

EMBEDDED WATERSTOP

Recent Changes in Wisconsin
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PROBLEMS!!

Changes to the NRCS 313 Standard

Waste Storage Facility



Concrete with waterstop – **all joints shall have embedded non-metallic waterstop** in accordance with WI FOTG Construction Specification 4, Concrete (Spec. 4).



Non-Fixed Joints

An embedded waterstop shall be installed at the wall to footing intersection if the joint is designed for movement.



Fixed Joints

Either a hydrophilic sealant, or embedded non-metallic waterstop shall be installed at this joint if it is not designed for movement (fixed).



Waterstop Joint Plan (now required):

- Location of joints
- Cross-section details of joint(s)
- Waterstop materials
- Factory fabricated corners, intersections, and transitions
- Installation specifications
- Quality assurance plan



Construction Quality Assurance:

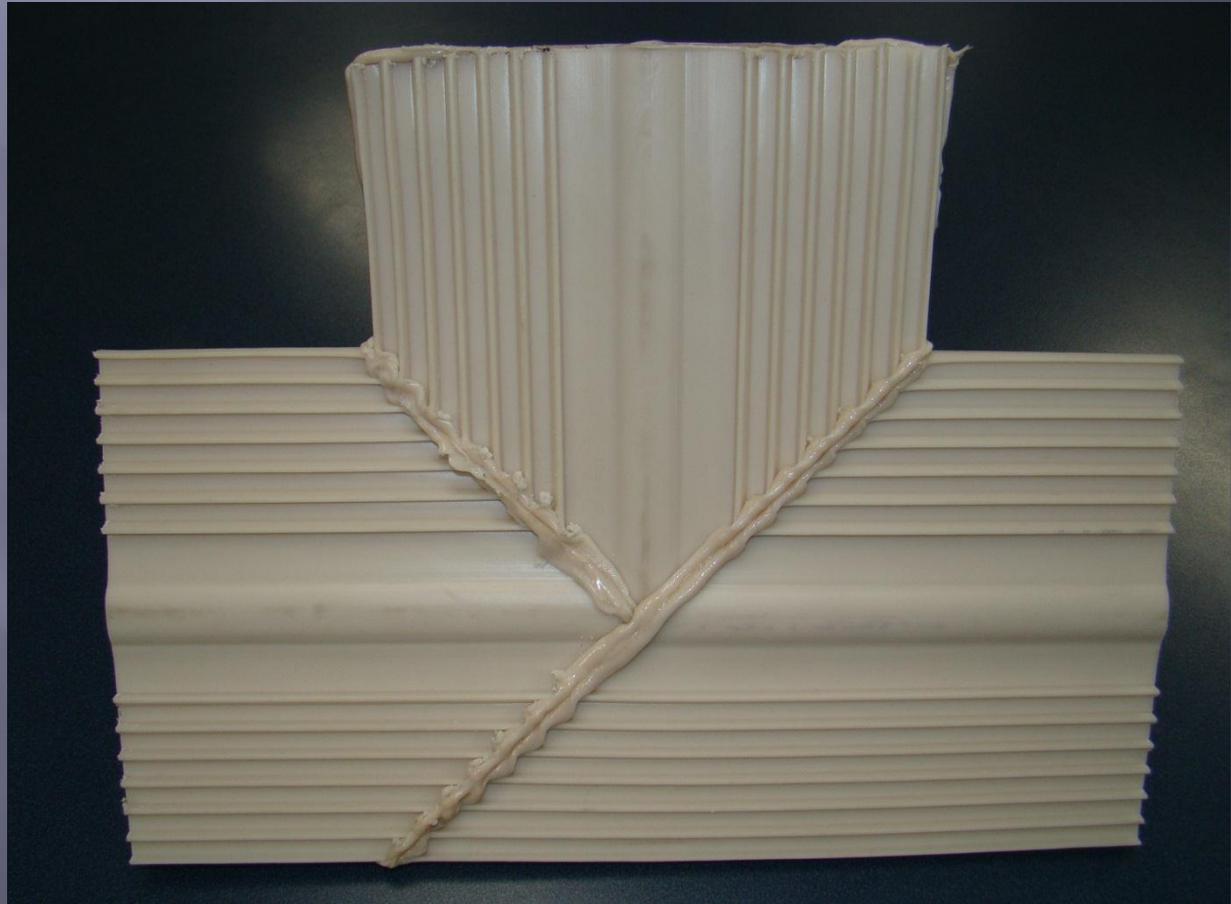
- Formwork
- Waterstop placement
- Waterstop welding
- Continuous Inspection during placement of concrete



