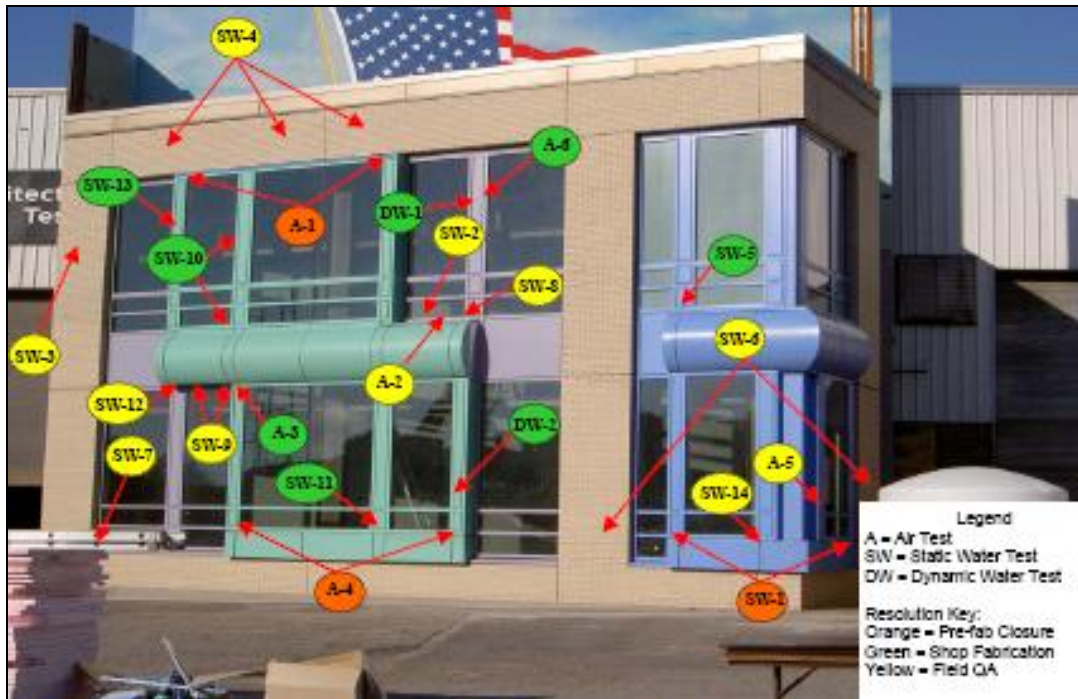
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Plan and specification review / questions

BOLDT		Specification Testing Requirements	
Job Number:		Job Name:	
Specification Review Performed by:			
Date:			
Spec Section	Page	Item #	Testing Requirements
3100- Concrete	8	3.8/D	Notify engineer after steel is installed but prior concrete
3300 - Structural concrete	10	3.4/A & B	Notify Architect/Engineer 48 hours prior to pouring & Failure to notify may result in rejection of concrete placed without observation
3300 - Structural concrete	13	3.9/D/1	Floor tolerance to be tested by independent agency - paid by owner
3300 - Structural concrete	13	3.9/D/2-4	Contractor shall test for F number within 72 hours of pour and prior form removal
3300 - Structural concrete	13	3.10/D/	Test cylinders will be taken - paid by owner
3300 - Structural concrete	13	3.10/F	No water shall be added to concrete unless approved by engineer
34500 - Precast	7	2.8/A/1-3	Take 2 sample cylinders from each batch, test one at 28 days
42000 - Masonry	12	3.12/A/1	Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement
44300 -			

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On site coordination planning / mock ups – enclosure & rooms



- Coordination planning
 - Contractors discuss sequencing / details
 - MEP's (BIM), MEP's and drywall, enclosure contractors, interior finishes
- Room mock ups
 - Hospitals, Universities etc
 - Architect & Owner Sign off
- Enclosure mock up tested at a certified testing lab (Boldt EQM)
 - Increase Life Cycle and Sustainability of Building

Over **93%** of enclosure mock ups fail their first test

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Creation of Quality Assurance requirement lists

- One page document for contractors
 - Items that are specification specific
 - Common punch list items
 - Signed off by contractor and regularly returned to CM / GC

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Quality Assurance Check Lists
Air Vapor Barrier

Company name: _____
Company Representative: _____
Date: _____
Location of Work Performed: _____

