

Joint Restraints versus Thrust Blocks for System Fortification

When considering an irrigation design and a budget to match, one of the items that always comes under fire is whether to use joint restraints or thrust blocks. On the surface, a joint restraint system appears to be a premium – especially if your focus is material cost. However, if one takes the time to survey site soils and contractor installation capabilities, material costs become a smaller part of the installation price.

Let's view it from a different perspective. Contractors generally look at the total cost of installation, not just the price of material to perform their installation. With a thrust block system, items that *won't* show up on a BOM (Bill of Material) are usually the incidentals – like concrete and the labor needed to install the thrust block. Those costs can vary significantly.

Remember, when truly considering the total cost of installation, the aforementioned "premium" for a joint restraint system in some cases isn't as costly as it seems. Less time and labor might be required for an effective installation that's immediately testable and operational.

When working through your irrigation design budget, ensure that you've gathered sufficient site information and investigated the marketplace to make sound fiscal decisions. Moreover, when making the specific decision of a joint restraint or a thrust block system consider the following:

Thrust Block Cons:

- A properly designed thrust block involves much more than dumping a load of concrete behind a bend. The design involves consideration of undisturbed soil, soil-bearing strength, test pressure, pipe size, fitting configuration and trench depth to determine the actual bearing area of the thrust block.
- The bearing strength of the soil is expressed in pounds-per-square-foot. Therefore, the area behind the thrust block must engage enough soil area to resist the resultant thrust force at a particular change in direction.
- Tremendous thrust forces are involved: 27,000 pounds of force can be exerted by some fittings at 150 psi. Such forces and more created by pressure surges could potentially move a thrust block, even in hard soils.
- Thrust blocks, which are typically dimensioned or engineered on a plan, are difficult to quantify during inspection in accordance with the plan due to various conditions that apply to every thrust block required.

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Joint restraints may cost more on paper but can be buried and tested immediately after installation without having to wait for any concrete to cure.

Joint Restraint Pros

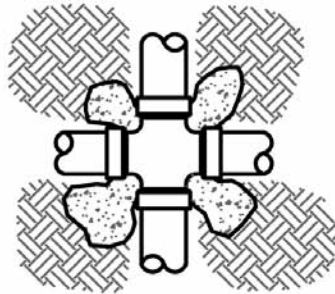
- A properly designed, restrained pipeline uses the bearing strength and frictional resistance of the soil to turn the pipeline into a thrust block.
- Parameters are pipe size, pipe type, test pressure, fitting type, trench type, depth of bury, soil type and safety factors.
- The use of joint restraints allows the pipeline to be restrained, buried and tested without waiting for concrete to cure. This eliminates the need to leave trenches open for extended periods of time. The water can be turned on as soon as the restraint is set.
- Joint restraints have been used successfully for more than 25 years in water works, municipality and utility systems.

The force of water accelerating through irrigation piping can take its toll on an irrigation system. Even at controlled velocities, surge pressures pounding against fittings day-in and day-out can destroy faulty fortification and quickly or, over time, render your system unreliable at best.

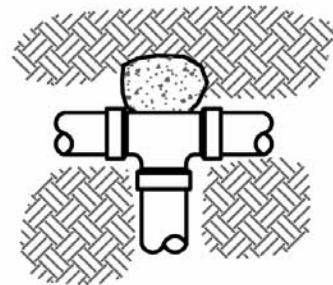
The two most common problems with every irrigation system installation are related to pipe fittings and wire splices. When considering thrust block versus joint restraint within your particular budget, be aware that, on average, joint restraints are going to cost 5 percent more in materials than thrust blocks. But weigh-in the total cost of installation and the potential for error before you decide whether or not it's really worth value engineering the joint restraints. **-OC**



ELL



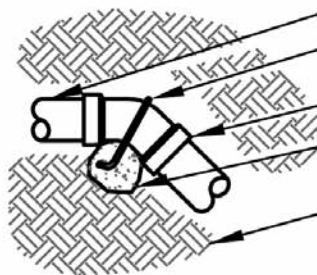
CROSS



TEE



45° ELL



45° ELL

- PIPE (TYPICAL)
- REBAR BENT AROUND FITTING (TYPICAL)
- FITTING (TYPICAL)
- CONCRETE THRUST BLOCK (TYPICAL)
- UNDISTURBED SOIL (TYPICAL)



WYE

NOTES:

ALL MAINLINE AND LATERAL CHANGE OF DIRECTION THAT ARE TRENCHED OR OPENED SHALL RECEIVE THRUST BLOCKING OR JOINT RESTRAINTS. - SEE THRUST BLOCKING TABLE FOR BEARING STRENGTH. FURTHERMORE ANY SOILS NOT STABLE FOR ADEQUATE THRUST BLOCKING, SAID FITTINGS MUST UTILIZE JOINT RESTRAINTS AT NO ADDITIONAL COST TO OWNER. IT IS ULTIMATELY THE CONTRACTORS RESPONSIBILITY TO INSTALL THE APPROPRIATE APPLICATION TO ENSURE THAT THE FITTING OR VALVE DOES NOT MOVE FROM A OUTWARD DEFLECTION.

THRUST BLOCK

SCALE: NOT TO SCALE

A properly installed thrust block must take into account the soil type, soil-bearing strength, pipe size, test pressure, trench depth and as outlined in the drawing, the fitting configuration.