A concrete mix in accordance with WI
FOTG Spec. 4 shall be used

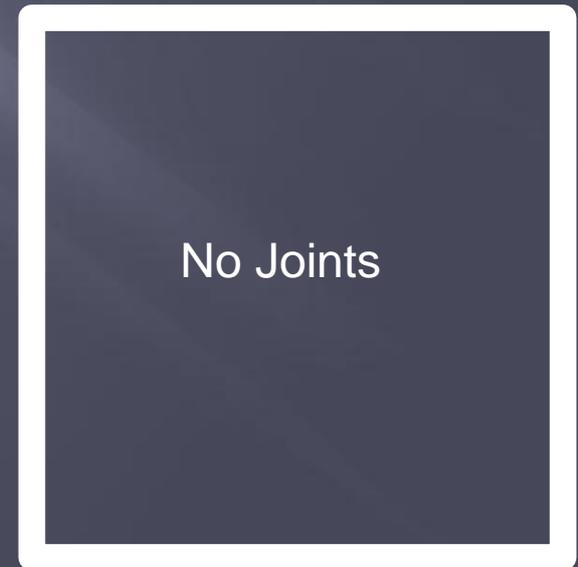
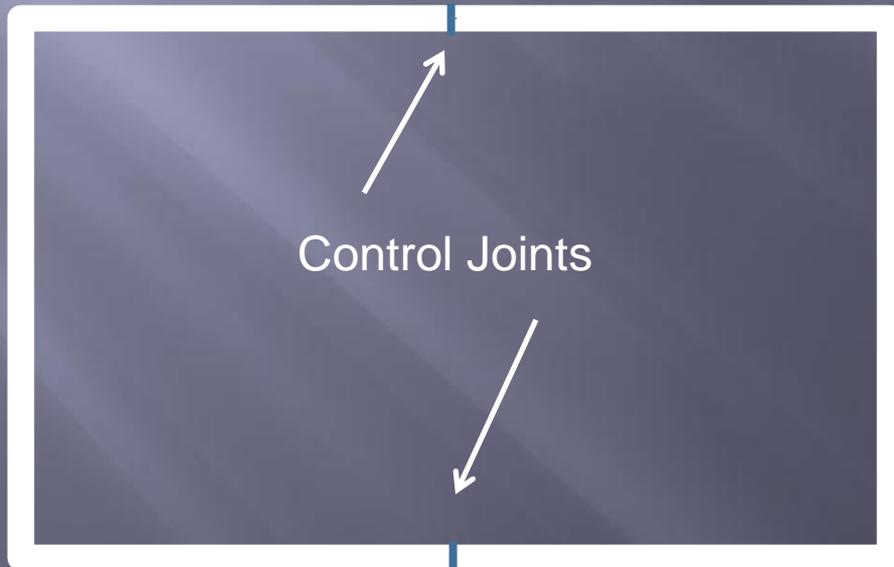


If there is a non-metallic embedded waterstop between the footing and the bottom of the wall, the wall joint waterstop shall be welded to a factory fabricated intersection at the base of the wall.



Cast-in-place vertical walls shall have one control joint with waterstop every 100 feet with a minimum of two control joints per structure.

Wall control joints are not required in structures with less than 100 feet of wall.