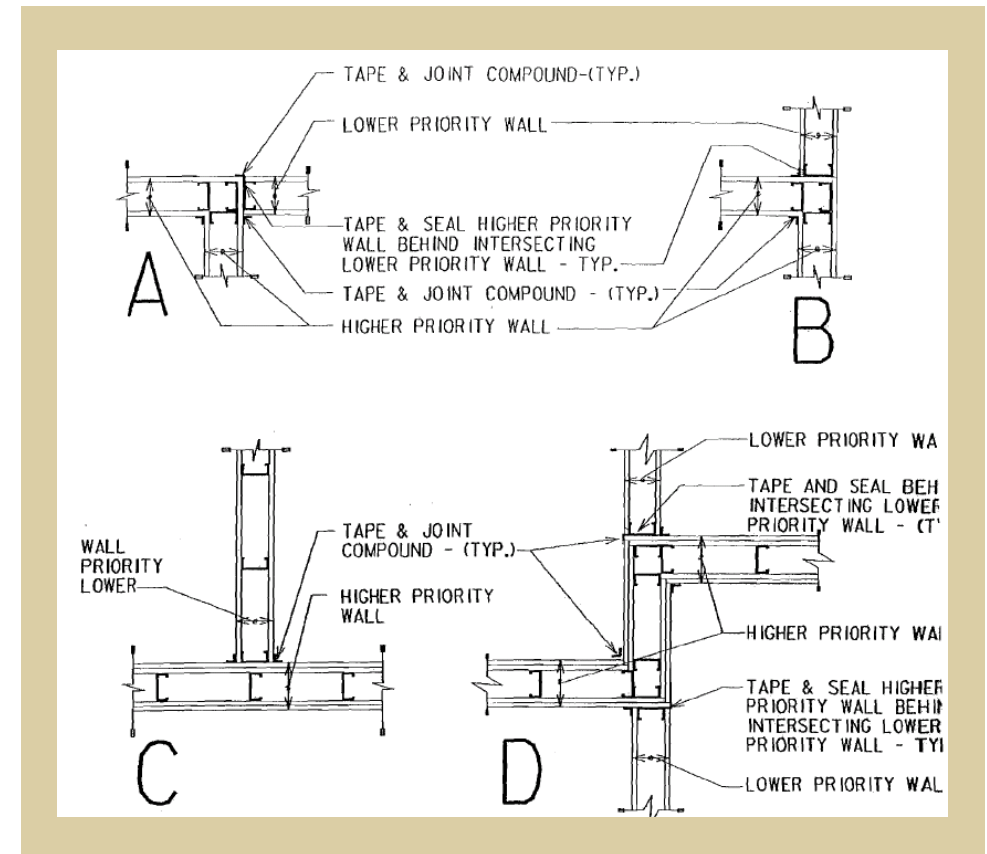
Items	Yes	No	N/A
Sheet - Has the substrate which is to receive the membrane been cleaned, dried, free of frost, and is it above the minimum temperature of 40 degrees F, If between 25 and 40 degrees F use a low temperature membrane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sheet - Avoid hollows at the corners and along wall intersections. Inside corners received a fillet bead of sealant per specifications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sheet - At the intersection of sheet membrane to fluid membrane, a transition piece of sheet membrane shall overlap the fluid membrane by 6".	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have all expansion joints been filled with sealant prior to air vapor barrier sheet membrane?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all Wall to slab edge expansion joints detailed per ABAA recommendations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has all membrane been properly rolled with no "fish mouths" able to be seen and achieve proper adhesion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is surface ready to receive air vapor barrier material - (concrete) cured long enough?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have all surfaces to receive primer have the appropriate amount of primer installed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has the proper wet film been applied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have all shelf angles been completely sealed to on all sides including underneath?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has all Board insulation been properly adhered to substrate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have all gaps and board to board joints been filled with SPF to ensure continuity of insulation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has daily clean up taken place and all scraps picked up?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Area Ready for next Contractor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

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On Site Training

- Training and discussing of job expectations
 - Fire rated wall assemblies (drywall)
 - Fire stop installation
 - Site training by manufacturer
 - Air vapor barrier installation
 - Site training/review by manufacturer



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Superintendent pre-conference with subcontractor trade foreman

- Discuss expectations
 - Specifications
 - Inspections
 - Testing requirements
 - Job rules (Safety, QA Program)



*Communication is **KEY!***

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- Main Steps in QC process
 - Subcontractor's on-going sign off of quality assurance requirements list
 - Team or sheet sign off for in-wall, above ceiling, and enclosure inspections
 - Boldt field report inspections
 - Tracking and responding to architect, engineer, and third party inspections



QC = The review of installed products

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Tracking and Responding to Architect, Engineer, and Third Party Inspections

- Boldt project website software allows for:
 - Instant communication of RFI's and deficient items
 - Contractors to sign off completed items on line
 - Originator of items to verify items complete on line using tablet PC
 - Owners and project team to be able to instantly view status of any deficient items

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- **Time & Cost**

- Cost of incorrect work, and having it presented to owner
- Project managers and superintendents should be doing *some* of these procedures already
- Bid documents
 - How much do you include for rework, including management time for subcontractors
- Doc-it more efficient than excel
- \$100 million dollar company
 - 1% rework = \$1 million lost annually



- **Will This Work On My Job?**

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Why a Quality Program is important



\$650,000 settlement in Madison school mold case

April 23, 2006

MADISON - Thirty-five students and teachers from a Madison school that had to be ripped open and reconstructed to get rid of mold have agreed on a \$650,000 settlement from the builder, attorneys say.

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BOLD THINKING



Brian Stroik
The Boldt Company
brian.stroik@boldt.com