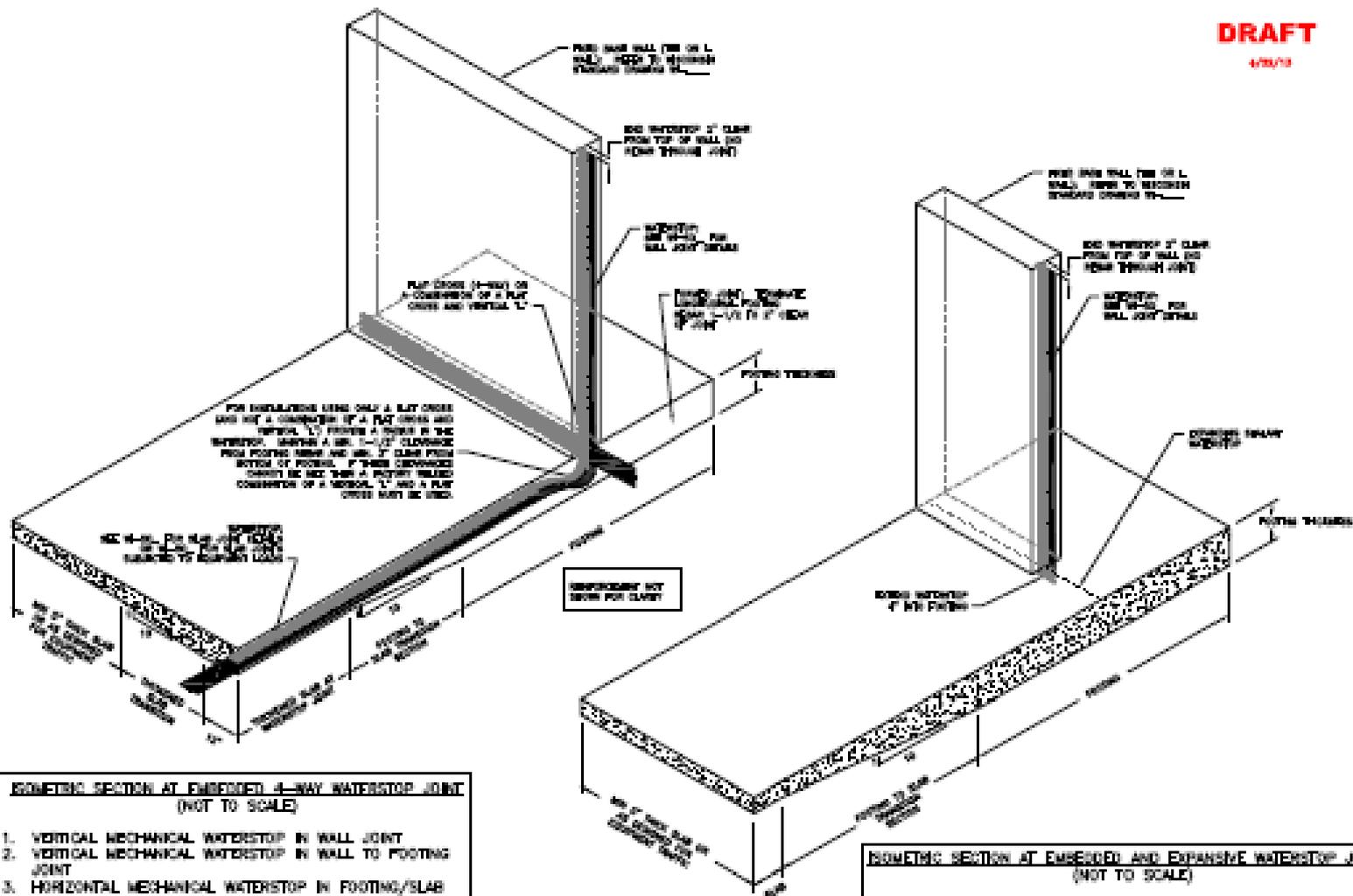
Floor Joints – Floor joints in vertical walled structures, if used, shall extend through the footing and continue to the top of the vertical wall.



DRAFT

4/28/18

Design	_____
Draw	_____
Check	_____
Approve	_____



ISOMETRIC SECTION AT EMBEDDED 4-WAY WATERSTOP JOINT (NOT TO SCALE)

1. VERTICAL MECHANICAL WATERSTOP IN WALL JOINT
2. VERTICAL MECHANICAL WATERSTOP IN WALL TO FOOTING JOINT
3. HORIZONTAL MECHANICAL WATERSTOP IN FOOTING/SLAB

ISOMETRIC SECTION AT EMBEDDED AND EXPANSIVE WATERSTOP JOINT (NOT TO SCALE)

1. VERTICAL MECHANICAL WATERSTOP IN WALL JOINT
2. EXPANDING (HYDROPHILIC) WATERSTOP IN WALL TO FOOTING JOINT
3. FOOTING/SLAB CONTINUOUS WITHOUT WATERSTOP

FIGURE 6

ISOMETRIC VIEW - TEE WALL WATERSTOP OPTIONS



Project Name	_____
Date	_____
Scale	_____
Sheet # of _____	_____

Changes to Construction Spec. 4

Concrete

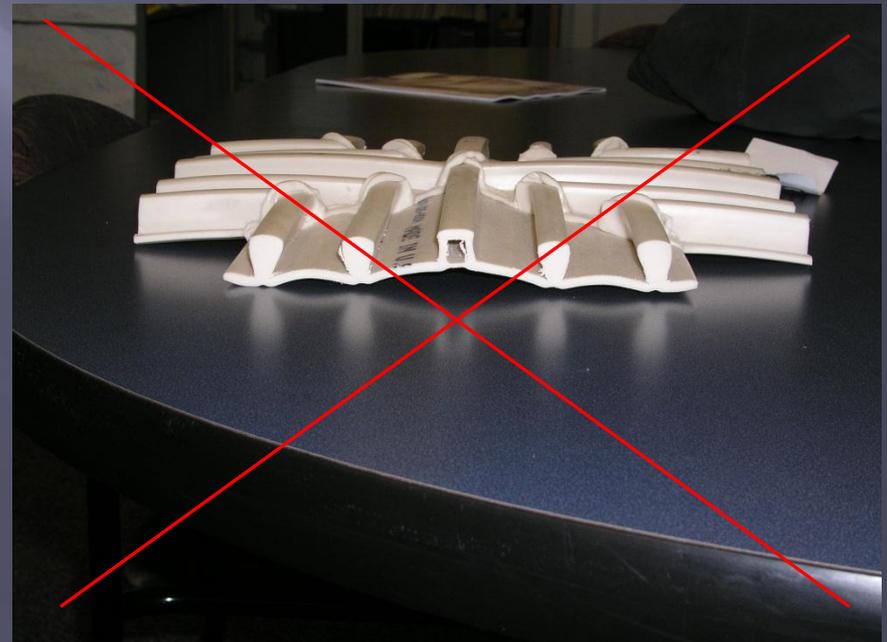


MATERIALS:

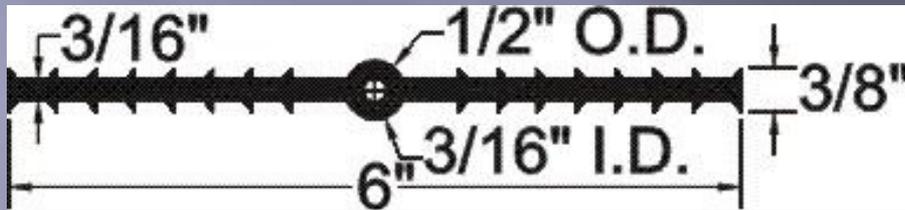
- PVC (vinyl chloride polymer or copolymer)
- Rubber (natural or synthetic)
- Minimum width of 6 inches
- Web thickness shall be a minimum of 3/16 inches



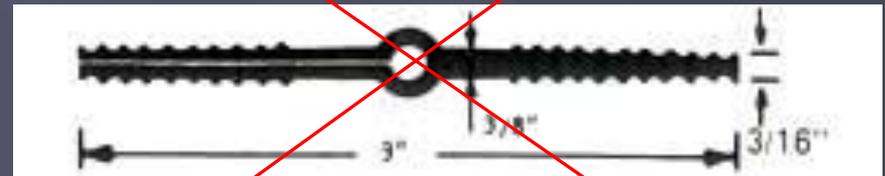
Waterstops shall be the type intended for placement entirely within the concrete cross section



Waterstops shall have ribbed or bulb-type anchor flanges and a hollow tubular center bulb.



Split flange waterstops are prohibited.



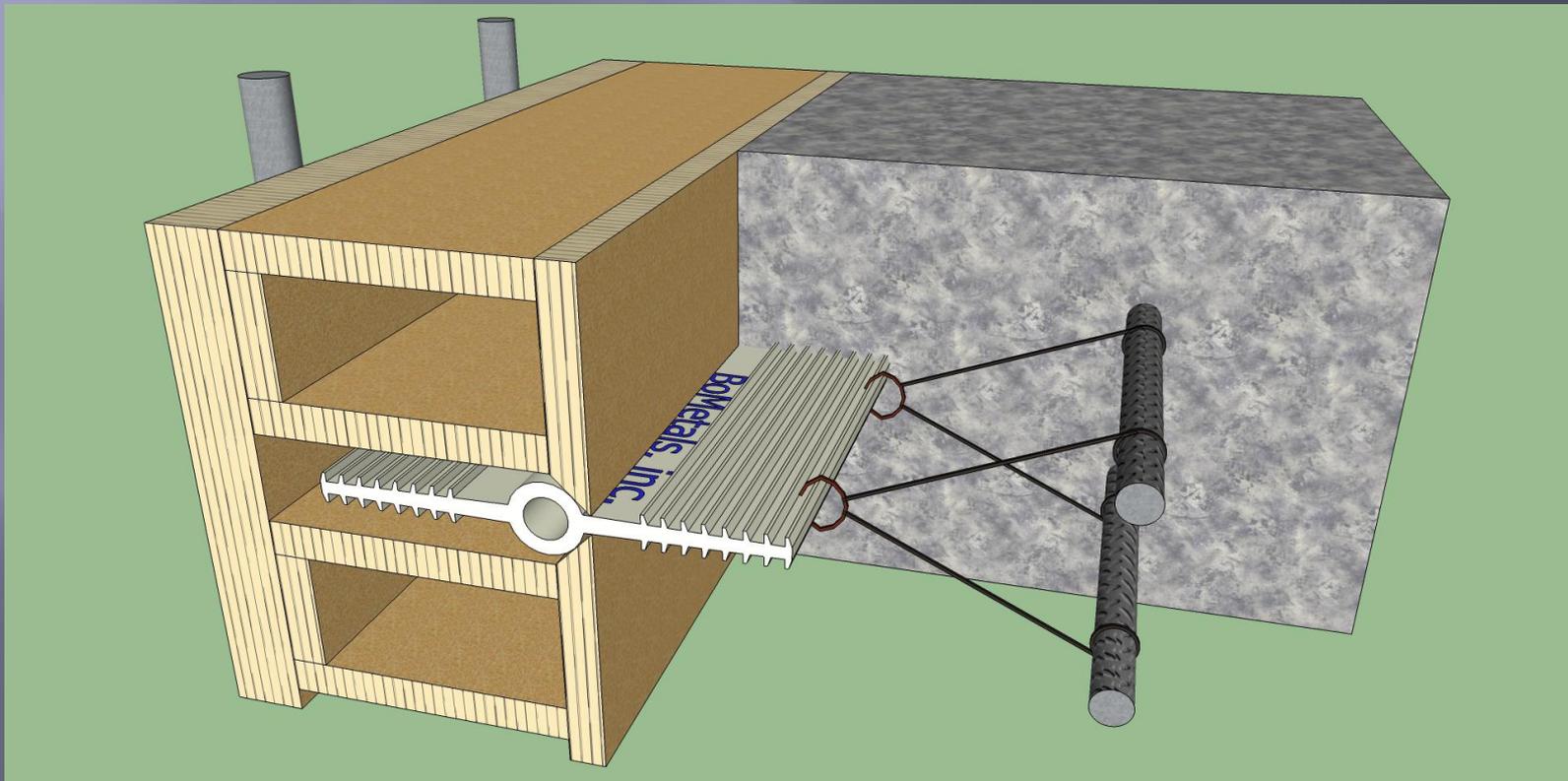
Waterstops shall be:

- Located as shown on the drawings
- Secured in position so that displacement does not occur during concrete placement
- Placed and secured with the hollow bulb aligned in the center of the planned joint



Waterstops may be:

Secured to reinforcement using wire or “hog ring” type fasteners at the outermost rib



Factory-Installed Attachments



Manufacturers' fabricated waterstop intersections shall be provided

Only straight butt joint splices are allowed for field fabrication





Good Joint

Bad Joint



Manufacturer-certified contractors may fabricate waterstop intersections in a controlled environment and with proper manufacturers' equipment.

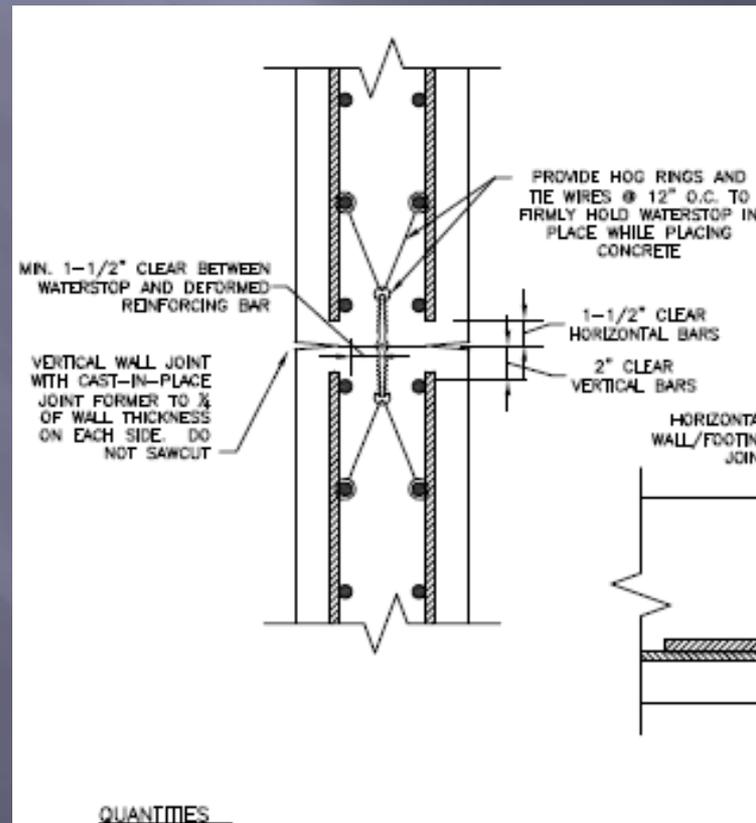


Prior to the time of delivery of the fabricated intersections, documentation of certification must be presented to the technician.

Waterstop shall not be placed horizontally across sloped slabs.



Continuous placement of concrete through a waterstop joint is not allowed...
except for control joints in formed walls where preformed joint control formers are used.



No wet-setting of waterstop is ever allowed!



Internal vibration is required along the entire length of all joints that contain waterstop for both formed surfaces and slabs.

Side Note: Spec. 4 now requires a maximum w/c ratio of 0.45 (5" slump, or 8" slump with superplasticizers)



Embedded Waterstop

Do's

&

Don'ts

- Follow the joint plan
- Support waterstop securely
- Watch your clearances
- Use only certified fittings
- Use irons to make butt welds
- Give 24 hrs. notice before pours
- Vibrate, vibrate, vibrate!
- Use care when stripping forms
- Allow minimum curing times (for hydrophilic caulks)
- Communicate!
- Make unauthorized changes
- Wet-set waterstop
- Tie waterstop tight against rebar
- Nail through waterstop (except edge)
- Use a torch to make butt welds
- Pour without an inspector on site
- Skip vibrating
- Rip forms off carelessly
- Cut short proper curing times (for hydrophilic caulks)
- Make Assumptions!